Annual Groundwater Monitoring Report

Southwestern Electric Power Company

H. W. Pirkey Power Plant

FGD Stackout Area CCR Management Unit

CN600126767; RN100214287

Registration No: CCR104

Hallsville, Texas

January 31, 2023

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SOUTHWESTERN ELECTRIC POWER COMPANY℠

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Abbreviations:
ASD - Alternate Source Demonstration
CCR – Coal Combustion Residual
GWPS - Groundwater protection standards
SSI - Statistically Significant Increase
SSL - Statistically Significant Level
TCEQ – Texas Commission on Environmental Quality

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, 2023.

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 2021 sampling event (November 2021):

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

  - 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
- A successful ASD for the 2nd semi-annual 2021 potential SSLs cobalt and beryllium was certified on June 16, 2022 and submitted to TCEQ June 16, 2022 for approval.
- During the 1st semi-annual sampling event held in June 2022:

The following Appendix IV parameters exceeded established GWPS:

- Cobalt at AD-22
- Beryllium at AD-7 and AD-22

The following Appendix III parameters exceeded background:

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

- A successful ASD for 1st semi-annual 2022 potential SSLs for cobalt and beryllium was certified January 25, 2023 and submitted to TCEQ January 25, 2023 for approval.
- The 2nd semi-annual event (November 2022) data are still undergoing statistical analysis.
- Because an alternate source for the SSL(s) was identified, but no alternate source for the SSI(s) was identified, 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);

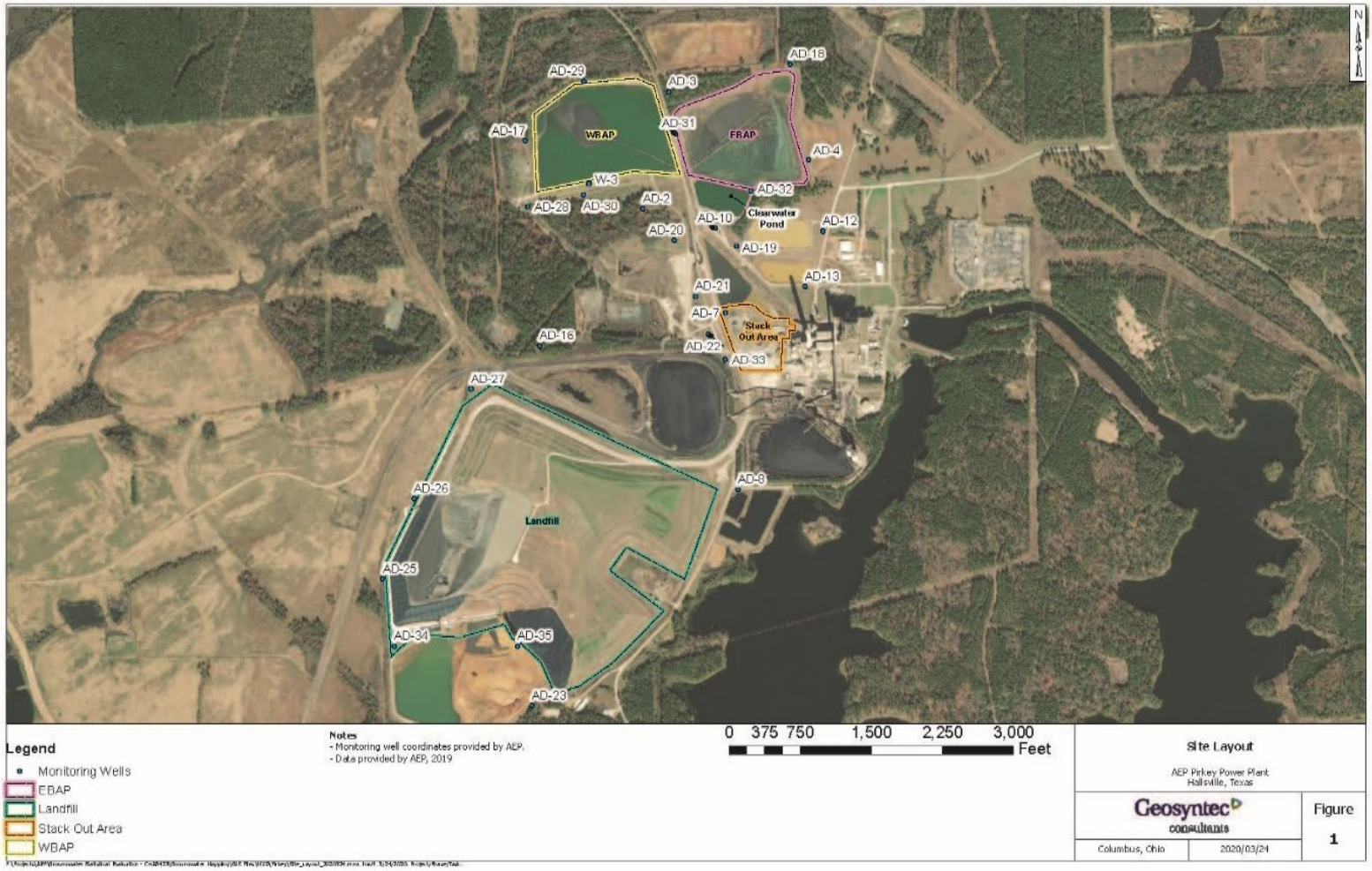
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened;
- Other information required to be included in the annual report such as field sheets, analytical reports, etc. (**Appendix 4 and 5**)

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 2022. The network design, as summarized in the *Groundwater Monitoring Network Design Report* (May 25, 2016) and as posted at the CCR website for Pirkey Power Plant's 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 2022 satisfies the annual screening sampling requirements of 30 TAC §352.951.

V. Statistical Evaluation of 2022 Events

Appendix 2 contains the statistical analysis report(s).

- Data and statistical analysis not available for the previous reporting period indicates that during the 2nd semi-annual 2021 sampling event (November 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-33 and AD-7
  - Chloride at AD-22
  - Sulfate at AD-22

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

  The following Appendix IV parameters exceeded established groundwater protection standards:

  - Cobalt at AD-22
  - Beryllium at AD-7 and AD-22

  The following Appendix III parameters exceeded background:

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

- Sulfate at AD-22

The 2nd semi-annual event (November 2022) data are still undergoing statistical analysis.

VI. Alternate Source Demonstration

A successful ASD for the 2nd semi-annual 2021 potential SSLs cobalt and beryllium was certified on June 16, 2022 and submitted to TCEQ June 16, 2022 for approval.

An successful ASD for 1st semi-annual 2022 potential SSLs for cobalt and beryllium was certified January 25, 2023 and submitted to TCEQ January 25, 2023 for approval.

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

Because an alternate source for the SSL(s) was identified, but no alternate source for the SSI(s) was identified, 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 2022.

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 2022 and Actions Taken

No significant problems were encountered. The low flow sampling effort went smoothly and the schedule was met to support the annual groundwater report preparation covering the year 2022 groundwater monitoring activities.

X. A Projection of Key Activities for the Upcoming Year

Key activities for next year will include:

- Assessment monitoring sampling will be conducted.
- Complete the statistical evaluation of the second semi-annual groundwater monitoring event that took place in November 2022.
- Conduct the annual groundwater sampling event for all constituents listed in 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.

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
3/28/2022	Assessment	3.78	4.33	40.8	0.36	3.6	49.9	230 L1
6/21/2022	Assessment	6.13	5.4	53.1	0.30	3.5	71.1	290
11/16/2022	Assessment	9.38	5.20	69.7	0.23	3.6	60.5	300

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 1 - Groundwater Data Summary: AD-7
Pirkey - Stackout
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/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	4.10	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	3.30	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
3/28/2022	Assessment	< 0.04 U1	1.08	58.8	5.59	0.998	4.78	33.6	4.59	0.36	0.8	0.0967	0.400 J1	< 0.2 U1	3.5	0.20 J1
6/21/2022	Assessment	< 0.1 U1	1.3	58.7	4.66	0.95	0.4 J1	36.4	4.82	0.30	1.0	0.113	< 0.400 U1	< 0.5 U1	2.3 J1	0.2 J1
11/16/2022	Assessment	< 0.02 U1	0.43	55.2	2.49	0.880	0.35	31.8	4.13	0.23	0.27	0.110	0.037	< 0.1 U1	1.49	0.19 J1

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

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

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/11/2016	Background	0.03	0.362	5	< 0.083 U1	4.4	4	94
7/13/2016	Background	0.03	0.26	6	< 0.083 U1	3.1	4	75
9/7/2016	Background	0.04	0.343	6	< 0.083 U1	3.9	7	63
10/12/2016	Background	0.03	0.271	7	1	3.4	8	92
11/14/2016	Background	0.04	0.331	8	< 0.083 U1	2.6	6	80
1/11/2017	Background	0.03	0.315	7	< 0.083 U1	4.8	6	76
2/28/2017	Background	0.04	0.434	5	< 0.083 U1	3.6	4	50
4/11/2017	Background	0.05	0.299	6	0.2565 J1	4.7	7	72
8/23/2017	Detection	0.0495	0.245	6	0.213 J1	4.8	6	52
3/21/2018	Assessment	0.01397	0.269	5	< 0.083 U1	4.2	3	< 2 U1
8/20/2018	Assessment	0.017	0.338	10	< 0.083 U1	4.4	4	94
2/27/2019	Assessment	0.03 J1	0.4 J1	6.08	0.09	5.2	3.6	36
5/21/2019	Assessment	0.020	0.3 J1	6.30	0.09	4.1	4.0	80
8/12/2019	Assessment	< 0.02 U1	0.278	7.24	0.06 J1	4.9	2.6	90
3/10/2020	Assessment	0.02 J1	0.3 J1	6.08	0.10	4.9	3.7	62
6/2/2020	Assessment	< 0.02 U1	0.2 J1	5.63	0.10	4.0	3.9	91
11/2/2020	Assessment	0.03 J1	0.3 J1	4.65	0.08	4.3	3.3	74
3/8/2021	Assessment	0.01 J1	0.2 J1	6.46	0.11	4.1	3.8	68
5/24/2021	Assessment	0.032 J1	0.2 J1	5.54	0.12	4.2	5.46	70
11/15/2021	Assessment	0.012 J1	0.28	8.03	0.07	3.5	2.90	90
3/28/2022	Assessment	0.021 J1	0.20	6.10	0.07	3.9	3.80	60 L1
6/20/2022	Assessment	0.042 J1	0.32	7.59	0.09	4.3	4.81	80
11/15/2022	Assessment	0.013 J1	0.36	8.03	0.08	4.7	3.39	70

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 1 - Groundwater Data Summary: AD-12
Pirkey - Stackout
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
5/11/2016	Background	< 0.93 U1	< 1.05 U1	26	0.219521 J1	< 0.07 U1	0.710981 J1	1.58207 J1	0.2073	< 0.083 U1	< 0.68 U1	< 0.00013 U1	< 0.005 U1	< 0.29 U1	1.73953 J1	< 0.86 U1
7/13/2016	Background	< 0.93 U1	< 1.05 U1	23	0.190337 J1	< 0.07 U1	0.68835 J1	1.29444 J1	2.909	< 0.083 U1	< 0.68 U1	0.008	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
9/7/2016	Background	< 0.93 U1	< 1.05 U1	30	0.232192 J1	< 0.07 U1	0.353544 J1	1.66591 J1	0.881	< 0.083 U1	< 0.68 U1	0.01	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/12/2016	Background	< 0.93 U1	< 1.05 U1	27	0.149553 J1	< 0.07 U1	0.529033 J1	1.56632 J1	0.257	1	< 0.68 U1	0.012	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
11/14/2016	Background	< 0.93 U1	< 1.05 U1	28	0.152375 J1	< 0.07 U1	0.32826 J1	1.47282 J1	0.767	< 0.083 U1	< 0.68 U1	0.013	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/11/2017	Background	< 0.93 U1	< 1.05 U1	23	0.126621 J1	< 0.07 U1	0.650158 J1	1.09495 J1	1.536	< 0.083 U1	< 0.68 U1	0.01	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/28/2017	Background	< 0.93 U1	< 1.05 U1	26	0.149219 J1	< 0.07 U1	0.325811 J1	1.29984 J1	0.416	< 0.083 U1	< 0.68 U1	0.009	< 0.005 U1	< 0.29 U1	< 0.99 U1	0.994913 J1
4/11/2017	Background	< 0.93 U1	< 1.05 U1	24	0.159412 J1	< 0.07 U1	0.416007 J1	1.33344 J1	0.3895	0.2565 J1	< 0.68 U1	0.008	0.01364 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/21/2018	Assessment	< 0.93 U1	< 1.05 U1	25.82	0.16 J1	< 0.07 U1	1.05	1.49 J1	0.784	< 0.083 U1	< 0.68 U1	0.00722	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/20/2018	Assessment	< 0.01 U1	0.11	27.8	0.159	0.01 J1	0.330	1.72	1.128	< 0.083 U1	0.089	0.0143	< 0.005 U1	0.04 J1	0.1	0.04 J1
2/27/2019	Assessment	< 0.4 U1	< 0.6 U1	22.5	< 0.4 U1	< 0.2 U1	< 0.8 U1	1.37	0.225	0.09	< 0.4 U1	0.00688	< 0.005 U1	< 8 U1	< 0.6 U1	< 2 U1
5/21/2019	Assessment	< 0.4 U1	< 0.6 U1	21.7	< 0.4 U1	< 0.2 U1	< 0.8 U1	1.15	0.201	0.09	< 0.4 U1	0.00576	< 0.005 U1	< 8 U1	< 0.6 U1	< 0.1 U1
8/12/2019	Assessment	< 0.02 U1	0.07 J1	23.8	0.154	< 0.01 U1	0.204	1.30	0.237	0.06 J1	0.08 J1	0.00829	< 0.005 U1	< 0.4 U1	0.2 J1	< 0.1 U1
3/10/2020	Assessment	< 0.02 U1	0.09 J1	21.7	0.139	0.01 J1	0.2 J1	1.21	3.0706	0.10	0.09 J1	0.00547	< 0.002 U1	< 0.4 U1	0.2	< 0.1 U1
6/2/2020	Assessment	< 0.02 U1	0.09 J1	19.0	0.132	< 0.01 U1	0.208	1.02	0.799	0.10	0.09 J1	0.00505	< 0.002 U1	< 0.4 U1	0.3	< 0.1 U1
11/2/2020	Assessment	0.05 J1	0.09 J1	18.9	0.122	< 0.01 U1	0.204	1.04	0.929	0.08	0.09 J1	0.00510	< 0.002 U1	< 0.4 U1	0.3	< 0.1 U1
3/8/2021	Assessment	< 0.02 U1	0.07 J1	22.9	0.150	0.007 J1	0.2 J1	1.19	0.214	0.11	0.07 J1	0.00570	< 0.002 U1	< 0.1 U1	0.2 J1	< 0.04 U1
5/24/2021	Assessment	< 0.02 U1	0.08 J1	23.1	0.136	0.005 J1	0.24	1.19	0.60	0.12	0.07 J1	0.00500	< 0.002 U1	< 0.1 U1	0.31 J1	< 0.04 U1
11/15/2021	Assessment	< 0.02 U1	0.05 J1	26.5	0.148	0.01 J1	0.30	1.38	1.76	0.07	0.07 J1	0.0110	< 0.002 U1	< 0.1 U1	0.10 J1	< 0.04 U1
3/28/2022	Assessment	< 0.02 U1	0.09 J1	20.2	0.127	0.009 J1	0.35	1.01	0.76	0.07	0.09 J1	0.00604	< 0.002 U1	< 0.1 U1	0.33 J1	< 0.04 U1
6/20/2022	Assessment	< 0.02 U1	0.08 J1	24.2	0.135	0.008 J1	0.63	1.35	0.63	0.09	0.08 J1	0.00949	< 0.002 U1	< 0.1 U1	0.16 J1	< 0.04 U1
11/15/2022	Assessment	< 0.02 U1	0.06 J1	30.6	0.153	0.007 J1	0.45	1.59	1.46	0.08	0.08 J1	0.0119	< 0.002 U1	< 0.1 U1	0.23 J1	< 0.04 U1

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

Table 1 - Groundwater Data Summary: AD-13
Pirkey - Stackout
Appendix III Constituents

Geosyntec Consultants, Inc.

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
3/28/2022	Assessment	0.065	13.3	46.5	0.34	5.3	79.2	230 L1
6/20/2022	Assessment	0.075	11.1	54.5	0.26	5.7	138	270
11/15/2022	Assessment	0.095	8.57	41.3	0.36	5.8	69.6	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.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 1 - Groundwater Data Summary: AD-13
Pirkey - Stackout
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/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
3/28/2022	Assessment	< 0.02 U1	2.18	52.1	0.579	< 0.004 U1	0.52	46.9	2.95	0.34	< 0.05 U1	0.138	< 0.002 U1	< 0.1 U1	< 0.09 U1	< 0.04 U1
6/20/2022	Assessment	< 0.02 U1	4.30	41.4	0.409	< 0.004 U1	0.31	56.2 M1	2.22	0.26	< 0.05 U1	0.150 M1	< 0.002 U1	1.1	0.1 J1	< 0.04 U1
11/15/2022	Assessment	< 0.02 U1	1.62	44.2	0.131	< 0.004 U1	0.35	45.9	1.55	0.36	< 0.05 U1	0.141	< 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

Geosyntec Consultants, Inc.

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
3/28/2022	Assessment	0.068	16.4	88.8	0.96	4.3	385	720 L1
6/20/2022	Assessment	0.028 J1	11.9	107	0.32	4.5	293	580
11/14/2022	Assessment	0.021 J1	10.5	101	0.28	4.8	251	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.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 1 - Groundwater Data Summary: AD-22
Pirkey - Stackout
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/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
3/28/2022	Assessment	< 0.02 U1	3.21	19.3	8.78	1.27	0.43	109	4.24	0.96	0.15 J1	0.170	< 0.004 U1	< 0.1 U1	9.20	0.19 J1
6/20/2022	Assessment	< 0.02 U1	3.02	16.2	2.11	0.587	0.66	69.6	3.95	0.32	0.18 J1	0.110	0.460	0.1 J1	2.01	0.15 J1
11/14/2022	Assessment	< 0.02 U1	2.40	20.8	2.16	0.494	0.47	60.3	2.70	0.28	0.22	0.0905	0.410	< 0.1 U1	1.93	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

Geosyntec Consultants, Inc.

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
3/28/2022	Assessment	0.146	2.28	8.88	0.30	4.0	67.0	190 L1
6/20/2022	Assessment	0.093	1.06	8.49	0.19	4.4	57.7	150
11/15/2022	Assessment	0.086	0.90	9.18	0.16	4.0	42.7	140

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 1 - Groundwater Data Summary: AD-33
Pirkey - Stackout
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/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	1.40	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
3/28/2022	Assessment	< 0.02 U1	0.87	45.0	1.35	0.057	0.47	9.82	2.28	0.30	0.32	0.0219	4.600	< 0.1 U1	2.68	< 0.04 U1
6/20/2022	Assessment	0.04 J1	1.19	42.0	0.939	0.039	0.64	7.81	3.37	0.19	0.27	0.0166	3.000	< 0.1 U1	1.27	< 0.04 U1
11/15/2022	Assessment	< 0.02 U1	0.37	49.4	0.945	0.038	0.44	6.83	3.66	0.16	0.22	0.0185	5.900	< 0.1 U1	0.96	< 0.04 U1

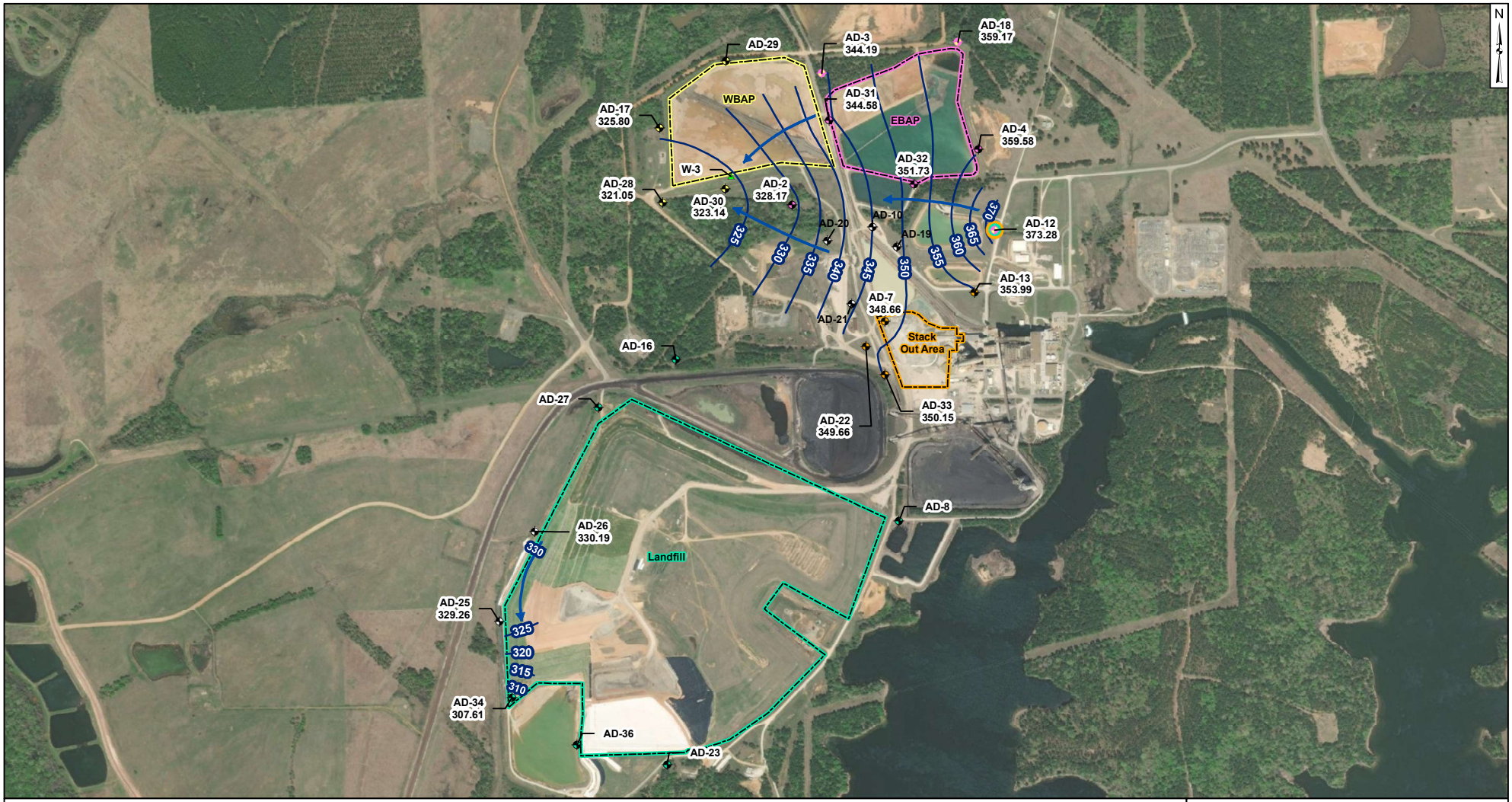
Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical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

Geosyntec Consultants, Inc.

CCR Management Unit	Monitoring Well	Well Diameter (inches)	2022-03		2022-06		2022-11	
			Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Stack Out Area	AD-7 [2]	4.0	11.9	10.2	10.6	11.4	11.1	11.0
	AD-12 [1]	4.0	36.4	3.3	21.6	5.6	22.8	5.3
	AD-13 [1]	4.0	9.1	13.4	6.1	20.0	6.3	19.2
	AD-22 [2]	2.0	20.1	3.0	19.6	3.1	11.0	5.5
	AD-33 [2]	2.0	12.3	5.0	10.4	5.8	9.7	6.3

Notes:
[1] - Background Well
[2] - Downgradient Well



Legend

Groundwater Monitoring Wells

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

Notes

- Monitoring well coordinates and water level data (collected on March 28 - 29, 2022) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- Clearwater pond base elevation is 344 ft. msl (Sargent and Lundy, 1983).
- AD-8, AD-10, AD-16, AD-19, AD-20, AD-21, AD-23, AD-27, AD-29, AD-35, AD-36, and W-3 were not gauged during the March 2022 event.
- AD-35 was abandoned on November 13, 2018.

1,000 500 0 1,000 Feet

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Beth Ann Gross

January 25, 2023

TX Eng Firm
Registration #1182

Potentiometric Contours - Uppermost Aquifer March 2022

AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec consultants

Columbus, Ohio | 2023/01/25

Figure 1

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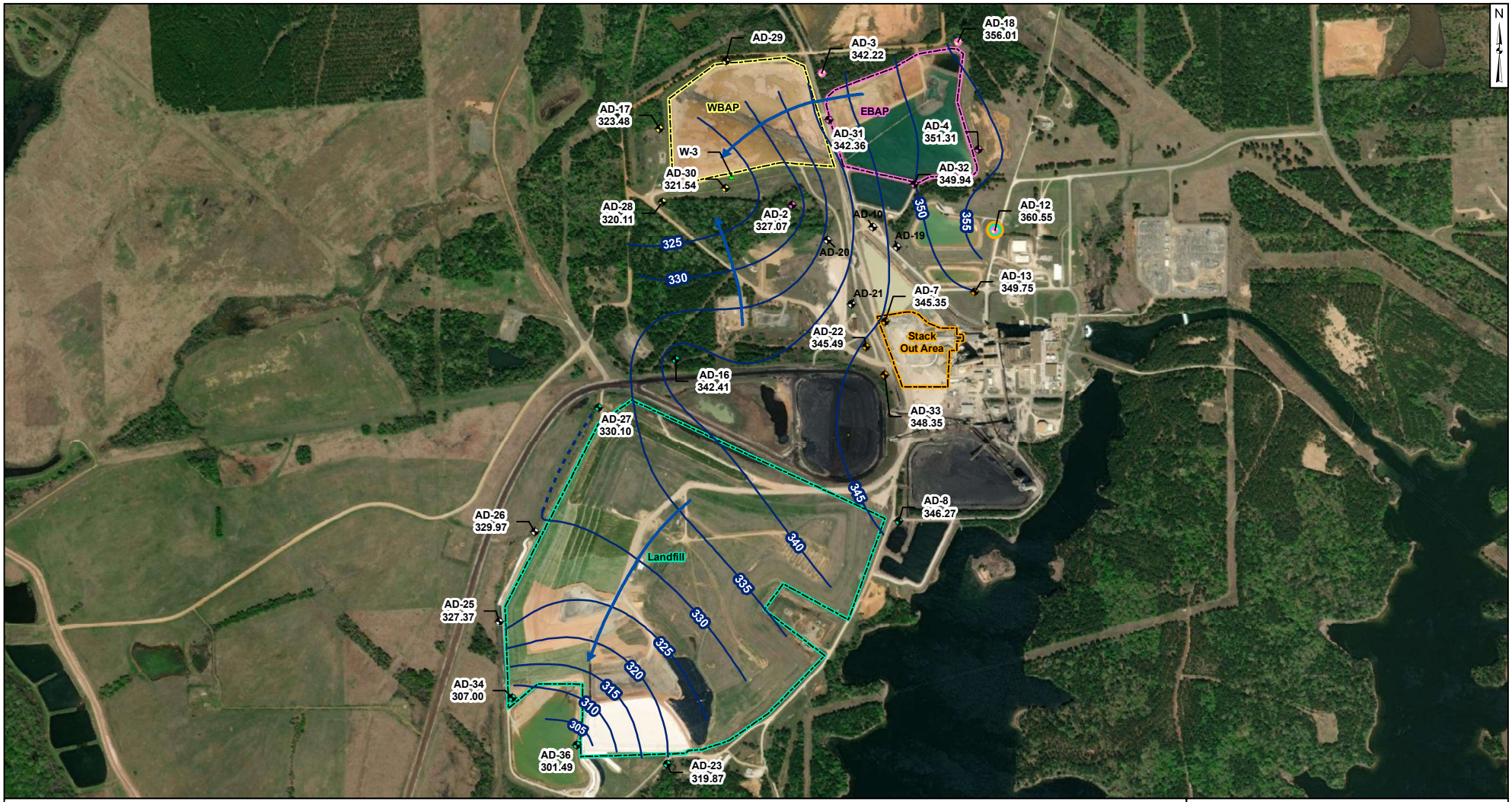

Legend

Groundwater Monitoring Wells

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

Notes

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

1,000 500 0 1,000 Feet

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12/29/2022

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Potentiometric Contours - Uppermost Aquifer
June 2022

AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec consultants

Columbus, Ohio | 2022/12/21

Figure 2

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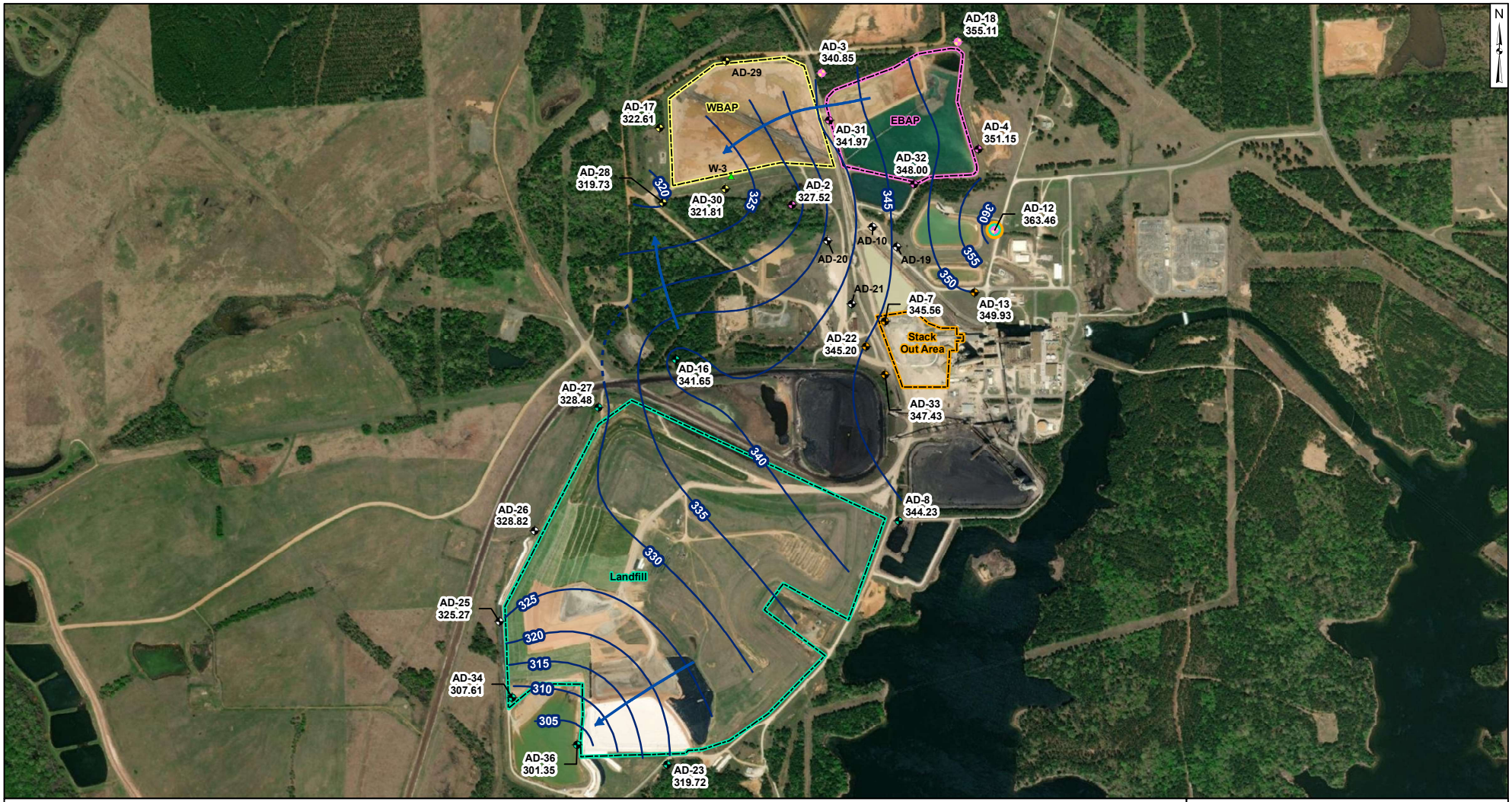

Legend

Groundwater Monitoring Wells
- Out of Network
- EBAP
- WBAP
- Landfill
- Stackout Area
- EBAP and WBAP

- All CCR Unit Networks
- Piezometer
- Groundwater Elevation Contour
- Groundwater Elevation Contours (Inferred)
- Approximate Groundwater Flow Direction

Notes
- Monitoring well coordinates and water level data (collected on November 15, 2022) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation Update (Arcadis, 2022) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- AD-10, AD-19, AD-20, AD-21, AD-29, and W-3 were not gauged during the November 2022 event.
- AD-35 was abandoned on November 13, 2018.

