

Annual Groundwater Monitoring Report

Southwestern Electric Power Company
H. W. Pirkey Power Plant
FGD Stackout Area CCR Management Unit
Hallsville, Texas

January 31, 2022

Prepared by:
American Electric Power Service Corporation
1 Riverside Plaza
Columbus, Ohio 43215



An **AEP** Company

BOUNDLESS ENERGY™

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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. Summary

This *Annual Groundwater Monitoring Report* (Report) has been prepared to report the status of activities for the preceding year at the FGD Stackout Area (FGDSA) Coal Combustion Residual (CCR) unit at Pirkey Power Plant. Southwestern Electric Power Company is wholly-owned subsidiary of American Electric Power Company (AEP). The Texas Commission on Environmental Quality's (TCEQ's) CCR 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 FGDSA was operating under the Assessment monitoring program.
- At the end of the current annual reporting period, the FGDSA was operating under the Assessment monitoring program.
- The FGDSA initiated an assessment monitoring program on April 3, 2018.
- Groundwater samples were collected for AD-7, AD-12, AD-13, AD-22, and AD-33 in March, May, and November 2021 analyzed for 30 TAC §352 Appendix III and Appendix IV constituents, as specified in 30 TAC §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-22
- Beryllium at AD-22

The following Appendix III parameters exceeded background:

- Boron at AD-33 and AD-7
- Chloride at AD-22
- Sulfate at AD-22
- An ASD for the 2nd semi-annual 2020 potential SSLs cobalt and beryllium 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-22
- Beryllium at AD-22

The following Appendix III parameters exceeded background:

- Boron at AD-7 and AD-33
 - Chloride at AD-22
 - Sulfate at AD-22
 - Fluoride at AD-22
- An ASD for 1st semi-annual 2021 potential SSLs for cobalt and beryllium 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, FGDSA 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);

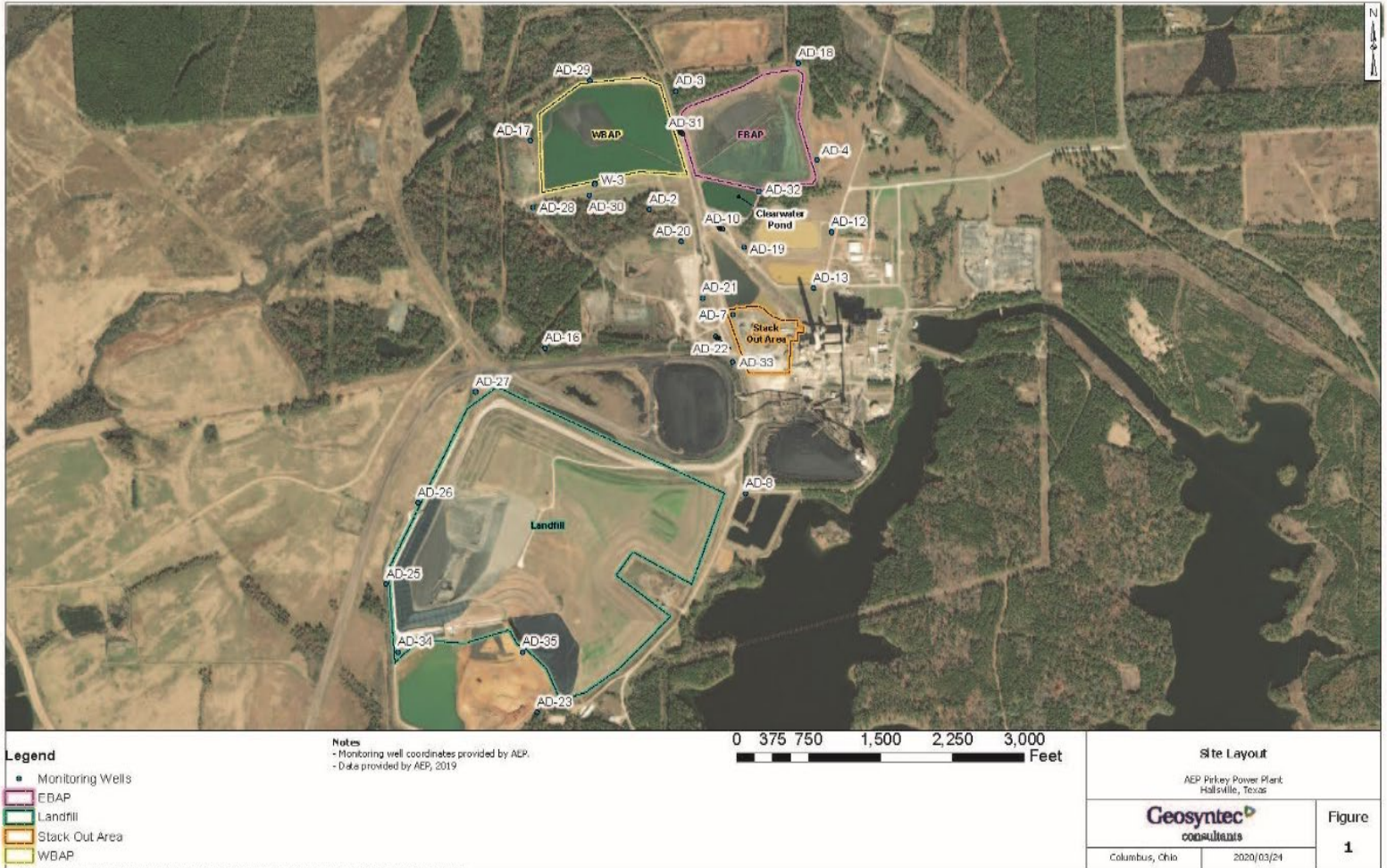
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened;
- Other information required to be included in the annual report such as field sheets, analytical reports, etc. (**Appendix 4 and 5**)

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.

FGD Stackout Area Monitoring Wells	
Upgradient	Downgradient
AD-12	AD-7
AD-13	AD-22
	AD-33



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 FGDSA, 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-22
- Beryllium at AD-22

The following Appendix III parameters exceeded background:

- Boron at AD-33 and AD-7
- Chloride at AD-22
- Sulfate at AD-22

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

The following Appendix IV parameters exceeded established groundwater protection standards:

- Cobalt at AD-22
- Beryllium at AD-22

The following Appendix III parameters exceeded background:

- Boron at AD-7 and AD-33
- Chloride at AD-22

- Sulfate at AD-22
- Fluoride at AD-22

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, FGDSA remained in Assessment Monitoring.

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

The FGDSA 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 FGDSA, 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 30 TAC §352 Appendix III and IV parameters was completed in 2021.

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).

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.

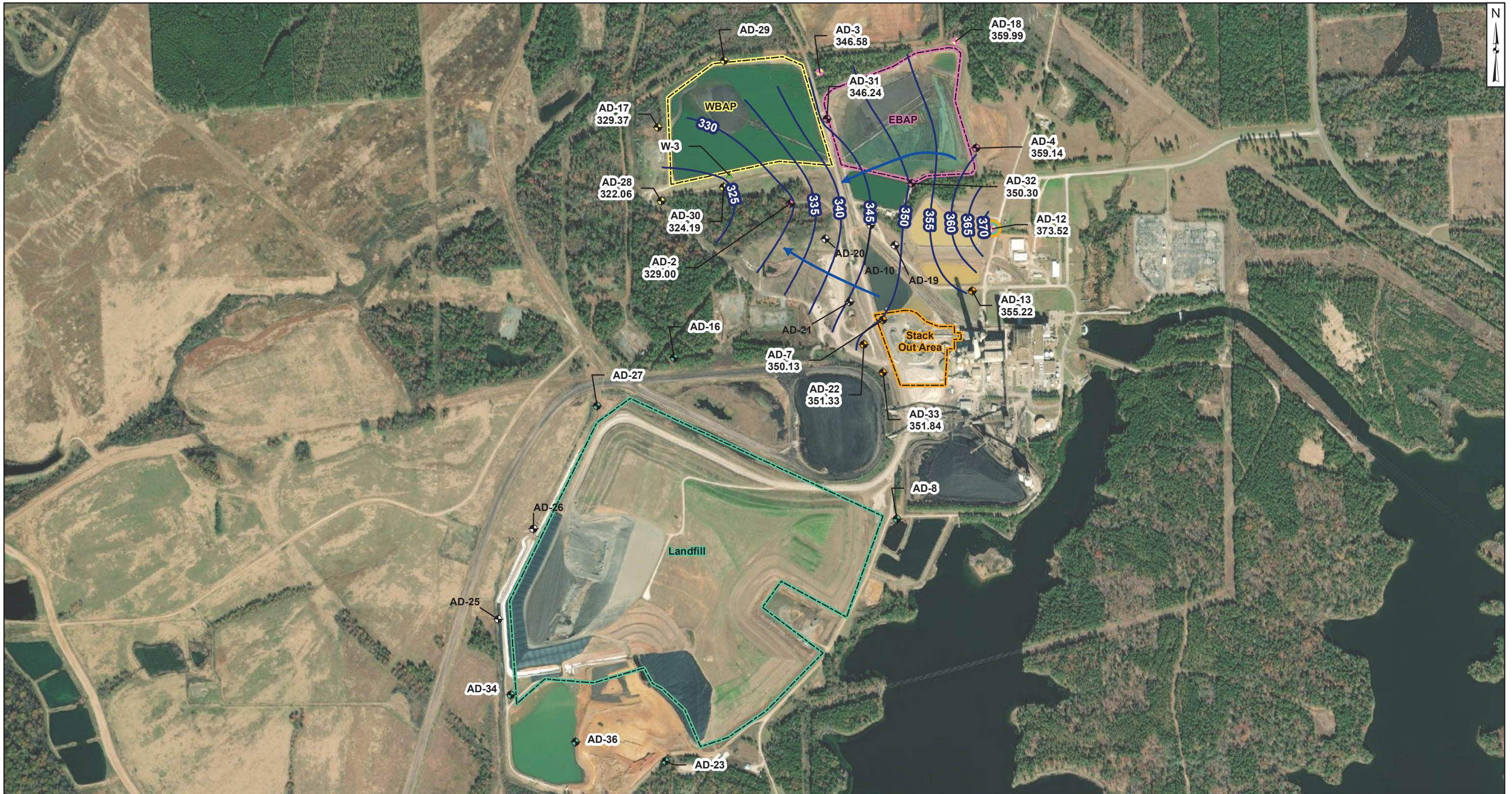
X. A Projection of Key Activities for the Upcoming Year

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 30 TAC §352 Appendix III and IV as required by 30 TAC §352.951.
- Perform statistical analysis on the sampling results for the 30 TAC §352 Appendix III and Appendix IV parameters as required by 30 TAC §352.951.
- Determine applicable GWPSs for the 30 TAC §352 Appendix IV parameters, and compare the calculated confidence limits for the Appendix IV constituents to the GWPSs.
- If no GWPSs are exceeded, the FGDSA will remain in assessment monitoring
- Responding to any new data received in light of TCEQ 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.



- 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

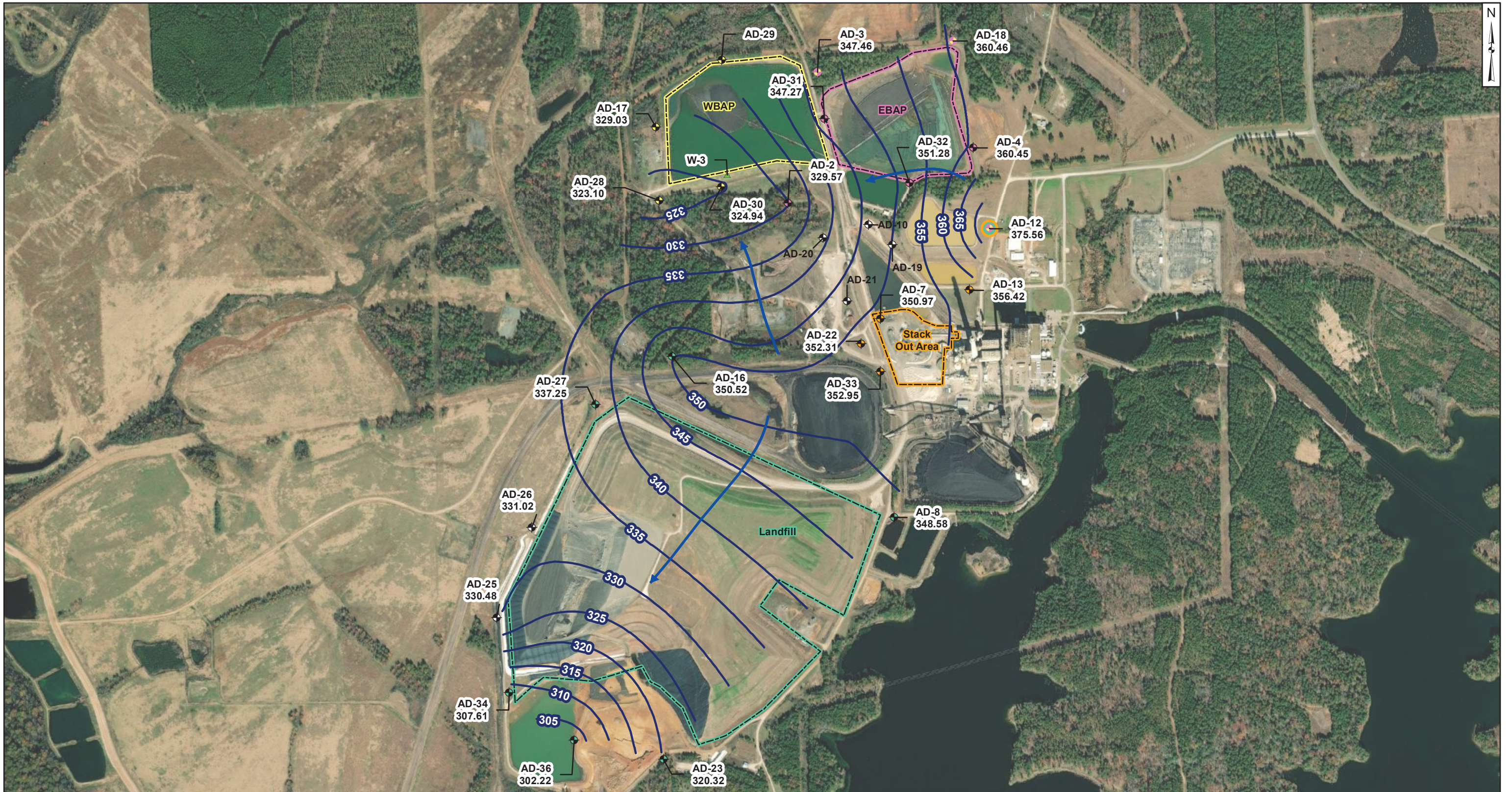
- Monitoring well coordinates and water level data (collected on March 9, 2021) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluations (Arcadis, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- East and 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	

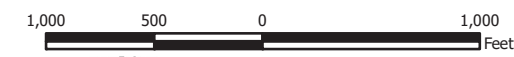


Legend

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

Notes

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



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

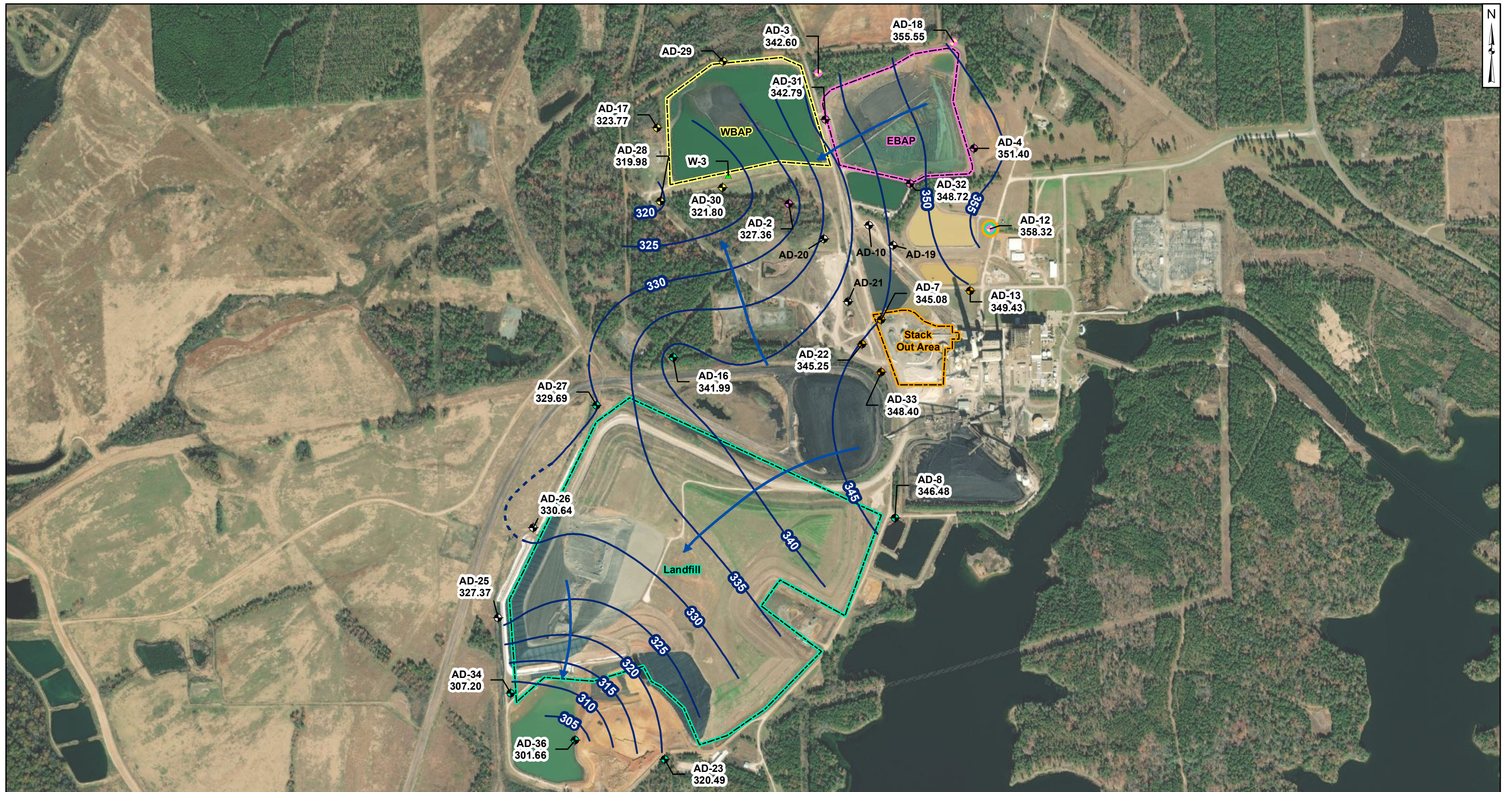
Geosyntec
 consultants

Figure

2

Columbus, Ohio

2021/08/18



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

**Table 1: Residence Time Calculation Summary
Pirkey Plant - Stackout Area**

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)
Stack Out Area	AD-7 ^[2]	4.0	13.9	8.7	8.0	15.2	10.5	11.6
	AD-12 ^[1]	4.0	22.9	5.3	40.6	3.0	19.3	6.3
	AD-13 ^[1]	4.0	7.6	15.9	6.0	20.3	6.0	20.3
	AD-22 ^[2]	2.0	20.4	3.0	15.6	3.9	11.2	5.4
	AD-33 ^[2]	2.0	8.4	7.2	6.7	9.1	11.0	5.5

Notes:

[1] - Background Well

[2] - Downgradient Well

**Table 1 - Groundwater Data Summary: AD-7
Pirkey - Stackout
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	2.39	6.58	28	0.6493 J1	4.0	92	302
7/13/2016	Background	0.716	2.97	16	< 0.083 U1	3.6	40	204
9/7/2016	Background	0.978	3.15	18	< 0.083 U1	4.1	42	208
10/13/2016	Background	0.67	2.81	17	< 0.083 U1	3.8	38	212
11/14/2016	Background	0.682	2.63	16	< 0.083 U1	4.0	38	216
1/11/2017	Background	1.39	3.92	19	< 0.083 U1	3.5	46	204
2/28/2017	Background	1.51	4.78	20	< 0.083 U1	3.7	46	240
4/10/2017	Background	3.24	5.06	28	0.4117 J1	3.6	65	322
8/24/2017	Detection	0.943	2.99	18	2.994	3.7	51	176
12/21/2017	Detection	0.718	3.26	19	< 0.083 U1	--	39	176
3/21/2018	Assessment	2.47	5.37	20	< 0.083 U1	3.6	90	266
8/20/2018	Assessment	1.36	3.76	33	< 0.083 U1	4.3	54	180
2/27/2019	Assessment	2.10	5.20	29.9	0.50	2.9	69.1	268
5/22/2019	Assessment	0.195	5.77	28.0	0.58	3.4	91.6	334
8/12/2019	Assessment	3.54	4.20	36.7	0.30	4.0	59.6	266
3/10/2020	Assessment	1.99	4.86	28.7	0.57	3.5	88.5	254
6/2/2020	Assessment	1.93	4.98	29.1	0.58	3.3	74.4	303
11/3/2020	Assessment	4.19	4.10	38.2	0.27	3.3	60.2	236
3/9/2021	Assessment	2.12	4.54	29.3	0.55	3.6	71.5	283
5/25/2021	Assessment	1.84	4.4	28.4	0.54	3.2	64.6	250
11/16/2021	Assessment	2.24	4.56	33.6	0.44	3.1	62.6	260

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-7

Pirkey - Stackout

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	1.38216 J1	37	8	0.87394 J1	0.766043 J1	52	4.344	0.6493 J1	< 0.68 U1	0.044	0.309	< 0.29 U1	1.04661 J1	< 0.86 U1
7/13/2016	Background	< 0.93 U1	1.18444 J1	50	3	0.66774 J1	1	24	0.942	< 0.083 U1	< 0.68 U1	0.099	0.261	< 0.29 U1	< 0.99 U1	1.03212 J1
9/7/2016	Background	< 0.93 U1	< 1.05 U1	50	4	0.730872 J1	0.316008 J1	27	3.132	< 0.083 U1	< 0.68 U1	0.099	0.059	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/13/2016	Background	< 0.93 U1	1.08028 J1	61	4	0.858417 J1	1	23	3.81	< 0.083 U1	< 0.68 U1	0.101	0.154	< 0.29 U1	< 0.99 U1	< 0.86 U1
11/14/2016	Background	< 0.93 U1	< 1.05 U1	60	4	1	< 0.23 U1	22	3.538	< 0.083 U1	< 0.68 U1	0.099	0.039	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/11/2017	Background	< 0.93 U1	< 1.05 U1	58	5	0.756968 J1	< 0.23 U1	31	3.77	< 0.083 U1	< 0.68 U1	0.101	0.02275 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/28/2017	Background	< 0.93 U1	< 1.05 U1	53	5	0.838869 J1	< 0.23 U1	34	3.92	< 0.083 U1	< 0.68 U1	0.101	0.185	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/10/2017	Background	< 0.93 U1	< 1.05 U1	51	7	0.723565 J1	0.295188 J1	44	4.35	0.4117 J1	< 0.68 U1	0.111	0.191	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/21/2018	Assessment	< 0.93 U1	< 1.05 U1	40.31	6.81	0.82 J1	< 0.23 U1	45.34	3.99	< 0.083 U1	< 0.68 U1	0.108	0.117	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/20/2018	Assessment	0.01 J1	0.47	51.6	2.07	0.68	0.075	25.6	0.787	< 0.083 U1	0.362	0.0877	0.006 J1	< 0.02 U1	1.0	0.179
2/27/2019	Assessment	< 0.4 U1	2.12	42.9	7.01	0.73	0.225	41.0	4.75	0.50	1 J1	0.106	0.201	< 0.4 U1	7.1	< 2 U1
5/22/2019	Assessment	< 0.4 U1	2 J1	37.8	6.47	0.6 J1	< 0.8 U1	46.0	4.72	0.58	0.8 J1	0.0975	0.26	< 8 U1	3 J1	< 0.1 U1
8/12/2019	Assessment	< 0.02 U1	0.64	41.9	3.24	0.75	0.1 J1	29.7	3.278	0.30	0.529	0.102	0.09	< 0.4 U1	1.7	0.2 J1
3/10/2020	Assessment	< 0.02 U1	1.54	31.0	5.29	0.72	0.212	42.1	5.283	0.57	0.943	0.0781	0.179	< 0.4 U1	5.5	0.2 J1
6/2/2020	Assessment	< 0.02 U1	1.29	38.9	5.14	0.69	0.241	39.6	4.1	0.58	0.876	0.0720	0.349	< 0.4 U1	5.0	0.2 J1
11/3/2020	Assessment	< 0.02 U1	0.61	47.9	2.97	0.78	0.236	31.5	2.957	0.27	0.783	0.0752	0.085	< 0.4 U1	2.1	0.2 J1
3/9/2021	Assessment	< 0.02 U1	1.32	44.1	4.80	0.65	0.402	37.5	3.099	0.55	0.997	0.0684	0.341	< 0.1 U1	4.9	0.2 J1
5/25/2021	Assessment	< 0.02 U1	0.82	36.1	4.11	0.642	0.40	36.1	3.3	0.54	0.92	0.0634	0.300 J1	0.1 J1	2.91	0.23
11/16/2021	Assessment	< 0.02 U1	1.05	37.3	4.86	0.734	0.37	38.3	5.59	0.44	0.80	0.0760	0.480	< 0.1 U1	3.47	0.26

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 - Stackout
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 - Stackout
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-13

**Pirkey - Stackout
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	0.06	8.77	28	0.748 J1	5.6	52	236
7/13/2016	Background	0.06	9.08	32	0.3474 J1	5.6	59	192
9/7/2016	Background	0.05	8.48	23	< 0.083 U1	5.2	41	228
10/13/2016	Background	0.06	7.53	26	0.6297 J1	5.8	47	236
11/14/2016	Background	0.06	7.21	26	0.3114 J1	6.1	47	250
1/11/2017	Background	0.04	6.14	22	< 0.083 U1	5.8	37	188
2/28/2017	Background	0.07	7.88	28	< 0.083 U1	5.9	56	172
4/11/2017	Background	0.08	9.11	32	0.4278 J1	5.2	58	200
8/23/2017	Detection	0.07408	9.5	21	0.344 J1	6.0	38	160
3/21/2018	Assessment	0.07169	10.3	25	< 0.083 U1	5.9	48	176
8/20/2018	Assessment	0.065	8.40	39	0.0845 J1	5.9	66	210
2/27/2019	Assessment	0.08 J1	11.0	40.8	0.25	5.2	80.8	176
5/21/2019	Assessment	0.061	10.1	34.8	0.40	5.3	69.5	190
8/12/2019	Assessment	0.064	8.68	42.3	0.39	5.9	73.6	310
3/10/2020	Assessment	0.067	10.7	41.1	0.32	6.4	82.7	216
6/2/2020	Assessment	0.065	10.9	41.4	0.45	6.4	83.4	322
11/2/2020	Assessment	0.052	5.90	22.6	0.38	6.4	39.1	204
3/8/2021	Assessment	0.067	13.2	41.2	0.36	4.9	74.6	229
5/24/2021	Assessment	0.078	13.6	41.6	0.48	5.5	78.6	60
11/15/2021	Assessment	0.063	8.61	42.3	0.26	5.5	70.8	220

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-13

Pirkey - Stackout

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	4.25914 J1	38	0.586539 J1	0.293832 J1	< 0.23 U1	42	0.989	0.748 J1	< 0.68 U1	0.081	0.00969 J1	< 0.29 U1	< 0.99 U1	1.11268 J1
7/13/2016	Background	< 0.93 U1	9	44	2	0.0875208 J1	< 0.23 U1	47	2.332	0.3474 J1	< 0.68 U1	0.158	0.01928 J1	< 0.29 U1	3.63671 J1	0.928756 J1
9/7/2016	Background	< 0.93 U1	< 1.05 U1	47	0.631177 J1	0.219799 J1	< 0.23 U1	38	1.219	< 0.083 U1	< 0.68 U1	0.139	< 0.005 U1	< 0.29 U1	< 0.99 U1	1.44332 J1
10/13/2016	Background	< 0.93 U1	7	43	0.963478 J1	< 0.07 U1	< 0.23 U1	42	2.422	0.6297 J1	< 0.68 U1	0.142	< 0.005 U1	< 0.29 U1	2.59885 J1	< 0.86 U1
11/14/2016	Background	< 0.93 U1	2.07189 J1	39	0.717704 J1	0.310257 J1	< 0.23 U1	42	1.723	0.3114 J1	< 0.68 U1	0.136	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/11/2017	Background	< 0.93 U1	2.73936 J1	39	0.302907 J1	0.11238 J1	< 0.23 U1	32	1.844	< 0.083 U1	< 0.68 U1	0.133	0.00732 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/28/2017	Background	< 0.93 U1	1.64435 J1	34	0.290018 J1	< 0.07 U1	< 0.23 U1	44	1.728	< 0.083 U1	< 0.68 U1	0.153	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/11/2017	Background	< 0.93 U1	4.43115 J1	45	0.736525 J1	2	< 0.23 U1	56	1.309	0.4278 J1	< 0.68 U1	0.156	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/21/2018	Assessment	< 0.93 U1	3.23 J1	42.23	0.46 J1	0.86 J1	< 0.23 U1	39.91	2.093	< 0.083 U1	< 0.68 U1	0.145	< 0.005 U1	< 0.29 U1	3.86 J1	< 0.86 U1
8/20/2018	Assessment	0.01 J1	5.79	40.9	0.648	< 0.005 U1	0.103	48.8	1.735	0.0845 J1	0.01 J1	0.146	< 0.005 U1	< 0.02 U1	0.2	0.03 J1
2/27/2019	Assessment	< 0.4 U1	2.17	38.5	< 0.4 U1	< 0.2 U1	< 0.8 U1	48.7	0.909	0.25	< 0.4 U1	0.165	< 0.005 U1	< 8 U1	< 0.6 U1	< 2 U1
5/21/2019	Assessment	< 0.4 U1	2 J1	35.0	< 0.4 U1	< 0.2 U1	< 0.8 U1	44.7	0.875	0.40	< 0.4 U1	0.153	< 0.005 U1	< 8 U1	< 0.6 U1	< 0.1 U1
8/12/2019	Assessment	< 0.02 U1	1.64	35.0	0.235	< 0.01 U1	0.06 J1	44.5	1.642	0.39	< 0.05 U1	0.139	< 0.005 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
3/10/2020	Assessment	< 0.02 U1	1.58	38.4	0.327	< 0.01 U1	0.06 J1	44.7	1.382	0.32	< 0.05 U1	0.145	< 0.002 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
6/2/2020	Assessment	< 0.02 U1	1.39	35.6	0.222	< 0.01 U1	0.07 J1	43.7	1.116	0.45	< 0.05 U1	0.140	< 0.002 U1	< 0.4 U1	0.04 J1	< 0.1 U1
11/2/2020	Assessment	< 0.02 U1	3.40	34.5	0.270	< 0.01 U1	0.2 J1	35.4	1.729	0.38	< 0.05 U1	0.109	< 0.002 U1	< 0.4 U1	0.07 J1	< 0.1 U1
3/8/2021	Assessment	< 0.02 U1	0.44	56.7	1.20	< 0.004 U1	0.2 J1	46.3	1.354	0.36	< 0.05 U1	0.132	< 0.002 U1	< 0.1 U1	< 0.09 U1	< 0.04 U1
5/24/2021	Assessment	< 0.02 U1	0.89	36.6	0.119	< 0.004 U1	0.24	43.9	1.44	0.48	< 0.05 U1	0.134	< 0.002 U1	< 0.1 U1	< 0.09 U1	< 0.04 U1
11/15/2021	Assessment	< 0.02 U1	4.39	41.7	0.344	< 0.004 U1	0.34	45.9 M1	1.56	0.26	< 0.05 U1	0.135 M1	< 0.002 U1	< 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.

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

Table 1 - Groundwater Data Summary: AD-22

**Pirkey - Stackout
Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/11/2016	Background	0.08	15.3	76	1.266	4.0	284	672
7/14/2016	Background	0.04	9.5	52	0.3891 J1	3.9	162	412
9/7/2016	Background	0.04	6.95	42	< 0.083 U1	4.1	114	341
10/12/2016	Background	0.03	7.68	52	0.473 J1	4.7	148	388
11/14/2016	Background	0.04	7.55	48	0.2834 J1	4.4	177	362
1/12/2017	Background	0.02	6.47	51	< 0.083 U1	4.2	137	344
3/1/2017	Background	0.05	13.6	69	< 0.083 U1	4.1	266	624
4/11/2017	Background	0.04	10.8	72	0.5041 J1	4.1	215	446
8/23/2017	Detection	0.05075	7.77	54	1.196	4.6	121	350
12/21/2017	Detection	0.06278	7.29	61	< 0.083 U1	--	120	344
3/21/2018	Assessment	0.0818	15.2	79	< 0.083 U1	3.9	377	656
8/20/2018	Assessment	0.031	9.43	92	< 0.083 U1	4.2	184	476
2/27/2019	Assessment	0.07 J1	15.2	76.7	1.33	4.9	337	584
5/22/2019	Assessment	0.073	16.5	63.3	1.06	5.1	360	506
8/12/2019	Assessment	0.03 J1	8.96	79.6	0.45	4.8	198	484
3/10/2020	Assessment	0.067	12.7	73.6	1.25	3.8	364	654
6/2/2020	Assessment	0.062	13.1	74.0	1.25	3.6	369	682
11/2/2020	Assessment	0.03 J1	8.60	84.0	0.28	4.8	190	468
3/8/2021	Assessment	0.069	12.5	71.1	1.03	4.0	337	692
5/24/2021	Assessment	0.076	12.7	60.6	1.24	3.5	327	290
11/15/2021	Assessment	0.030 J1	11.7	108	0.35	4.4	236	570

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-22

Pirkey - Stackout
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	23	71	13	2	24	129	6.994	1.266	0.97266 J1	0.139	13.41	< 0.29 U1	1.97127 J1	1.16089 J1
7/14/2016	Background	< 0.93 U1	12	48	6	0.674427 J1	12	67	2.325	0.3891 J1	< 0.68 U1	0.169	17	< 0.29 U1	< 0.99 U1	0.895409 J1
9/7/2016	Background	< 0.93 U1	23	108	5	0.833408 J1	33	54	3.412	< 0.083 U1	2.72959 J1	0.131	19.829	< 0.29 U1	< 0.99 U1	1.25036 J1
10/12/2016	Background	< 0.93 U1	10	54	4	0.333745 J1	7	54	3.39	0.473 J1	< 0.68 U1	0.14	7.984	< 0.29 U1	< 0.99 U1	< 0.86 U1
11/14/2016	Background	< 0.93 U1	3.69822 J1	66	4	0.596378 J1	2	47	3.63	0.2834 J1	< 0.68 U1	0.115	8.634	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/12/2017	Background	< 0.93 U1	6	67	4	0.385609 J1	2	43	3.173	< 0.083 U1	< 0.68 U1	0.104	13.32	< 0.29 U1	1.09664 J1	< 0.86 U1
3/1/2017	Background	< 0.93 U1	1.61319 J1	29	10	1	< 0.23 U1	105	4.385	< 0.083 U1	< 0.68 U1	0.218	0.22	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/11/2017	Background	< 0.93 U1	11	130	6	2	5	78	3.045	0.5041 J1	1.89388 J1	0.176	7.201	< 0.29 U1	1.86563 J1	< 0.86 U1
3/21/2018	Assessment	< 0.93 U1	3.56 J1	24.13	12.1	1.87	< 0.23 U1	121	6.22	< 0.083 U1	< 0.68 U1	0.277	1.206	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/20/2018	Assessment	0.02 J1	5.18	22.7	3.30	0.46	0.829	62.9	3.088	< 0.083 U1	0.386	0.132	1.448	0.07 J1	2.5	0.162
2/27/2019	Assessment	< 0.4 U1	6.30	17.0	13.3	1.55	0.8 J1	123	5.99	1.33	0.5 J1	0.269	0.642	< 8 U1	16.7	< 2 U1
5/22/2019	Assessment	< 0.4 U1	5.89	16.7	12.5	1.52	< 0.8 U1	129	6.71	1.06	< 0.4 U1	0.288	0.837	< 8 U1	5.9	0.2 J1
8/12/2019	Assessment	< 0.02 U1	2.19	15.3	3.38	0.44	0.2 J1	57.5	3.088	0.45	0.1 J1	0.151	0.325	< 0.4 U1	2.0	0.2 J1
3/10/2020	Assessment	< 0.02 U1	4.26	18.2	10.1	1.41	0.398	108	7.68	1.25	0.346	0.222	1.58	< 0.4 U1	10.5	0.2 J1
6/2/2020	Assessment	< 0.02 U1	3.53	14.4	8.00	1.43	0.376	101	4.334	1.25	0.261	0.185	0.171	< 0.4 U1	10.7	0.3 J1
11/2/2020	Assessment	< 0.02 U1	1.92	20.4	2.39	0.47	0.2 J1	60.0	3.338	0.28	0.2 J1	0.101	0.184	< 0.4 U1	2.4	0.1 J1
3/8/2021	Assessment	< 0.02 U1	3.05	19.2	8.52	1.42	0.395	107	6.007	1.03	0.277	0.164	0.045	< 0.1 U1	11.7	0.2 J1
5/24/2021	Assessment	< 0.02 U1	2.05	16.0	6.83	1.25	0.56	99.1	5.27	1.24	0.24	0.166	0.084	< 0.1 U1	7.43	0.21
11/15/2021	Assessment	< 0.02 U1	1.85	17.9	2.50	0.502	0.27	69.9	2.88	0.35	0.09 J1	0.122	0.056	< 0.1 U1	1.92	0.14 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-33

**Pirkey - Stackout
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	0.126	2.44	8	< 0.083 U1	4.1	56	326
7/14/2016	Background	0.173	1.69	16	< 0.083 U1	3.1	108	176
9/7/2016	Background	0.152	1.81	10	< 0.083 U1	3.6	64	176
10/12/2016	Background	0.162	1.39	9	0.357 J1	3.4	46	180
11/14/2016	Background	0.182	1.63	8	< 0.083 U1	3.1	54	190
1/12/2017	Background	0.144	1.26	10	< 0.083 U1	4.3	58	168
2/28/2017	Background	0.14	1.25	7	< 0.083 U1	3.9	51	146
4/10/2017	Background	0.114	1.29	9	< 0.083 U1	3.4	49	178
8/23/2017	Detection	0.07952	1.06	9	0.67 J1	4.4	40	132
12/21/2017	Detection	0.09993	0.946	--	--	--	--	--
3/21/2018	Assessment	0.115	1.42	7	< 0.083 U1	4.4	58	160
8/21/2018	Assessment	0.098	1.09	12	< 0.083 U1	3.6	48	156
2/27/2019	Assessment	0.134	1.73	8.89	0.25	3.3	62.8	146
5/22/2019	Assessment	0.111	1.65	8.57	0.23	4.1	60.4	204
8/12/2019	Assessment	0.097	1.03	8.85	0.19	4.2	44.3	156
3/10/2020	Assessment	0.132	1.61	8.81	0.25	4.0	64.5	172
6/2/2020	Assessment	0.112	1.49	8.89	0.28	3.9	63.1	206
11/2/2020	Assessment	0.115	0.980	8.49	0.16	3.9	44.8	162
3/8/2021	Assessment	0.159	1.96	8.65	0.42	4.1	70.1	213
5/24/2021	Assessment	0.121	1.5	8.56	0.29	4.0	60.4	100
11/15/2021	Assessment	0.093	0.98	8.60	0.17	3.6	41.9	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-33

Pirkey - Stackout
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	2.53645 J1	60	2	< 0.07 U1	4	12	1.303	< 0.083 U1	< 0.68 U1	< 0.00013 U1	0.288	< 0.29 U1	< 0.99 U1	< 0.86 U1
7/14/2016	Background	< 0.93 U1	4.91616 J1	64	2	< 0.07 U1	9	12	4.28	< 0.083 U1	< 0.68 U1	0.029	0.707	< 0.29 U1	< 0.99 U1	1.19199 J1
9/7/2016	Background	< 0.93 U1	67	163	4	0.984692 J1	125	33	3.461	< 0.083 U1	14	0.048	1.826	0.736517 J1	1.61343 J1	< 0.86 U1
10/12/2016	Background	< 0.93 U1	2.15866 J1	59	1	< 0.07 U1	4	10	2.208	0.357 J1	< 0.68 U1	0.027	0.145	< 0.29 U1	< 0.99 U1	1.56738 J1
11/14/2016	Background	< 0.93 U1	1.46353 J1	52	1	< 0.07 U1	1	9	1.953	< 0.083 U1	< 0.68 U1	0.024	0.197	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/12/2017	Background	< 0.93 U1	1.12979 J1	56	1	< 0.07 U1	2	9	2.596	< 0.083 U1	< 0.68 U1	0.027	0.36	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/28/2017	Background	< 0.93 U1	1.069 J1	55	1	< 0.07 U1	< 0.23 U1	9	0.942	< 0.083 U1	< 0.68 U1	0.026	0.41	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/10/2017	Background	< 0.93 U1	< 1.05 U1	55	1	< 0.07 U1	3	10	9.024	< 0.083 U1	< 0.68 U1	0.027	0.341	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/21/2018	Assessment	< 0.93 U1	1.78 J1	57.26	1.4	0.15 J1	4.64	10.42	1.643	< 0.083 U1	< 0.68 U1	0.02669	0.825	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/21/2018	Assessment	0.01 J1	0.65	43.8	0.905	0.04	0.147	7.72	6.32	< 0.083 U1	0.151	0.0178	0.745	< 0.02 U1	1.7	0.05 J1
2/27/2019	Assessment	< 0.4 U1	1 J1	49.5	1 J1	< 0.2 U1	< 0.8 U1	10.5	2.235	0.25	< 0.4 U1	0.0262	0.464	< 8 U1	3 J1	< 2 U1
5/22/2019	Assessment	< 0.4 U1	< 0.6 U1	52.4	1 J1	< 0.2 U1	< 0.8 U1	10.5	1.178	0.23	< 0.4 U1	0.0245	0.481	< 8 U1	1 J1	< 0.1 U1
8/12/2019	Assessment	< 0.02 U1	0.41	38.6	1.00	0.04 J1	0.1 J1	7.02	1.141	0.19	0.1 J1	0.0233	0.564	< 0.4 U1	1.1	< 0.1 U1
3/10/2020	Assessment	< 0.02 U1	0.63	45.3	1.18	0.06	0.1 J1	9.67	2.479	0.25	0.208	0.0197	2.45	< 0.4 U1	2.0	< 0.1 U1
6/2/2020	Assessment	< 0.02 U1	0.61	41.3	1.15	0.05 J1	0.2 J1	8.78	1.477	0.28	0.2 J1	0.0188	2.52	< 0.4 U1	2.1	< 0.1 U1
11/2/2020	Assessment	< 0.02 U1	0.39	45.1	0.858	0.04 J1	0.1 J1	7.86	1.443	0.16	0.2 J1	0.0175	4.30	< 0.4 U1	1.1	< 0.1 U1
3/8/2021	Assessment	< 0.02 U1	1.01	47.5	1.51	0.06	0.373	12.4	1.312	0.42	0.286	0.0232	3.13	< 0.1 U1	3.4	< 0.04 U1
5/24/2021	Assessment	< 0.02 U1	0.43	43.8	1.04	0.048	0.28	9.85	1.4	0.29	0.22	0.0188	2.000	< 0.1 U1	1.39	0.05 J1
11/15/2021	Assessment	< 0.02 U1	0.40	45.1	0.916	0.043	0.28	6.75	1.65	0.17	0.23	0.0177	14.600	< 0.1 U1	1.0	< 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.

APPENDIX 2- Statistical Analyses

The reports summarizing the statistical evaluation follow.

**STATISTICAL ANALYSIS SUMMARY
FLUE GAS DESULFURIZATION (FGD)
STACKOUT AREA
H.W. Pirkey Plant
Hallsville, Texas**

Submitted to



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LIST OF ATTACHMENTS

Attachment A	Certification by Qualified Professional Engineer
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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
FGD	Flue Gas Desulfurization
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

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 Flue Gas Desulfurization (FGD) Stackout Area, 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, chloride, and sulfate at the FGD Stackout Area. An alternative source was not identified at the time, so the FGD Stackout Area 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 FGD Stackout Area in November 2020, in accordance with 40 CFR 257.95. The results of the November 2020 assessment event are documented in this report.

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

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Groundwater protection standards (GWPSs) were re-established for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at a statistically significant level (SSL) above the GWPS. SSLs were identified for beryllium and 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

FGD STACKOUT AREA EVALUATION

2.1 Data Validation & QA/QC

During the assessment monitoring program, one set of samples was collected for analysis from each upgradient and downgradient well to meet the requirements of 40 CFR 257.95(d)(1) (November 2020). Samples from this event were analyzed for the Appendix III and Appendix IV parameters. A summary of 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 across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.26 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 FGD Stackout Area were conducted in accordance with the January 2020 Statistical Analysis Plan (Geosyntec, 2020b), except where noted below. Time series plots and results for all completed statistical tests are provided in Attachment B.

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

2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with 40 CFR 257.95(h) and the *Statistical Analysis Plan* (Geosyntec, 2020b). 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 arsenic, barium, chromium, and combined radium. Non-parametric tolerance limits

were calculated for beryllium, cobalt, fluoride, lithium, and selenium due to apparent non-normal distributions and for antimony, cadmium, lead, mercury, molybdenum, and thallium due to a high non-detect frequency. Calculated 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). For mercury at AD-22, earlier values were higher than recent values and so the confidence interval was calculated using only the most recent twelve samples to better reflect recent conditions.

Seasonal patterns were observed for beryllium, cadmium, cobalt, combined radium, fluoride and lithium at AD-22. For these well/parameter pairs, Kruskal Wallis tests were performed to test whether differences between the results from different seasons were statistically significant. Statistically significant differences were found for all pairs identified above. Where the Kruskal-Wallis test found significant seasonal effects, the data for these well/parameter pairs was deseasonalized so that the resulting confidence limits correctly account for seasonality as a predictable pattern rather than random variation or a release.

An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B.

The following SSLs was identified at the Pirkey FGD Stackout Area:

- The deseasonalized LCL for beryllium exceeded the GWPS of 0.00400 mg/L at AD-22 (0.00560 mg/L).
- The deseasonalized LCL for cobalt exceeded the GWPS of 0.0560 mg/L at AD-22 (0.0685 mg/L).

As a result, the Pirkey FGD Stackout Area 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) were previously established for all Appendix III parameters following the background monitoring period (Geosyntec, 2019). Intrawell tests were used to evaluate potential SSIs for calcium, pH, and TDS, whereas interwell tests were used to evaluate potential SSIs for boron, chloride, fluoride, and sulfate. While interwell prediction limits have been updated periodically during the assessment monitoring period as sufficient data became

available, this represents the first update to the background dataset for parameters evaluated using intrawell tests.

Mann-Whitney (Wilcoxon rank-sum) tests were performed to determine whether the newer data are affected by a release from the FGD Stackout Area. 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 - April 2017) to the new compliance samples (August 2017 – June 2020) for calcium, pH, 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 continued to be used.

The complete Mann-Whitney test results and a summary of the significant findings can be found in Attachment B. No significant differences were found between the two groups for calcium, pH, or TDS.

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

UPLs were updated using all the historical data through June 2020 to represent background values. LPLs were also updated for pH. The updated prediction limits are summarized in Table 3. Intrawell tests continued to be used to evaluate potential SSIs for calcium, pH, and TDS, whereas interwell tests continued to be used to evaluate potential SSIs for boron, chloride, fluoride, and sulfate. 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 were also completed to assess whether concentrations of Appendix III parameters at the compliance wells exceeded background concentrations.

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

- Boron concentrations exceeded the interwell UPL of 0.0818 mg/L at AD-7 (4.19 mg/L) and AD-33 (0.115 mg/L).
- Chloride concentrations exceeded the interwell UPL of 42.3 mg/L at AD-22 (84.0 mg/L).
- Sulfate concentrations exceeded the interwell UPL of 83.4 mg/L at AD-22 (190 mg/L)

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

2.3 Conclusions

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

Based on this evaluation, the Pirkey FGD Stackout Area 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. 2019. Statistical Analysis Summary – Flue Gas Desulfurization (FGD) Stackout Area, H.W. Pirkey Plant, Hallsville, Texas. December 10, 2019.

Geosyntec Consultants. 2020b. Statistical Analysis Summary – Flue Gas Desulfurization (FGD) Stackout Area, H.W. Pirkey Plant, Hallsville, Texas. October 2, 2020.

Geosyntec. 2020a. Statistical Analysis Plan. October 2020.

TABLES

**Table 1 - Groundwater Data Summary
Pirkey Plant - Stackout Area**

Parameter	Unit	AD-12	AD-13	AD-22	AD-33	AD-7
		11/2/2020	11/2/2020	11/2/2020	11/2/2020	11/3/2020
Antimony	µg/L	0.05 J	0.1 U	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	0.09 J	3.40	1.92	0.39	0.61
Barium	µg/L	18.9	34.5	20.4	45.1	47.9
Beryllium	µg/L	0.122	0.270	2.39	0.858	2.97
Boron	mg/L	0.03 J	0.052	0.03 J	0.115	4.19
Cadmium	µg/L	0.05 U	0.05 U	0.47	0.04 J	0.78
Calcium	mg/L	0.3 J	5.90	8.60	0.980	4.10
Chloride	mg/L	4.65	22.6	84.0	8.49	38.2
Chromium	µg/L	0.204	0.2 J	0.2 J	0.1 J	0.236
Cobalt	µg/L	1.04	35.4	60.0	7.86	31.5
Combined Radium	pCi/L	0.929	1.729	3.338	1.443	2.957
Fluoride	mg/L	0.08	0.38	0.28	0.16	0.27
Lead	µg/L	0.09 J	0.2 U	0.2 J	0.2 J	0.783
Lithium	mg/L	0.00510	0.109	0.101	0.0175	0.0752
Mercury	µg/L	0.005 U	0.005 U	0.184	4.30	0.085
Molybdenum	µg/L	2 U	2 U	2 U	2 U	2 U
Selenium	µg/L	0.3	0.07 J	2.4	1.1	2.1
Sulfate	mg/L	3.3	39.1	190	44.8	60.2
Thallium	µg/L	0.5 U	0.5 U	0.1 J	0.5 U	0.2 J
Total Dissolved Solids	mg/L	74	204	468	162	236
pH	SU	4.3	6.4	4.8	3.9	3.3

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 - Stackout Area**

Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.006		0.005	0.006
Arsenic, Total (mg/L)	0.010		0.0069	0.010
Barium, Total (mg/L)	2.00		0.0500	2.00
Beryllium, Total (mg/L)	0.00400		0.00200	0.00400
Cadmium, Total (mg/L)	0.005		0.001	0.005
Chromium, Total (mg/L)	0.10		0.0017	0.10
Cobalt, Total (mg/L)	n/a	0.00600	0.0560	0.0560
Combined Radium, Total (pCi/L)	5.00		2.96	5.00
Fluoride, Total (mg/L)	4.0		1.0	4.0
Lead, Total (mg/L)	n/a	0.015	0.0050	0.015
Lithium, Total (mg/L)	n/a	0.0400	0.170	0.170
Mercury, Total (mg/L)	0.0020		0.000025	0.0020
Molybdenum, Total (mg/L)	n/a	0.1	0.005	0.1
Selenium, Total (mg/L)	0.050		0.0050	0.050
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 - Stackout Area**

Analyte	Unit	Description	AD-7	AD-22	AD-33
			11/3/2020	11/2/2020	11/2/2020
Boron	mg/L	Interwell Background Value (UPL)	0.0818		
		Analytical Result	4.19	0.03	0.115
Calcium	mg/L	Intrawell Background Value (UPL)	6.55	17.6	2.18
		Analytical Result	4.10	8.60	0.980
Chloride	mg/L	Interwell Background Value (UPL)	42.3		
		Analytical Result	38.2	84.0	8.49
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.27	0.28	0.16
pH	SU	Intrawell Background Value (UPL)	4.4	5.1	4.7
		Intrawell Background Value (LPL)	3.0	3.4	3.0
		Analytical Result	3.3	4.8	3.9
Sulfate	mg/L	Interwell Background Value (UPL)	83.4		
		Analytical Result	60.2	190	44.8
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	343	682	212
		Analytical Result	236	468	162

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

Background values are shaded gray.

Bold values exceed the background value.

ATTACHMENT A

Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Pirkey FGD Stackout Area 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

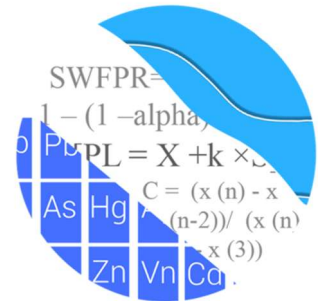
Licensing State

03.03.21

Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING



December 23, 2020

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

Re: Pirkey Stackout
Background Update & Assessment Monitoring Event – November 2020

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the background update and statistical analysis of groundwater data for the November 2020 sample event for American Electric Power Inc.'s Pirkey Stackout. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

Sampling 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-12 and AD-13
- **Downgradient wells:** AD-22, AD-33, and AD-7

Data were sent electronically to Groundwater Stats Consulting, and the statistical analysis was conducted according to the Statistical Analysis Plan and screening evaluation prepared by GSC and approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC. The analysis was reviewed by Dr. Jim Loftis, Civil & Environmental Engineering professor emeritus at Colorado State University and Senior Advisor to Groundwater Stats Consulting.

The CCR program consists of the following constituents:

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

Time series plots for these parameters are provided for all wells and constituents; and are used to evaluate concentrations over the entire record (Figure A). Additionally, box plots are included for all constituents at upgradient and downgradient wells (Figure B). Nondetects are plotted at the reporting limit originally entered into the database and are then screened as described later in the section on the 2020 background update.

In the previous background screening, data at all wells were evaluated for the following: 1) outliers; 2) trends; 3) most appropriate statistical method for Appendix III parameters based on site characteristics of groundwater data upgradient of the facility; and 4) eligibility of downgradient wells when intrawell statistical methods are recommended. Power curves were provided with the background screening report submitted in December 2017 and demonstrated that the selected statistical methods for Appendix III parameters comply with the USEPA Unified Guidance recommendations.

Summary of Appendix III Statistical Methods:

The most appropriate statistical methods for each parameter as recommended in the 2017 screening analysis were as follows:

- 1) Intrawell prediction limits, combined with a 1-of-2 resample plan for calcium, pH, and TDS

Interwell prediction limits combined with a 1-of-2 resample plan for boron, chloride, fluoride, and sulfate. 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. 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, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for nondetects is the practical quantification limit (PQL) as reported by the laboratory.
- When data contain between 15-50% nondetects, the Kaplan-Meier nondetect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% nondetects.

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 will be necessary to accommodate these types of changes. In the interwell case, statistical limits may be updated with all upgradient well data after careful screening for new outliers. In the intrawell case, data for all wells and constituents are 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 some cases, the earlier portion of data are deselected prior to construction of limits in order to provide sensitive limits that will rapidly detect 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.

Summary of Appendix IV 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). If, and only if, the entire confidence interval exceeds the GWPS, the well/constituent is considered to exceed its standard. The GWPS is determined for each parameter as the largest of the Maximum Contaminant Levels (MCLs), CCR Rule-Specified levels, or background limits determined from tolerance limits on 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. Data are then analyzed using either parametric or non-

parametric tolerance limits and confidence intervals as appropriate. Nondetects are handled with the same approaches as described above for Appendix III parameters.

Summary of Original Background Screening Conducted in December 2017

Outlier Evaluation

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 and Appendix IV parameters were formally tested using Tukey's box plot method and, when identified by Tukey's test or visual comparison with other data, flagged in the computer database with "o" and deselected prior to construction of statistical limits. A current list of outliers from screening to date is included as Figure C.

Tukey's outlier test noted a few outliers, and the results were submitted with the screening report. For the downgradient well data that are used to construct confidence intervals, a regulatory conservative approach is taken in that values that are marginally high relative to the rest of the data are retained unless there is particular justification for excluding them. In particular, for the 9/7/16 observations, the values were remarkably high for several constituents at the same time, suggesting a likely systematic error. Therefore, those values were flagged. Additionally, four reported mercury values in well AD-22 prior to April 2017 were unusually high compared to recently reported measurements and were, therefore, flagged as outliers.

The Sen's Slope/Mann Kendall trend test was used to evaluate all data at each well to identify statistically significant increasing or decreasing trends. In the absence of suspected contamination, significant trending data are typically not included as part of the background data used for construction of prediction limits. Exclusion of trending data produces conservative limits that better represent current background concentrations.

The results of the trend analyses showed no statistically significant trends, as may be seen on the Trend Test Summary Table that accompanies the trend tests in the December 2017 screening report. Therefore, no adjustments were made to the data sets.

The most appropriate statistical method, i.e. interwell or intrawell prediction limits as listed above for each Appendix III parameter, was recommended based on two criteria: 1) spatial variability of each parameter among upgradient wells and 2) comparison of average concentrations in each downgradient well to the expected upper limit of concentrations across all upgradient wells. The application of Analysis of Variance,

upgradient tolerance limits, and downgradient confidence intervals for evaluation of these criteria is described in the 2017 screening study report and resulted in the recommended method for each Appendix III parameter.

Appendix III and Appendix IV Background Update – 2020

Prior to updating background, data were evaluated using Tukey's outlier test and visual screening through the June 2020 sample event for Appendix III parameters at all wells. For Appendix IV parameters, pooled upgradient well data were evaluated using Tukey's test and visual screening. Previously flagged data were re-evaluated, and no changes were made. Tukey's outlier test noted an outlier for chloride in well MW-33; however, this value did not require flagging as the value was similar to other measurements within the well, and this constituent is evaluated through interwell prediction limits.

For several constituents, the reporting limit changes--usually decreases--over time. For this analysis nondetect data are analyzed using the reporting limit as originally entered into the database. However, when a nondetect substitution could result in a misleadingly high statistical limit, those data are flagged as outliers and deselected prior to computing limits. In particular, the reporting limit during the February and May 2019 events for molybdenum at all wells (except for well AD-7 in February) was 0.04 mg/L, compared to the previous reporting limit of 0.002 mg/L. The resulting nondetects, reported at 0.04 mg/L, are censored at much higher levels than the rest of the data and, therefore, are flagged as outliers. The reporting limit (practical quantitation limit) for the February 2019 event for thallium also increased from the historical reporting limit of 0.002 mg/L to 0.01 mg/L for all wells. However, since no detections were present above the method detection limit of 0.002 mg/L, the historical reporting limit of 0.002 mg/L was used for historic nondetects, and the nondetects with a reporting limit of 0.01 mg/L were flagged as outliers. A summary of Tukey's test results and flagged values follows this letter (Figure C).

Several constituents appear to have seasonal patterns for well AD-22. Therefore, all constituents at this well were tested for seasonality using the Kruskal-Wallis test, and the results are presented following this letter. Appendix III constituents with significant seasonality were boron, calcium, fluoride, and sulfate. Appendix IV constituents with significant seasonality were beryllium, cadmium, cobalt, combined radium 226+228, fluoride, and lithium. Analysis of the seasonal constituents is discussed in the appropriate sections below.

For Appendix III constituents evaluated through intrawell methods (calcium, pH, and TDS), 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 June 2020 (Figure D). The test evaluates whether the groups are statistically different at the 99% confidence level. If no significant difference is found, background data may be updated with compliance data.

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 but will be reconsidered in the future. The test results are included with the Mann Whitney test section at the end of this report. No significant differences were found; therefore, all records were updated through June 2020.

The Sen's Slope/Mann Kendall trend test was used to evaluate upgradient well data for constituents evaluated through interwell methods (boron, chloride, fluoride, and sulfate) to identify statistically significant increasing or decreasing trends (Figure E). While trends may be identified visually, a quantification of each trend and its significance is needed. In the absence of suspected contamination, significant trending data are typically not included as part of the background data used for construction of prediction limits. The Sen's Slope/Mann Kendall trend test did not identify any statistically significant increasing trends. A statistically significant decreasing trend was identified for fluoride in upgradient well AD-12; however, the trend is a result of several nondetects followed by reported trace values. Therefore, no adjustment was required for this record. A summary of those findings follows this letter.

Evaluation of Appendix III Constituents – November 2020

Intrawell prediction limits, combined with a 1-of-2 resample plan, were constructed for calcium, pH, and TDS at all wells using all historical data through June 2020 (Figure F). No statistically significant increases were identified. An intrawell prediction limit was also computed on seasonalized data for calcium, and no exceedance was found. That result is included with the intrawell prediction limit section and a summary of all prediction limits follows this letter.

Interwell prediction limits, combined with a 1-of-2 resample plan, were constructed for boron, chloride, fluoride, and sulfate (Figure G). Statistically significant increases were noted for boron in wells AD-33 and AD-7; and chloride and sulfate in well AD-22. Three of the interwell constituents (boron, fluoride, and sulfate) had statistically significant seasonality in well AD-22. However, when prediction limits are calculated on deseasonalized data, both the background and compliance data are deseasonalized in the Sanitas software, which would not be appropriate in this case, since only the single downgradient well has seasonal patterns. Therefore, interwell limits on deseasonalized

data were not included. One should note from the interwell prediction limit plots in Figure G that future fluoride exceedances could occur for well AD-22 simply as a result of seasonal variation.

The Sen's Slope/Mann Kendall trend test was used to determine whether data are significantly changing over time for prediction limit exceedances (Figure H). The upgradient wells were included in this analysis to determine whether similar groundwater quality patterns are noted upgradient of the facility. Trends noted in upgradient well data are an indication of natural changes in groundwater quality. No significant trends were noted in any wells except for a statistically significant increasing trend for chloride in well AD-22. The general pattern for chloride in this well is similar to that observed in upgradient well AD-13; though the downgradient concentrations are higher, and the upgradient trend is not statistically significant. A summary of these results follows this letter.

Evaluation of Appendix IV Constituents – November 2020

To evaluate Appendix IV constituents, a GWPS was first established for each constituent using the higher of either a regulatory limit or a background limit determined from statistical analysis of upgradient well data. When data followed a normal or transformed-normal distribution, parametric tolerance limits were used to calculate background limits for Appendix IV parameters using pooled upgradient well data through November 2020 with a target of 95% confidence and 95% coverage (Figure I). Nonparametric tolerance limits were constructed when data did not follow a normal or transformed-normal distribution or when there were greater than 50% nondetects. 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 regulatory limits--Maximum Contaminant Levels (MCLs) and CCR Rule-Specified levels--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 with data through November 2020 for each of the Appendix IV parameters using either parametric or nonparametric intervals depending on the data distribution and percentage of nondetects, similar to the logic used to construct tolerance limits as discussed above (Figure K). Each confidence interval was compared with the corresponding GWPS from Figure J. Only when the entire confidence interval is above the GWPS is the well/constituent pair considered to exceed its respective standard. Both a tabular summary and graphical presentation of the confidence interval results follow this letter.