1,000 500 0 1,000 Feet

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Digitally signed by Beth Gross, Date: 2023.01.23 09:40:36 -05'00'

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Potentiometric Contours - Uppermost Aquifer
November 2022

AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec consultants

Columbus, Ohio | 2023/01/17

Figure 3

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APPENDIX 2- Statistical Analyses

The reports summarizing the statistical evaluation follow.

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

Submitted to

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

941 Chatham Lane
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March 18, 2022
CHA8500

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LIST OF ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

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

SECTION 1

EXECUTIVE SUMMARY

In accordance with the Texas Commission on Environmental Quality's (TCEQ's) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (Title 30 Chapter 352, "CCR rule"), groundwater monitoring has been conducted at the Flue Gas Desulfurization (FGD) Stackout Area, an existing CCR unit at the H.W. Pirkey Power Plant located in Hallsville, Texas. Recent groundwater monitoring results were compared to site-specific groundwater protection standards (GWPSs) to identify potential exceedances.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, chloride, and sulfate at the FGD Stackout Area. An alternative source was not identified at the time, so the FGD Stackout Area initiated assessment monitoring in 2018. GWPSs were set in accordance with § 352.951(b) and a statistical evaluation of the assessment monitoring data was conducted. During 2021, sampling events for both Appendix III and Appendix IV parameters, as required by § 352.951(a), were completed in March and May. During the May 2021 assessment monitoring event, statistically significant levels (SSLs) were observed for beryllium and cobalt (Geosyntec, 2021a). In accordance with § 352.951(e), an alternative source demonstration (ASD) was successfully completed (Geosyntec, 2021b); thus, the unit remained in assessment monitoring. One assessment monitoring event was conducted at the FGD Stackout Area in November 2021 in accordance with § 352.951(a). The results of the November 2021 assessment event are documented in this report.

Prior to conducting the statistical analyses, the groundwater data underwent several validation tests, including those for completeness, sample tracking accuracy, transcription errors, and consistent use of measurement units. No data quality issues were identified which would impact data usability.

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. GWPSs were re-established for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether SSLs of Appendix IV parameters were present above the GWPSs. 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

FLUE GAS DESULFURIZATION STACKOUT AREA EVALUATION

2.1 Data Validation & QA/QC

During the assessment monitoring program, one set of samples was collected for analysis from the background and compliance wells to meet the requirements of § 352.951(a) in November 2021. Samples from November 2021 were analyzed for all Appendix III and Appendix IV parameters. A summary of data collected during this assessment monitoring event is presented in Table 1.

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

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.32 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

2.2 Statistical Analysis

Statistical analyses for the FGD Stackout Area were conducted in accordance with the November 2021 *Statistical Analysis Plan* (Geosyntec, 2021c). Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained in November 2021 were screened for potential outliers. No outliers were identified for this event.

2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with the *Statistical Analysis Plan* (Geosyntec, 2021c). The established GWPS was determined to be the greater value of the background concentration and the maximum contaminant level (MCL) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events. Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for barium, chromium, and combined radium. Non-parametric tolerance limits were calculated for arsenic, beryllium, cobalt, fluoride, and lithium due to apparent non-normal distributions and for antimony, cadmium, lead, mercury, molybdenum,

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

2.2.2 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ($\alpha = 0.01$); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high).

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. 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 following SSLs were identified at the Pirkey FGD Stackout Area:

- The deseasonalized LCL for beryllium exceeded the GWPS of 0.00400 mg/L at AD-22 (0.00559 mg/L).
- The deseasonalized LCL for cobalt exceeded the GWPS of 0.00560 mg/L at AD-22 (0.0724 mg/L).

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

2.2.3 Establishment of Appendix III Prediction Limits

Upper prediction limits (UPLs) were previously established for all Appendix III parameters following the background monitoring period. Intrawell tests were used to evaluate potential SSIs for calcium, pH and TDS, whereas interwell tests were used to evaluate potential SSIs for boron, chloride, fluoride, and sulfate. Interwell and intrawell prediction limits are updated periodically during the assessment monitoring period as sufficient data became available.

For the intrawell tests, insufficient data was available to compare against the existing background dataset, and so the prediction limits were not updated for the intrawell tests at this time. The intrawell prediction limits were previously calculated using historical data through June 2020

(Geosyntec, 2021d). The established intrawell prediction limits were used to evaluate potential SSIs for calcium, pH, and TDS.

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

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-Francía test for normality. The Kaplan-Meier non-detect adjustment was applied to datasets with between 15% and 50% non-detect data. For datasets with fewer than 15% non-detect data, non-detect data were replaced with one half of the PQL. The selected analysis (i.e., parametric or non-parametric) and transformation (where applicable) for each background dataset are shown in Attachment B.

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

2.2.4 Evaluation of Potential Appendix III SSIs

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

Data collected during the November 2021 assessment monitoring event from each compliance well were compared to the re-calculated prediction limits to evaluate results above background values. The results from this event and the prediction limits are summarized in Table 3. The following exceedances of the UPLs were noted:

- Boron concentrations exceeded the interwell UPL of 0.0834 mg/L at AD-33 (0.093 mg/L) and AD-7 (2.24 mg/L).

- Chloride concentrations exceeded the interwell UPL of 42.3 mg/L at AD-22 (108 mg/L).

- Sulfate concentrations exceeded the interwell UPL of 83.4 mg/L at AD-22 (291.6 mg/L).

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

2.3 Conclusions

A semi-annual assessment monitoring event was conducted at the FGD Stackout Area in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified no potential outliers in the November 2021 data. GWPSs were re-established for the Appendix IV parameters. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. SSLs were identified for beryllium and cobalt. Appendix III parameters were compared to established 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, Inc. (Geosyntec). 2021a. Statistical Analysis Summary – Flue Gas Desulfurization Stackout Area, Pirkey, Hallsville, Texas. September.

Geosyntec. 2021b. Alternative Source Demonstration Report - Texas State CCR Rule. H.W. Pirkey Power Plant Flue Gas Desulfurization Stackout Area.

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

Geosyntec. 2021d. Statistical Analysis Summary – Flue Gas Desulfurization Stackout Area, Pirkey, Hallsville, Texas. March.

TABLES

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

Geosyntec Consultants, Inc.

Well ID		AD-7	AD-12	AD-13	AD-22	AD-33
Well Classification		Compliance	Background	Background	Compliance	Compliance
Parameter	Unit	11/16/2021	11/15/2021	11/15/2021	11/15/2021	11/15/2021
Antimony	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	1.05	0.05 J	4.39	1.85	0.40
Barium	µg/L	37.3	26.5	41.7	17.9	45.1
Beryllium	µg/L	4.86	0.148	0.344	2.50	0.916
Boron	mg/L	2.24	0.012 J	0.063	0.030 J	0.093
Cadmium	µg/L	0.734	0.01 J	0.02 U	0.502	0.043
Calcium	mg/L	4.56	0.28	8.61	11.7	0.98
Chloride	mg/L	33.6	8.03	42.3	108	8.60
Chromium	µg/L	0.37	0.30	0.34	0.27	0.28
Cobalt	µg/L	38.3	1.38	45.9	69.9	6.75
Combined Radium	pCi/L	5.59	1.76	1.56	2.88	1.65
Fluoride	mg/L	0.44	0.07	0.26	0.35	0.17
Lead	µg/L	0.80	0.07 J	0.2 U	0.09 J	0.23
Lithium	mg/L	0.0760	0.0110	0.135	0.122	0.0177
Mercury	µg/L	0.480	0.005 U	0.005 U	0.056	14.600
Molybdenum	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Selenium	µg/L	3.47	0.10 J	0.5 U	1.92	1.0
Sulfate	mg/L	62.6	2.90	70.8	236	41.9
Thallium	µg/L	0.26	0.2 U	0.2 U	0.14 J	0.2 U
Total Dissolved Solids	mg/L	260	90	220	570	150
pH	SU	3.1	3.5	5.5	4.4	3.6

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: Appendix IV Groundwater Protection Standards
Pirkey Plant - FGD Stackout Area

Geosyntec Consultants, Inc.

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600	0.00500	0.00600
Arsenic, Total (mg/L)	0.0100	0.00900	0.0100
Barium, Total (mg/L)	2.00	0.0519	2.00
Beryllium, Total (mg/L)	0.00400	0.00200	0.00400
Cadmium, Total (mg/L)	0.00500	0.00100	0.00500
Chromium, Total (mg/L)	0.100	0.00136	0.100
Cobalt, Total (mg/L)	n/a	0.0560	0.0560
Combined Radium, Total (pCi/L)	5.00	2.83	5.00
Fluoride, Total (mg/L)	4.00	1.00	4.00
Lead, Total (mg/L)	n/a	0.00500	0.0050
Lithium, Total (mg/L)	n/a	0.165	0.165
Mercury, Total (mg/L)	0.00200	0.0000250	0.00200
Molybdenum, Total (mg/L)	n/a	0.00500	0.00500
Selenium, Total (mg/L)	0.0500	0.00500	0.0500
Thallium, Total (mg/L)	0.00200	0.00200	0.00200

Notes:
MCL = Maximum Contaminant Level
GWPS = Groundwater Protection Standard
Calculated UTL (Upper Tolerance Limit) represents site-specific background values.
Grey cells indicate the GWPS is based on the calculated UTL, which is either higher than the MCL or an MCL does not exist.

Table 3 - Appendix III Data Summary
Pirkey Plant - FGD Stackout Area

Geosyntec Consultants, Inc.

Analyte	Unit	Description	AD-22	AD-33	AD-7
			11/15/2021	11/15/2021	11/16/2021
Boron	mg/L	Interwell Background Value (UPL)	0.0834		
		Analytical Result	0.04052 J	**0.093**	**2.24**
Calcium	mg/L	Intrawell Background Value (UPL)	17.6	2.18	6.55
		Analytical Result	13.67	0.98	4.56
Chloride	mg/L	Interwell Background Value (UPL)	42.3		
		Analytical Result	**108**	8.60	33.6
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.527	0.17	0.44
pH	SU	Intrawell Background Value (UPL)	5.1	4.7	4.4
		Intrawell Background Value (LPL)	3.4	3.0	3.0
		Analytical Result	4.4	3.6	3.1
Sulfate	mg/L	Interwell Background Value (UPL)	83.4		
		Analytical Result	**291.6**	41.9	62.6
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	682	212	343
		Analytical Result	570	150	260

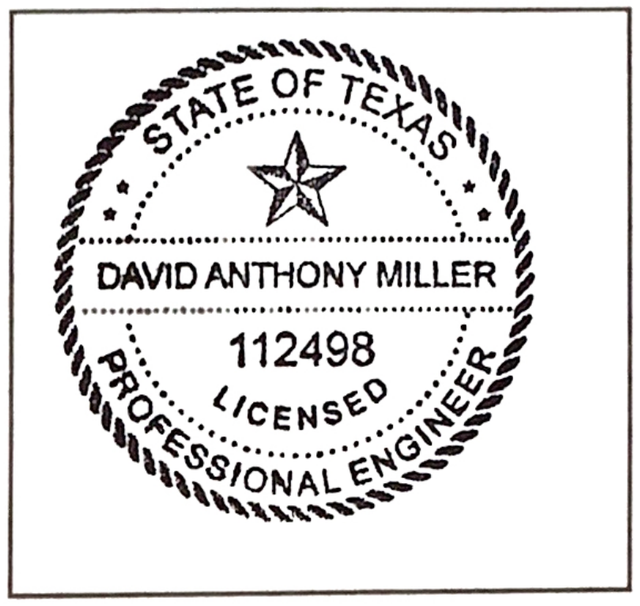
Notes:
UPL: Upper prediction limit
LPL: Lower prediction limit
Bold values exceed the background value.
Background values are shaded gray.

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	TEXAS	03.19.22
License Number	Licensing State	Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS CONSULTING

March 2, 2022

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

Re: Pirkey Stackout
Background Update & Assessment Monitoring Event – November 2021

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 2021 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 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). Non-detects 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
2) 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 non-detects, 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. Non-detects are handled as follows:

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

Natural systems continuously evolve due to physical changes made to the environment. Examples include capping a landfill, paving areas near a well, or lining a drainage channel to prevent erosion. Periodic updating of background statistical limits 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 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

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. However, during the 9/7/16 sample event, several reported measurements for a number of constituents were remarkably high, suggesting a likely systematic error. Therefore, those values were flagged as outliers.

Trend Test Evaluation

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; therefore, no adjustments were made to the data sets.

Appendix III – Determination of Statistical Methods

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 results of the application of Analysis of Variance, upgradient tolerance limits, and downgradient confidence intervals were included in the 2017 screening study report.

Appendix III and Appendix IV Background Update

December 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. For several constituents, the reporting limit changed--usually decreased--over time. For the screening non-detect data were analyzed using the reporting limit as originally entered into the database. However, when a non-detect substitution could result in a misleadingly high statistical limit, those data were 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 non-detects, reported at 0.04 mg/L, were censored at much higher levels than the rest of the data and, therefore, were 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 non-detects, and the non-detects with a reporting limit of 0.01 mg/L were flagged as outliers.

Several constituents appeared 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 were presented with the report. 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.

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. 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. 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. Although a statistically significant decreasing trend was identified for fluoride in upgradient well AD-12, the trend is a result of several non-detects followed by reported trace values. Therefore, no adjustment was required for this record.

February 2022

During this analysis upgradient well data through November 2021 were re-screened for the purpose of updating the interwell prediction limits for boron, chloride, fluoride, and sulfate and interwell upper tolerance limits for Appendix IV parameters. Intrawell prediction limits will be updated after the Fall 2022 sample event when sufficient compliance samples are available.

Outlier Analysis

Prior to updating background data during this analysis, upgradient wells were re-evaluated using Tukey's outlier test and visual screening for Appendix III constituents tested with interwell prediction limits and for Appendix IV constituents on historical data through November 2021 (Figure C). Tukey's outlier test on pooled upgradient well data did not identify any potential outliers, and no new values were flagged.

No changes to values flagged in previous background updates occurred. As mentioned above, any flagged data are displayed in a lighter font and as a disconnected symbol on the time series reports, as well as in a lighter font on the accompanying data pages. A summary table of all flagged outliers follows this report (Figure C).

Seasonality

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 (Figure D). 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.

Intrawell Prediction Limits

Intrawell prediction limits, combined with a 1-of-2 resample plan, are constructed using historical data through June 2020 for calcium, pH, and TDS at all wells. Additionally, a deseasonalized prediction limit was constructed for calcium in well AD-22 and may be found at the end of the intrawell prediction limits (Figure E). As discussed earlier, background data sets for calcium, pH, and TDS will be updated after the Fall 2022 sample event when a minimum of 4 new compliance samples are available. A summary table of the limits follows this report.

Interwell – Trend Test Evaluation

The Sen's Slope/Mann Kendall trend test was used to evaluate data at upgradient wells for boron, chloride, fluoride, and sulfate to identify statistically significant increasing or decreasing trends (Figure F). A statistically significant decreasing trend was identified for fluoride in upgradient well AD-12; however, the trend is a result of several non-detects followed by reported trace values. Statistically significant increasing trends were identified for chloride and sulfate in upgradient well AD-13; however, the magnitude of the trends

would not greatly impact the respective interwell prediction limits. Therefore, no adjustments were required for these records.

Interwell – Prediction Limits

Interwell prediction limits, combined with a 1-of-2 resample plan, were constructed using all pooled upgradient well data through November 2021 for boron, chloride, fluoride, and sulfate (Figure G). Time series plots were included with the interwell prediction limit graphs to display concentrations at upgradient wells that were used to construct the statistical limits. A summary table of the updated limits may be found following this letter in the Prediction Limit Summary Tables.

Evaluation of Appendix IV Constituents – November 2021

As mentioned above, prior to evaluating Appendix IV parameters, background data are screened through visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits. For the current analysis, Tukey's outlier test on pooled upgradient well data for Appendix IV parameters through November 2021 did not identify any outliers. Therefore, no new values were flagged and no changes to previous outliers were made.

Interwell Upper Tolerance Limits

Parametric upper tolerance limits were used to calculate background limits from pooled upgradient well data through November 2021 for Appendix IV parameters with a target of 95% confidence and 95% coverage for use as background limits (Figure H). The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

Groundwater Protection Standards

These background limits were compared to the Maximum Contaminant Levels (MCLs) as shown in the Groundwater Protection Standard (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure I).

Confidence Intervals

Confidence intervals were then constructed on downgradient wells with data through October 2021 for each of the Appendix IV parameters and then compared to the GWPS,

i.e., the highest limit of the MCL, or background limit as discussed above (Figure J). Note that concentrations of mercury in well AD-22 decreased in 2019 compared to historical data. Therefore, a confidence interval was constructed on data since 2019 to reflect present-day groundwater quality conditions at this well for mercury. Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. Complete graphical results of the confidence intervals follow this letter. Exceedances were identified 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 seasonality was identified by the Kruskal-Wallis test and 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. The following exceedances were identified in the confidence intervals constructed with the original and deseasonalized data:

- 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

Date Ranges

Date: 2/2/2022 8:45 AM

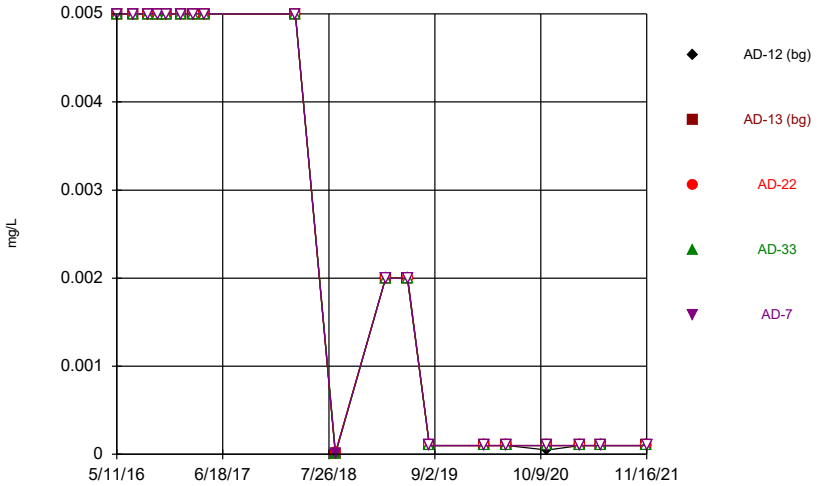
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Mercury, total (mg/L)

AD-22 overall:2/27/2019-11/15/2021

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

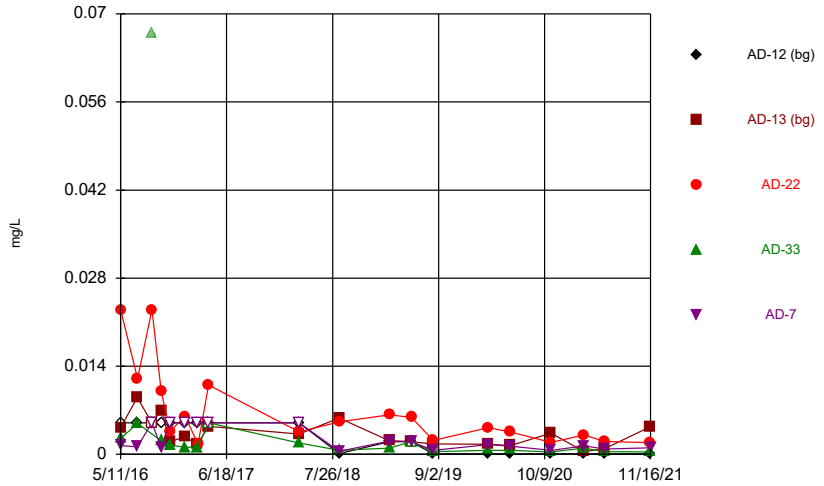
Time Series



Constituent: Antimony, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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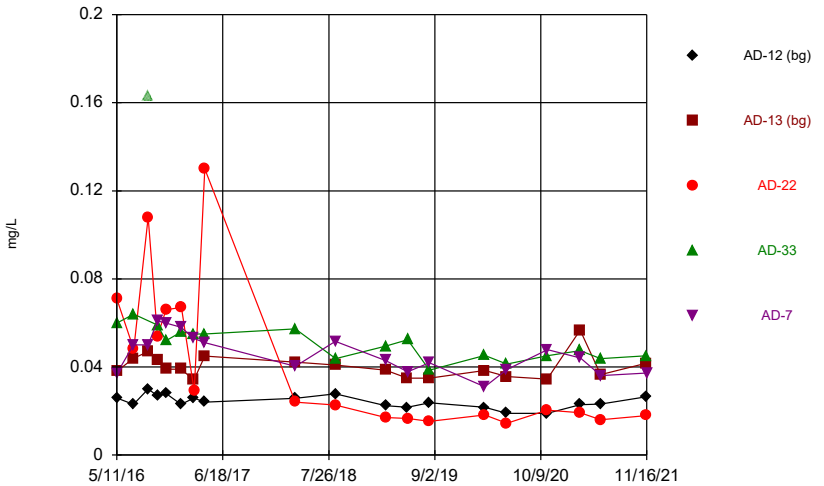
Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

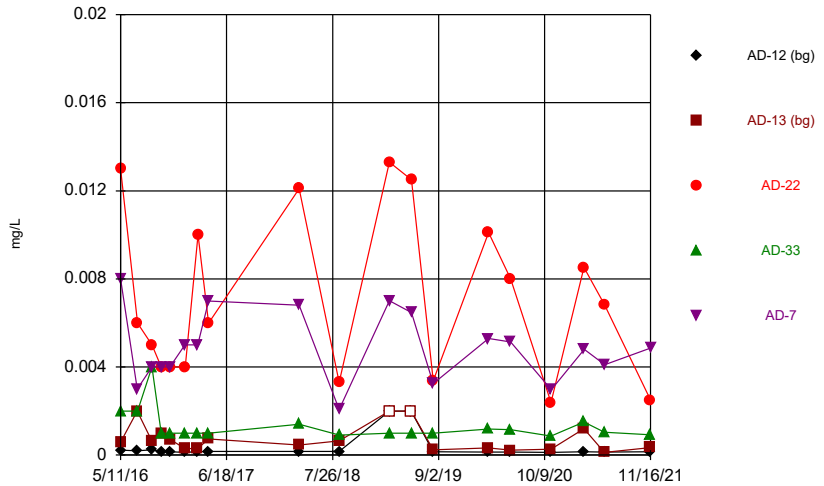
Time Series



Constituent: Barium, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

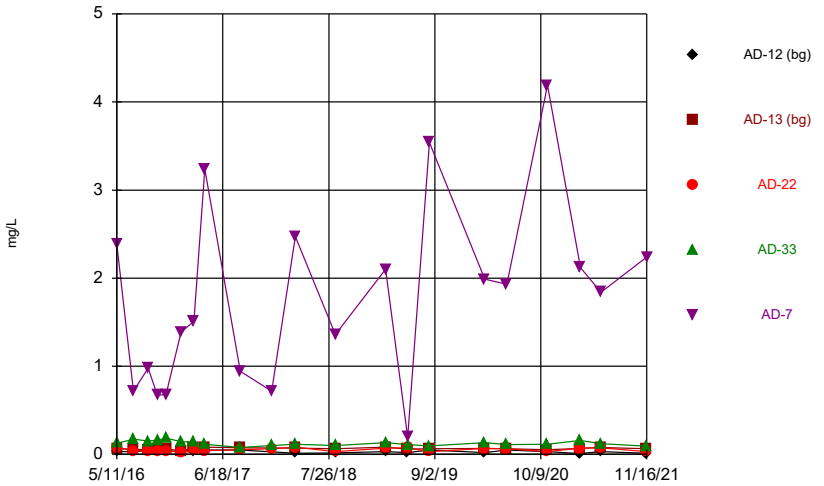
Time Series



Constituent: Beryllium, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

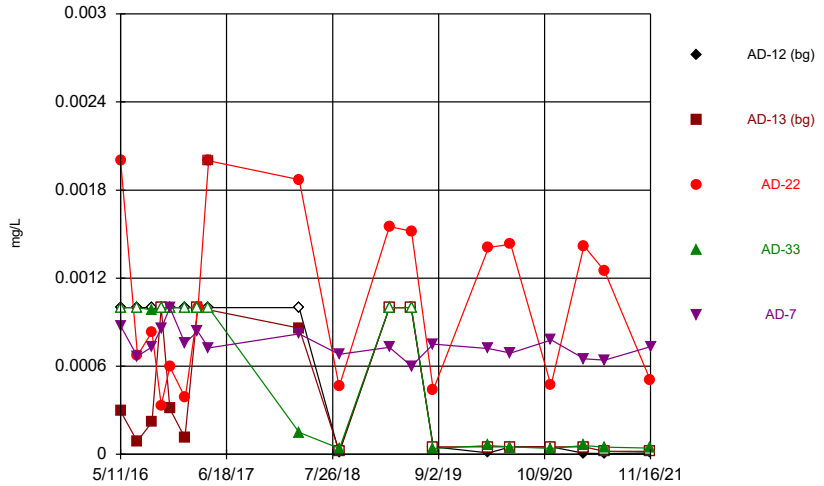
Time Series



Constituent: Boron, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

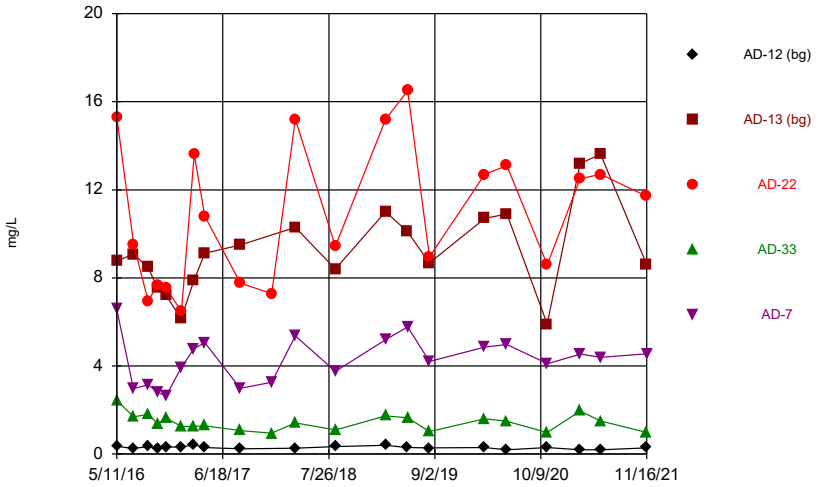
Time Series



Constituent: Cadmium, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

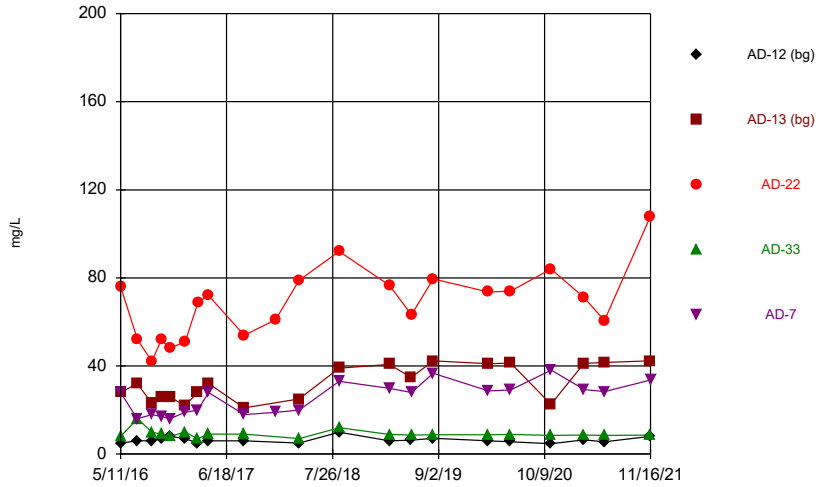
Time Series



Constituent: Calcium, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

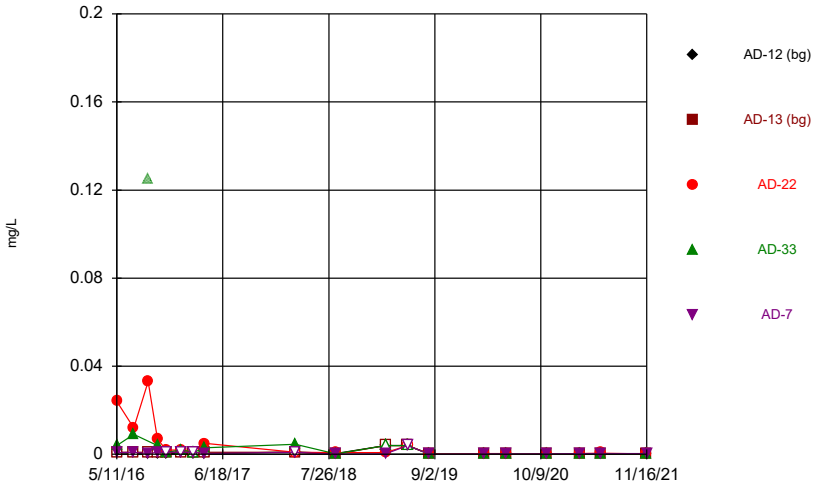
Time Series



Constituent: Chloride, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

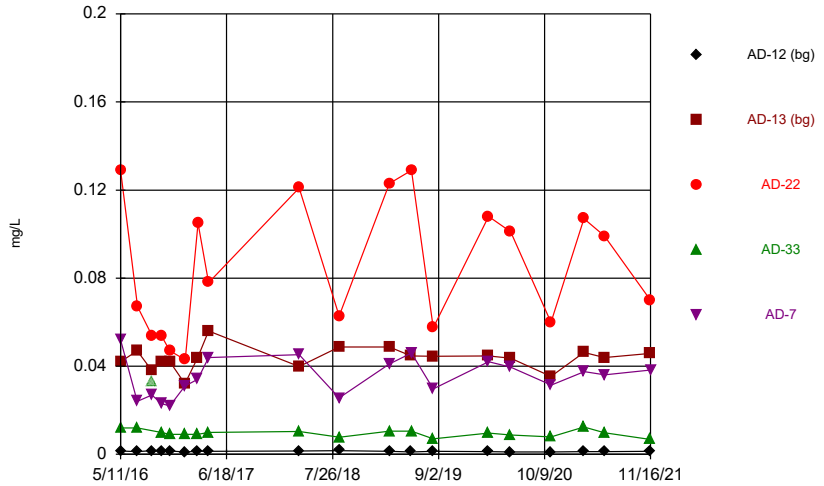
Time Series



Constituent: Chromium, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

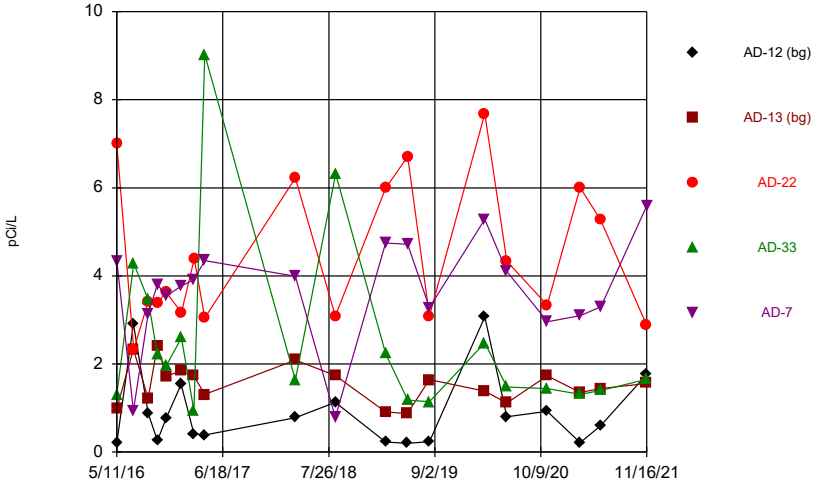
Time Series



Constituent: Cobalt, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

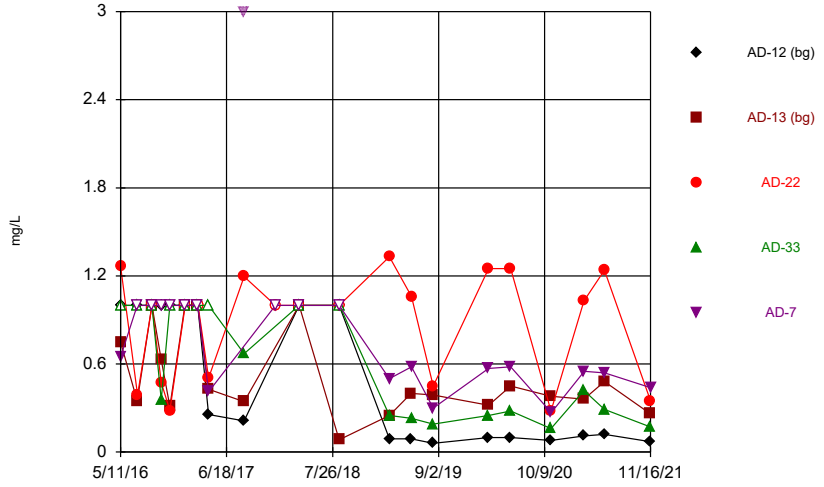
Time Series



Constituent: Combined Radium 226 + 228 Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

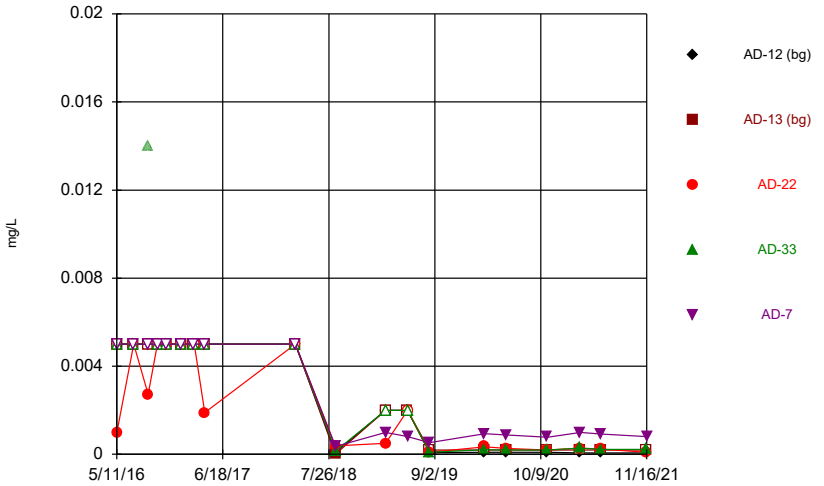
Time Series



Constituent: Fluoride, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

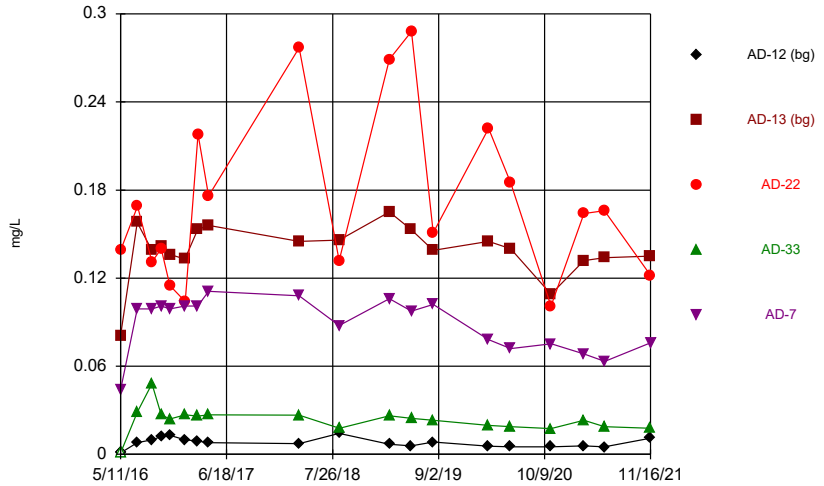
Time Series



Constituent: Lead, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

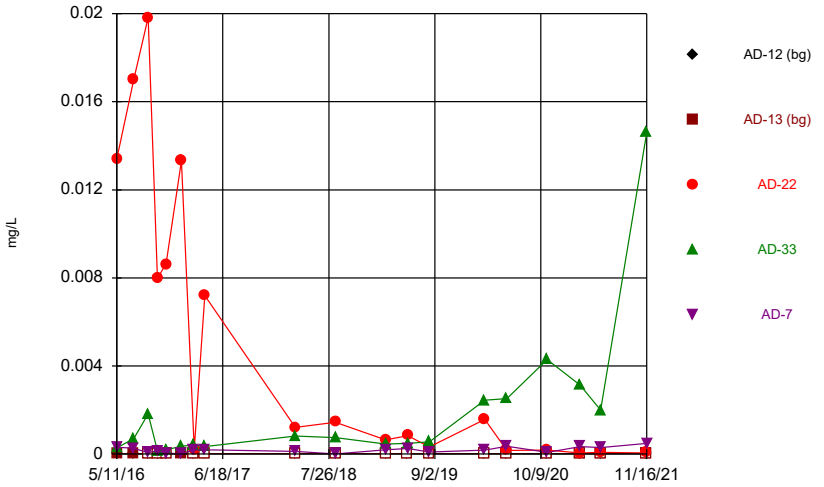
Time Series



Constituent: Lithium, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

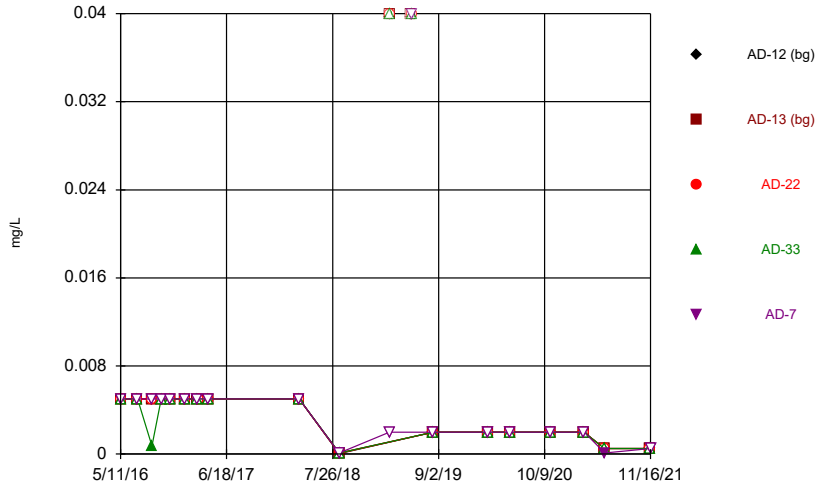
Time Series



Constituent: Mercury, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

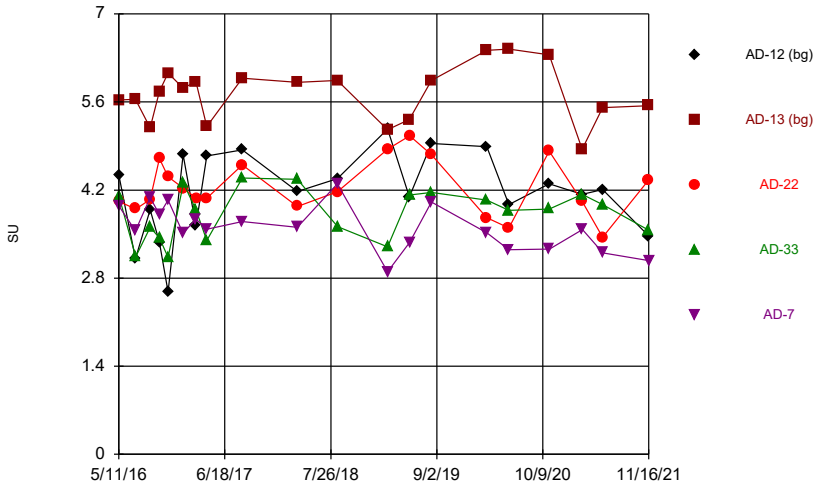
Time Series



Constituent: Molybdenum, total Analysis Run 1/25/2022 5:20 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Time Series



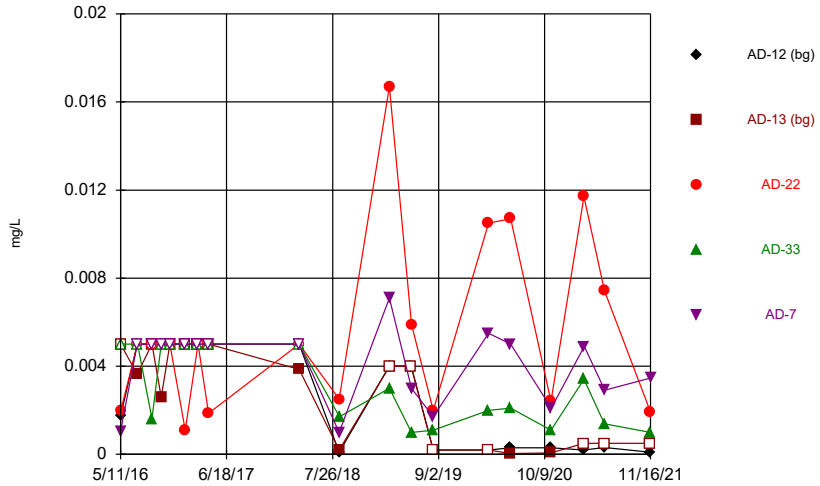
Constituent: pH, field Analysis Run 1/25/2022 5:20 PM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Hollow symbols indicate censored values.

Time Series

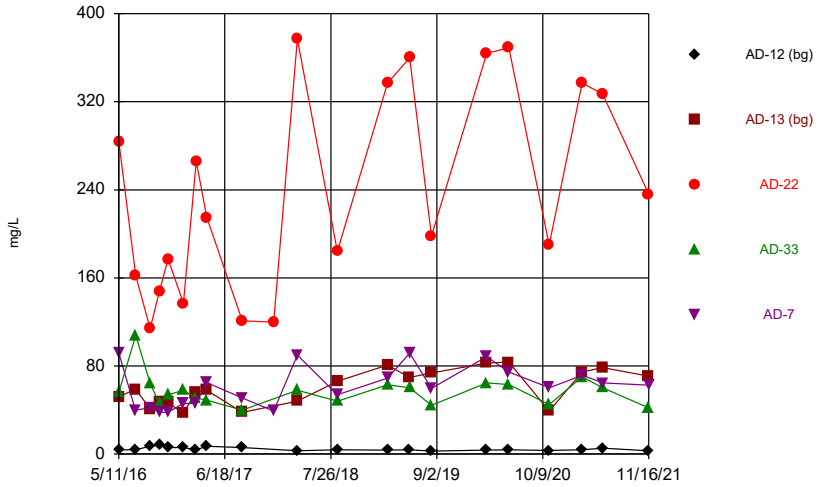


Constituent: Selenium, total Analysis Run 1/25/2022 5:20 PM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Time Series



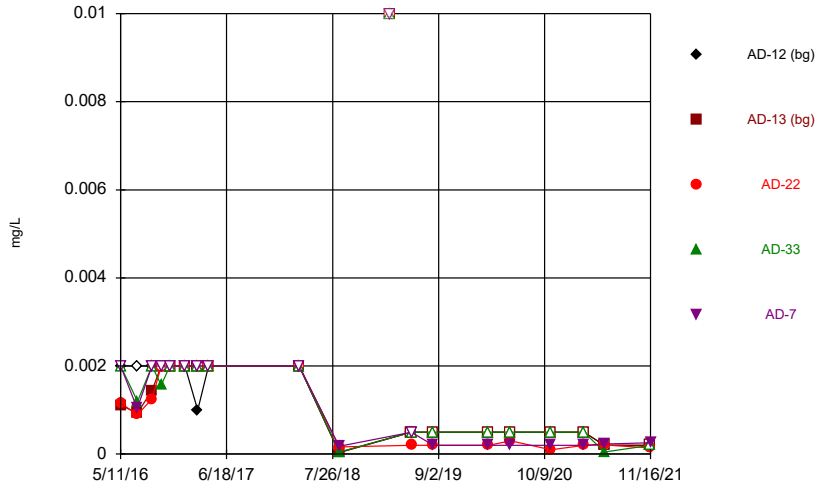
Constituent: Sulfate, total Analysis Run 1/25/2022 5:21 PM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Hollow symbols indicate censored values.

Time Series

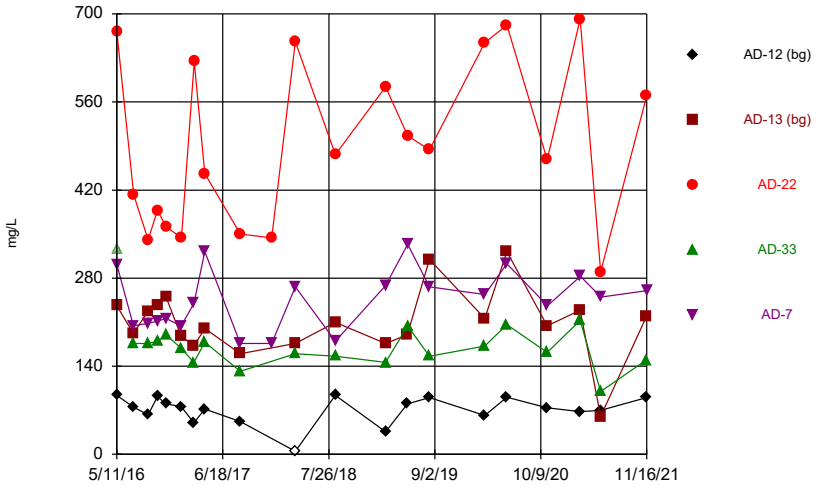


Constituent: Thallium, total Analysis Run 1/25/2022 5:21 PM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

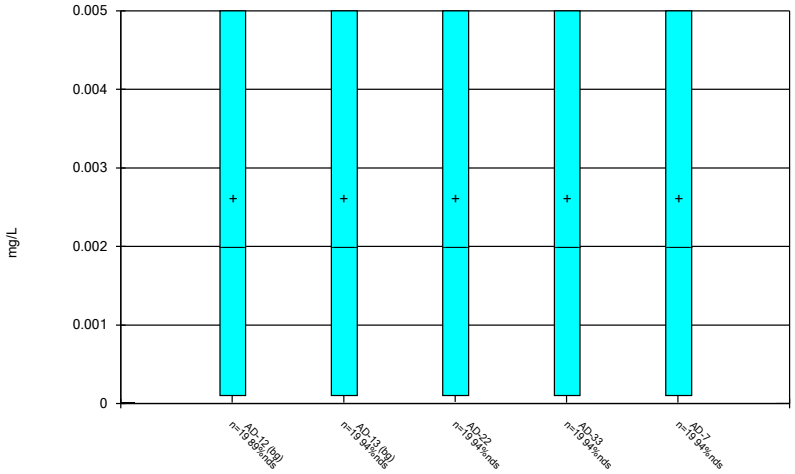
Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/25/2022 5:21 PM

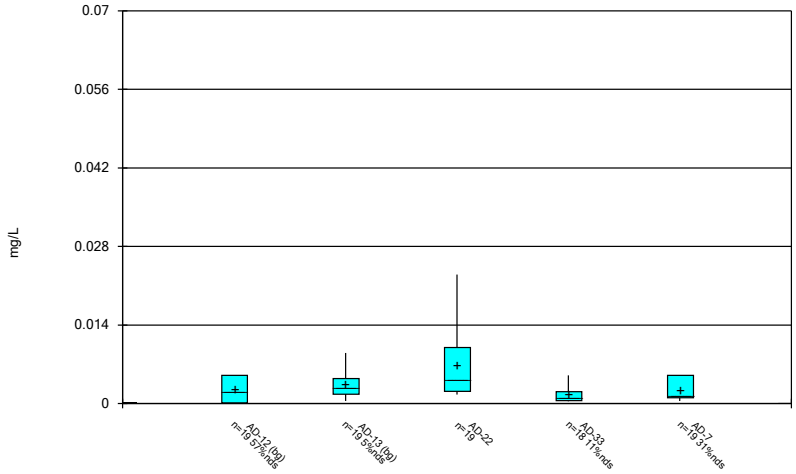
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



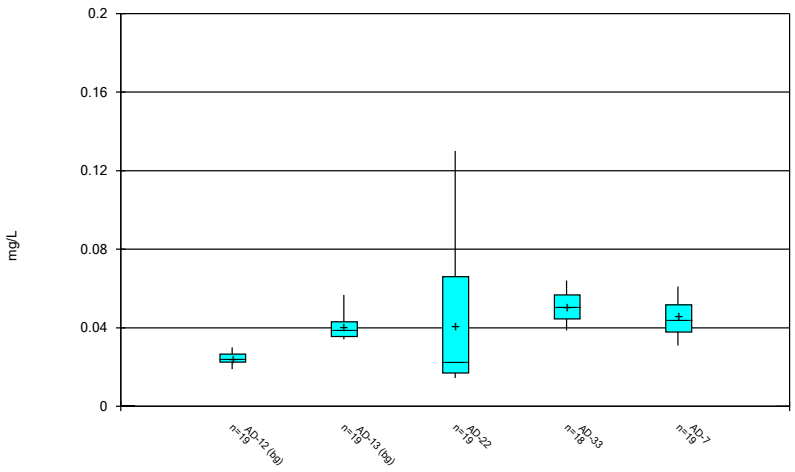
Constituent: Antimony, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



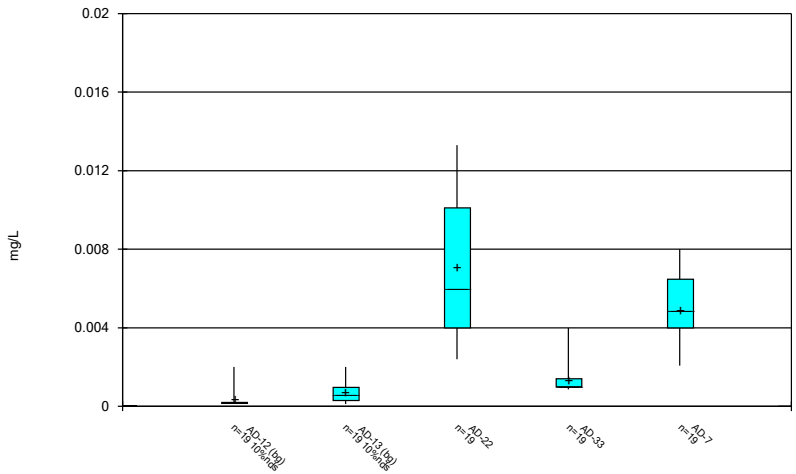
Constituent: Arsenic, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



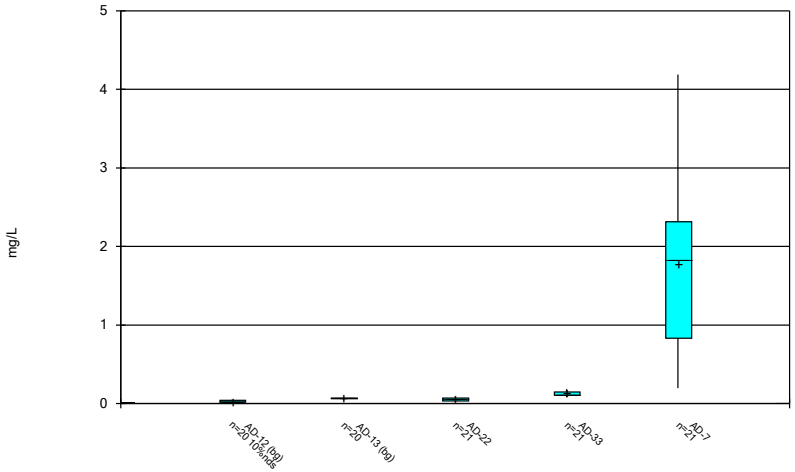
Constituent: Barium, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



Constituent: Beryllium, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

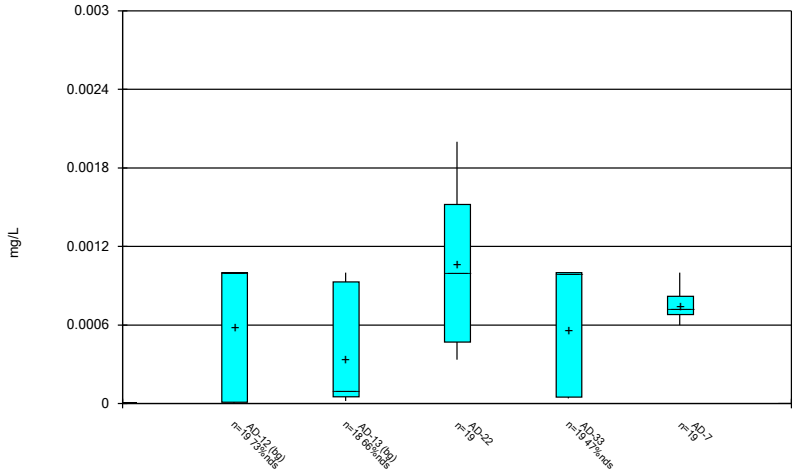
Box & Whiskers Plot



Constituent: Boron, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

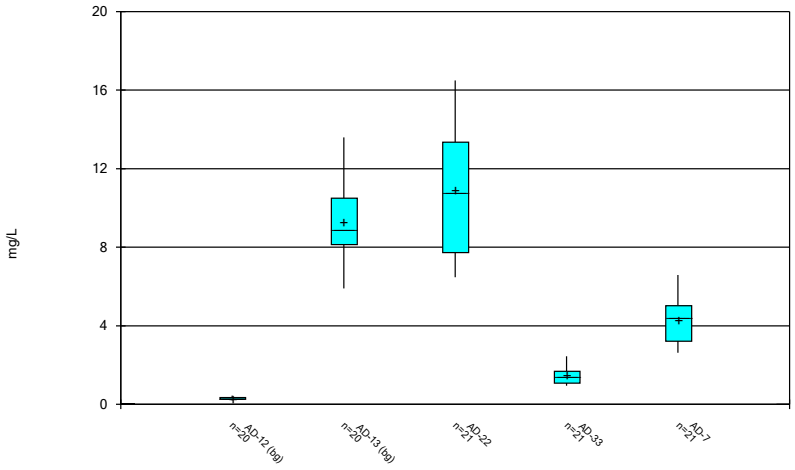
Box & Whiskers Plot



Constituent: Cadmium, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

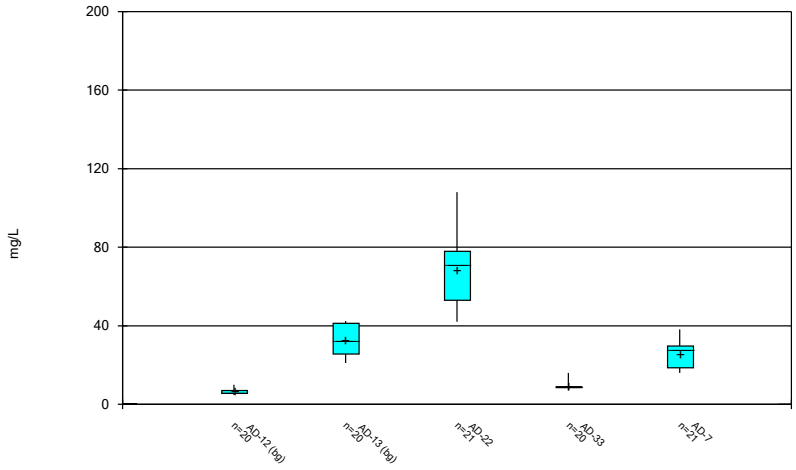
Box & Whiskers Plot



Constituent: Calcium, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

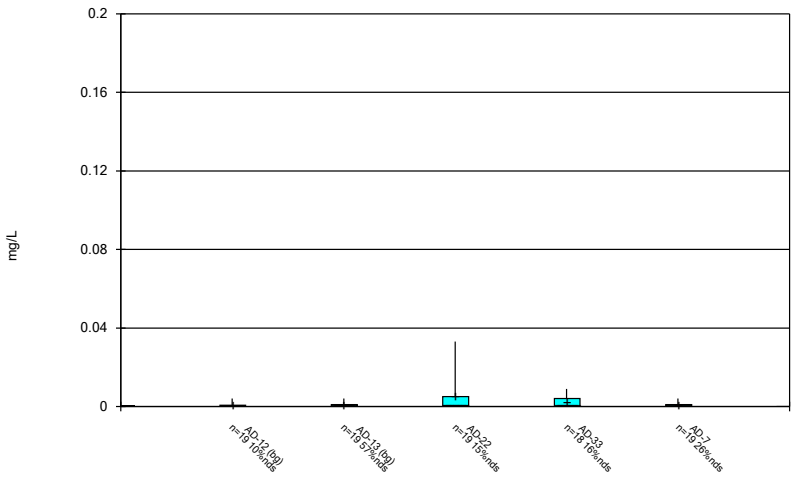
Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Box & Whiskers Plot



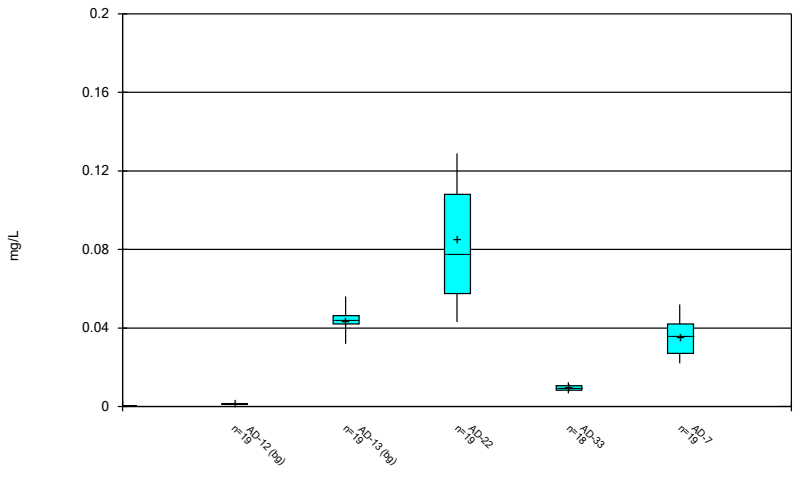
Constituent: Chloride, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



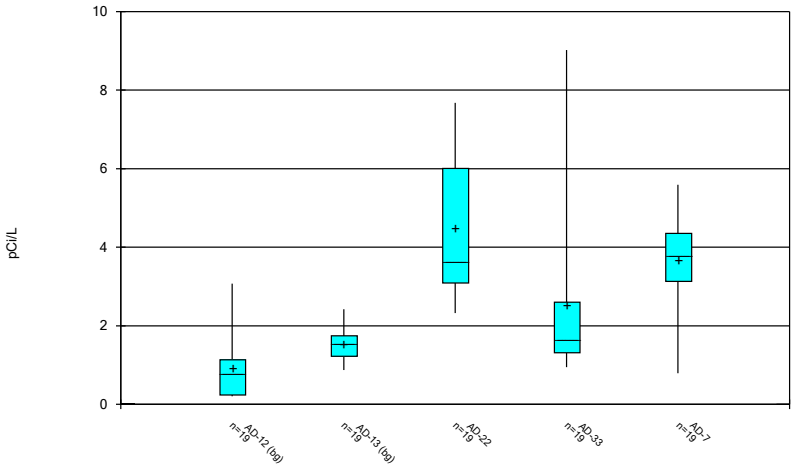
Constituent: Chromium, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



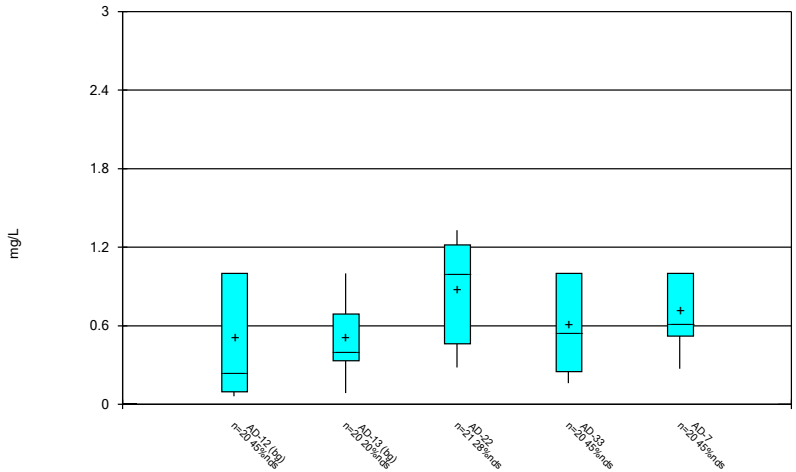
Constituent: Cobalt, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



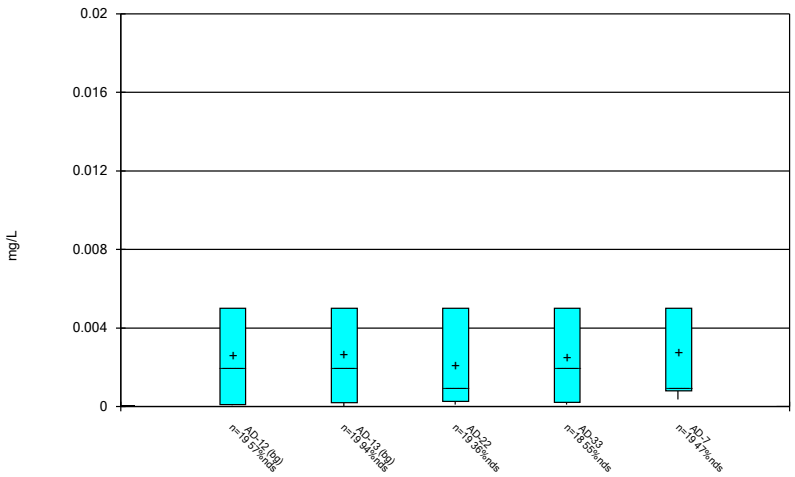
Constituent: Combined Radium 226 + 228 Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



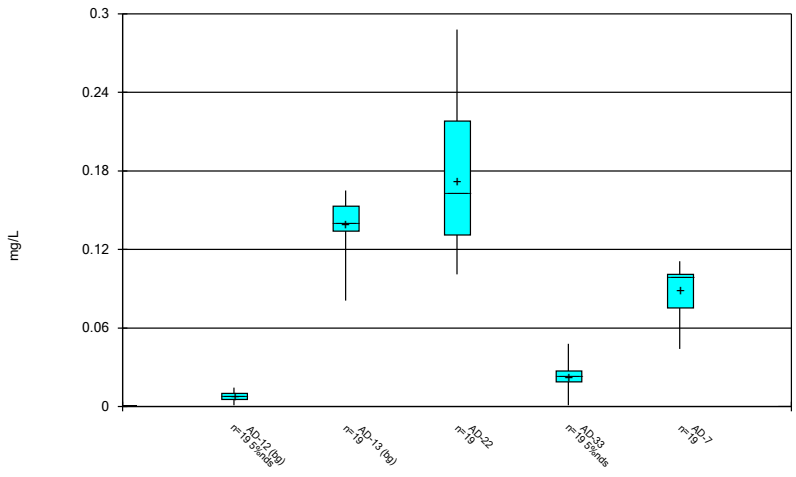
Constituent: Fluoride, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



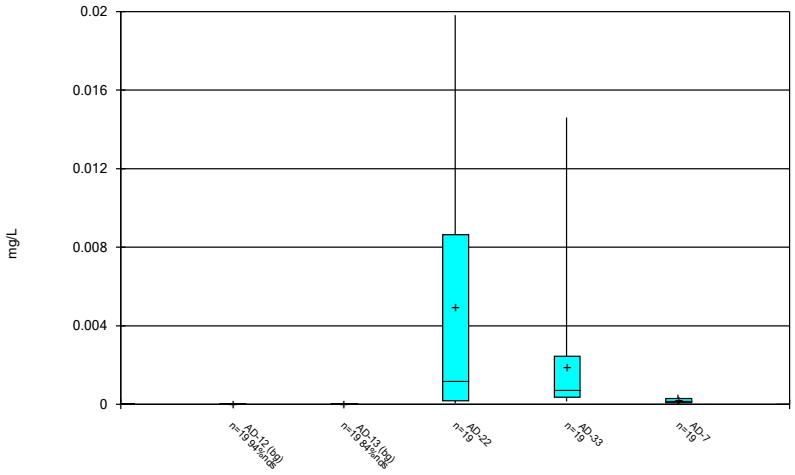
Constituent: Lead, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



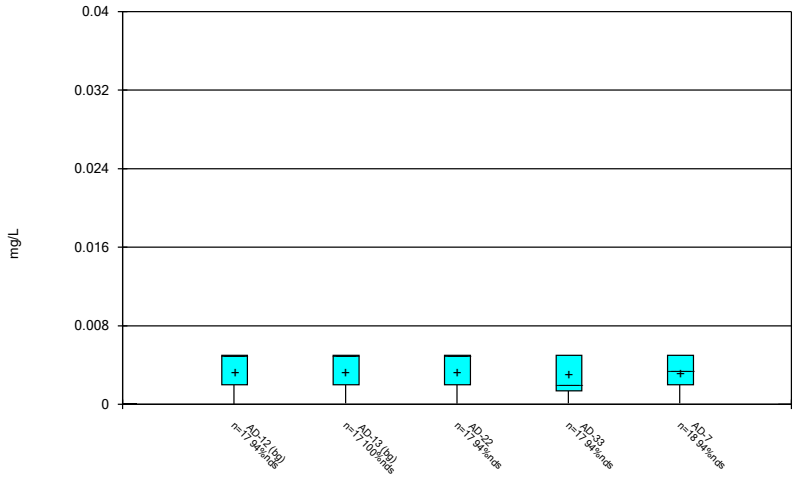
Constituent: Lithium, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