Exceedances were noted for the following well/constituent pairs:

- Beryllium: AD-22
- Cobalt: AD-22

Confidence intervals were constructed also on deseasonalized data for well AD-22 when at least one reported measurement was higher than the established GWPS for a given parameter. The constituents analyzed using deseasonalized data at well AD-22 include beryllium, cobalt, combined radium 226+228, and lithium. The results are included with the confidence intervals provided in Figure K. Exceedances remained the same as follows:

- Beryllium: AD-22
- Cobalt: AD-22

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

For Groundwater Stats Consulting,



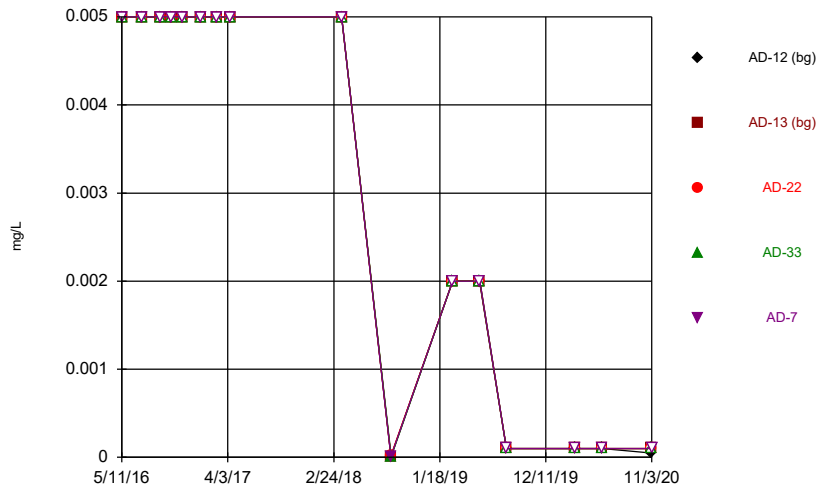
Kristina L. Rayner
Groundwater Statistician

100% Non-Detects

Analysis Run 12/20/2020 11:06 AM View: 100% Nondetects
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

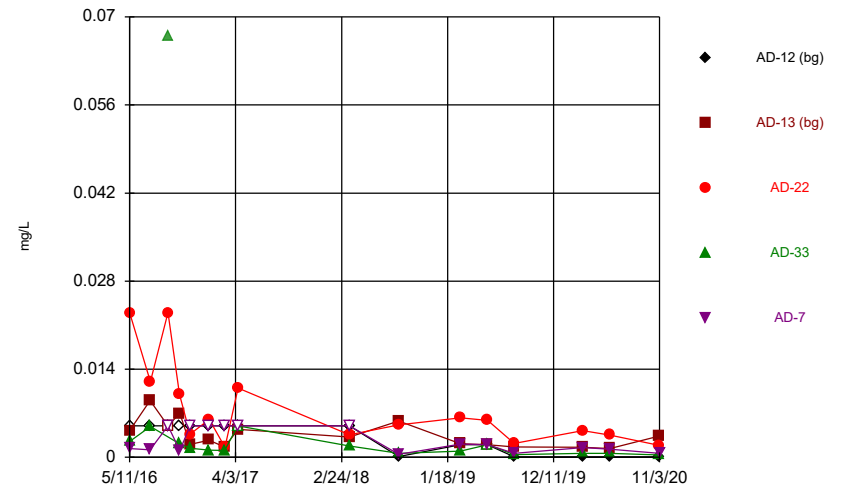
Molybdenum, total (mg/L)
AD-13, AD-7

Time Series



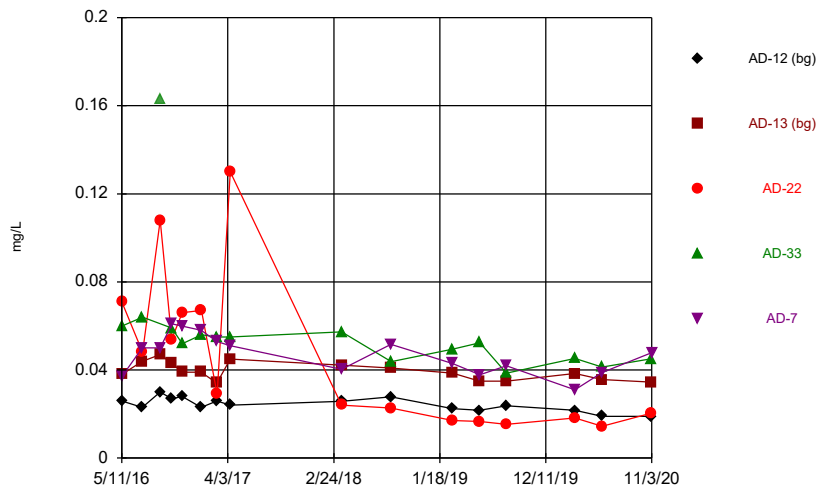
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 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



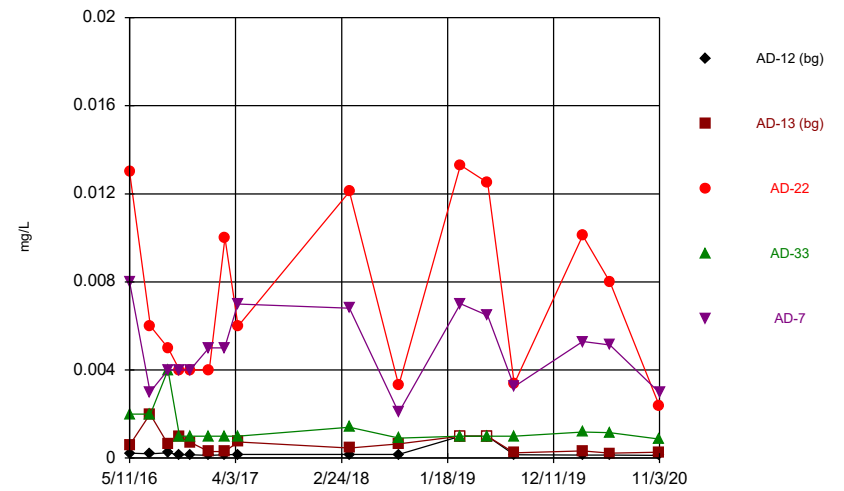
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Time Series



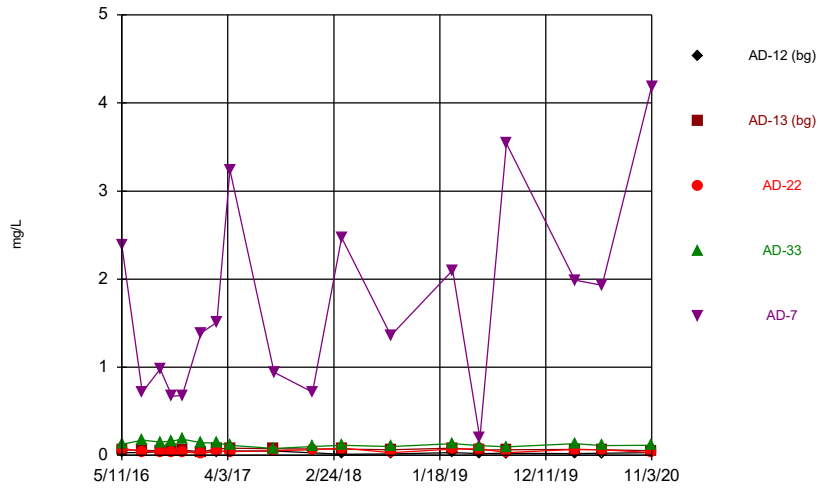
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Time Series



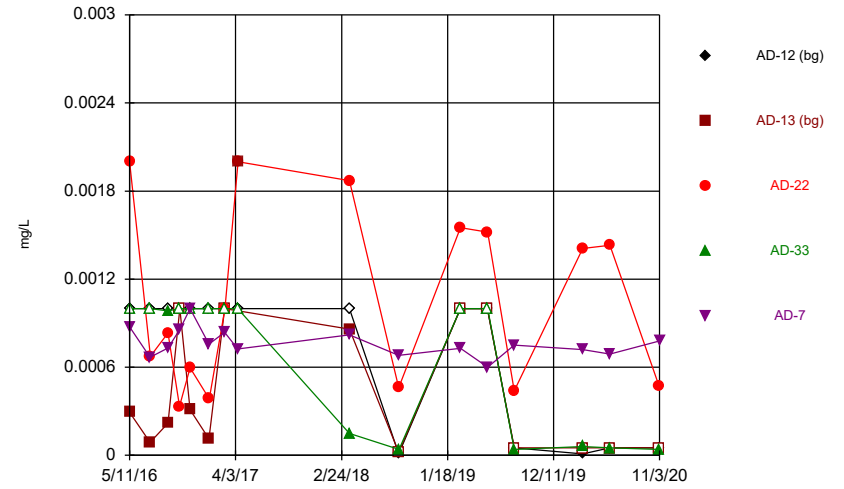
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Time Series



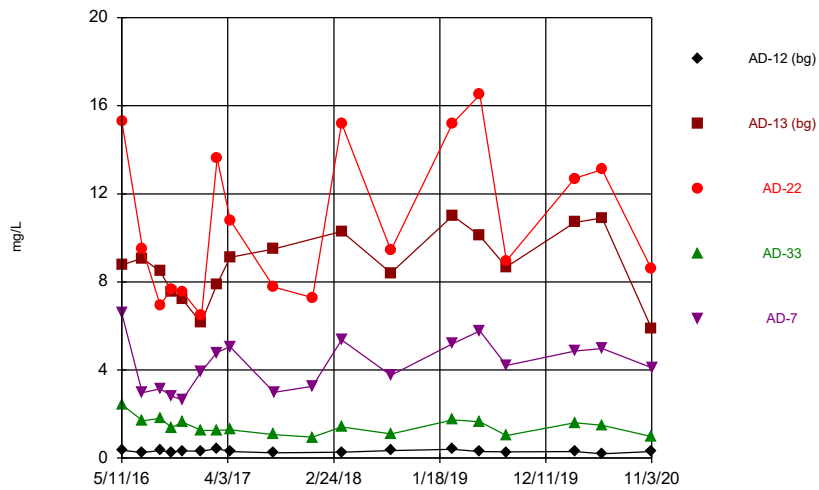
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Time Series



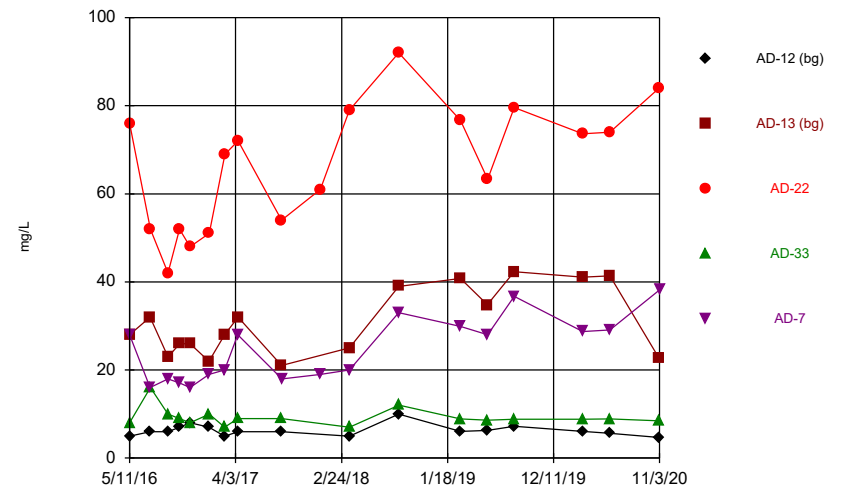
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Time Series



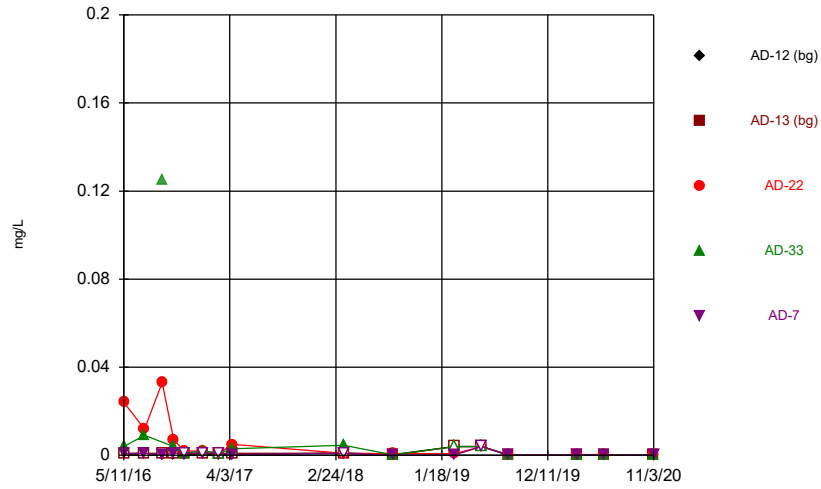
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Time Series



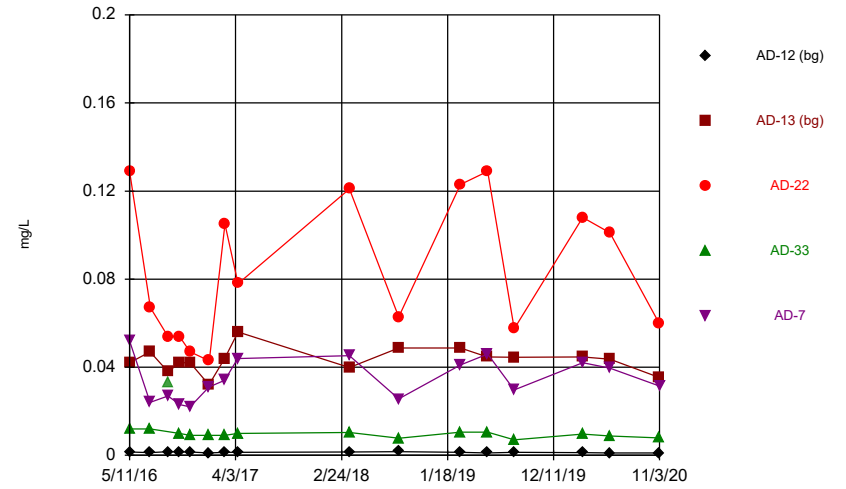
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Time Series



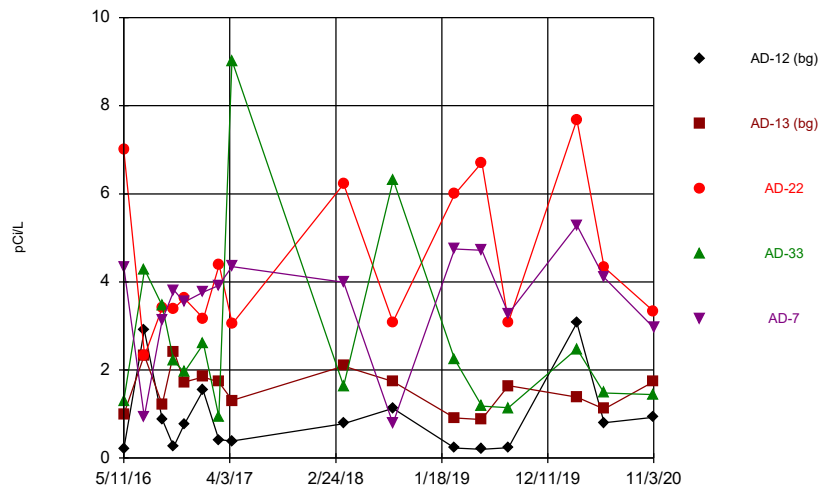
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Time Series



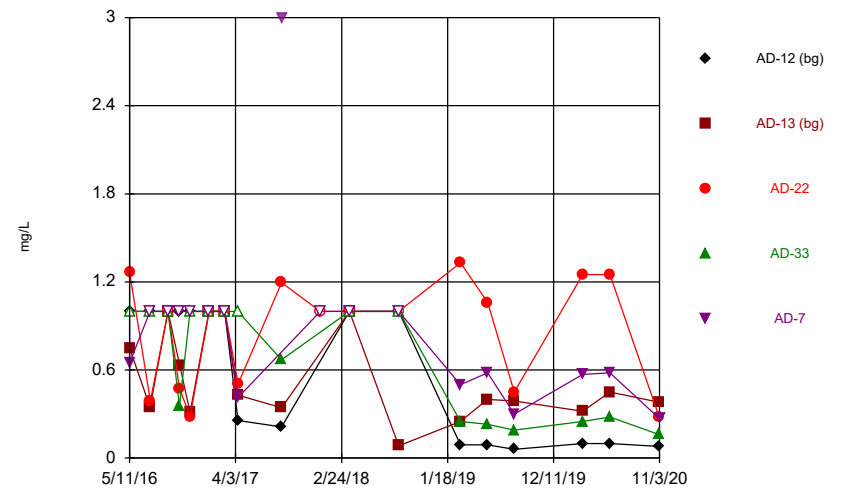
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Time Series



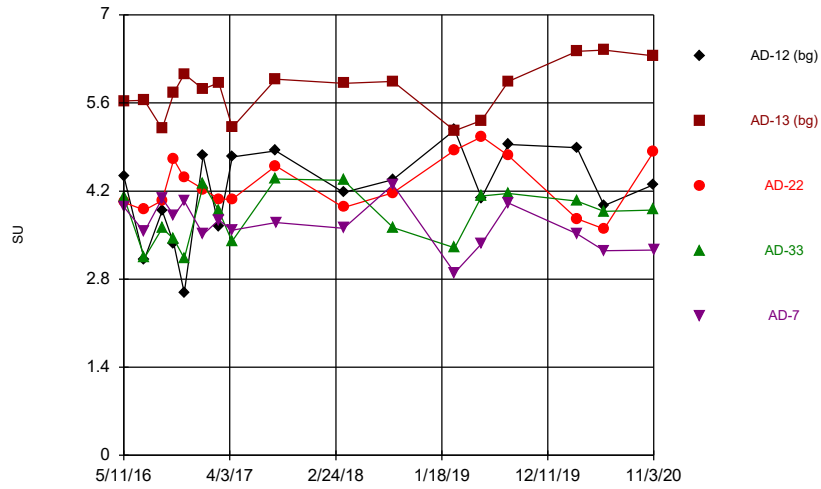
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Time Series



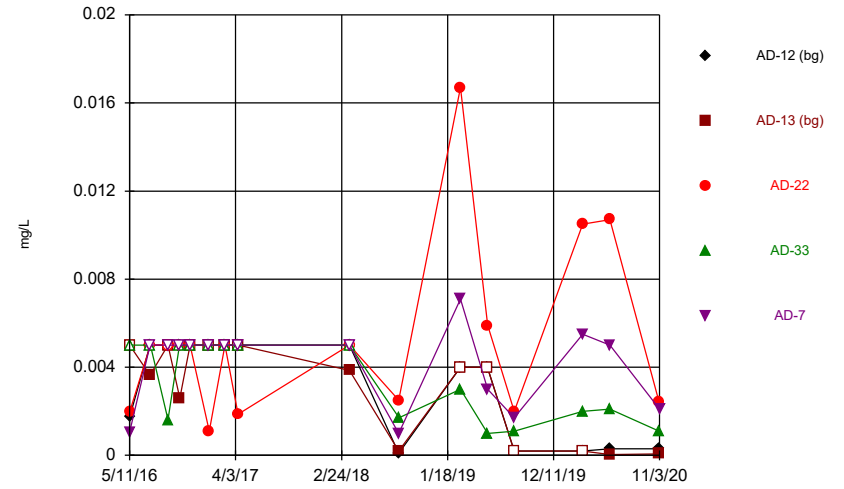
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Time Series



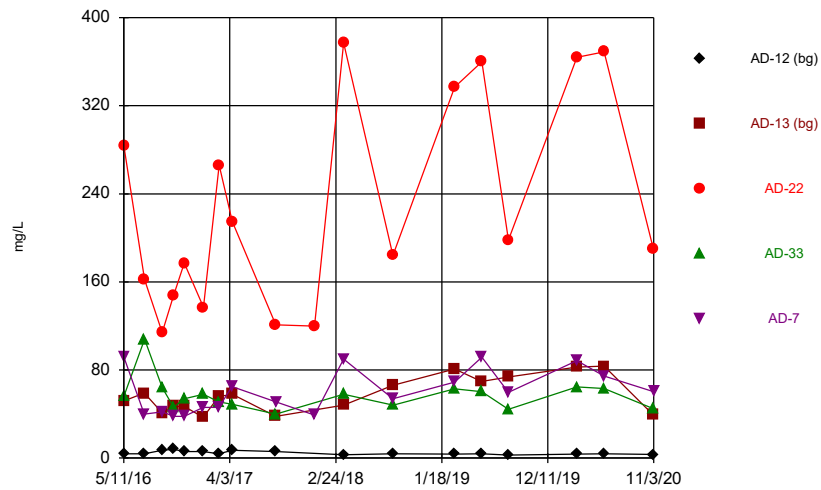
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Time Series



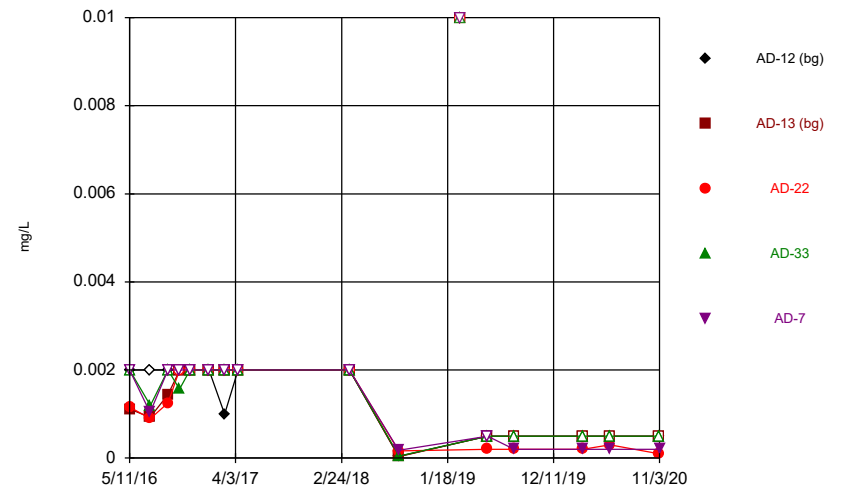
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Time Series



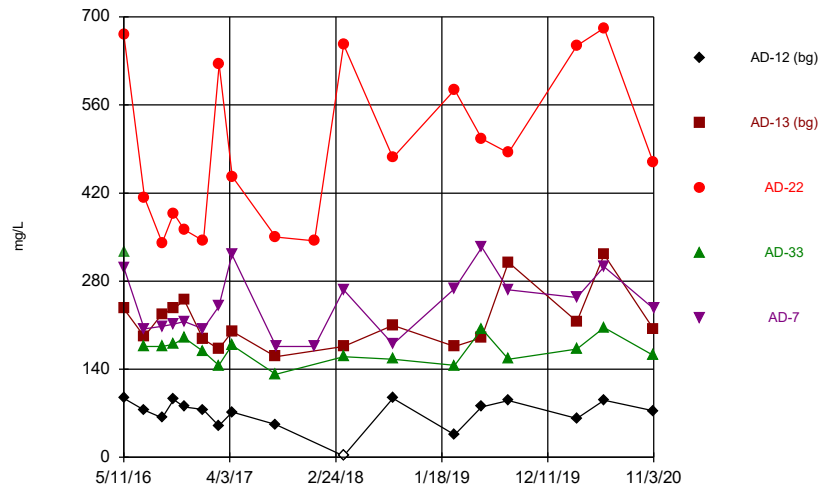
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Time Series



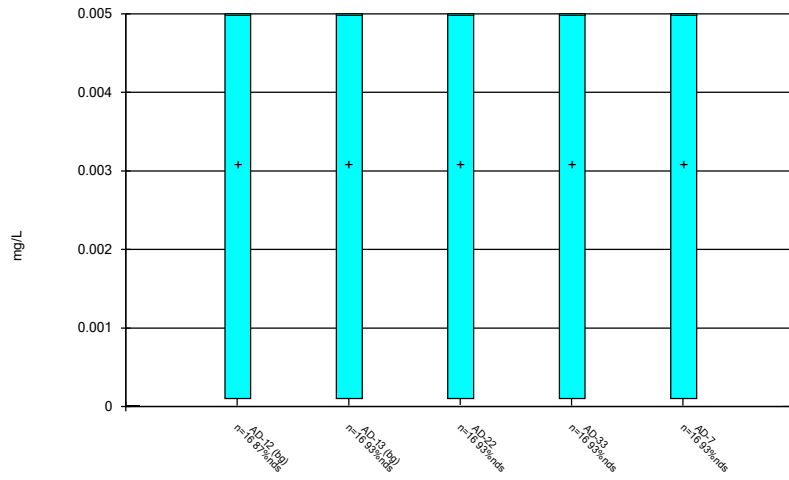
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Time Series



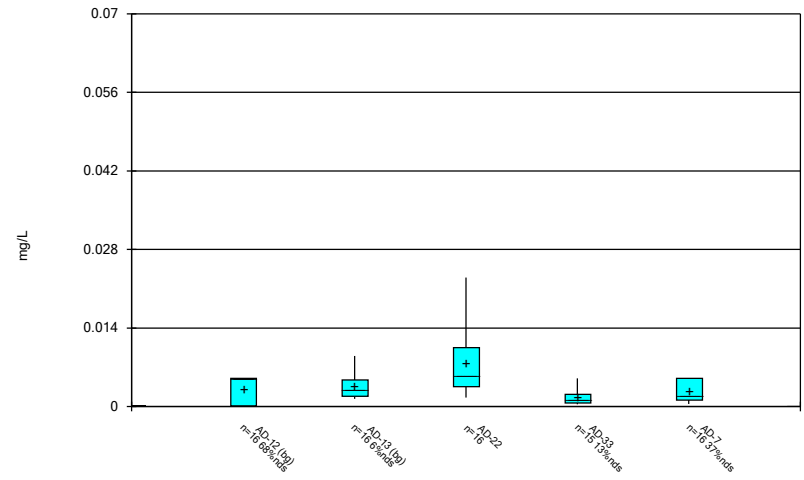
Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 1:12 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



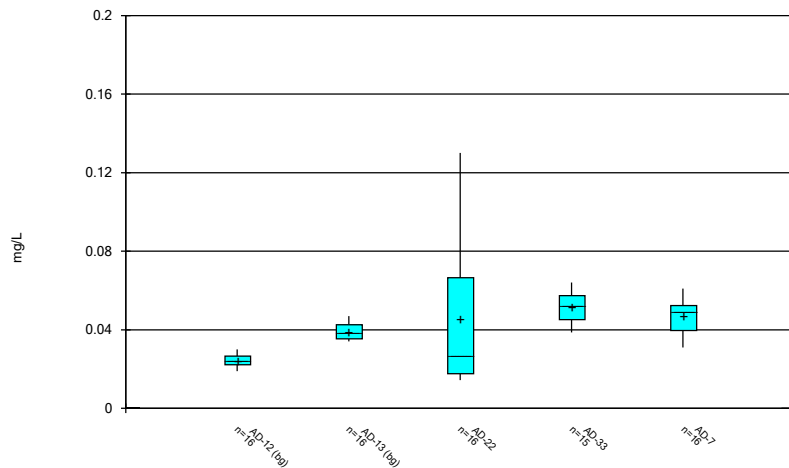
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Box & Whiskers Plot



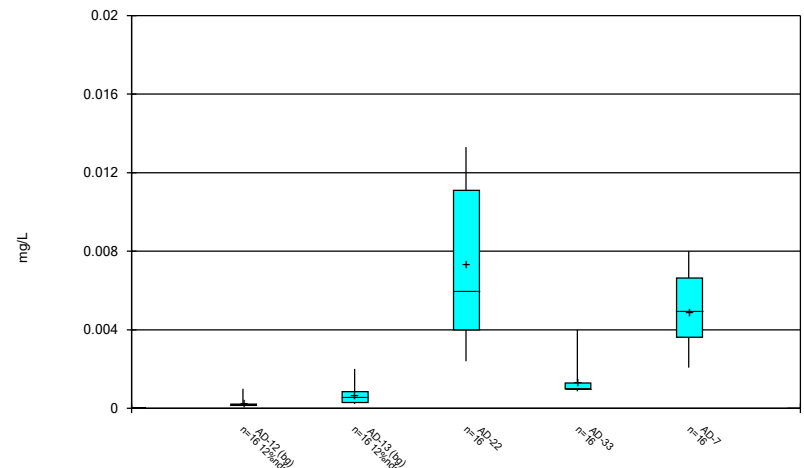
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Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



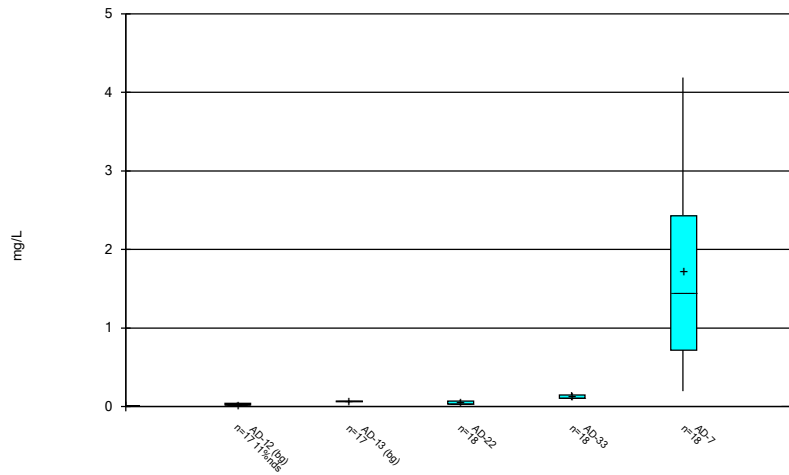
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Box & Whiskers Plot



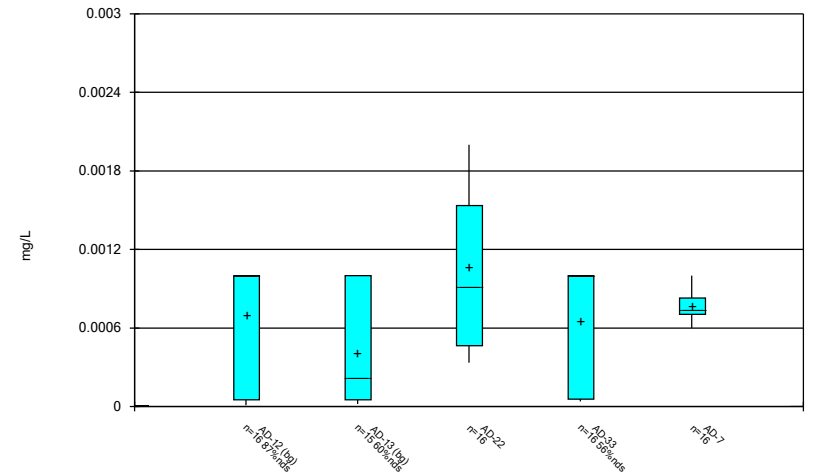
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Box & Whiskers Plot



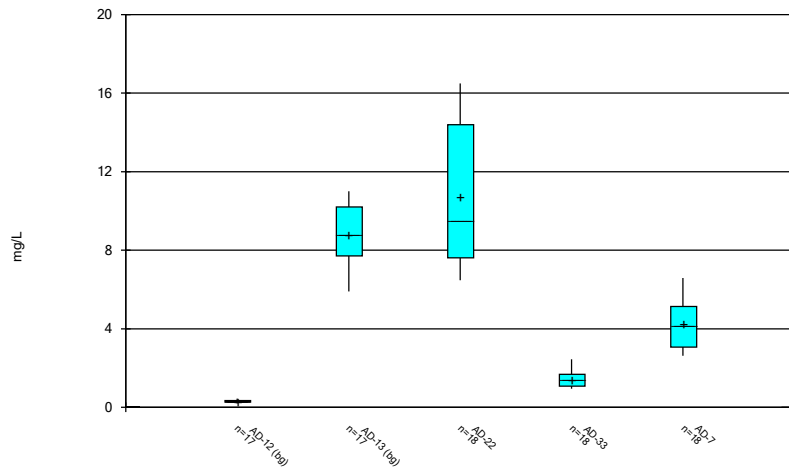
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Box & Whiskers Plot



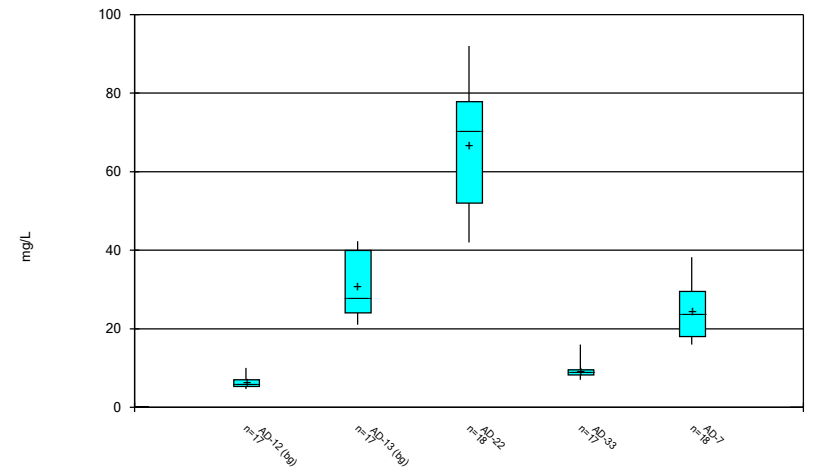
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Box & Whiskers Plot



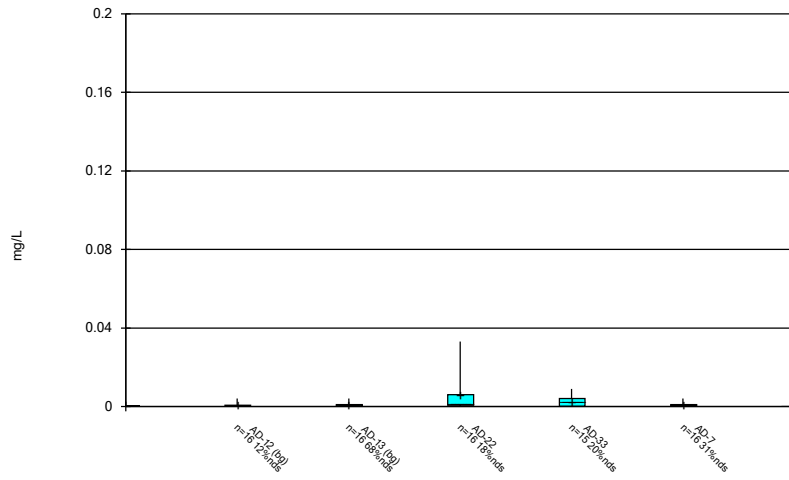
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Box & Whiskers Plot



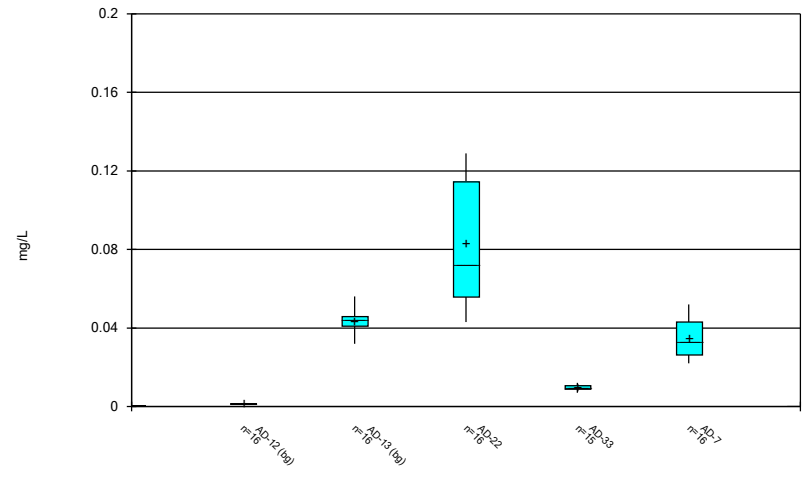
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Box & Whiskers Plot



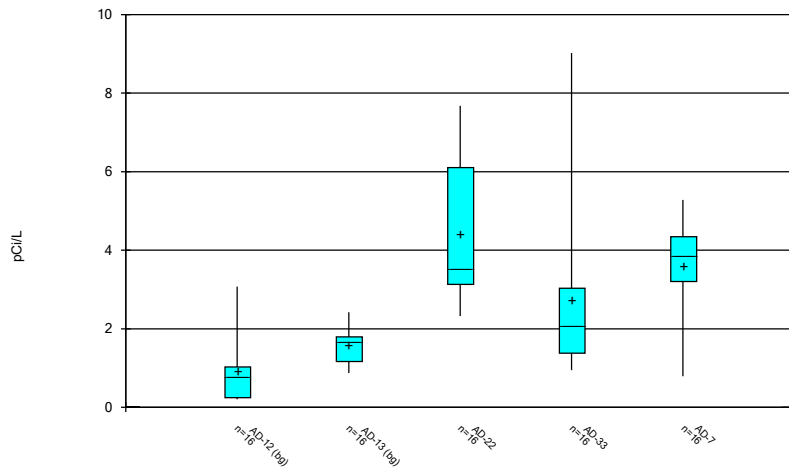
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Box & Whiskers Plot



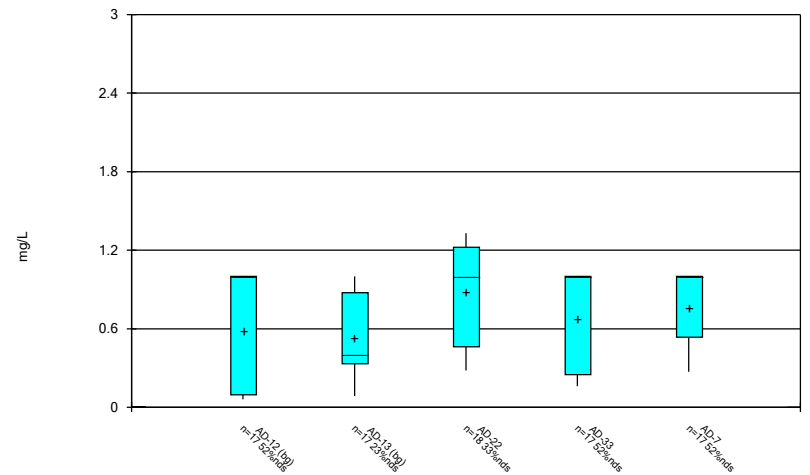
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Box & Whiskers Plot



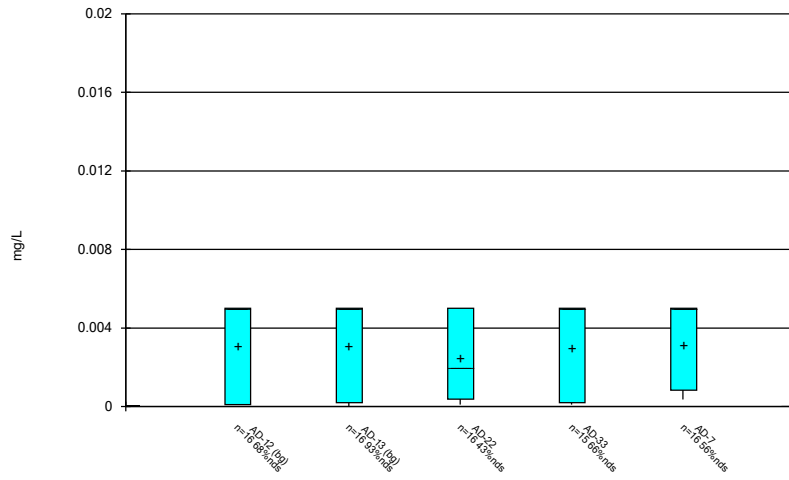
Constituent: Combined Radium 226 + 228 Analysis Run 12/20/2020 1:14 PM View: Descriptive
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



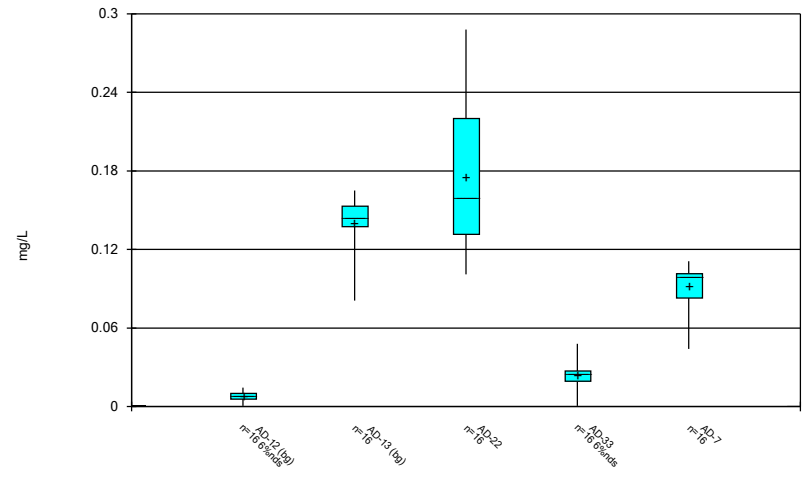
Constituent: Fluoride, total Analysis Run 12/20/2020 1:14 PM View: Descriptive
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



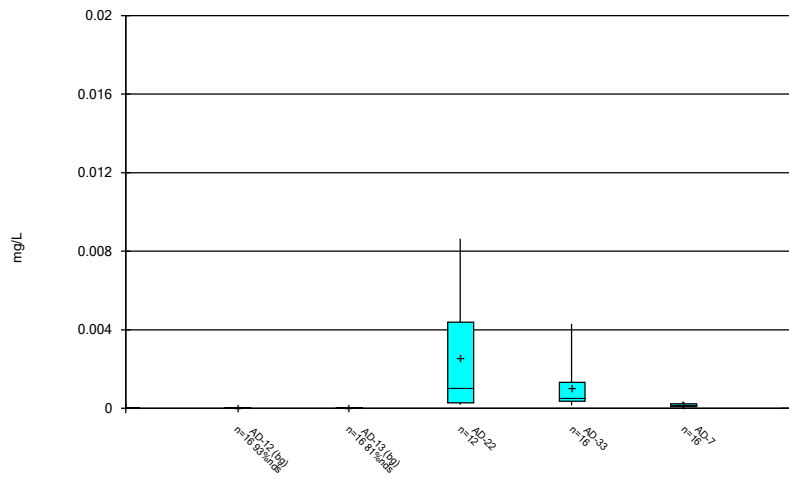
Constituent: Lead, total Analysis Run 12/20/2020 1:14 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



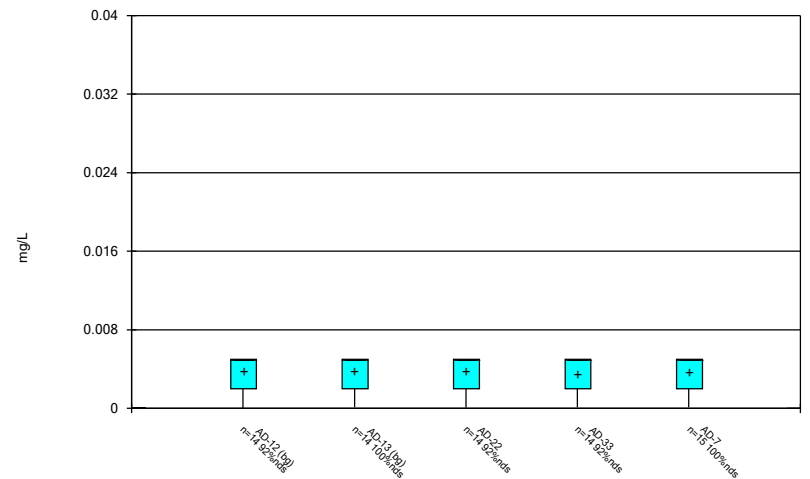
Constituent: Lithium, total Analysis Run 12/20/2020 1:14 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



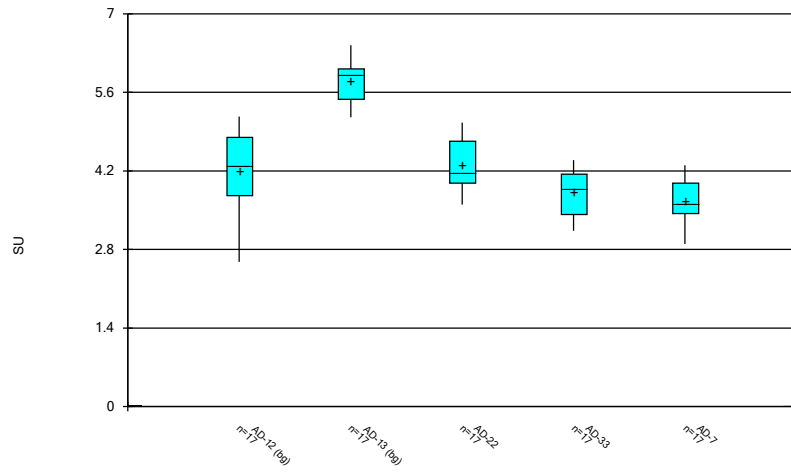
Constituent: Mercury, total Analysis Run 12/20/2020 1:14 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



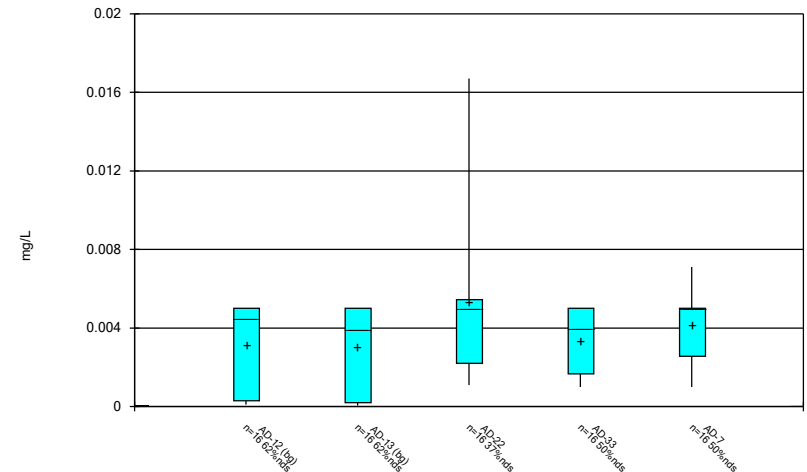
Constituent: Molybdenum, total Analysis Run 12/20/2020 1:14 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



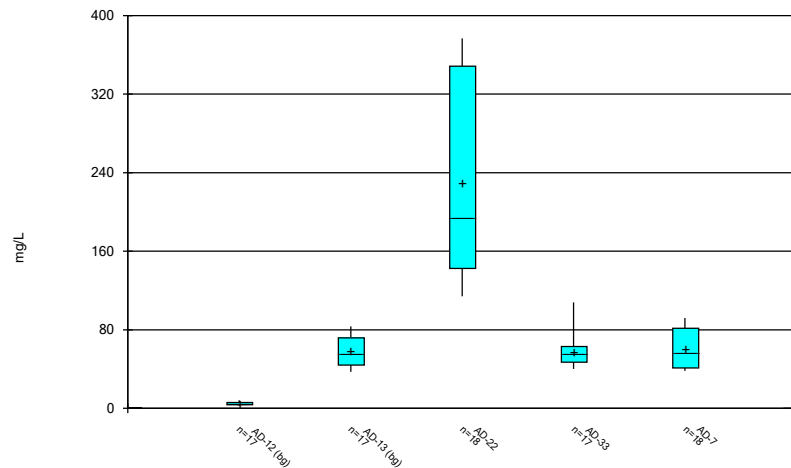
Constituent: pH, field Analysis Run 12/20/2020 1:14 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



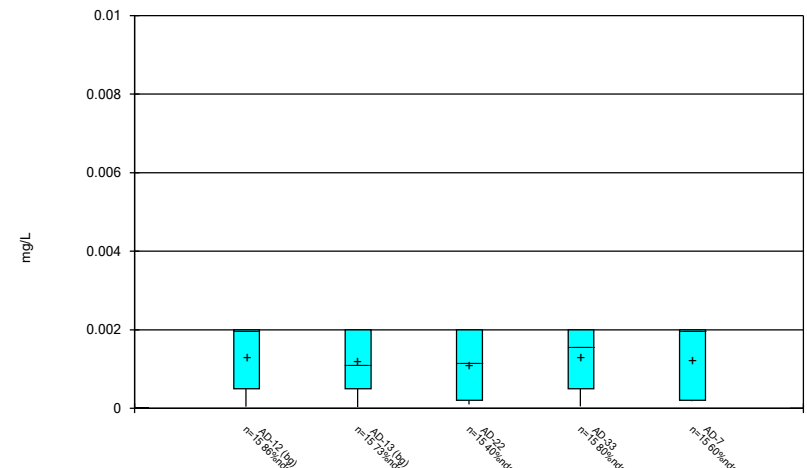
Constituent: Selenium, total Analysis Run 12/20/2020 1:14 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



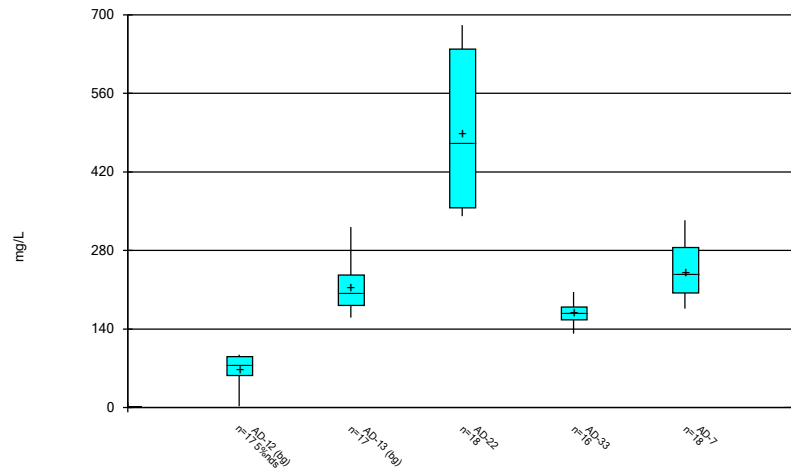
Constituent: Sulfate, total Analysis Run 12/20/2020 1:14 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 12/20/2020 1:14 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 1:14 PM View: Descriptive
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Outlier Summary

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 11:18 AM

	AD-33 Arsenic, total (mg/L)	AD-33 Barium, total (mg/L)	AD-13 Cadmium, total (mg/L)	AD-33 Chromium, total (mg/L)	AD-33 Cobalt, total (mg/L)	AD-7 Fluoride, total (mg/L)	AD-33 Lead, total (mg/L)	AD-22 Mercury, total (mg/L)	AD-12 Molybdenum, total (mg/L)	AD-13 Molybdenum, total (mg/L)
5/11/2016								0.01341 (o)		
7/14/2016								0.017 (o)		
9/7/2016	0.067 (o)	0.163 (o)		0.125 (o)	0.033 (o)		0.014 (o)	0.019829 (o)		
1/12/2017								0.01332 (o)		
4/11/2017			0.002 (o)							
8/24/2017						2.994 (o)				
2/27/2019								<0.04 (o)	<0.04 (o)	
5/21/2019								<0.04 (o)	<0.04 (o)	
5/22/2019										

	AD-22 Molybdenum, total (mg/L)	AD-33 Molybdenum, total (mg/L)	AD-7 Molybdenum, total (mg/L)	AD-12 Thallium, total (mg/L)	AD-13 Thallium, total (mg/L)	AD-22 Thallium, total (mg/L)	AD-33 Thallium, total (mg/L)	AD-7 Thallium, total (mg/L)	AD-33 Total Dissolved Solids [TDS] (mg/L)
5/11/2016									326 (o)
7/14/2016									
9/7/2016									
1/12/2017									
4/11/2017									
8/24/2017									
2/27/2019	<0.04 (o)	<0.04 (o)		<0.01 (o)	<0.01 (o)	<0.01 (o)	<0.01 (o)	<0.01 (o)	
5/21/2019									
5/22/2019	<0.04 (o)	<0.04 (o)	<0.04 (o)						

Appendix III Outlier Analysis - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 8:59 AM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Method</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Chloride, total (mg/L)	AD-33	Yes	16	NP	16	9.313	2.14	ln(x)	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-33	Yes	326	NP	16	179.5	44.03	ln(x)	ShapiroWilk

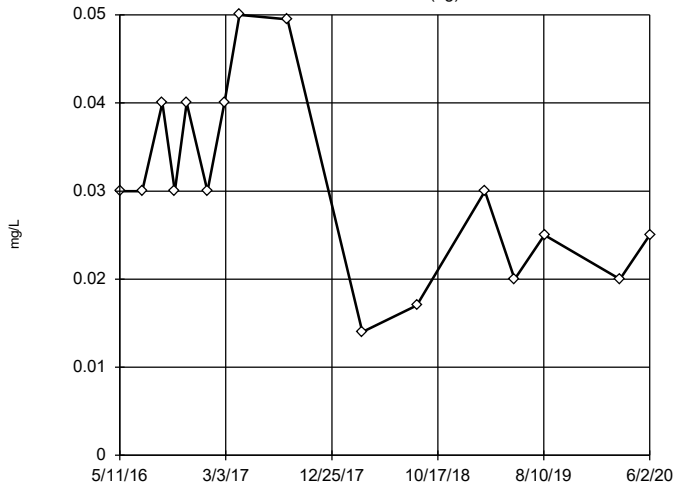
Appendix III Outlier Analysis - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 8:59 AM

Constituent	Well	Outlier	Value(s)	Method	N	Mean	Std. Dev.	Distribution	Normality Test
Boron, total (mg/L)	AD-12 (bg)	No	n/a	NP	16	0.03066	0.0108	x^(1/3)	ShapiroWilk
Boron, total (mg/L)	AD-13 (bg)	No	n/a	NP	16	0.06424	0.01021	x^2	ShapiroWilk
Boron, total (mg/L)	AD-22	No	n/a	NP	17	0.05108	0.01917	sqrt(x)	ShapiroWilk
Boron, total (mg/L)	AD-33	No	n/a	NP	17	0.1277	0.02854	x^(1/3)	ShapiroWilk
Boron, total (mg/L)	AD-7	No	n/a	NP	17	1.578	0.9522	sqrt(x)	ShapiroWilk
Calcium, total (mg/L)	AD-12 (bg)	No	n/a	NP	16	0.3091	0.05881	x^(1/3)	ShapiroWilk
Calcium, total (mg/L)	AD-13 (bg)	No	n/a	NP	16	8.986	1.396	normal	ShapiroWilk
Calcium, total (mg/L)	AD-22	No	n/a	NP	17	10.82	3.451	ln(x)	ShapiroWilk
Calcium, total (mg/L)	AD-33	No	n/a	NP	17	1.458	0.3676	ln(x)	ShapiroWilk
Calcium, total (mg/L)	AD-7	No	n/a	NP	17	4.252	1.178	sqrt(x)	ShapiroWilk
Chloride, total (mg/L)	AD-12 (bg)	No	n/a	NP	16	6.396	1.272	ln(x)	ShapiroWilk
Chloride, total (mg/L)	AD-13 (bg)	No	n/a	NP	16	31.4	7.575	ln(x)	ShapiroWilk
Chloride, total (mg/L)	AD-22	No	n/a	NP	17	65.6	13.92	normal	ShapiroWilk
Chloride, total (mg/L)	AD-33	Yes	16	NP	16	9.313	2.14	ln(x)	ShapiroWilk
Chloride, total (mg/L)	AD-7	No	n/a	NP	17	23.79	6.631	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-12 (bg)	No	n/a	NP	16	0.6193	0.4482	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-13 (bg)	No	n/a	NP	16	0.5439	0.3085	x^(1/3)	ShapiroWilk
Fluoride, total (mg/L)	AD-22	No	n/a	NP	17	0.9089	0.3463	x^3	ShapiroWilk
Fluoride, total (mg/L)	AD-33	No	n/a	NP	16	0.7017	0.3643	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-7	No	n/a	NP	17	0.9168	0.5919	ln(x)	ShapiroWilk
pH, field (SU)	AD-12 (bg)	No	n/a	NP	16	4.186	0.7328	x^3	ShapiroWilk
pH, field (SU)	AD-13 (bg)	No	n/a	NP	16	5.772	0.3969	x^2	ShapiroWilk
pH, field (SU)	AD-22	No	n/a	NP	16	4.262	0.4219	ln(x)	ShapiroWilk
pH, field (SU)	AD-33	No	n/a	NP	16	3.807	0.434	x^3	ShapiroWilk
pH, field (SU)	AD-7	No	n/a	NP	16	3.683	0.3514	x^2	ShapiroWilk
Sulfate, total (mg/L)	AD-12 (bg)	No	n/a	NP	16	4.8	1.612	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-13 (bg)	No	n/a	NP	16	58.69	15.75	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-22	No	n/a	NP	17	231.4	98.43	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-33	No	n/a	NP	16	57.94	15.36	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-7	No	n/a	NP	17	60.25	20.45	ln(x)	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-12 (bg)	No	n/a	NP	16	69.34	24.88	x^2	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-13 (bg)	No	n/a	NP	16	216.4	46.74	ln(x)	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-22	No	n/a	NP	17	489.7	130.1	ln(x)	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-33	Yes	326	NP	16	179.5	44.03	ln(x)	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-7	No	n/a	NP	17	243	51.43	ln(x)	ShapiroWilk

Tukey's Outlier Screening

AD-12 (bg)

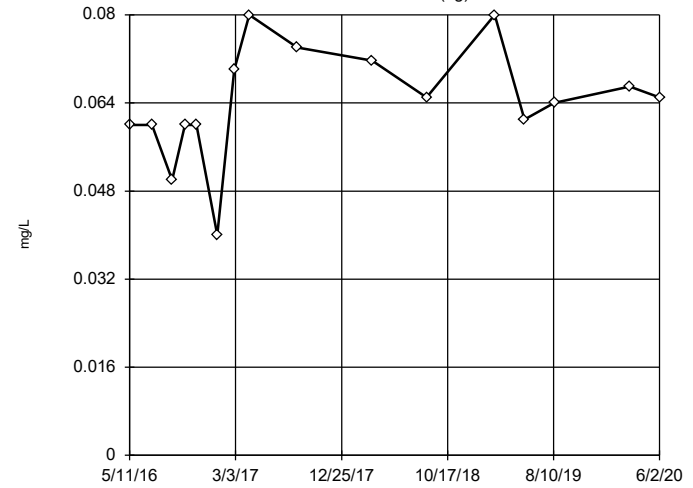


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.1424, low cutoff = 0.001052, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-13 (bg)

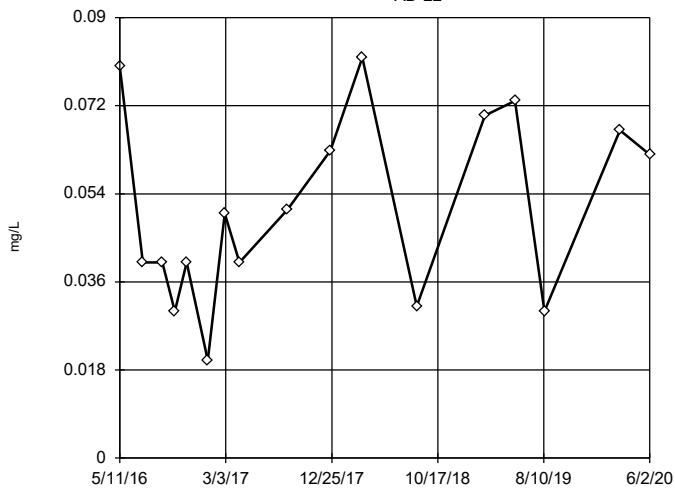


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were square transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.09634, low cutoff = -0.02572, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-22

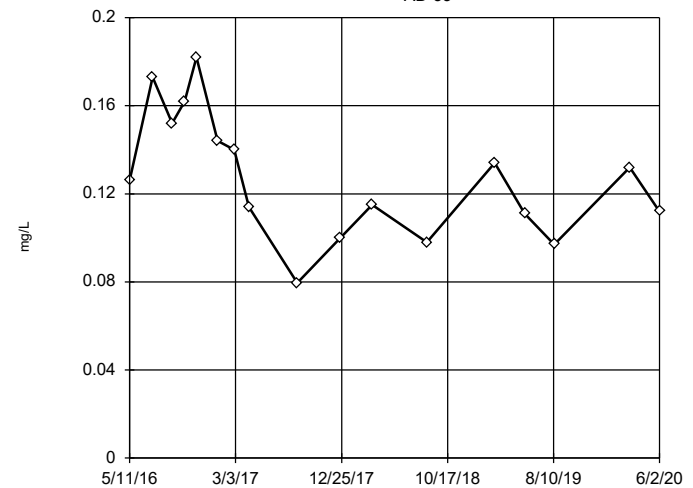


n = 17
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.233, low cutoff = -0.001088, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-33

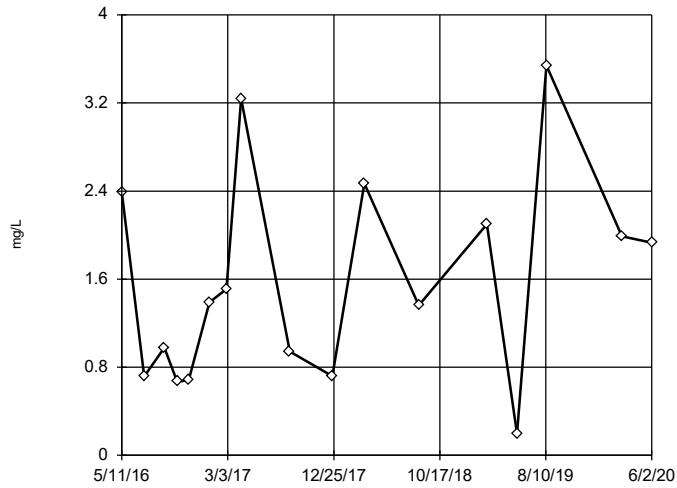


n = 17
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.3411, low cutoff = 0.02769, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-7



n = 17

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

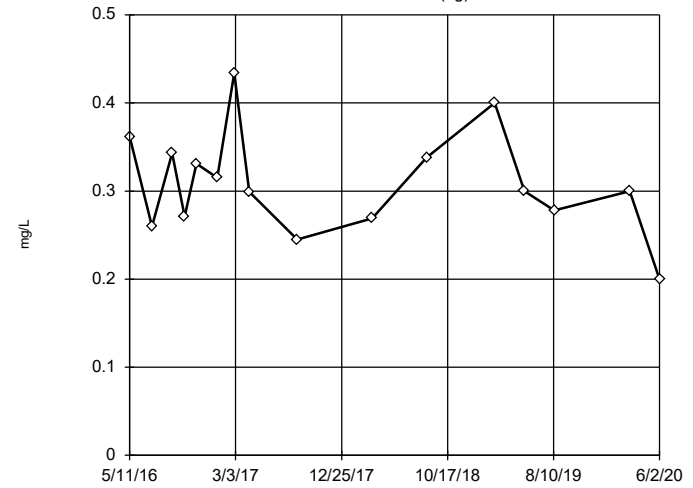
Data were square root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 11.9, low cutoff = -1.222, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-12 (bg)



n = 16

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

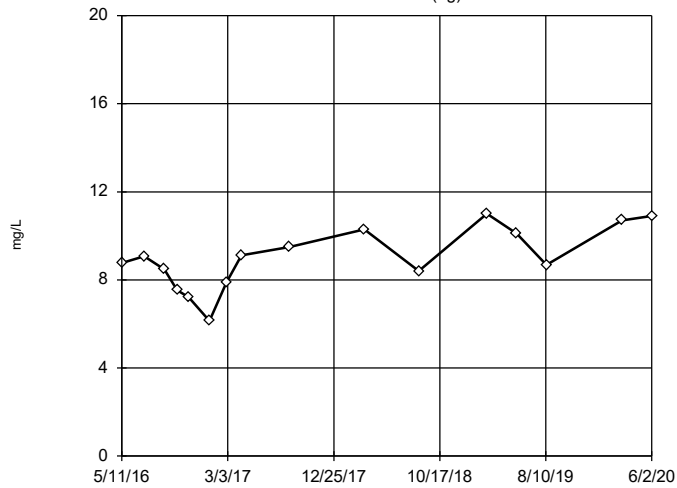
Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.6232, low cutoff = 0.118, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-13 (bg)



n = 16

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

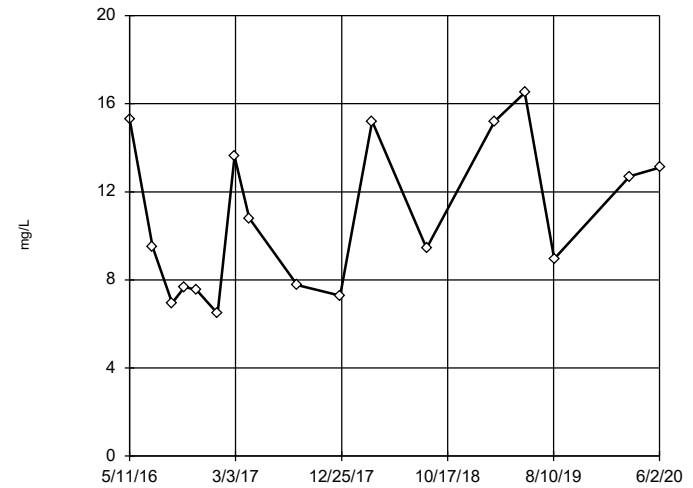
Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 16.38, low cutoff = 1.96, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-22



n = 17

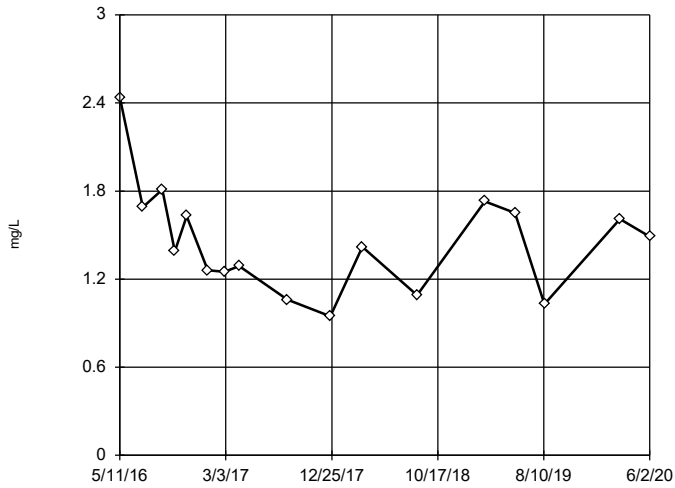
No outliers found.
Tukey's method selected by user.

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

High cutoff = 96.78, low cutoff = 1.131, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

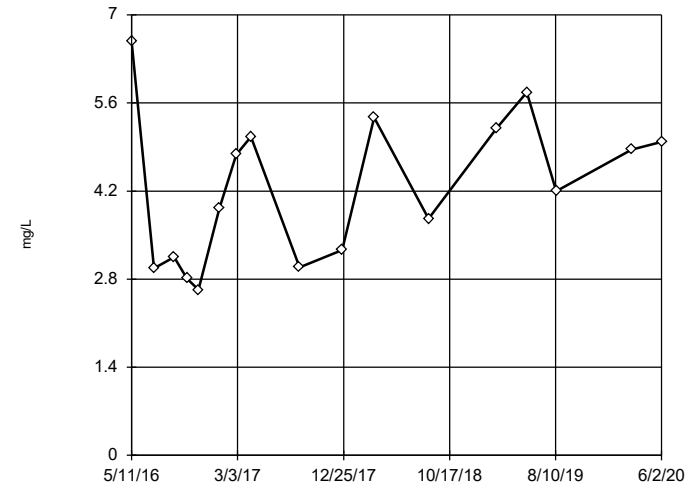
Tukey's Outlier Screening
AD-33



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 = 4.889, low cutoff = 0.3987, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

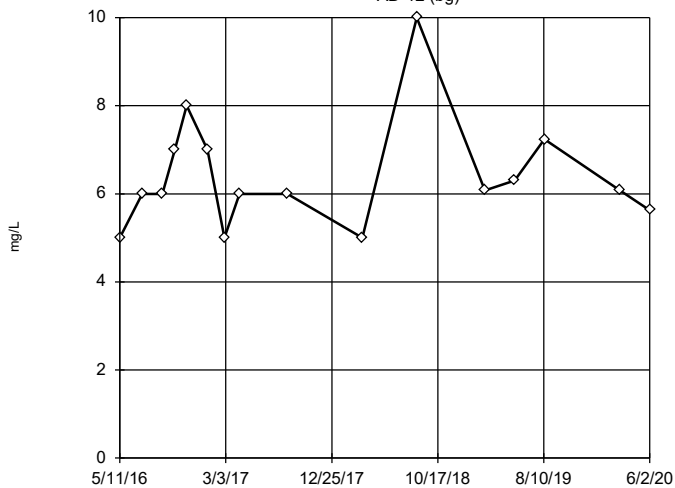
Tukey's Outlier Screening
AD-7



n = 17
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 = 14.47, low cutoff = 0.04549, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

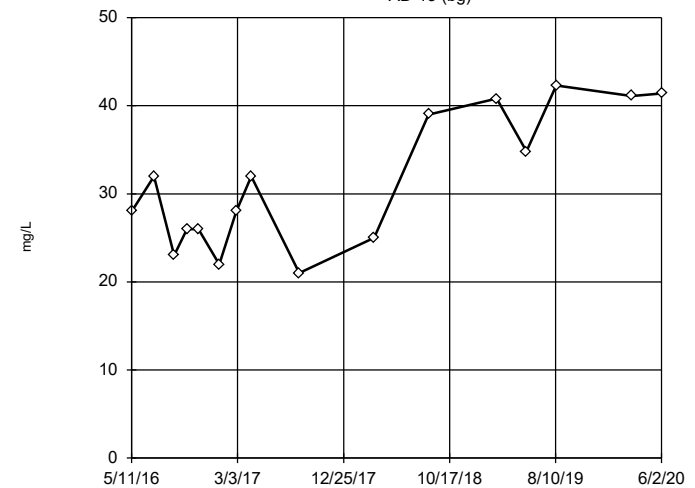
Tukey's Outlier Screening
AD-12 (bg)



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 = 12.23, low cutoff = 3.327, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening
AD-13 (bg)

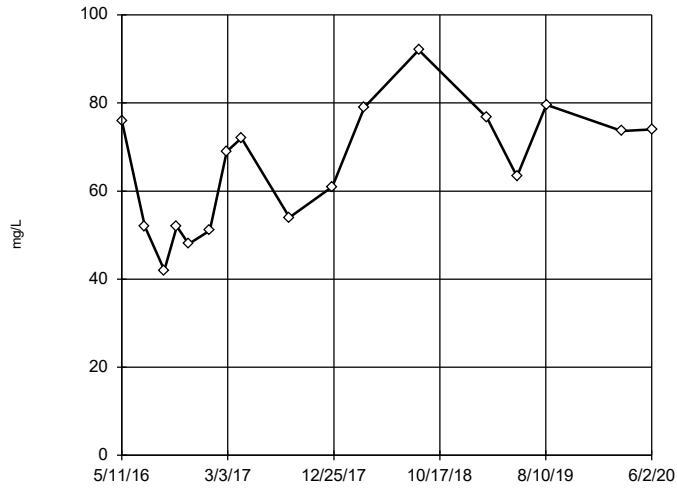


n = 16
No outliers found. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 152.8, low cutoff = 6.656, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-22

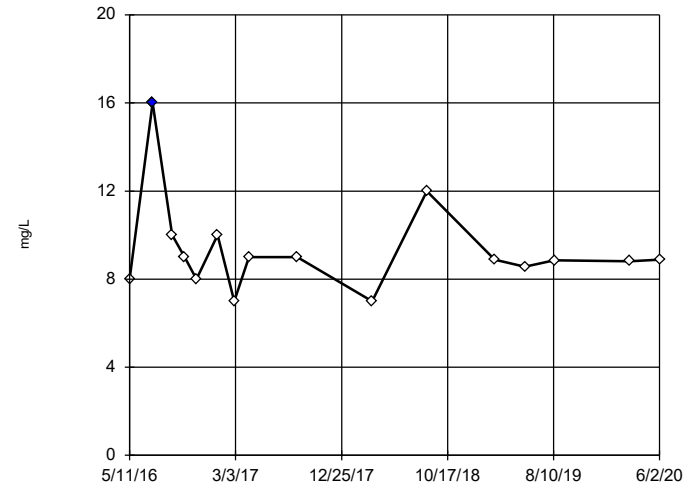


n = 17
 No outliers found.
 Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality; analysis run on raw data.
 High cutoff = 149.4, low cutoff = -21.05, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-33

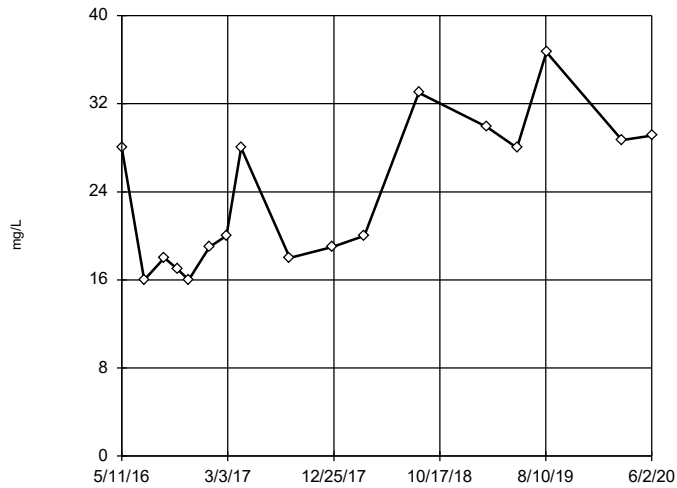


n = 16
 Outlier is drawn as solid.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 14.27, low cutoff = 5.505, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-7

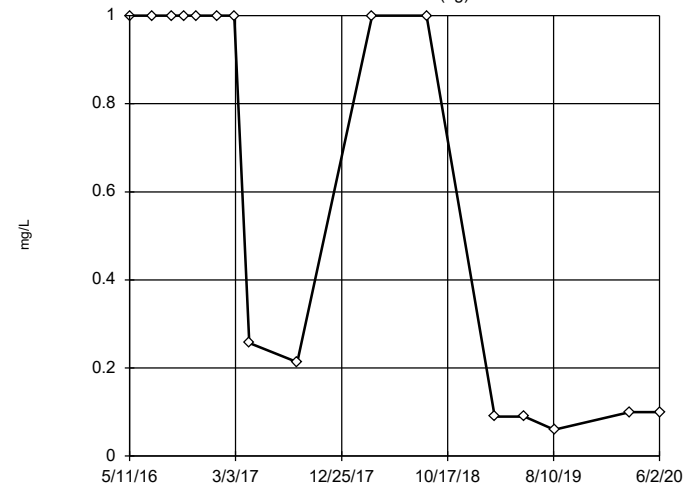


n = 17
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 119.6, low cutoff = 4,349, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-12 (bg)

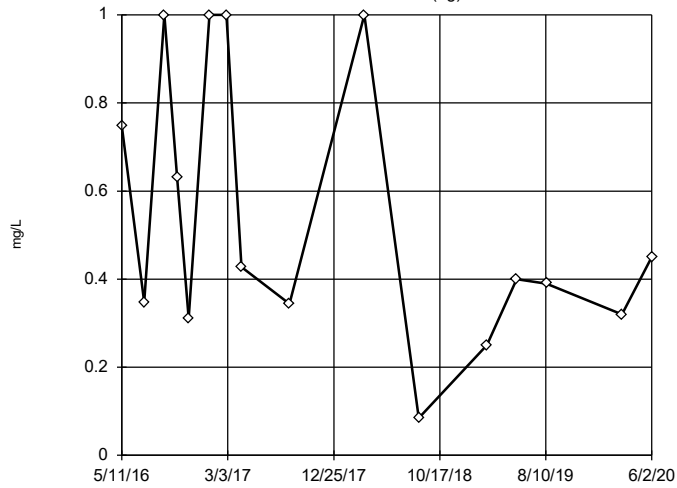


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1000, low cutoff = 0.0001, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-13 (bg)

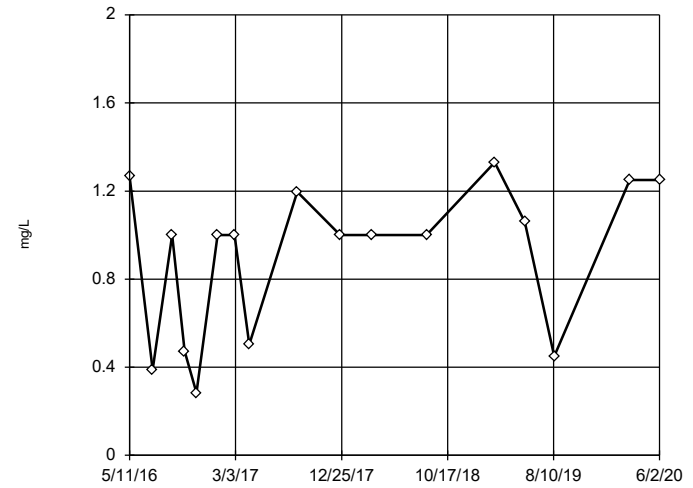


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 5.254, low cutoff = -0.000786, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-22

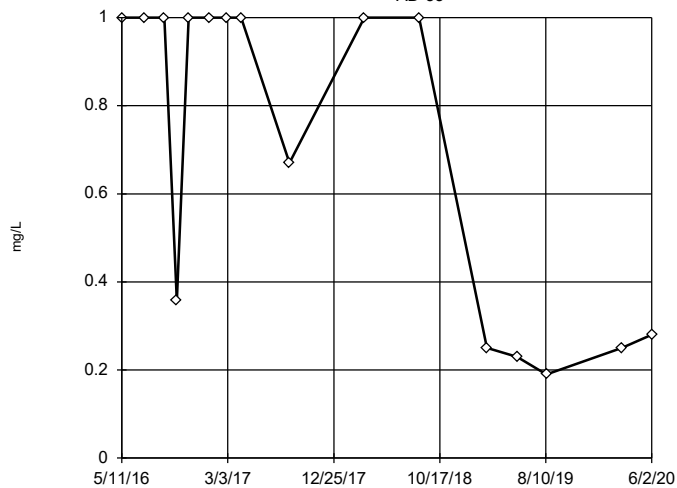


n = 17
 No outliers found.
 Tukey's method selected by user.
 Data were cube transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1.911, low cutoff = -1.713, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-33

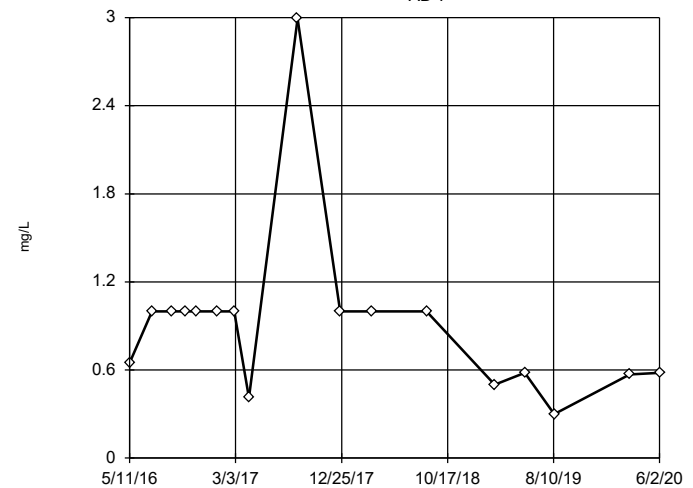


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 53.99, low cutoff = 0.0049, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

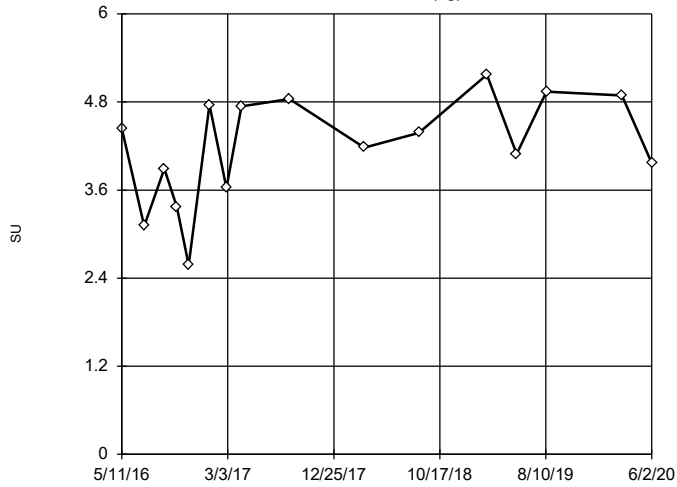
AD-7



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 = 5.261, low cutoff = 0.1093, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

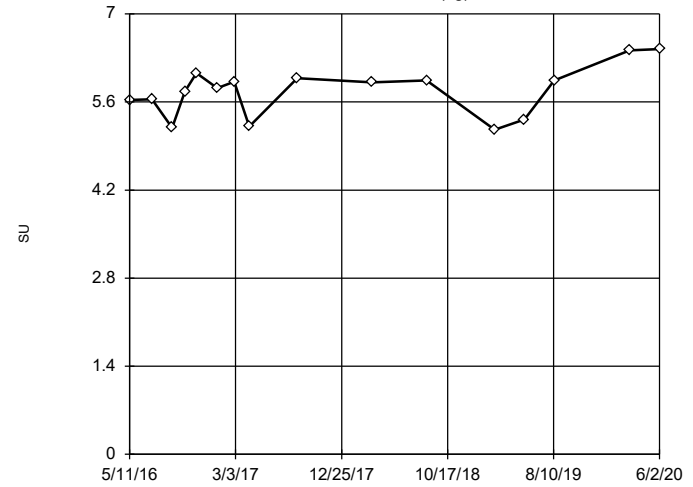
Tukey's Outlier Screening AD-12 (bg)



n = 16
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 = 6.561, low cutoff = -4.911, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

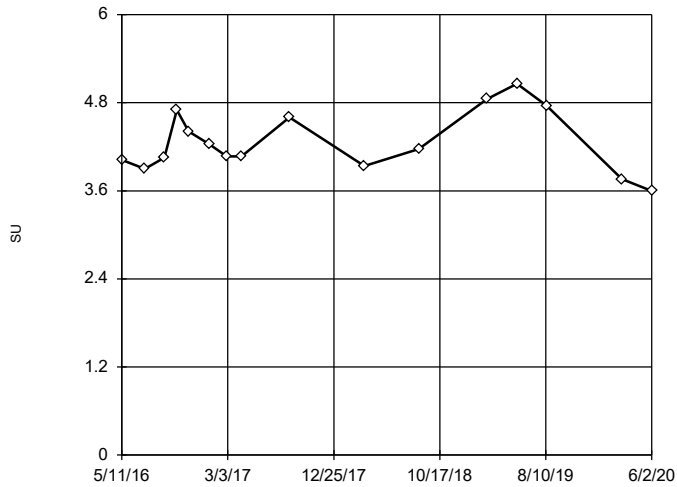
Tukey's Outlier Screening AD-13 (bg)



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 = 7.217, low cutoff = 3.665, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

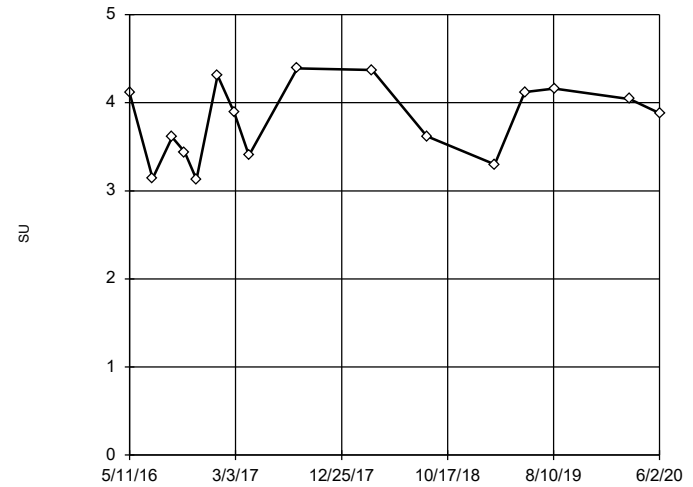
Tukey's Outlier Screening AD-22



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 = 7.415, low cutoff = 2.496, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

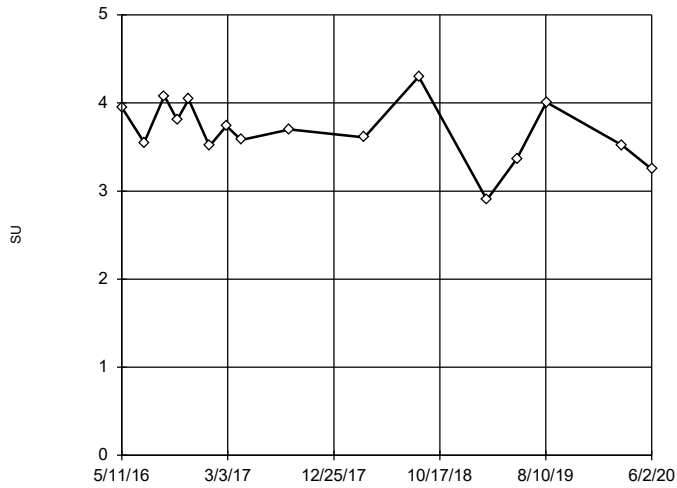
Tukey's Outlier Screening AD-33



n = 16
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 = 5.472, low cutoff = -3.753, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

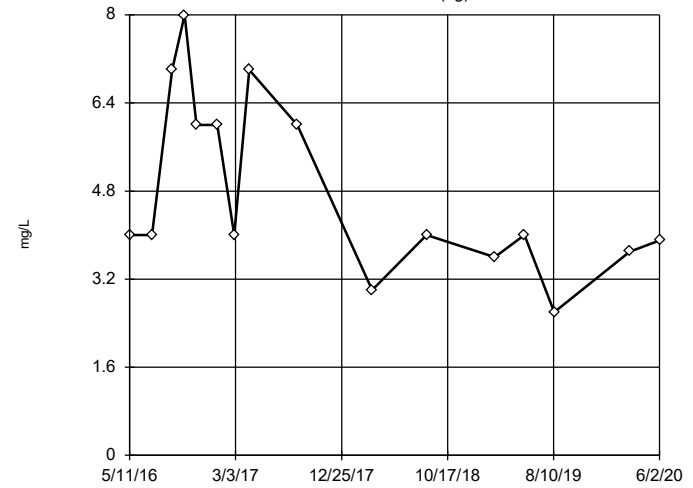
Tukey's Outlier Screening
AD-7



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 = 5.128, low cutoff = 1.377, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

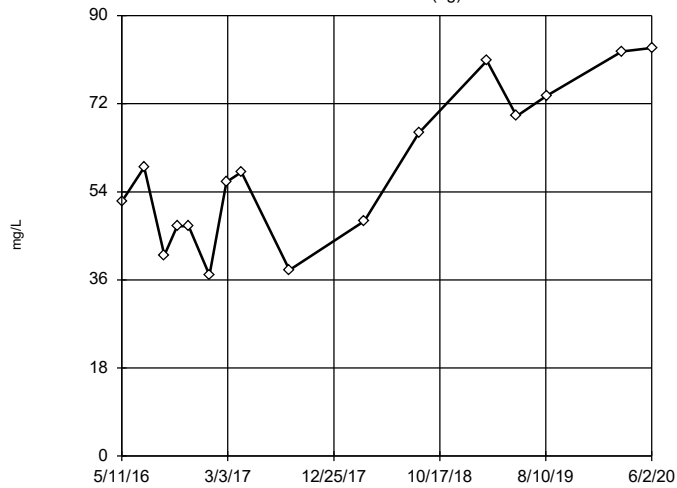
Tukey's Outlier Screening
AD-12 (bg)



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 = 23.64, low cutoff = 0.964, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

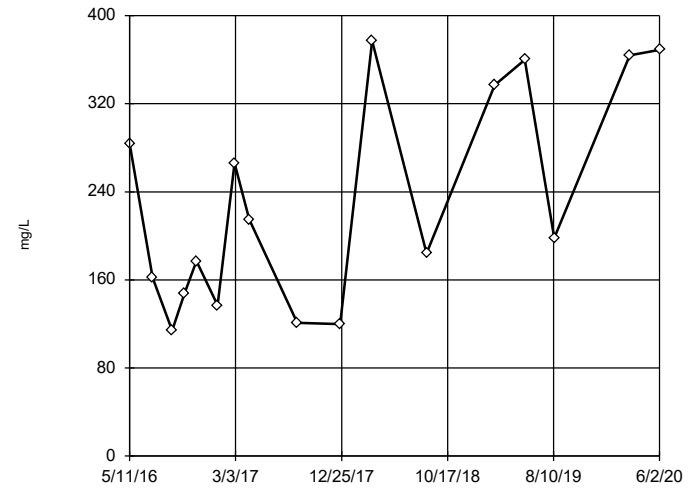
Tukey's Outlier Screening
AD-13 (bg)



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 = 252, low cutoff = 13.34, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening
AD-22

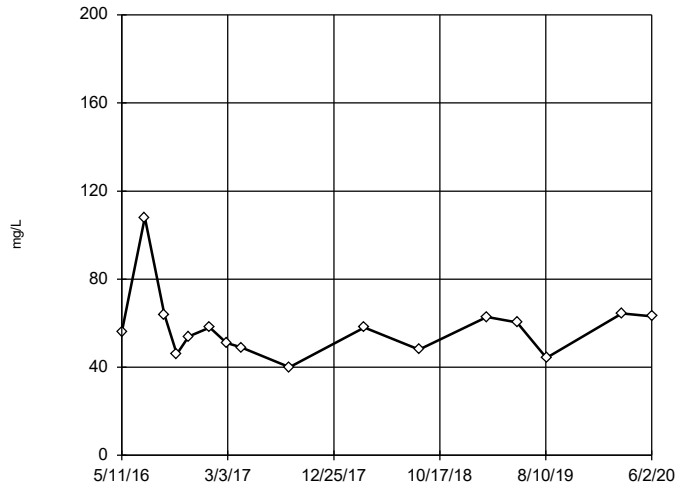


n = 17
No outliers found. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 5098, low cutoff = 9.729, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/20/2020 8:57 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-33

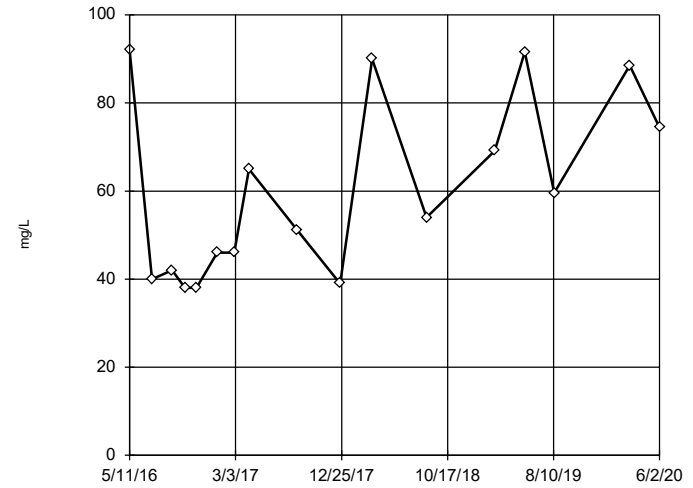


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 137.7, low cutoff = 22.18, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-7

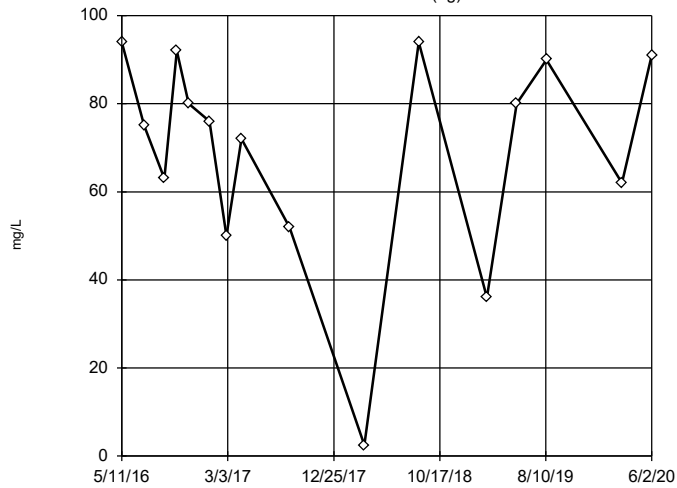


n = 17
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 629.6, low cutoff = 5.283, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-12 (bg)

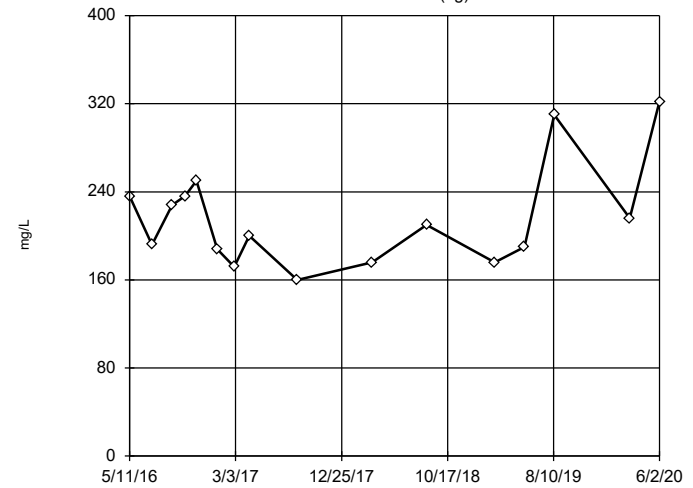


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were square transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 151.5, low cutoff = -107.1, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-13 (bg)

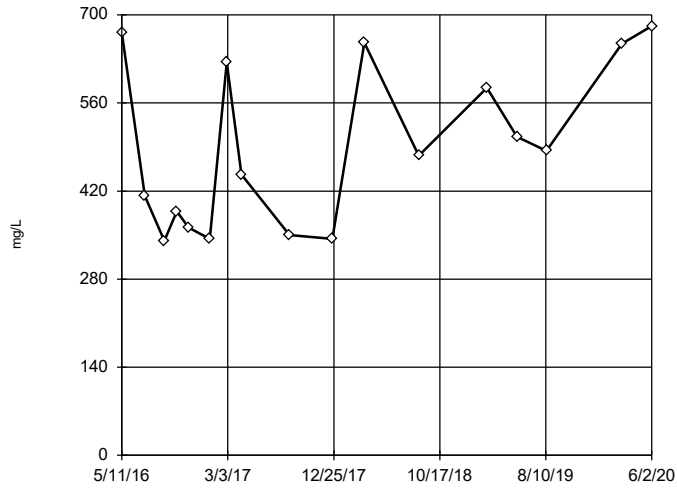


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 515.4, low cutoff = 83.29, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-22

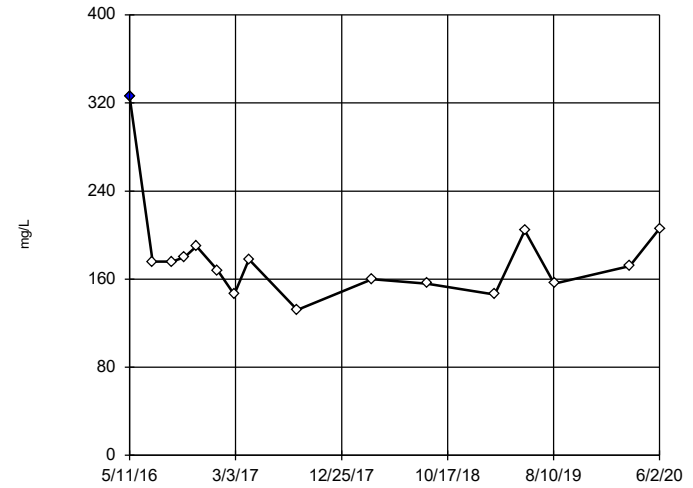


n = 17
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 3693, low cutoff = 61.58, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-33

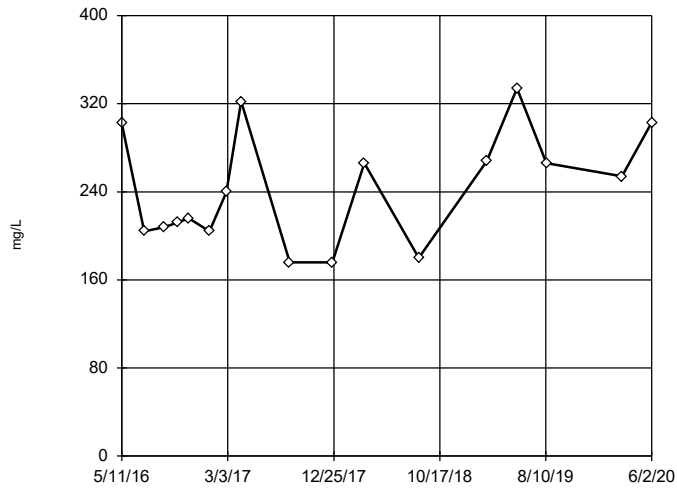


n = 16
 Outlier is drawn as solid. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 308.1, low cutoff = 93.64, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening

AD-7



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 = 771.6, low cutoff = 75.22, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 8:57 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

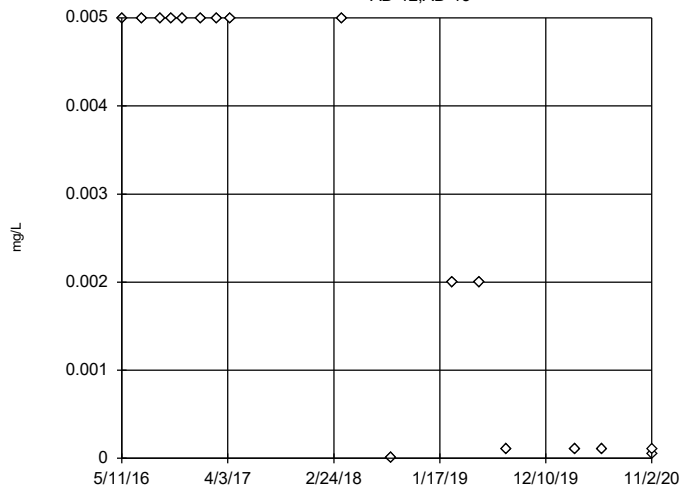
Appendix IV Outlier Analysis - All Results (No Significant)

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 10:58 AM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Method</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Antimony, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	32	0.003087	0.00228	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.003337	0.002238	normal	ShapiroWilk
Barium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.03179	0.008441	sqrt(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.0004574	0.0004212	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	30	0.0005471	0.0004657	unknown	ShapiroWilk
Chromium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.0009903	0.001208	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.02234	0.02169	x^3	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-12,AD-13	No	n/a	NP	32	1.243	0.7784	sqrt(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-12,AD-13	No	n/a	NP	34	0.561	0.38	x^(1/3)	ShapiroWilk
Lead, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	32	0.003102	0.00226	unknown	ShapiroWilk
Lithium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.07402	0.06854	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.00001969	0.000008434	normal	ShapiroWilk
Molybdenum, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	28	0.003791	0.001718	unknown	ShapiroWilk
Selenium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.003114	0.00214	x^2	ShapiroWilk
Thallium, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	30	0.001252	0.0007583	unknown	ShapiroWilk

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13

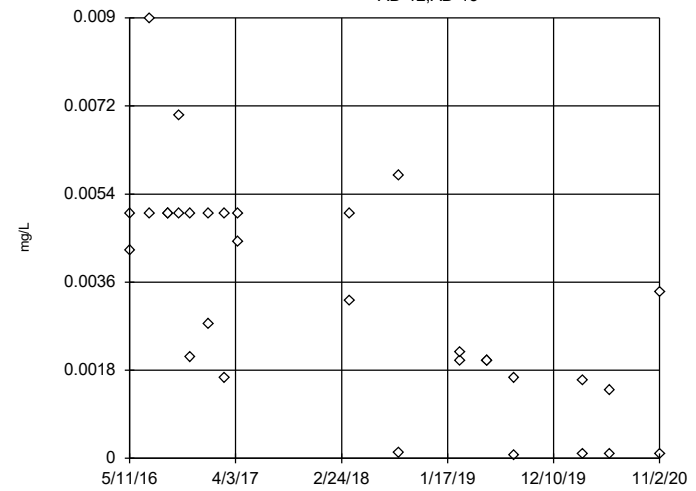


n = 32
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Antimony, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13

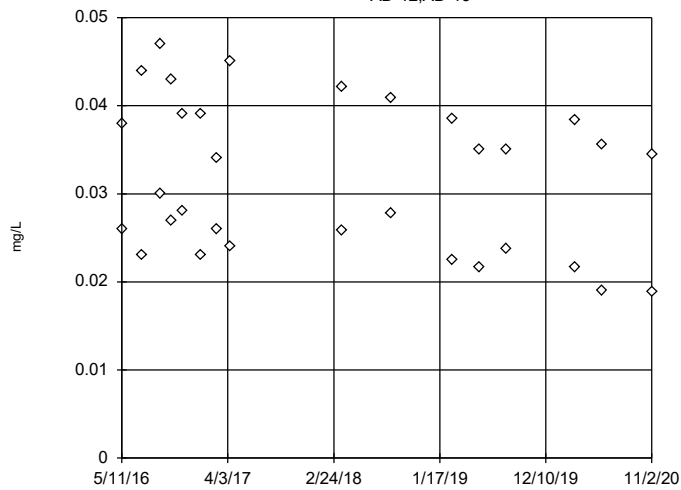


n = 32
 No outliers found.
 Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality; analysis run on raw data.
 High cutoff = 0.01507, low cutoff = -0.008431, based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13

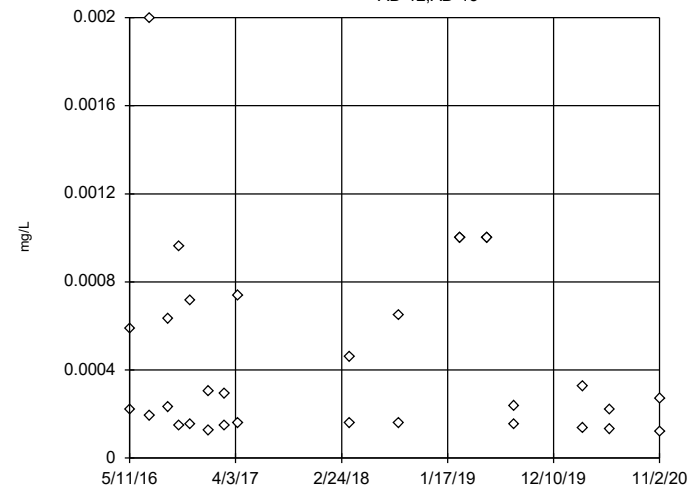


n = 32
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.1047, low cutoff = 0.0007748, based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13

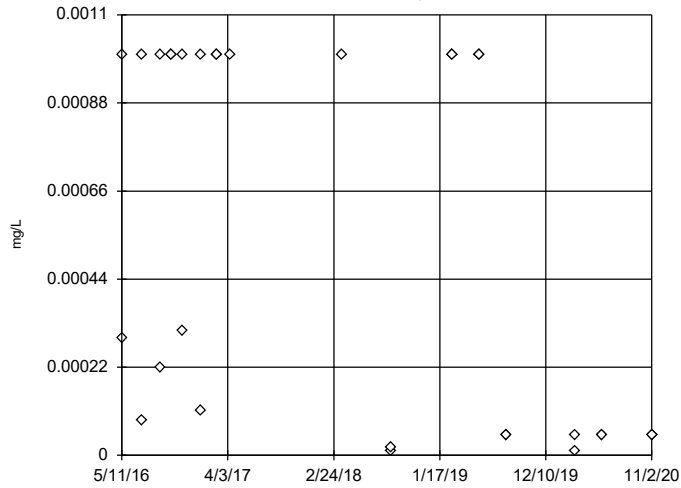


n = 32
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.05645, low cutoff = 0.00000189, based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13

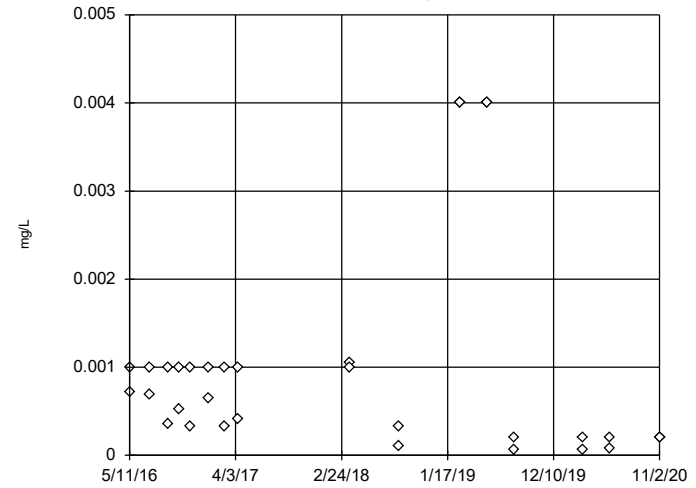


n = 30
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Cadmium, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13

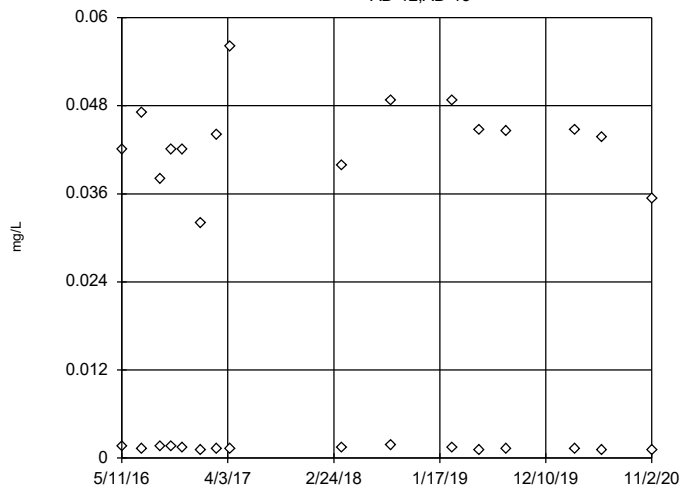


n = 32
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.1144, low cutoff = 0.0000018, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13

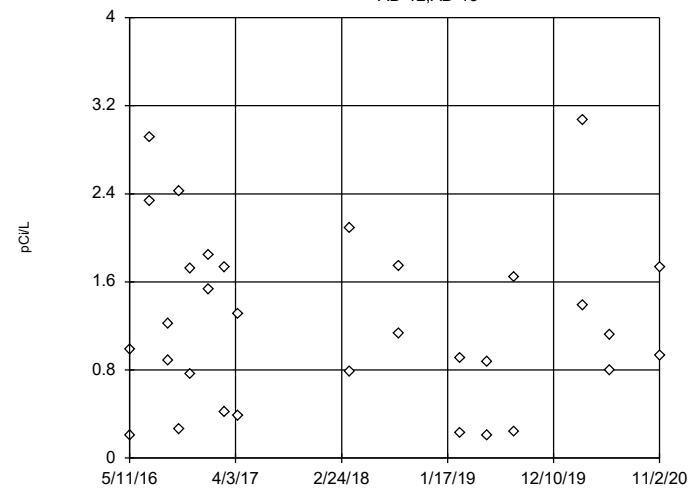


n = 32
 No outliers found.
 Tukey's method selected by user.
 Data were cube transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.06961, low cutoff = -0.06324, based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background

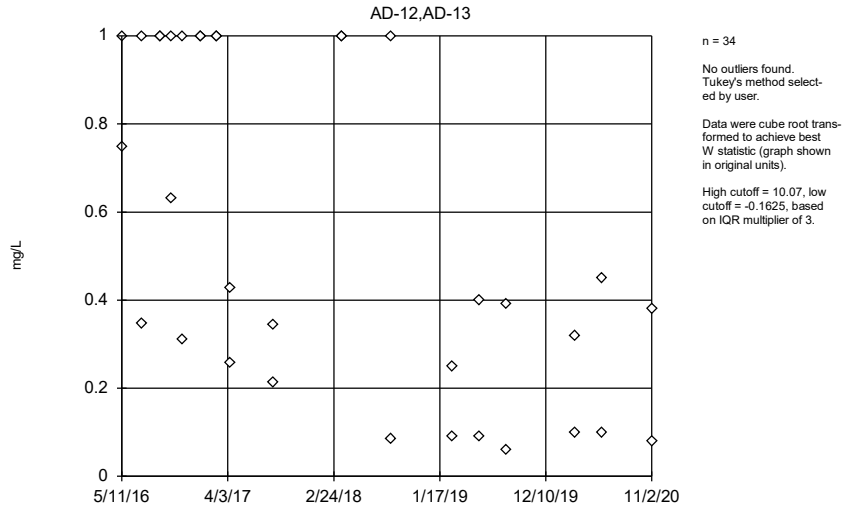
AD-12,AD-13



n = 32
 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 = 6.849, low cutoff = -0.1779, based on IQR multiplier of 3.

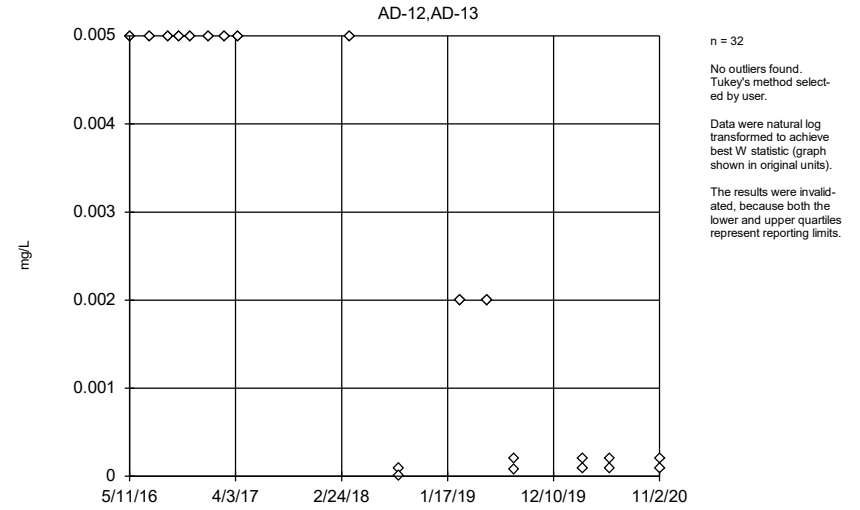
Constituent: Combined Radium 226 + 228 Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background



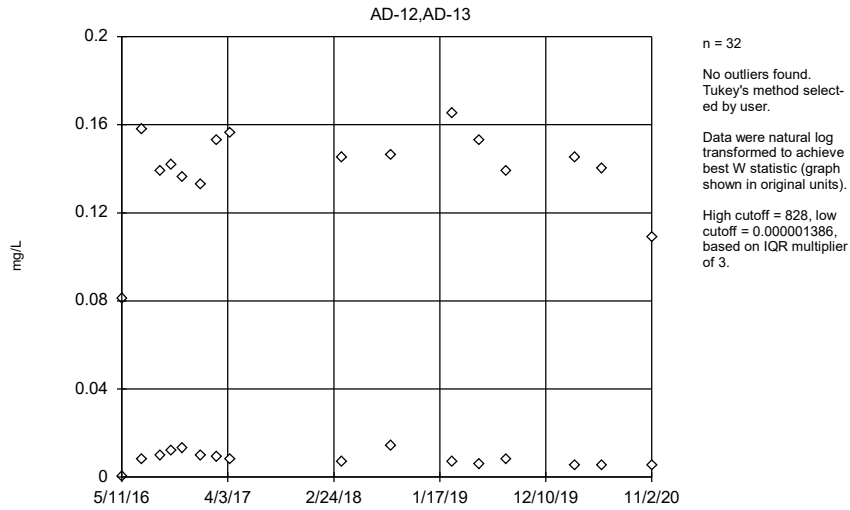
Constituent: Fluoride, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background



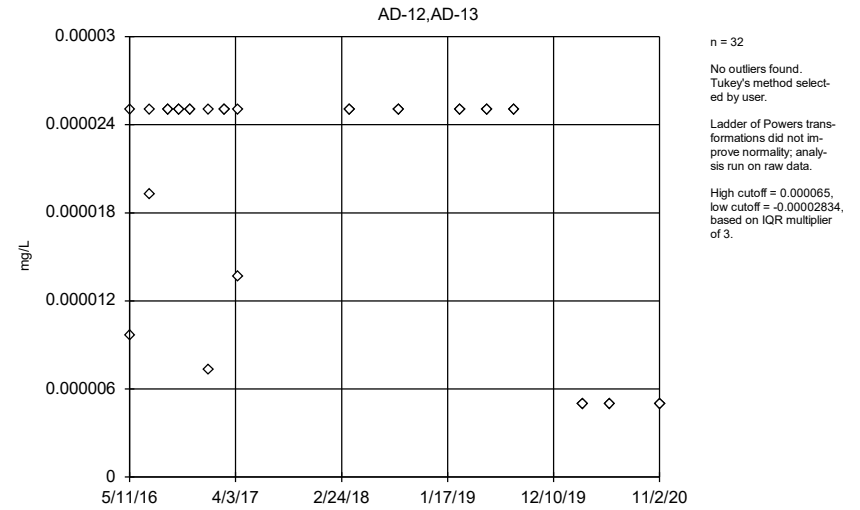
Constituent: Lead, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background



Constituent: Lithium, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tukey's Outlier Screening, Pooled Background



Constituent: Mercury, total Analysis Run 12/20/2020 10:52 AM View: UTLs
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Outlier Analysis - All Results (No Significant)

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 10:58 AM

Constituent	Well	Outlier	Value(s)	Method	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	32	0.003087	0.00228	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.003337	0.002238	normal	ShapiroWilk
Barium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.03179	0.008441	sqrt(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.0004574	0.0004212	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	30	0.0005471	0.0004657	unknown	ShapiroWilk
Chromium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.0009903	0.001208	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.02234	0.02169	x^3	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-12,AD-13	No	n/a	NP	32	1.243	0.7784	sqrt(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-12,AD-13	No	n/a	NP	34	0.561	0.38	x^(1/3)	ShapiroWilk
Lead, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	32	0.003102	0.00226	unknown	ShapiroWilk
Lithium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.07402	0.06854	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.00001969	0.000008434	normal	ShapiroWilk
Molybdenum, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	28	0.003791	0.001718	unknown	ShapiroWilk
Selenium, total (mg/L)	AD-12,AD-13	No	n/a	NP	32	0.003114	0.00214	x^2	ShapiroWilk
Thallium, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	30	0.001252	0.0007583	unknown	ShapiroWilk

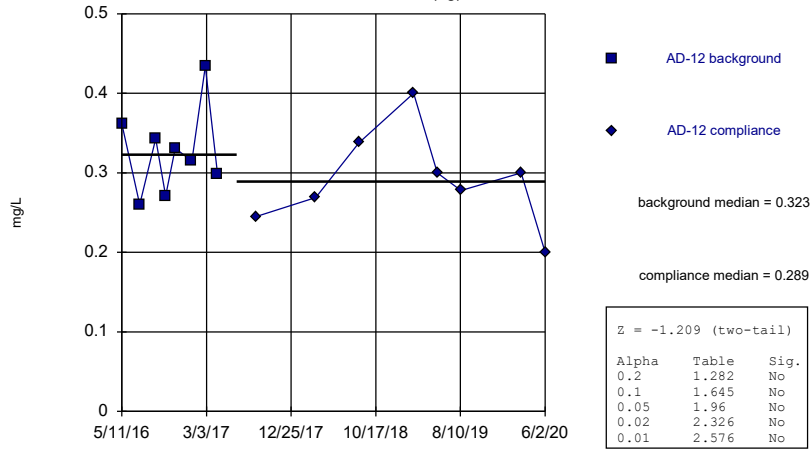
Mann-Whitney Summary - All Results (No Significant)

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 11:47 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Sig.</u>	<u>Method</u>
Calcium, total (mg/L)	AD-12 (bg)	-1.209	No	No	Mann-W
Calcium, total (mg/L)	AD-13 (bg)	2.573	No	No	Mann-W
Calcium, total (mg/L)	AD-22	1.107	No	No	Mann-W
Calcium, total (mg/L)	AD-33	-1.299	No	No	Mann-W
Calcium, total (mg/L)	AD-7	1.203	No	No	Mann-W
pH, field (SU)	AD-12 (bg)	2.048	No	No	Mann-W
pH, field (SU)	AD-13 (bg)	1.314	No	No	Mann-W
pH, field (SU)	AD-22	0.4729	No	No	Mann-W
pH, field (SU)	AD-33	1.628	No	No	Mann-W
pH, field (SU)	AD-7	-1.208	No	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-12 (bg)	-0.5785	No	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-13 (bg)	-0.4733	No	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-22	1.252	No	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-33	-1.044	No	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-7	0.241	No	No	Mann-W

Mann-Whitney (Wilcoxon Rank Sum)

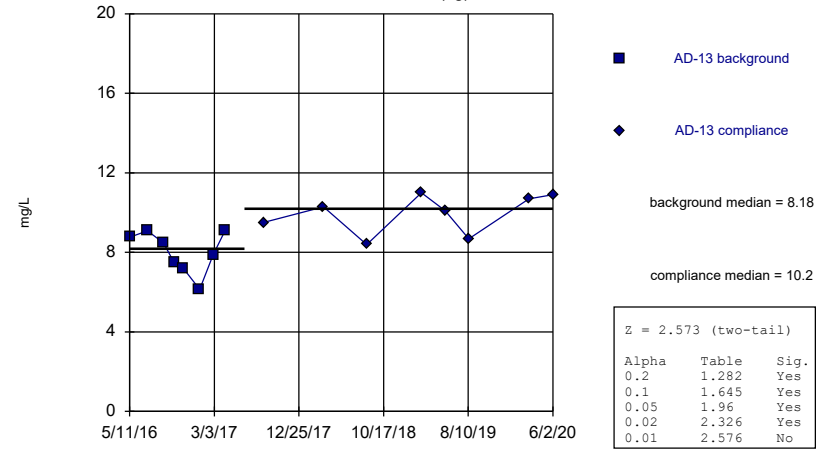
AD-12 (bg)



Constituent: Calcium, total Analysis Run 12/20/2020 11:46 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

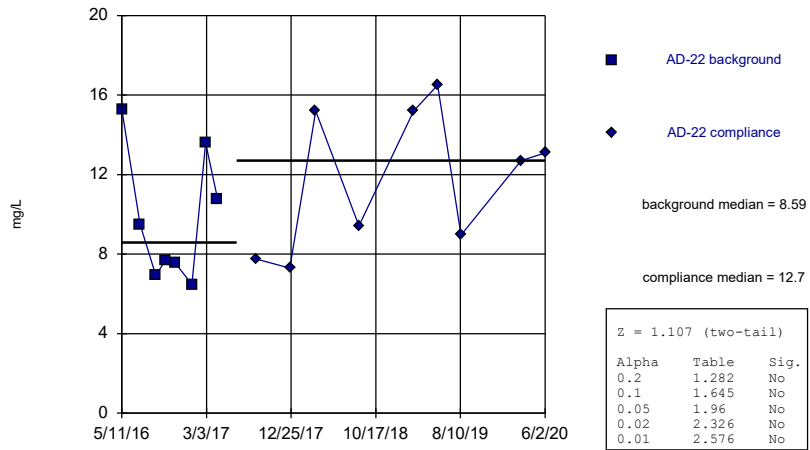
AD-13 (bg)



Constituent: Calcium, total Analysis Run 12/20/2020 11:46 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

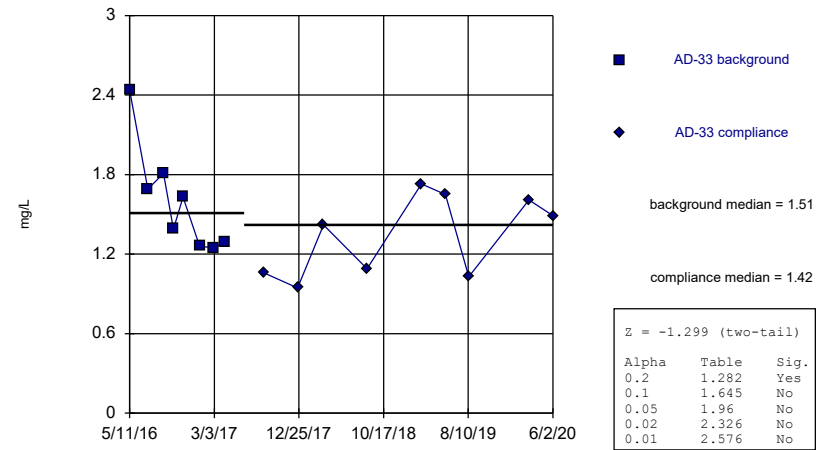
AD-22



Constituent: Calcium, total Analysis Run 12/20/2020 11:46 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

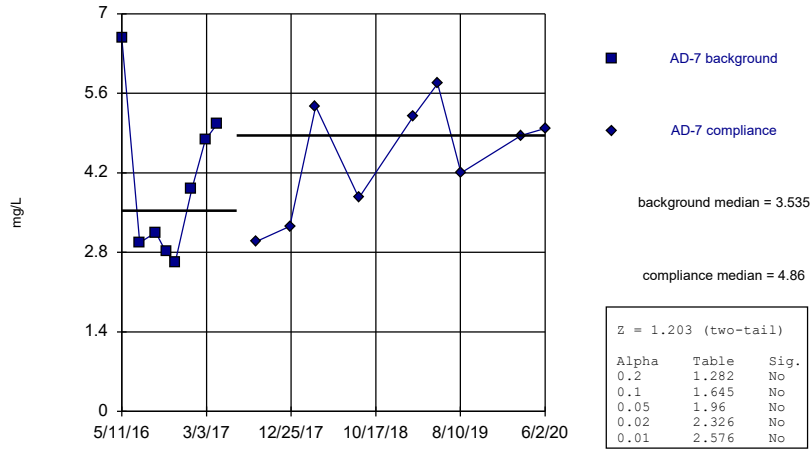
AD-33



Constituent: Calcium, total Analysis Run 12/20/2020 11:46 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

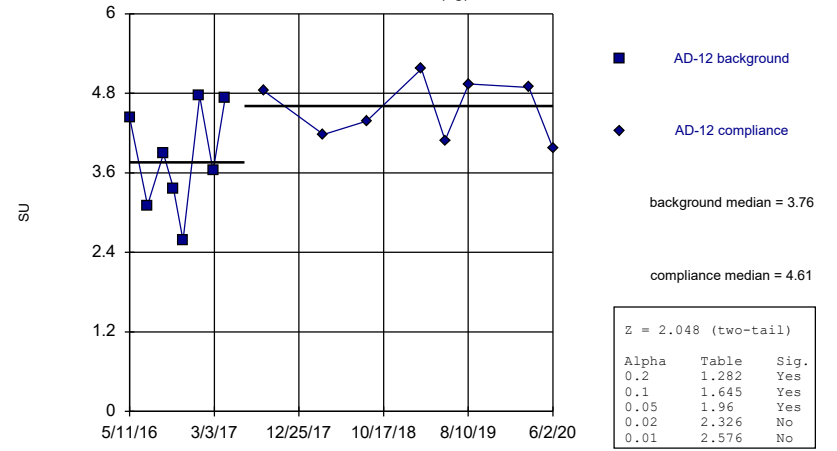
AD-7



Constituent: Calcium, total Analysis Run 12/20/2020 11:46 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

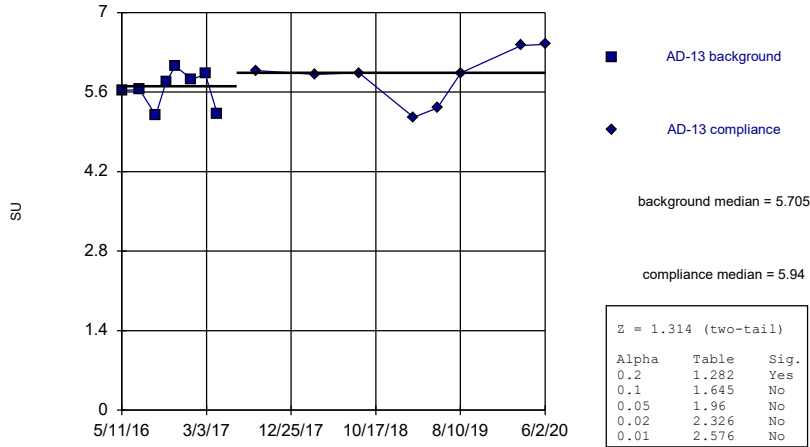
AD-12 (bg)



Constituent: pH, field Analysis Run 12/20/2020 11:46 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

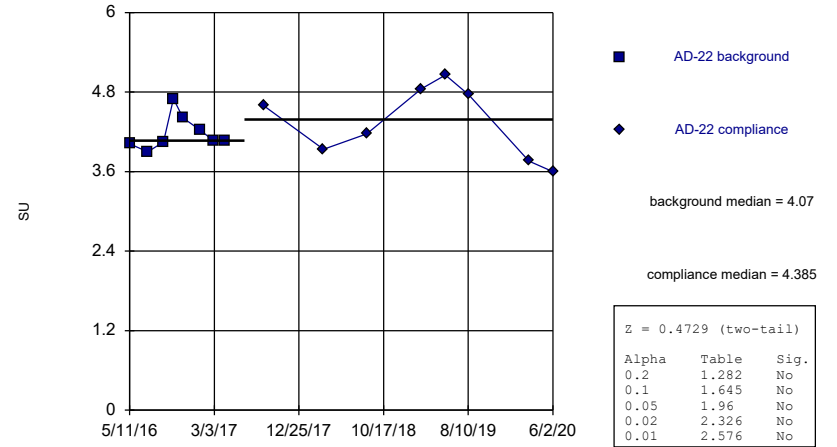
AD-13 (bg)



Constituent: pH, field Analysis Run 12/20/2020 11:46 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

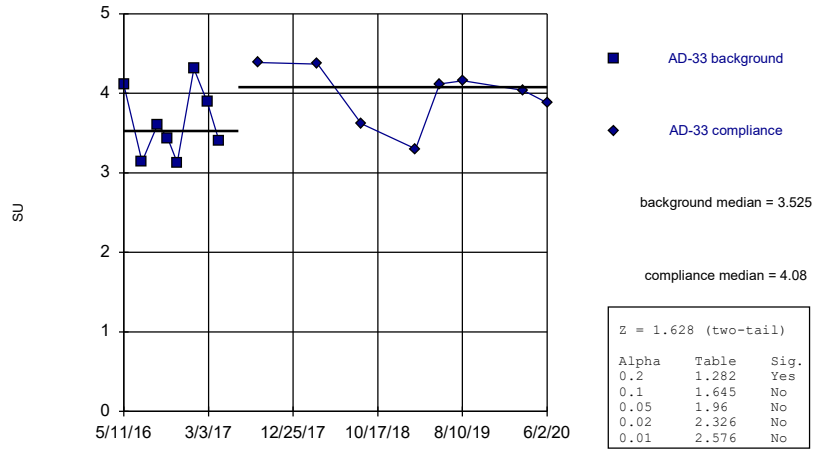
AD-22



Constituent: pH, field Analysis Run 12/20/2020 11:46 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

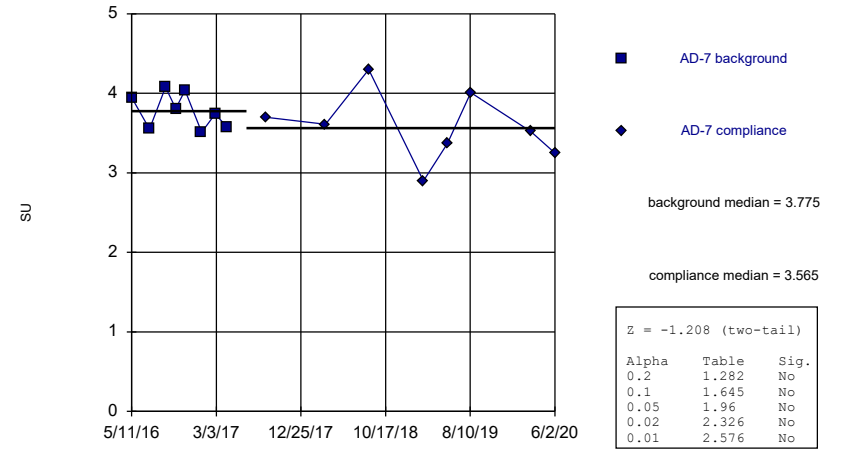
AD-33



Constituent: pH, field Analysis Run 12/20/2020 11:46 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

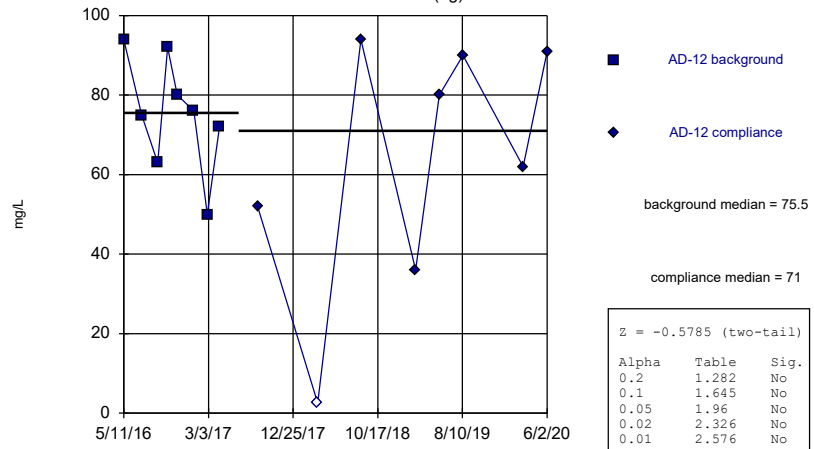
AD-7



Constituent: pH, field Analysis Run 12/20/2020 11:46 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)