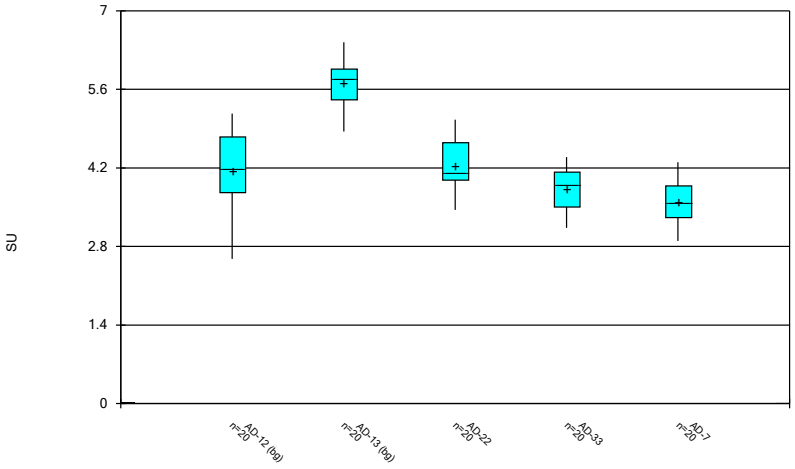
Constituent: Mercury, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



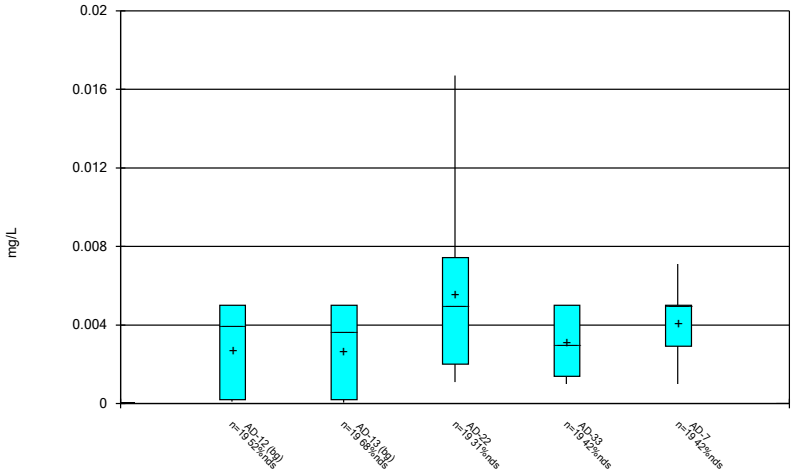
Constituent: Molybdenum, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



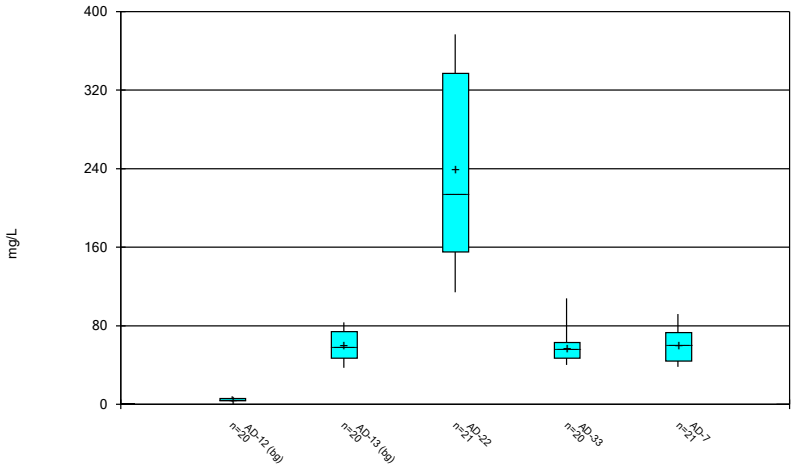
Constituent: pH, field Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



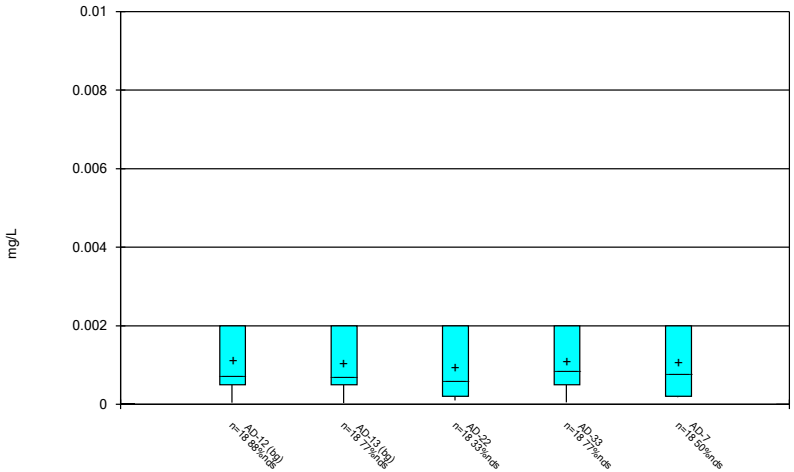
Constituent: Selenium, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



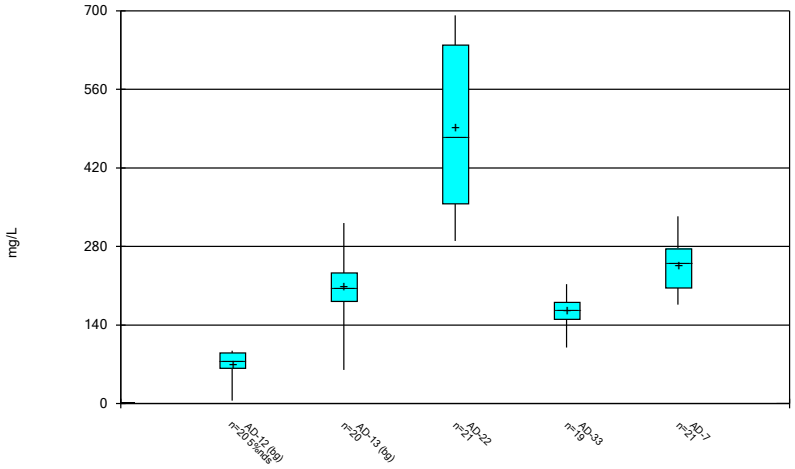
Constituent: Sulfate, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 1/25/2022 5:22 PM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/25/2022 5:22 PM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Outlier Summary

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/25/2022, 5:24 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)
5/11/2016										
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)	AD-33 Total Dissolved Solids [TDS] (mg/L)
5/11/2016								326 (o)
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)						

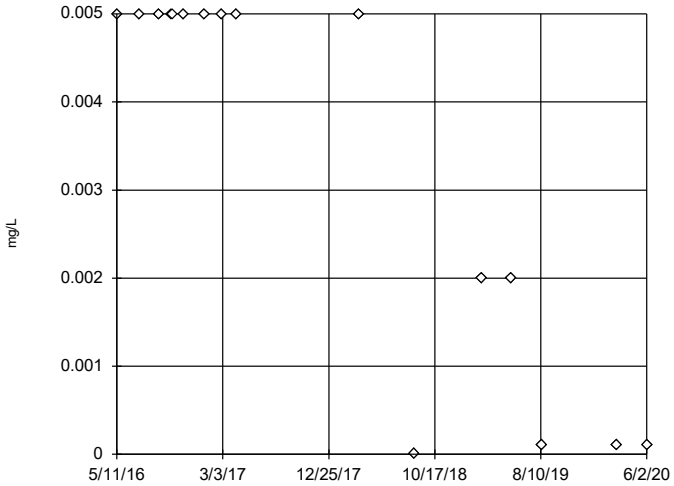
Tukey's Outlier Test - Upgradient Wells - All Results (No Significant)

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/27/2022, 9:25 AM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	NaN	30	0.003287	0.002212	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	30	0.003444	0.002231	normal	ShapiroWilk
Barium, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	30	0.03213	0.00837	x^(1/3)	ShapiroWilk
Beryllium, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	30	0.0006081	0.0006698	ln(x)	ShapiroWilk
Boron, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	32	0.04901	0.01906	normal	ShapiroWilk
Cadmium, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	NaN	30	0.0006391	0.0005169	unknown	ShapiroWilk
Chloride, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	32	18.9	13.78	sqrt(x)	ShapiroWilk
Chromium, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	30	0.001043	0.001231	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	30	0.02262	0.02193	x^3	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-12,AD-13	No	n/a	NP	NaN	30	1.238	0.7976	sqrt(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	32	0.5816	0.3805	x^(1/3)	ShapiroWilk
Lead, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	NaN	30	0.003299	0.002195	unknown	ShapiroWilk
Lithium, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	30	0.07517	0.06937	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	30	0.00002066	0.000007757	normal	ShapiroWilk
Molybdenum, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	NaN	30	0.008738	0.01257	unknown	ShapiroWilk
Selenium, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	30	0.003309	0.002065	x^2	ShapiroWilk
Sulfate, total (mg/L)	AD-12,AD-13	No	n/a	NP	NaN	32	31.74	29.51	normal	ShapiroWilk
Thallium, total (mg/L)	AD-12,AD-13	n/a	n/a	NP	NaN	30	0.001885	0.002324	unknown	ShapiroWilk

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 30

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

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

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

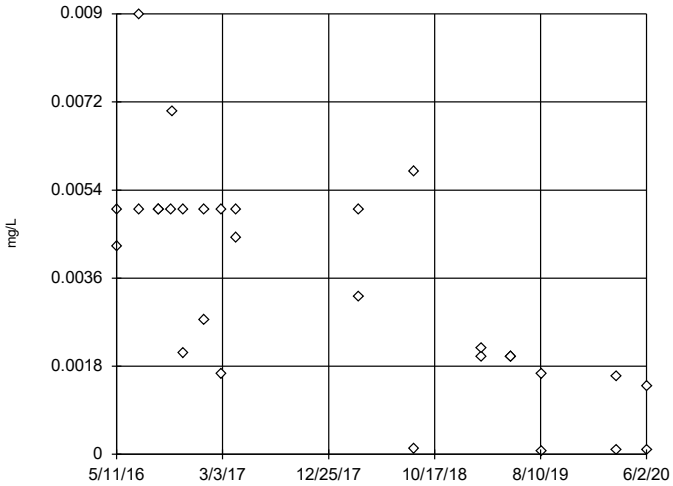
Constituent: Antimony, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 30

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.

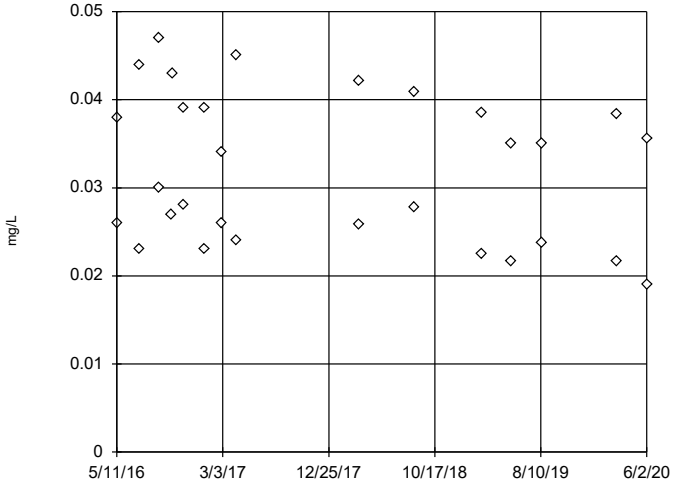
Constituent: Arsenic, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 30

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 = 0.1193, low cutoff = 0.002451, based on IQR multiplier of 3.

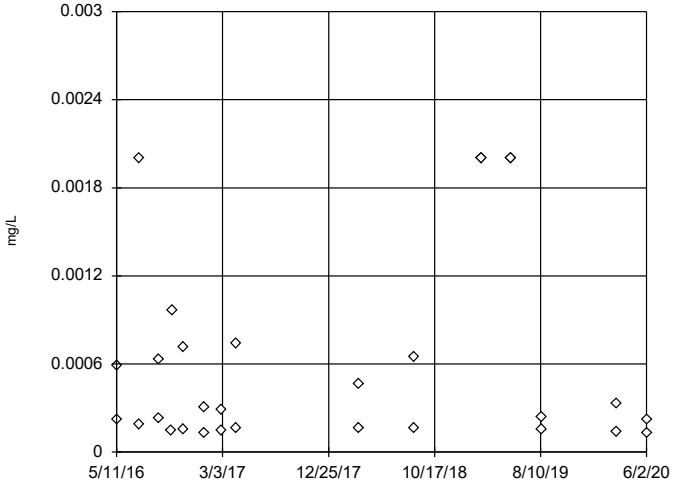
Constituent: Barium, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

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).

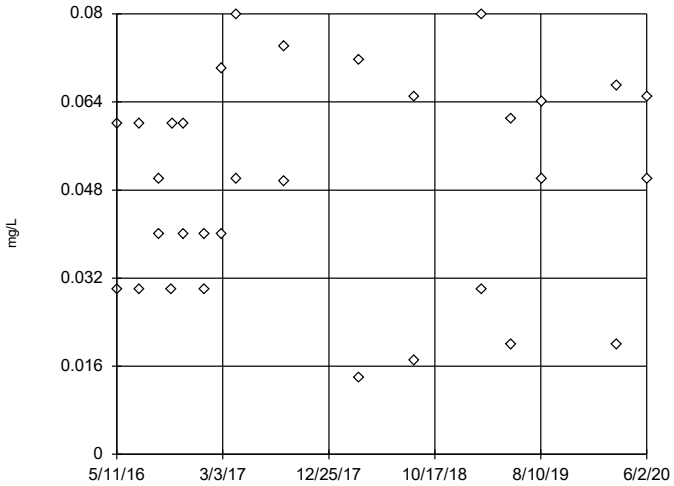
High cutoff = 0.07293, low cutoff = 0.00000156, based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 1/27/2022 9:24 AM View: Outliers

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 = 0.168, low cutoff = -0.0735, based on IQR multiplier of 3.

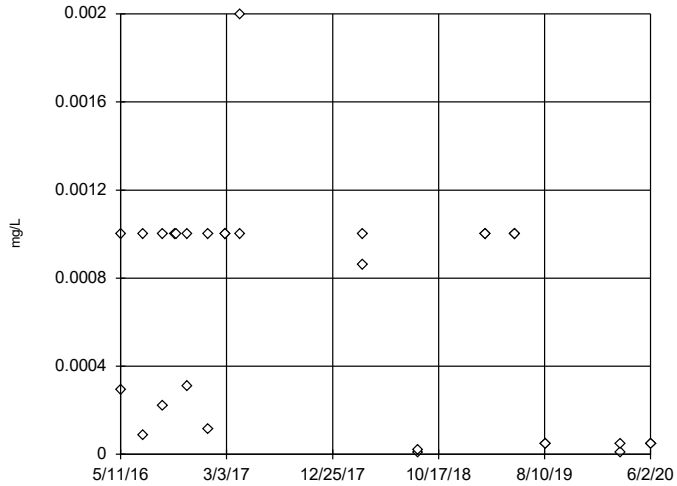
Constituent: Boron, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 30

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

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

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

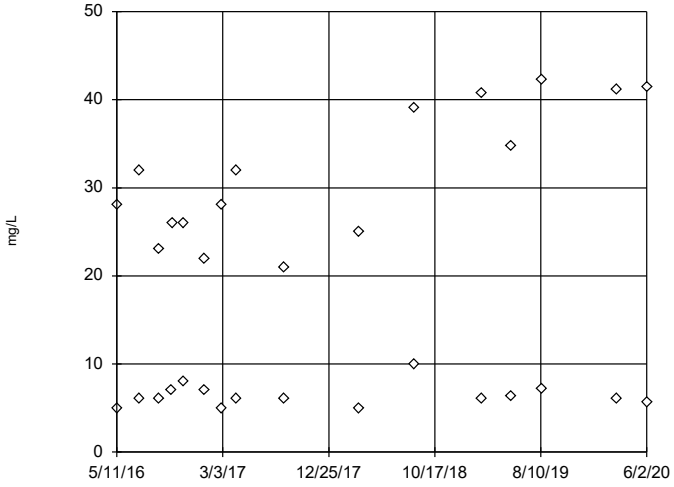
Constituent: Cadmium, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

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 = 210.9, low cutoff = -43.45, based on IQR multiplier of 3.

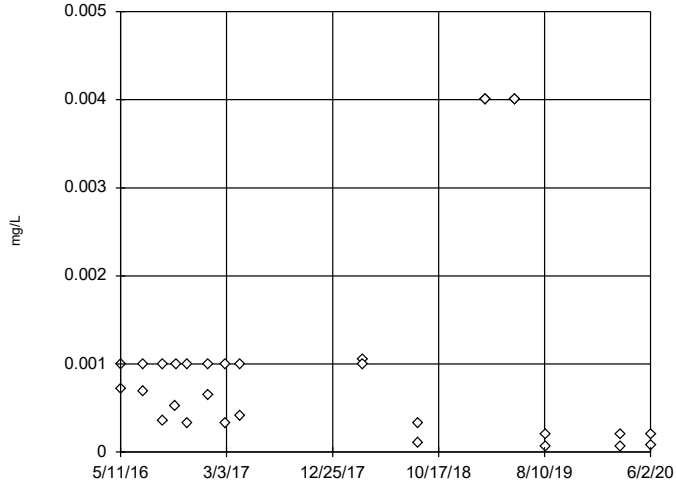
Constituent: Chloride, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

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).

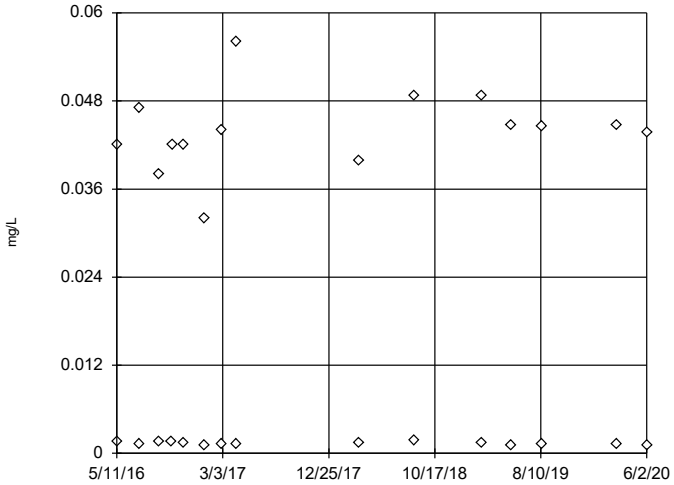
High cutoff = 0.05668, low cutoff = 0.000004593, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 1/27/2022 9:24 AM View: Outliers

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

High cutoff = 0.07024, low cutoff = -0.06382, based on IQR multiplier of 3.

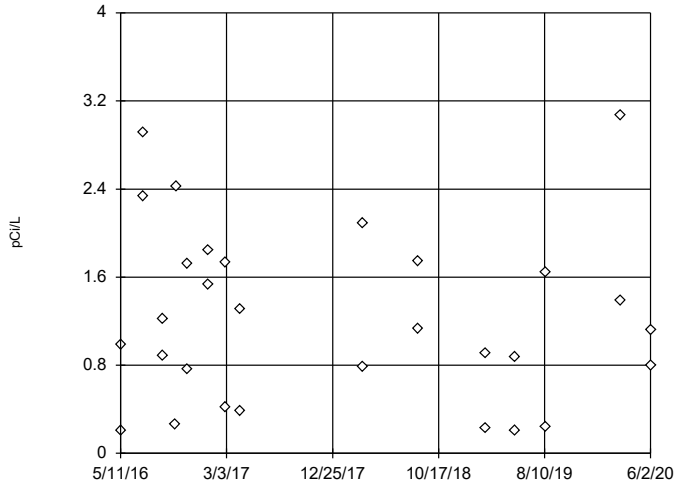
Constituent: Cobalt, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 30

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 = 8.917, low cutoff = -0.8261, based on IQR multiplier of 3.

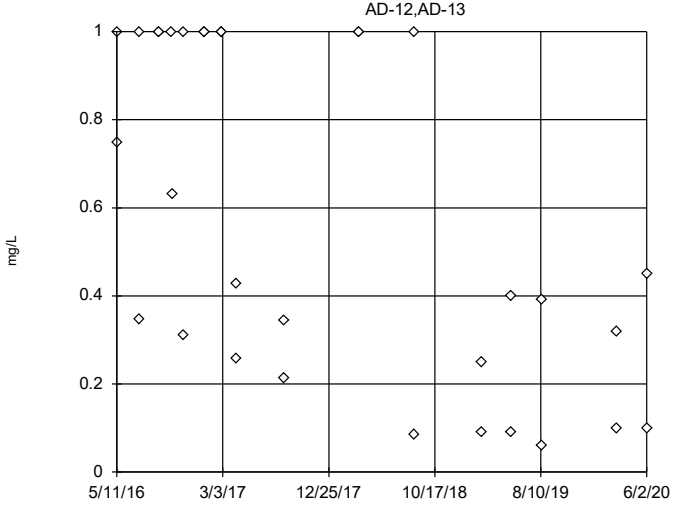
Constituent: Combined Radium 226 + 228 Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 32

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 = 9.287, low cutoff = -0.1034, based on IQR multiplier of 3.

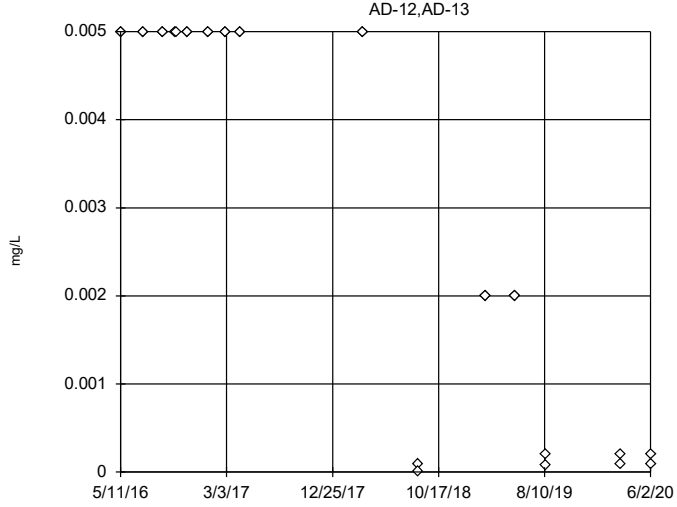
Constituent: Fluoride, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 30

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

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

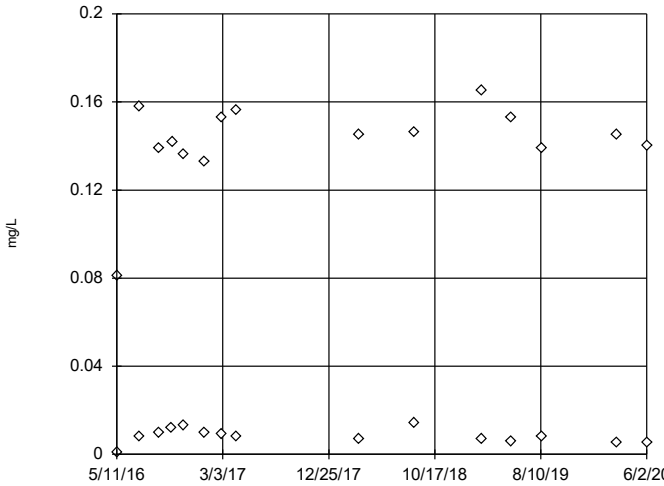
The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Lead, total Analysis Run 1/27/2022 9:24 AM View: Outliers

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).

High cutoff = 863.4, low cutoff = 0.000001344, based on IQR multiplier of 3.

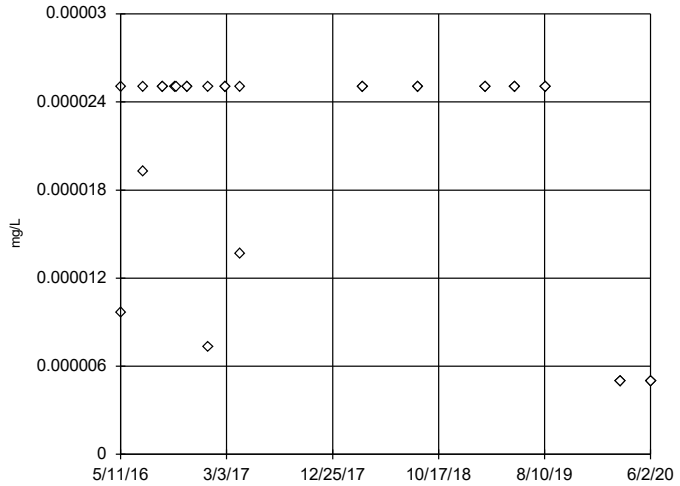
Constituent: Lithium, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 30

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

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

High cutoff = 0.00005062, low cutoff = -0.00000916, based on IQR multiplier of 3.

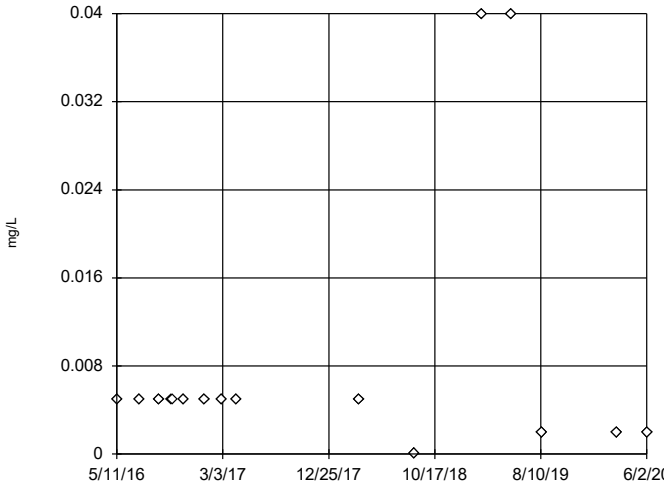
Constituent: Mercury, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

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.

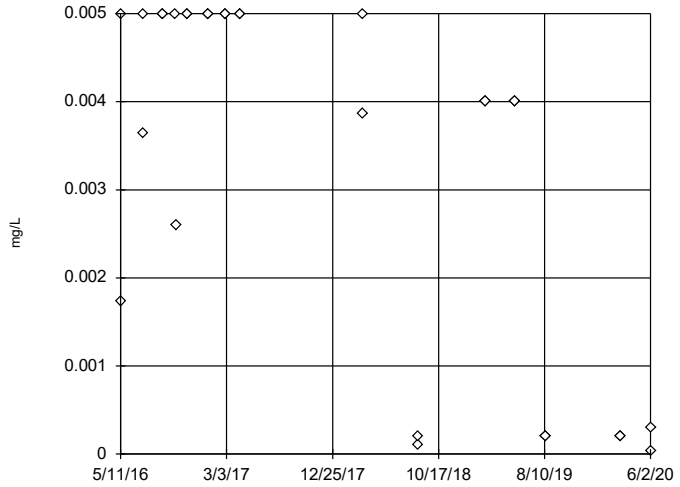
Constituent: Molybdenum, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 30

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

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

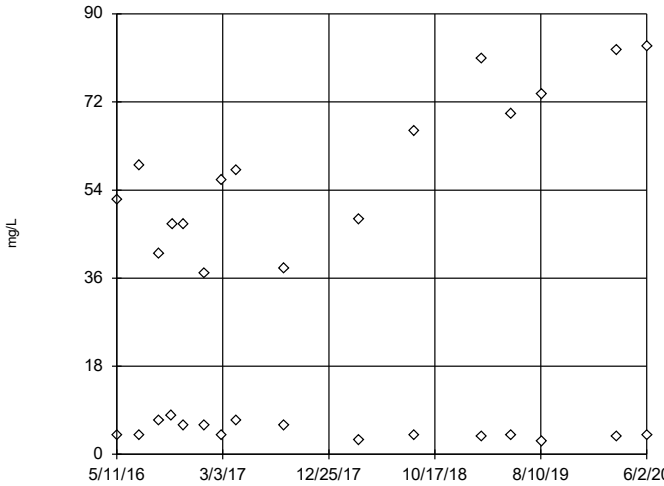
High cutoff = 0.00999, low cutoff = -0.008645, based on IQR multiplier of 3.

Constituent: Selenium, total Analysis Run 1/27/2022 9:24 AM View: Outliers

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 = 216, low cutoff = -155, based on IQR multiplier of 3.

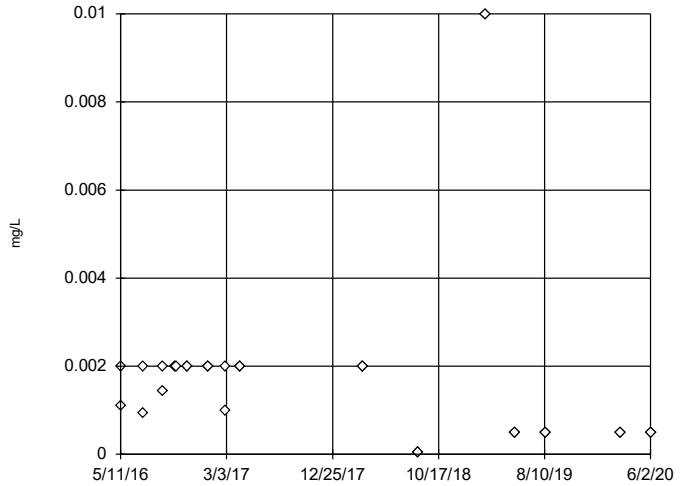
Constituent: Sulfate, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

AD-12,AD-13



n = 30

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

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

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

Constituent: Thallium, total Analysis Run 1/27/2022 9:24 AM View: Outliers

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality Summary Table - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 2/2/2022, 12:40 PM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Beryllium, total (mg/L)	**AD-22**	**Yes**	**9.925**	**3.841**	**1**	**19**	**0.05**
Boron, total (mg/L)	**AD-22**	**Yes**	**6.693**	**3.841**	**1**	**21**	**0.05**
Cadmium, total (mg/L)	**AD-22**	**Yes**	**7.266**	**3.841**	**1**	**19**	**0.05**
Calcium, total (mg/L)	**AD-22**	**Yes**	**7.552**	**3.841**	**1**	**21**	**0.05**
Cobalt, total (mg/L)	**AD-22**	**Yes**	**7.72**	**3.841**	**1**	**19**	**0.05**
Combined Radium 226 + 228 (pCi/L)	**AD-22**	**Yes**	**7.26**	**3.841**	**1**	**19**	**0.05**
Fluoride, total (mg/L)	**AD-22**	**Yes**	**5.869**	**3.841**	**1**	**21**	**0.05**
Lithium, total (mg/L)	**AD-22**	**Yes**	**5.227**	**3.841**	**1**	**19**	**0.05**
Sulfate, total (mg/L)	**AD-22**	**Yes**	**7.165**	**3.841**	**1**	**21**	**0.05**

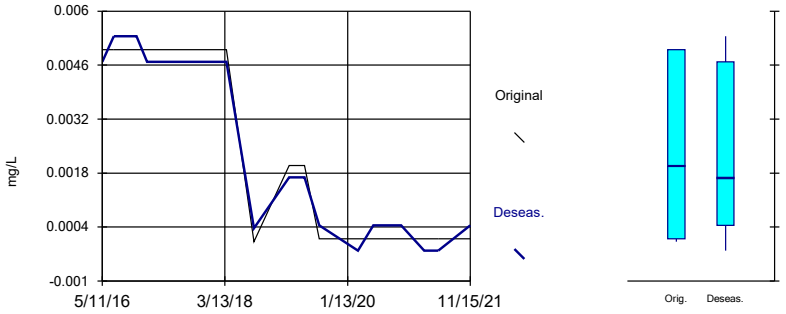
Seasonality Summary Table - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 2/2/2022, 12:40 PM

Constituent	Well	Sig.	K.-W.	Chi-Sq.	df	N	Alpha
Antimony, total (mg/L)	AD-22	No	0.6393	3.841	1	19	0.05
Arsenic, total (mg/L)	AD-22	No	0.0417	3.841	1	19	0.05
Barium, total (mg/L)	AD-22	No	0.02667	3.841	1	19	0.05
Beryllium, total (mg/L)	**AD-22**	**Yes**	**9.925**	**3.841**	**1**	**19**	**0.05**
Boron, total (mg/L)	**AD-22**	**Yes**	**6.693**	**3.841**	**1**	**21**	**0.05**
Cadmium, total (mg/L)	**AD-22**	**Yes**	**7.266**	**3.841**	**1**	**19**	**0.05**
Calcium, total (mg/L)	**AD-22**	**Yes**	**7.552**	**3.841**	**1**	**21**	**0.05**
Chloride, total (mg/L)	AD-22	No	0.04466	3.841	1	21	0.05
Chromium, total (mg/L)	AD-22	No	0.2824	3.841	1	19	0.05
Cobalt, total (mg/L)	**AD-22**	**Yes**	**7.72**	**3.841**	**1**	**19**	**0.05**
Combined Radium 226 + 228 (pCi/L)	**AD-22**	**Yes**	**7.26**	**3.841**	**1**	**19**	**0.05**
Fluoride, total (mg/L)	**AD-22**	**Yes**	**5.869**	**3.841**	**1**	**21**	**0.05**
Lead, total (mg/L)	AD-22	No	0.4969	3.841	1	19	0.05
Lithium, total (mg/L)	**AD-22**	**Yes**	**5.227**	**3.841**	**1**	**19**	**0.05**
Mercury, total (mg/L)	AD-22	No	0.1667	3.841	1	19	0.05
Molybdenum, total (mg/L)	AD-22	No	0.6296	3.841	1	17	0.05
pH, field (SU)	AD-22	No	0.9672	3.841	1	20	0.05
Selenium, total (mg/L)	AD-22	No	0.6878	3.841	1	19	0.05
Sulfate, total (mg/L)	**AD-22**	**Yes**	**7.165**	**3.841**	**1**	**21**	**0.05**
Thallium, total (mg/L)	AD-22	No	1.177	3.841	1	18	0.05
Total Dissolved Solids [TDS] (mg/L)	AD-22	No	2.512	3.841	1	21	0.05