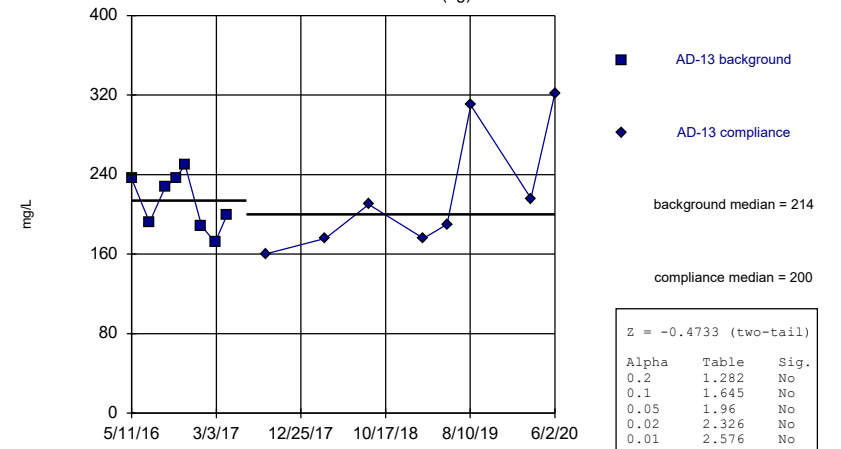
AD-12 (bg)



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 11:46 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

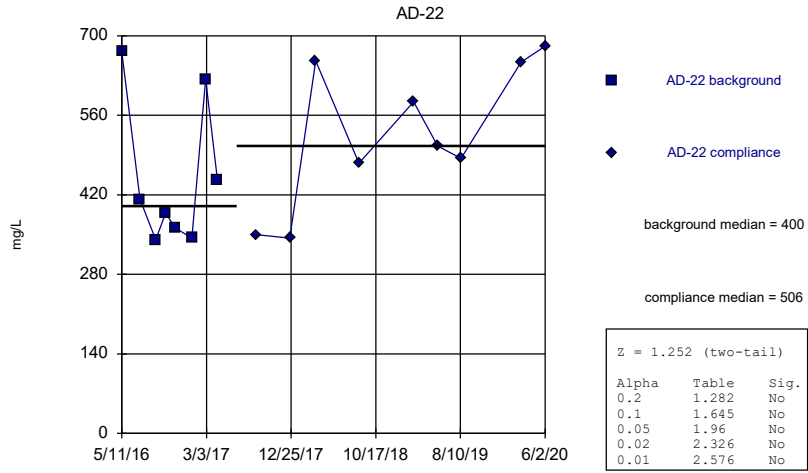
Mann-Whitney (Wilcoxon Rank Sum)

AD-13 (bg)



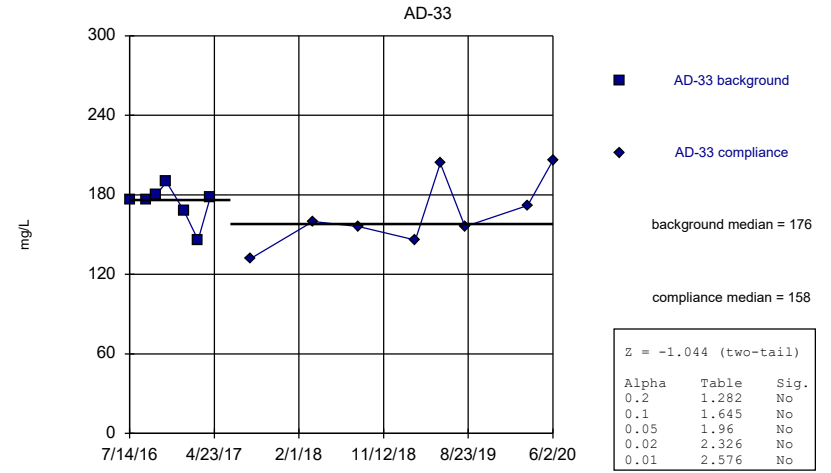
Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 11:46 AM View: Screening
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)



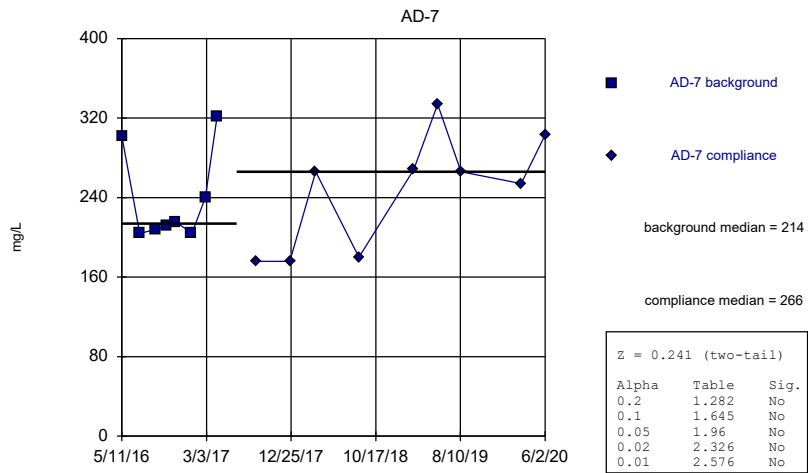
Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 11:46 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 11:46 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 11:46 AM View: Screening
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Trend Test Summary - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 12:23 PM

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

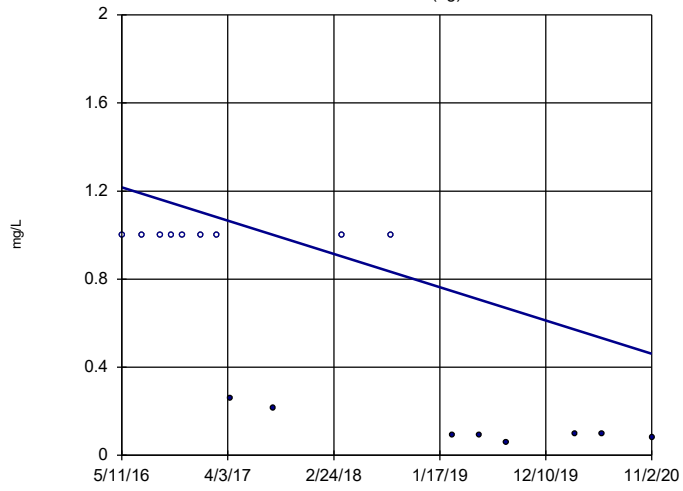
Trend Test Summary - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 12:23 PM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	AD-12 (bg)	-0.001505	-30	-63	No	17	11.76	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-13 (bg)	0.001285	26	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-13 (bg)	3.346	45	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-13 (bg)	-0.05547	-32	-63	No	17	23.53	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (mg/L)	AD-12 (bg)	-0.9837	-14	-63	No	17	5.882	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (mg/L)	AD-13 (bg)	1.562	6	63	No	17	0	n/a	n/a	0.01	NP

Sen's Slope Estimator

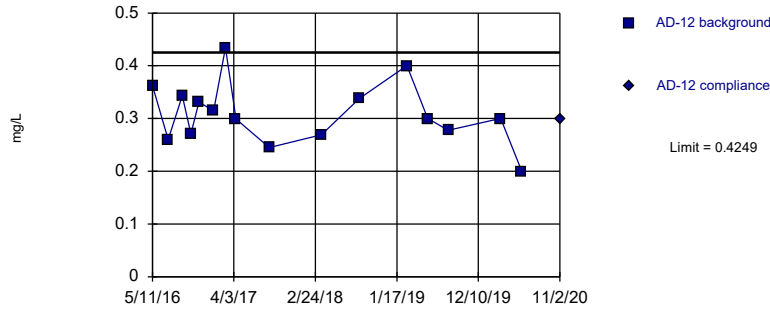
AD-12 (bg)



n = 17
Slope = -0.1686
units per year.
Mann-Kendall
statistic = -76
critical = -63
Decreasing trend
significant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Fluoride, total Analysis Run 12/20/2020 12:21 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

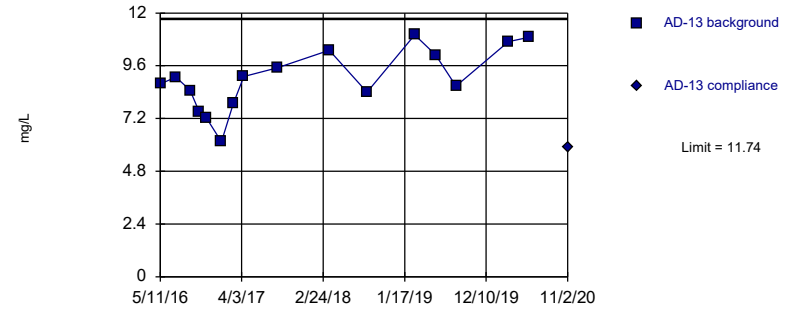
Within Limit Prediction Limit
Intrawell Parametric



Background Data Summary: Mean=0.3091, Std. Dev.=0.05881, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9788, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

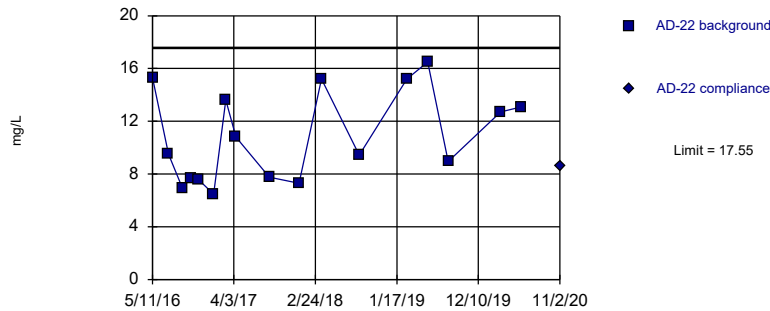
Within Limit Prediction Limit
Intrawell Parametric



Background Data Summary: Mean=8.986, Std. Dev.=1.396, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9675, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

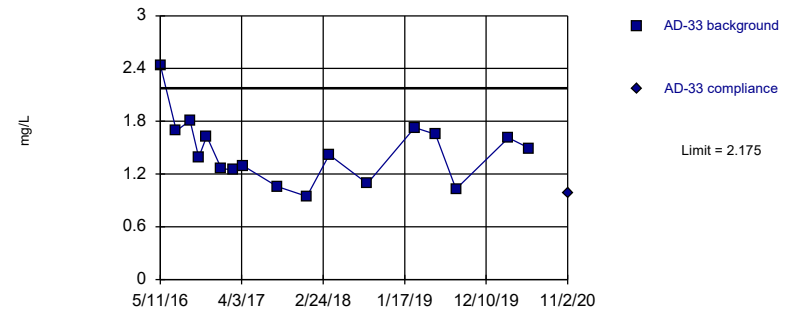
Within Limit Prediction Limit
Intrawell Parametric



Background Data Summary: Mean=10.82, Std. Dev.=3.451, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8952, critical = 0.892. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

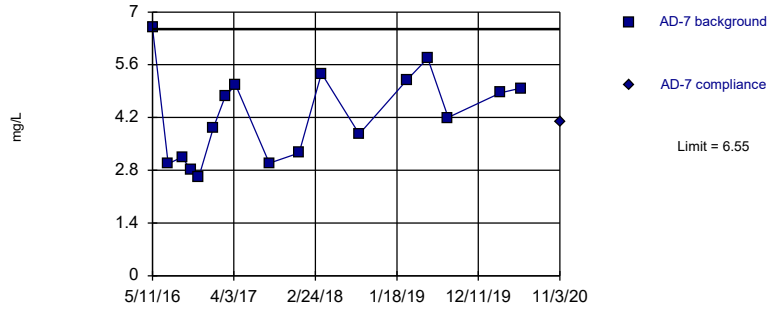
Within Limit Prediction Limit
Intrawell Parametric



Background Data Summary: Mean=1.458, Std. Dev.=0.3676, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9269, critical = 0.892. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

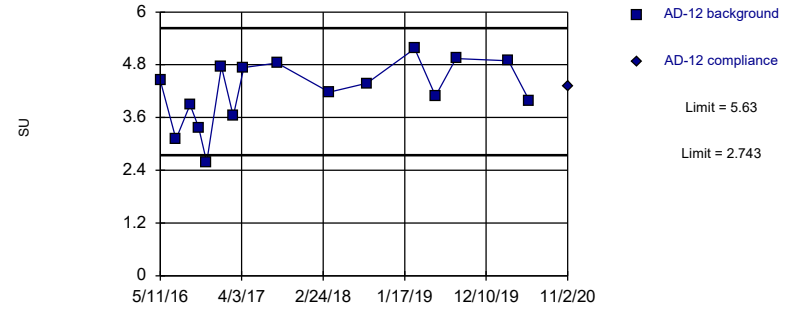
Within Limit Prediction Limit
Intrawell Parametric



Background Data Summary: Mean=4.252, Std. Dev.=1.178, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9417, critical = 0.892. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Calcium, total Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

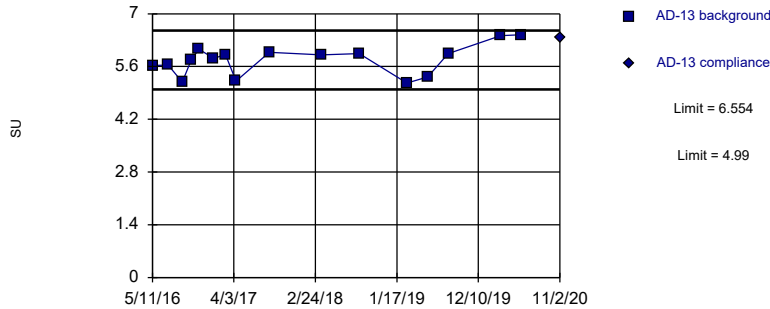
Within Limits Prediction Limit
Intrawell Parametric



Background Data Summary: Mean=4.186, Std. Dev.=0.7328, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.944, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: pH, field Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

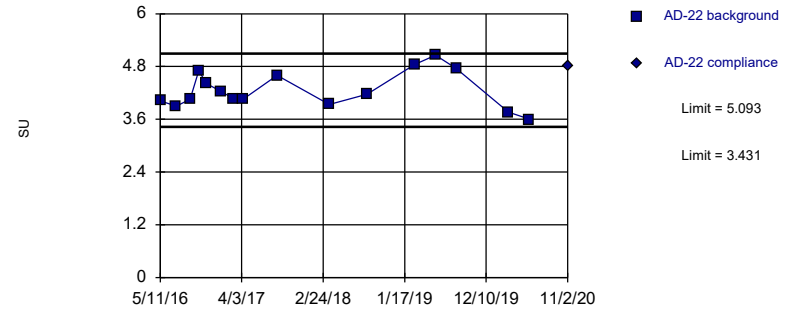
Within Limits Prediction Limit
Intrawell Parametric



Background Data Summary: Mean=5.772, Std. Dev.=0.3969, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9266, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: pH, field Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Within Limits Prediction Limit
Intrawell Parametric

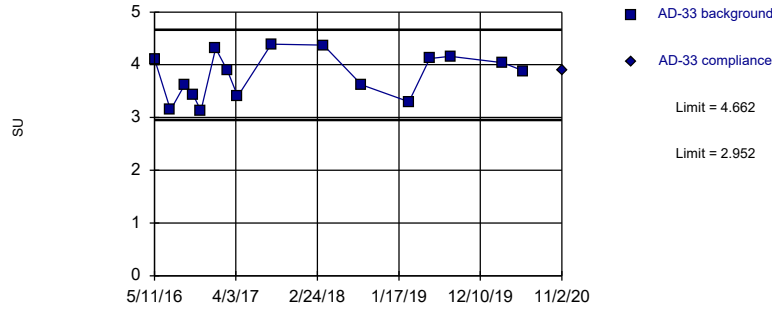


Background Data Summary: Mean=4.262, Std. Dev.=0.4219, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9498, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: pH, field Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

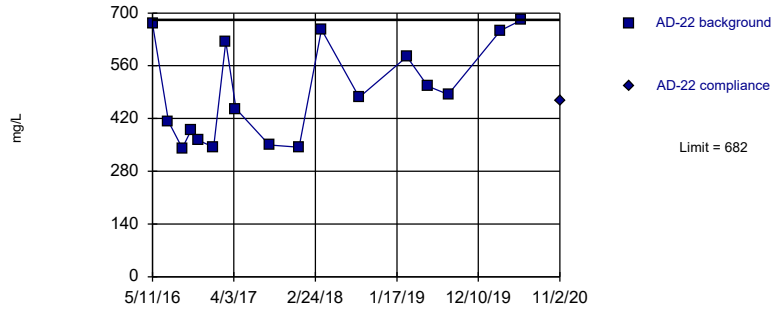
Within Limits

Prediction Limit
Intrawell Parametric



Within Limit

Prediction Limit
Intrawell Non-parametric

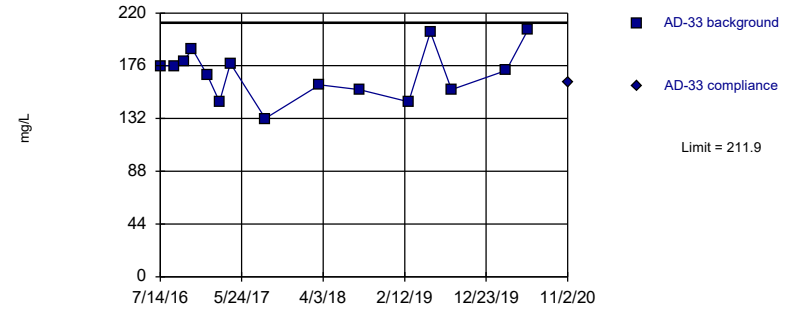


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 17 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005914 (1 of 2).

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Within Limit

Prediction Limit
Intrawell Parametric

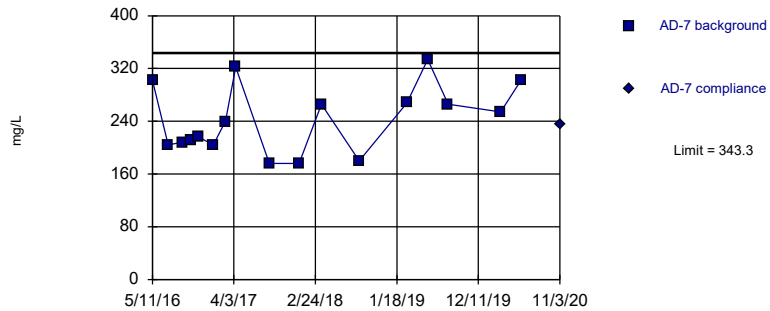


Background Data Summary: Mean=169.7, Std. Dev.=21.02, n=15. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9714, critical = 0.881. Kappa = 2.006 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Within Limit

Prediction Limit
Intrawell Parametric

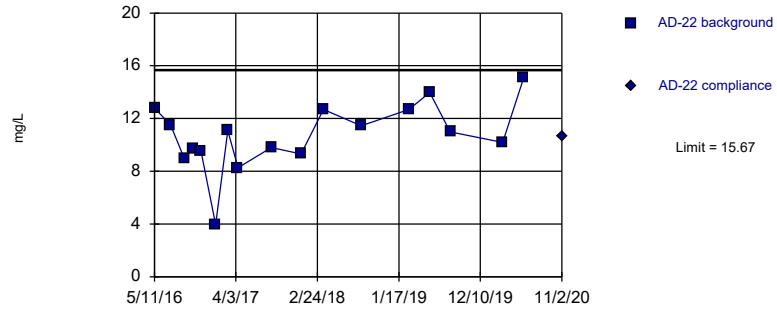


Background Data Summary: Mean=243, Std. Dev.=51.43, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9308, critical = 0.892. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/20/2020 11:48 AM View: PL's - Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

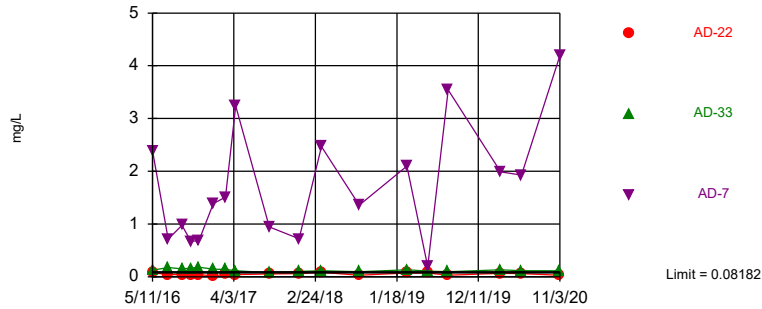
Within Limit

Prediction Limit
Intrawell Parametric



Exceeds Limit: AD-33, AD-7

Prediction Limit
Interwell Parametric

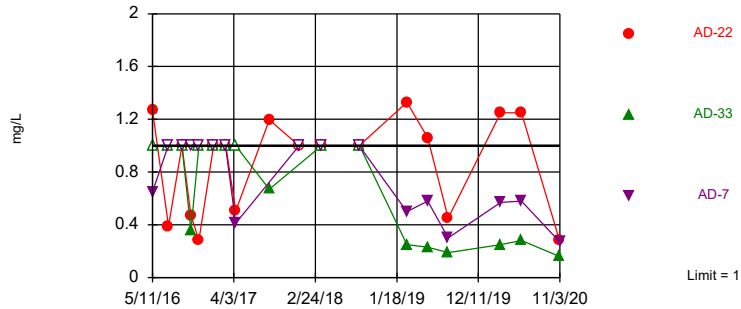


Background Data Summary: Mean=0.04707, Std. Dev.=0.01958, n=34, 5.882% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9355, critical = 0.908. Kappa = 1.775 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Constituent: Boron, total Analysis Run 12/20/2020 11:50 AM View: PL's - Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Within Limit

Prediction Limit
Interwell Non-parametric

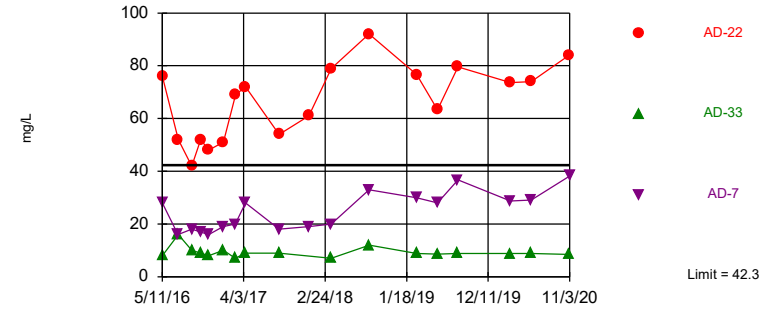


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 34 background values. 38.24% NDs. Annual per-constituent alpha = 0.009408. Individual comparison alpha = 0.001574 (1 of 2). Comparing 3 points to limit.

Constituent: Fluoride, total Analysis Run 12/20/2020 11:50 AM View: PL's - Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Exceeds Limit: AD-22

Prediction Limit
Interwell Non-parametric

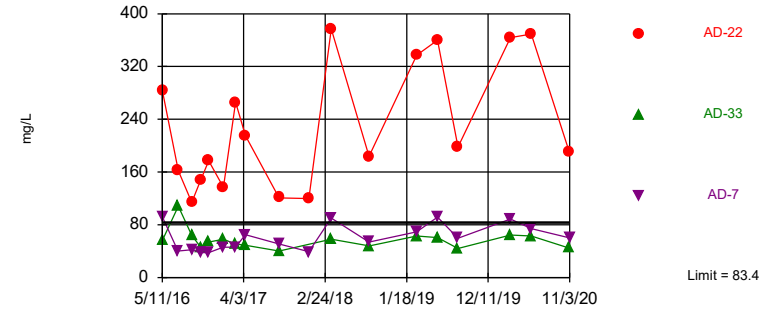


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 34 background values. Annual per-constituent alpha = 0.009408. Individual comparison alpha = 0.001574 (1 of 2). Comparing 3 points to limit.

Constituent: Chloride, total Analysis Run 12/20/2020 11:50 AM View: PL's - Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Exceeds Limit: AD-22

Prediction Limit
Interwell Non-parametric



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 34 background values. Annual per-constituent alpha = 0.009408. Individual comparison alpha = 0.001574 (1 of 2). Comparing 3 points to limit.

Constituent: Sulfate, total Analysis Run 12/20/2020 11:50 AM View: PL's - Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Trend Test Summary - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 11:56 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>
Chloride, total (mg/L)	AD-22	7.028	76	68	Yes	18	0	n/a	n/a	0.01	NP

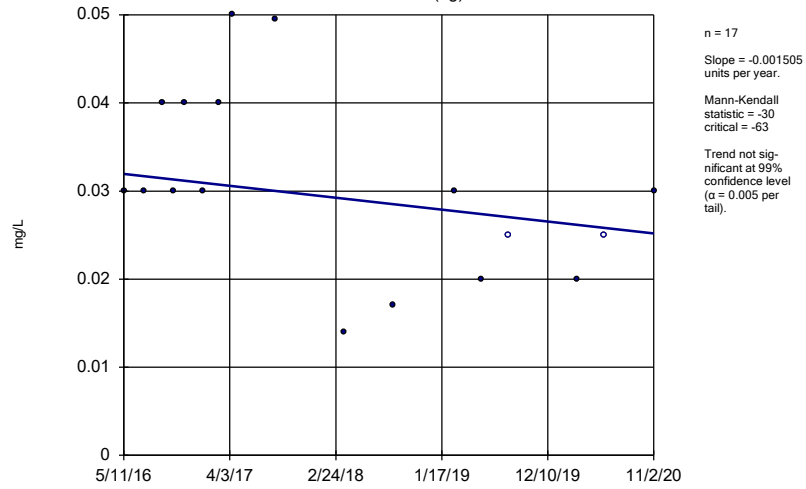
Trend Test Summary - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 11:56 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	AD-12 (bg)	-0.001505	-30	-63	No	17	11.76	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-13 (bg)	0.001285	26	63	No	17	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-33	-0.01173	-62	-68	No	18	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-7	0.3463	45	68	No	18	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-13 (bg)	3.346	45	63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-22	7.028	76	68	Yes	18	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	AD-12 (bg)	-0.5812	-62	-63	No	17	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	AD-13 (bg)	7.749	55	63	No	17	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	AD-22	25.34	51	68	No	18	0	n/a	n/a	0.01	NP

Sen's Slope Estimator

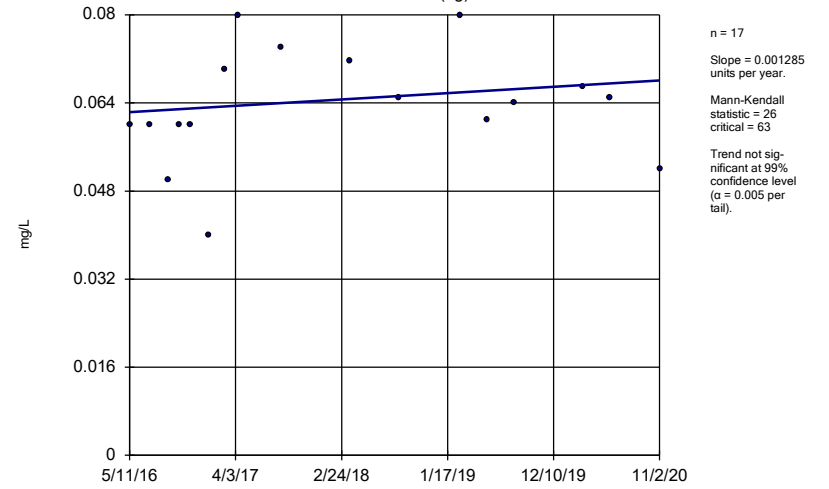
AD-12 (bg)



Constituent: Boron, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sen's Slope Estimator

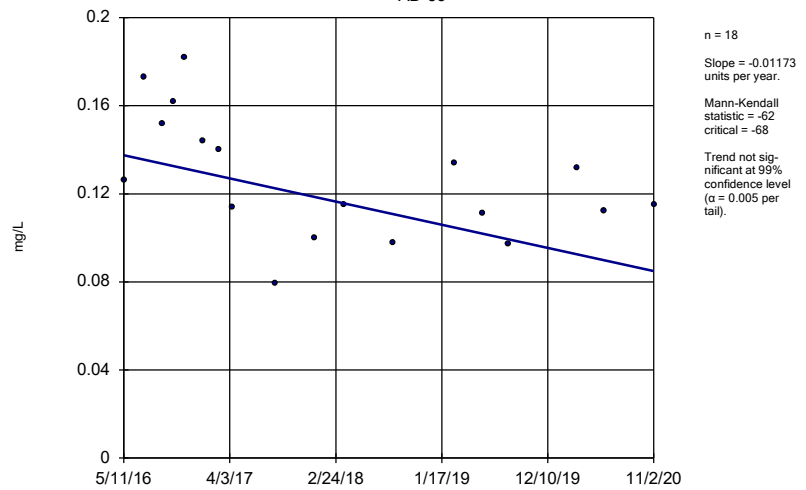
AD-13 (bg)



Constituent: Boron, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sen's Slope Estimator

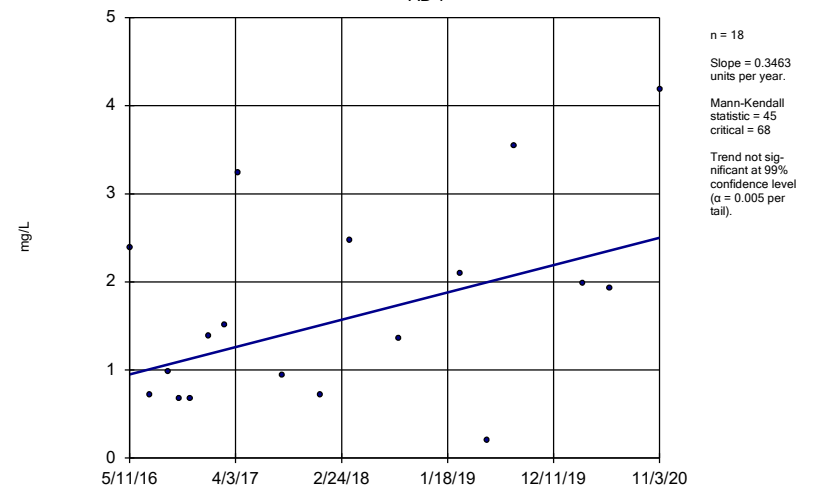
AD-33



Constituent: Boron, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sen's Slope Estimator

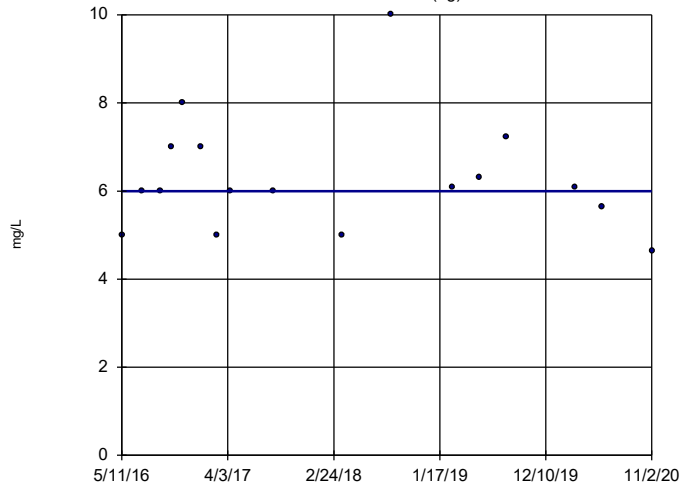
AD-7



Constituent: Boron, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sen's Slope Estimator

AD-12 (bg)

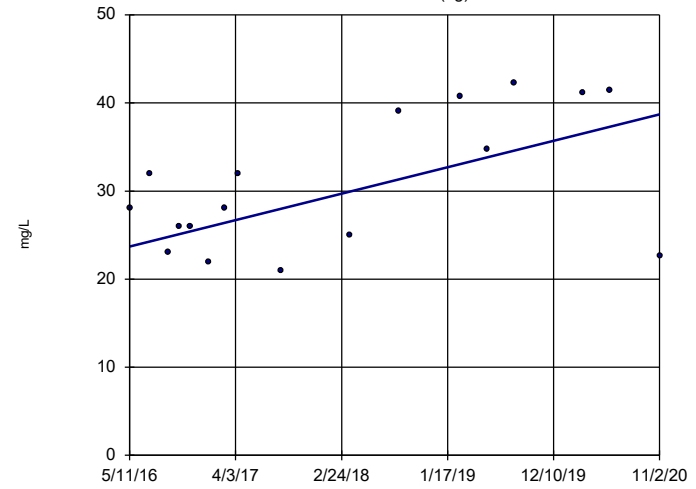


n = 17
 Slope = 0
 units per year.
 Mann-Kendall
 statistic = -1
 critical = -63
 Trend not sig-
 nificant at 99%
 confidence level
 (α = 0.005 per
 tail).

Constituent: Chloride, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sen's Slope Estimator

AD-13 (bg)

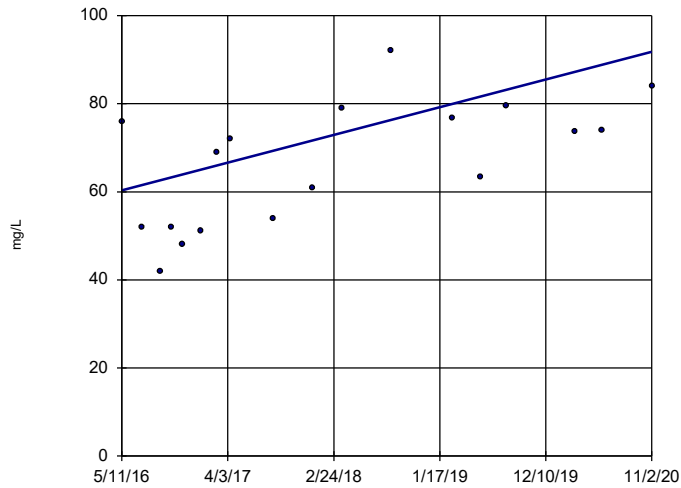


n = 17
 Slope = 3.346
 units per year.
 Mann-Kendall
 statistic = 45
 critical = 63
 Trend not sig-
 nificant at 99%
 confidence level
 (α = 0.005 per
 tail).

Constituent: Chloride, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sen's Slope Estimator

AD-22

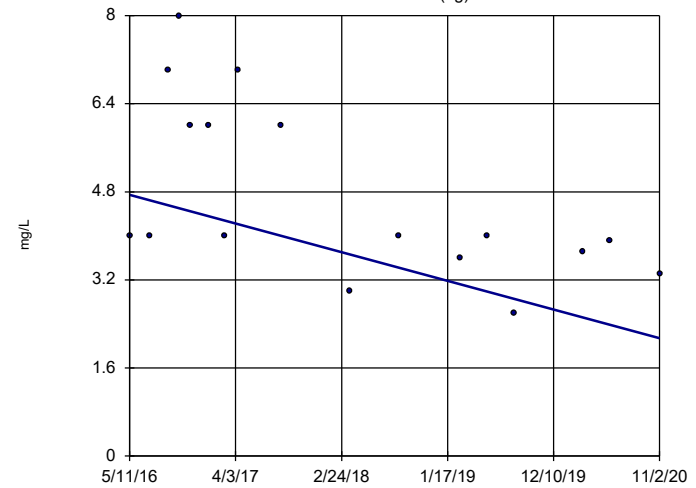


n = 18
 Slope = 7.028
 units per year.
 Mann-Kendall
 statistic = 76
 critical = 68
 Increasing trend
 significant at 99%
 confidence level
 (α = 0.005 per
 tail).

Constituent: Chloride, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sen's Slope Estimator

AD-12 (bg)

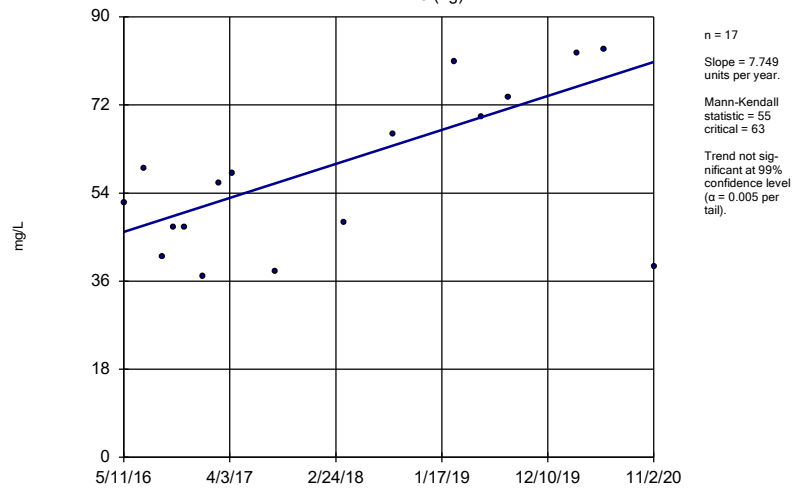


n = 17
 Slope = -0.5812
 units per year.
 Mann-Kendall
 statistic = -62
 critical = -63
 Trend not sig-
 nificant at 99%
 confidence level
 (α = 0.005 per
 tail).

Constituent: Sulfate, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sen's Slope Estimator

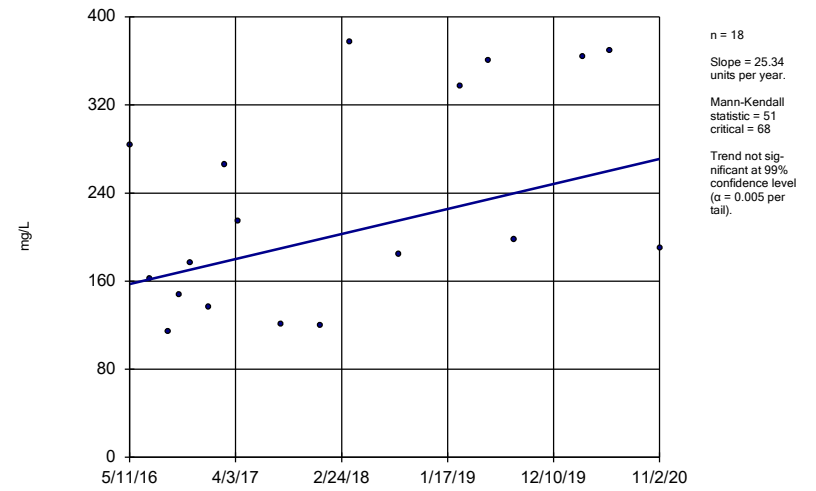
AD-13 (bg)



Constituent: Sulfate, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sen's Slope Estimator

AD-22



Constituent: Sulfate, total Analysis Run 12/20/2020 11:55 AM View: Trend Tests
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit Summary Table

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 11:00 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony, total (mg/L)	n/a	0.005	32	n/a	n/a	90.63	n/a	n/a	0.1937	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.006915	32	0.002241	0.002126	37.5	Kaplan-Meier	No	0.05	Inter
Barium, total (mg/L)	n/a	0.05035	32	0.03179	0.008441	0	None	No	0.05	Inter
Beryllium, total (mg/L)	n/a	0.002	32	n/a	n/a	12.5	n/a	n/a	0.1937	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	30	n/a	n/a	76.67	n/a	n/a	0.2146	NP Inter(NDs)
Chromium, total (mg/L)	n/a	0.001651	32	-8.378	0.897	40.63	Kaplan-Meier	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.056	32	n/a	n/a	0	n/a	n/a	0.1937	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	2.955	32	1.243	0.7784	0	None	No	0.05	Inter
Fluoride, total (mg/L)	n/a	1	34	n/a	n/a	38.24	n/a	n/a	0.1748	NP Inter(normality)
Lead, total (mg/L)	n/a	0.005	32	n/a	n/a	81.25	n/a	n/a	0.1937	NP Inter(NDs)
Lithium, total (mg/L)	n/a	0.165	32	n/a	n/a	3.125	n/a	n/a	0.1937	NP Inter(normality)
Mercury, total (mg/L)	n/a	0.000025	32	n/a	n/a	87.5	n/a	n/a	0.1937	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.005	28	n/a	n/a	96.43	n/a	n/a	0.2378	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	32	n/a	n/a	62.5	n/a	n/a	0.1937	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.002	30	n/a	n/a	80	n/a	n/a	0.2146	NP Inter(NDs)

PIRKEY STACKOUT 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		0.0069	0.01
Barium, Total (mg/L)	2		0.05	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		0.0017	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.056	0.056
Combined Radium, Total (pCi/L)	5		2.96	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	0.17	0.17
Mercury, Total (mg/L)	0.002		0.000025	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 is higher than MCL or CCR-Rule Specified.*

**MCL = Maximum Contaminant Level*

**GWPS = Groundwater Protection Standard*

**CCR = Coal Combustion Residual*

Confidence Interval Summary Table - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 11:35 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Beryllium, total (mg/L)	AD-22	0.009526	0.004558	0.004	Yes 16	0.007317	0.003924	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	AD-22	0.1025	0.06177	0.056	Yes 16	0.08371	0.03177	0	None	sqrt(x)	0.01	Param.

Confidence Interval Summary Table - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 11:35 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-22	0.005	0.0001	0.006	No 16	0.003089	0.002315	93.75	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-33	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-7	0.005	0.0001	0.006	No 16	0.003088	0.002316	93.75	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-22	0.01029	0.00345	0.01	No 16	0.007696	0.006736	0	None	x^(1/3)	0.01	Param.
Arsenic, total (mg/L)	AD-33	0.002431	0.0007564	0.01	No 15	0.001716	0.001472	13.33	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	AD-7	0.005	0.00064	0.01	No 16	0.002645	0.001934	37.5	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-22	0.05601	0.02137	2	No 16	0.04511	0.0354	0	None	ln(x)	0.01	Param.
Barium, total (mg/L)	AD-33	0.05667	0.04657	2	No 15	0.05162	0.00745	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-7	0.05277	0.04127	2	No 16	0.04702	0.008839	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-22	0.009526	0.004558	0.004	Yes 16	0.007317	0.003924	0	None	sqrt(x)	0.01	Param.
Beryllium, total (mg/L)	AD-33	0.0014	0.000905	0.004	No 16	0.001343	0.0007899	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-7	0.006068	0.003807	0.004	No 16	0.004938	0.001738	0	None	No	0.01	Param.
Cadmium, total (mg/L)	AD-22	0.001404	0.0006219	0.005	No 16	0.001061	0.0006125	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	AD-33	0.001	0.00005	0.005	No 16	0.0006478	0.0004682	56.25	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-7	0.0008267	0.0007008	0.005	No 16	0.0007638	0.00009677	0	None	No	0.01	Param.
Chromium, total (mg/L)	AD-22	0.003951	0.0004362	0.1	No 16	0.005863	0.009525	18.75	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-33	0.002656	0.0002412	0.1	No 15	0.002486	0.00252	20	Kaplan-Meier	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	AD-7	0.0004158	0.0001592	0.1	No 16	0.0007791	0.0009411	31.25	Kaplan-Meier	ln(x)	0.01	Param.
Cobalt, total (mg/L)	AD-22	0.1025	0.06177	0.056	Yes 16	0.08371	0.03177	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	AD-33	0.01054	0.008587	0.056	No 15	0.009563	0.001441	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-7	0.04103	0.02869	0.056	No 16	0.03486	0.00948	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-22	5.262	3.269	5	No 16	4.425	1.702	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-33	3.327	1.456	5	No 16	2.73	2.179	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-7	4.379	3.108	5	No 16	3.604	1.233	0	None	x^2	0.01	Param.
Fluoride, total (mg/L)	AD-22	1.25	0.45	4	No 18	0.874	0.3672	33.33	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-33	1	0.23	4	No 17	0.6698	0.3764	52.94	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-7	1	0.5	4	No 17	0.7565	0.282	52.94	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-22	0.005	0.000261	0.015	No 16	0.002462	0.002155	43.75	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-33	0.005	0.0002	0.015	No 15	0.002991	0.002299	66.67	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-7	0.005	0.000783	0.015	No 16	0.003143	0.002179	56.25	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-22	0.2162	0.1359	0.17	No 16	0.1761	0.06174	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-33	0.027	0.0178	0.17	No 16	0.02394	0.009392	6.25	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-7	0.1031	0.08588	0.17	No 16	0.09259	0.01737	0	None	x^3	0.01	Param.
Mercury, total (mg/L)	AD-22	0.003244	0.0003356	0.002	No 12	0.002537	0.003307	0	None	ln(x)	0.01	Param.
Mercury, total (mg/L)	AD-33	0.001221	0.0003495	0.002	No 16	0.001039	0.001154	0	None	ln(x)	0.01	Param.
Mercury, total (mg/L)	AD-7	0.0002242	0.00008925	0.002	No 16	0.0001567	0.0001037	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	AD-22	0.005	0.002	0.1	No 14	0.003791	0.00175	92.86	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-33	0.005	0.0007365	0.1	No 14	0.003488	0.001885	92.86	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-22	0.005887	0.00167	0.05	No 16	0.005352	0.004121	37.5	Kaplan-Meier	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	AD-33	0.005	0.001613	0.05	No 16	0.003351	0.001764	50	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-7	0.005	0.0017	0.05	No 16	0.004153	0.001791	50	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-22	0.002	0.000162	0.002	No 15	0.001098	0.00084	40	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-33	0.002	0.0005	0.002	No 15	0.001287	0.0007687	80	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-7	0.002	0.0002	0.002	No 15	0.001234	0.0008727	60	None	No	0.01	NP (normality)

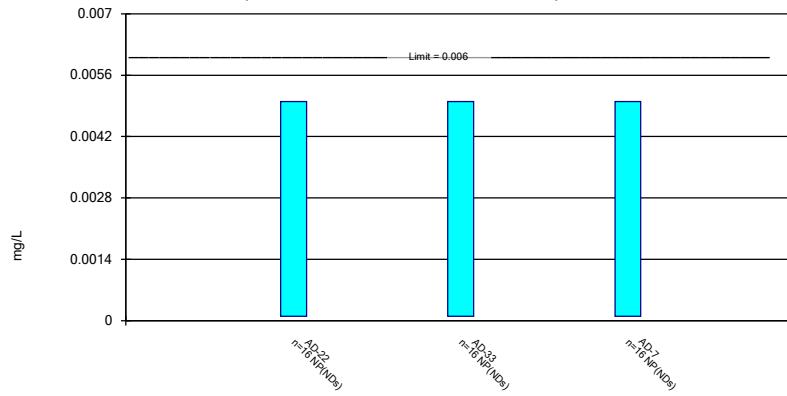
Confidence Interval Summary Table - Well AD-22 (Deseasonalized Results)

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/23/2020, 2:02 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Beryllium, total (mg/L)	AD-22	0.009037	0.005597	0.004	Yes 16	0.007317	0.002644	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-22	0.09895	0.06847	0.056	Yes 16	0.08371	0.02342	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-22	5.25	3.6	5	No 16	4.425	1.268	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-22	0.2084	0.1438	0.17	No 16	0.1761	0.04963	0	None	No	0.01	Param.

Non-Parametric Confidence Interval

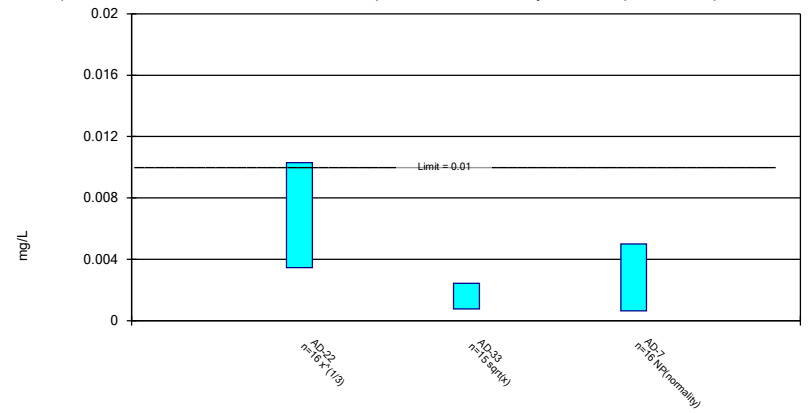
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

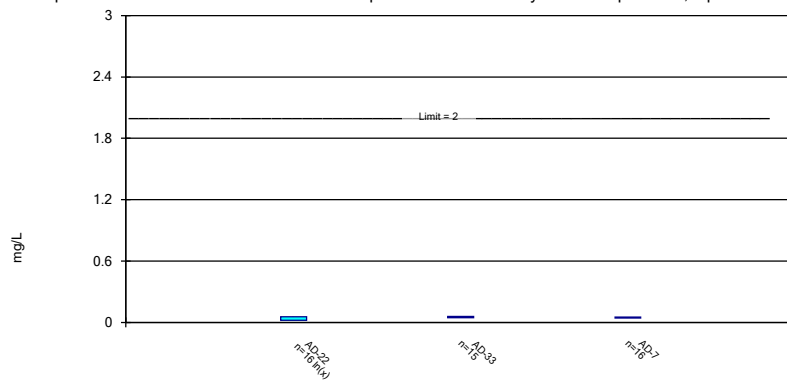
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

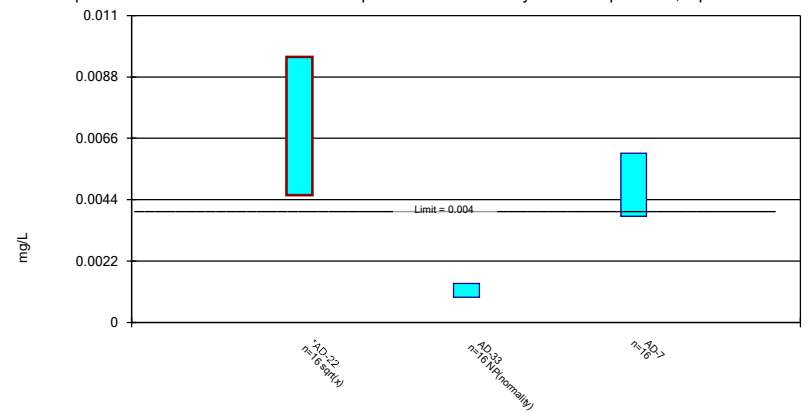
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

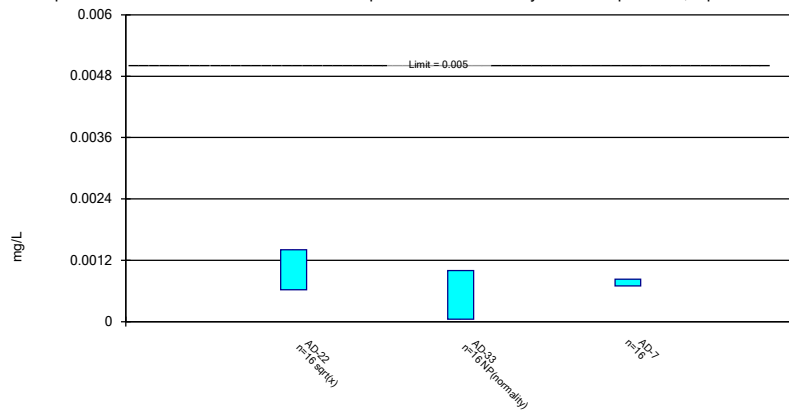
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

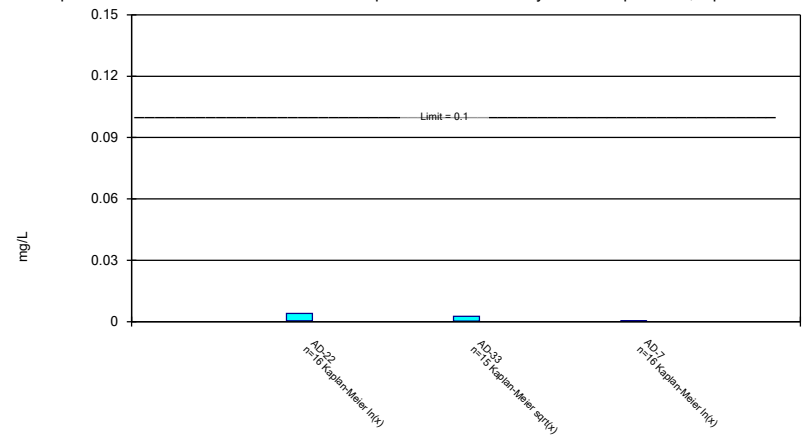
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

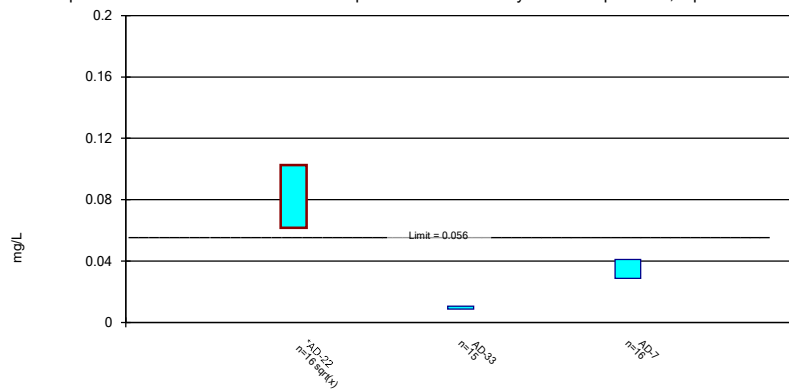
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

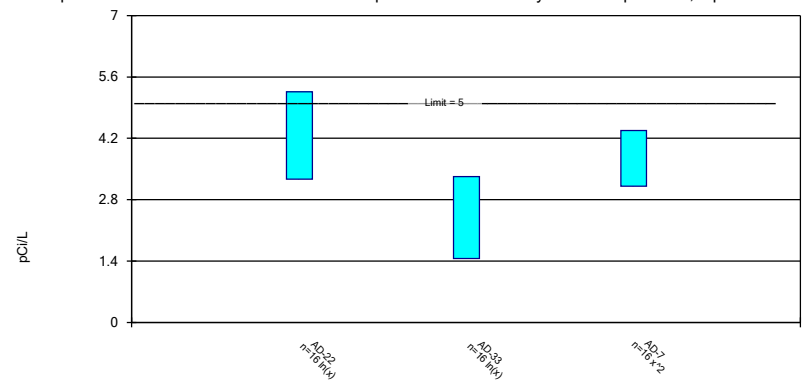
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

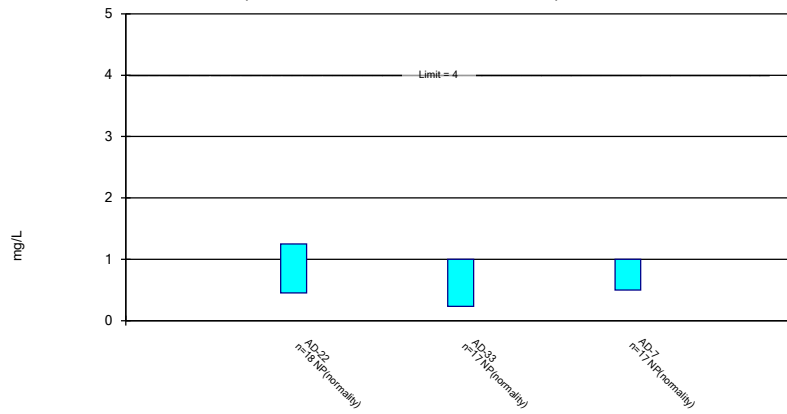
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

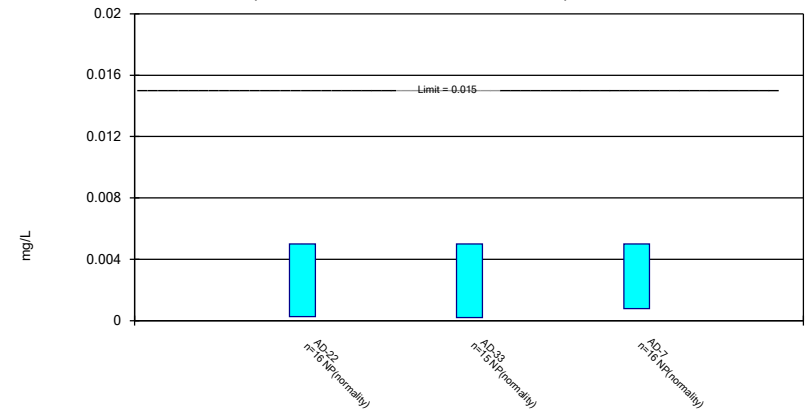
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Fluoride, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

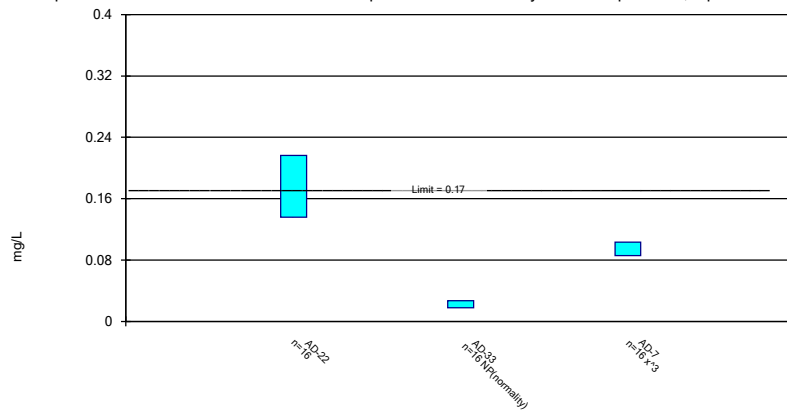
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

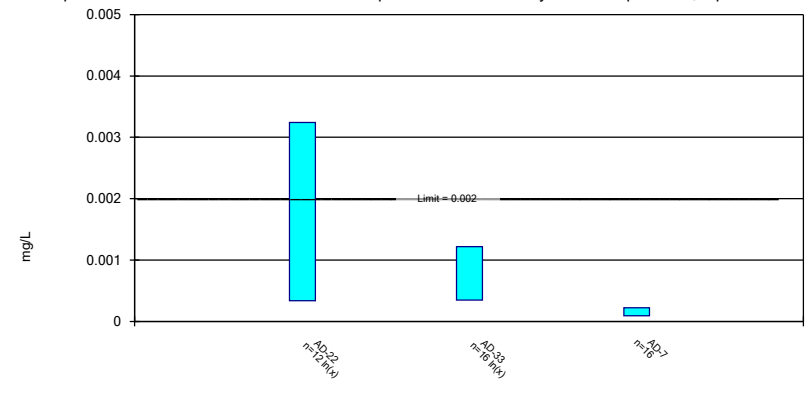
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

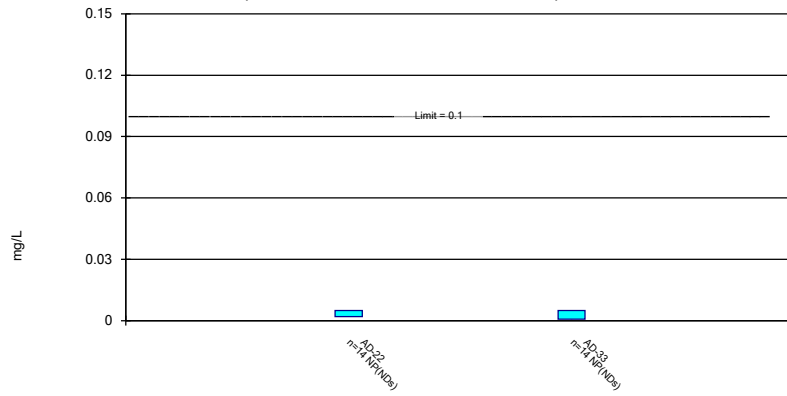
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

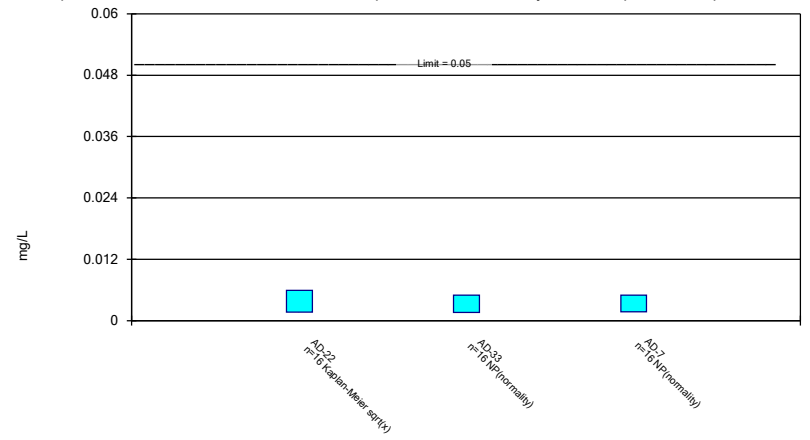
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

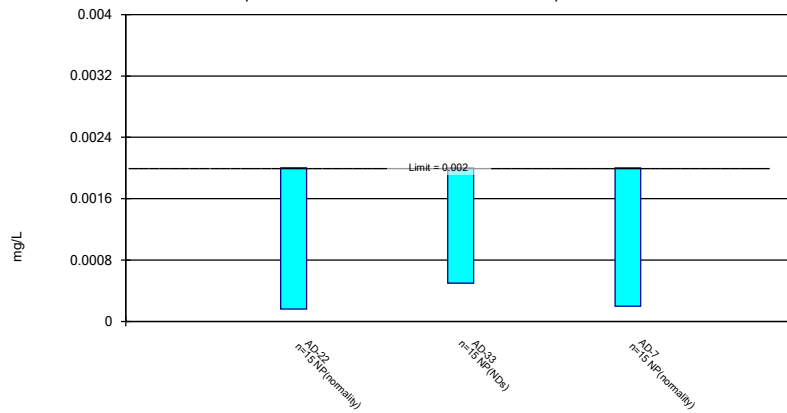
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

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



Constituent: Thallium, total Analysis Run 12/20/2020 11:34 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

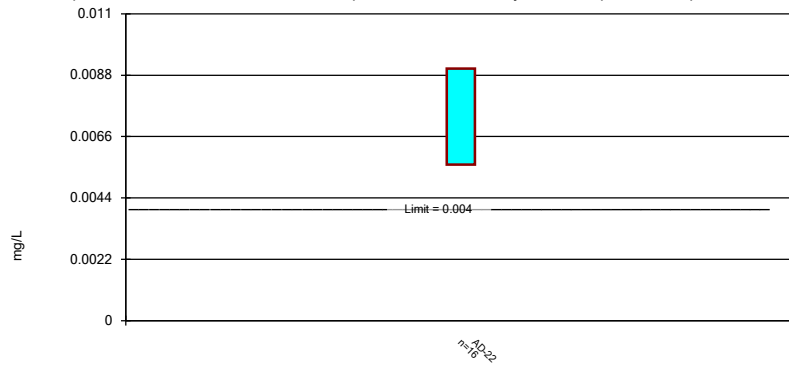
Confidence Interval Summary Table - Well AD-22 (Deseasonalized Results)

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/23/2020, 2:02 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>
Beryllium, total (mg/L)	AD-22	0.009037	0.005597	0.004	Yes 16	0.007317	0.002644	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-22	0.09895	0.06847	0.056	Yes 16	0.08371	0.02342	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-22	5.25	3.6	5	No 16	4.425	1.268	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-22	0.2084	0.1438	0.17	No 16	0.1761	0.04963	0	None	No	0.01	Param.