Seasonality: AD-22

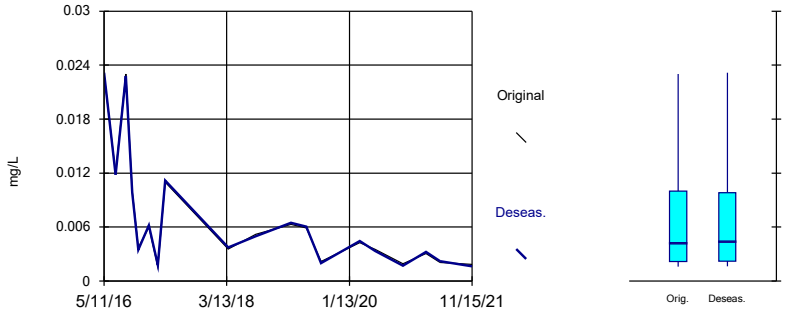
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 0.6393
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) = 0.54
Adjusted Kruskal-Wallis statistic (H') = 0.6393



Constituent: Antimony, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

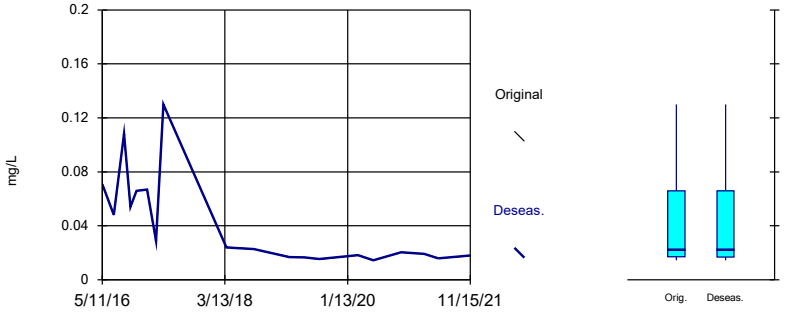
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 0.0417
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) = 0.04167
Adjusted Kruskal-Wallis statistic (H') = 0.0417



Constituent: Arsenic, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

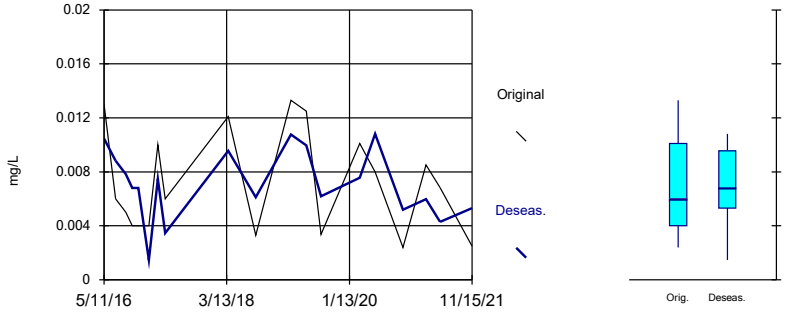
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 0.02667
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 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

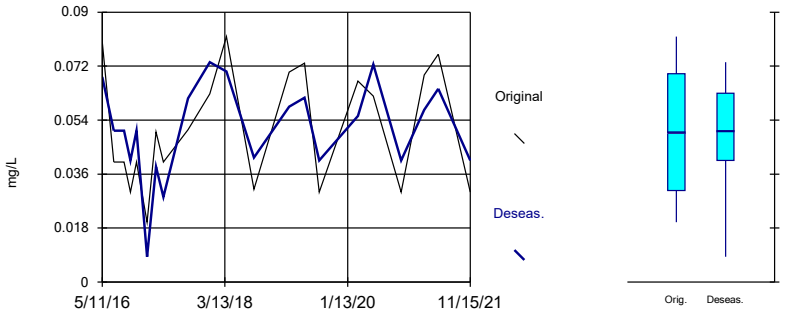
For the selected data, the Kruskal-Wallis test indicates SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 9.925
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) = 9.882
Adjusted Kruskal-Wallis statistic (H') = 9.925



Constituent: Beryllium, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

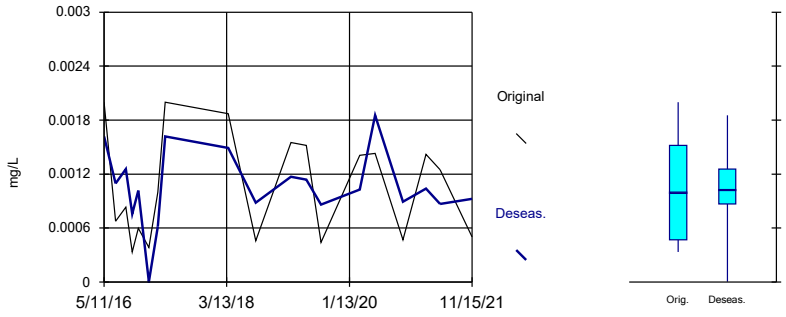
For the selected data, the Kruskal-Wallis test indicates SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 6.693
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) = 6.606
Adjusted Kruskal-Wallis statistic (H') = 6.693



Constituent: Boron, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

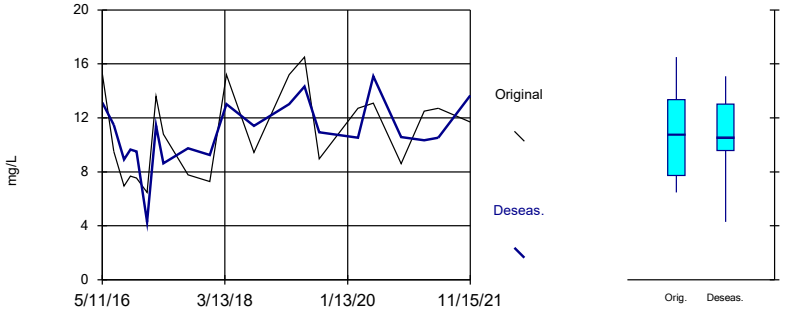
For the selected data, the Kruskal-Wallis test indicates SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 7.266
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) = 7.26
Adjusted Kruskal-Wallis statistic (H') = 7.266



Constituent: Cadmium, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

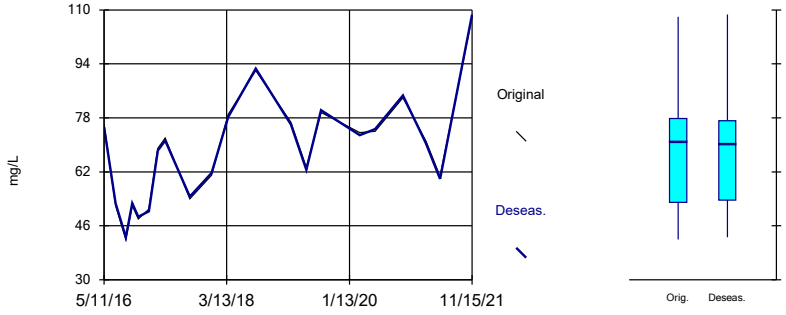
For the selected data, the Kruskal-Wallis test indicates SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 7.552
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) = 7.542
Adjusted Kruskal-Wallis statistic (H') = 7.552



Constituent: Calcium, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

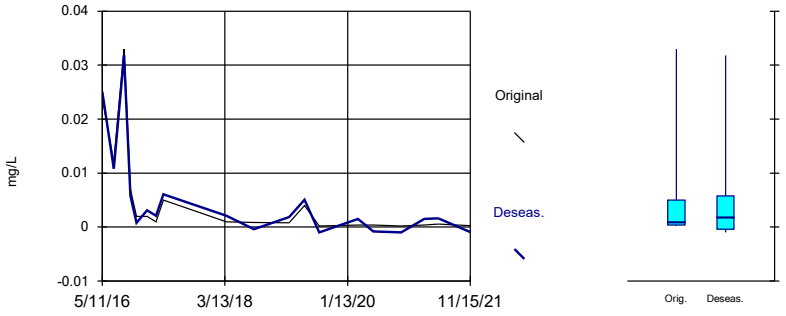
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 0.04466
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) = 0.04463
Adjusted Kruskal-Wallis statistic (H') = 0.04466



Constituent: Chloride, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

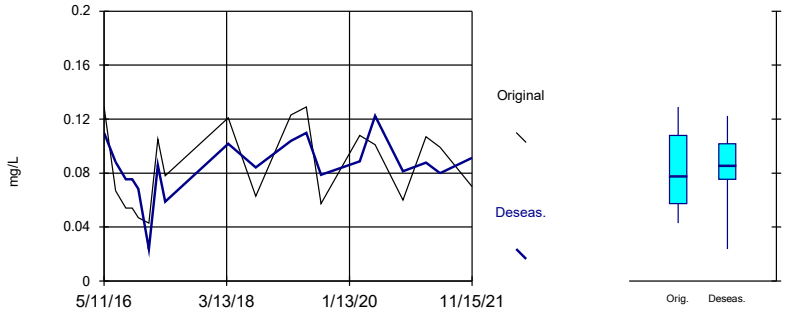
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 0.2824
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) = 0.2817
Adjusted Kruskal-Wallis statistic (H') = 0.2824



Constituent: Chromium, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

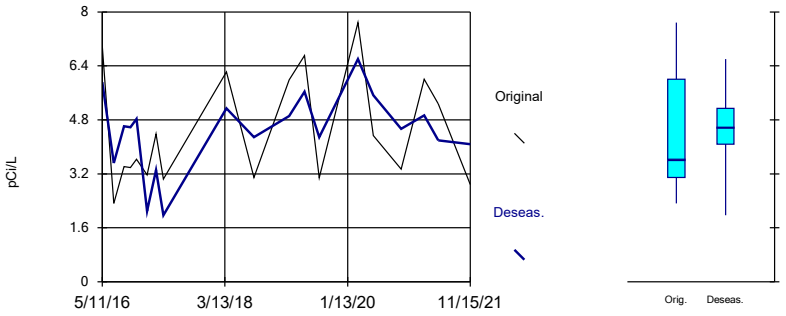
For the selected data, the Kruskal-Wallis test indicates SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 7.72
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) = 7.707
Adjusted Kruskal-Wallis statistic (H') = 7.72



Constituent: Cobalt, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

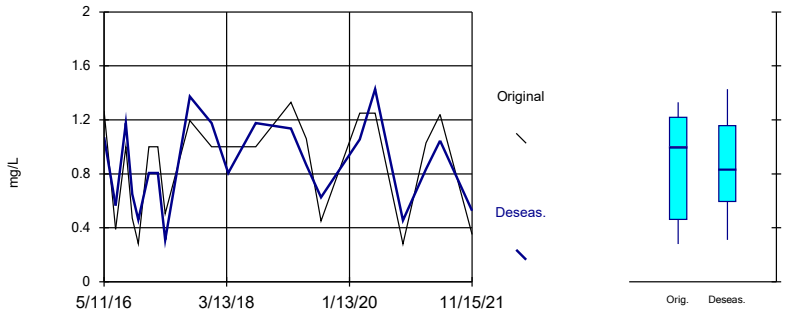
For the selected data, the Kruskal-Wallis test indicates SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 7.26
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 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

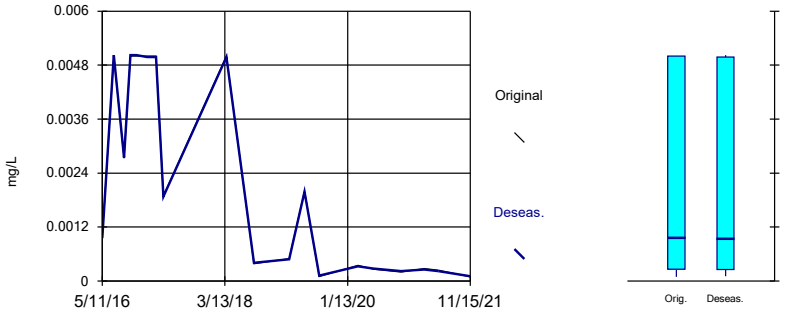
For the selected data, the Kruskal-Wallis test indicates SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 5.869
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) = 5.732
Adjusted Kruskal-Wallis statistic (H') = 5.869



Constituent: Fluoride, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

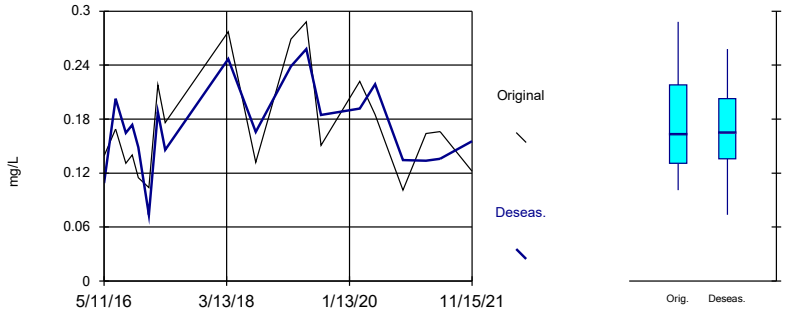
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 0.4969
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) = 0.4817
Adjusted Kruskal-Wallis statistic (H') = 0.4969



Constituent: Lead, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

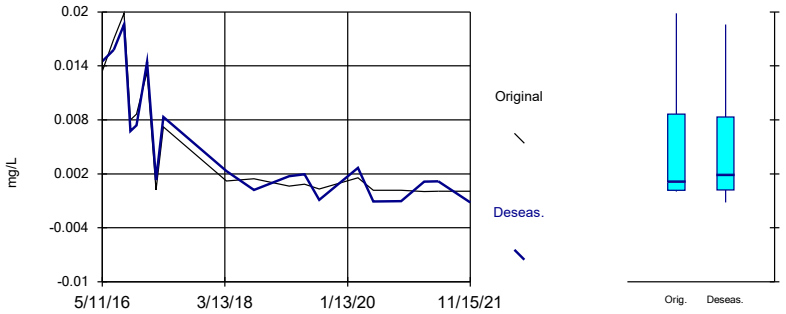
For the selected data, the Kruskal-Wallis test indicates SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 5.227
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 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

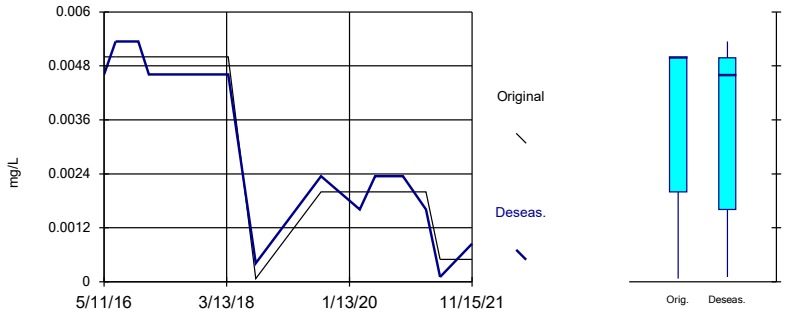
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 0.1667
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 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

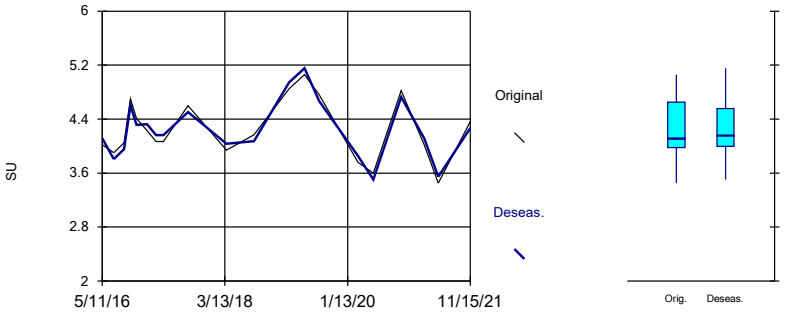
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 0.6296
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) = 0.5208
Adjusted Kruskal-Wallis statistic (H') = 0.6296



Constituent: Molybdenum, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat 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 = 0.9672
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) = 0.9657
Adjusted Kruskal-Wallis statistic (H') = 0.9672

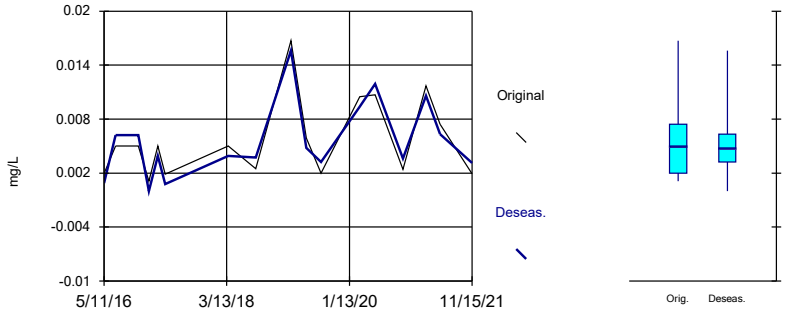


Constituent: pH, field Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat 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 = 0.6878
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) = 0.6667
Adjusted Kruskal-Wallis statistic (H') = 0.6878

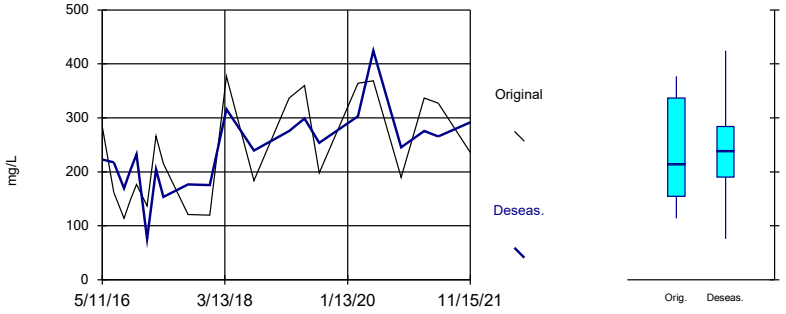


Constituent: Selenium, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates SEASONALITYat 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 = 7.165
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) = 7.16
Adjusted Kruskal-Wallis statistic (H') = 7.165

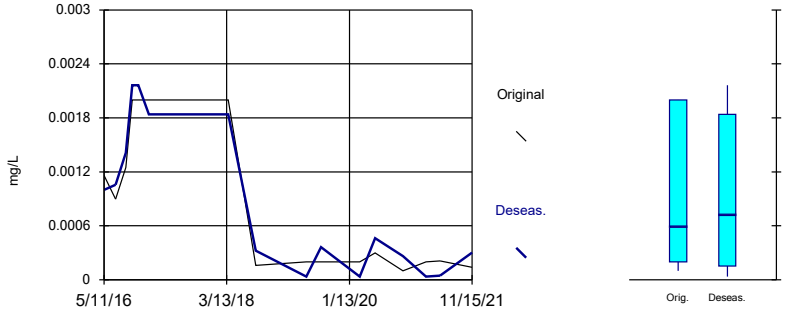


Constituent: Sulfate, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Seasonality: AD-22

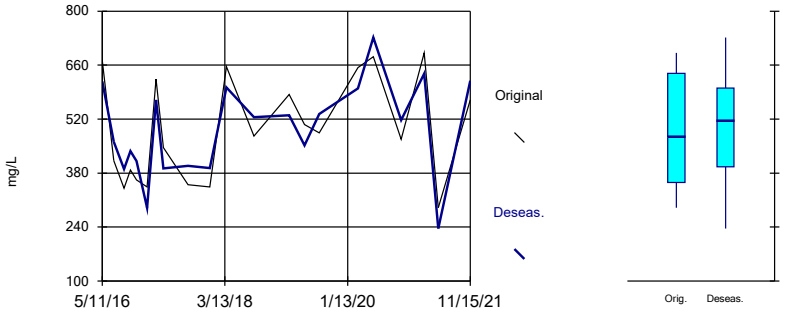
For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat the 5% significance level. Because the calculated Kruskal-Wallis statistic is less than or equal to the Chi-squared value, we conclude that no season has a significantly different median concentration of this constituent than any other season.
Calculated Kruskal-Wallis statistic = 1.177
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) = 1.123
Adjusted Kruskal-Wallis statistic (H') = 1.177



Constituent: Thallium, total Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Seasonality: AD-22

For the selected data, the Kruskal-Wallis test indicates NO SEASONALITYat 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 = 2.512
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) = 2.51
Adjusted Kruskal-Wallis statistic (H') = 2.512



Constituent: Total Dissolved Solids [TDS] Analysis Run 2/2/2022 12:39 PM View: Seasonality
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

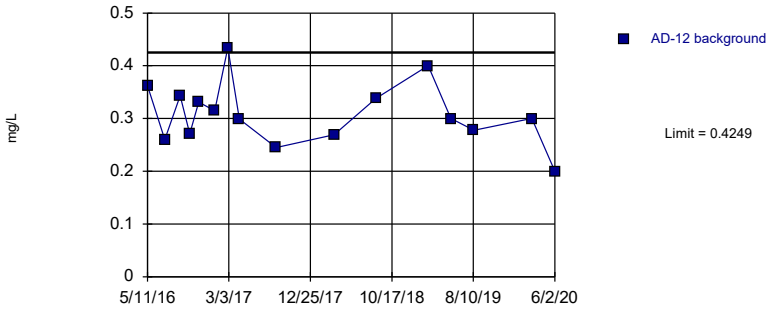
Intrawell Prediction Limits - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/27/2022, 12:02 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium, total (mg/L)	AD-12	0.4249	n/a	n/a	1 future	n/a	16	0.3091	0.05881	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-13	11.74	n/a	n/a	1 future	n/a	16	8.986	1.396	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-22	17.55	n/a	n/a	1 future	n/a	17	10.82	3.451	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-33	2.175	n/a	n/a	1 future	n/a	17	1.458	0.3676	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-7	6.55	n/a	n/a	1 future	n/a	17	4.252	1.178	0	None	No	0.002505	Param Intra 1 of 2
pH, field (SU)	AD-12	5.63	2.743	n/a	1 future	n/a	16	4.186	0.7328	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-13	6.554	4.99	n/a	1 future	n/a	16	5.772	0.3969	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-22	5.093	3.431	n/a	1 future	n/a	16	4.262	0.4219	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-33	4.662	2.952	n/a	1 future	n/a	16	3.807	0.434	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-7	4.375	2.99	n/a	1 future	n/a	16	3.683	0.3514	0	None	No	0.001253	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	AD-12	104.3	n/a	n/a	1 future	n/a	16	5390	2789	6.25	None	x^2	0.002505	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	AD-13	311.2	n/a	n/a	1 future	n/a	16	14.64	1.525	0	None	sqrt(x)	0.002505	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	AD-22	682	n/a	n/a	1 future	n/a	17	n/a	n/a	0	n/a	n/a	0.005914	NP Intra (normality) 1 of 2
Total Dissolved Solids [TDS] (mg/L)	AD-33	211.9	n/a	n/a	1 future	n/a	15	169.7	21.02	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	AD-7	343.3	n/a	n/a	1 future	n/a	17	243	51.43	0	None	No	0.002505	Param Intra 1 of 2

Prediction Limit

Intrawell Parametric, AD-12 (bg)



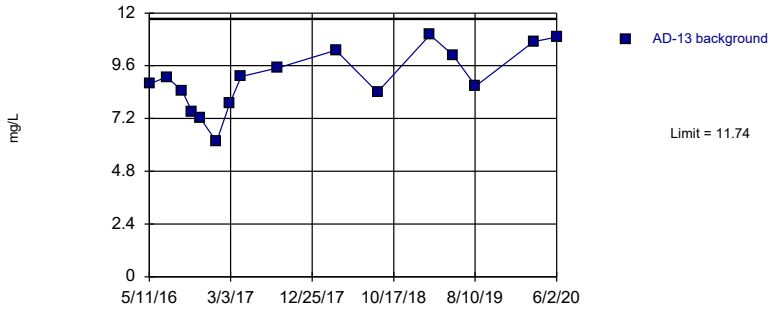
Background Data Summary: Mean=0.3091, Std. Dev.=0.05881, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9788, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, AD-13 (bg)



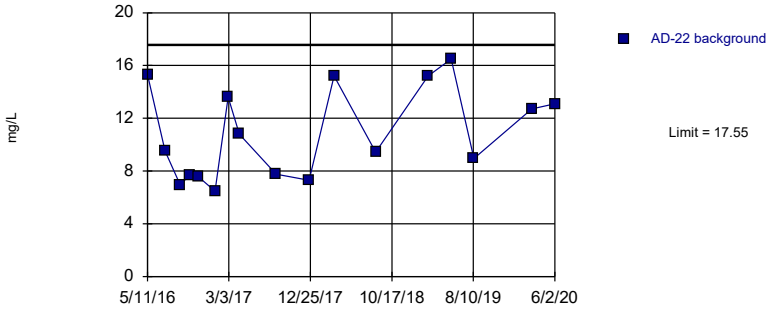
Background Data Summary: Mean=8.986, Std. Dev.=1.396, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9675, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, AD-22



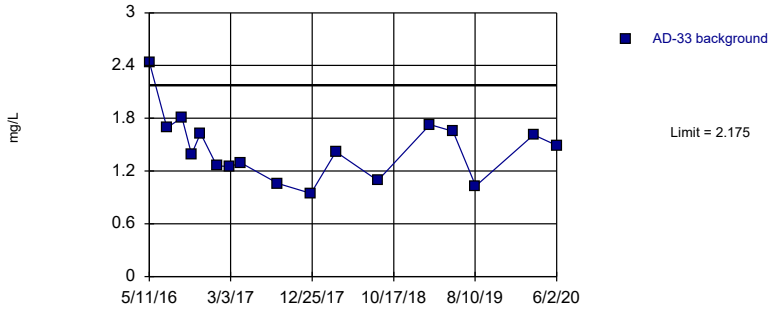
Background Data Summary: Mean=10.82, Std. Dev.=3.451, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8952, critical = 0.892. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, AD-33

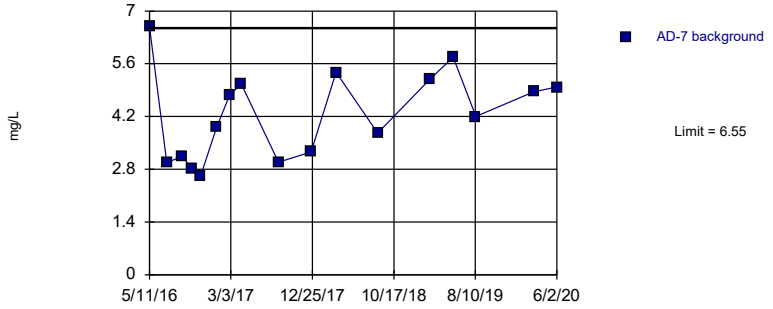


Background Data Summary: Mean=1.458, Std. Dev.=0.3676, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9269, critical = 0.892. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Prediction Limit

Intrawell Parametric, AD-7



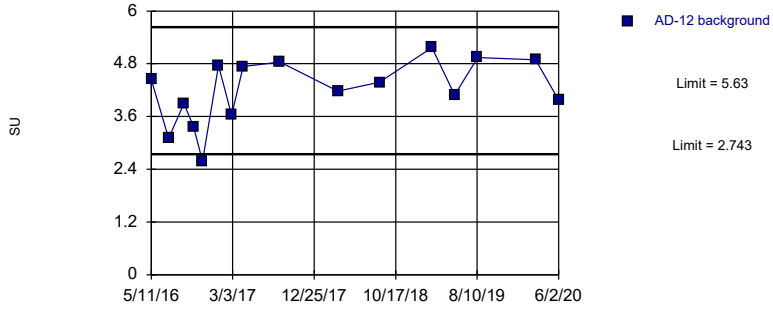
Background Data Summary: Mean=4.252, Std. Dev.=1.178, n=17. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9417, critical = 0.892. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, AD-12 (bg)



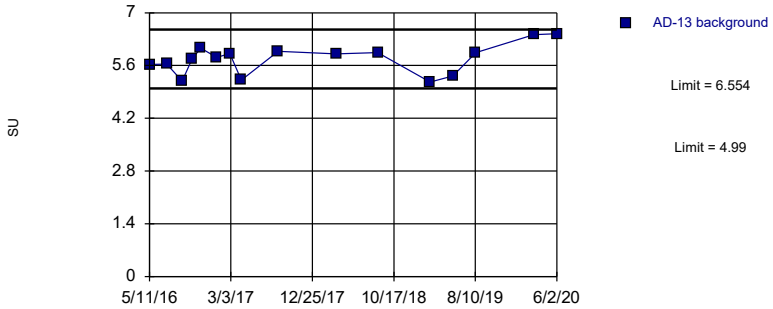
Background Data Summary: Mean=4.186, Std. Dev.=0.7328, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.944, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, AD-13 (bg)



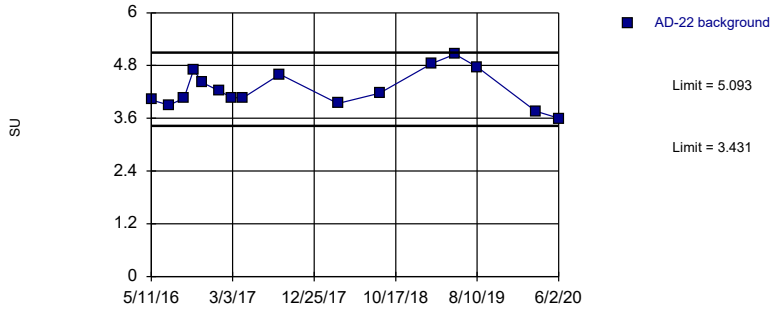
Background Data Summary: Mean=5.772, Std. Dev.=0.3969, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9266, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, AD-22

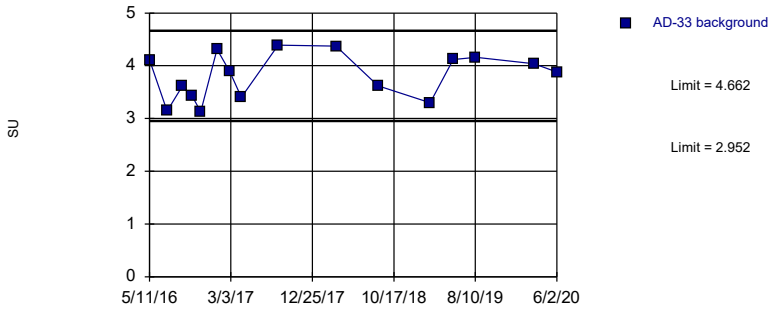


Background Data Summary: Mean=4.262, Std. Dev.=0.4219, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9498, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Prediction Limit

Intrawell Parametric, AD-33

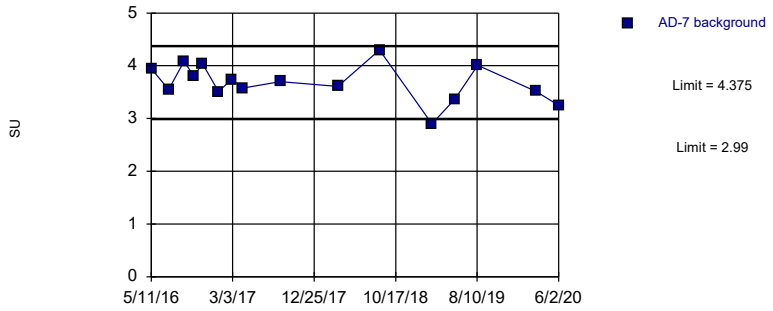


Background Data Summary: Mean=3.807, Std. Dev.=0.434, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.926, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Prediction Limit

Intrawell Parametric, AD-7



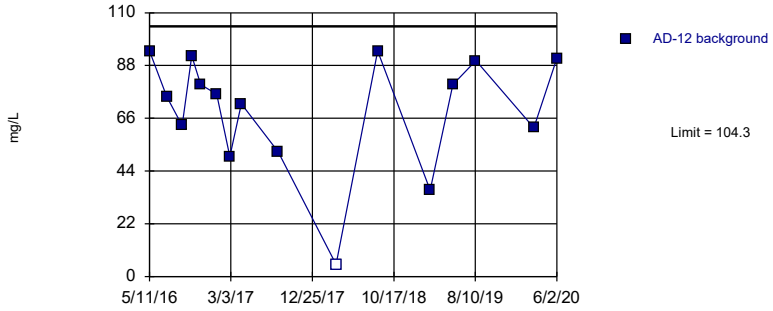
Background Data Summary: Mean=3.683, Std. Dev.=0.3514, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9786, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Hollow symbols indicate censored values.

Prediction Limit

Intrawell Parametric, AD-12 (bg)

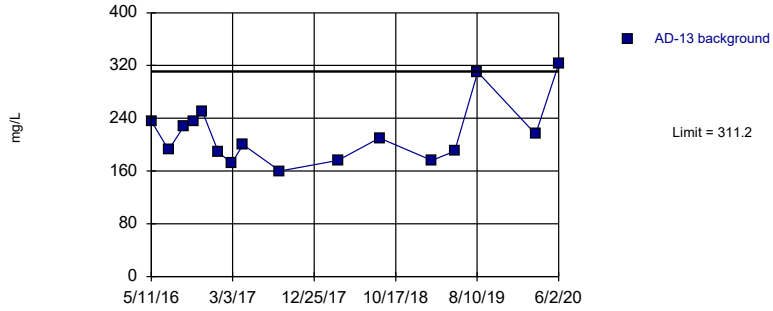


Background Data Summary (based on square transformation): Mean=5390, Std. Dev.=2789, n=16, 6.25% NDs. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9367, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Prediction Limit

Intrawell Parametric, AD-13 (bg)

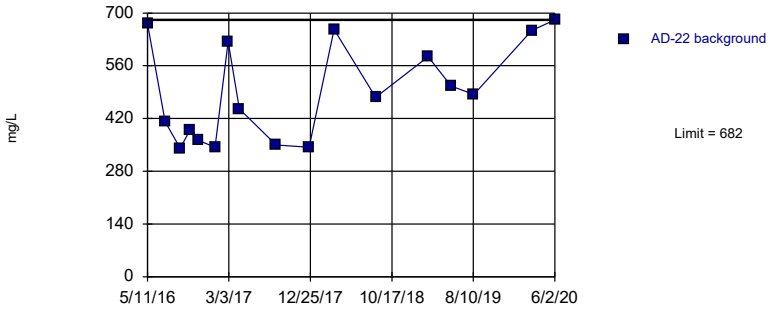


Background Data Summary (based on square root transformation): Mean=14.64, Std. Dev.=1.525, n=16. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9087, critical = 0.887. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Prediction Limit

Intrawell Non-parametric, AD-22



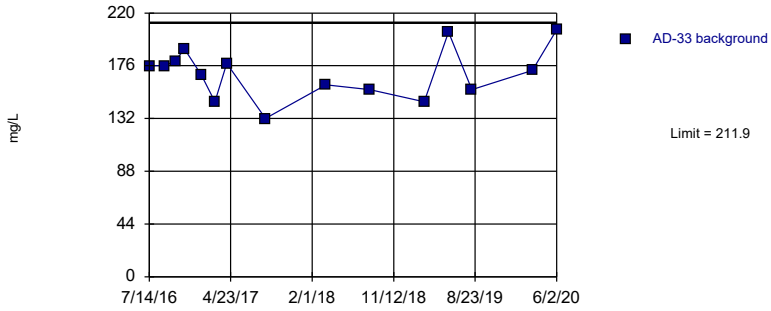
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 17 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005914 (1 of 2). Assumes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

Constituent: Total Dissolved Solids [TDS] Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, AD-33



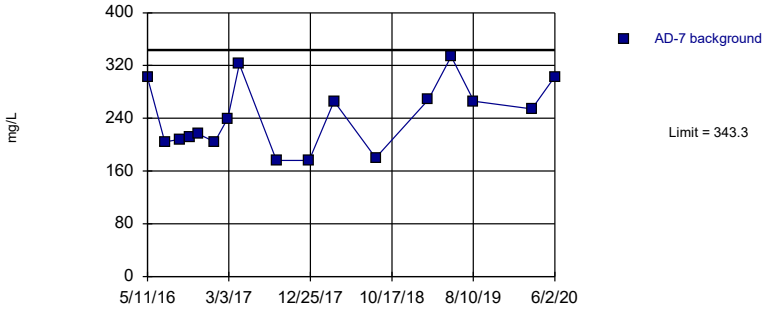
Background Data Summary: Mean=169.7, Std. Dev.=21.02, n=15. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9714, critical = 0.881. Kappa = 2.006 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, AD-7



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. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 1/27/2022 12:02 PM View: Intrawell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Intrawell Prediction Limit - Calcium Well AD-22

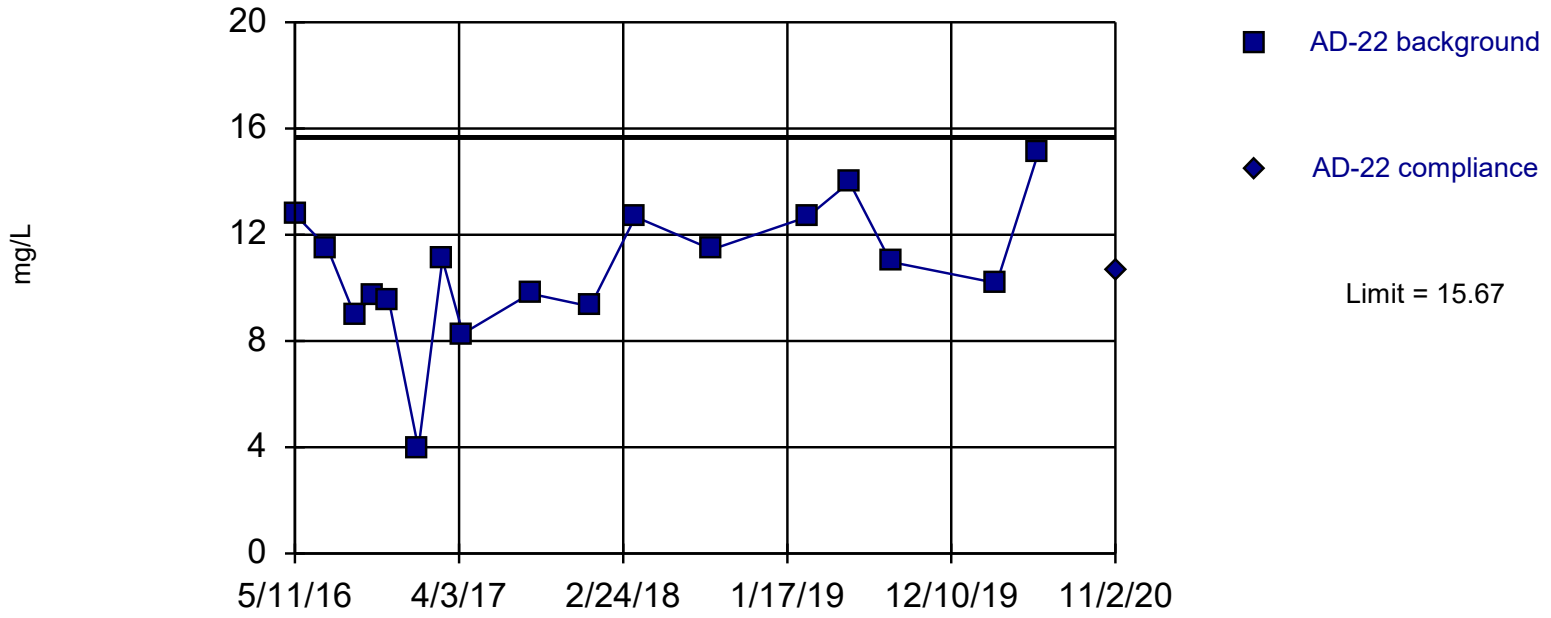
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/27/2022, 12:33 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium, total (mg/L)	AD-22	15.67	n/a	11/2/2020	10.62	No	17	10.7	2.545	0	None	No	0.002505	Param Intra 1 of 2 Deseas

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=10.7, Std. Dev.=2.545, n=17. Data were deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9421, 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 1/27/2022 12:13 PM View: Intrawell

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Upgradient Wells Trend Tests - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/27/2022, 11:57 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Chloride, total (mg/L)	**AD-13 (bg)**	**3.234**	**92**	**81**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**AD-12 (bg)**	**-0.1502**	**-102**	**-81**	**Yes**	**20**	**45**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate, total (mg/L)	**AD-13 (bg)**	**6.191**	**85**	**81**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.01**	**NP**

Upgradient Wells Trend Tests - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/27/2022, 11:57 AM

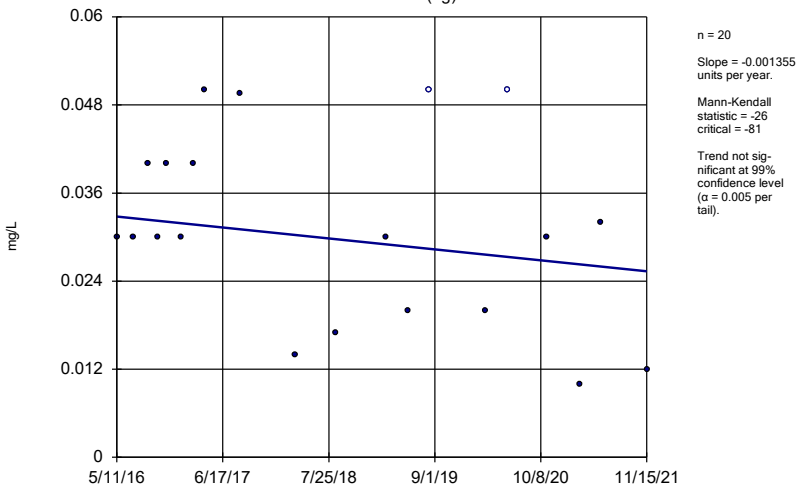
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	AD-12 (bg)	-0.001355	-26	-81	No	20	10	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-13 (bg)	0.001291	43	81	No	20	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-12 (bg)	0.01392	13	81	No	20	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	**AD-13 (bg)**	**3.234**	**92**	**81**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**AD-12 (bg)**	**-0.1502**	**-102**	**-81**	**Yes**	**20**	**45**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	AD-13 (bg)	-0.04052	-46	-81	No	20	20	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	AD-12 (bg)	-0.3331	-80	-81	No	20	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	**AD-13 (bg)**	**6.191**	**85**	**81**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.01**	**NP**

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Hollow symbols indicate censored values.

Sen's Slope Estimator

AD-12 (bg)



n = 20

Slope = -0.001355 units per year.

Mann-Kendall statistic = -26
critical = -81

Trend not significant at 99% confidence level (α = 0.005 per tail).

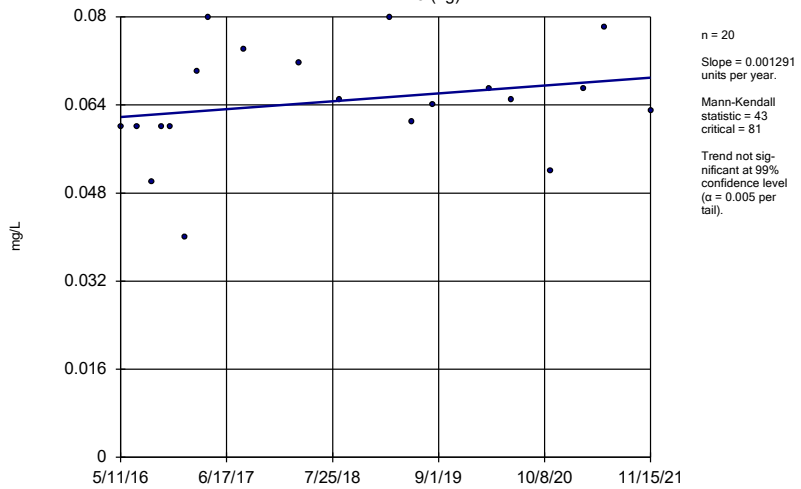
Constituent: Boron, total Analysis Run 1/27/2022 11:54 AM View: Interwell

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Sen's Slope Estimator

AD-13 (bg)



n = 20

Slope = 0.001291 units per year.

Mann-Kendall statistic = 43
critical = 81

Trend not significant at 99% confidence level (α = 0.005 per tail).

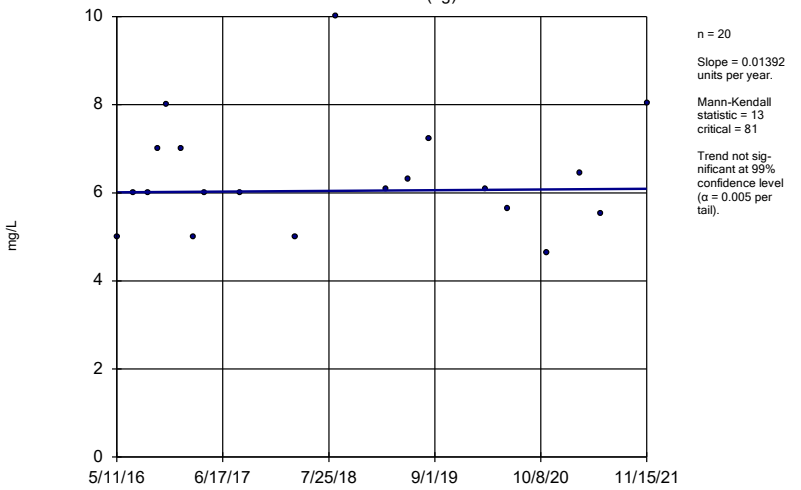
Constituent: Boron, total Analysis Run 1/27/2022 11:54 AM View: Interwell

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Sen's Slope Estimator

AD-12 (bg)



n = 20

Slope = 0.01392 units per year.

Mann-Kendall statistic = 13
critical = 81

Trend not significant at 99% confidence level (α = 0.005 per tail).

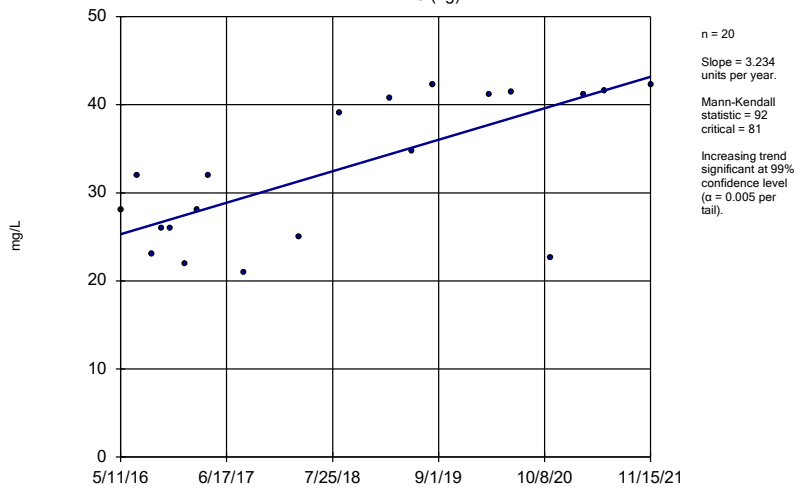
Constituent: Chloride, total Analysis Run 1/27/2022 11:54 AM View: Interwell

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Sen's Slope Estimator

AD-13 (bg)



n = 20

Slope = 3.234 units per year.

Mann-Kendall statistic = 92
critical = 81

Increasing trend significant at 99% confidence level (α = 0.005 per tail).

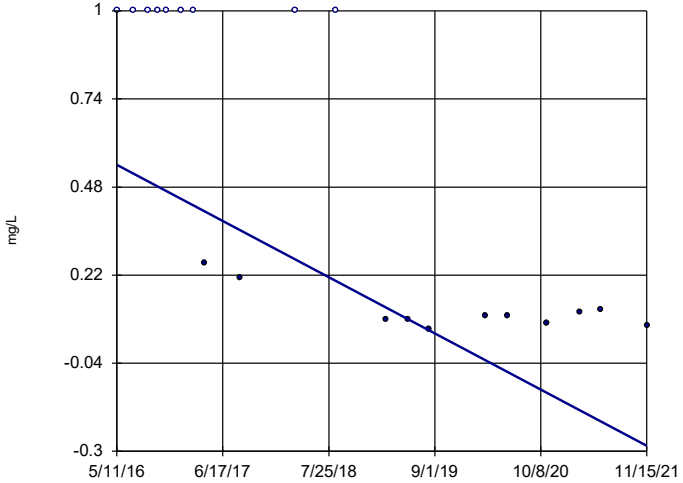
Constituent: Chloride, total Analysis Run 1/27/2022 11:54 AM View: Interwell

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

AD-12 (bg)



n = 20

Slope = -0.1502 units per year.

Mann-Kendall statistic = -102
critical = -81

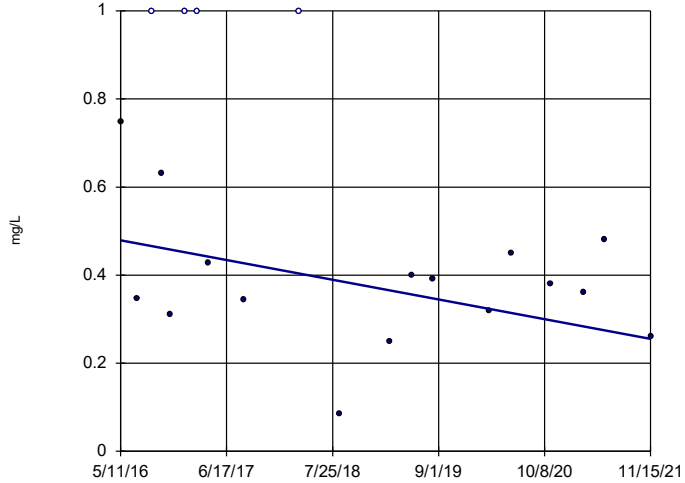
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride, total Analysis Run 1/27/2022 11:54 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Sen's Slope Estimator

AD-13 (bg)



n = 20

Slope = -0.04052 units per year.

Mann-Kendall statistic = -46
critical = -81

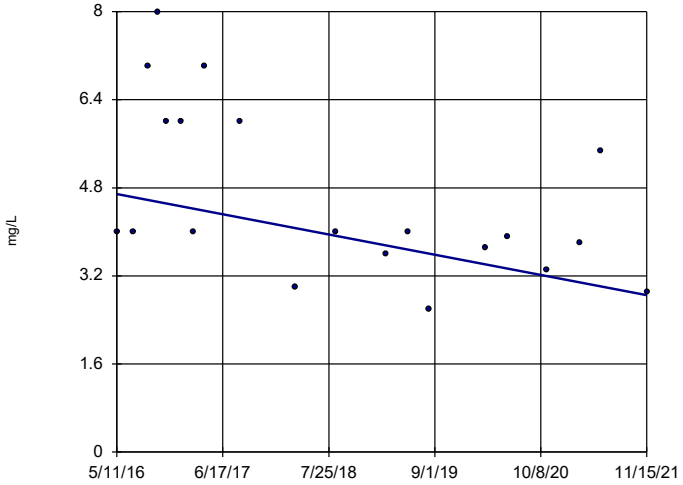
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Fluoride, total Analysis Run 1/27/2022 11:54 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Sen's Slope Estimator

AD-12 (bg)



n = 20

Slope = -0.3331 units per year.

Mann-Kendall statistic = -80
critical = -81

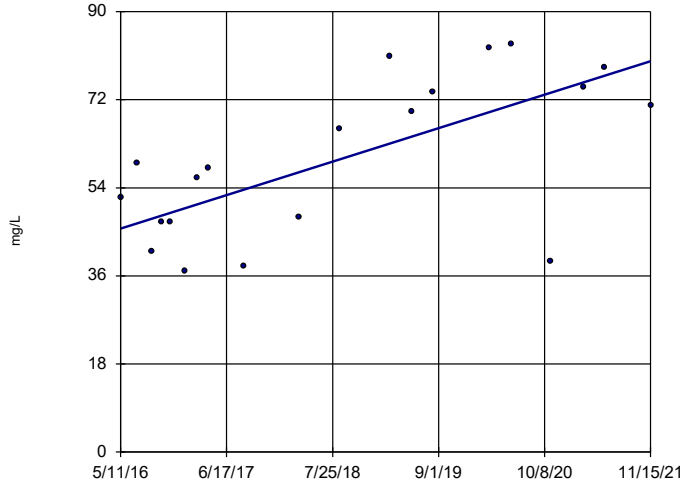
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate, total Analysis Run 1/27/2022 11:54 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Sen's Slope Estimator

AD-13 (bg)



n = 20

Slope = 6.191 units per year.

Mann-Kendall statistic = 85
critical = 81

Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate, total Analysis Run 1/27/2022 11:54 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

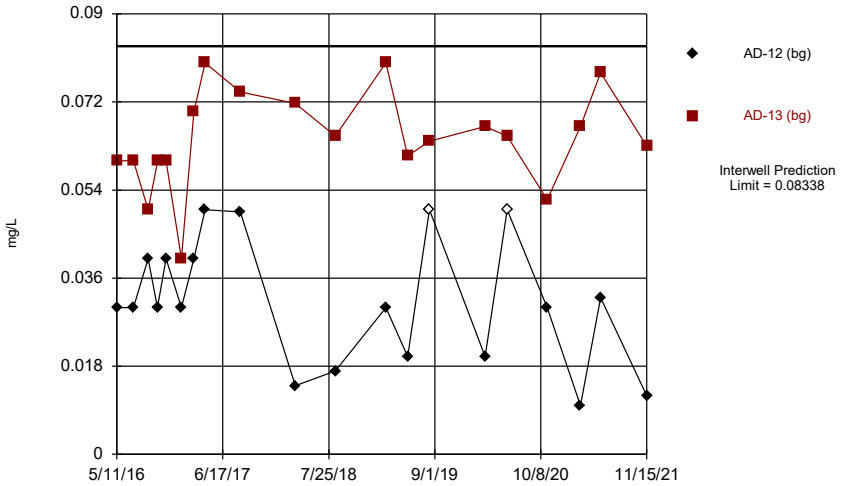
Interwell Prediction Limits - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/27/2022, 11:58 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron, total (mg/L)	n/a	0.08338	n/a	n/a	3 future	n/a	40	0.04781	0.02033	5	None	No	0.002505	Param Inter 1 of 2
Chloride, total (mg/L)	n/a	42.3	n/a	n/a	3 future	n/a	40	n/a	n/a	0	n/a	n/a	0.001146	NP Inter (normality) 1 of 2
Fluoride, total (mg/L)	n/a	1	n/a	n/a	3 future	n/a	40	n/a	n/a	32.5	n/a	n/a	0.001146	NP Inter (normality) 1 of 2
Sulfate, total (mg/L)	n/a	83.4	n/a	n/a	3 future	n/a	40	n/a	n/a	0	n/a	n/a	0.001146	NP Inter (normality) 1 of 2

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

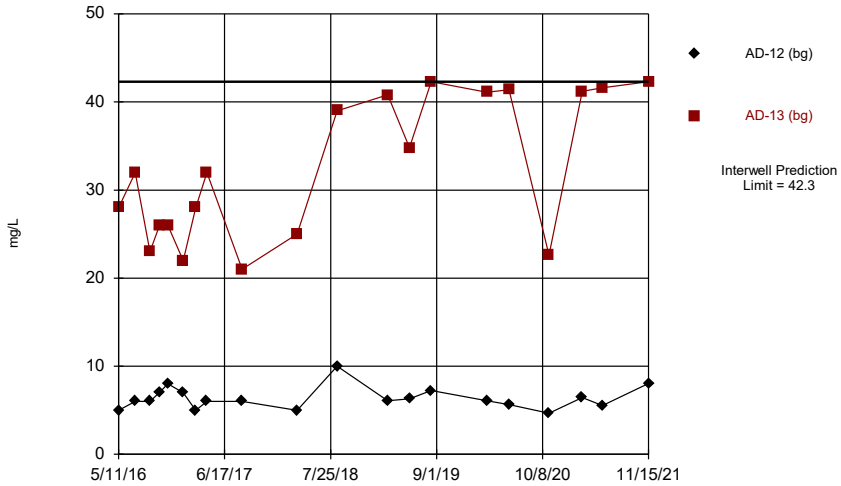
Time Series



Constituent: Boron, total Analysis Run 2/2/2022 8:54 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

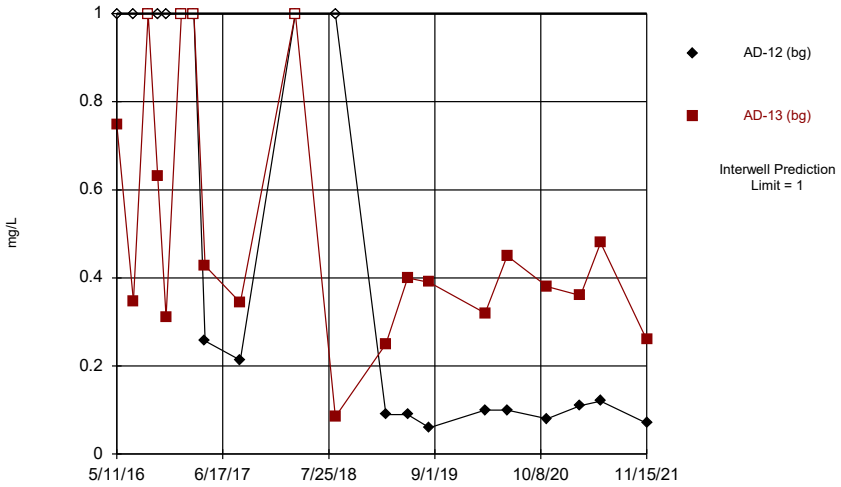
Time Series



Constituent: Chloride, total Analysis Run 2/2/2022 8:54 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

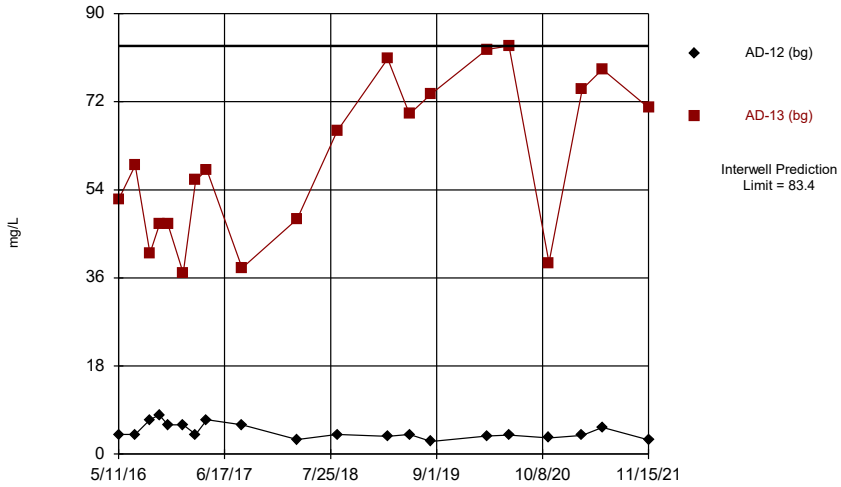
Time Series



Constituent: Fluoride, total Analysis Run 2/2/2022 8:54 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

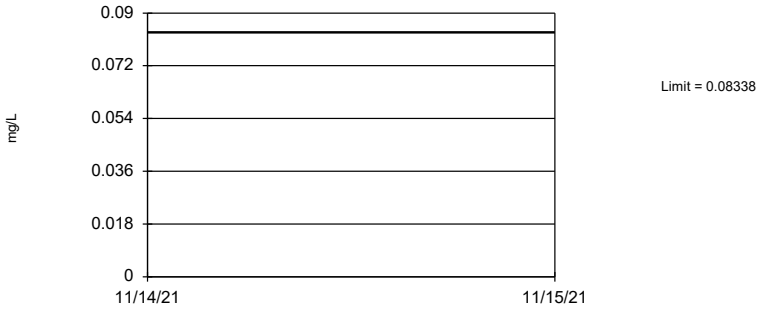
Time Series



Constituent: Sulfate, total Analysis Run 2/2/2022 8:54 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Prediction Limit

Interwell Parametric



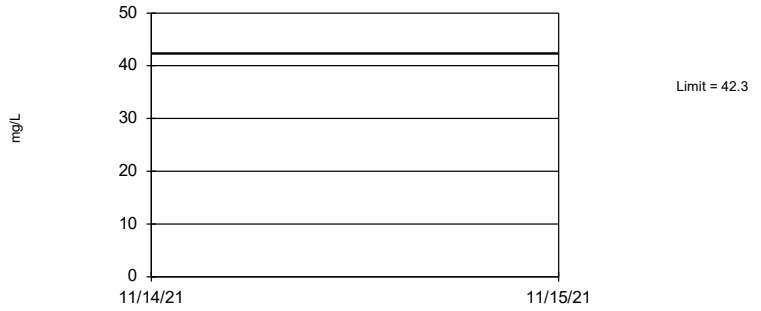
Background Data Summary: Mean=0.04781, Std. Dev.=0.02033, n=40, 5% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9397, critical = 0.919. Kappa = 1.75 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Assumes 3 future values.

Constituent: Boron, total Analysis Run 1/27/2022 11:57 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Interwell Non-parametric



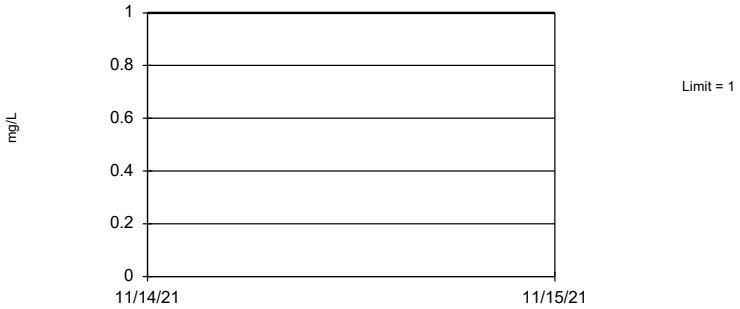
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 40 background values. Annual per-constituent alpha = 0.006854. Individual comparison alpha = 0.001146 (1 of 2). Assumes 3 future values.

Constituent: Chloride, total Analysis Run 1/27/2022 11:57 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Interwell Non-parametric



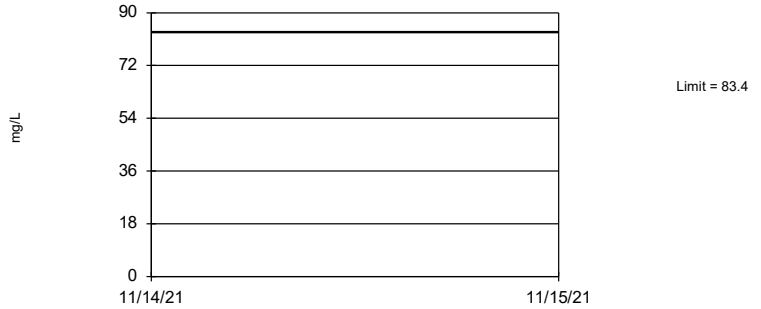
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 40 background values. 32.5% NDs. Annual per-constituent alpha = 0.006854. Individual comparison alpha = 0.001146 (1 of 2). Assumes 3 future values.

Constituent: Fluoride, total Analysis Run 1/27/2022 11:57 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

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 40 background values. Annual per-constituent alpha = 0.006854. Individual comparison alpha = 0.001146 (1 of 2). Assumes 3 future values.

Constituent: Sulfate, total Analysis Run 1/27/2022 11:57 AM View: Interwell
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

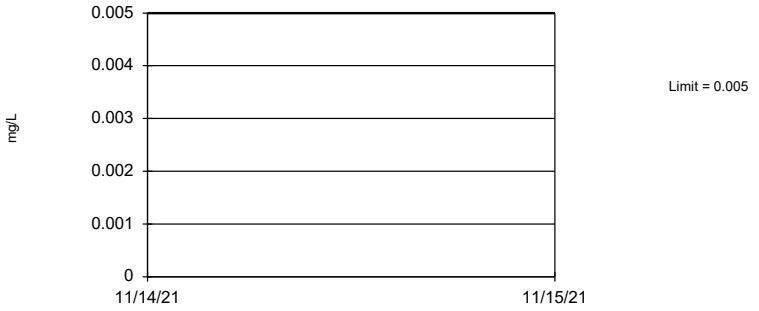
Tolerance Limits Summary Table

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/27/2022, 12:44 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.005	n/a	n/a	n/a	38	n/a	n/a	92.11	n/a	n/a	0.1424	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.009	n/a	n/a	n/a	38	n/a	n/a	31.58	n/a	n/a	0.1424	NP Inter(normality)
Barium, total (mg/L)	n/a	0.05192	n/a	n/a	n/a	38	0.03223	0.009191	0	None	No	0.05	Inter
Beryllium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	38	n/a	n/a	10.53	n/a	n/a	0.1424	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	n/a	n/a	n/a	37	n/a	n/a	70.27	n/a	n/a	0.1499	NP Inter(NDs)
Chromium, total (mg/L)	n/a	0.001364	n/a	n/a	n/a	38	-8.478	0.8777	34.21	Kaplan-Meier	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.056	n/a	n/a	n/a	38	n/a	n/a	0	n/a	n/a	0.1424	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	2.83	n/a	n/a	n/a	38	1.229	0.7474	0	None	No	0.05	Inter
Fluoride, total (mg/L)	n/a	1	n/a	n/a	n/a	40	n/a	n/a	32.5	n/a	n/a	0.1285	NP Inter(normality)
Lead, total (mg/L)	n/a	0.005	n/a	n/a	n/a	38	n/a	n/a	76.32	n/a	n/a	0.1424	NP Inter(NDs)
Lithium, total (mg/L)	n/a	0.165	n/a	n/a	n/a	38	n/a	n/a	2.632	n/a	n/a	0.1424	NP Inter(normality)
Mercury, total (mg/L)	n/a	0.000025	n/a	n/a	n/a	38	n/a	n/a	89.47	n/a	n/a	0.1424	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.005	n/a	n/a	n/a	34	n/a	n/a	97.06	n/a	n/a	0.1748	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	n/a	n/a	n/a	38	n/a	n/a	60.53	n/a	n/a	0.1424	NP Inter(NDs)
Thallium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	36	n/a	n/a	83.33	n/a	n/a	0.1578	NP Inter(NDs)

Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 38 background values. 92.11% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Antimony, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Non-parametric

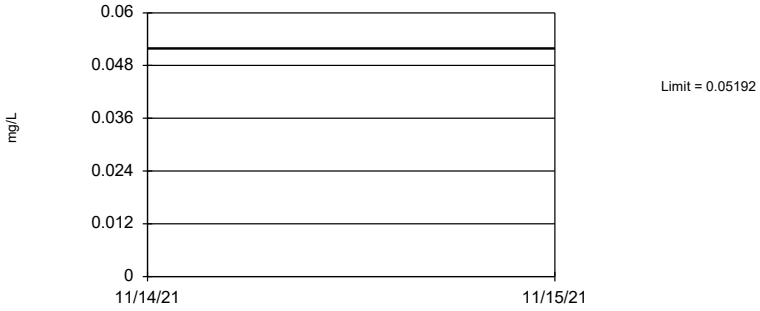
Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 38 background values. 31.58% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Arsenic, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Parametric



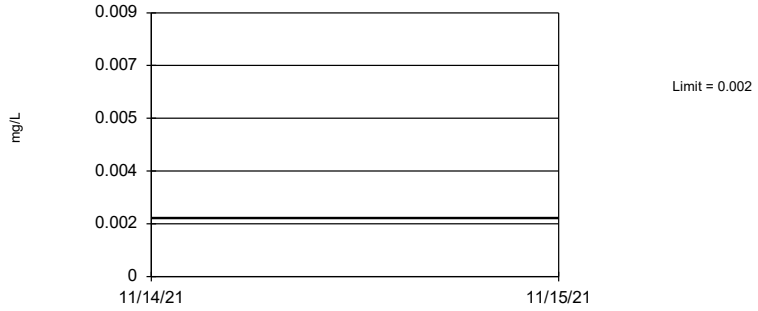
95% coverage. Background Data Summary: Mean=0.03223, Std. Dev.=0.009191, n=38. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9358, critical = 0.916. Report alpha = 0.05.