Parametric Confidence Interval

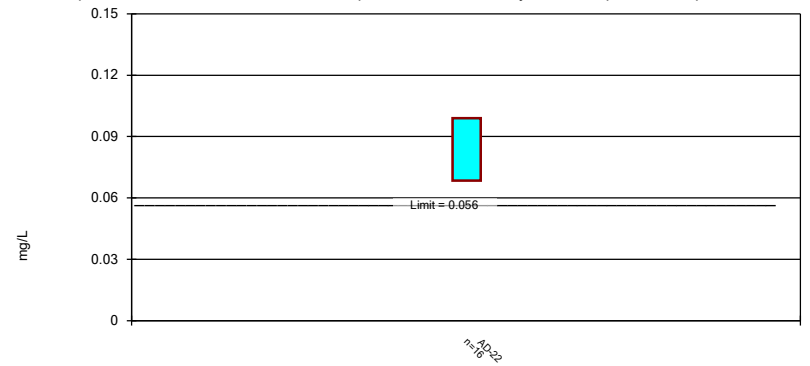
Compliance limit is exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total, Alt. Values Analysis Run 12/23/2020 1:40 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

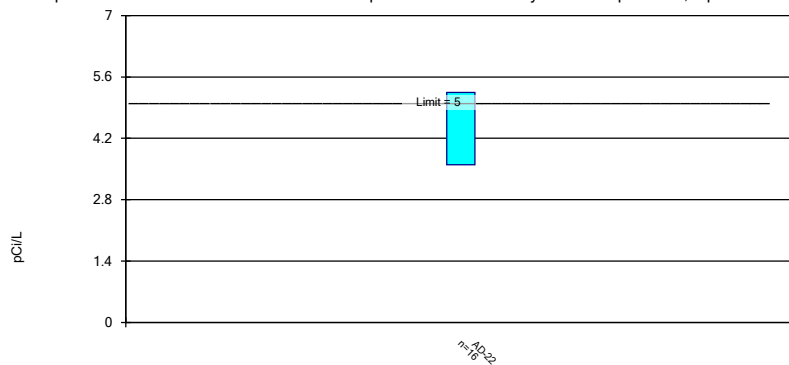
Compliance limit is exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total, Alt. Values Analysis Run 12/23/2020 1:43 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

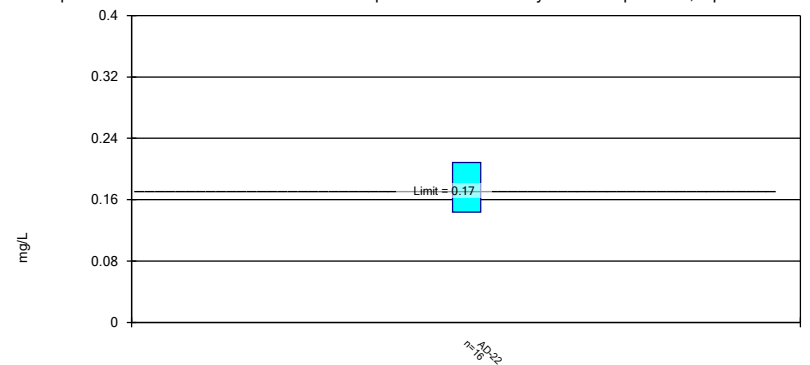
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228, Alt. Values Analysis Run 12/23/2020 1:43 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

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



Constituent: Lithium, total, Alt. Values Analysis Run 12/23/2020 1:44 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality - AD-22 - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/21/2020, 4:32 PM

<u>Constituent</u>	<u>Well</u>	<u>Sig.</u>	<u>K.-W.</u>	<u>Chi-Sq.</u>	<u>df</u>	<u>N</u>	<u>Alpha</u>
Beryllium, total (mg/L)	AD-22	Yes	7.803	3.841	1	16	0.05
Boron, total (mg/L)	AD-22	Yes	4.055	3.841	1	18	0.05
Cadmium, total (mg/L)	AD-22	Yes	5.843	3.841	1	16	0.05
Calcium, total (mg/L)	AD-22	Yes	6.196	3.841	1	18	0.05
Cobalt, total (mg/L)	AD-22	Yes	5.852	3.841	1	16	0.05
Combined Radium 226 + 228 (pCi/L)	AD-22	Yes	4.412	3.841	1	16	0.05
Fluoride, total (mg/L)	AD-22	Yes	3.968	3.841	1	18	0.05
Lithium, total (mg/L)	AD-22	Yes	4.412	3.841	1	16	0.05
Sulfate, total (mg/L)	AD-22	Yes	5.755	3.841	1	18	0.05

Seasonality - AD-22 - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/21/2020, 4:32 PM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Antimony, total (mg/L)	AD-22	No	1	3.841	1	16	0.05
Arsenic, total (mg/L)	AD-22	No	0.1353	3.841	1	16	0.05
Barium, total (mg/L)	AD-22	No	0.1765	3.841	1	16	0.05
Beryllium, total (mg/L)	AD-22	Yes	7.803	3.841	1	16	0.05
Boron, total (mg/L)	AD-22	Yes	4.055	3.841	1	18	0.05
Cadmium, total (mg/L)	AD-22	Yes	5.843	3.841	1	16	0.05
Calcium, total (mg/L)	AD-22	Yes	6.196	3.841	1	18	0.05
Chloride, total (mg/L)	AD-22	No	0.3872	3.841	1	18	0.05
Chromium, total (mg/L)	AD-22	No	0.3366	3.841	1	16	0.05
Cobalt, total (mg/L)	AD-22	Yes	5.852	3.841	1	16	0.05
Combined Radium 226 + 228 (pCi/L)	AD-22	Yes	4.412	3.841	1	16	0.05
Fluoride, total (mg/L)	AD-22	Yes	3.968	3.841	1	18	0.05
Lead, total (mg/L)	AD-22	No	0.3005	3.841	1	16	0.05
Lithium, total (mg/L)	AD-22	Yes	4.412	3.841	1	16	0.05
Mercury, total (mg/L)	AD-22	No	0.02564	3.841	1	12	0.05
Molybdenum, total (mg/L)	AD-22	No	0.75	3.841	1	14	0.05
pH, field (SU)	AD-22	No	0.08344	3.841	1	17	0.05
Selenium, total (mg/L)	AD-22	No	0	3.841	1	16	0.05
Sulfate, total (mg/L)	AD-22	Yes	5.755	3.841	1	18	0.05
Thallium, total (mg/L)	AD-22	No	1.44	3.841	1	15	0.05
Total Dissolved Solids [TDS] (m...	AD-22	No	3.653	3.841	1	18	0.05

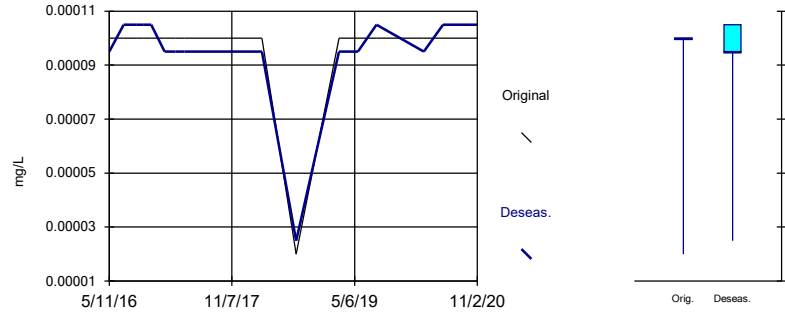
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 1
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 0.1765
 Adjusted Kruskal-Wallis statistic (H') = 1



Constituent: Antimony, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

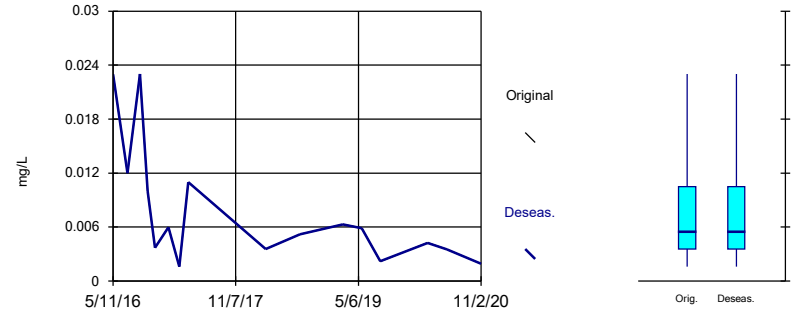
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0.1353
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 0.1351
 Adjusted Kruskal-Wallis statistic (H') = 0.1353



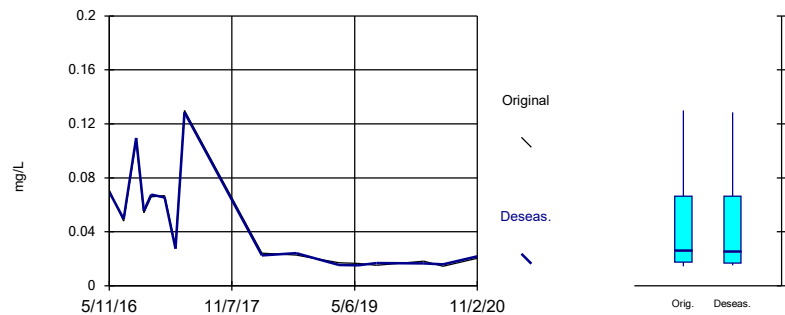
Constituent: Arsenic, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0.1765
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.



Constituent: Barium, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

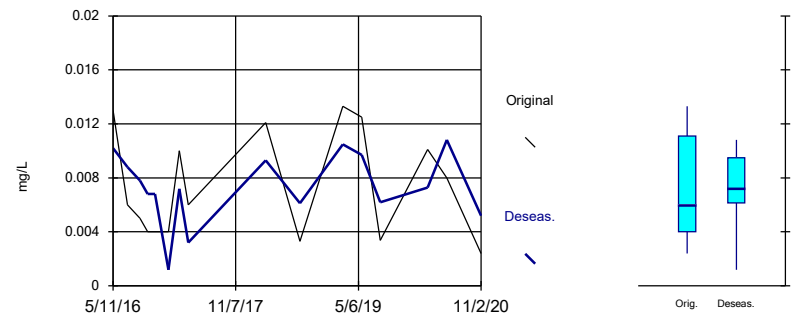
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 7.803
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 7.745
 Adjusted Kruskal-Wallis statistic (H') = 7.803



Constituent: Beryllium, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

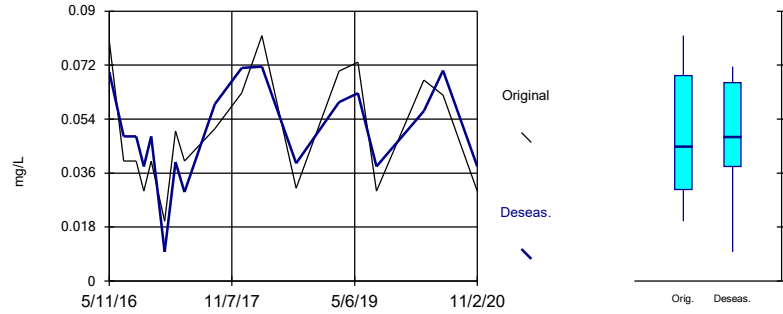
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 4.055
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 3.997
 Adjusted Kruskal-Wallis statistic (H') = 4.055



Constituent: Boron, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

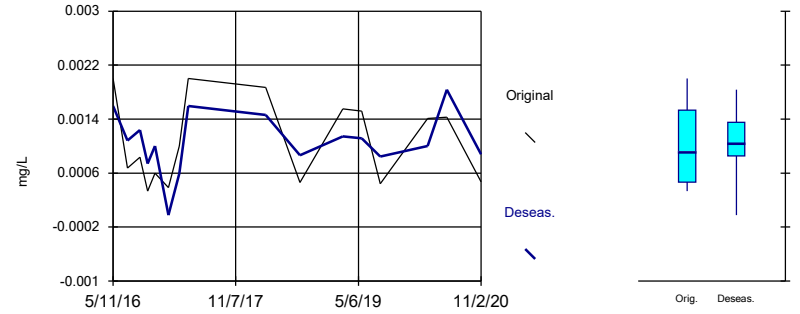
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 5.843
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 5.835
 Adjusted Kruskal-Wallis statistic (H') = 5.843



Constituent: Cadmium, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

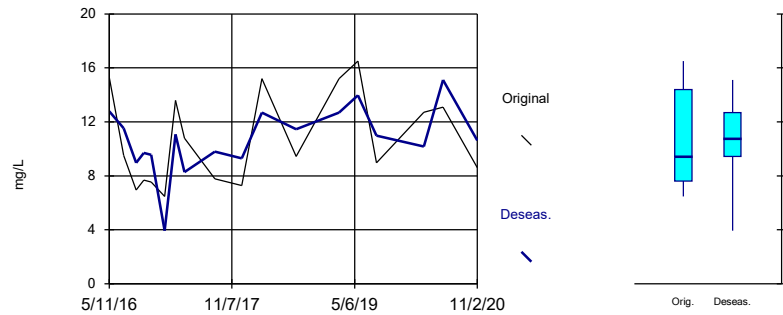
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 6.196
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 6.189
 Adjusted Kruskal-Wallis statistic (H') = 6.196



Constituent: Calcium, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

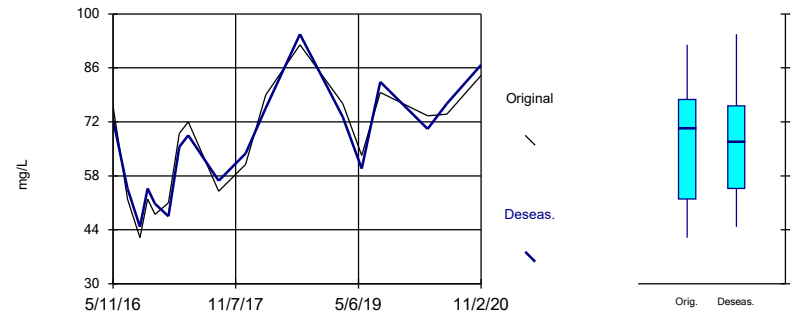
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0.3872
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

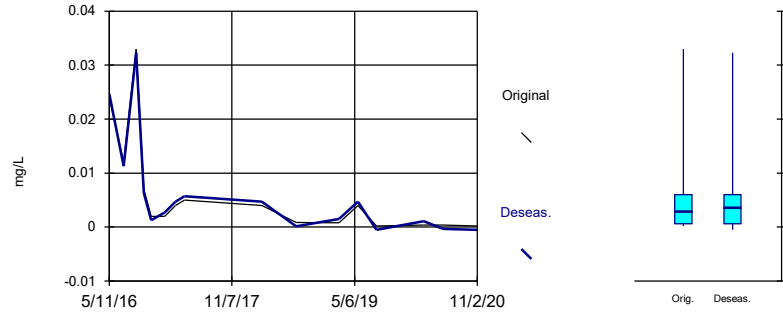
Kruskal-Wallis statistic (H) = 0.3868
 Adjusted Kruskal-Wallis statistic (H') = 0.3872



Constituent: Chloride, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

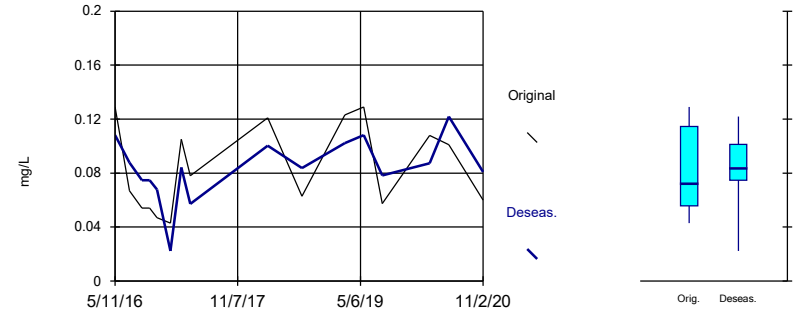
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 0.3366
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H) was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.3336
 Adjusted Kruskal-Wallis statistic (H) = 0.3366



Constituent: Chromium, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

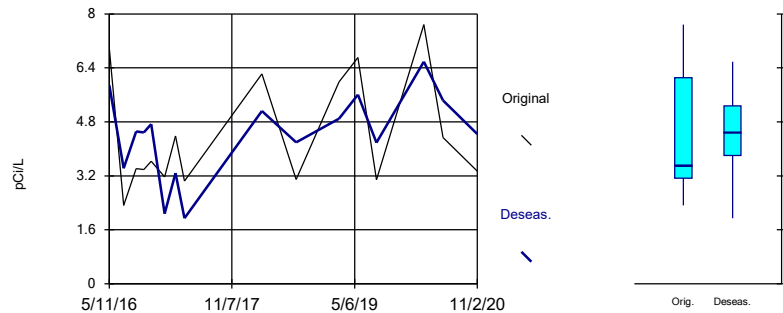
For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 5.852
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H) was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 5.835
 Adjusted Kruskal-Wallis statistic (H) = 5.852



Constituent: Cobalt, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

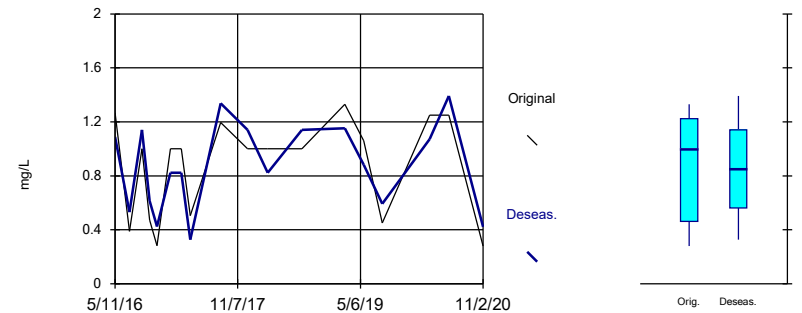
For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 4.412
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.



Constituent: Combined Radium 226 + 228 Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

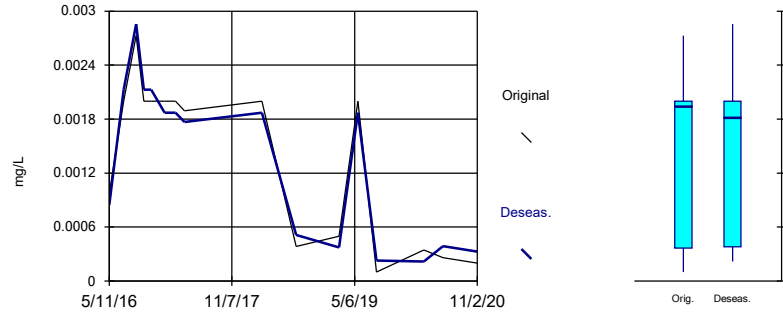
For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 3.968
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H) was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 3.821
 Adjusted Kruskal-Wallis statistic (H) = 3.968



Constituent: Fluoride, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

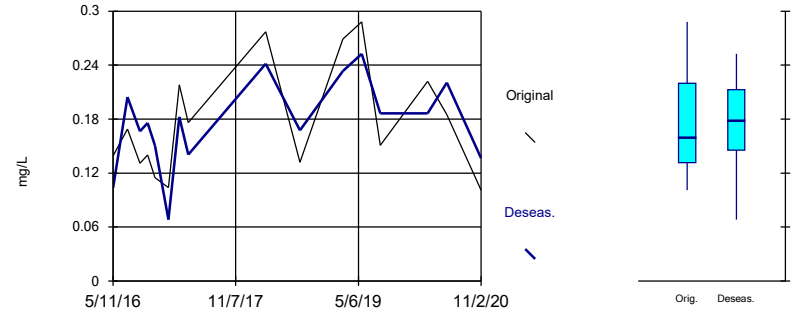
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 0.3005
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.2757
 Adjusted Kruskal-Wallis statistic (H') = 0.3005



Constituent: Lead, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

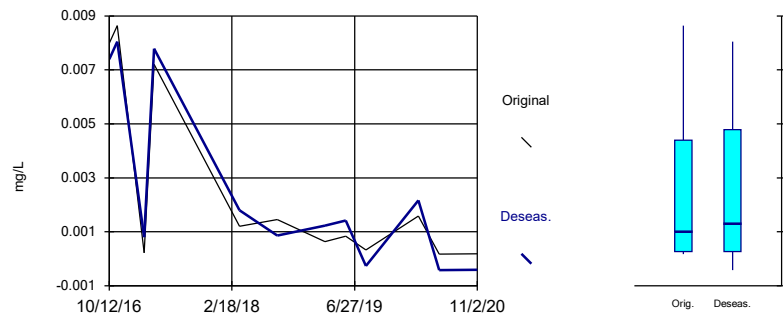
For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 4.412
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.



Constituent: Lithium, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

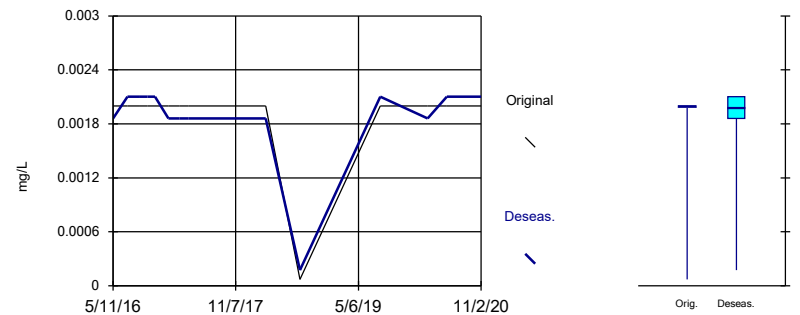
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 0.02564
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.



Constituent: Mercury, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 0.75
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.15
 Adjusted Kruskal-Wallis statistic (H') = 0.75



Constituent: Molybdenum, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

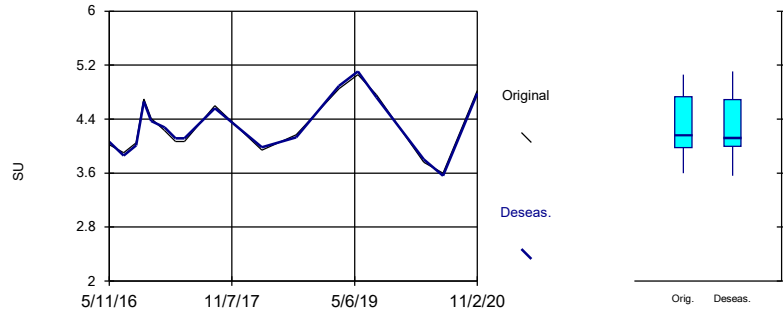
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0.08344
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 0.08333
 Adjusted Kruskal-Wallis statistic (H') = 0.08344



Constituent: pH, field Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

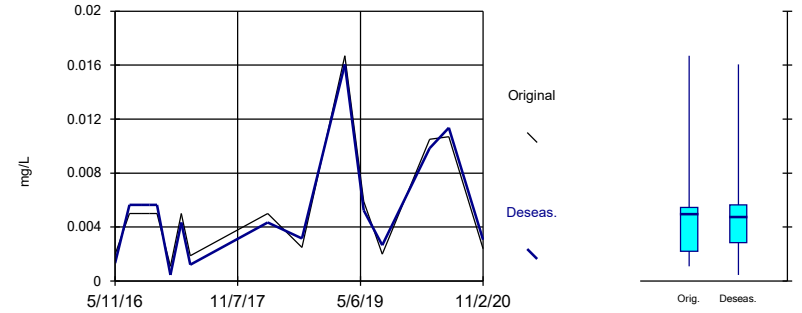
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 0
 Adjusted Kruskal-Wallis statistic (H') = 0



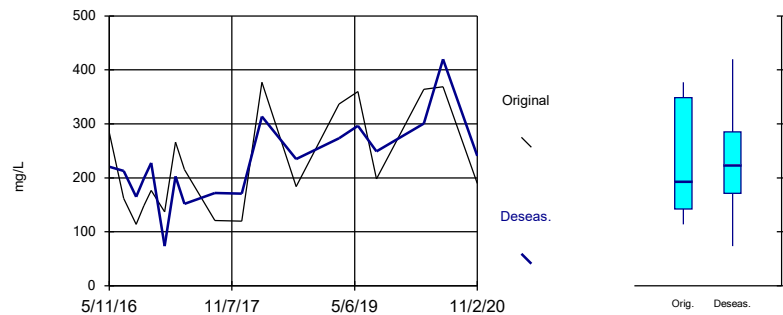
Constituent: Selenium, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 5.755
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.



Constituent: Sulfate, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

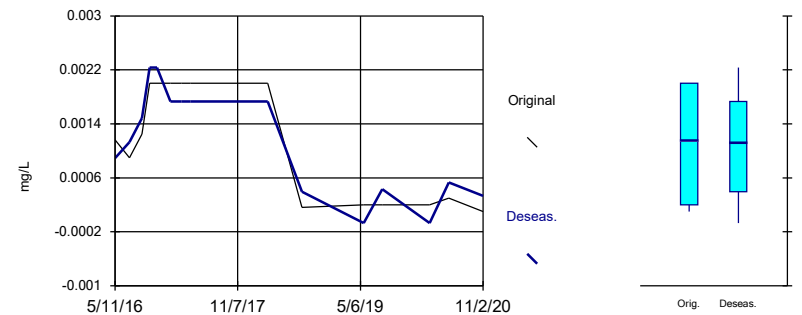
Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 1.44
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 1.339
 Adjusted Kruskal-Wallis statistic (H') = 1.44



Constituent: Thallium, total Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals - Well AD-22
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

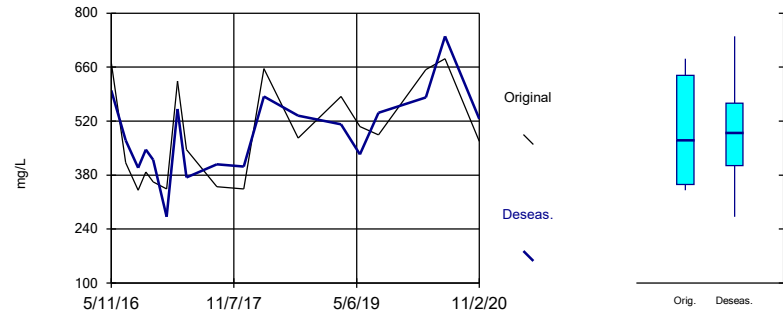
Calculated Kruskal-Wallis statistic = 3.653

Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H) was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 3.649

Adjusted Kruskal-Wallis statistic (H) = 3.653



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/21/2020 4:30 PM View: Confidence Intervals -
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

**STATISTICAL ANALYSIS SUMMARY
FLUE GAS DESULFURIZATION (FGD)
STACKOUT AREA
H.W. Pirkey Plant
Hallsville, Texas**

Submitted to



1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by



engineers | scientists | innovators

941 Chatham Lane
Suite 103
Columbus, Ohio 43221

September 24, 2021

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
CFR	Code of Federal Regulations
FGD	Flue Gas Desulfurization
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
QA	Quality Assurance
QC	Quality Control
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit

SECTION 1

EXECUTIVE SUMMARY

In accordance with the Texas Commission on Environmental Quality's (TCEQ's) regulations regarding the disposal of coal combustion residuals (CCRs) in landfills and surface impoundments (Title 30 Chapter 352, "CCR rule"), groundwater monitoring has been conducted at the Flue Gas Desulfurization (FGD) Stackout Area, 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, chloride, and sulfate at the FGD Stackout Area. An alternative source was not identified at the time, so the FGD Stackout Area has been in assessment monitoring since. Groundwater protection standards (GWPS) were set in accordance with § 352.951(b) and a statistical evaluation of the assessment monitoring data was conducted. During the most recent assessment monitoring event, completed in November 2020, statistically significant levels (SSLs) for beryllium and cobalt were identified (Geosyntec, 2021). A successful alternative source demonstration (ASD) was completed in accordance with § 352.951(e); therefore, the FGD Stackout Area remained in assessment monitoring. Two assessment monitoring events were conducted at the FGD Stackout Area in March and May 2021, in accordance with § 352.951(a). The results of these assessment events are documented in this report.

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

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at an SSL above previously established GWPS. SSLs were identified for beryllium and 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

FGD STACKOUT AREA 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). For mercury at AD-22, earlier values were higher than recent values and so the confidence interval was calculated using only the most recent 14 samples to better reflect recent conditions.

Seasonal patterns were observed for several parameters at AD-22 based on the time series graphs (Attachment B). Kruskal Wallis tests were performed to test whether differences between the results from different seasons were statistically significant for all Appendix IV constituents at AD-22. Statistically significant differences were found for beryllium, cadmium, cobalt, combined

radium, fluoride, and lithium at AD-22. Where the Kruskal-Wallis test found significant seasonal effects, the data for these well/parameter pairs were deseasonalized so that the resulting confidence limits correctly account for seasonality as a predictable pattern rather than random variation or a release.

An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B. The calculated confidence limits were compared to the GWPSs provided in Table 2. The GWPSs were established as either the greater value of the background concentration calculated during a previous statistical analysis (Geosyntec, 2021) or the maximum contaminant level (MCL).

The following SSLs was identified at the Pirkey FGD Stackout Area:

- The deseasonalized LCL for beryllium exceeded the GWPS of 0.00400 mg/L at AD-22 (0.00577 mg/L).
- The deseasonalized LCL for cobalt exceeded the GWPS of 0.056 mg/L at AD-22 (0.0723 mg/L).

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

2.2.2 Evaluation of Potential Appendix III SSIs

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

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

- Boron concentrations exceeded the interwell UPL of 0.0818 mg/L at AD-7 (1.84 mg/L) and AD-33 (0.121 mg/L).
- Chloride concentrations exceeded the interwell UPL of 42.3 mg/L at AD-22 (60.6 mg/L).
- Fluoride concentrations exceeded the interwell UPL of 1.00 mg/L at AD-22 (1.24 mg/L).
- Sulfate concentrations exceeded the interwell UPL of 83.4 mg/L at AD-22 (327 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the May 2021 sample was above the UPL or below the LPL. Based on

these results, concentrations of Appendix III constituents appear to be above background concentrations.

2.3 Conclusions

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

Based on this evaluation, the Pirkey FGD Stackout Area 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. 2021. Statistical Analysis Summary – Flue Gas Desulfurization (FGD) Stackout Area, H.W. Pirkey Plant, Hallsville, Texas. March 3, 2021.

TABLES

**Table 1 - Groundwater Data Summary
Pirkey Plant - FGD Stackout Pad**

Parameter	Unit	AD-12		AD-13		AD-22		AD-33		AD-7	
		3/8/2021	5/24/2021	3/8/2021	5/24/2021	3/8/2021	5/24/2021	3/8/2021	5/24/2021	3/9/2021	5/25/2021
Antimony	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	0.07 J	0.08 J	0.44	0.89	3.05	2.05	1.01	0.43	1.32	0.82
Barium	µg/L	22.9	23.1	56.7	36.6	19.2	16.0	47.5	43.8	44.1	36.1
Beryllium	µg/L	0.150	0.136	1.20	0.119	8.52	6.83	1.51	1.04	4.80	4.11
Boron	mg/L	0.01 J	0.032 J	0.067	0.078	0.069	0.076	0.159	0.121	2.12	1.84
Cadmium	µg/L	0.007 J	0.005 J	0.05 U	0.02 U	1.42	1.25	0.06	0.048	0.65	0.642
Calcium	mg/L	0.2 J	0.2 J	13.2	13.6	12.5	12.7	1.96	1.5	4.54	4.4
Chloride	mg/L	6.46	5.54	41.2	41.6	71.1	60.6	8.65	8.56	29.3	28.4
Chromium	µg/L	0.2 J	0.24	0.2 J	0.24	0.395	0.56	0.373	0.28	0.402	0.40
Cobalt	µg/L	1.19	1.19	46.3	43.9	107	99.1	12.4	9.85	37.5	36.1
Combined Radium	pCi/L	0.214	0.6	1.354	1.44	6.007	5.27	1.312	1.4	3.099	3.3
Fluoride	mg/L	0.11	0.12	0.36	0.48	1.03	1.24	0.42	0.29	0.55	0.54
Lead	µg/L	0.07 J	0.07 J	0.2 U	0.2 U	0.277	0.24	0.286	0.22	0.997	0.92
Lithium	mg/L	0.00570	0.00500	0.132	0.134	0.164	0.166	0.0232	0.0188	0.0684	0.0634
Mercury	µg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.045	0.084	3.13	2.000	0.341	0.300 J
Molybdenum	µg/L	2 U	0.5 U	2 U	0.5 U	2 U	0.5 U	2 U	0.5 U	2 U	0.1 J
Selenium	µg/L	0.2 J	0.31 J	0.5 U	0.5 U	11.7	7.43	3.4	1.39	4.9	2.91
Sulfate	mg/L	3.8	5.46	74.6	78.6	337	327	70.1	60.4	71.5	64.6
Thallium	µg/L	0.5 U	0.2 U	0.5 U	0.2 U	0.2 J	0.21	0.5 U	0.05 J	0.2 J	0.23
Total Dissolved Solids	mg/L	68	70	229	60	692	290	213	100	283	250
pH	SU	4.1	4.2	4.9	5.5	4.0	3.5	4.1	4.0	3.6	3.2

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 - Stackout Area**

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.006	0.005	0.006
Arsenic, Total (mg/L)	0.010	0.0069	0.010
Barium, Total (mg/L)	2.00	0.0500	2.00
Beryllium, Total (mg/L)	0.00400	0.00200	0.00400
Cadmium, Total (mg/L)	0.005	0.001	0.005
Chromium, Total (mg/L)	0.10	0.0017	0.10
Cobalt, Total (mg/L)	n/a	0.0560	0.0560
Combined Radium, Total (pCi/L)	5.00	2.96	5.00
Fluoride, Total (mg/L)	4.0	1.0	4.0
Lead, Total (mg/L)	n/a	0.005	0.005
Lithium, Total (mg/L)	n/a	0.170	0.170
Mercury, Total (mg/L)	0.0020	0.000025	0.0020
Molybdenum, Total (mg/L)	n/a	0.005	0.005
Selenium, Total (mg/L)	0.050	0.0050	0.050
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 - FGD Stackout Pad**

Analyte	Unit	Description	AD-7	AD-22	AD-33
			5/25/2021	5/24/2021	5/24/2021
Boron	mg/L	Interwell Background Value (UPL)	0.0818		
		Analytical Result	1.84	0.076	0.121
Calcium	mg/L	Intrawell Background Value (UPL)	6.55	17.6	2.18
		Analytical Result	4.4	12.7	1.5
Chloride	mg/L	Interwell Background Value (UPL)	42.3		
		Analytical Result	28.4	60.6	8.56
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.54	1.24	0.29
pH	SU	Intrawell Background Value (UPL)	5.1		
		Intrawell Background Value (LPL)	3.4		
		Analytical Result	3.2	3.5	4.0
Sulfate	mg/L	Interwell Background Value (UPL)	83.4		
		Analytical Result	64.6	327	60.4
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	343	682	212
		Analytical Result	250	290	100

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 FGD Stackout Area CCR management area and that the requirements of § 352.931(a) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



112498

License Number

TEXAS

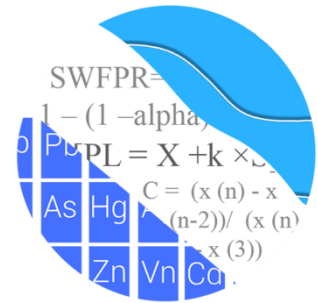
Licensing State

09.27.21

Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING



August 30, 2021

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

Re: Pirkey Stackout
Assessment Monitoring Event – May 2021

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical analysis of groundwater data for the May 2021 Assessment Monitoring sample event for American Electric Power Inc.'s Pirkey Stackout. 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-12 and AD-13
- **Downgradient wells:** AD-22, AD-33, and AD-7

Data were sent electronically to Groundwater Stats Consulting, and the statistical analysis was conducted according to the Statistical Analysis Plan and screening evaluation prepared by GSC and approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC. The 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 graphs for Appendix IV parameters are provided for all wells and are used to evaluate concentrations over the entire record (Figure A). Additionally, box plots are included for all constituents at upgradient and downgradient wells (Figure B). The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells.

Summary of Statistical Methods

Assessment monitoring for Appendix IV parameters involves the comparison of confidence intervals for parameters 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 determined from tolerance limits constructed from pooled upgradient well data.

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

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

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

Background Update – Conducted in December 2020

Outlier Analysis

Prior to constructing statistical limits, pooled upgradient well data were screened using Tukey's test and visual screening through time series plots for outliers and extreme trending patterns that would lead to artificially elevated statistical limits. Values identified as outliers are flagged with "o" and displayed in a lighter font and disconnected symbol on the time series graphs. 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.

Tukey's outlier test results for Appendix IV parameters and a description of outliers flagged during previous analyses were included and discussed with the background update conducted in December 2020. 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 calculated 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).

Seasonality

Seasonal patterns were observed on the time series plots for several constituents in well AD-22. Therefore, all constituents at this well were tested for seasonality using the Kruskal-Wallis test (Figure F). Appendix IV constituents with significant seasonality were beryllium, cadmium, cobalt, combined radium 226+228, fluoride, and lithium. When

seasonal patterns are observed, data are deseasonalized so that the resulting limits will correctly account for the seasonality as a predictable pattern rather than random variation or a release. This procedure includes subtracting the seasonal mean from each value within a given season, and adding the overall mean to each observation. Confidence intervals constructed with deseasonalized values may be found in Figure G following the confidence intervals which are discussed below.

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 G). Each confidence interval was compared with the corresponding GWPS from Figure E. Only when the entire confidence interval is above the GWPS is the well/constituent pair considered to exceed its respective standard. Both a tabular summary and graphical presentation of the confidence interval results follow this letter. Exceedances were noted for the following well/constituent pairs:

- Beryllium: AD-22
- Cobalt: AD-22

Confidence intervals were constructed also on deseasonalized data for constituents with detected seasonality in well AD-22 when at least one reported measurement was higher than the established GWPS for a given parameter. The constituents that met these criteria at well AD-22 are beryllium, cobalt, combined radium 226+228, and lithium. The results are included with the confidence intervals provided in Figure F. Confidence interval exceedances remained the same:

- Beryllium: AD-22
- Cobalt: AD-22

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

For Groundwater Stats Consulting,

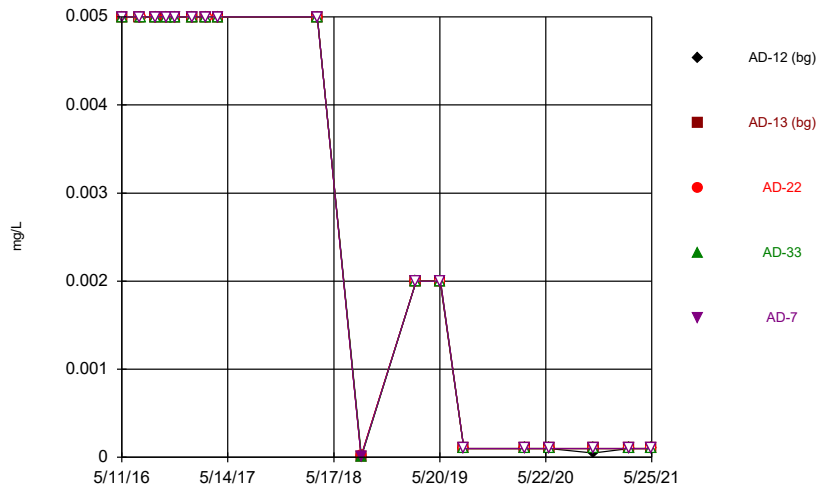


Andrew T. Collins
Project Manager



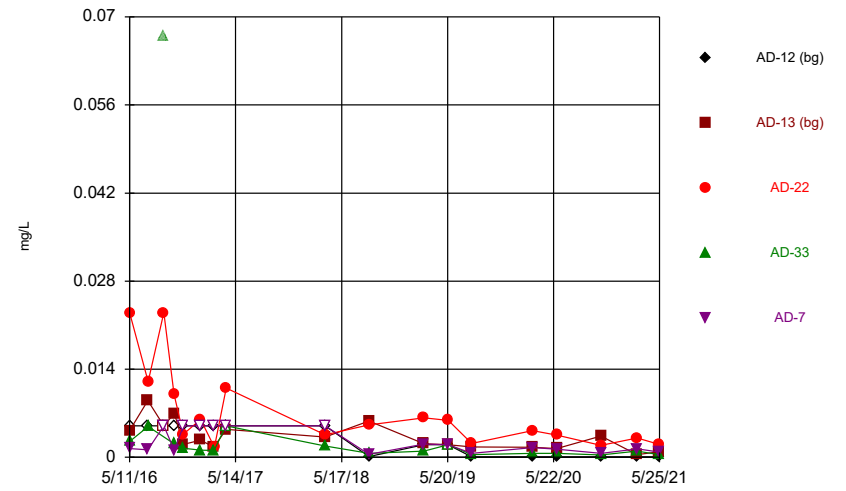
Kristina L. Rayner
Groundwater Statistician

Time Series



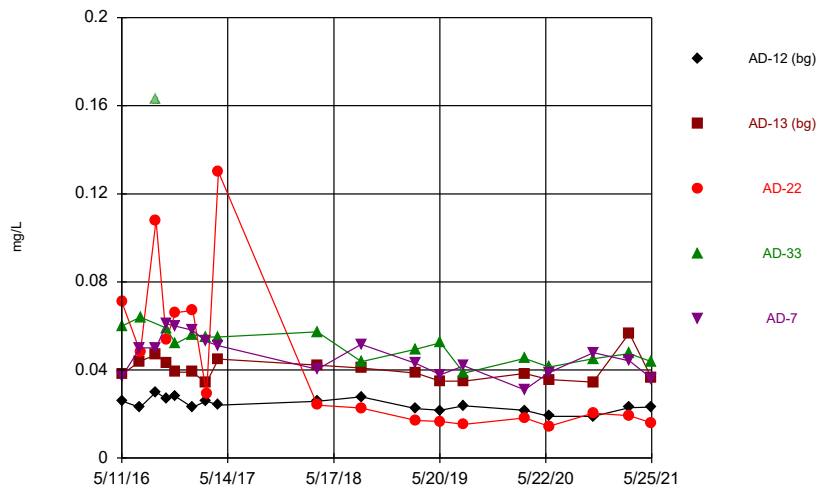
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Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



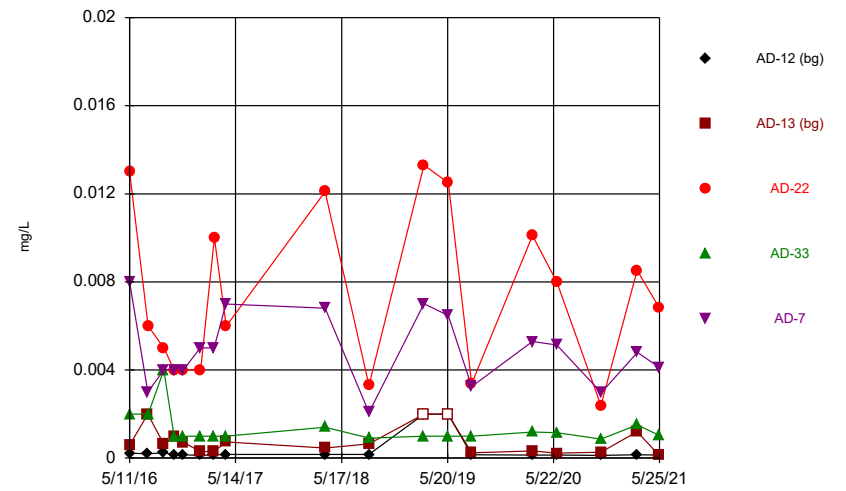
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Time Series



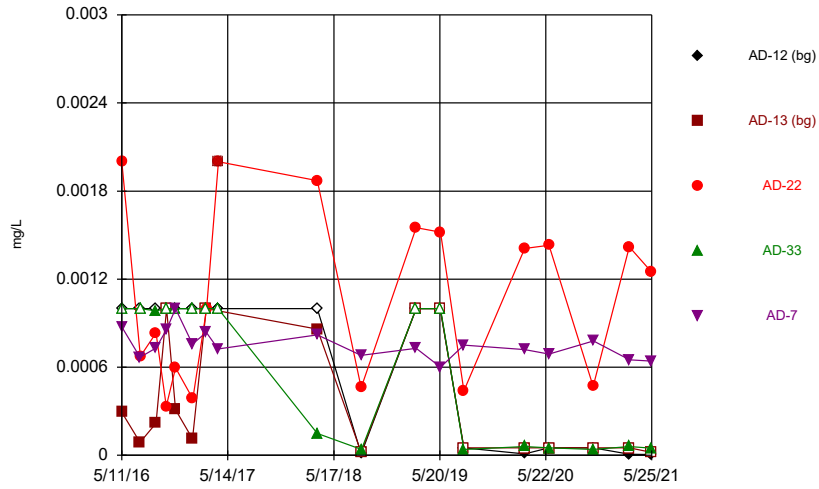
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Time Series



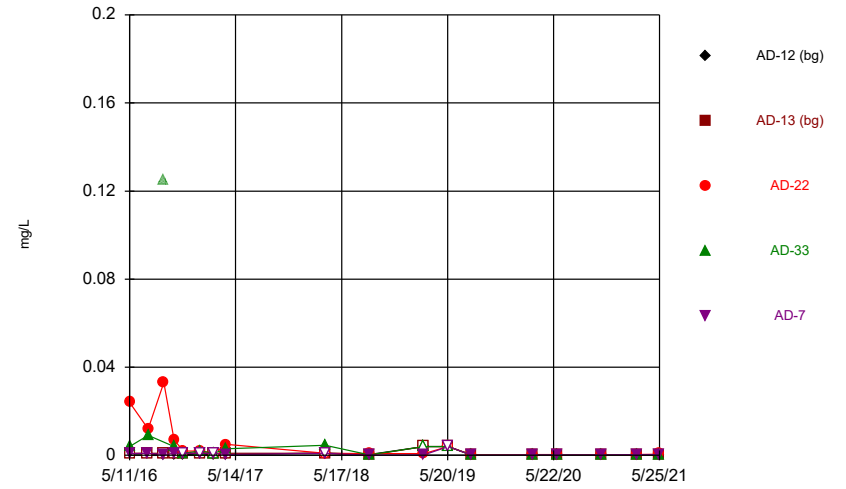
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Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



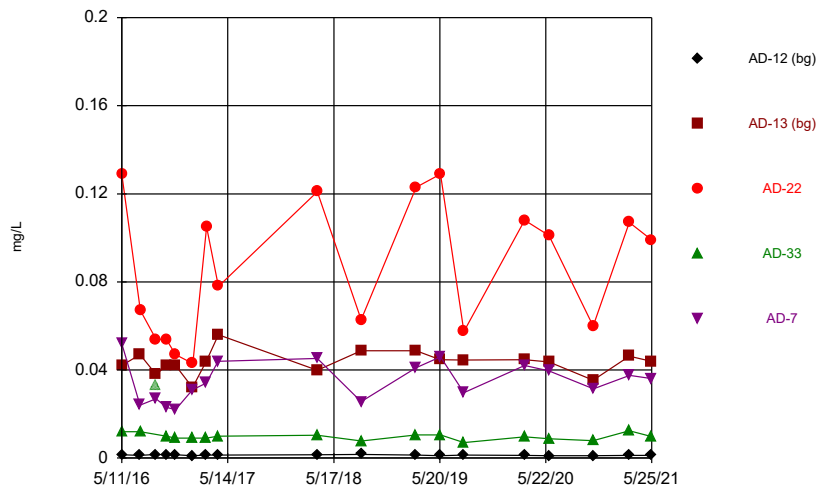
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Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



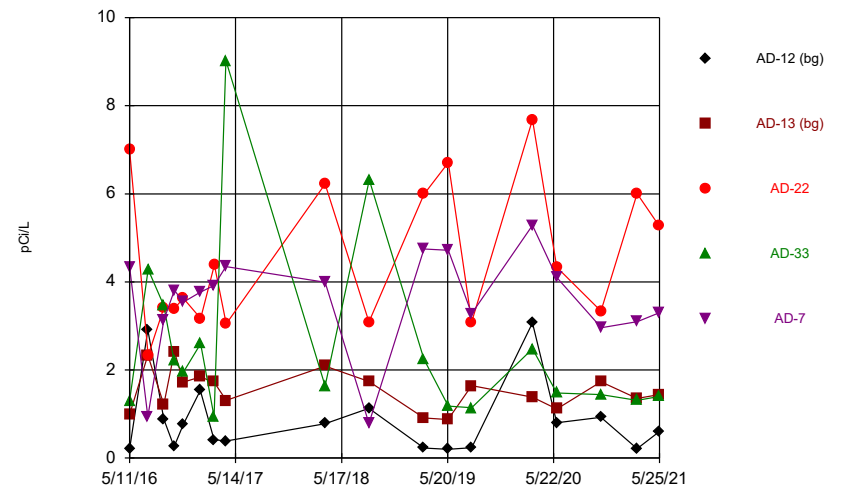
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Time Series



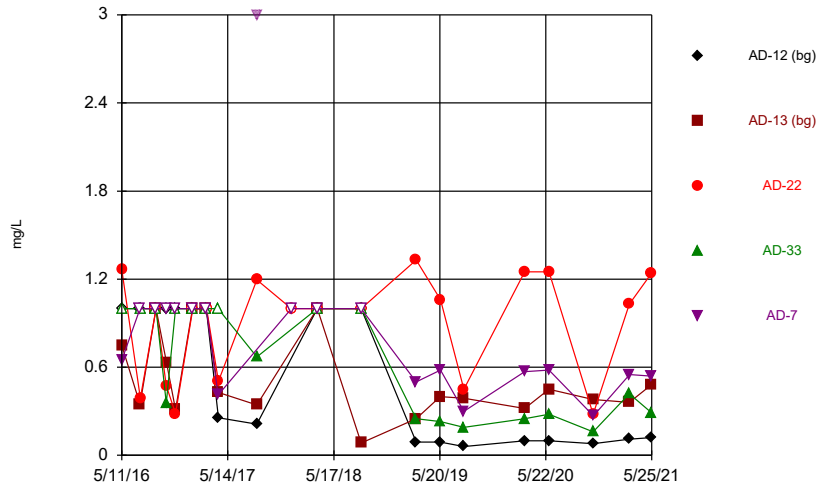
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Time Series



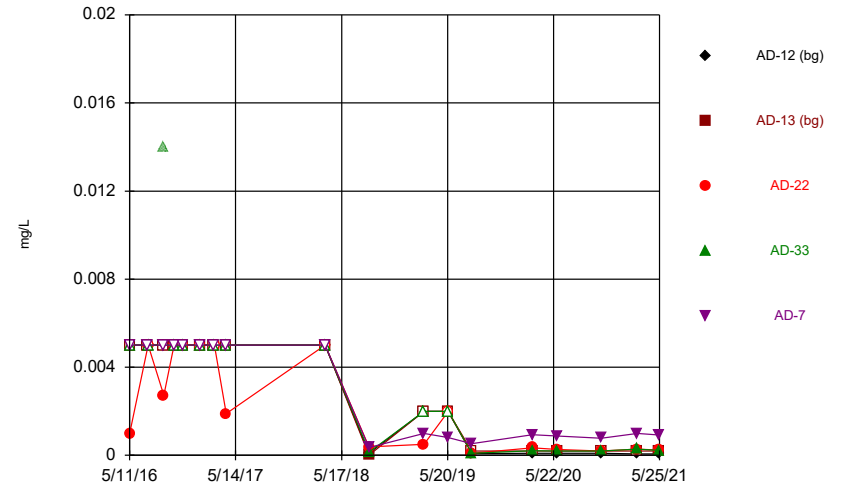
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Time Series



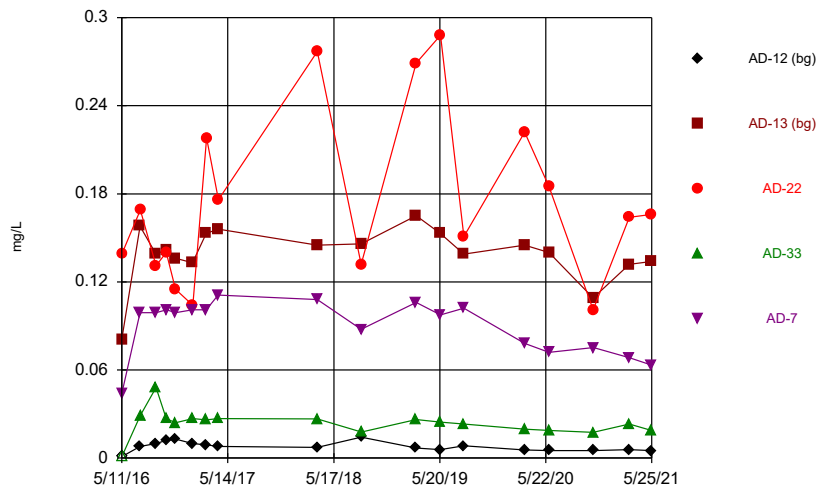
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Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



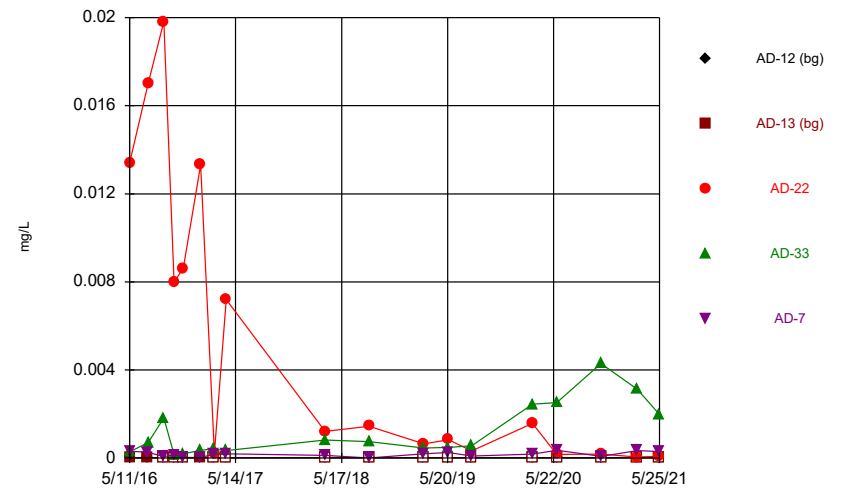
Constituent: Lead, total Analysis Run 8/11/2021 8:59 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



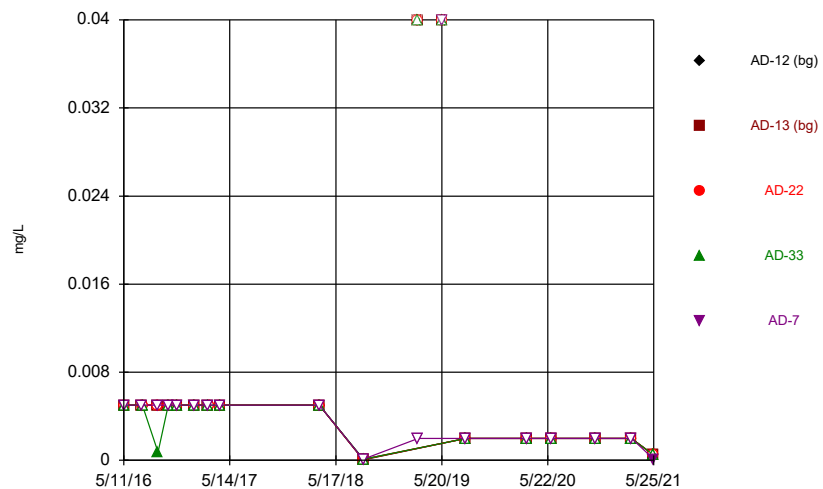
Constituent: Lithium, total Analysis Run 8/11/2021 8:59 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



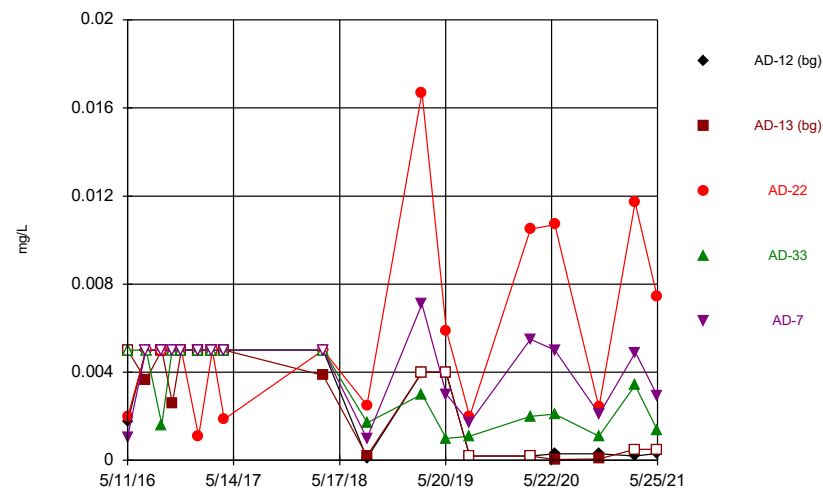
Constituent: Mercury, total Analysis Run 8/11/2021 8:59 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



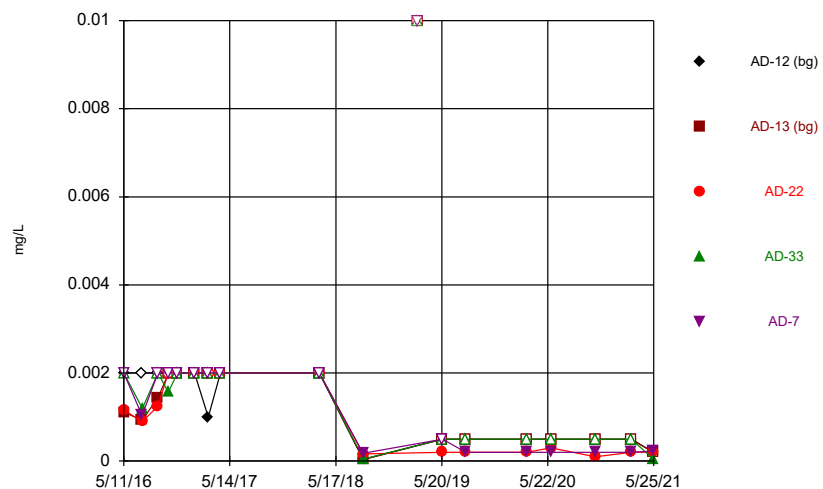
Constituent: Molybdenum, total Analysis Run 8/11/2021 8:59 AM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



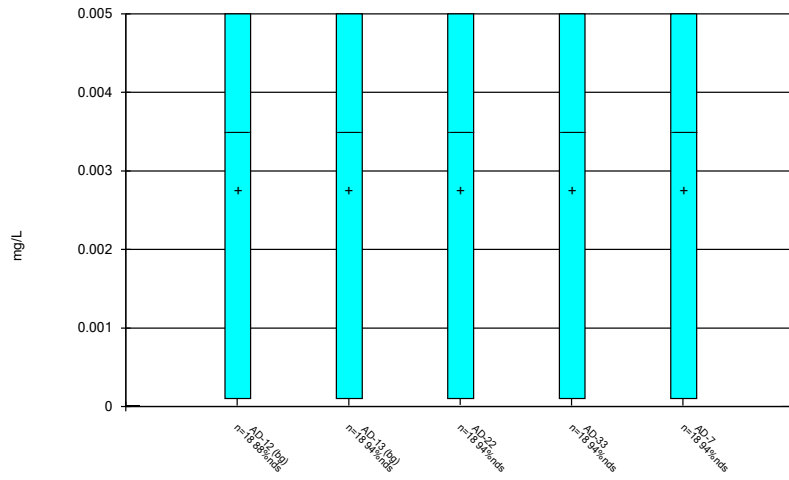
Constituent: Selenium, total Analysis Run 8/11/2021 8:59 AM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Time Series



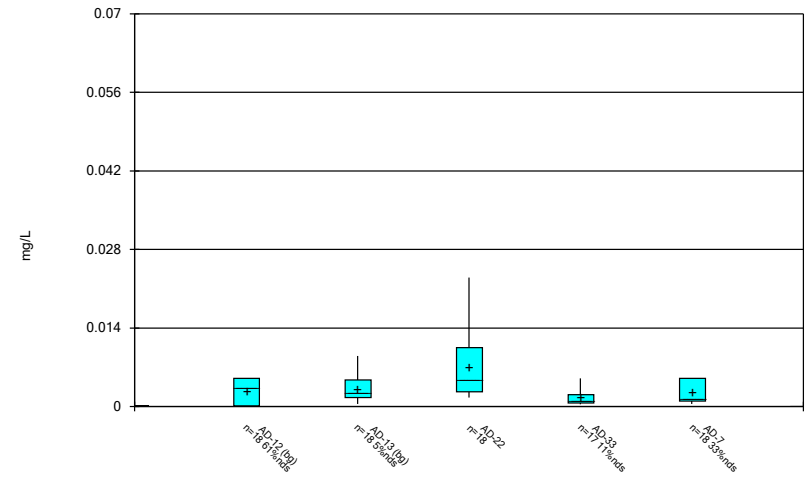
Constituent: Thallium, total Analysis Run 8/11/2021 8:59 AM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



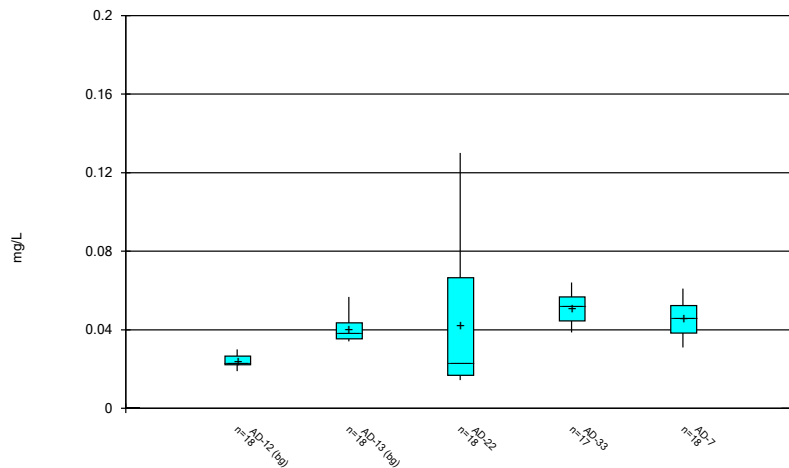
Constituent: Antimony, total Analysis Run 8/9/2021 3:20 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



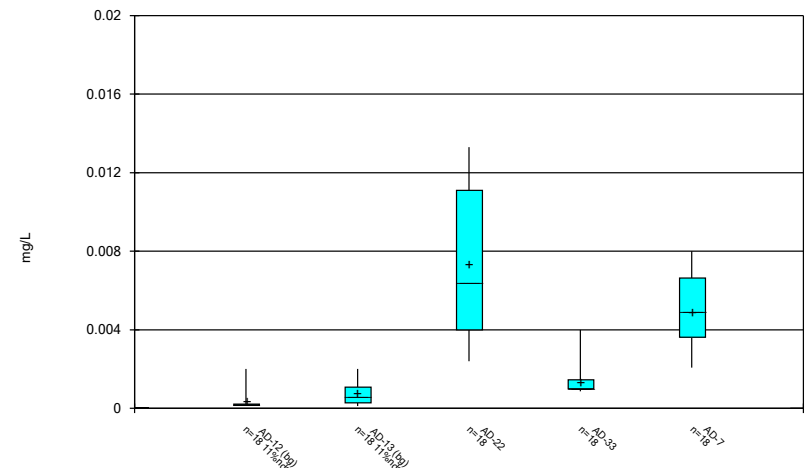
Constituent: Arsenic, total Analysis Run 8/9/2021 3:20 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



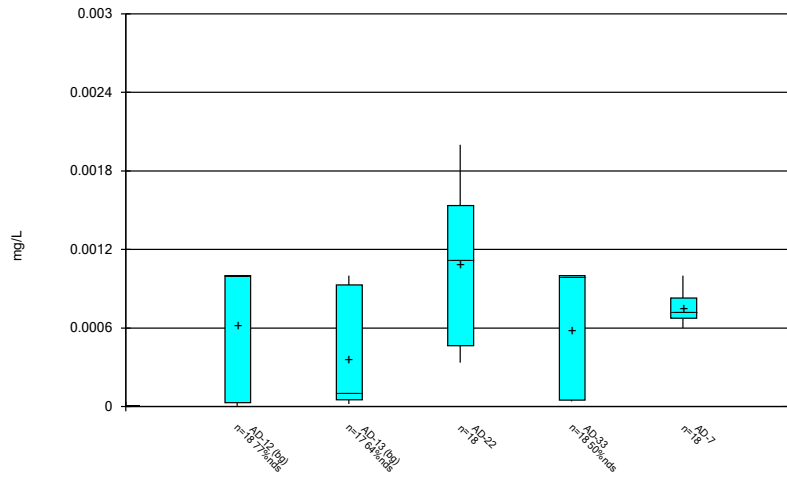
Constituent: Barium, total Analysis Run 8/9/2021 3:20 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



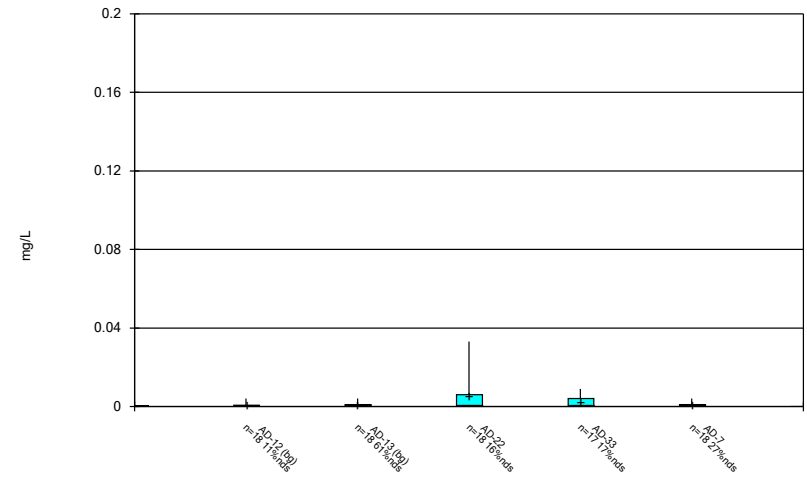
Constituent: Beryllium, total Analysis Run 8/9/2021 3:20 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



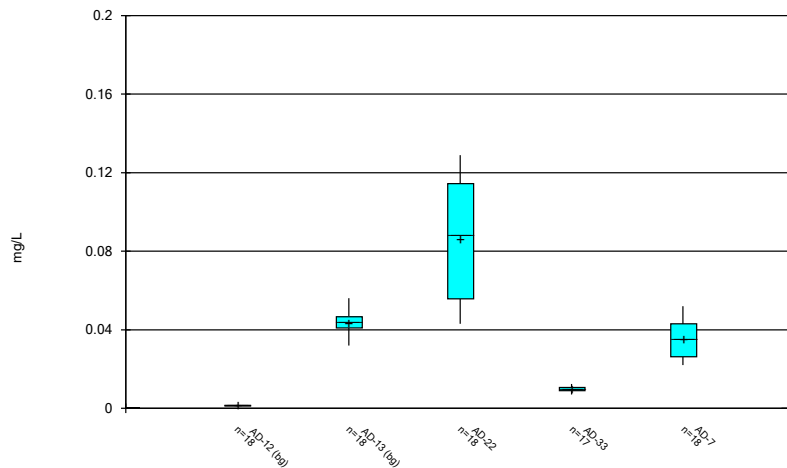
Constituent: Cadmium, total Analysis Run 8/9/2021 3:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



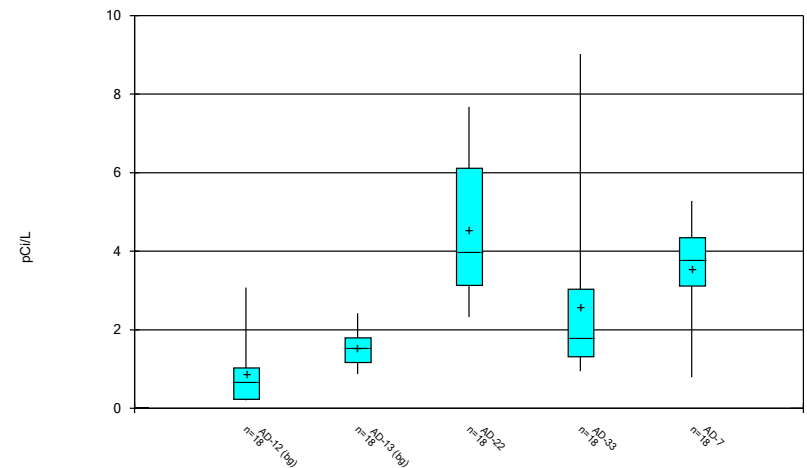
Constituent: Chromium, total Analysis Run 8/9/2021 3:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



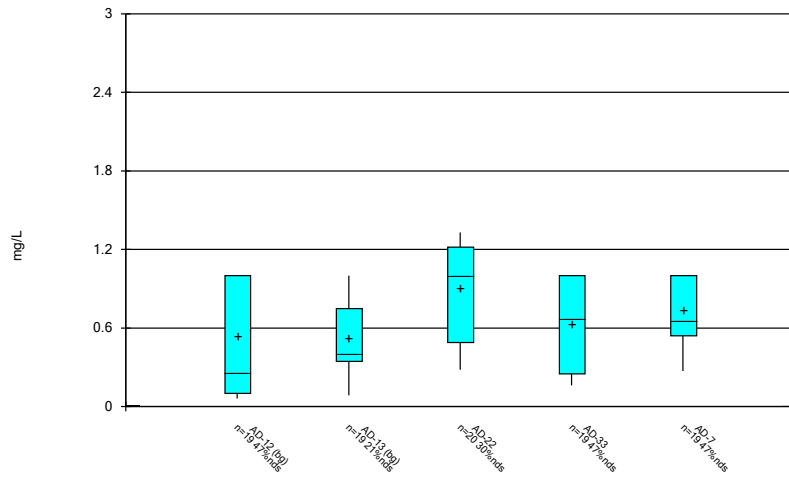
Constituent: Cobalt, total Analysis Run 8/9/2021 3:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



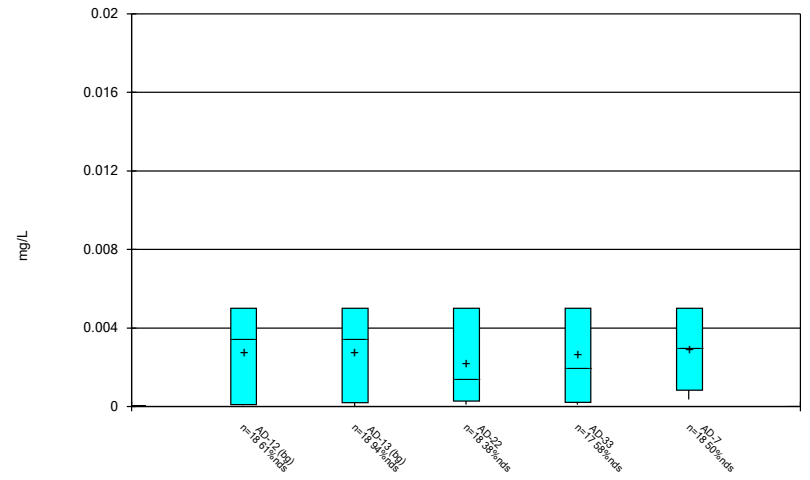
Constituent: Combined Radium 226 + 228 Analysis Run 8/9/2021 3:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



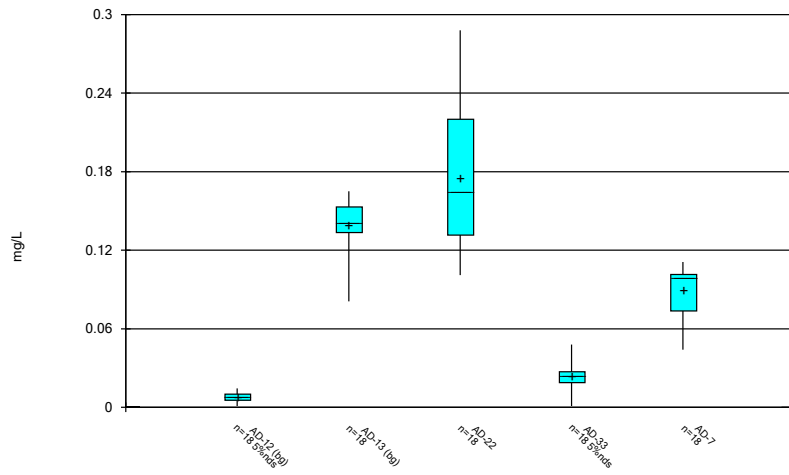
Constituent: Fluoride, total Analysis Run 8/9/2021 3:20 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



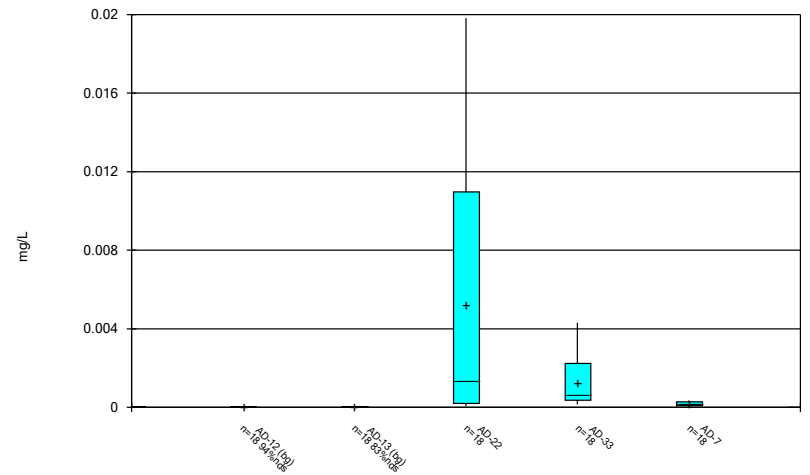
Constituent: Lead, total Analysis Run 8/9/2021 3:20 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



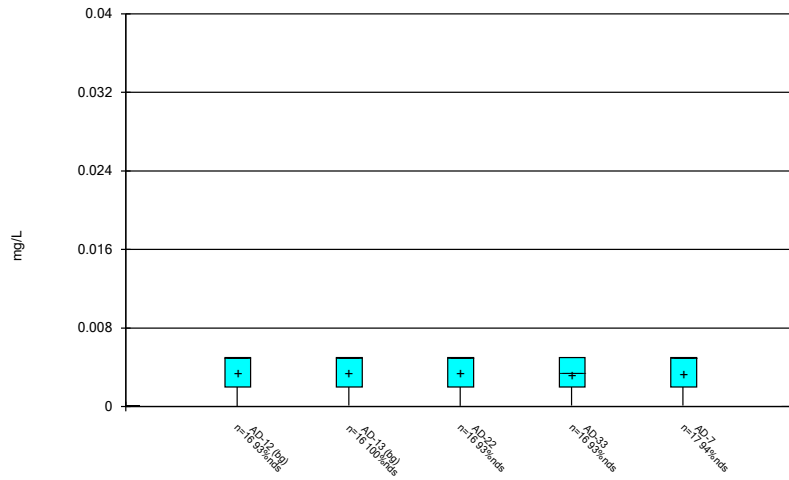
Constituent: Lithium, total Analysis Run 8/9/2021 3:20 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



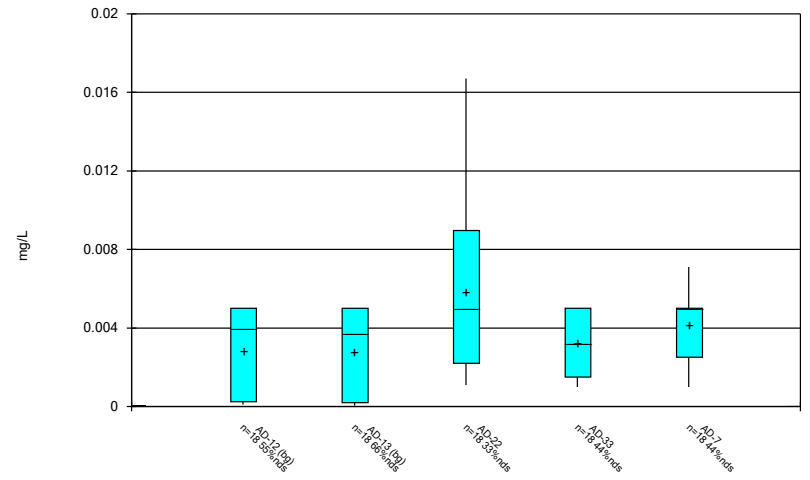
Constituent: Mercury, total Analysis Run 8/9/2021 3:20 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



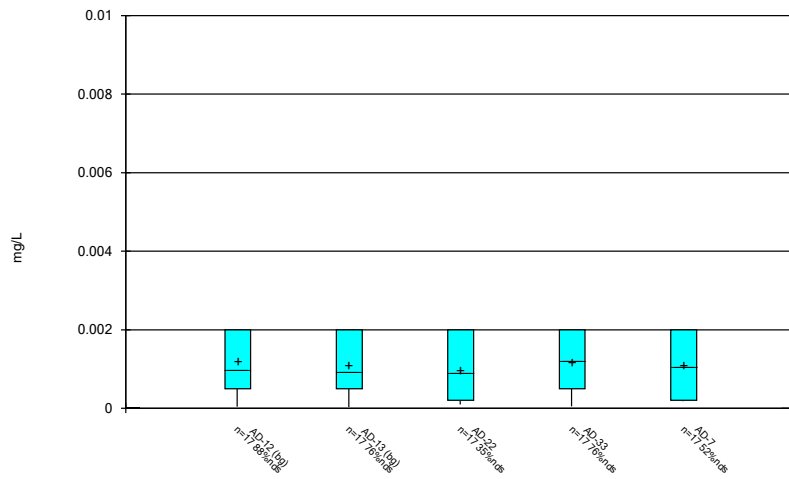
Constituent: Molybdenum, total Analysis Run 8/9/2021 3:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 8/9/2021 3:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/9/2021 3:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Outlier Summary

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 8/9/2021, 3:21 PM

	AD-33 Arsenic, total (mg/L)	AD-33 Barium, total (mg/L)	AD-13 Cadmium, total (mg/L)	AD-33 Chromium, total (mg/L)	AD-33 Cobalt, total (mg/L)	AD-7 Fluoride, total (mg/L)	AD-33 Lead, total (mg/L)	AD-12 Molybdenum, total (mg/L)	AD-13 Molybdenum, total (mg/L)	AD-22 Molybdenum, total (mg/L)
9/7/2016	0.067 (o)	0.163 (o)		0.125 (o)	0.033 (o)		0.014 (o)			
4/11/2017			0.002 (o)							
8/24/2017						2.994 (o)				
2/27/2019							<0.04 (o)	<0.04 (o)	<0.04 (o)	
5/21/2019							<0.04 (o)	<0.04 (o)		
5/22/2019										<0.04 (o)

	AD-33 Molybdenum, total (mg/L)	AD-7 Molybdenum, total (mg/L)	AD-12 Thallium, total (mg/L)	AD-13 Thallium, total (mg/L)	AD-22 Thallium, total (mg/L)	AD-33 Thallium, total (mg/L)	AD-7 Thallium, total (mg/L)
9/7/2016							
4/11/2017							
8/24/2017							
2/27/2019	<0.04 (o)		<0.01 (o)	<0.01 (o)	<0.01 (o)	<0.01 (o)	<0.01 (o)
5/21/2019							
5/22/2019	<0.04 (o)	<0.04 (o)					

Tolerance Limit Summary Table

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 12/20/2020, 11:00 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony, total (mg/L)	n/a	0.005	32	n/a	n/a	90.63	n/a	n/a	0.1937	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.006915	32	0.002241	0.002126	37.5	Kaplan-Meier	No	0.05	Inter
Barium, total (mg/L)	n/a	0.05035	32	0.03179	0.008441	0	None	No	0.05	Inter
Beryllium, total (mg/L)	n/a	0.002	32	n/a	n/a	12.5	n/a	n/a	0.1937	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	30	n/a	n/a	76.67	n/a	n/a	0.2146	NP Inter(NDs)
Chromium, total (mg/L)	n/a	0.001651	32	-8.378	0.897	40.63	Kaplan-Meier	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.056	32	n/a	n/a	0	n/a	n/a	0.1937	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	2.955	32	1.243	0.7784	0	None	No	0.05	Inter
Fluoride, total (mg/L)	n/a	1	34	n/a	n/a	38.24	n/a	n/a	0.1748	NP Inter(normality)
Lead, total (mg/L)	n/a	0.005	32	n/a	n/a	81.25	n/a	n/a	0.1937	NP Inter(NDs)
Lithium, total (mg/L)	n/a	0.165	32	n/a	n/a	3.125	n/a	n/a	0.1937	NP Inter(normality)
Mercury, total (mg/L)	n/a	0.000025	32	n/a	n/a	87.5	n/a	n/a	0.1937	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.005	28	n/a	n/a	96.43	n/a	n/a	0.2378	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	32	n/a	n/a	62.5	n/a	n/a	0.1937	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.002	30	n/a	n/a	80	n/a	n/a	0.2146	NP Inter(NDs)

PIRKEY STACKOUT GWPS			
Constituent Name	MCL	Background Limit	GWPS
Antimony, Total (mg/L)	0.006	0.005	0.006
Arsenic, Total (mg/L)	0.01	0.0069	0.01
Barium, Total (mg/L)	2	0.05	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	0.0017	0.1
Cobalt, Total (mg/L)	n/a	0.056	0.056
Combined Radium, Total (pCi/L)	5	2.96	5
Fluoride, Total (mg/L)	4	1	4
Lead, Total (mg/L)	n/a	0.005	0.005
Lithium, Total (mg/L)	n/a	0.17	0.17
Mercury, Total (mg/L)	0.002	0.000025	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

*MCL = Maximum Contaminant Level

*GWPS = Groundwater Protection Standard

Seasonality Summary Table - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 8/9/2021, 3:23 PM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Beryllium, total (mg/L)	AD-22	Yes	8.906	3.841	1	18	0.05
Cadmium, total (mg/L)	AD-22	Yes	6.646	3.841	1	18	0.05
Cobalt, total (mg/L)	AD-22	Yes	7.12	3.841	1	18	0.05
Combined Radium 226 + 228 (pCi/L)	AD-22	Yes	6.189	3.841	1	18	0.05
Fluoride, total (mg/L)	AD-22	Yes	4.939	3.841	1	20	0.05
Lithium, total (mg/L)	AD-22	Yes	4.547	3.841	1	18	0.05

Seasonality Summary Table - All Results

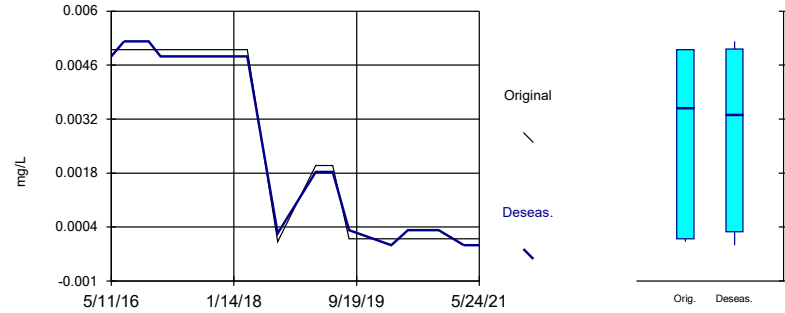
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 8/9/2021, 3:23 PM

<u>Constituent</u>	<u>Well</u>	<u>Sig.</u>	<u>K.-W.</u>	<u>Chi-Sq.</u>	<u>df</u>	<u>N</u>	<u>Alpha</u>
Antimony, total (mg/L)	AD-22	No	0.2846	3.841	1	18	0.05
Arsenic, total (mg/L)	AD-22	No	0.01778	3.841	1	18	0.05
Barium, total (mg/L)	AD-22	No	0	3.841	1	18	0.05
Beryllium, total (mg/L)	AD-22	Yes	8.906	3.841	1	18	0.05
Cadmium, total (mg/L)	AD-22	Yes	6.646	3.841	1	18	0.05
Chromium, total (mg/L)	AD-22	No	0.01782	3.841	1	18	0.05
Cobalt, total (mg/L)	AD-22	Yes	7.12	3.841	1	18	0.05
Combined Radium 226 + 228 (pCi/L)	AD-22	Yes	6.189	3.841	1	18	0.05
Fluoride, total (mg/L)	AD-22	Yes	4.939	3.841	1	20	0.05
Lead, total (mg/L)	AD-22	No	0.1003	3.841	1	18	0.05
Lithium, total (mg/L)	AD-22	Yes	4.547	3.841	1	18	0.05
Mercury, total (mg/L)	AD-22	No	0.6395	3.841	1	18	0.05
Molybdenum, total (mg/L)	AD-22	No	0.2222	3.841	1	16	0.05
Selenium, total (mg/L)	AD-22	No	0.4013	3.841	1	18	0.05
Thallium, total (mg/L)	AD-22	No	0.5512	3.841	1	17	0.05

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0.2846
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.2388
 Adjusted Kruskal-Wallis statistic (H') = 0.2846

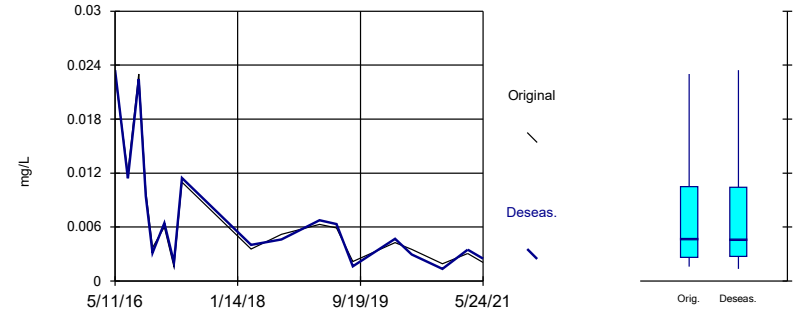


Constituent: Antimony, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0.01778
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.01776
 Adjusted Kruskal-Wallis statistic (H') = 0.01778

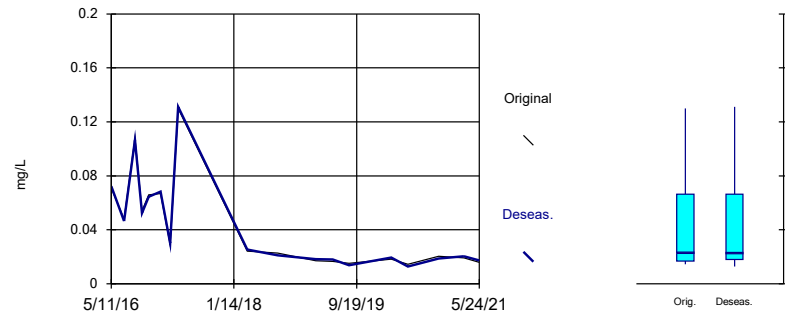


Constituent: Arsenic, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.

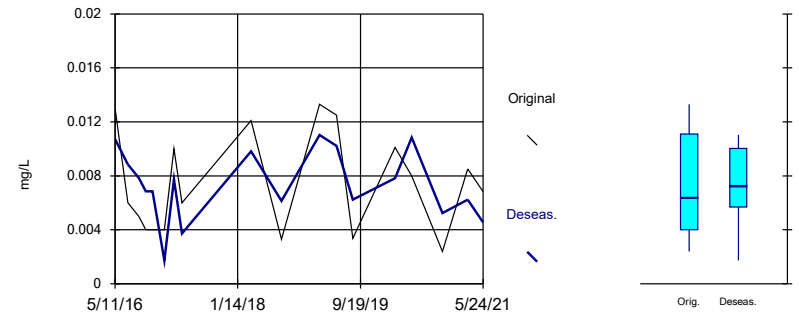


Constituent: Barium, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 8.906
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 8.86
 Adjusted Kruskal-Wallis statistic (H') = 8.906

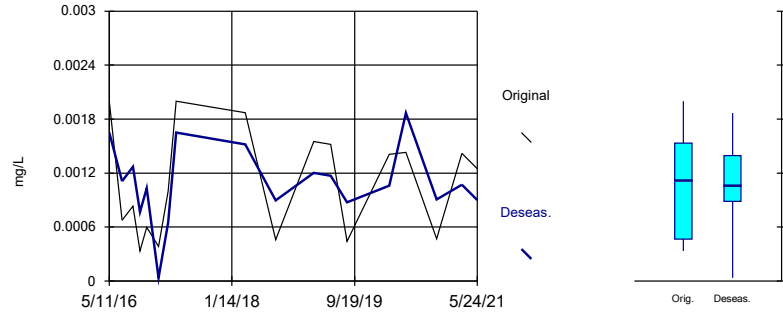


Constituent: Beryllium, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 6.646
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 6.639
 Adjusted Kruskal-Wallis statistic (H') = 6.646

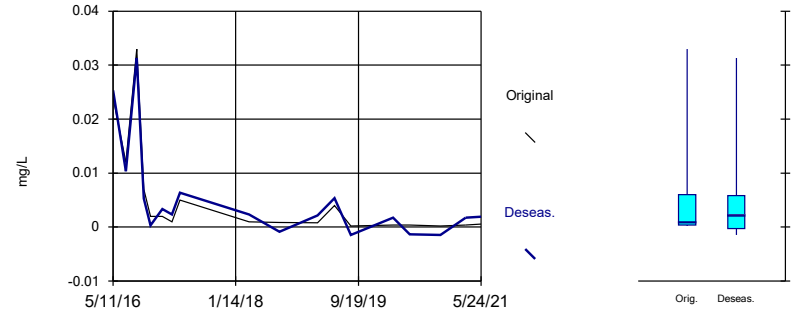


Constituent: Cadmium, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0.01782
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 3 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.01776
 Adjusted Kruskal-Wallis statistic (H') = 0.01782

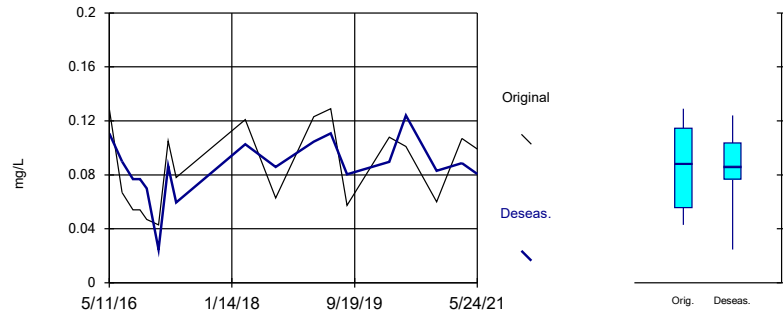


Constituent: Chromium, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 7.12
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 7.105
 Adjusted Kruskal-Wallis statistic (H') = 7.12

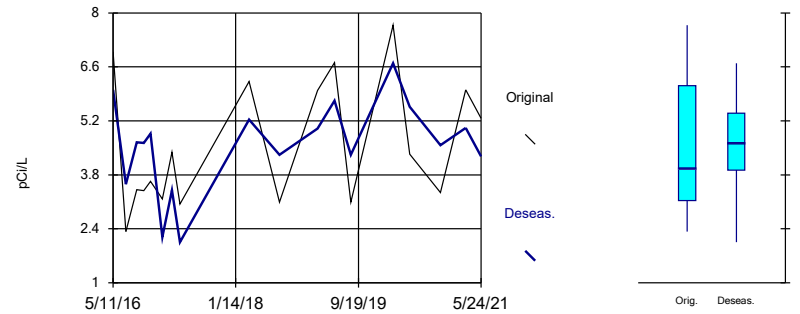


Constituent: Cobalt, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 6.189
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.

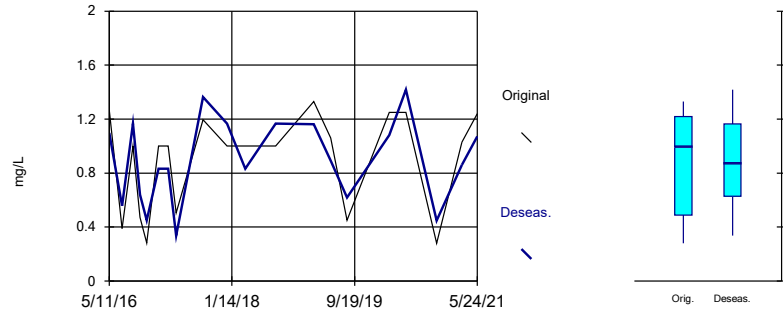


Constituent: Combined Radium 226 + 228 Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 4.939
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 4.806
 Adjusted Kruskal-Wallis statistic (H') = 4.939

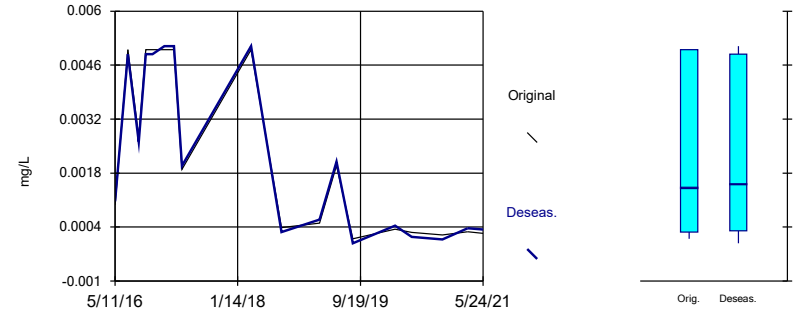


Constituent: Fluoride, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 0.1003
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.09671
 Adjusted Kruskal-Wallis statistic (H') = 0.1003

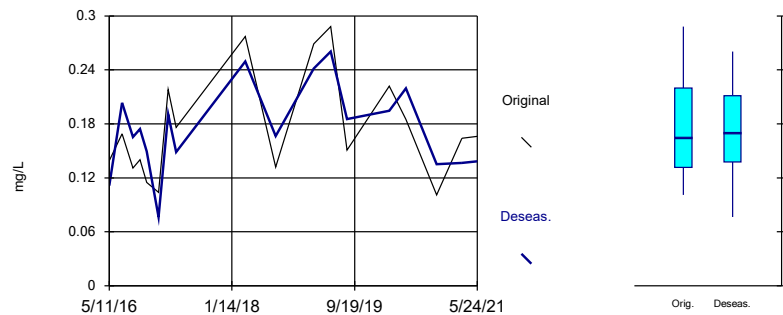


Constituent: Lead, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.

Calculated Kruskal-Wallis statistic = 4.547
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.

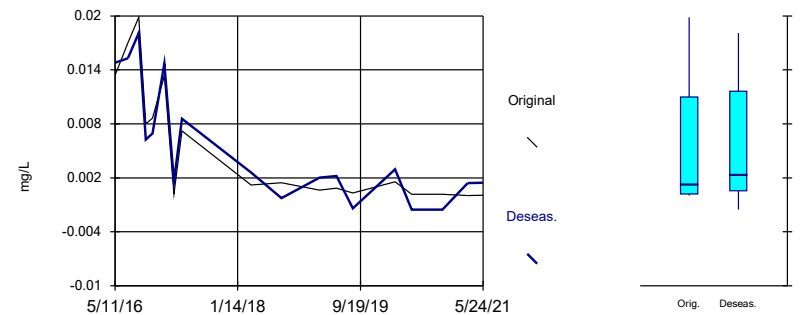


Constituent: Lithium, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.

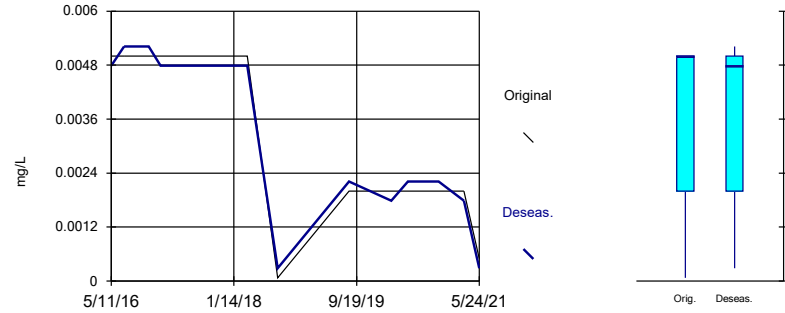
Calculated Kruskal-Wallis statistic = 0.6395
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.



Constituent: Mercury, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

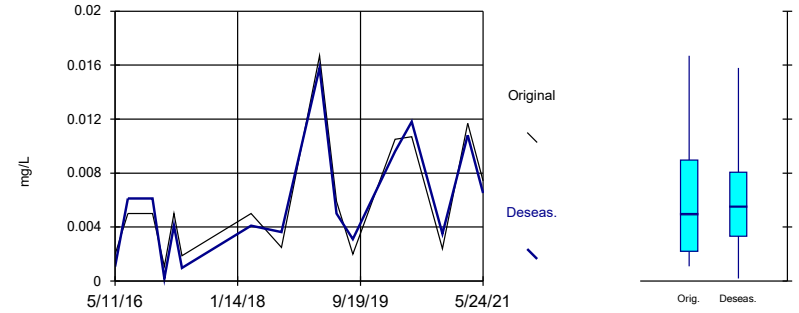
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 0.2222
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.1765
 Adjusted Kruskal-Wallis statistic (H') = 0.2222



Constituent: Molybdenum, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

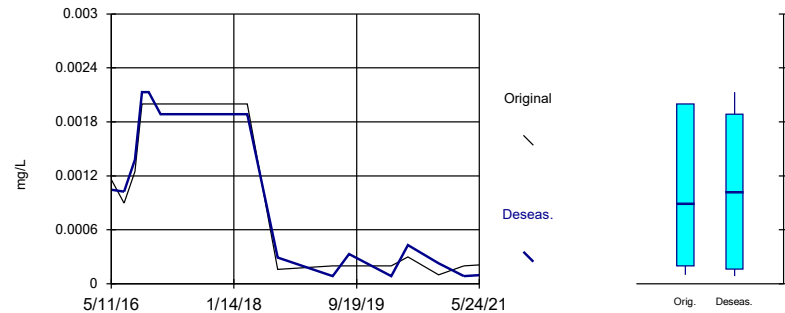
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 0.4013
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.3868
 Adjusted Kruskal-Wallis statistic (H') = 0.4013



Constituent: Selenium, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITY at the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
 Calculated Kruskal-Wallis statistic = 0.5512
 Tabulated Chi-Squared value = 3.841 with 1 degrees of freedom at the 5% significance level.
 There were 2 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
 Kruskal-Wallis statistic (H) = 0.5208
 Adjusted Kruskal-Wallis statistic (H') = 0.5512



Constituent: Thallium, total Analysis Run 8/9/2021 3:22 PM View: Seasonality
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Confidence Interval Summary Table - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 8/26/2021, 4:00 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Beryllium, total (mg/L)	AD-22	0.009595	0.005118	0.004	Yes	18	0.007357	0.003699	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-22	0.1028	0.06569	0.056	Yes	18	0.08586	0.03052	0	None	sqrt(x)	0.01	Param.

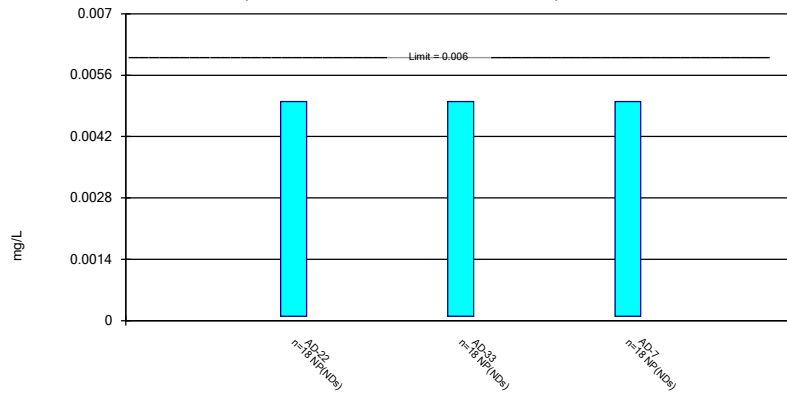
Confidence Interval Summary Table - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 8/26/2021, 4:00 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-22	0.005	0.0001	0.006	No	18	0.002757	0.00238	94.44	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-33	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-7	0.005	0.0001	0.006	No	18	0.002756	0.00238	94.44	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-22	0.009193	0.003267	0.01	No	18	0.007125	0.006544	0	None	x^(1/3)	0.01	Param.
Arsenic, total (mg/L)	AD-33	0.002099	0.0007314	0.01	No	17	0.001599	0.00142	11.76	None	x^(1/3)	0.01	Param.
Arsenic, total (mg/L)	AD-7	0.005	0.00082	0.01	No	18	0.00247	0.001888	33.33	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-22	0.067	0.0167	2	No	18	0.04206	0.03443	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-33	0.05548	0.04636	2	No	17	0.05092	0.007275	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-7	0.05152	0.04098	2	No	18	0.04625	0.008708	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-22	0.009595	0.005118	0.004	Yes	18	0.007357	0.003699	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-33	0.00151	0.000905	0.004	No	18	0.001336	0.0007466	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-7	0.005879	0.003889	0.004	No	18	0.004884	0.001644	0	None	No	0.01	Param.
Cadmium, total (mg/L)	AD-22	0.001444	0.0007386	0.005	No	18	0.001091	0.0005829	0	None	No	0.01	Param.
Cadmium, total (mg/L)	AD-33	0.001	0.000048	0.005	No	18	0.0005818	0.0004799	50	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-7	0.0008103	0.0006911	0.005	No	18	0.0007507	0.00009856	0	None	No	0.01	Param.
Chromium, total (mg/L)	AD-22	0.003145	0.000443	0.1	No	18	0.005264	0.009115	16.67	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-33	0.004	0.000147	0.1	No	17	0.002232	0.002464	17.65	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-7	0.0004227	0.0001824	0.1	No	18	0.0007371	0.0008925	27.78	Kaplan-Meier	ln(x)	0.01	Param.
Cobalt, total (mg/L)	AD-22	0.1028	0.06569	0.056	Yes	18	0.08586	0.03052	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	AD-33	0.01069	0.008799	0.056	No	17	0.009747	0.001513	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-7	0.04048	0.02967	0.056	No	18	0.03508	0.00893	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-22	5.445	3.508	5	No	18	4.56	1.651	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-33	3.029	1.436	5	No	18	2.578	2.095	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-7	4.266	3.117	5	No	18	3.559	1.166	0	None	x^2	0.01	Param.
Fluoride, total (mg/L)	AD-22	0.9917	0.5176	4	No	20	0.9001	0.3581	30	Kaplan-Meier	x^2	0.01	Param.
Fluoride, total (mg/L)	AD-33	1	0.25	4	No	19	0.6367	0.3691	47.37	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-7	1	0.5	4	No	19	0.7343	0.2741	47.37	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-22	0.005	0.000261	0.005	No	18	0.002217	0.002146	38.89	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-33	0.005	0.0002	0.005	No	17	0.002669	0.002335	58.82	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-7	0.005	0.0008	0.005	No	18	0.002901	0.002166	50	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-22	0.21	0.1397	0.17	No	18	0.1748	0.05811	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-33	0.027	0.0188	0.17	No	18	0.02364	0.00883	5.556	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-7	0.1009	0.08086	0.17	No	18	0.08963	0.01848	0	None	x^2	0.01	Param.
Mercury, total (mg/L)	AD-22	0.002297	0.000211	0.002	No	14	0.002183	0.003172	0	None	ln(x)	0.01	Param.
Mercury, total (mg/L)	AD-33	0.00157	0.0004429	0.002	No	18	0.001209	0.001206	0	None	x^(1/3)	0.01	Param.
Mercury, total (mg/L)	AD-7	0.0002422	0.0001077	0.002	No	18	0.0001749	0.0001111	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	AD-22	0.005	0.0005	0.005	No	16	0.003473	0.001866	93.75	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-33	0.005	0.0007365	0.005	No	16	0.003209	0.001934	93.75	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-7	0.005	0.0001	0.005	No	17	0.003365	0.00188	94.12	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-22	0.006486	0.002079	0.05	No	18	0.00582	0.004168	33.33	Kaplan-Meier	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	AD-33	0.005	0.00139	0.05	No	18	0.003245	0.00172	44.44	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-7	0.005	0.0021	0.05	No	18	0.004125	0.001718	44.44	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-22	0.002	0.0002	0.002	No	17	0.0009929	0.0008398	35.29	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-33	0.002	0.0005	0.002	No	17	0.001168	0.0007978	76.47	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-7	0.002	0.0002	0.002	No	17	0.001114	0.0008838	52.94	None	No	0.01	NP (NDs)

Non-Parametric Confidence Interval

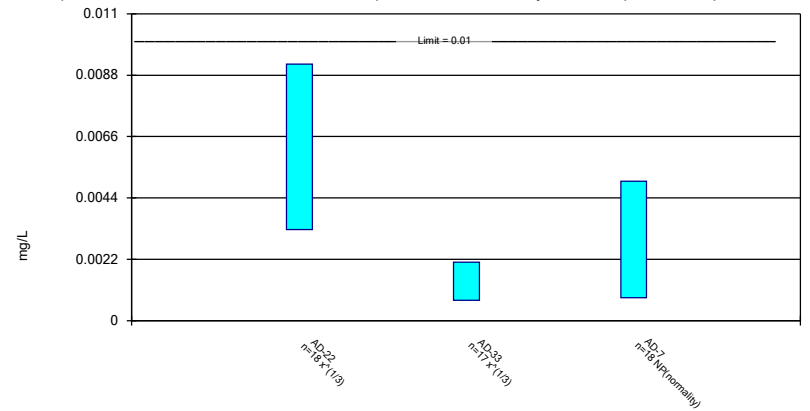
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

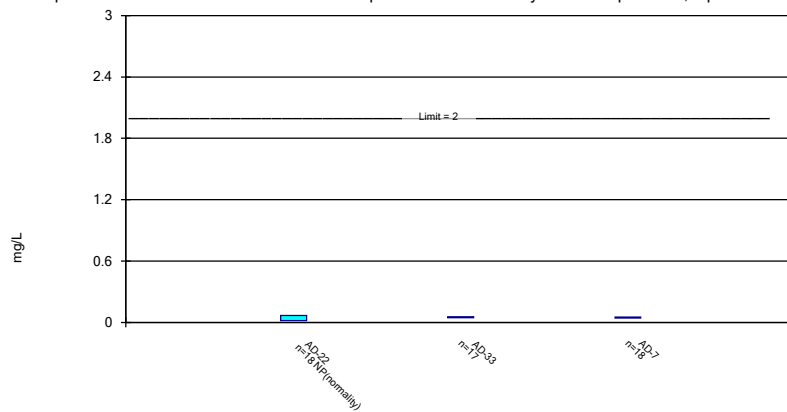
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

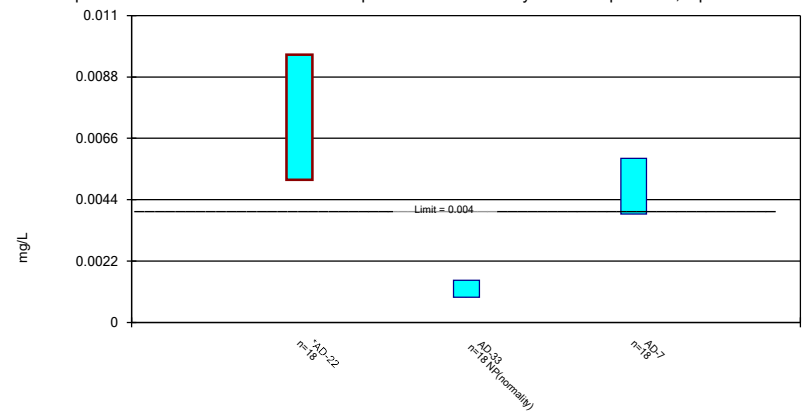
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

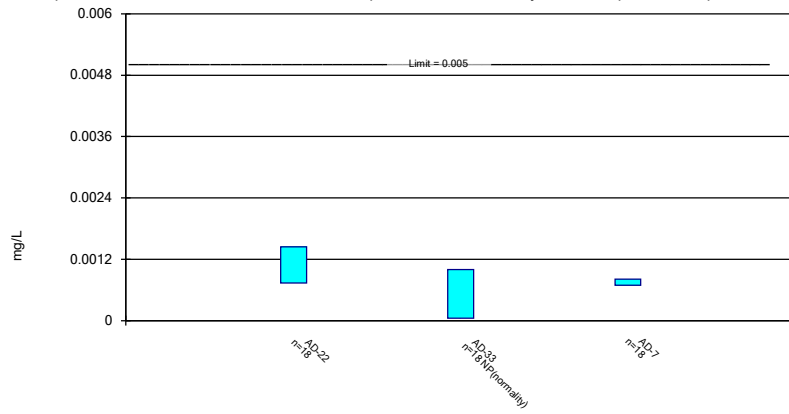
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

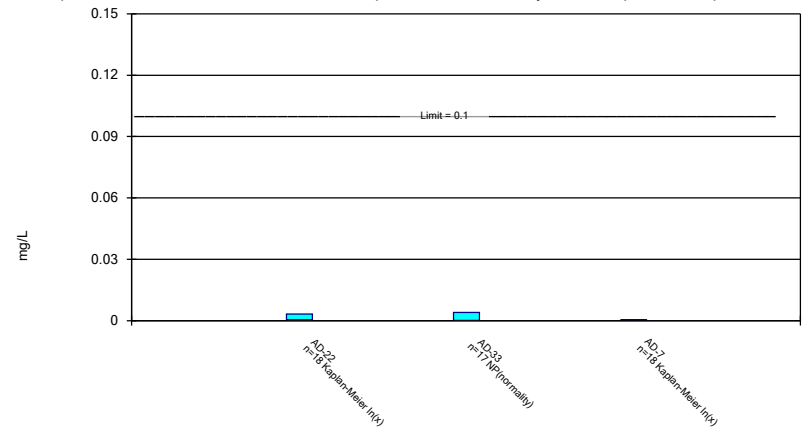
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

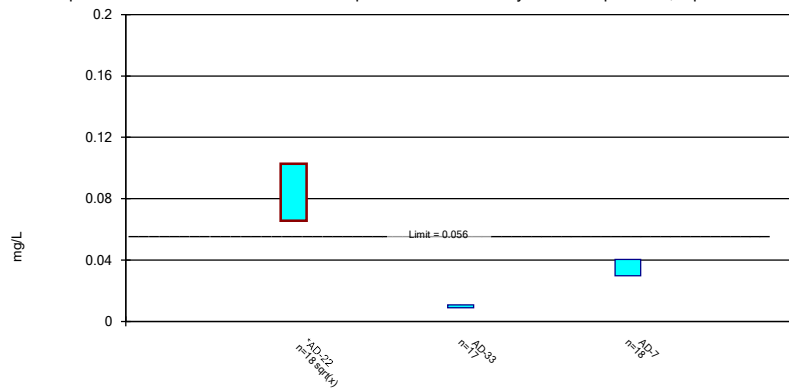
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

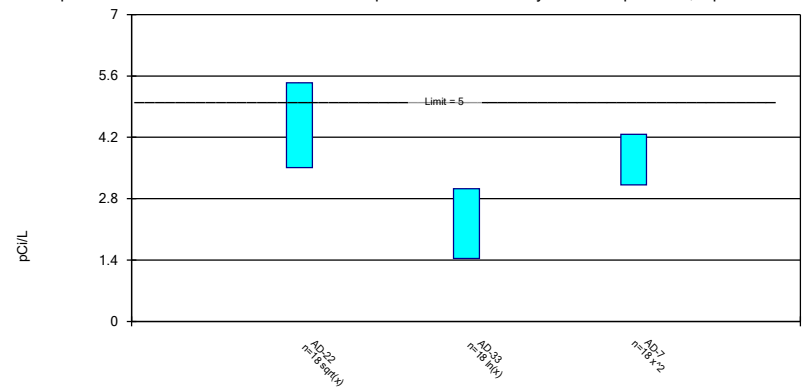
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

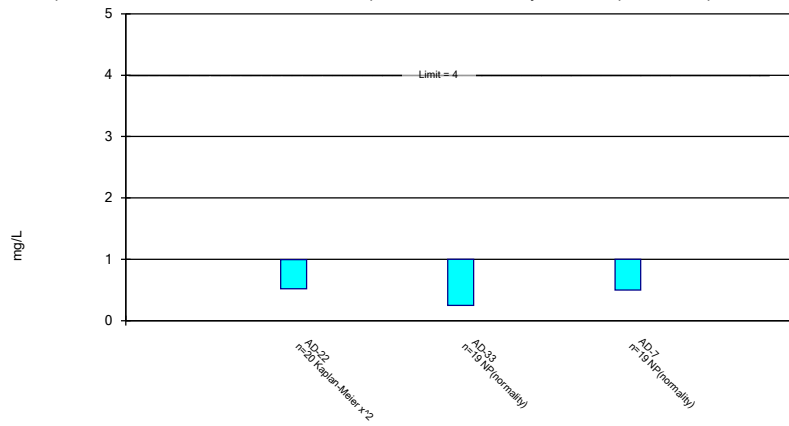
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

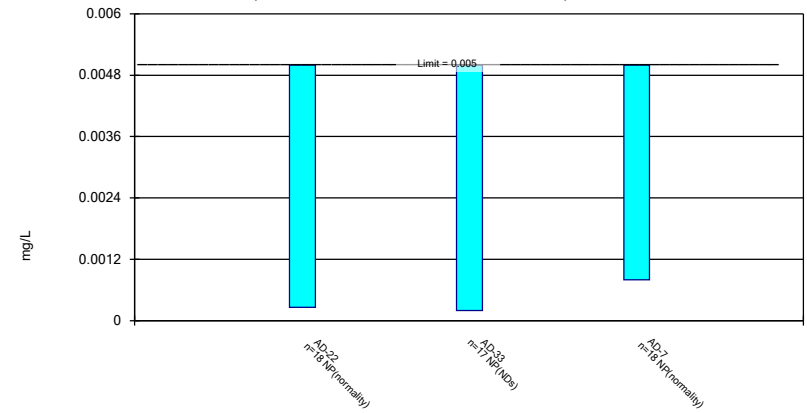
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 8/26/2021 3:57 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

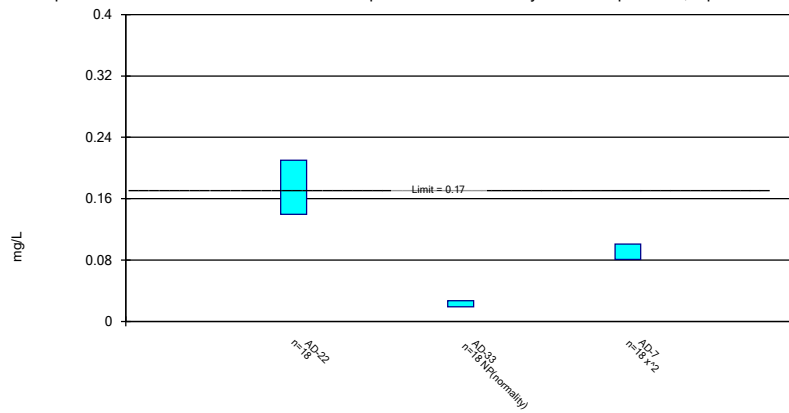
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 8/26/2021 3:57 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

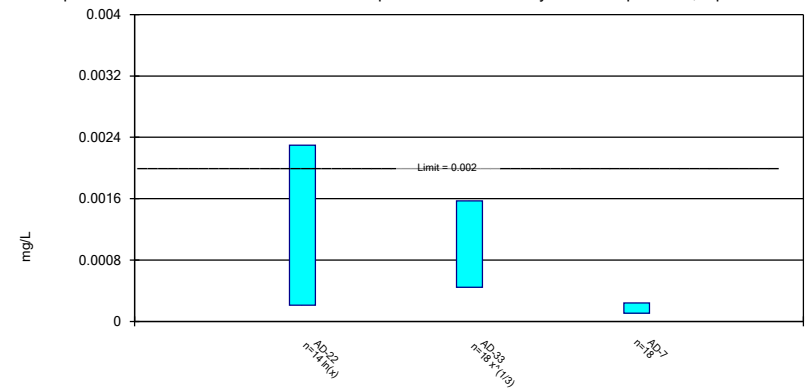
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 8/26/2021 3:57 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

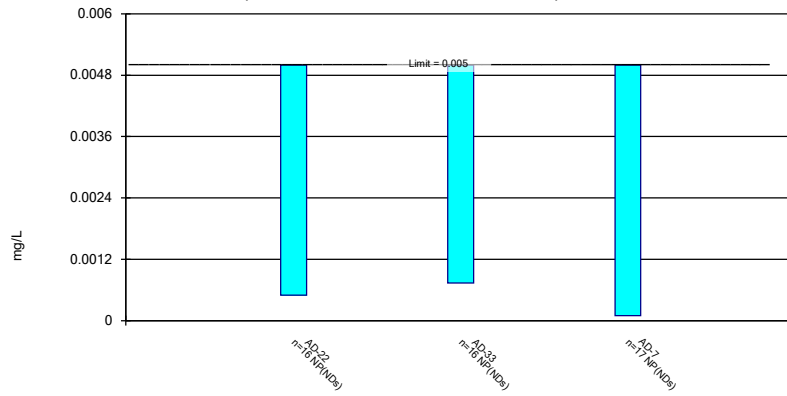
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 8/26/2021 3:57 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

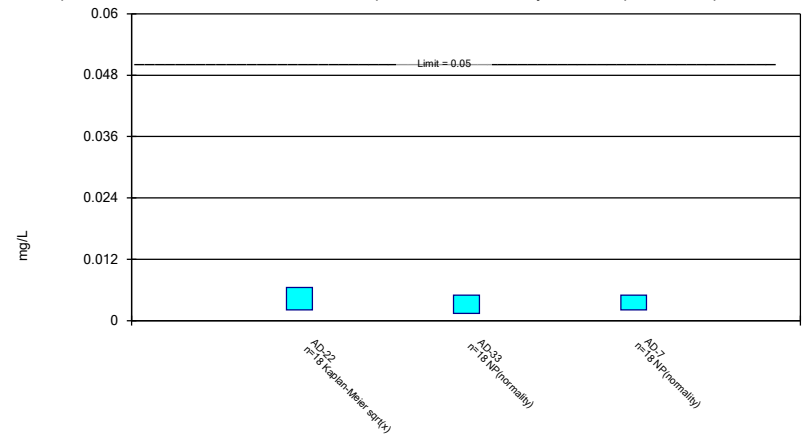
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

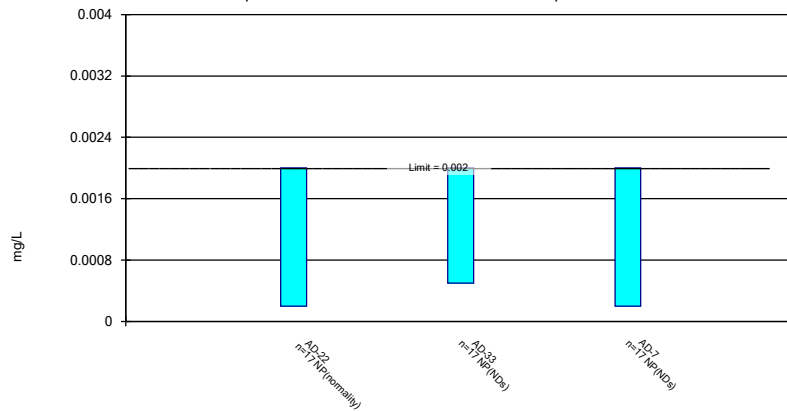
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

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



Constituent: Thallium, total Analysis Run 8/26/2021 3:57 PM
 Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

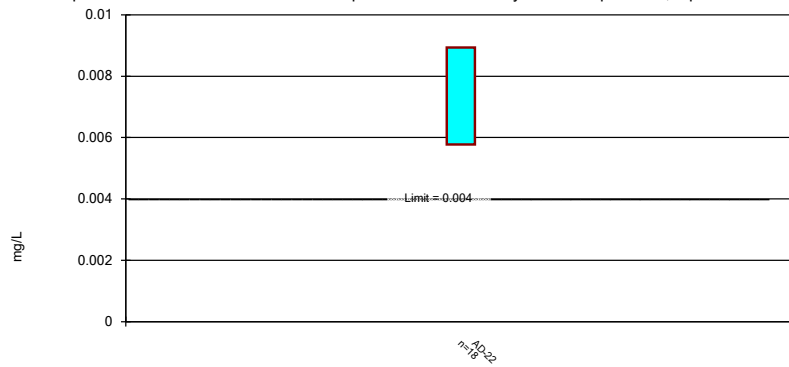
Confidence Intervals - Well AD-22 (Deseasonalized Results)

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 8/20/2021, 8:53 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Beryllium, total (mg/L)	AD-22	0.008936	0.005777	0.004	Yes	18	0.007357	0.002611	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-22	0.0992	0.07252	0.056	Yes	18	0.08586	0.02205	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-22	5.285	3.835	5	No	18	4.56	1.198	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-22	0.2043	0.1453	0.17	No	18	0.1748	0.04877	0	None	No	0.01	Param.

Parametric Confidence Interval

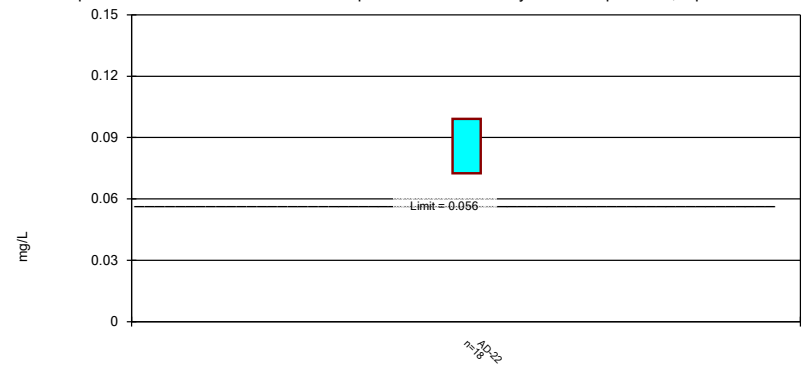
Compliance limit is exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total, Alt. Values Analysis Run 8/20/2021 8:50 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

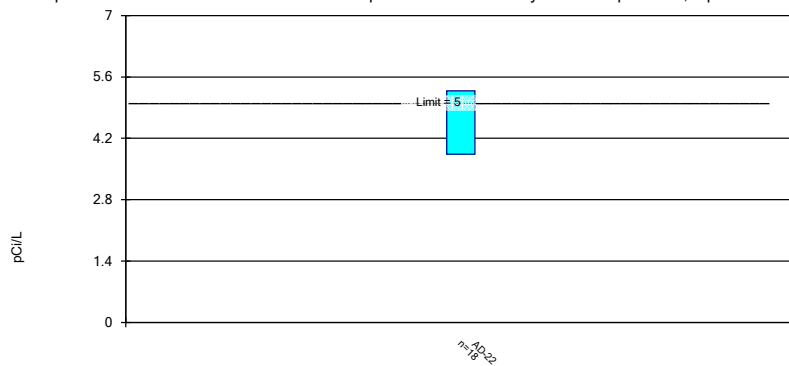
Compliance limit is exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total, Alt. Values Analysis Run 8/20/2021 8:50 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

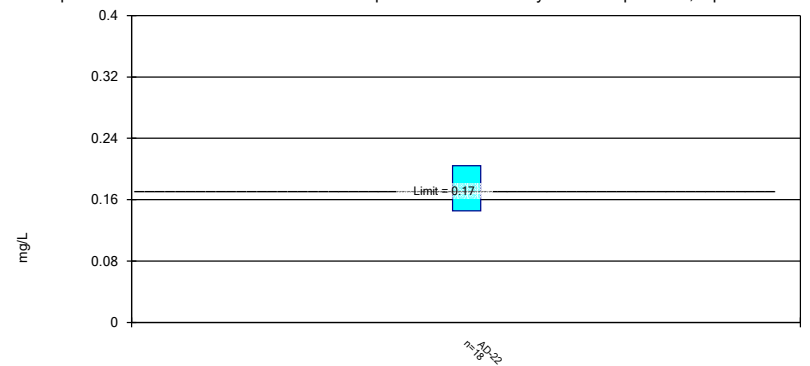
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228, Alt. Values Analysis Run 8/20/2021 8:51 AM View: Confidenc
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

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



Constituent: Lithium, total, Alt. Values Analysis Run 8/20/2021 8:51 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

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
Flue Gas Desulfurization
(FGD) Stackout Area
Hallsville, Texas**

Submitted to



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Columbus, Ohio 43215-2372

Submitted by

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May 2021

CHA8495

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ATTACHMENTS

Attachment A	SP-B4 Boring Log
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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
EPRI	Electric Power Research Institute
FGD	Flue Gas Desulfurization
GSC	Groundwater Stats Consulting, LLC
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
MCL	Maximum Contaminant Level
QA	Quality Assurance
QC	Quality Control
SPLP	Synthetic Precipitation Leaching Profile
SSL	Statistically Significant Level
SU	Standard Unit
TCEQ	Texas Commission on Environmental Quality
UTL	Upper Tolerance Limit
USEPA	United States Environmental Protection Agency
WBAP	West Bottom Ash Pond
XRD	X-Ray Diffraction

SECTION 1

INTRODUCTION AND SUMMARY

This Alternative Source Demonstration (ASD) report has been prepared to address statistically significant levels (SSLs) for beryllium and cobalt in the groundwater monitoring network at the H.W. Pirkey Plant Flue Gas Desulfurization (FGD) Stackout Area, located in Hallsville, Texas, following the second semi-annual detection monitoring event of 2020. The FGD Stackout Area is registered as a waste pile 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 FGD Stackout Area (**Figure 1**). In November 2020, a semi-annual assessment monitoring event was conducted at the FGD Stackout Area in accordance with 40 CFR 257.95(d)(1). The monitoring data were submitted to Groundwater Stats Consulting, LLC (GSC) for statistical analysis. Groundwater protection standards (GWPSs) were established for each Appendix IV parameter in accordance with the statistical analysis plan developed for the unit (Geosyntec, 2020a) and 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. Seasonal patterns were observed for beryllium, cadmium, cobalt, combined radium, fluoride, and lithium at AD-22 (Geosyntec, 2021). To correctly account for seasonality, confidence intervals for these wells and constituents were constructed using deseasonalized values. An SSL was concluded if the lower confidence limit (LCL) of a parameter exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). The following SSLs were identified at the Pirkey FGD Stackout Area (Geosyntec, 2021):

- The deseasonalized LCL for beryllium exceeded the GWPS of 0.00400 mg/L at AD-22 (0.00560 mg/L); and
- The deseasonalized LCL for cobalt exceeded the GWPS of 0.0560 mg/L at AD-22 (0.0685 mg/L).

No other SSLs were identified.

1.1 CCR Rule Requirements

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

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

Pursuant to 40 CFR 257.95(g)(3)(ii), Geosyntec Consultants, Inc. (Geosyntec) has prepared this ASD report to document that the SSLs identified for beryllium and cobalt at AD-22 are from a source other than the FGD Stackout Area.

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 SSLs identified for beryllium and cobalt were based on a Type IV cause and not by a release from the Pirkey FGD Stackout Area.

SECTION 2

ALTERNATIVE SOURCE DEMONSTRATION

The Federal CCR Rule allows the owner or operator 90 days from the determination of an SSL to demonstrate that a source other than the CCR unit caused the SSL. The methodology used to evaluate the SSLs identified for beryllium and 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 beryllium and 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 SSLs have been attributed to natural variation associated with seasonal effects, which is a Type IV (natural variation) issue.

2.1.1 Beryllium

An SSL was identified for beryllium at AD-22 using deseasonalized statistics (Geosyntec, 2021). According to the Unified Guidance, “seasonal correction should be done both to minimize the chance of mistaking a seasonal effect for evidence of contaminated groundwater, and also to build more powerful background to compliance point tests. Problems can arise, for instance, from measurement variations associated with changing recharge rates during different seasons” (USEPA, 2009).

The seasonal effects observed in the statistical analysis occur in roughly annual cycles, with somewhat higher beryllium concentrations occurring in early spring and lower concentrations in early fall. For example, beryllium concentrations in 2020 at AD-22 were 0.0101 milligrams per liter (mg/L) in March 2020, in contrast to 0.00239 mg/L in November 2020. Previous ASDs for the FGD Stackout Area showed that beryllium concentrations at AD-22 appear to correlate with groundwater elevations at the well (Geosyntec, 2019; Geosyntec, 2020b; Geosyntec, 2020c). This relationship still holds true (**Figure 2**). Beryllium concentrations at AD-22 are correlated with seasonal changes in other constituents, including calcium (**Figure 3**) and lithium (**Figure 4**). The correlation between beryllium and both monovalent (lithium) and divalent (calcium) cations suggests that the variability in observed beryllium concentrations is related to cation exchange behavior with clay minerals present in the native soil.

Soil boring SP-B4, which was advanced in March 2020 to re-log AD-22, found that clay materials were identified in the seasonally saturated zones above the permanent water table. The boring log for SP-B4 is provided in **Attachment A**, and the original boring log and well construction diagram

is provided in **Attachment B**. At AD-22, the depth to water fluctuated between approximately 3 and 12 ft below ground surface (bgs). Clay was identified from approximately 1.5 ft bgs to 13.3 ft bgs, where it transitioned to a clayey silt (**Figure 5**). Analysis by X-ray diffraction (XRD) confirmed the presence of clays within the seasonal water table and sand within the screened interval, as summarized in **Table 1**. The clay fraction of the uppermost sample collected from within the seasonal water table was further analyzed to identify the type of clays present. Smectite-type clays, which are 2:1-layer high-activity clays with characteristic cation exchange capacity, make up the majority of the clay minerals present at that interval.

Sorption and desorption of beryllium from smectite-type clays is well documented (Boschi and Willenbring, 2016a; You, et al., 1989). Desorption was found to be affected by pH, with 75% of beryllium desorbed from a smectite-type clay as pH decreased from 6.0 standard units (SU) to 3.0 SU (Boschi and Willenbring, 2016b). The pH values recorded at AD-22 for groundwater samples collected under the Federal CCR Rule ranged from 3.6 to 5.1 SU, suggesting that conditions are favorable for beryllium desorption from smectite-type clays. The presence of these exchangeable clays provides further evidence that the exceedance of beryllium at AD-22 can be attributed to the effects of seasonal groundwater elevation changes, and the resulting cation exchange between groundwater and the exchangeable clay within the seasonal water table, on groundwater quality.