Constituent: Barium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Non-parametric

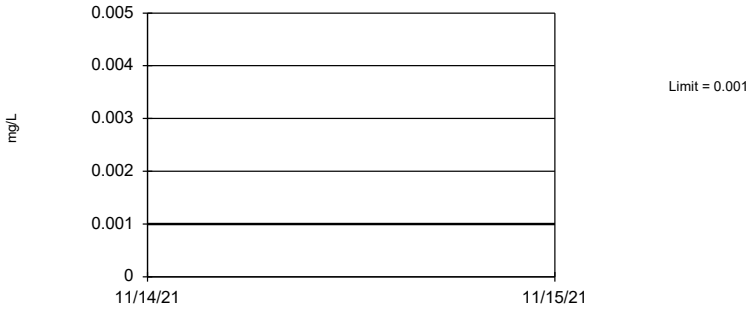


Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 38 background values. 10.53% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Beryllium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric

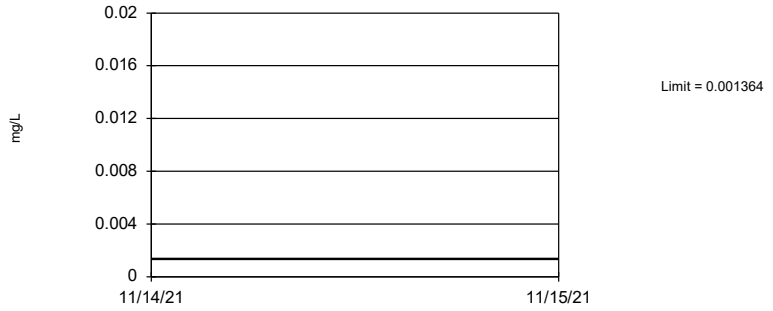


Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 37 background values. 70.27% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1499.

Constituent: Cadmium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Parametric

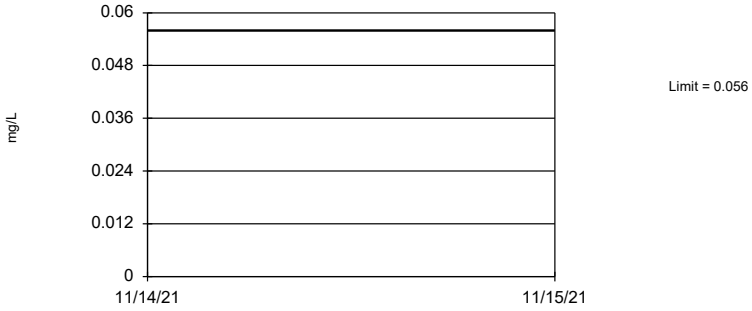


95% coverage. Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=-8.478, Std. Dev.=0.8777, n=38, 34.21% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.934, critical = 0.916. Report alpha = 0.05.

Constituent: Chromium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric

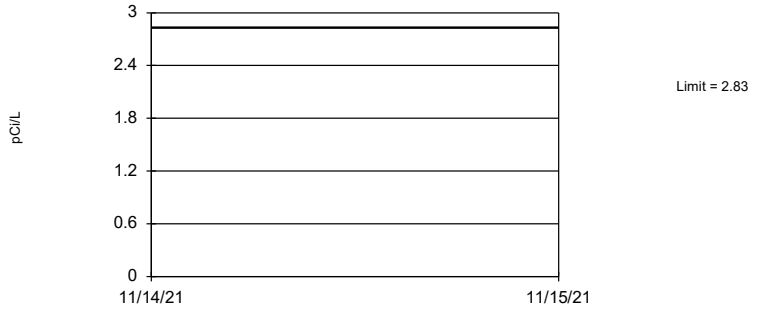


Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 38 background values. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Cobalt, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary: Mean=1.229, Std. Dev.=0.7474, n=38. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9445, critical = 0.916. Report alpha = 0.05.

Constituent: Combined Radium 226 + 228 Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limit
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric

Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 40 background values. 32.5% NDs. 89.26% coverage at alpha=0.01; 92.77% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1285.

Constituent: Fluoride, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric

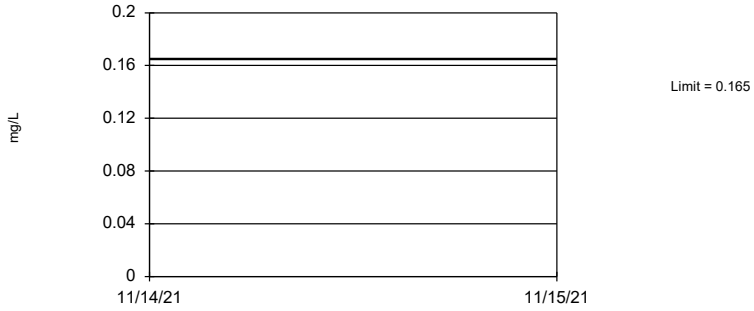
Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 38 background values. 76.32% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Lead, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric



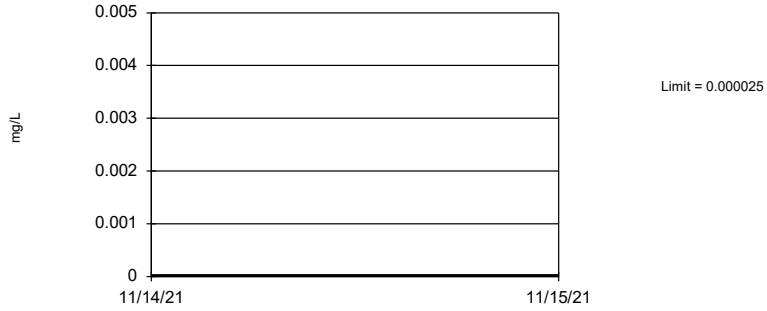
Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 38 background values. 2.632% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Lithium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric



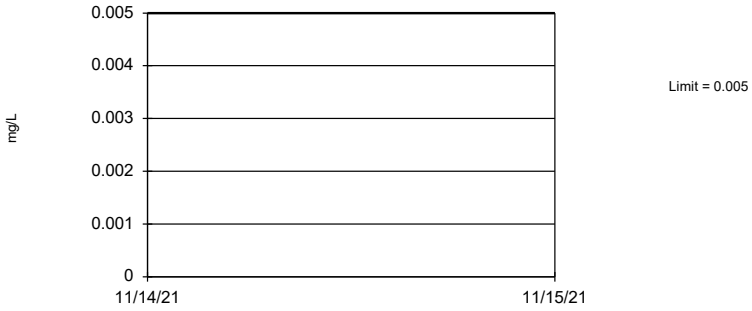
Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 38 background values. 89.47% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Mercury, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 34 background values. 97.06% NDs. 87.3% coverage at alpha=0.01; 91.6% coverage at alpha=0.05; 97.85% coverage at alpha=0.5. Report alpha = 0.1748.

Constituent: Molybdenum, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Non-parametric

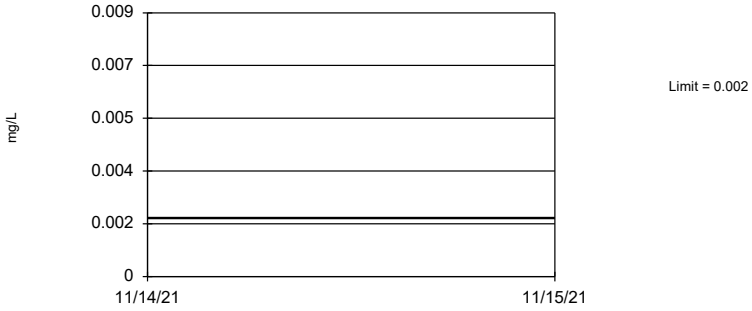
Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 38 background values. 60.53% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Selenium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 36 background values. 83.33% NDs. 88.09% coverage at alpha=0.01; 91.99% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1578.

Constituent: Thallium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

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	0.009	0.01
Barium, Total (mg/L)	2	0.052	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	0.0014	0.1
Cobalt, Total (mg/L)	n/a	0.056	0.056
Combined Radium, Total (pCi/L)	5	2.83	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*

**CCR = Coal Combustion Residual*

Confidence Intervals - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 3/2/2022, 2:58 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**	**0.009305**	**0.004897**	**0.004**	**Yes**	**19**	**0.007101**	**0.003764**	**0**	**None**	**No**	**0.01**	**Param.**
Cobalt, total (mg/L)	**AD-22**	**0.1025**	**0.06752**	**0.056**	**Yes**	**19**	**0.08502**	**0.02989**	**0**	**None**	**No**	**0.01**	**Param.**

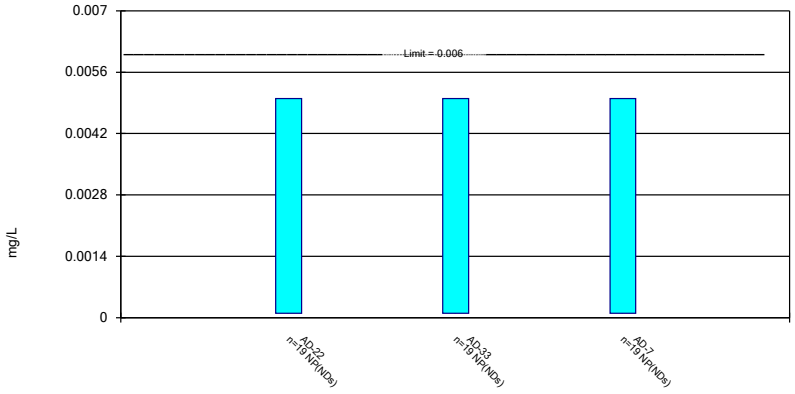
Confidence Intervals - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 3/2/2022, 2:58 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	19	0.002617	0.002392	94.74	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-33	0.005	0.0001	0.006	No	19	0.002616	0.002392	94.74	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-7	0.005	0.0001	0.006	No	19	0.002616	0.002392	94.74	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-22	0.007871	0.003038	0.01	No	19	0.006847	0.006474	0	None	ln(x)	0.01	Param.
Arsenic, total (mg/L)	AD-33	0.00198	0.0006962	0.01	No	18	0.001532	0.001406	11.11	None	x^(1/3)	0.01	Param.
Arsenic, total (mg/L)	AD-7	0.005	0.00082	0.01	No	19	0.002395	0.001864	31.58	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-22	0.067	0.0167	2	No	19	0.04078	0.03392	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-33	0.05494	0.04624	2	No	18	0.05059	0.00719	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-7	0.05088	0.04068	2	No	19	0.04578	0.008708	0	None	No	0.01	Param.
Beryllium, total (mg/L)	**AD-22**	**0.009305**	**0.004897**	**0.004**	**Yes**	**19**	**0.007101**	**0.003764**	**0**	**None**	**No**	**0.01**	**Param.**
Beryllium, total (mg/L)	AD-33	0.00151	0.000916	0.004	No	19	0.001314	0.000732	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-7	0.005818	0.003947	0.004	No	19	0.004883	0.001598	0	None	No	0.01	Param.
Cadmium, total (mg/L)	AD-22	0.001347	0.0006711	0.005	No	19	0.00106	0.0005824	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	AD-33	0.001	0.000043	0.005	No	19	0.0005535	0.0004825	47.37	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-7	0.0008059	0.0006937	0.005	No	19	0.0007498	0.00009586	0	None	No	0.01	Param.
Chromium, total (mg/L)	AD-22	0.002784	0.0004195	0.1	No	19	0.005001	0.008932	15.79	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-33	0.004	0.000147	0.1	No	18	0.002123	0.002435	16.67	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-7	0.000421	0.0001917	0.1	No	19	0.0007178	0.0008714	26.32	Kaplan-Meier	ln(x)	0.01	Param.
Cobalt, total (mg/L)	**AD-22**	**0.1025**	**0.06752**	**0.056**	**Yes**	**19**	**0.08502**	**0.02989**	**0**	**None**	**No**	**0.01**	**Param.**
Cobalt, total (mg/L)	AD-33	0.01057	0.008595	0.056	No	18	0.009581	0.001629	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-7	0.04035	0.03015	0.056	No	19	0.03525	0.00871	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-22	5.313	3.454	5	No	19	4.472	1.65	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-33	2.93	1.448	5	No	19	2.529	2.047	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-7	4.384	2.949	5	No	19	3.666	1.226	0	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-22	1.033	0.5686	4	No	21	0.8739	0.3691	28.57	Kaplan-Meier	x^3	0.01	Param.
Fluoride, total (mg/L)	AD-33	1	0.25	4	No	20	0.6134	0.3742	45	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-7	1	0.5	4	No	20	0.7196	0.2748	45	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-22	0.005	0.00024	0.005	No	19	0.002105	0.002142	36.84	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-33	0.005	0.0002	0.005	No	18	0.002533	0.002337	55.56	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-7	0.005	0.0008	0.005	No	19	0.00279	0.002159	47.37	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-22	0.2016	0.1371	0.17	No	19	0.1721	0.05776	0	None	sqrt(x)	0.01	Param.
Lithium, total (mg/L)	AD-33	0.027	0.0178	0.17	No	19	0.02333	0.008689	5.263	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-7	0.09982	0.08047	0.17	No	19	0.08891	0.01823	0	None	x^2	0.01	Param.
Mercury, total (mg/L)	AD-22	0.003942	0.0003499	0.002	No	19	0.004957	0.006541	0	None	ln(x)	0.01	Param.
Mercury, total (mg/L)	AD-33	0.001778	0.0004416	0.002	No	19	0.001913	0.003288	0	None	ln(x)	0.01	Param.
Mercury, total (mg/L)	AD-7	0.0002663	0.0001156	0.002	No	19	0.000191	0.0001287	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	AD-22	0.005	0.0005	0.005	No	17	0.003298	0.001946	94.12	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-33	0.005	0.0007365	0.005	No	17	0.003049	0.001984	94.12	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-7	0.005	0.0005	0.005	No	18	0.003206	0.001945	94.44	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-22	0.00619	0.002061	0.05	No	19	0.005615	0.004148	31.58	Kaplan-Meier	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	AD-33	0.005	0.00139	0.05	No	19	0.003126	0.001749	42.11	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-7	0.005	0.0021	0.05	No	19	0.004091	0.001677	42.11	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-22	0.002	0.000162	0.002	No	18	0.0009455	0.0008392	33.33	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-33	0.002	0.0002	0.002	No	18	0.001114	0.0008069	77.78	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-7	0.002	0.0002	0.002	No	18	0.001067	0.0008807	50	None	No	0.01	NP (normality)

Non-Parametric Confidence Interval

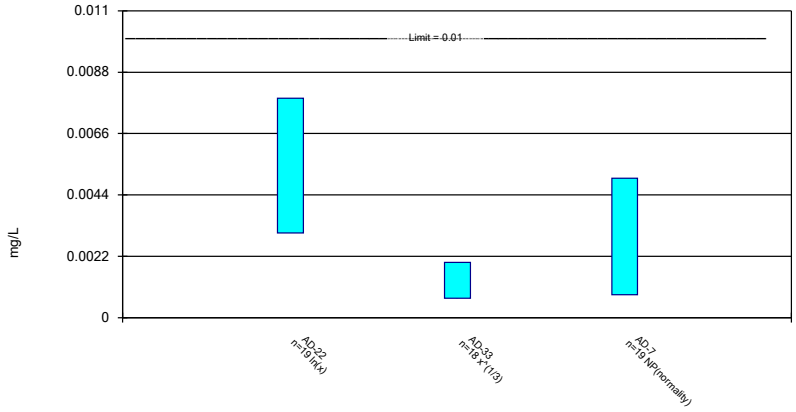
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

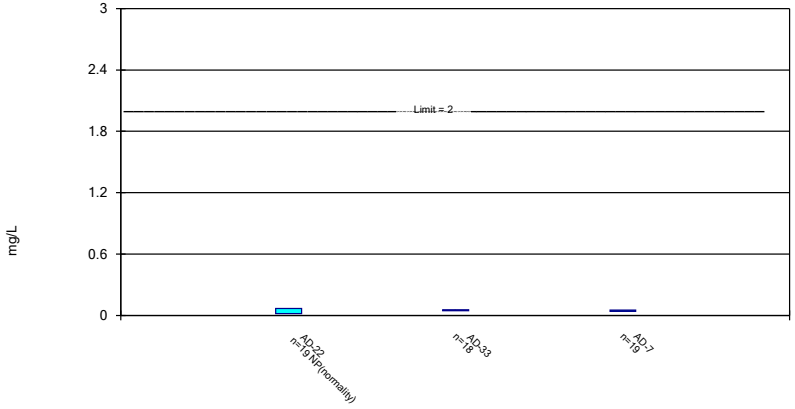
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

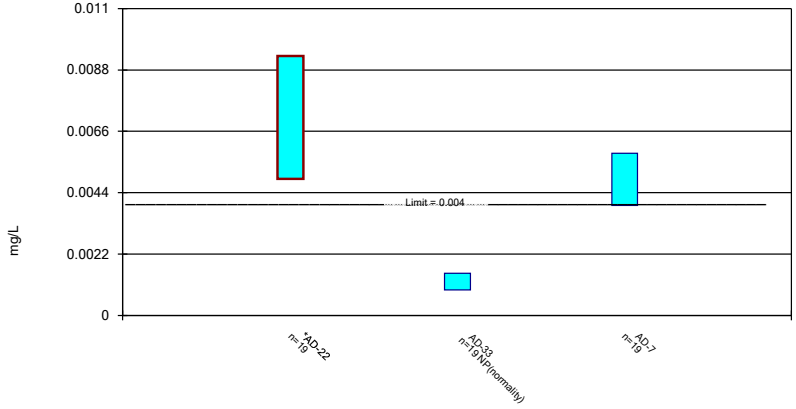
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

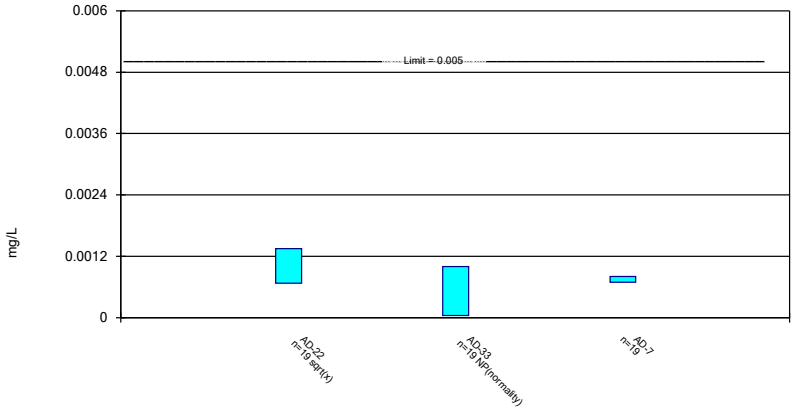
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 3/2/2022 2:56 PM 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.

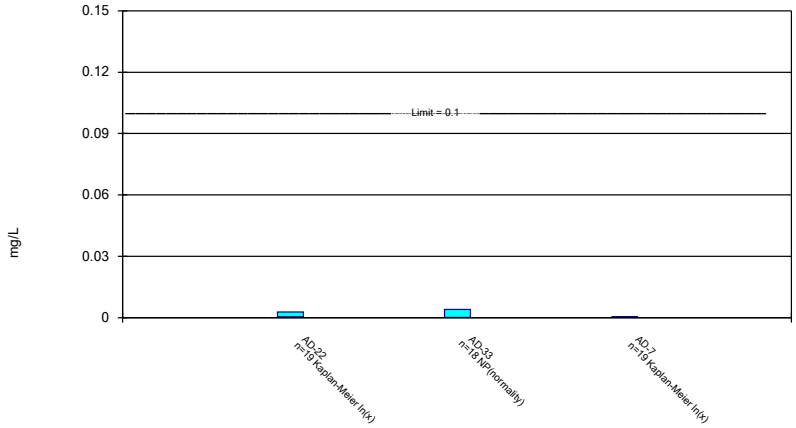


Constituent: Cadmium, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

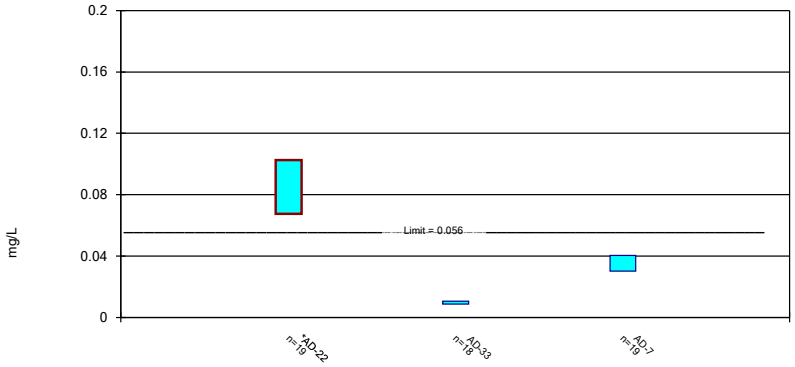


Constituent: Chromium, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

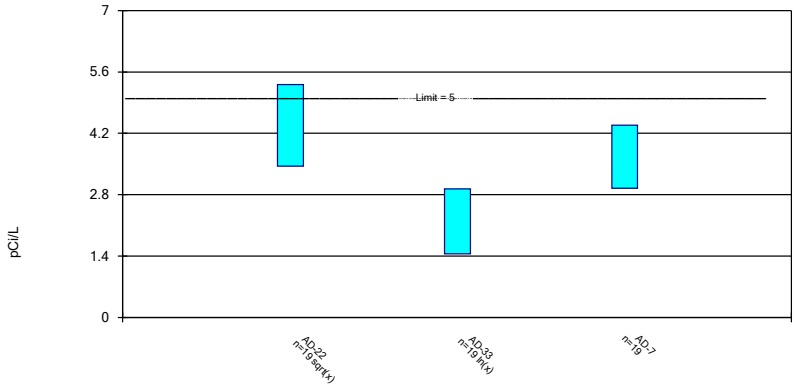


Constituent: Cobalt, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Parametric Confidence Interval

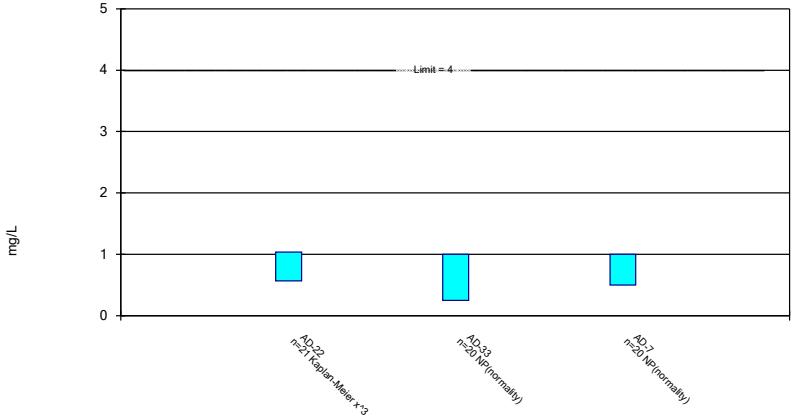
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

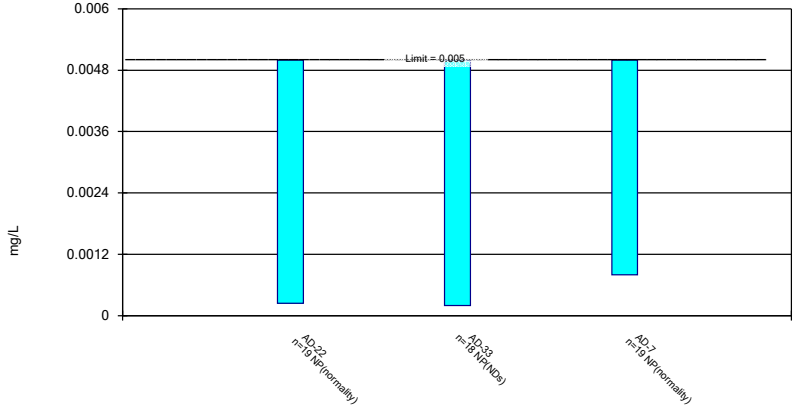
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

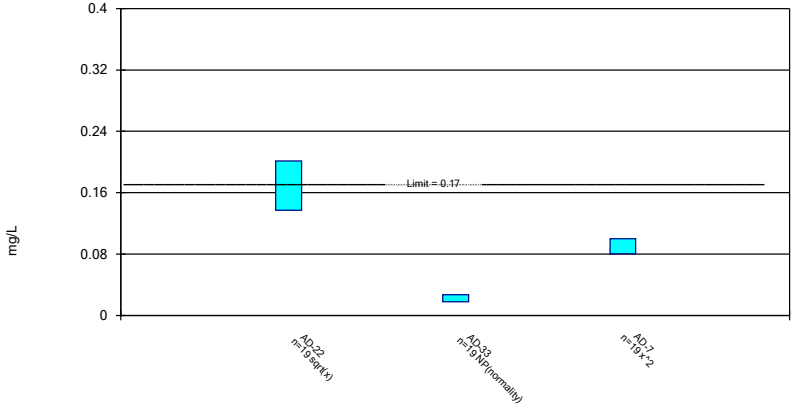
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

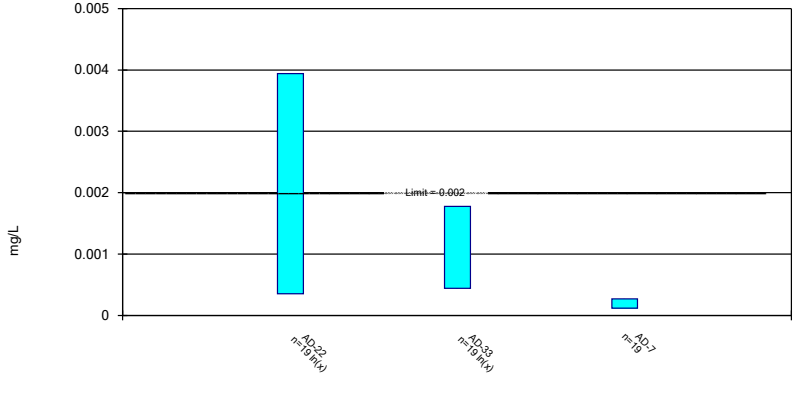
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

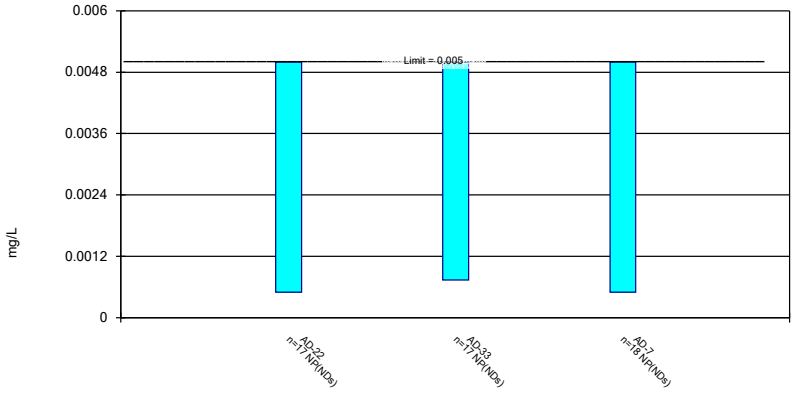
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

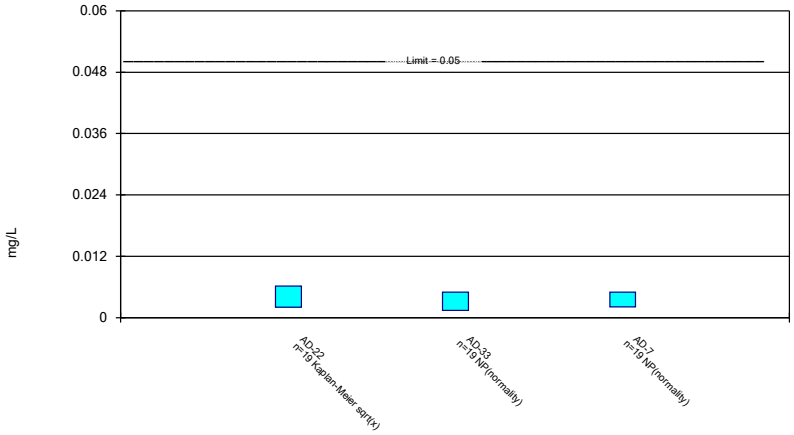
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum, total Analysis Run 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

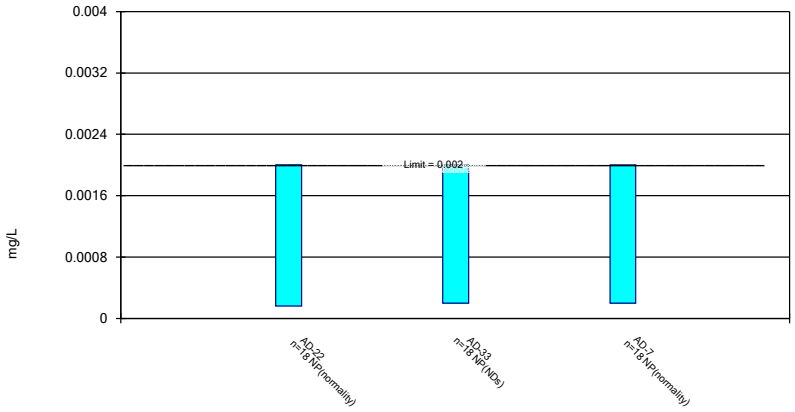
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 3/2/2022 2:56 PM 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 3/2/2022 2:56 PM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Confidence Intervals - Well AD-22 (Deseasonalized Results)

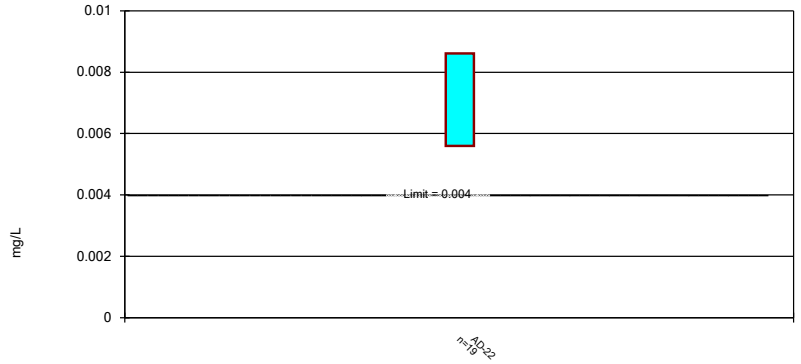
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/27/2022, 1:19 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Beryllium, total (mg/L)	**AD-22**	**0.008609**	**0.005593**	**0.004**	**Yes**	**19**	**0.007101**	**0.002576**	**0**	**None**	**No**	**0.01**	**Param.**
Cobalt, total (mg/L)	**AD-22**	**0.0976**	**0.07244**	**0.056**	**Yes**	**19**	**0.08502**	**0.02148**	**0**	**None**	**No**	**0.01**	**Param.**
Combined Radium 226 + 228 (pCi/L)	AD-22	5.156	3.787	5	No	19	4.472	1.169	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-22	0.1999	0.1442	0.17	No	19	0.1721	0.04757	0	None	No	0.01	Param.