2.1.2 Cobalt

An SSL was identified for cobalt at AD-22 using deseasonalized statistics (Geosyntec, 2021). As shown in previous ASDs (Geosyntec, 2020b; Geosyntec, 2020c), the cobalt concentrations at AD-22 also appear to correlate with seasonal changes in groundwater elevation (**Figure 6**). In addition, the cobalt concentrations are well correlated with changes in other cations, including calcium and lithium (**Figure 7**), suggesting natural variability associated with interactions with the aquifer solids.

The concentration ratio between calcium and cobalt is consistently on the order of 1000:1 at both upgradient and downgradient locations (**Figure 8**). A sample was collected of the solid FGD sludge material accumulated on the FGD Stackout Area. The solid phase sample was leached using both USEPA's Synthetic Precipitation Leaching Profile (SPLP) testing procedure (SW-846 Test Method 1312) and TCEQ's 7-Day Distilled Water Leachate Test Procedure (30 TAC 335.521 Appendix 4). While cobalt concentrations in both of the leached samples are consistent with those observed in the groundwater samples, the leached calcium concentrations are approximately two to three orders of magnitude higher. However, calcium concentrations in groundwater are generally consistent between AD-22 and upgradient well AD-13 (**Figure 9**). The different ratio between calcium and cobalt in the leached FGD sludge material (about 45,000:1) as compared to the ratio for groundwater indicate that dissolved calcium concentrations at AD-22 would be significantly higher if the groundwater at this location were affected by leachate. The similarity between upgradient and downgradient calcium concentrations provides an additional line of evidence that the exceedances observed at the FGD Stackout Area are not due to a release from the unit.

Siderite and pyrite, both reduced iron-bearing minerals, were identified below the seasonal water table (within the saturated zone) at AD-22. Cobalt is known to undergo isomorphic substitution for iron in both siderite and pyrite (Gross, 1965; Hitzman, et al., 2017; Krupka and Serne, 2002). This is due to the similarity of their ionic radii (approximately 1.56 angstrom (Å) for iron vs. 1.52 Å for cobalt [Clementi and Raimondi, 1963]). The proposed substitution of cobalt for iron in the crystal lattice of pyrite has been documented in other ASDs prepared for the Pirkey Plant's East Bottom Ash Pond (EBAP; Geosyntec, 2020d) and West Bottom Ash Pond (WBAP; Geosyntec, 2020e).

Goethite (an iron oxide) was identified within the seasonally saturated zone and the screened interval at AD-22 (**Table 1**). The weathering of siderite and pyrite to goethite under oxidizing conditions is a well-understood phenomenon, including in formations in east Texas (Senkayi, et al., 1986; Dixon, et al., 1982) and may have occurred within the seasonally saturated zone. A review of geochemical conditions at AD-22 shows that the conditions observed at AD-22 are favorable for goethite formation (**Figure 10**). During weathering from reduced (pyrite or siderite) to oxidized (goethite) iron minerals, cobalt would be released from the mineral structure. The contribution of cobalt to groundwater via dissolution of siderite or pyrite within the saturated aquifer is not likely to change seasonally. However, the mobilization of cobalt which was released during weathering of siderite or pyrite to goethite in the seasonally saturated zone may explain the variability in aqueous cobalt concentrations and their correlation with the groundwater elevation.

2.1.3 Conceptual Site Model

The seasonal fluctuations in beryllium and cobalt concentrations at AD-22 can be attributed to variations in the amount of the aquifer solids that are in contact with groundwater as the water table elevation changes. When the water table is higher, more clay material is in contact with groundwater, allowing greater desorption of cations (including beryllium) from the cation exchange sites on the clay. In the case of cobalt, more iron oxides are in contact with groundwater as the water table rises, allowing for the release of cobalt from mineral phases where it has isomorphically substituted for iron. Thus, the observed SSLs were attributed to natural variation associated with seasonal desorption of beryllium and cobalt as the amount of aquifer solids that are saturated increases.

2.2 Sampling Requirements

As the ASD presented above supports the position that the identified SSLs are not due to a release from the Pirkey FGD Stackout Area, 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 SSLs of beryllium and cobalt at AD-22 identified during assessment monitoring in November 2020 were not due to a release from the FGD Stackout Area. The identified SSLs were, instead, attributed to natural variation related to seasonal desorption or dissolution of beryllium and cobalt from the aquifer solids. Therefore, no further action is warranted, and the Pirkey FGD Stackout Area will remain in the assessment monitoring program. Certification of this ASD by a qualified professional engineer is provided in **Attachment C**.

SECTION 4

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TABLES

**Table 1: X-Ray Diffraction Results
FGD Stackout Area - H. W. Pirkey Plant**

Boring Location	SP-B4		
Associated Well	AD-22		
Depth (ft bgs)	6-8	18-20	28-30
Sample Location	Within Seasonal Water Table	Below Seasonal Water Table	Within Screened Interval
Quartz	28	47.5	95
Plagioclase Feldspar	<0.5	<0.5	1
K-Feldspar	1	0.5	-
Goethite	1	-	2
Hematite	-	-	-
Chlorite	1	-	-
Siderite	-	10	-
Pyrite	-	2	-
Clays	*	40	2
Kaolinite	13	/	/
Illite/Mica	2		
Smectite	43		
Mixed-Layered Illite/Smectite	11		

Notes:

-: not detected

Mineral constituents are reported in percentage.

Values shown as less than indicate the mineral constituent is present but below the quantification limit.

*The clay fraction at SP-B4-6-8 was further analyzed to characterize the types of clays present, as listed below.

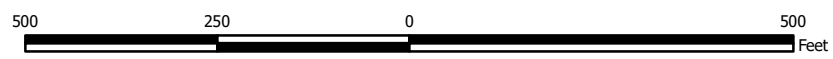
FIGURES



- Legend**
- Downgradient Monitoring Well
 - Upgradient Monitoring Well
 - 2020 Soil Borings
 - Stackout Area

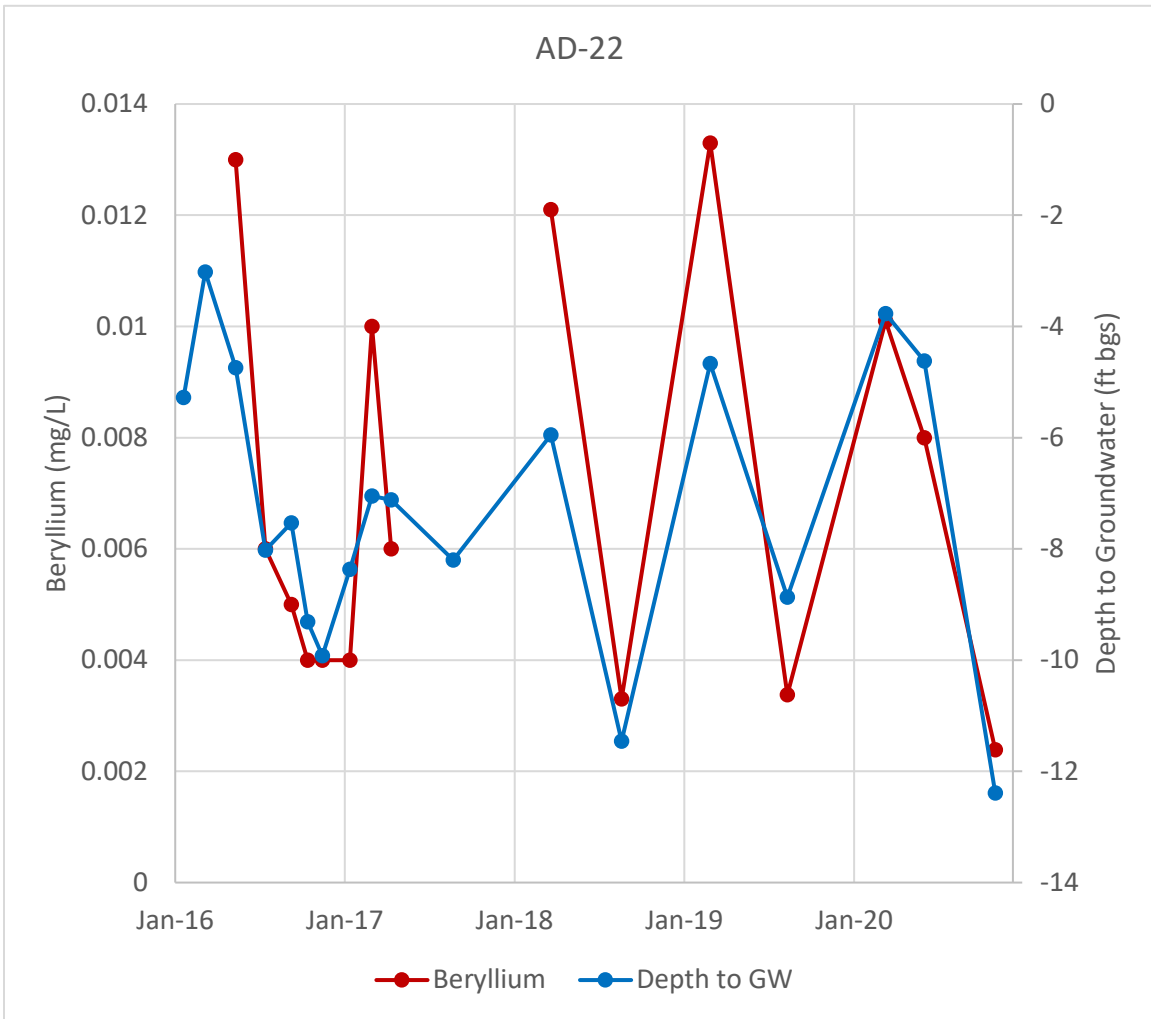
Notes

- Soil boring locations are approximate.
- Monitoring well locations are provided by AEP.



Site Layout
 AEP Pirkey Power Plant
 Hallsville, Texas

		Figure 1
Columbus, Ohio	2020/03/27	1



Notes: Beryllium concentrations are shown in milligrams per liter (mg/L). Depth to water is shown as feet below ground surface (ft bgs). The gap in beryllium data represents the time period in which detection monitoring took place and samples were not analyzed for beryllium.

Beryllium v. Depth to Groundwater

Pirkey FGD Stackout Area

Geosyntec
consultants

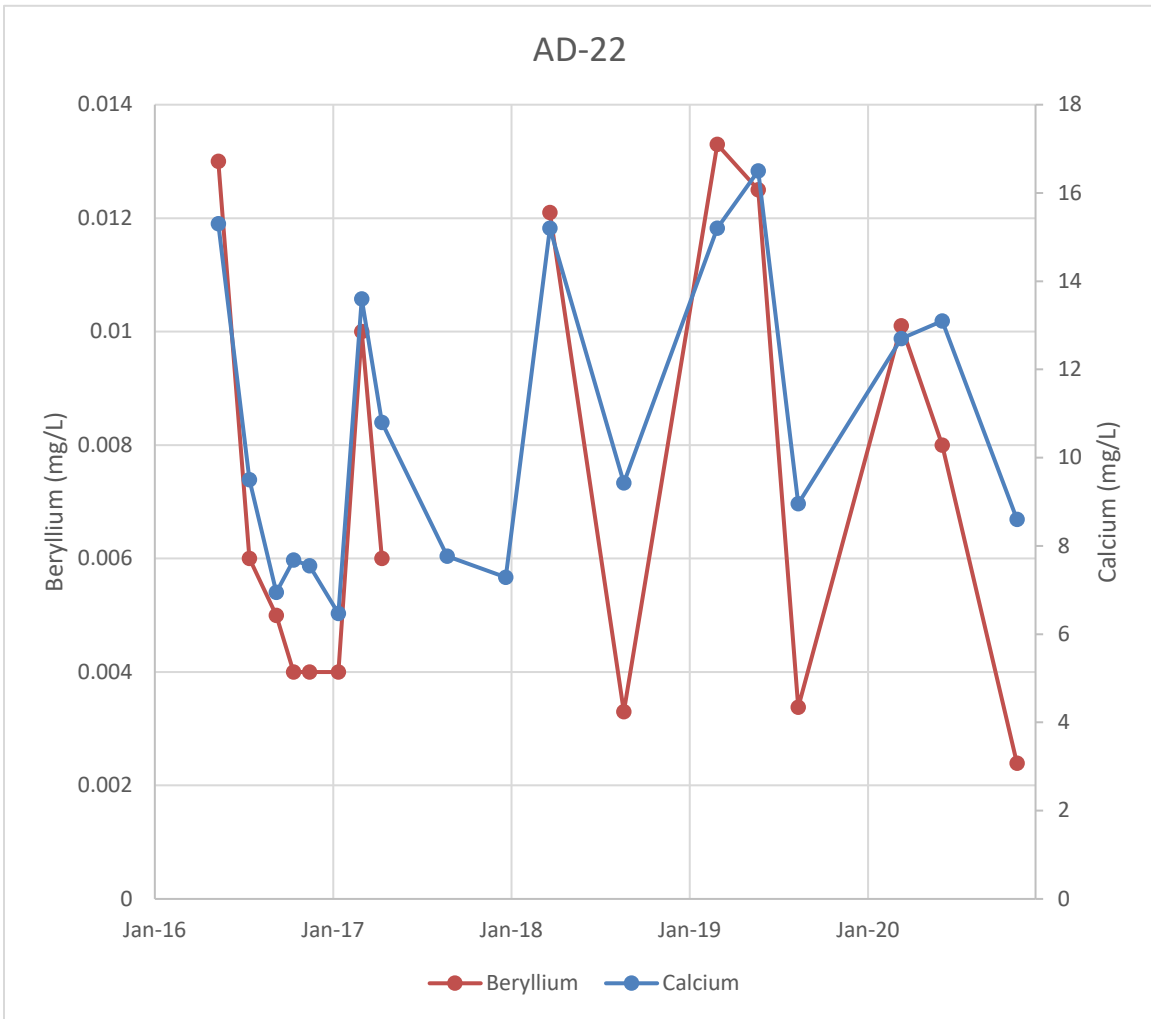


Figure

2

Columbus, Ohio

17-May-2021



Notes: Beryllium and calcium concentrations are shown in milligrams per liter (mg/L). The gaps in beryllium data represent the time period in which detection monitoring took place and samples were not analyzed for beryllium.

Beryllium v. Calcium Concentrations

Pirkey FGD Stackout Area

Geosyntec
consultants

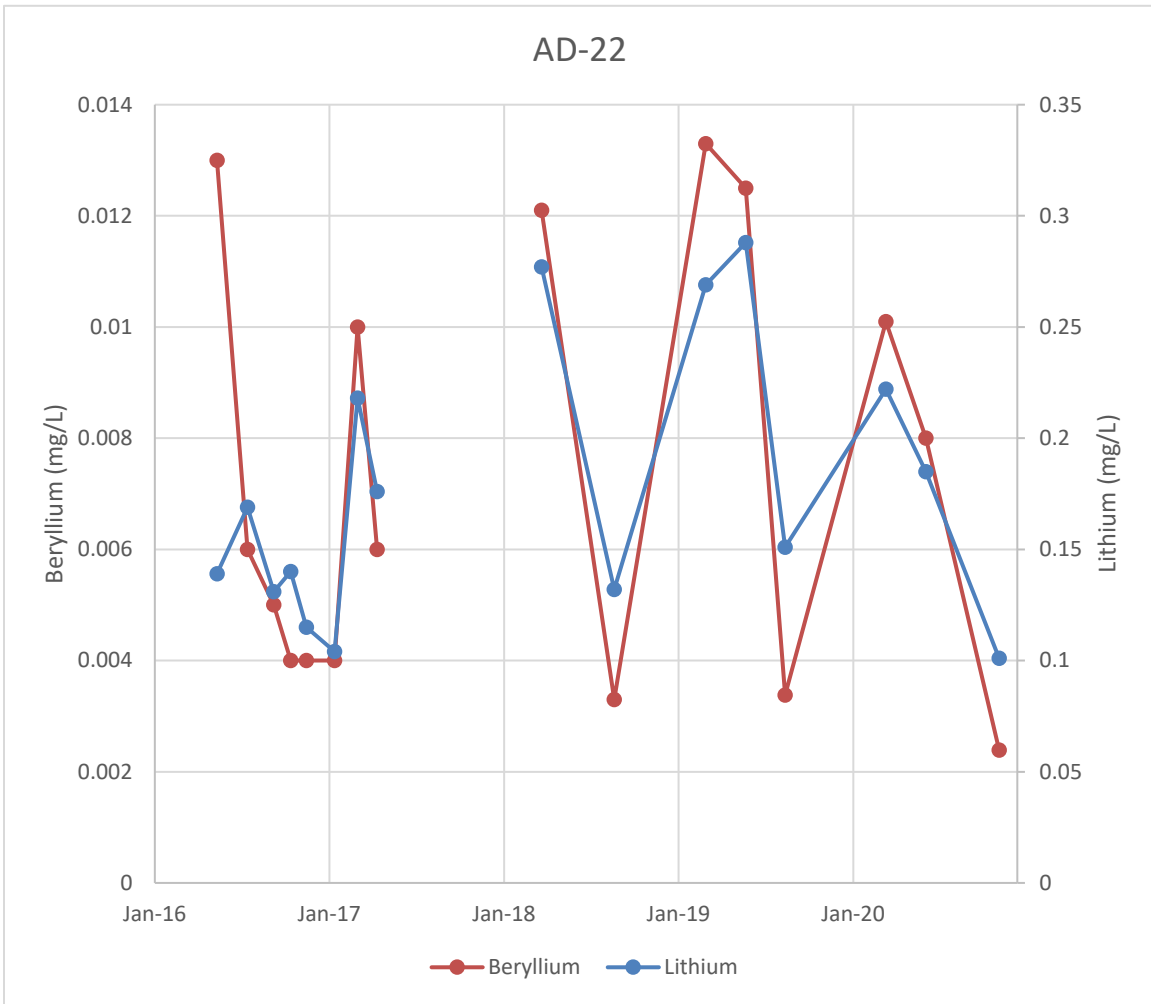


Figure

3

Columbus, Ohio

17-May-2021



Notes: Beryllium and lithium concentrations are shown in milligrams per liter (mg/L). The gaps in data represents the time period in which detection monitoring took place and samples were not analyzed for beryllium or lithium.

Beryllium v. Lithium Concentrations

Pirkey FGD Stackout Area

Geosyntec
consultants

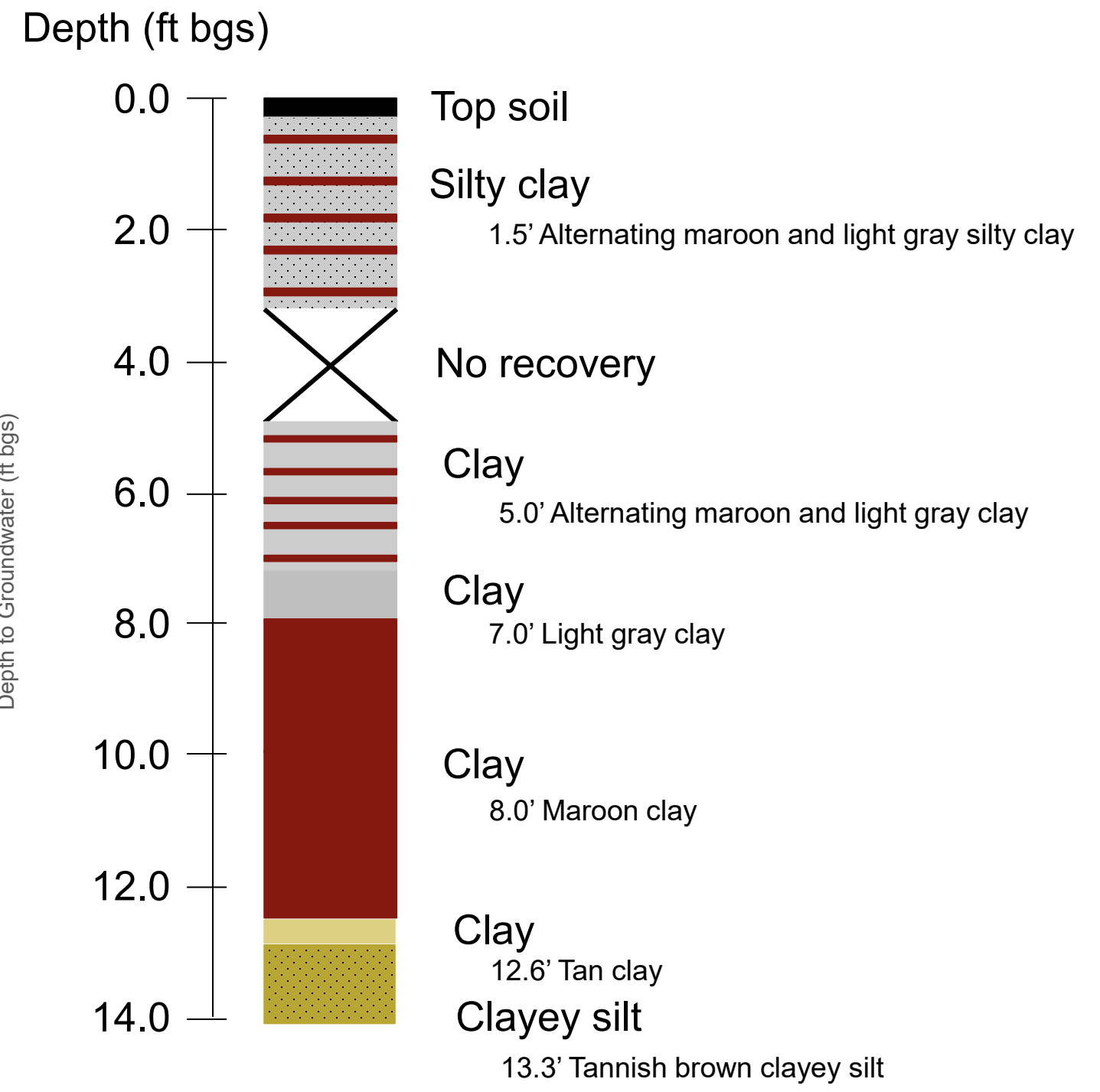
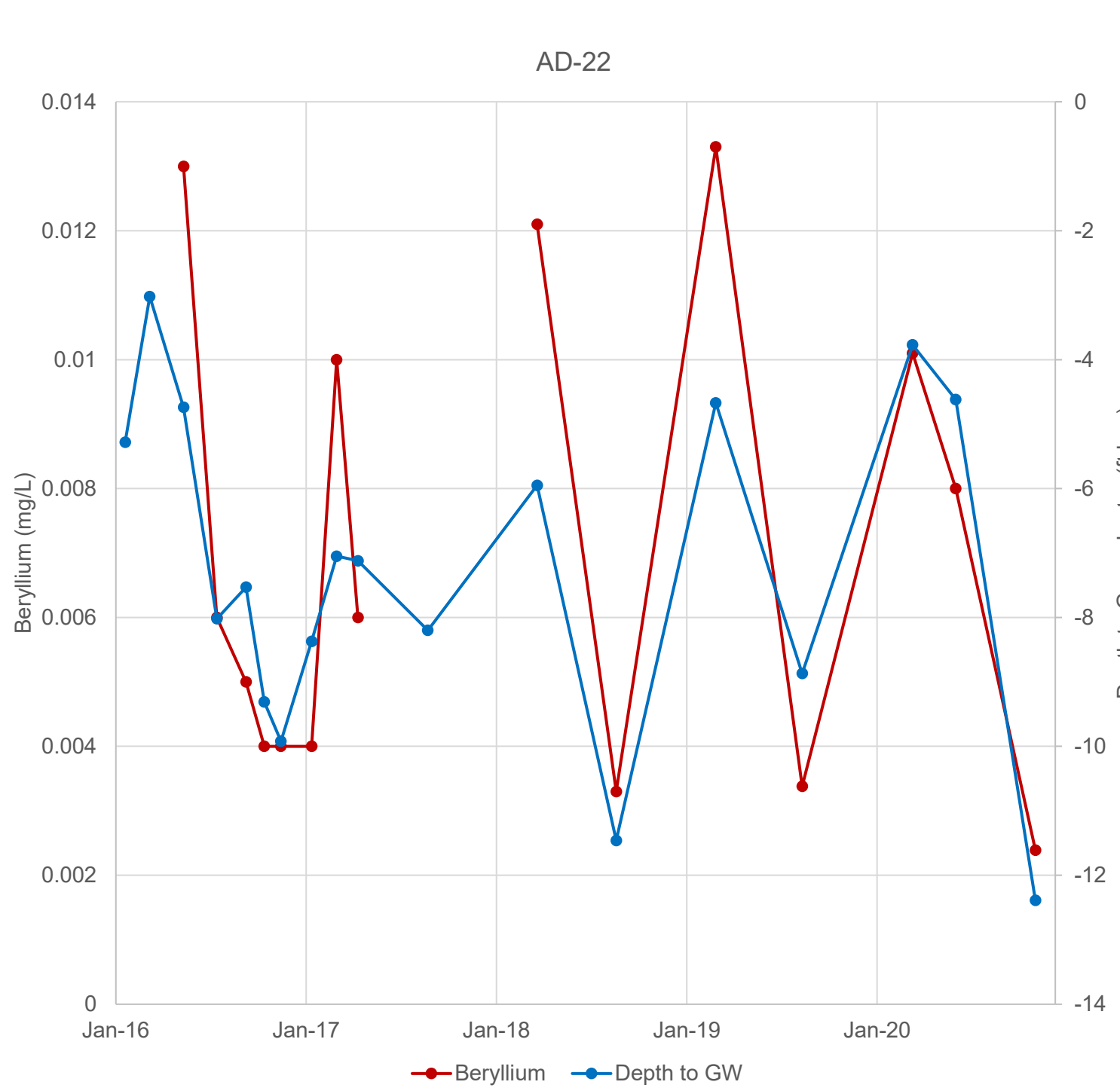


Figure

4

Columbus, Ohio

17-May-2021



Notes:
 -A sample was collected for analysis of mineralogy from 6-8 ft bgs.
 -The full boring log is available in Attachment A.

AD-22 Seasonal Water Table Geology

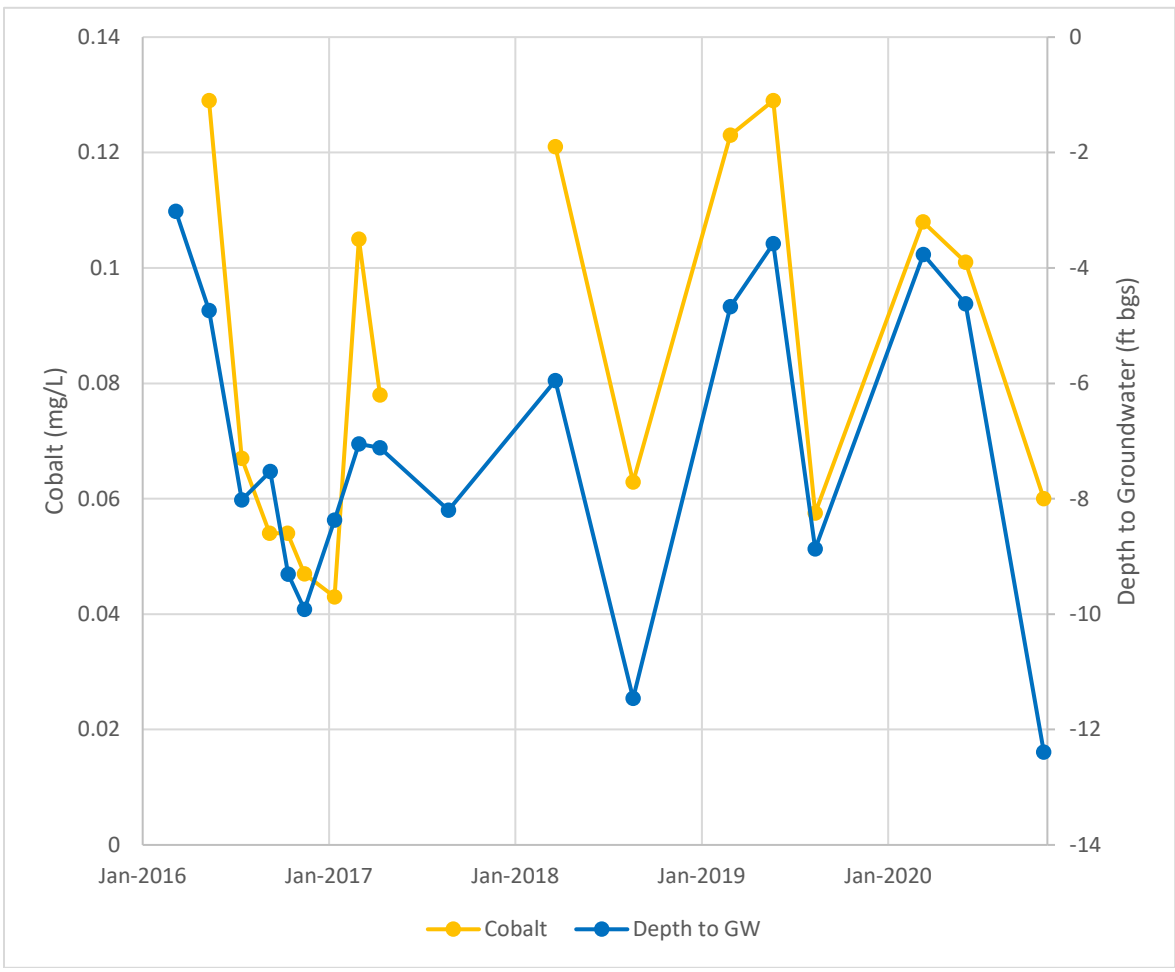
H. W. Pirkey Plant – FGD Stackout Area



Figure
5

Columbus, OH

17-May-2021



Notes: Cobalt concentrations are shown in milligrams per liter (mg/L). Depth to water is shown as feet below ground surface (ft bgs). The gap in cobalt data represents the time period in which detection monitoring took place and samples were not analyzed for cobalt.

AD-22 Cobalt v. Depth to Groundwater

Pirkey FGD Stackout Area

Geosyntec
consultants

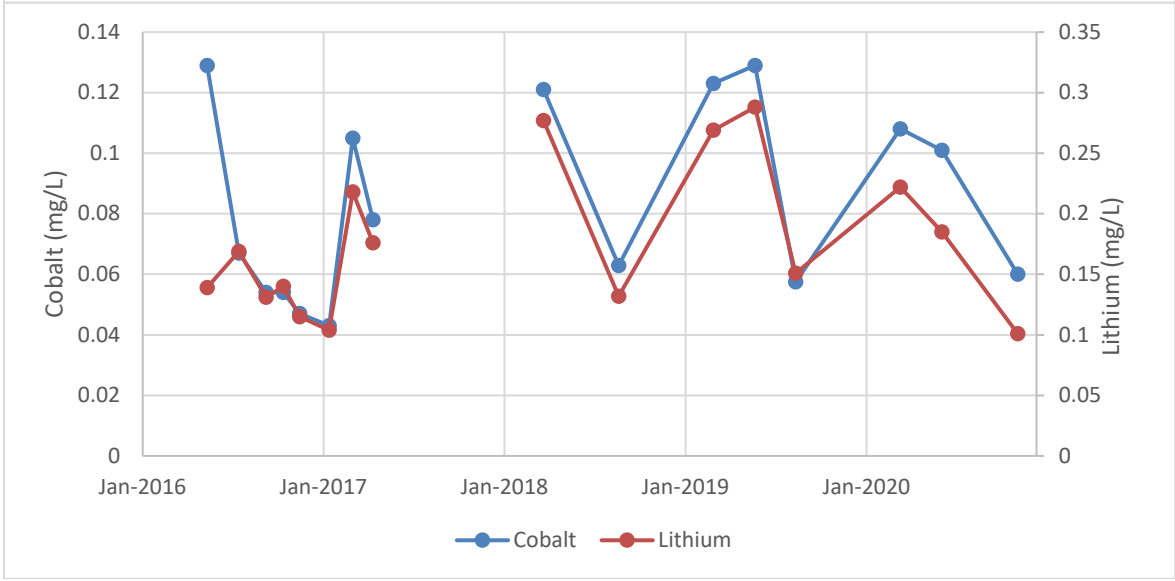
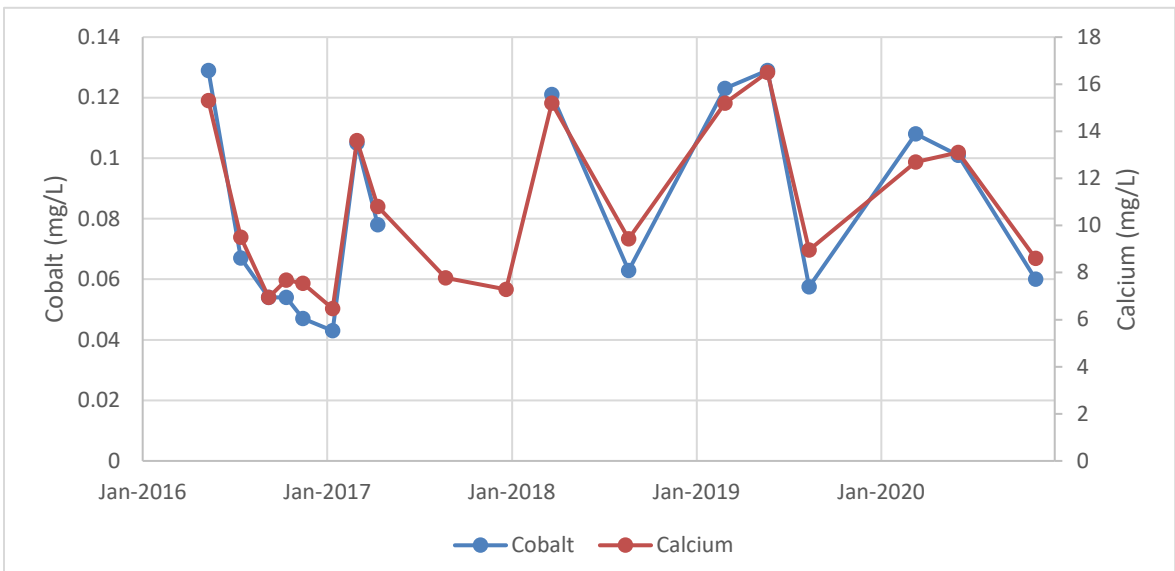


Figure

6

Columbus, Ohio

17-May-2021



Notes: Cobalt, calcium, and lithium concentrations are shown in milligrams per liter (mg/L). The gaps in cobalt and lithium data represent the time period during which detection monitoring took place and samples were not analyzed for cobalt and lithium.

AD-22 Cobalt v. Calcium and Lithium

Pirkey FGD Stackout Area

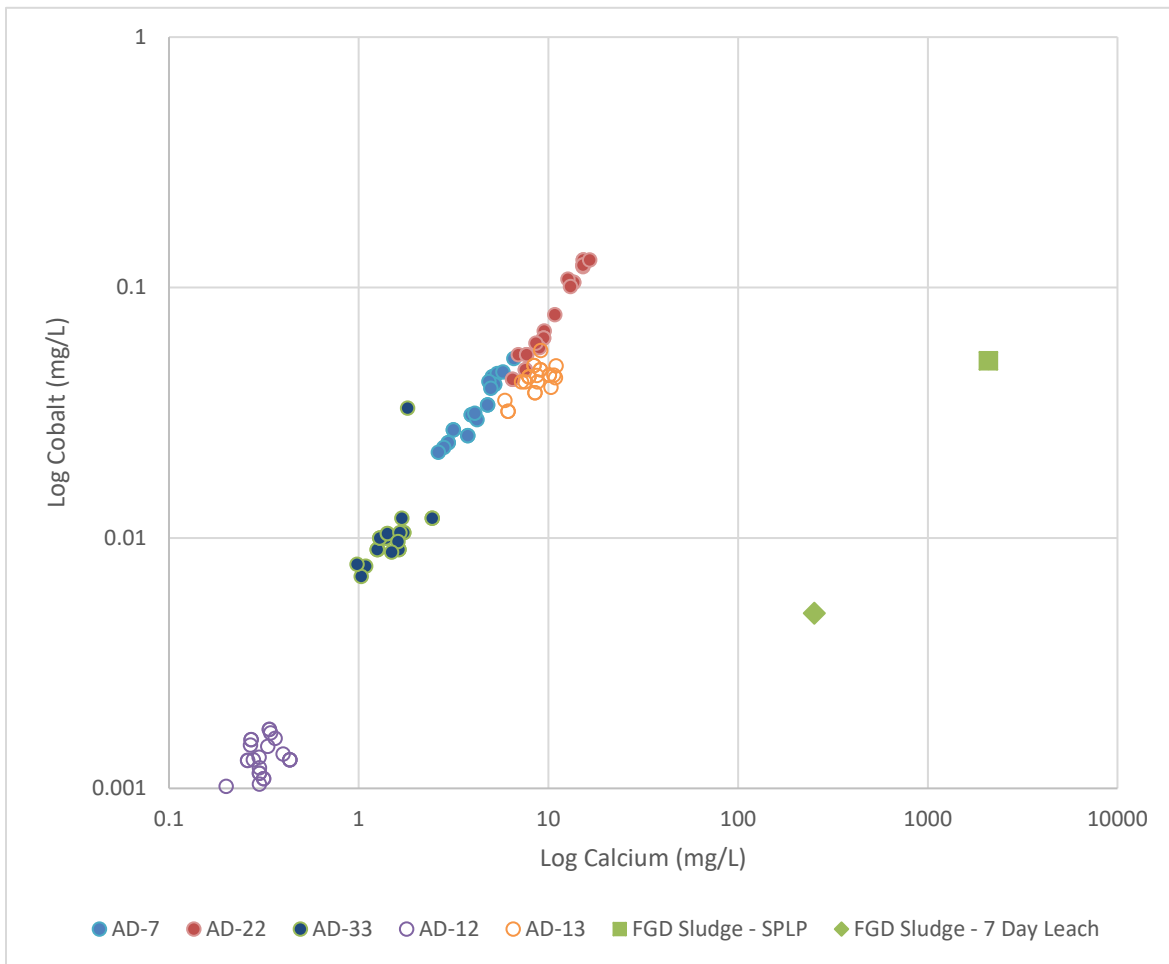


Figure

7

Columbus, Ohio

17-May-2021



Notes: Cobalt and calcium concentrations are shown in milligrams per liter (mg/L). Upgradient wells are shown with hollow circles. ‘FGD Sludge-SPLP’ and ‘FGD Sludge 7 Day Leach’ present the leached concentrations of cobalt and calcium using the Synthetic Precipitation Leaching Procedure (SW-846 Test Method 1312) and the 7-Day Distilled Water Leachate Test Procedure (30 TAC 335.521 Appendix 4), respectively.

Cobalt and Calcium Concentration Distribution

Pirkey FGD Stackout Area

Geosyntec
consultants

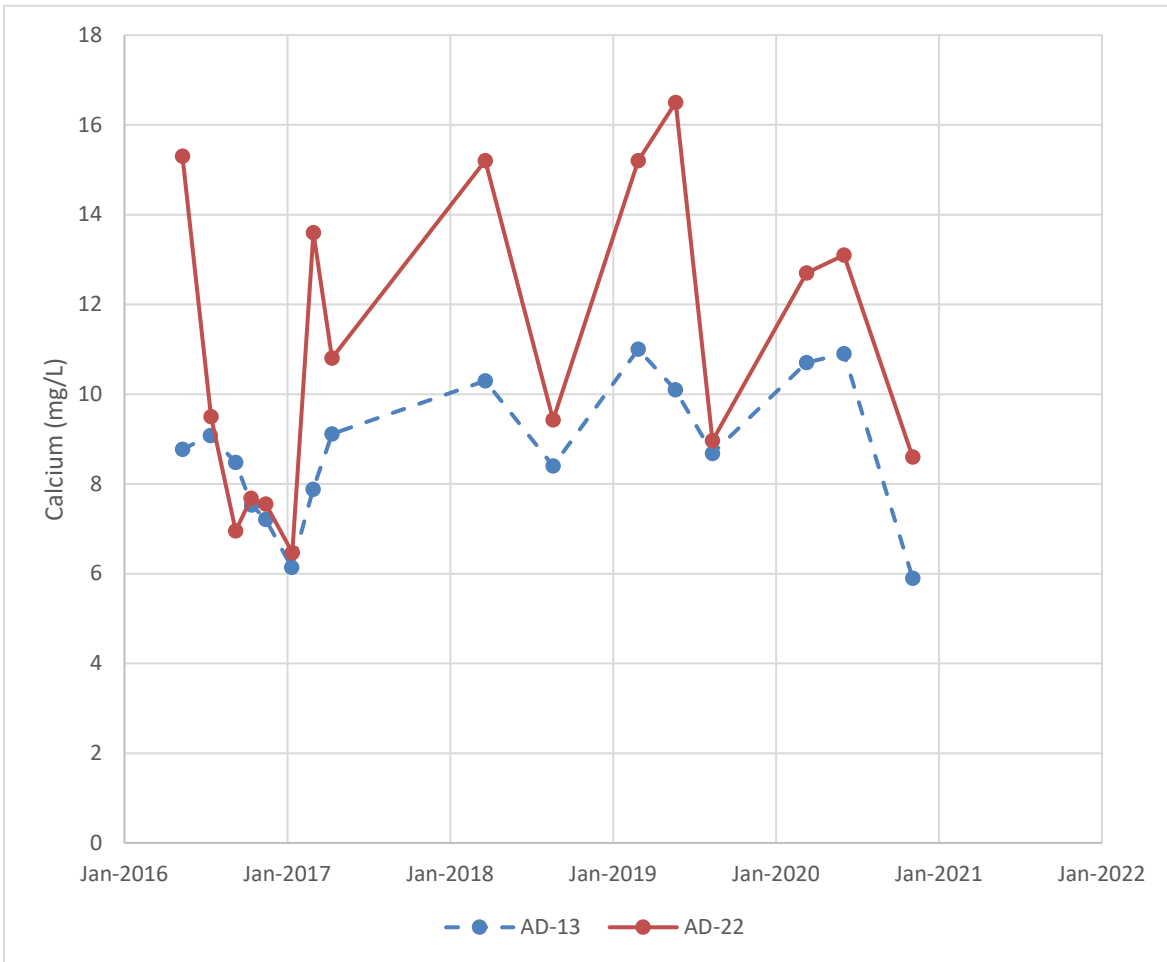


Figure

8

Columbus, Ohio

17-May-2021



Notes: Calcium concentrations are shown in milligrams per liter (mg/L). AD-13 is shown with a dashed line because it is an upgradient location.

Calcium Time Series Graph

Pirkey FGD Stackout Area

Geosyntec
consultants

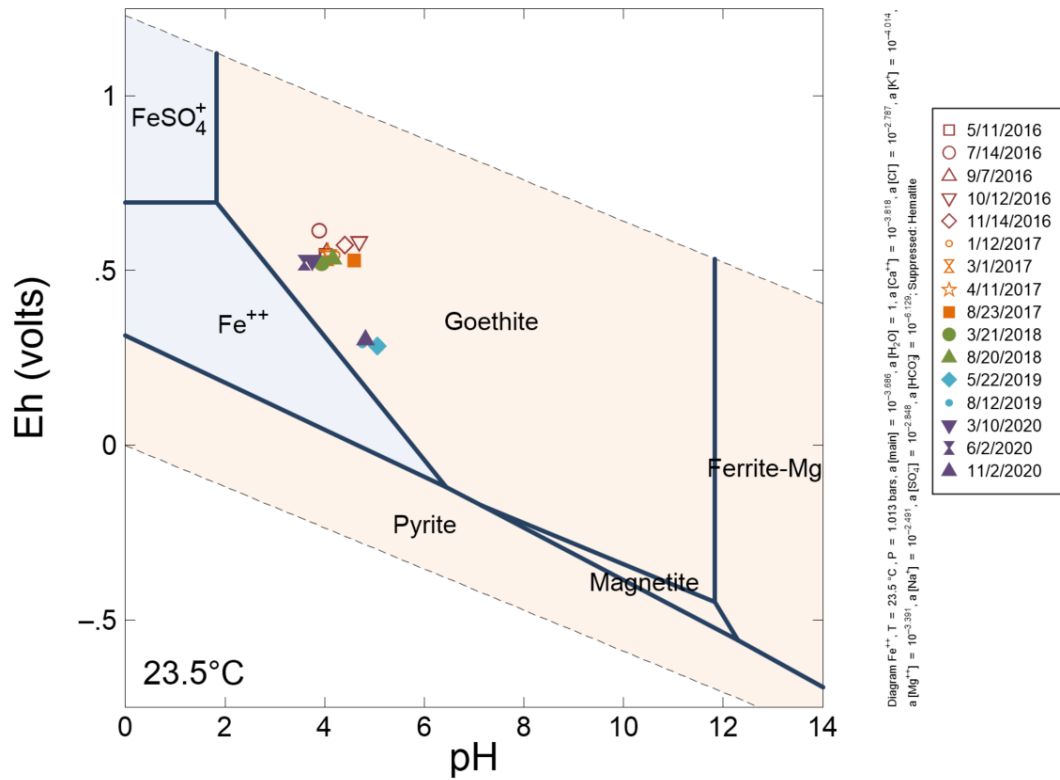


Figure

9

Columbus, Ohio

17-May-2021



Notes: Average groundwater concentrations of major cations and anions at AD-22 were used to establish baseline conditions for the diagram. Eh and pH values for sampling dates at AD-22 are shown on the diagram.

AD-22 Eh-pH Diagram

Pirkey FGD Stackout Area

Geosyntec
consultants



Figure

10

Columbus, Ohio

20-May-2021

ATTACHMENT A
SP-B4 Boring Logs

Soil Boring Log

Project: AEP Pirkey

Boring/Well Name: _____ SP-B4

Project Location: _____ Hallsville, TX

Boring Date: __ 3/3/2020

Depth Scale Feet	Water Table	Soil Profile Description	PID*
0		pp= pocket penetrometer	
		0.0'-0.4': Top soil, black silt, vegetation	
		0.4'-0.7': Brown clayey silt, good cohesion	
		0.7'-1.5': Red and light gray silty clay, moderate stiffness (pp. 2.5), high plasticity	
		1.5'-3.7': Maroon and light gray clay, high stiffness (pp. 4.5-5.0), low plasticity; iron ore present 3.1'-3.7'	
		3.7'-5.0': NO RECOVERY	
5		5.0'-7.0': Maroon and light gray clay, high stiffness (pp. 4.5-5.0), low plasticity; iron ore present throughout	
		7.0'-8.0': Light gray clay with iron ore, moderate stiffness (pp.2.5-3.0), moderate plasticity	
		8.0'-10.0': Maroon clay, moderate stiffness (pp. 3.5), moderate plasticity; iron ore present; moist at 9'	
10		10.0'-12.6': Maroon clay, moderate stiffness (pp. 3.5), moderate plasticity; iron ore present; wet at 12'	
	▼	12.6'-13.3': Tan clay, low stiffness (pp.1.5), high plasticity; wet	
		13.3'-18.5': Tan and brown clayey silt, moderate cohesion; iron ore present; wet	
15			
		18.5'-20.3': Maroon silty clay, low stiffness (pp. 1.0), moderate plasticity; iron ore; wet	
20		20.3'-21.1': Dark gray/black clay, trace silt, low stiffness (pp. 1.5), high plasticity; wet	
		21.1'-21.3': Dark gray silt, good cohesion; wet	
		21.3'-21.9': Dark gray silty clay, low stiffness (pp. 1.5), high plasticity; wet	
		21.9'-22.3': Dark gray silt, moderate cohesion; wet	
		22.3'-22.7': light brown silt; low cohesion; wet	
		22.7'-24.4': Dark gray and dark green silty clay, moderate/high stiffness (pp.3.5), moderate plasticity; wet, glauconite present	
25		24.4'-27.8': Dark green/gray fine grained sand, well sorted; wet; glauconite present	
		27.8'-30.0': Red and orange fine grained sand, well sorted, with iron ore; wet	
30			
		Samples collected at 6-8'; 18-20'; 28-30'	
		TD at 30' bgs; refusal	
		*PID readings not collected	
35			


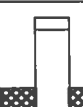

Drill Rig Geoprobe 3230 DT
 Drilling Contractor: _____ C&S
 Driller: _____ DJ Diduch

Geosyntec Consultants

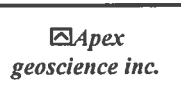
ATTACHMENT B

AD-22 Boring Log and Well Installation Diagram

BORING MONITOR WELL
 APEX PROJECT NO.: 110-089 BORING NUMBER: _____ MONITOR WELL NUMBER: AD-22
 FACILITY NAME: AEP- Pirkey Power Plant FACILITY ID NO.: N/A
 FACILITY ADDRESS: Hallsville, Texas
 DRILLING COMPANY/METHOD/RIG: Apex Geoscience Inc. / Hollow-stem Augers/ CME-55 Track Rig
 DRILLER: Ed Wilson, Apex Geoscience Inc. COMPLETION DATE: 12/16/2010
 PREPARED BY: David Bedford LOGGED BY: David Bedford
 LATITUDE: N 32°27'03.3" Datum: WGS-84 WELL LOCATION: Triangle- South side Quansit Hut
 LONGITUDE: W94°29'41.3"

DEPTH (FEET)	PID (PPM)	SAMPLE INTERVAL	WELL LOG AND COMPLETION DETAILS	USCS CODE	SOIL DESCRIPTION AND COMMENTS	Odor	Moisture	
1				0-0.5	SC	Clayey sand, light brown, very fine grained	None	Moist
2				0.5-12	CL	Lean clay, light brown mottled with light gray	None	Slightly Moist
3								
4						Few iron ore (small) pebbles in clayey sandy streaks		
5								
6								
7								
8								
9								
10								
11								
12								
13				12-20	SC	Clayey sand, grayish brown with orangish brown streaks, very fine grained	None	Slightly Wet
14						Slightly wet @ 12.5' from seepage		
15						Large amount of iron ore 15-17'		
16								
17								
18						Very firm 18-18.5'		
19								
20								
21				20-25	SC	(Dense crystalline rock 21-21.1'), light brown clayey sand, greenish black, mica, black clay streaks, very fine grained, wet @ 20'	None	Wet
22								
23								
24								
25								
26				25-30	SM	Sand, greenish brown (1') grading to orangish brown, silty, very fine grained	None	Wet
27								
28								
29								
30								
31						Boring Terminated at 30'		
32								
33								
34								
35								
36								
37								
38								
39								
40								

 Cement
  Bentonite
  Filter Sand
  Water Level



Total Depth: 30 feet Riser Interval: +3 (ags)-10'
 Filter Sand (Size/Interval): 8-30' Screen Interval: 10-30'
 Grout (Type/Interval): Grout from 0-2'; Bentonite from 2-8' Water level: 12.5'
 Surface Completion Flush Above Ground 3'

Note: This log is not to be used separate from this report.

ATTACHMENT C

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 FGD Stackout Area 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

5/20/2021
Date

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

**H.W. Pirkey Power Plant
Flue Gas Desulfurization
(FGD) Stackout Area
Hallsville, Texas**

Submitted to



1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by



engineers | [scientists](#) | [innovators](#)

941 Chatham Lane, Suite 103
Columbus, OH 43221

December 2021

CHA8495

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ATTACHMENTS

Attachment A	SP-B4 Boring Log
Attachment B	AD-22 Boring Log and Well Installation Diagram
Attachment C	Certification by a Qualified Professional Engineer

LIST OF ACRONYMS

AEP	American Electric Power
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
EBAP	East Bottom Ash Pond
EPRI	Electric Power Research Institute
FGD	Flue Gas Desulfurization
GSC	Groundwater Stats Consulting, LLC
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
MCL	Maximum Contaminant Level
QA	Quality Assurance
QC	Quality Control
SPLP	Synthetic Precipitation Leaching Profile
SSL	Statistically Significant Level
SU	Standard Unit
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
UTL	Upper Tolerance Limit
USEPA	United States Environmental Protection Agency
WBAP	West Bottom Ash Pond
XRD	X-Ray Diffraction

SECTION 1

INTRODUCTION AND SUMMARY

This Alternative Source Demonstration (ASD) report has been prepared to address statistically significant levels (SSLs) for beryllium and cobalt in the groundwater monitoring network at the H.W. Pirkey Plant Flue Gas Desulfurization (FGD) Stackout Area, located in Hallsville, Texas, following the first semi-annual detection monitoring event of 2021. The FGD Stackout Area is registered as a waste pile 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 FGD Stackout Area (**Figure 1**). In May 2021, a semi-annual assessment monitoring event was conducted at the FGD Stackout Area in accordance with 30 TAC §352.951(a). The monitoring data were submitted to Groundwater Stats Consulting, LLC (GSC) for statistical analysis. Groundwater protection standards (GWPSs) were established for each Appendix IV parameter in accordance with the statistical analysis plan developed for the unit (Geosyntec, 2020a) and 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. Seasonal patterns were observed for beryllium, cadmium, cobalt, combined radium, fluoride, and lithium at AD-22 (Geosyntec, 2021a). To correctly account for seasonality, confidence intervals for these wells and constituents were constructed using deseasonalized values. An SSL was concluded if the lower confidence limit (LCL) of a parameter exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). The following SSLs were identified at the Pirkey FGD Stackout Area (Geosyntec, 2021a):

- The deseasonalized LCL for beryllium exceeded the GWPS of 0.0040 mg/L at AD-22 (0.00577 mg/L); and
- The deseasonalized LCL for cobalt exceeded the GWPS of 0.0560 mg/L at AD-22 (0.0723 mg/L).

No other SSLs were identified.

1.1 CCR Rule Requirements

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

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

Pursuant to 30 TAC §352.951(e), Geosyntec Consultants, Inc. (Geosyntec) has prepared this ASD report to document that the SSLs identified for beryllium and cobalt at AD-22 are from a source other than the FGD Stackout Area.

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 SSLs identified for beryllium and cobalt were based on a Type IV cause and not by a release from the Pirkey FGD Stackout Area.

SECTION 2

ALTERNATIVE SOURCE DEMONSTRATION

The TCEQ CCR Rule allows the owner or operator 90 days from the determination of an SSL to demonstrate that a source other than the CCR unit caused the SSL. The methodology used to evaluate the SSLs identified for beryllium and 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 beryllium and 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 SSLs have been attributed to natural variation associated with seasonal effects, which is a Type IV (natural variation) issue.

2.1.1 Beryllium

An SSL was identified for beryllium at AD-22 using deseasonalized statistics (Geosyntec, 2021a). According to the Unified Guidance, “seasonal correction should be done both to minimize the chance of mistaking a seasonal effect for evidence of contaminated groundwater, and also to build more powerful background to compliance point tests. Problems can arise, for instance, from measurement variations associated with changing recharge rates during different seasons” (USEPA, 2009).

The seasonal effects observed in the statistical analysis occur in roughly annual cycles, with somewhat higher beryllium concentrations occurring in early spring and lower concentrations in early fall. For example, the beryllium concentration in 2021 at AD-22 was 0.00852 milligrams per liter (mg/L) in March 2021, in contrast to 0.00239 mg/L in November 2020. Previous ASDs for the FGD Stackout Area showed that beryllium concentrations at AD-22 appear to correlate with groundwater elevations at the well (Geosyntec, 2019; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec 2021b). This relationship still holds true (**Figure 2**). Beryllium concentrations at AD-22 are correlated with seasonal changes in other constituents, including calcium (**Figure 3**) and lithium (**Figure 4**). The correlation between beryllium and both monovalent (lithium) and divalent (calcium) cations suggests that the variability in observed beryllium concentrations is related to cation exchange behavior with clay minerals present in the native soil.

Soil boring SP-B4, which was advanced in March 2020 to re-log AD-22, found that clay materials were identified in the seasonally saturated zones above the permanent water table. The boring log for SP-B4 is provided in **Attachment A**, and the original boring log and well construction diagram

is provided in **Attachment B**. At AD-22, the depth to water fluctuated between approximately 3 and 12 ft below ground surface (bgs). Clay was identified from approximately 1.5 ft bgs to 13.3 ft bgs, where it transitioned to a clayey silt (**Figure 5**). Analysis by X-ray diffraction (XRD) confirmed the presence of clays within the seasonal water table and sand within the screened interval, as summarized in **Table 1**. The clay fraction of the uppermost sample collected from within the seasonal water table was further analyzed to identify the type of clays present. Smectite-type clays, which are 2:1-layer high-activity clays with characteristic cation exchange capacity, make up the majority of the clay minerals present at that interval.

Sorption and desorption of beryllium from smectite-type clays is well documented (Boschi and Willenbring, 2016a; You, et al., 1989). Desorption was found to be affected by pH, with 75% of beryllium desorbed from a smectite-type clay as pH decreased from 6.0 standard units (SU) to 3.0 SU (Boschi and Willenbring, 2016b). The pH values recorded at AD-22 for groundwater samples collected under the Federal CCR Rule ranged from 3.6 to 5.1 SU, suggesting that conditions are favorable for beryllium desorption from smectite-type clays. The presence of these exchangeable clays provides further evidence that the exceedance of beryllium at AD-22 can be attributed to the effects of seasonal groundwater elevation changes, and the resulting cation exchange between groundwater and the exchangeable clay within the seasonal water table, on groundwater quality.

2.1.2 Cobalt

An SSL was identified for cobalt at AD-22 using deseasonalized statistics (Geosyntec, 2021a). As shown in previous ASDs (Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021b), the cobalt concentrations at AD-22 also appear to correlate with seasonal changes in groundwater elevation (**Figure 6**). In addition, the cobalt concentrations are well correlated with changes in other cations, including calcium and lithium (**Figure 7**), suggesting natural variability associated with interactions with the aquifer solids.

The concentration ratio between calcium and cobalt is consistently on the order of 1000:1 at both upgradient and downgradient locations (**Figure 8**). A sample was collected of the solid FGD sludge material accumulated on the FGD Stackout Area. The solid phase sample was leached using both USEPA's Synthetic Precipitation Leaching Profile (SPLP) testing procedure (SW-846 Test Method 1312 [USEPA, 1994]) and TCEQ's 7-Day Distilled Water Leachate Test Procedure (30 TAC 335.521 Appendix 4). While cobalt concentrations in both of the leached samples are consistent with those observed in the groundwater samples, the leached calcium concentrations are approximately two to three orders of magnitude higher. However, calcium concentrations in groundwater are generally consistent between AD-22 and upgradient well AD-13 (**Figure 9**). The different ratio between calcium and cobalt in the leached FGD sludge material (about 45,000:1) as compared to the ratio for groundwater indicate that dissolved calcium concentrations at AD-22 would be significantly higher if the groundwater at this location were affected by leachate. The similarity between upgradient and downgradient calcium concentrations provides an additional line of evidence that the exceedances observed at the FGD Stackout Area are not due to a release from the unit.

Siderite and pyrite, both reduced iron-bearing minerals, were identified below the seasonal water table (within the saturated zone) at AD-22. Cobalt is known to undergo isomorphic substitution for iron in both siderite and pyrite (Gross, 1965; Hitzman, et al., 2017; Krupka and Serne, 2002). This is due to the similarity of their ionic radii (approximately 1.56 angstrom (Å) for iron vs. 1.52 Å for cobalt [Clementi and Raimondi, 1963]). The proposed substitution of cobalt for iron in the crystal lattice of pyrite has been documented in other ASDs prepared for the Pirkey Plant's East Bottom Ash Pond (EBAP; Geosyntec, 2021c) and West Bottom Ash Pond (WBAP; Geosyntec, 2021d).

Goethite (an iron oxide) was identified within the seasonally saturated zone and the screened interval at AD-22 (**Table 1**). The weathering of siderite and pyrite to goethite under oxidizing conditions is a well-understood phenomenon, including in formations in east Texas (Senkayi, et al., 1986; Dixon, et al., 1982) and may have occurred within the seasonally saturated zone. A review of geochemical conditions at AD-22 shows that the conditions observed at AD-22 are favorable for goethite formation (**Figure 10**). During weathering from reduced (pyrite or siderite) to oxidized (goethite) iron minerals, cobalt would be released from the mineral structure. The contribution of cobalt to groundwater via dissolution of siderite or pyrite within the saturated aquifer is not likely to change seasonally. However, the mobilization of cobalt which was released during weathering of siderite or pyrite to goethite in the seasonally saturated zone may explain the variability in aqueous cobalt concentrations and their correlation with the groundwater elevation.

2.1.3 Conceptual Site Model

The seasonal fluctuations in beryllium and cobalt concentrations at AD-22 can be attributed to variations in the amount of the aquifer solids that are in contact with groundwater as the water table elevation changes. When the water table is higher, more clay material is in contact with groundwater, allowing greater desorption of cations (including beryllium) from the cation exchange sites on the clay. In the case of cobalt, more iron oxides are in contact with groundwater as the water table rises, allowing for the release of cobalt from mineral phases where it has isomorphically substituted for iron. Thus, the observed SSLs were attributed to natural variation associated with seasonal desorption of beryllium and cobalt as the amount of aquifer solids that are saturated increases.

2.2 Sampling Requirements

As the ASD presented above supports the position that the identified SSLs are not due to a release from the Pirkey FGD Stackout Area, 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 SSLs of beryllium and cobalt at AD-22 identified during the first semiannual assessment monitoring event of 2021 were not due to a release from the FGD Stackout Area. The identified SSLs were, instead, attributed to natural variation related to seasonal desorption or dissolution of beryllium and cobalt from the aquifer solids. Therefore, no further action is warranted, and the Pirkey FGD Stackout Area will remain in the assessment monitoring program. Certification of this ASD by a qualified professional engineer is provided in **Attachment C**.

SECTION 4

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TABLES

**Table 1: X-Ray Diffraction Results
FGD Stackout Pad - H. W. Pirkey Plant**

Boring Location	SP-B4		
Associated Well	AD-22		
Depth (ft bgs)	6-8	18-20	28-30
Sample Location	Within Seasonal Water Table	Below Seasonal Water Table	Within Screened Interval
Quartz	28	47.5	95
Plagioclase Feldspar	<0.5	<0.5	1
K-Feldspar	1	0.5	-
Goethite	1	-	2
Hematite	-	-	-
Chlorite	1	-	-
Siderite	-	10	-
Pyrite	-	2	-
Clays	*	40	2
Kaolinite	13	/	/
Illite/Mica	2		
Smectite	43		
Mixed-Layered Illite/Smectite	11		

Notes:

-: not detected





Mineral constituents are reported in percentage.

Values shown as less than indicate the mineral constituent is present but below the quantification limit.

*The clay fraction at SP-B4-6-8 was further analyzed to characterize the types of clays present, as listed below.

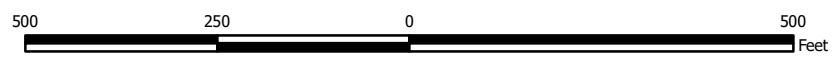
FIGURES



- Legend**
-  Downgradient Monitoring Well
 -  Upgradient Monitoring Well
 -  2020 Soil Borings
 -  Stackout Pad

Notes

- Soil boring locations are approximate.
- Monitoring well locations are provided by AEP.



Site Layout
 AEP Pirkey Power Plant
 Hallsville, Texas

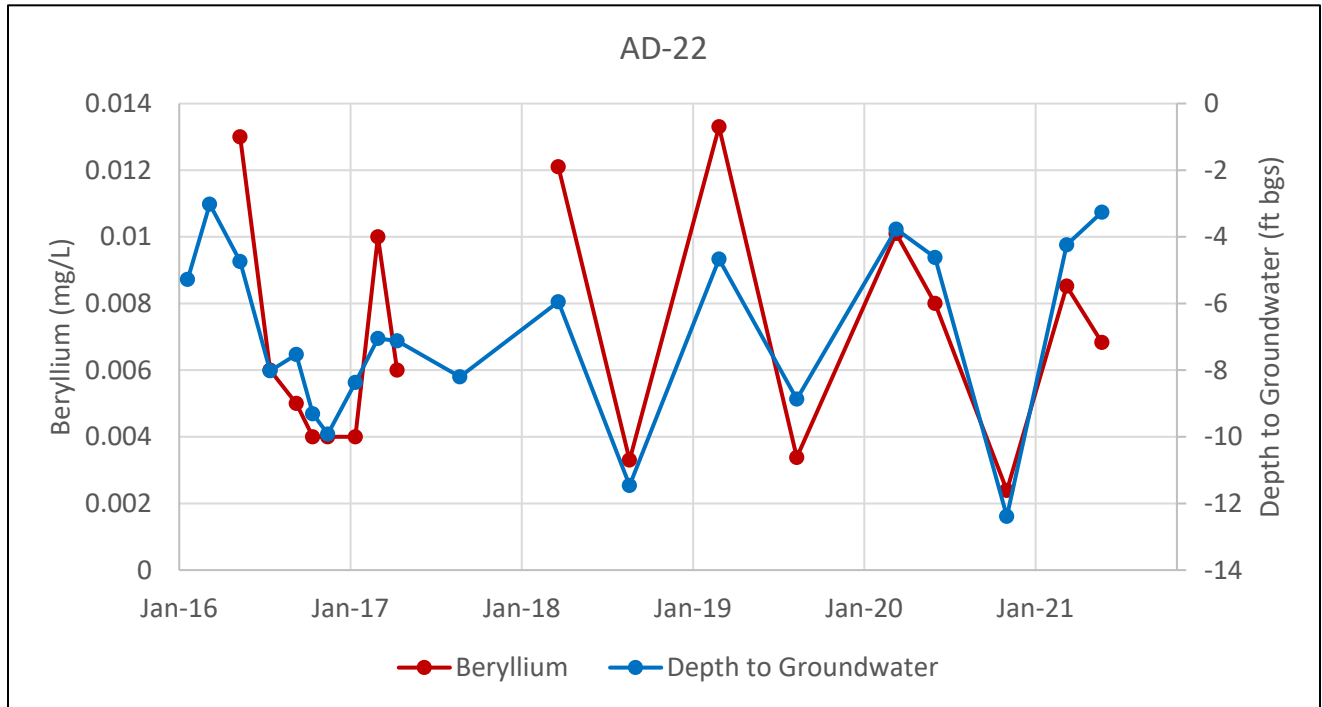
Geosyntec
 consultants



Columbus, Ohio

2020/03/27

Figure
1



Notes: Beryllium concentrations are shown in milligrams per liter (mg/L). Depth to water is shown as feet below ground surface (ft bgs). The gap in beryllium data represents the time period in which detection monitoring took place and samples were not analyzed for beryllium.

Beryllium v. Depth to Groundwater
Pirkey FGD Stackout Pad

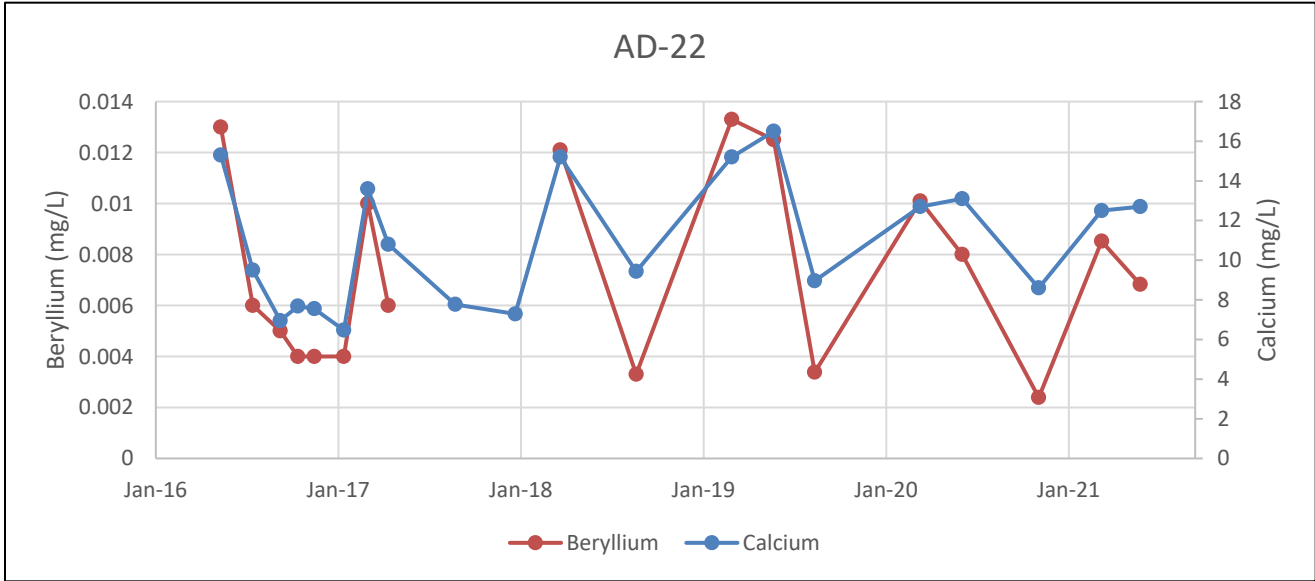


Figure

2

Columbus, Ohio

25-October-2021



Notes: Beryllium and calcium concentrations are shown in milligrams per liter (mg/L). The gaps in beryllium data represent the time period in which detection monitoring took place and samples were not analyzed for beryllium.

Beryllium v. Calcium Concentrations
Pirkey FGD Stackout Pad

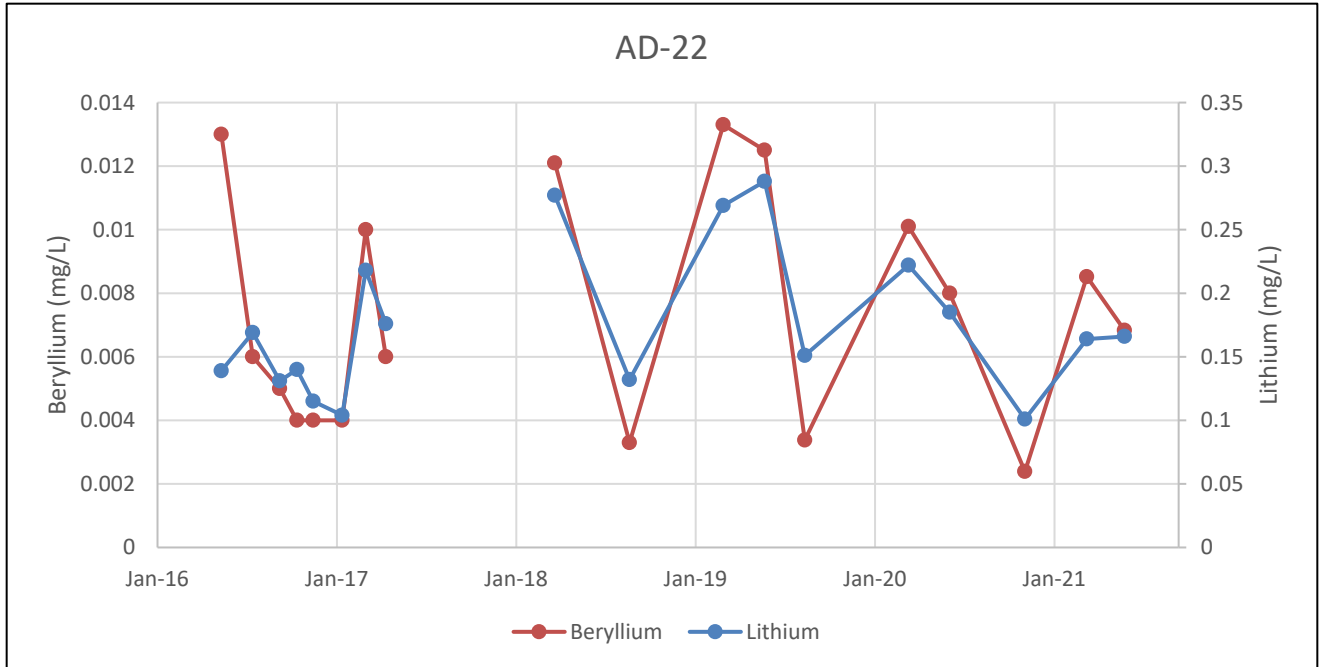


Figure

3

Columbus, Ohio

25-October-2021



Notes: Beryllium and lithium concentrations are shown in milligrams per liter (mg/L). The gaps in data represents the time period in which detection monitoring took place and samples were not analyzed for beryllium or lithium.

Beryllium v. Lithium Concentrations
Pirkey FGD Stackout Pad

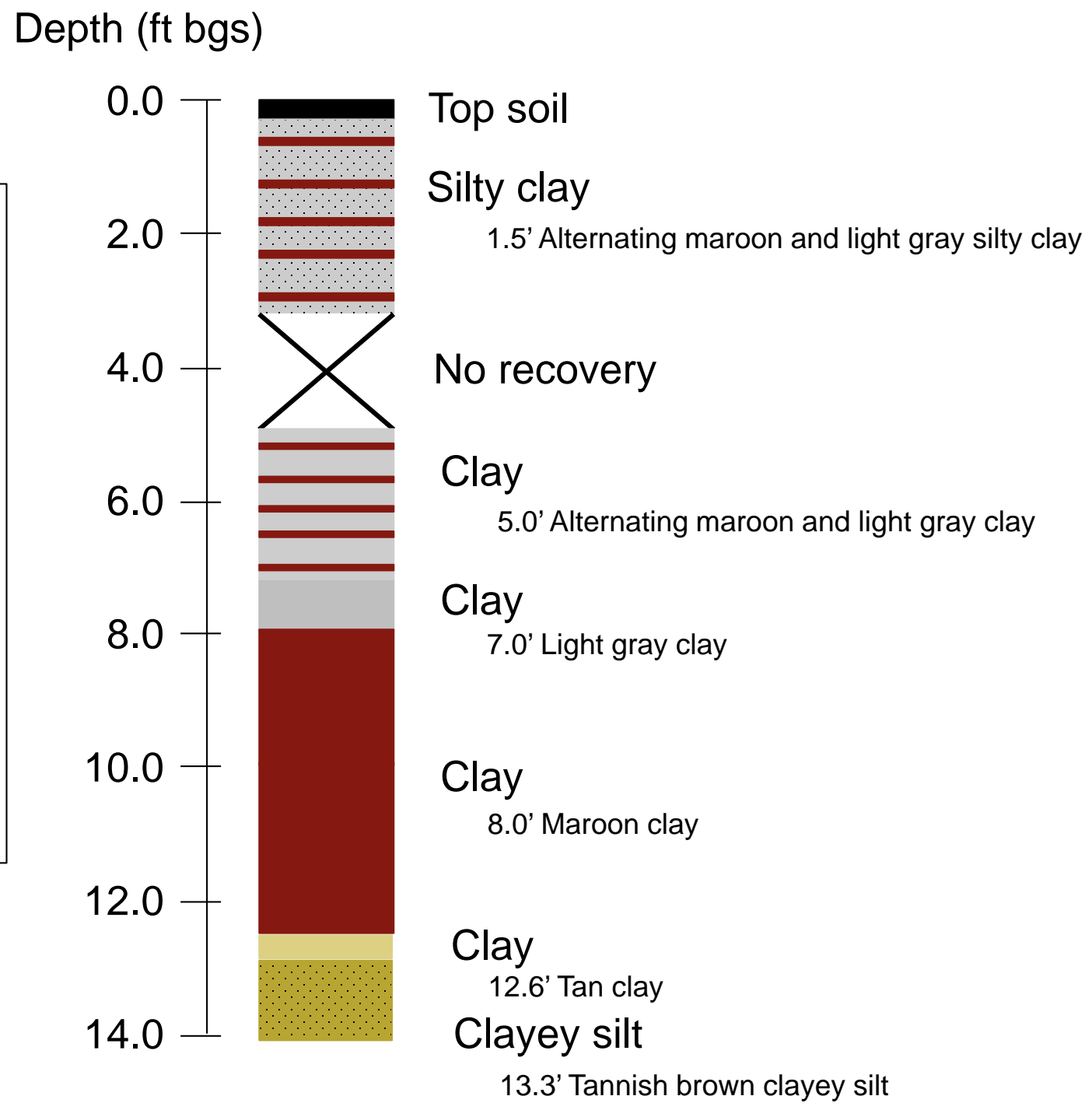
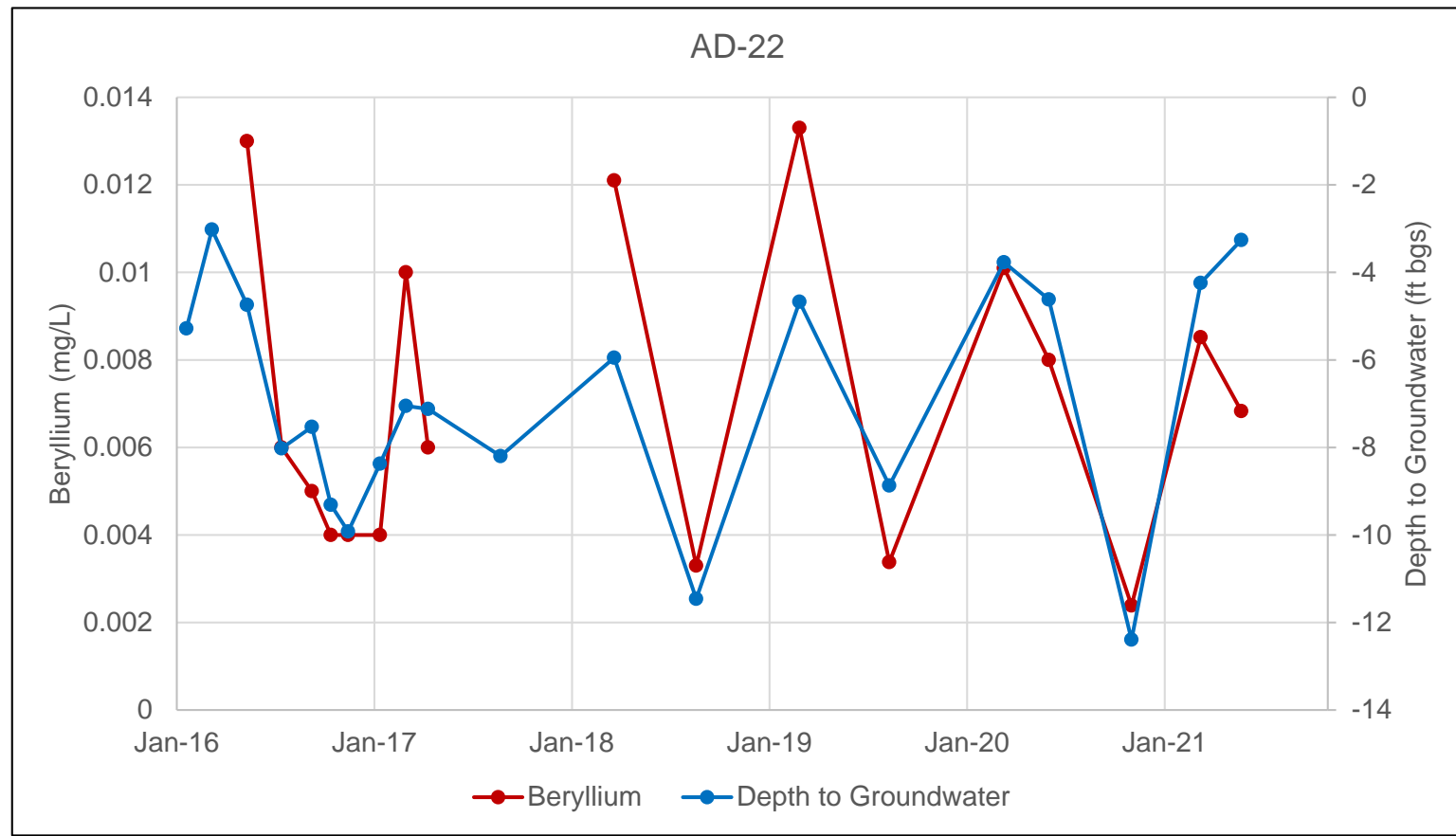


Figure

4

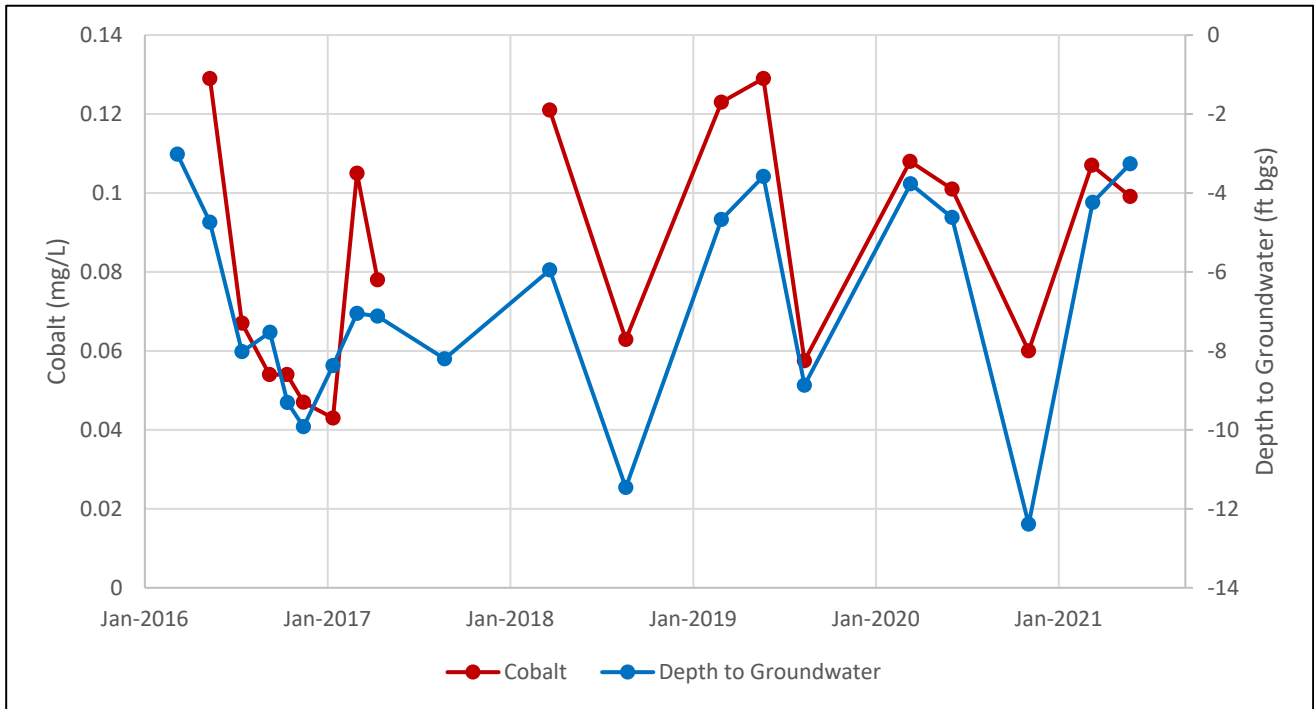
Columbus, Ohio

25-October-2021



Notes:
 -A sample was collected for analysis of mineralogy from 6-8 ft bgs.
 -The full boring log is available in Attachment A.

Internal Info: Path, date, revised, author



Notes: Cobalt concentrations are shown in milligrams per liter (mg/L). Depth to water is shown as feet below ground surface (ft bgs). The gap in cobalt data represents the time period in which detection monitoring took place and samples were not analyzed for cobalt.

AD-22 Cobalt v. Depth to Groundwater
Pirkey FGD Stackout Pad

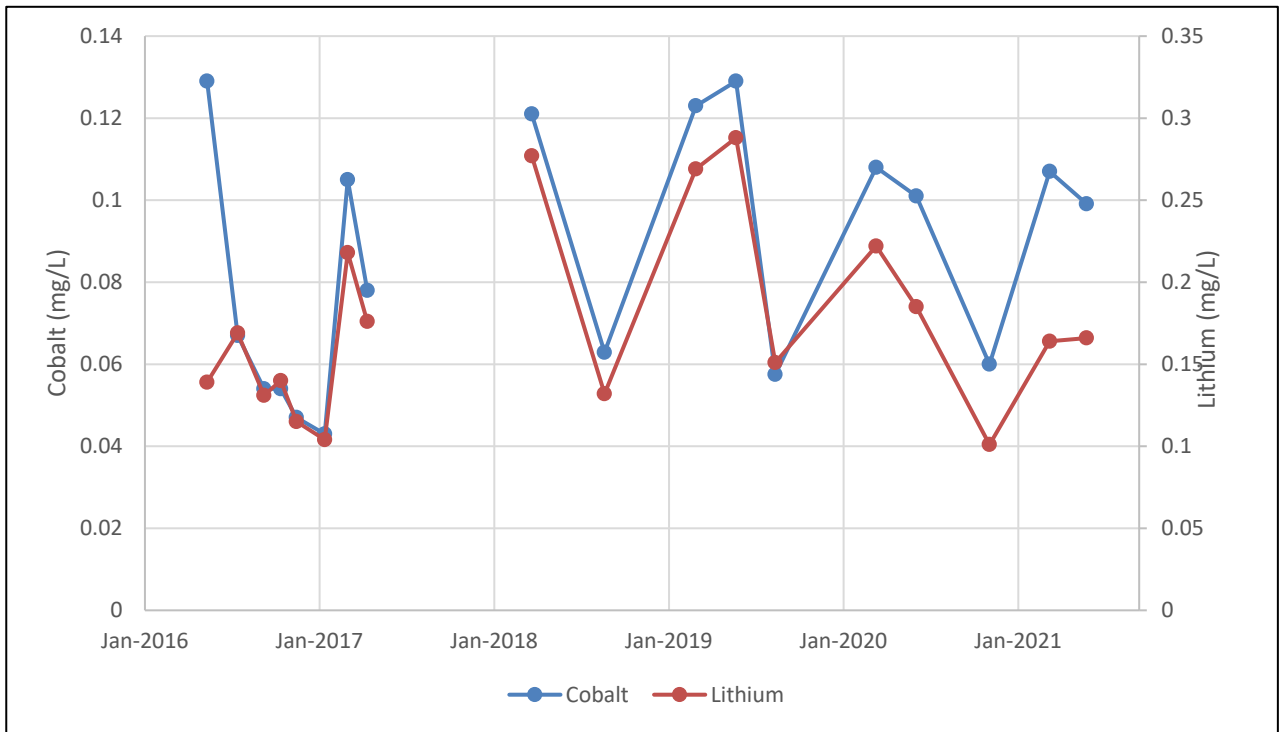
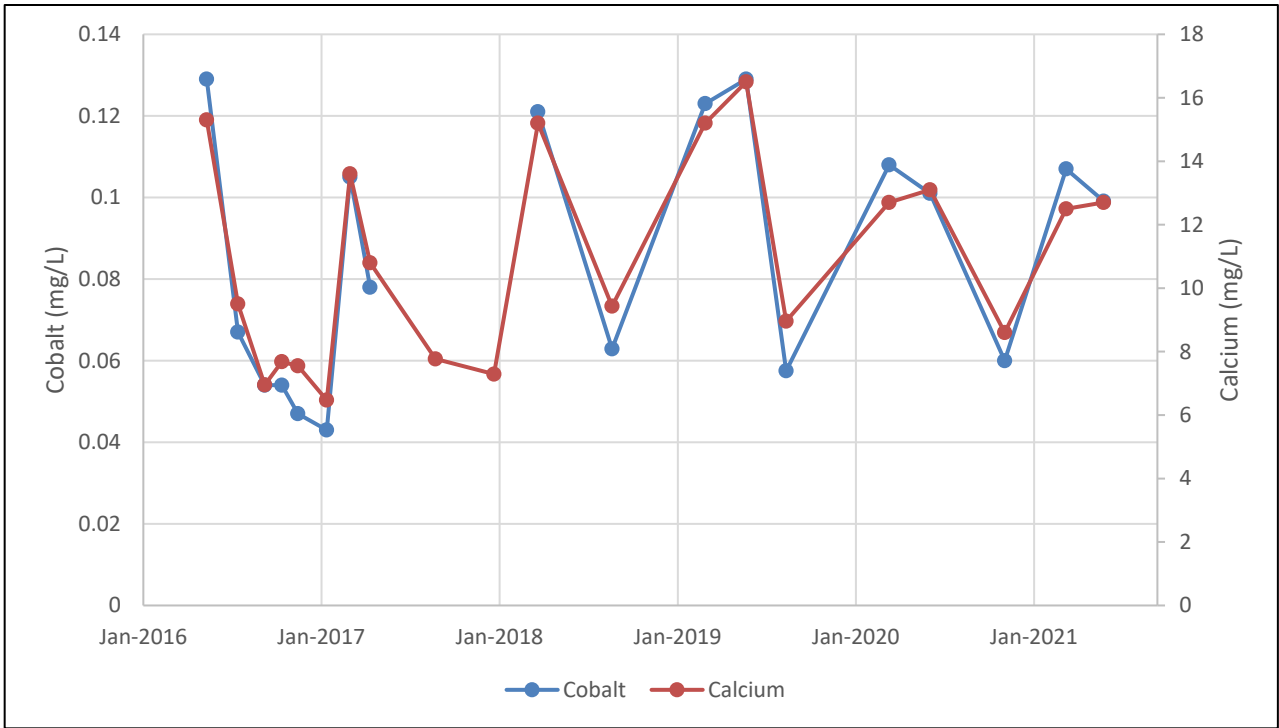


Figure

6

Columbus, Ohio

26-October-2021



Notes: Cobalt, calcium, and lithium concentrations are shown in milligrams per liter (mg/L). The gaps in cobalt and lithium data represent the time period during which detection monitoring took place and samples were not analyzed for cobalt and lithium.

AD-22 Cobalt v. Calcium and Lithium
Pirkey FGD Stackout Pad

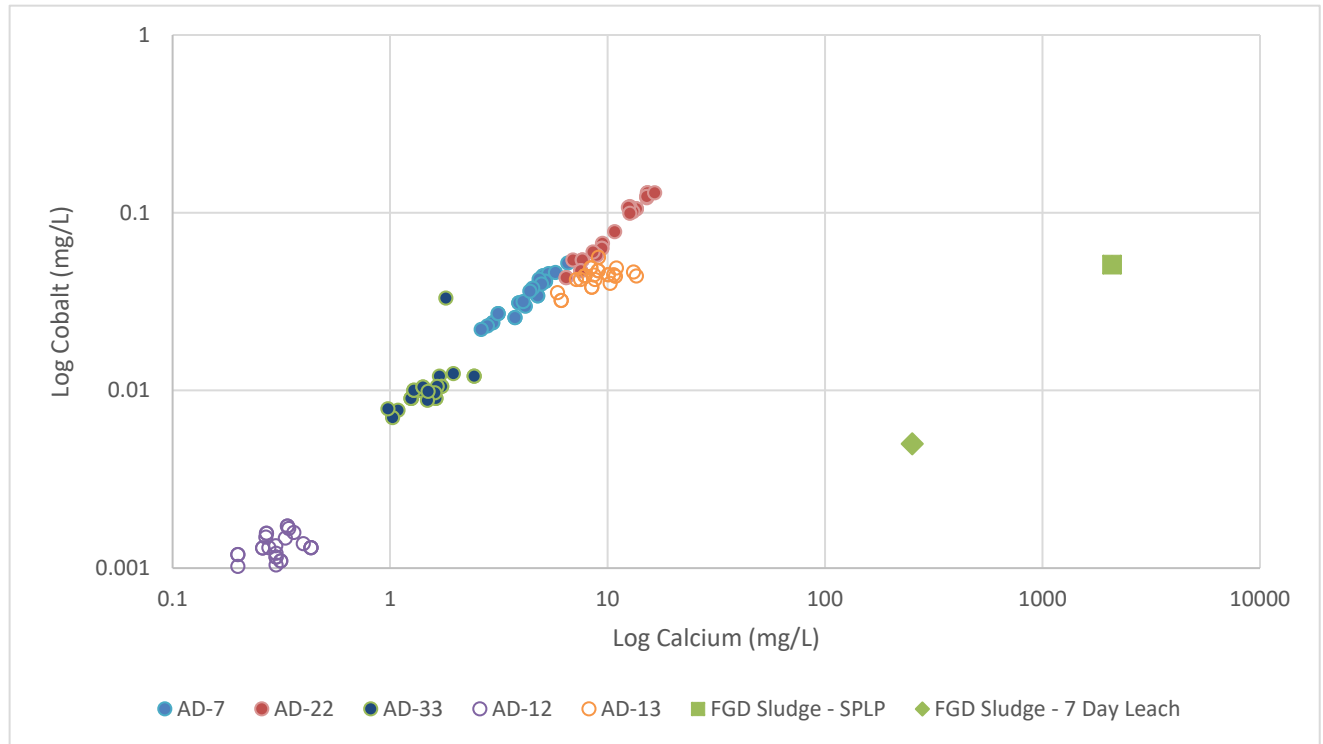


Figure

7

Columbus, Ohio

26-October-2021



Notes: Cobalt and calcium concentrations are shown in milligrams per liter (mg/L). Upgradient wells are shown with hollow circles. 'FGD Sludge-SPLP' and 'FGD Sludge 7 Day Leach' present the leached concentrations of cobalt and calcium using the Synthetic Precipitation Leaching Procedure (SW-846 Test Method 1312) and the 7-Day Distilled Water Leachate Test Procedure (30 TAC 335.521 Appendix 4), respectively.

Cobalt and Calcium Concentration Distribution

Pirkey FGD Stackout Pad

Geosyntec
consultants

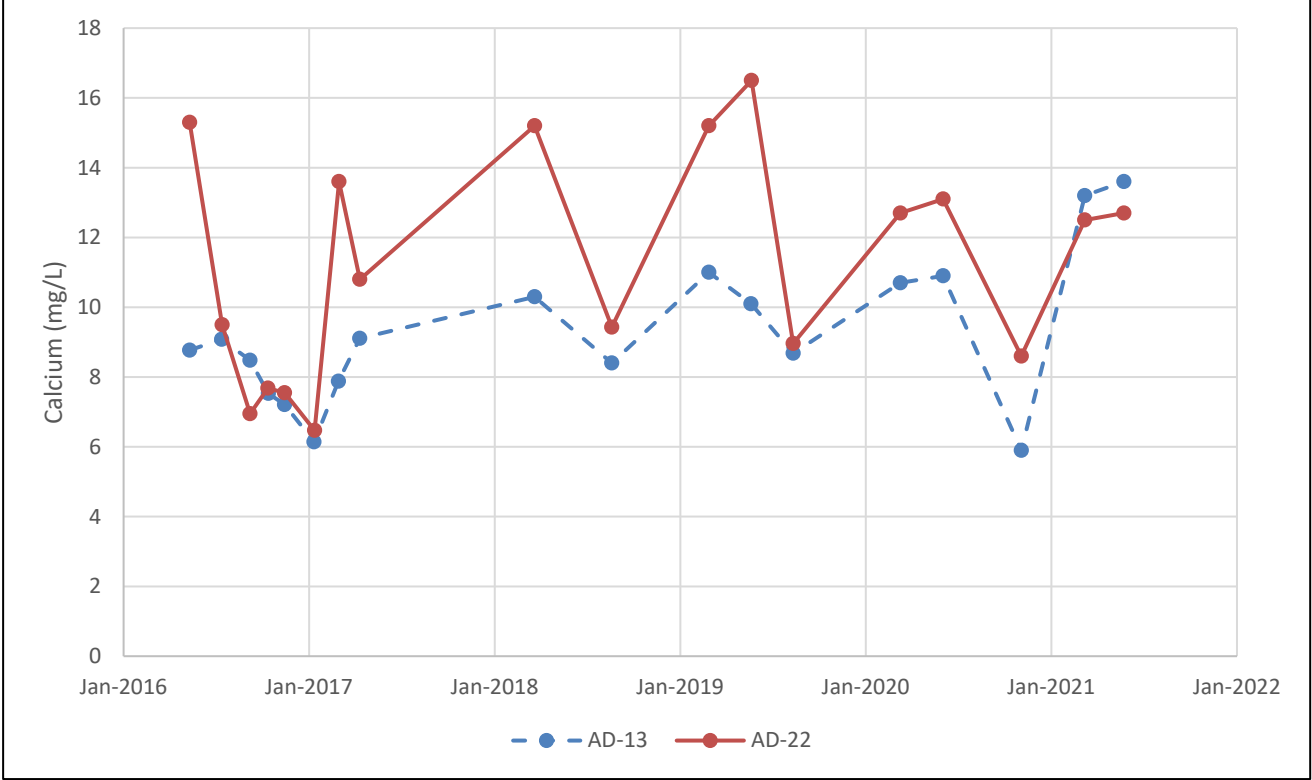


Figure

8

Columbus, Ohio

26-October-2021



Notes: Calcium concentrations are shown in milligrams per liter (mg/L). AD-13 is shown with a dashed line because it is an upgradient location.

Calcium Time Series Graph
Pirkey FGD Stackout Pad

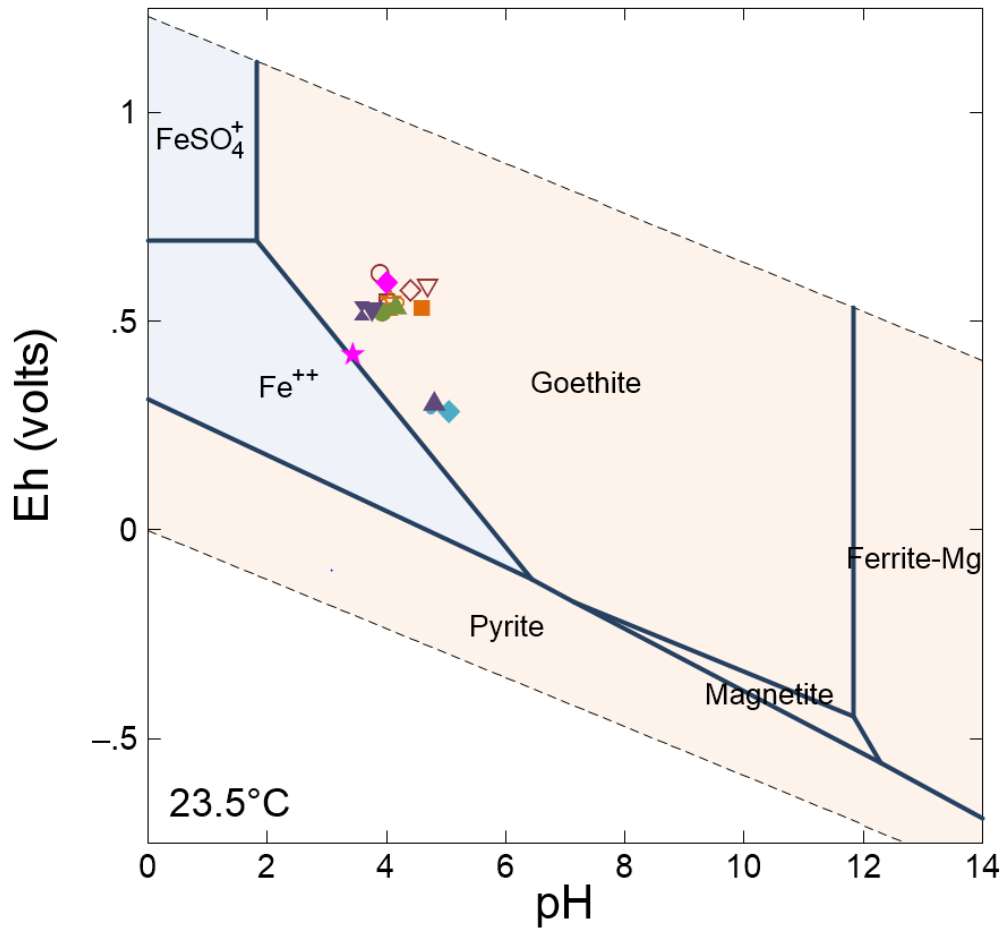


Figure

9

Columbus, Ohio

26-October-2021



- 5/11/2016
- 7/14/2016
- △ 9/7/2016
- ▽ 10/12/2016
- ◇ 11/14/2016
- 1/12/2017
- ⊗ 3/1/2017
- ☆ 4/11/2017
- 8/23/2017
- 3/21/2018
- ▲ 8/20/2018
- ◆ 5/22/2019
- 8/12/2019
- ▼ 3/10/2020
- ⋈ 6/2/2020
- ▲ 11/2/2020
- ◆ 3/8/2021
- ★ 5/24/2021

Notes: Average groundwater concentrations of major cations and anions at AD-22 were used to establish baseline conditions for the diagram. Eh and pH values for sampling dates at AD-22 are shown on the diagram.

AD-22 Eh-pH Diagram
Pirkey FGD Stackout Pad

Geosyntec
consultants



Figure

10

Columbus, Ohio

28-October-2021

ATTACHMENT A
SP-B4 Boring Logs

Soil Boring Log

Project: AEP Pirkey

Boring/Well Name: _____ SP-B4

Project Location: _____ Hallsville, TX

Boring Date: __ 3/3/2020

Depth Scale Feet	Water Table	Soil Profile Description	PID*
0		pp= pocket penetrometer	
		0.0'-0.4': Top soil, black silt, vegetation	
		0.4'-0.7': Brown clayey silt, good cohesion	
		0.7'-1.5': Red and light gray silty clay, moderate stiffness (pp. 2.5), high plasticity	
		1.5'-3.7': Maroon and light gray clay, high stiffness (pp. 4.5-5.0), low plasticity; iron ore present 3.1'-3.7'	
		3.7'-5.0': NO RECOVERY	
5		5.0'-7.0': Maroon and light gray clay, high stiffness (pp. 4.5-5.0), low plasticity; iron ore present throughout	
		7.0'-8.0': Light gray clay with iron ore, moderate stiffness (pp.2.5-3.0), moderate plasticity	
		8.0'-10.0': Maroon clay, moderate stiffness (pp. 3.5), moderate plasticity; iron ore present; moist at 9'	
10		10.0'-12.6': Maroon clay, moderate stiffness (pp. 3.5), moderate plasticity; iron ore present; wet at 12'	
	▼	12.6'-13.3': Tan clay, low stiffness (pp.1.5), high plasticity; wet	
		13.3'-18.5': Tan and brown clayey silt, moderate cohesion; iron ore present; wet	
15			
		18.5'-20.3': Maroon silty clay, low stiffness (pp. 1.0), moderate plasticity; iron ore; wet	
20		20.3'-21.1': Dark gray/black clay, trace silt, low stiffness (pp. 1.5), high plasticity; wet	
		21.1'-21.3': Dark gray silt, good cohesion; wet	
		21.3'-21.9': Dark gray silty clay, low stiffness (pp. 1.5), high plasticity; wet	
		21.9'-22.3': Dark gray silt, moderate cohesion; wet	
		22.3'-22.7': light brown silt; low cohesion; wet	
		22.7'-24.4': Dark gray and dark green silty clay, moderate/high stiffness (pp.3.5), moderate plasticity; wet, glauconite present	
25		24.4'-27.8': Dark green/gray fine grained sand, well sorted; wet; glauconite present	
		27.8'-30.0': Red and orange fine grained sand, well sorted, with iron ore; wet	
30			
		Samples collected at 6-8'; 18-20'; 28-30'	
		TD at 30' bgs; refusal	
		*PID readings not collected	
35			


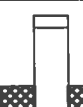

Drill Rig Geoprobe 3230 DT
 Drilling Contractor: _____ C&S
 Driller: _____ DJ Diduch

Geosyntec Consultants

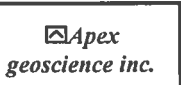
ATTACHMENT B

AD-22 Boring Log and Well Installation Diagram

BORING MONITOR WELL
 APEX PROJECT NO.: 110-089 BORING NUMBER: _____ MONITOR WELL NUMBER: AD-22
 FACILITY NAME: AEP- Pirkey Power Plant FACILITY ID NO.: N/A
 FACILITY ADDRESS: Hallsville, Texas
 DRILLING COMPANY/METHOD/RIG: Apex Geoscience Inc. / Hollow-stem Augers/ CME-55 Track Rig
 DRILLER: Ed Wilson, Apex Geoscience Inc. COMPLETION DATE: 12/16/2010
 PREPARED BY: David Bedford LOGGED BY: David Bedford
 LATITUDE: N 32°27'03.3" Datum: WGS-84 WELL LOCATION: Triangle- South side Quansit Hut
 LONGITUDE: W94°29'41.3"

DEPTH (FEET)	PID (PPM)	SAMPLE INTERVAL	WELL LOG AND COMPLETION DETAILS	USCS CODE	SOIL DESCRIPTION AND COMMENTS	Odor	Moisture	
1				0-0.5	SC	Clayey sand, light brown, very fine grained	None	Moist
2				0.5-12	CL	Lean clay, light brown mottled with light gray	None	Slightly Moist
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13				12-20	SC	Clayey sand, grayish brown with orangish brown streaks, very fine grained	None	Slightly Wet
14								
15								
16								
17								
18								
19								
20								
21				20-25	SC	(Dense crystalline rock 21-21.1'), light brown clayey sand, greenish black, mica, black clay streaks, very fine grained, wet @ 20'	None	Wet
22								
23								
24								
25								
26				25-30	SM	Sand, greenish brown (1') grading to orangish brown, silty, very fine grained	None	Wet
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

 Cement
  Bentonite
  Filter Sand
  Water Level



Total Depth: 30 feet Riser Interval: +3 (ags)-10'
 Filter Sand (Size/Interval): 8-30' Screen Interval: 10-30'
 Grout (Type/Interval): Grout from 0-2'; Bentonite from 2-8' Water level: 12.5'
 Surface Completion Flush Above Ground 3'

Note: This log is not to be used separate from this report.
 Boring Logs_110-089, AD-22

ATTACHMENT C

Certification by a Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

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

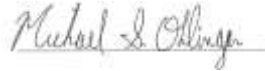
Date Collected: 03/09/2021 10:37

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)

Site Contact:

Date:

For Lab Use Only:

COC/Order #:

Project Name: Pirkey

Contact Name: Leslie Fuerschbach

Contact Phone: 318-423-3805

Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (in Calendar Days)

250 mL bottle, pH<2, HNO₃

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

1 L bottle, Cool, 0-5°C

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

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

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

Sample Specific Notes:

Sample Identification

Sample Date

Sample Time

Sample Type (C=Comp, G=Grab)

Matrix

of Cont.

Sampler(s) Initials

B, Ca, Li, Sb, As, Ba, Mo, Se, TL and Na, K, Mg, Sr

B, Ca, Li, Sb, As, Ba, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, Tl and Na, K, Mg, Sr

TDS, F, Cl, SO₄ and Br, Alkalinity

Hg

Hg

1

F= filter in field

Preservation Used: 1= Ice, 2= HCl; 3= H₂SO₄; 4=HNO₃; 5=NaOH; 6= Other

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: *[Signature]*

Relinquished by: *[Signature]*

Relinquished by: *[Signature]*

Company: *[Signature]*

Company: *[Signature]*

Company: *[Signature]*

Date/Time: 3/10/21

Date/Time: 3/10/21

Date/Time: 3/10/21

Date/Time: 3/10/21

Date/Time: 3/10/21

Date/Time: 3/10/21

Date/Time: 3/10/21

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Date/Time: 3/10/21

Date/Time: 3/10/21

Date/Time: 3/10/21

Date/Time: 3/10/21

Date/Time: 3/10/21



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

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

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

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

AD-7

Sample Number: 210586-004

Date Collected: 03/09/2021 09:43

Date Received: 3/15/2021

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

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

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

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

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

AD-7 Dissolved

Sample Number: 210586-004A

Date Collected: 03/09/2021 09:43

Date Received: 3/15/2021

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

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

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

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

AD-12

Sample Number: 210586-005

Date Collected: 03/08/2021 10:27

Date Received: 3/15/2021

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

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

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

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

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

AD-12 Dissolved

Sample Number: 210586-005A

Date Collected: 03/08/2021 10:27

Date Received: 3/15/2021

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

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

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

AD-13

Sample Number: 210586-006

Date Collected: 03/08/2021 09:47

Date Received: 3/15/2021

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

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

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

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

AD-13 Dissolved

Sample Number: 210586-006A

Date Collected: 03/08/2021 09:47

Date Received: 3/15/2021

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

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

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

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

AD-17

Sample Number: 210586-007

Date Collected: 03/09/2021 11:06

Date Received: 3/15/2021

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

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

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

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

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

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

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

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

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

AD-17 Dissolved

Sample Number: 210586-007A

Date Collected: 03/09/2021 11:06

Date Received: 3/15/2021

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

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

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

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

AD-18

Sample Number: 210586-008

Date Collected: 03/09/2021 13:15

Date Received: 3/15/2021

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

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

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

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

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

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

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

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

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

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

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

AD-18 Dissolved

Sample Number: 210586-008A

Date Collected: 03/09/2021 13:15

Date Received: 3/15/2021

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

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

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

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

AD-22

Sample Number: 210586-009

Date Collected: 03/08/2021 10:56

Date Received: 3/15/2021

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

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

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

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

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

AD-22 Dissolved

Sample Number: 210586-009A

Date Collected: 03/08/2021 10:56

Date Received: 3/15/2021

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

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

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

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

AD-28

Sample Number: 210586-010

Date Collected: 03/09/2021 10:18

Date Received: 3/15/2021

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

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

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

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

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

AD-28 Dissolved

Sample Number: 210586-010A

Date Collected: 03/09/2021 10:18

Date Received: 3/15/2021

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

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

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

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

AD-30

Sample Number: 210586-011

Date Collected: 03/09/2021 09:35

Date Received: 3/15/2021

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

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

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

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

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

AD-30 Dissolved

Sample Number: 210586-011A

Date Collected: 03/09/2021 09:35

Date Received: 3/15/2021

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

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

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

AD-31

Sample Number: 210586-012

Date Collected: 03/08/2021 12:23

Date Received: 3/15/2021

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

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

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

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

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

AD-31 Dissolved

Sample Number: 210586-012A

Date Collected: 03/08/2021 12:23

Date Received: 3/15/2021

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

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

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

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

AD-32

Sample Number: 210586-013

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

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

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

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

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

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

AD-32 Dissolved

Sample Number: 210586-013A

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

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

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

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

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

AD-33

Sample Number: 210586-014

Date Collected: 03/08/2021 11:59

Date Received: 3/15/2021

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

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

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

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

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

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

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

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

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

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

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

AD-33 Dissolved

Sample Number: 210586-014A

Date Collected: 03/08/2021 11:59

Date Received: 3/15/2021

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

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

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

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

Duplicate 1

Sample Number: 210586-015

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

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

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

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

Duplicate 1 Dissolved

Sample Number: 210586-015A

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

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

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

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

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

Duplicate 2

Sample Number: 210586-016

Date Collected: 03/09/2021 10:37

Date Received: 3/15/2021

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

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

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

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

Duplicate 2 Dissolved

Sample Number: 210586-016A

Date Collected: 03/09/2021 10:37

Date Received: 3/15/2021

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

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

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

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

Equipment Blank

Sample Number: 210586-017

Date Collected: 03/09/2021 11:42

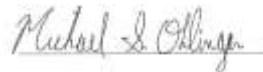
Date Received: 3/15/2021

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

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

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

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



Michael Ohlinger, Chemist

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Fax 614-836-4168

Audinet 8-210-

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

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

Date:

For Lab Use Only:

COC/Order #:

Project Name: Pirkey

Contact Name: Leslie Fuerschbach

Contact Phone: 318-423-3805

Sampler(s): Matt Hamilton Kenny McDonald

210586

Analysis Turnaround Time (in Calendar Days)

Sampler(s) Initials

Sample Specific Notes

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	# of Cont.	Analysis						H _g	H _g
				250 mL bottle, pH<2, HNO ₃	Field-filter 250 mL bottle, then pH<2, HNO ₃	1 L bottle, Cool, 0-5°C	Three (six every 1000 ¹) L bottles, pH<2, HNO ₃	40 mL Glass Vial or 250 mL PTFE lined bottle, HCL ² , pH<2	40 mL Glass Vial or 250 mL PTFE lined bottle, HCL ² , pH<2		
3/9/2021	1037	G	10	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	1156	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	1203	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	943	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	1027	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	947	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	1106	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	1315	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	1056	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	1018	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
3/9/2021	935	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, Ni, P, Se, Sr, Tl, U, V, Zn	X	X	X	X	X	X	
				F4	1	4	2	2			

Preservation Used: 1= Ice, 2= HCl; 3= H₂SO₄; 4=HNO₃; 5=NaOH; 6= Other _____; F= filter in field

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: *[Signature]* Company: *Essik*

Relinquished by: *[Signature]* Company: *Essik*

Relinquished by: *[Signature]* Company: *Essik*

Date/Time: 3/10/21 1430

Date/Time: 3/10/21

Date/Time: 3/15/21 12:40 PM

Received in Laboratory by: *[Signature]*



WATER & WASTE SAMPLE RECEIPT FORM

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

Customer Description:

Lab Number: 215084-016

Sampling Point:

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	0.09	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.011	mg/L	1	0.050	0.009	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.25	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	0.039	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00024	mg/L	1	0.00020	0.00005		GES	06/09/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	<0.0005	mg/L	1	0.0020	0.0005	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	<0.2	mg/L	1	1.0	0.2	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	<0.2	mg/L	1	0.5	0.2	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	<0.003	mg/L	1	0.010	0.003	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

Customer Sample ID:

Customer Description:

Lab Number: 215084-016-01

Sampling Point:

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
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Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

A handwritten signature in black ink that reads "Michael S. Ohlinger". The signature is written in a cursive style and is positioned above a horizontal line.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

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



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Data Qualifier Legend

- B1 Analyte detected in method blank (MB) at or above the method criteria.
- B2 Analyte detected in initial calibration blank (ICB) at or above the method criteria.
- B3 Analyte detected in continuing calibration blank (CCB) at or above the method criteria.
- B4 The interference check standard (ICS) exceeded the method criteria on this parameter.
- H1 Sample was received past holding time.
- H2 Sample analysis performed past holding time.
- J1 Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
- J2 Concentration estimated. Analyte exceeded calibration range.
- L1 The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
- M1 The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
- M2 Analyzed by method of standard additions (MSA).
- O1 The reporting limit for oil and grease is directly affected by the collected sample volume.
- O2 Client did not provide additional bottles; therefore, the MS and duplicate are missing in this batch.
- O3 Client did not provide additional bottles; therefore, the duplicate is missing in this batch.
- O4 Sample was transferred to a different bottle due to excess fine particulate. The particulate was rinsed with hexane, and the hexane layer was transferred to the corresponding bottle. The hexane rinse was completed three times.
- P1 The precision between duplicate results was above acceptance limits.
- P2 The precision on the laboratory control sample duplicate (LCSD) was above acceptance limits.
- P3 The precision on the matrix spike duplicate (MSD) was above acceptance limits.
- P4 The field duplicate was used as a sample duplicate.
- P5 The precision on the inorganic efficiency check (IEC) exceeded the method criteria.
- Q1 Sample received in inappropriate sample container.
- Q2 Sample was received damaged. The sample was recoverable.
- Q3 Sample container was received damaged. Unable to recover the sample.
- Q4 Sample was received outside of thermal preservation range.
- Q5 Sample was received with improper chemical preservation.
- Q6 Insufficient sample was received by the laboratory to perform the requested analysis.
- Q7 Insufficient sample was received to meet method QC requirements.
- Q8 Sample was received with head space.
- Q9 Due to instrument malfunction, sample was invalidated.
- Q10 Analysis was performed by a contracted laboratory. See attached report.
- Q11 Sample contains free liquid.
- Q12 Sample does not contain free liquid.
- Q13 Sample did not ignite.
- Q14 This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.
- R1 Surrogate recovery was outside acceptance limits.
- R2 Carrier recovery was outside acceptance limits.
- R3 Internal standard recovery was outside acceptance limits.
- R4 The recovery of the reduction efficiency checks (REC) for nitrate or nitrite exceeded the method criteria.
- R5 The back calculation recovery of one or more calibration points exceeded the method criteria.
- S1 Residue weight is above or below the method criteria and needs to be re-analyzed at a different dilution.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

- S2 Residue weight is above the method criteria but was already analyzed with the highest dilution factor.
- S3 Residue weight is below the method criteria but was already analyzed with 1000mL.
- S4 Sample and duplicate results vary due to large amounts of solids present.
- S5 Filtration time exceeds ten minutes.
- S6 Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.
- S7 Sample did not achieve constant weight.
- S8 Sample with low residue was selected for duplicate analysis.
- S9 Based on history, the sample residue was only measured twice and did not achieve constant weight.
- U1 Not detected at or above method detection limit (MDL).
- V1 The associated initial calibration verification (ICV) recovery was outside acceptance limits.
- V2 The associated continuing calibration verification (CCV) recovery was outside acceptance limits.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Michael Ohlinger (614-836-4184)
 Contacts: Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Analysis Turnaround Time (in Calendar Days) (☉ Routine (28 days for Monitoring Wells))				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	Date:	COC/Order #:	For Lab Use Only:
						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							
AD-2	5/25/2021	929	G	GW	7											
AD-3	5/25/2021	1159	G	GW	7											
AD-4	5/25/2021	1024	G	GW	7											
AD-7	5/25/2021	828	G	GW	7											
AD-12	5/24/2021	1047	G	GW	7											
AD-13	5/24/2021	954	G	GW	7											
AD-17	5/25/2021	1115	G	GW	7											
AD-18	5/25/2021	1145	G	GW	7											
AD-22	5/24/2021	1046	G	GW	7											
AD-28	5/25/2021	1022	G	GW	7											
AD-30	5/25/2021	946	G	GW	7											
AD-31	5/24/2021	1230	G	GW	7											
Preservation Used: 1= Ice, 2= HCl; 3= H ₂ SO ₄ ; 4=HNO ₃ ; 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:	Date/Time: 05/27/21 1400										Received by:	Date/Time:				
Relinquished by:	Date/Time:										Received by:	Date/Time:				
Relinquished by:	Date/Time:										Received in Laboratory by:	Date/Time: 6/1/21 2:00 PM				

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

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type <input checked="" type="radio"/> Cooler <input type="radio"/> Box <input type="radio"/> Bag <input type="radio"/> Envelope			Delivery Type PONY UPS <input checked="" type="radio"/> FedEx USPS Other _____		
Plant/Customer <u>Pirkey</u>		Number of Plastic Containers: <u>43</u>			
Opened By <u>M50</u>		Number of Glass Containers: <u>-</u>			
Date/Time <u>6/1/21 2:00PM</u>		Number of Mercury Containers: <u>-</u>			
Were all temperatures within 0-6°C? Y / N or <input checked="" type="radio"/> N/A Initial: _____ on ice / <input checked="" type="radio"/> no ice					
2(IR Gun Ser# <u>200700321</u> , Expir. <u>06-11-22</u>) If No, specify each deviation: _____					
Was container in good condition? <input checked="" type="radio"/> Y / N Comments _____					
Was Chain of Custody received? <input checked="" type="radio"/> Y / N Comments _____					
Requested turnaround: <u>28 days</u> If RUSH, who was notified? _____					
pH (15 min)	Cr 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: M50 6/1/21

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

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

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

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

Lab ID# 215084 Initial & Date & Time : _____

Logged by M50 Comments: Missing many bottles FedEx says they will arrive Thursday

Reviewed by SM

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

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type			Delivery Type				
<input checked="" type="radio"/> Cooler	<input type="radio"/> Box	<input type="radio"/> Bag	<input type="radio"/> Envelope	<input type="radio"/> PONY	<input type="radio"/> UPS	<input checked="" type="radio"/> FedEX	<input type="radio"/> USPS
Other _____							
Plant/Customer <u>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 CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	8	mg/L	1	20	5	J1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.7	mg/L	0.22	2.2	0.4		SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-004

Sampling Point: AD-7

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.62	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	28.4	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.54	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	64.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	50	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	250	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.14	1.4	0.3	U1	SDW	05/29/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-005

Sampling Point: AD-12

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.04	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	5.54	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.12	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	5.46	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	70	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.14	1.4	0.3	U1	HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-006

Sampling Point: AD-13

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.31	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	41.6	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.48	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	78.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	57.8	mg/L	0.20	2.0	0.4		HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-007

Sampling Point: AD-17

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.11	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	9.30	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	2.66	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.6	mg/L	0.29	2.9	0.6	U1	SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-008

Sampling Point: AD-18

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	7.16	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.02	mg/L	2	0.06	0.01	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.46	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20	P1	SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	3.2	mg/L	0.17	1.7	0.3		SDW	05/29/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:	Customer Description:
Lab Number: 215073-009	Sampling Point: AD-22
Date Collected: 05/24/2021	Date Received: 05/28/2021
Preparation:	

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.40	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	60.6	mg/L	10	0.20	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.24	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	327	mg/L	10	2.0	0.3		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	120	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	290	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.7	mg/L	0.12	1.2	0.2		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:	Customer Description:
Lab Number: 215073-010	Sampling Point: AD-28
Date Collected: 05/25/2021	Date Received: 05/28/2021
Preparation:	

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.09	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	4.92	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.0	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	27.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	110	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.17	1.7	0.3	U1	SDW	05/29/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-011

Sampling Point: AD-30

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.37	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	22.8	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.08	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	113	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	240	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.17	1.7	0.3	U1	SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-012

Sampling Point: AD-31

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.34	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	18.1	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	86.4	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	130	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	1.4	mg/L	0.14	1.4	0.3		HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-013

Sampling Point: AD-32

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.63	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	25.4	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.25	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	452	mg/L	25	5.0	0.8		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	110	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	340	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.2	mg/L	0.14	1.4	0.3		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-014

Sampling Point: AD-33

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.28	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	8.56	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.29	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	60.4	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.2	mg/L	0.11	1.1	0.2	U1	HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID: Duplicate-1

Customer Description:

Lab Number: 215073-015

Sampling Point:

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.40	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	63.8	mg/L	25	0.5	0.2		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.27	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	355	mg/L	25	5.0	0.8		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	130	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	320	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.4	mg/L	0.13	1.3	0.3		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-016

Sampling Point: B-2

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	6.92	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.25	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	27.8	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	160	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	20.6	mg/L	0.16	1.6	0.3		HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-017

Sampling Point: B-3

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.10	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	13.9	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.11	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	94.2	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	13	mg/L	1	20	5	J1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	240	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	1.3	mg/L	0.12	1.2	0.2	S6	SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-018

Sampling Point: AD-7R

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.59	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	15.3	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	81.6	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	240	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	11.8	mg/L	0.12	1.2	0.2		HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-019

Sampling Point: AD-25

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.08	mg/L	2	0.10	0.02	J1	CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.12	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.68	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	795	mg/L	25	5.0	0.8		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	400	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	1250	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	1.6	mg/L	0.20	2.0	0.4	S6, J1	SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-020

Sampling Point: AD-26

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.46	mg/L	5	0.25	0.05		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	17.8	mg/L	5	0.10	0.03		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	4.01	mg/L	5	0.15	0.04		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	1460	mg/L	50	10	2		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	530	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	2100	mg/L	2	100	40		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	3.0	mg/L	0.20	2.0	0.4	S6	SDW	06/01/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID: Duplicate-2

Customer Description:

Lab Number: 215073-021

Sampling Point:

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.61	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	15.1	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	80.4	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	230	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	10.6	mg/L	0.12	1.2	0.2		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-022

Sampling Point: AD-8

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.11	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.28	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.35	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	168	mg/L	10	2.0	0.3		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	112	mg/L	1	20	5		GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	390	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	8.8	mg/L	0.20	2.0	0.4		SDW	06/01/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-023

Sampling Point: AD-16

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.19	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	23.2	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.13	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.36	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	120	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	3.8	mg/L	0.20	2.0	0.4		SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-024

Sampling Point: AD-23

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.19	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	6.94	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.06	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.90	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	70	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	632	mg/L	1	10	2		SDW	06/01/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-025

Sampling Point: AD-27

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.31	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	13.5	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.25	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	50.8	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	40	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	230	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	61.2	mg/L	0.20	2.0	0.4		SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-026

Sampling Point: AD-34

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.21	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	7.44	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	2.1	mg/L	25	0.8	0.2		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	1110	mg/L	25	5.0	0.8		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	840	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	1670	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	0.3	mg/L	0.17	1.7	0.3	S6, J1	SDW	06/01/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-027

Sampling Point: AD-36

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.59	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	10.6	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.10	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	4.08	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO ₃ to pH 8.3	<20	mg/L	1	50	20	U1	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	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 CaCO ₃ to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO ₃	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 #:

2105073

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Michael Ohlinger (614-836-4184)
 Contacts: Dave Conover (614-836-4219)

Project Name: Pitkey PP CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

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

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Analysis				Sample Specific Notes:	
							250 mL bottle, pH<2, HNO3	Field-filter 250 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-6C	Three (six every 10th*) 1 L bottles, pH<2, HNO3		
AD-2	5/25/2021	929	G	GW	1							
AD-3	5/25/2021	1159	G	GW	1							
AD-4	5/25/2021	1024	G	GW	1							
AD-7	5/25/2021	828	G	GW	1							
AD-12	5/24/2021	1047	G	GW	1							
AD-13	5/24/2021	954	G	GW	1							
AD-17	5/25/2021	1115	G	GW	1							
AD-18	5/25/2021	1145	G	GW	1							
AD-22	5/24/2021	1046	G	GW	1							
AD-28	5/25/2021	1022	G	GW	1							
AD-30	5/25/2021	946	G	GW	1							
AD-31	5/24/2021	1230	G	GW	1							

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>Kurt N. Ad</i>	Company: <i>EA&F</i>	Date/Time: <i>05/27/21 1400</i>	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: <i>5/28/21 10:15</i>

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

Date:

COC/Order #:

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

Sampler(s) Initials

Sample Specific Notes:

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Michael Ohlinger (614-836-4184)
 Contacts: Dave Conover (614-836-4219)

Project Name: Pitkey PP CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Analysis				Sample Specific Notes
						250 mL bottle, pH<2, HNO3	Field-filter 250 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-6C	Three (six every 10th*) 1 L bottles, pH<2, HNO3	
AD-8	5/26/2021	912	G	GW	1	Mercury	Disolved Mercury	TDS, F, Cl, SO4, Br, Alkalinity	Ra-226, Ra-228	
AD-16	5/26/2021	1312	G	GW	1					
AD-23	5/26/2021	1137	G	GW	1					
AD-27	5/26/2021	1237	G	GW	1					
AD-34	5/26/2021	1043	G	GW	1					
AD-36	5/26/2021	959	G	GW	1					
Duplicate - 3	5/26/2021	1200	G	GW	1					
						4	F4	1	4	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ; F= filter in field

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>EAGLE</i>	Date/Time: <i>05/27/21 1400</i>	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time: <i>5-28-21 10:15</i>

AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>				<u>Delivery Type</u>			
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 MSO _____

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



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-2

Customer Description:

Lab Number: 216283-001

Preparation:

Date Collected: 11/16/2021 10:10

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.24	mg/L	2	0.10	0.02		CRJ	12/02/2021 17:33	EPA 300.1 -1997, Rev. 1.0
Chloride	29.2	mg/L	2	0.04	0.02		CRJ	12/02/2021 17:33	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.15	mg/L	2	0.06	0.02		CRJ	12/02/2021 17:33	EPA 300.1 -1997, Rev. 1.0
Sulfate	200	mg/L	10	2.0	0.3		CRJ	12/02/2021 17:07	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO 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: 2
 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	Date	COC/Order #	For Lab Use Only
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 _____

* 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: <i>11-18-21</i>	Received by: <i>[Signature]</i>	Date/Time: <i>12-19-21</i>
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: <i>11/19/21 12:30 PM</i>

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, Mku</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)
 Contacts: Dave Conover (614-836-4219)

Project Name: Pitkey PP CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

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

Site Contact:

Date:

COC/Order #:

For Lab Use Only:

216298
 (ppg) D

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Bottle/Filter Specifications			Sample Specific Notes	
							250 mL bottle, pH<2, HNO ₃	Field-filter 250 mL bottle, then pH<2, HNO ₃	Three (six every 10th) 1 L bottles, pH<2, HNO ₃		125 mL PTFE lined bottle, HCL =, pH<2
AD-2	11/16/2021	1010	G	GW	7		X	X	X	X	
AD-3	11/16/2021	1139	G	GW	7		X	X	X	X	
AD-4	11/16/2021	1108	G	GW	7		X	X	X	X	
AD-7	11/16/2021	837	G	GW	10		X	X	X	X	
AD-12	11/16/2021	1029	G	GW	7		X	X	X	X	
AD-13	11/15/2021	938	G	GW	7		X	X	X	X	
AD-17	11/16/2021	1052	G	GW	7		X	X	X	X	
AD-18	11/17/2021	825	G	GW	7		X	X	X	X	
AD-22	11/15/2021	1121	G	GW	7		X	X	X	X	
AD-28	11/16/2021	953	G	GW	7		X	X	X	X	
AD-30	11/15/2021	1212	G	GW	7		X	X	X	X	
AD-31	11/16/2021	858	G	GW	7		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)

Sampler(s): Matt Hamilton Kenny McDonald

Site Contact:

Date:

COC/Order #:

For Lab Use Only:

216298 (pg 2)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO 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	X	
Equipment Blank	11/16/2021	1046	G	GW	2		X					

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other : F= filter in field

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>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.