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

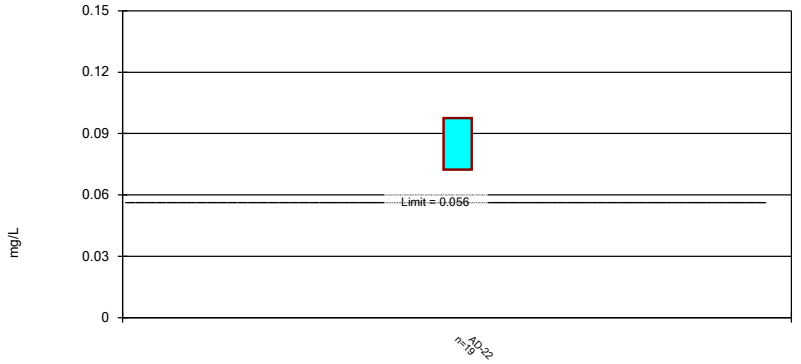


Constituent: Beryllium, total, Alt. Values Analysis Run 1/27/2022 1:17 PM View: Deseasonalized Confiden
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

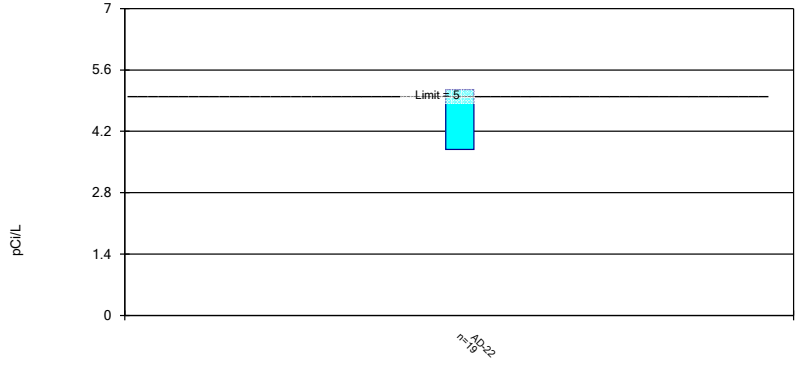


Constituent: Cobalt, total, Alt. Values Analysis Run 1/27/2022 1:18 PM View: Deseasonalized Confidence
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

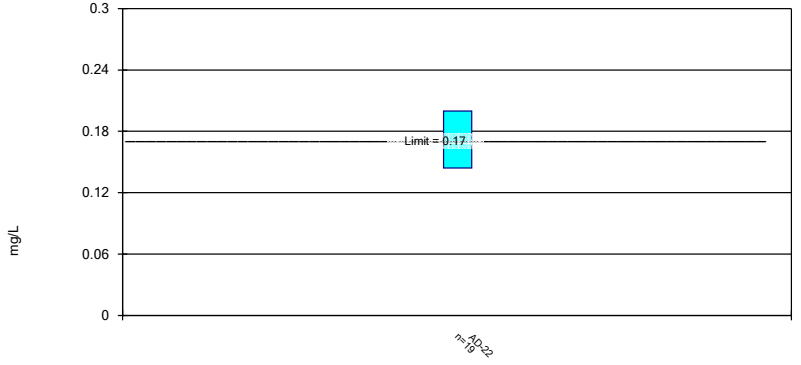


Constituent: Combined Radium 226 + 228, Alt. Values Analysis Run 1/27/2022 1:18 PM View: Deseason
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

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 1/27/2022 1:19 PM View: Deseasonalized Confidenc
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Geosyntec consultants

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January 11, 2023

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

Subject: October 2022 Assessment Monitoring Report Revisions
Pirkey Flue Gas Desulfurization (FGD) Stackout Area

Dear Mr. Miller:

Geosyntec Consultants, Inc. (Geosyntec) has revised the attached Statistical Analysis Summary report for the H.W. Pirkey Power Plant's Flue Gas Desulfurization (FGD) Stackout Area, which summarizes the statistical analysis of the March and June 2022 groundwater sampling results collected in accordance with the Texas Commission on Environmental Quality's (TCEQ's) regulations regarding the disposal of coal combustion residuals (CCRs) in landfills and surface impoundments (Title 30 Chapter 352, "CCR Rule").

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

Sincerely,

Allison Kreinberg, Project Manager

Attachment A: Statistical Analysis Summary, Flue Gas Desulfurization (FGD) Stackout Area. H.W. Pirkey Power Plant, Hallsville, Texas. October 2022.

CHA8500B 20230113 Pirkey Stackout Area AMR Rev1 CL

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

Submitted to

AMERICAN ELECTRIC POWER℠

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

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

October 27, 2022
CHA8500B

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ATTACHMENTS

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
LPL	Lower Prediction Limit
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
QA	Quality Assurance
QC	Quality Control
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
SU	Standard Units
TCEQ	Texas Commission on Environmental Quality
UPL	Upper Prediction Limit
UTL	Upper Tolerance Limit

SECTION 1

EXECUTIVE SUMMARY

In accordance with the Texas Commission on Environmental Quality's (TCEQ's) regulations regarding the disposal of coal combustion residuals (CCRs) in landfills and surface impoundments (Title 30 Chapter 352, "CCR rule"), groundwater monitoring has been conducted at the Flue Gas Desulfurization (FGD) Stackout Area, an existing CCR unit at the Pirkey Power Plant located in Hallsville, Texas. Recent groundwater monitoring results were compared to site-specific groundwater protection standards (GWPSs) to identify potential exceedances.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, chloride, and sulfate at the FGD Stackout Area. An alternative source was not identified at the time, so assessment monitoring was initiated and GWPSs were set in accordance with § 352.951(b). Two assessment monitoring events were conducted at the FGD Stackout Area in March and June 2022 in accordance with § 352.951(a). The results of these assessment events are documented in this report.

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at an SSL above previously established GWPS. SSLs were identified for 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 in 2022, two sets of samples (March 2022 and June 2022) were collected for analysis from each background and compliance well to meet the requirements of § 352.951(a). Samples from both sampling events were analyzed for all Appendix III and Appendix IV parameters. A summary of data collected during these assessment monitoring events are presented in Table 1.

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

A data quality review was completed to assess if the data met the objectives outlined in TCEQ Draft Technical Guidance No. 32 related to groundwater sampling and analysis (TCEQ, 2020). As noted in the review memorandum in Attachment B, the matrix spike recoveries for cobalt and lithium in the sample collected at groundwater monitoring well AD-13 were below the acceptable range. However, the reported cobalt and lithium values for AD-13 were consistent with previously reported results. Thus, the data were determined usable for supporting project objectives. The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.35 statistics software. The export file was checked against the analytical data for transcription errors and completeness.

2.2 Statistical Analysis

Statistical analyses for the FGD Stackout Area were conducted in accordance with the November 2021 *Statistical Analysis Plan* (Geosyntec, 2021). Time series plots and results for all completed statistical tests are provided in Attachment C. A visual review of the time series graphs identified apparent trends in the data for mercury at compliance wells AD-22 and AD-33. Mann Kendall trend tests identified a statistically significant decreasing trend at AD-22 and a statistically significant increasing trend at AD-33.

The data obtained in March and June 2022 were screened for potential outliers. No outliers were identified for these events.

2.2.1 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ($\alpha = 0.01$); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high). For mercury at AD-22 and AD-33, earlier values were different than recent values and so the confidence interval was calculated using only the most recent eight samples to better reflect recent conditions.

Seasonal patterns were observed for several parameters at AD-22 based on the time series graphs (Attachment C). 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 and at least one measurement was reported above the GWPS, 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 C. The calculated confidence limits were compared to the GWPSs provided in Table 2. The GWPSs were established as either the greater value of the background concentration calculated during a previous statistical analysis (Geosyntec, 2022) or the maximum contaminant level (MCL).

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

- The LCL for beryllium exceeded the GWPS of 0.00400 mg/L at AD-7 (0.00406 mg/L). The deseasonalized LCL for beryllium exceeded the GWPS of 0.00400 mg/L at AD-22 (0.00557 mg/L).

- The deseasonalized LCL for cobalt exceeded the GWPS of 0.056 mg/L at AD-22 (0.0742 mg/L).

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

2.2.2 Evaluation of Potential Appendix III SSIs

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

Data collected during the June 2022 assessment monitoring event from each compliance well were compared to previously established prediction limits to evaluate results above background values.

The results from this event and the prediction limits are summarized in Table 3. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 0.0834 mg/L at AD-7 (6.13 mg/L) and AD-33 (0.093 mg/L).
- Chloride concentrations exceeded the interwell UPL of 42.3 mg/L at AD-7 (53.1 mg/L) and AD-22 (107 mg/L).
- Sulfate concentrations exceeded the interwell UPL of 83.4 mg/L at AD-22 (293 mg/L).

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

2.3 Conclusions

An annual and semi-annual assessment monitoring event were conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that prevented data usage. A review of outliers identified no potential outliers in the March and June 2022 data. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. SSLs were identified for beryllium and cobalt. Appendix III parameters were compared to previously calculated 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 (Geosyntec). 2021. Statistical Analysis Plan – H.W. Pirkey Plant. November.

Geosyntec. 2022. Statistical Analysis Summary – Flue Gas Desulfurization (FGD) Stackout Area, H.W. Pirkey Plant, Hallsville, Texas. March 18, 2022.

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

TABLES

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

Geosyntec Consultants, Inc.

Well ID		AD-7		AD-12		AD-13		AD-22		AD-33	
Well Classification		Compliance		Background		Background		Compliance		Compliance	
Parameter	Unit	3/28/2022	6/21/2022	3/28/2022	6/20/2022	3/28/2022	6/20/2022	3/28/2022	6/20/2022	3/28/2022	6/20/2022
Antimony	µg/L	0.2 U1	0.5 U1	0.1 U1	0.1 U1	0.1 U1	0.1 U1	0.1 U1	0.1 U1	0.1 U1	0.04 J1
Arsenic	µg/L	1.08	1.3	0.09 J1	0.08 J1	2.18	4.30	3.21	3.02	0.87	1.19
Barium	µg/L	58.8	58.7	20.2	24.2	52.1	41.4	19.3	16.2	45.0	42.0
Beryllium	µg/L	5.59	4.66	0.127	0.135	0.579	0.409	8.78	2.11	1.35	0.939
Boron	mg/L	3.78	6.13	0.021 J1	0.042 J1	0.065	0.075	0.068	0.028 J1	0.146	0.093
Cadmium	µg/L	0.998	0.95	0.009 J1	0.008 J1	0.02 U1	0.02 U1	1.27	0.587	0.057	0.039
Calcium	mg/L	4.33	5.4	0.20	0.32	13.3	11.1	16.4	11.9	2.28	1.06
Chloride	mg/L	40.8	53.1	6.10	7.59	46.5	54.5	88.8	107	8.88	8.49
Chromium	µg/L	4.78	0.4 J1	0.35	0.63	0.52	0.31	0.43	0.66	0.47	0.64
Cobalt	µg/L	33.6	36.4	1.01	1.35	46.9	56.2 M1	109	69.6	9.82	7.81
Combined Radium	pCi/L	4.59	4.82	0.76	0.63	2.95	2.22	4.24	3.95	2.28	3.37
Fluoride	mg/L	0.36	0.30	0.07	0.09	0.34	0.26	0.96	0.32	0.30	0.19
Lead	µg/L	0.8	1.0	0.09 J1	0.08 J1	0.2 U1	0.2 U1	0.15 J1	0.18 J1	0.32	0.27
Lithium	mg/L	0.0967	0.113	0.00604	0.00949	0.138	0.150 M1	0.170	0.110	0.0219	0.0166
Mercury	µg/L	0.400 J1	1 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.01 U1	0.460	4.600	3.000
Molybdenum	µg/L	1 U1	2.5 U1	0.5 U1	0.5 U1	0.5 U1	1.1	0.5 U1	0.1 J1	0.5 U1	0.5 U1
Selenium	µg/L	3.5	2.3 J1	0.33 J1	0.16 J1	0.5 U1	0.1 J1	9.20	2.01	2.68	1.27
Sulfate	mg/L	49.9	71.1	3.80	4.81	79.2	138	385	293	67.0	57.7
Thallium	µg/L	0.20 J1	0.2 J1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.19 J1	0.15 J1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	230 L1	290	60 L1	80	230 L1	270	720 L1	580	190 L1	150
pH	SU	3.6	3.52	3.85	4.25	5.25	5.68	4.25	4.51	3.97	4.37

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 2: Appendix IV Groundwater Protection Standards
Pirkey Plant - FGD Stackout Area

Geosyntec Consultants, Inc.

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600	0.00500	0.00600
Arsenic, Total (mg/L)	0.0100	0.00900	0.0100
Barium, Total (mg/L)	2.00	0.0519	2.00
Beryllium, Total (mg/L)	0.00400	0.00200	0.00400
Cadmium, Total (mg/L)	0.00500	0.00100	0.00500
Chromium, Total (mg/L)	0.100	0.00136	0.100
Cobalt, Total (mg/L)	n/a	0.0560	0.0560
Combined Radium, Total (pCi/L)	5.00	2.83	5.00
Fluoride, Total (mg/L)	4.00	1.00	4.00
Lead, Total (mg/L)	n/a	0.00500	0.0050
Lithium, Total (mg/L)	n/a	0.165	0.165
Mercury, Total (mg/L)	0.00200	0.0000250	0.00200
Molybdenum, Total (mg/L)	n/a	0.00500	0.00500
Selenium, Total (mg/L)	0.0500	0.00500	0.0500
Thallium, Total (mg/L)	0.00200	0.00200	0.00200

Notes:
MCL = Maximum Contaminant Level
GWPS = Groundwater Protection Standard
Calculated UTL (Upper Tolerance Limit) represents site-specific background values.
Grey cells indicate the GWPS is based on the calculated UTL, which is either higher than the MCL or an MCL does not exist.

Table 3: Appendix III Data Summary
Pirkey - FGD Stackout Pad

Geosyntec Consultants, Inc.

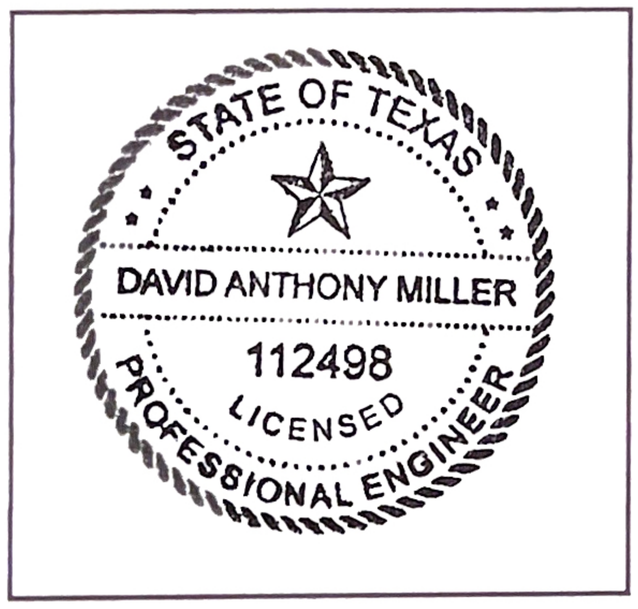
Analyte	Unit	Description	AD-7	AD-22	AD-33
			6/21/2022	6/20/2022	6/20/2022
Boron	mg/L	Interwell Background Value (UPL)	0.0834		
		Analytical Result	**6.13**	0.028	**0.093**
Calcium	mg/L	Intrawell Background Value (UPL)	6.55	17.6	2.18
		Analytical Result	5.4	11.9	1.06
Chloride	mg/L	Interwell Background Value (UPL)	42.3		
		Analytical Result	**53.1**	**107**	8.49
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.30	0.32	0.19
pH	SU	Intrawell Background Value (UPL)	4.4	5.1	4.7
		Intrawell Background Value (LPL)	3.0	3.4	3.0
		Analytical Result	3.5	4.5	4.4
Sulfate	mg/L	Interwell Background Value (UPL)	83.4		
		Analytical Result	71.1	**293**	57.7
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	343	682	212
		Analytical Result	290	580	150

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	TEXAS	10.27.22
License Number	Licensing State	Date

ATTACHMENT B
Data Quality Review Memorandum
Revision 1 - January 2023

ATTACHMENT B

DATA QUALITY REVIEW – H.W. PIRKEY POWER PLANT

JUNE 2022 SAMPLING EVENT MEMORANDUM

RECORD OF REVISIONS

Revision 1 (January 2023)

- The introductory text was updated to note that the laboratory reports for the sample data groups (SDGs) discussed in this memorandum were reissued in December 2022 with amended matrix spike (MS) precision calculations.

- For the second bullet point, regarding equipment blank detections, the text was amended to note that a high bias for groundwater chromium results may occur in multiple, not all, samples.

- The low matrix spike duplicate (MSD) recovery for beryllium in the sample "Duplicate 1" was added to the discussion of MS and MSD issues associated with SDG 222015.

- The relative percent difference (RPD) for sodium between the MS and MSD associated with sample 'AD-2' on SDG 222015 is no longer outside the acceptable range. This text was removed.

- The RPDs for calcium, lithium, magnesium, and sodium between the MS and MSD associated with sample 'Duplicate-1' on SDG 222015 are no longer outside the acceptable range. This text was removed.

- The RPD for calcium and sodium associated with the sample 'AD-8' on SDG 222016 are no longer outside the acceptable range. This text was removed.

Geosyntec consultants

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Worthington, Ohio 43085
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Memorandum

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

This memorandum summarizes the findings of a data quality review for groundwater samples collected at the H.W. Pirkey Power Plant, located in Pittsburg, Texas in June 2022. The groundwater samples were collected to comply with the Texas Commission on Environmental Quality's (TCEQ's) regulations regarding the disposal of coal combustion residuals (CCRs) in landfills and surface impoundments (Title 30 Chapter 352, "CCR Rule"). The groundwater samples were analyzed for 40 CFR 257 Appendix III and IV constituents, plus additional constituents collected to support site evaluation efforts.

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

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

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

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

The following data quality issues were identified:

- As reported in SDG 221989, the sample "AD-3" submitted for total dissolved solids (TDS) analysis via method SM2540C was analyzed out of hold time. The "AD-3" TDS results should be considered estimated.

- As reported in SDG 222015, chromium and cobalt were detected in the equipment blank sample "Equipment Blank" collected on 6/20/2022. The detected chromium concentration in the equipment blank (0.41 µg/L) was higher than the detected values for chromium in multiple groundwater samples, which could result in high bias for all groundwater chromium results. The cobalt equipment blank detection was less than 10% of the detected values in the groundwater samples and would not result in a high bias.

- As reported in SDG 221988 and SDG 221989, the relative percent difference (RPD) for fluoride concentrations from parent sample "AD-13" and duplicate sample "Duplicate-1" was 24%. The "AD-13" fluoride results should be considered estimated.

- As reported in SDG 2221989, the RPD for TDS (11.5%) in the laboratory duplicate was above the acceptable limit of 10%. The associated sample ("AD-3") was flagged P1: the precision between duplicate results was above acceptance limits. The "AD-3" TDS results should be considered estimated.

- As reported in SDG 222015, the following matrix spike (MS) or matrix spike duplicate (MSD) recovery issues were observed:

    - The MSD recovery for sodium (-30.9%) associated with sample "AD-2" was below the acceptable range of 75-125%. The associated sample (AD-2) was flagged M1: the associated MS or MSD recovery was outside acceptance limits. The "AD-2" sodium results should be considered estimated. Sodium is not a regulated Appendix III or IV constituent.

    - The MS recovery for cobalt (69.7%) and lithium (54%) associated with sample "AD13" were below the acceptable range of 75-125%. The associated sample (AD-13) was flagged M1: the associated MS or MSD recovery was outside

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

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

- The MSD recovery (72%) for beryllium associated with sample "Duplicate-1", which was collected from well AD-13, was below the acceptable range of 75-125%. The MS recovery (62.6%) for calcium was below the acceptable range of 75-125%. The MS recovery (5.81%) and MSD recovery (53.9%) for cobalt were below the acceptable range of 75-125%. The MS recovery (-3.26%) and MSD recovery (-49.7%) for lithium were below the acceptable range of 75-125%. The MS recovery (32.4%) and MSD recovery (52.1%) for magnesium were below the acceptable range of 75-125%. The MS recovery (71.5%) and MSD recovery (54.3%) for sodium were below the acceptable range of 75-125%. The 'Duplicate-1" beryllium, calcium, cobalt, lithium, magnesium, and sodium results should be considered estimated. Magnesium and sodium are not regulated Appendix III or IV constituents.

- As reported in SDG 222015, the RPD for radium-226 (25.5%) in the laboratory duplicate was above the acceptable limit of 25%. The "AD-13" radium-226 results should be considered estimated.

- As reported in SDG 222016, the MS recovery (49.2%) and MSD recovery (63.5%) for calcium associated with sample "AD-8" were below the acceptable range of 75-125%. The MS recovery for sodium (70.1%) was below the acceptable range of 75-125%. The MS recovery (62.6%) and MSD recovery (72.2%) were below the acceptable range of 75-125%. The associated sample (AD-8) was flagged M1: the associated MS or MSD recovery was outside acceptance limits. The "AD-8" calcium, sodium, and strontium results should be considered estimated. Sodium and strontium are not regulated Appendix III or Appendix IV constituents.

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

ATTACHMENT C

Statistical Analysis Output

GROUNDWATER STATS CONSULTING

October 21, 2022

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

Re: Pirkey Stackout
Assessment Monitoring Event – March & June 2022

Dear Ms. Kreinberg,

Groundwater Stats Consulting (GSC), formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical analysis of groundwater data for the March and June 2022 Assessment Monitoring sample events 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 GSC, 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 Kristina Rayner, Senior Statistician and Founder of Groundwater Stats Consulting.

The CCR Assessment Monitoring program consists of the following constituents:

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

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

A change in reported concentrations of more recent data was noted for mercury relative to historical concentrations in wells AD-22 and AD-33. The Sen's Slope/Mann Kendall trend test was used to evaluate the entire record of data for mercury at these wells to identify whether data are stable or have either statistically significant increasing or decreasing trends (Figure D). A statistically significant increasing trend was identified for mercury in well AD-33 and a statistically significant decreasing trend was identified for mercury in AD-22. In order to construct confidence intervals that represent current groundwater quality conditions and eliminate the influence of the trend, earlier concentrations were truncated from the records. A list of well/constituent pairs using truncated records follows this report.

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 March 2022

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.

As mentioned above, prior to evaluating Appendix IV parameters, background data are screened through visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits. Tukey's outlier test on pooled upgradient well data for Appendix IV parameters through November 2021 did not identify any outliers. Therefore, no new values were flagged and no changes to previous outliers were made. As mentioned above, a list of flagged values follows this report (Figure C).

During the background update conducted in March 2022, concentrations of mercury in well AD-22 were noted to have significantly decreased in 2019 compared to historical data. Therefore, earlier concentrations were truncated in order to reflect present-day groundwater quality conditions at this well for mercury. A list of well/constituent pairs using truncated records follows this report.

Interwell Upper Tolerance Limits

Interwell upper tolerance limits were established in the Fall 2021 using all available pooled upgradient well data for each Appendix IV parameter through November 2021 (Figure E). GWPS will be updated during Fall 2022. When data followed a normal or transformed-normal distribution, parametric tolerance limits were used to calculate background limits for Appendix IV parameters with a target of 95% confidence and 95% coverage. Nonparametric tolerance limits are constructed when data do not follow a normal or transformed-normal distribution or when there are greater than 50% non-detects. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

Groundwater Protection Standards

Background limits were compared to the Maximum Contaminant Levels (MCLs) in the Groundwater Protection Standard (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure F).

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. 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 – March & June 2022

Confidence intervals were then constructed on downgradient wells with data through June 2022 for each of the Appendix IV parameters using either parametric or nonparametric intervals depending on the data distribution and percentage of non-detects, similar to the logic used to construct tolerance limits as discussed above (Figure G). Each confidence interval was compared with the corresponding GWPS from Figure F. Only when the entire confidence interval is above the GWPS is the

well/constituent pair considered to exceed its respective standard. Exceedances were noted for the following well/constituent pairs:

- Beryllium: AD-7 and AD-22
- Cobalt: AD-22

Note that the lower confidence level for mercury at AD-33 equals the GWPS. Both a tabular summary and graphical presentation of the confidence interval results follow this letter.

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 G. The following confidence interval exceedances were identified:

- 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
Senior Statistician

Date Ranges

Date: 10/21/2022 8:22 AM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

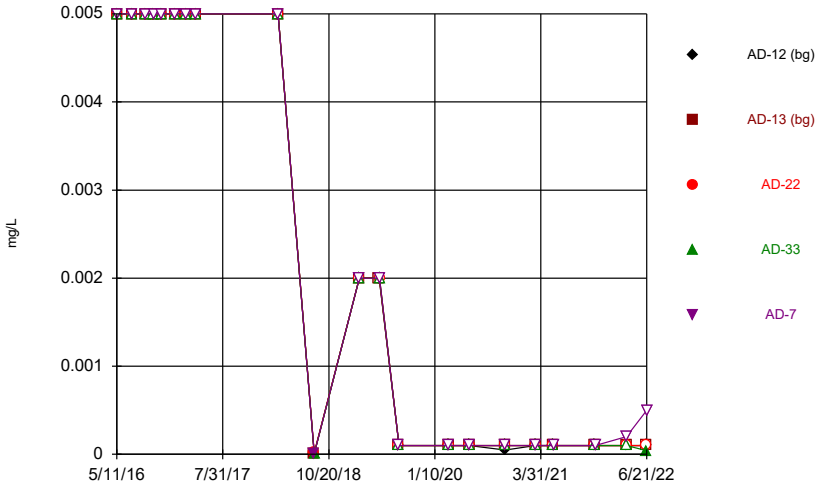
Mercury, total (mg/L)

AD-22 overall:3/10/2020-6/20/2022

AD-33 overall:3/10/2020-6/20/2022

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

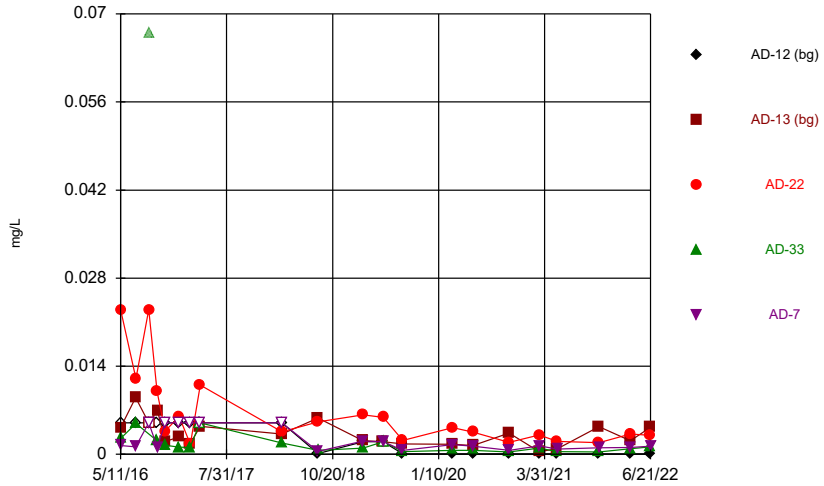
Time Series



Constituent: Antimony, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

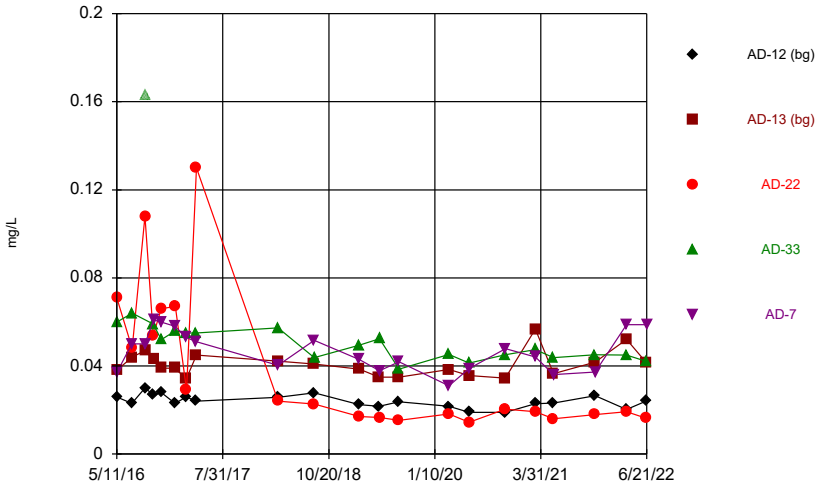
Time Series



Constituent: Arsenic, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

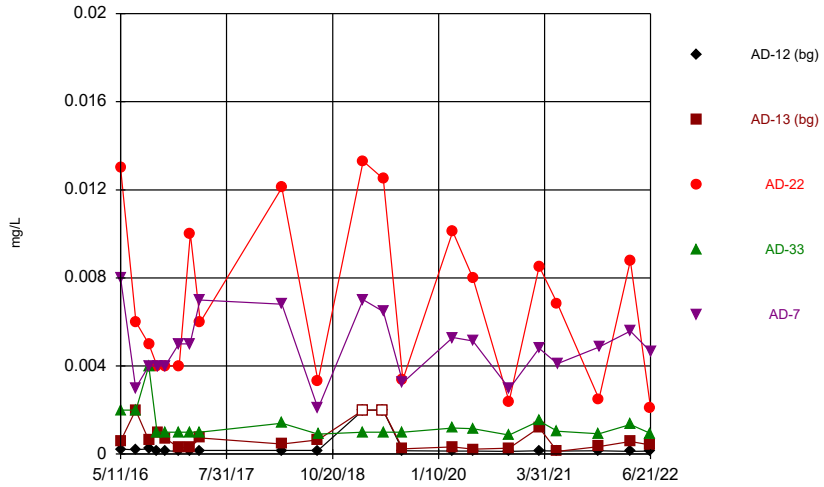
Time Series



Constituent: Barium, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

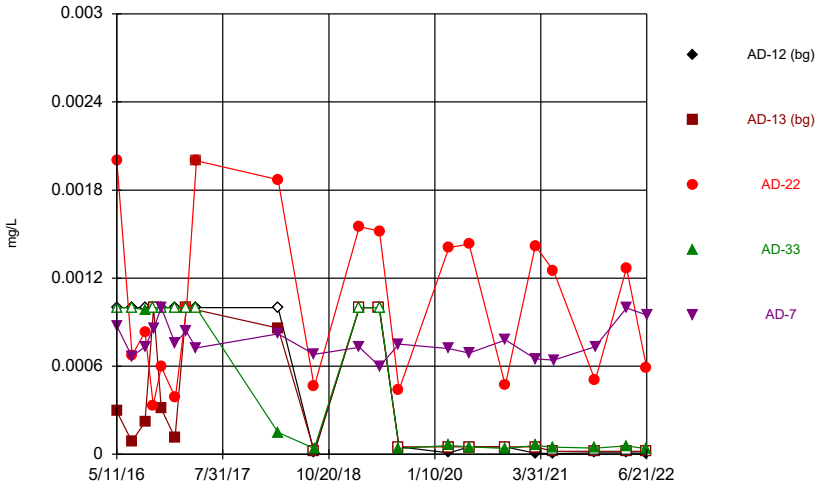
Time Series



Constituent: Beryllium, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

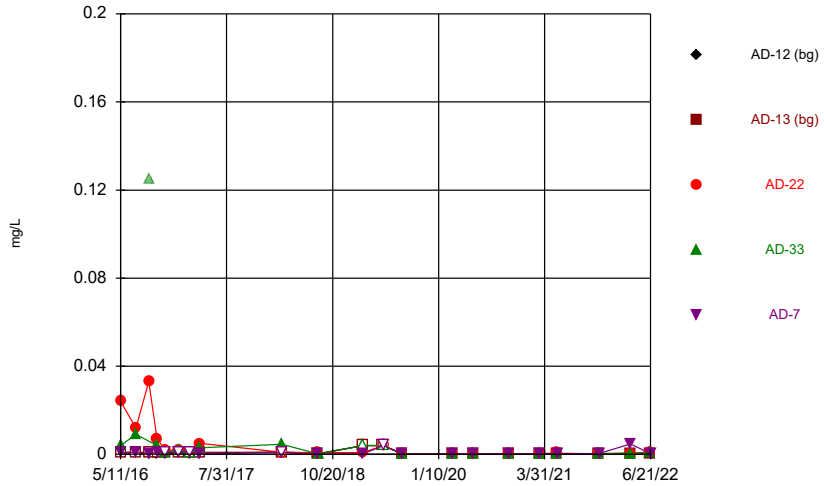
Time Series



Constituent: Cadmium, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

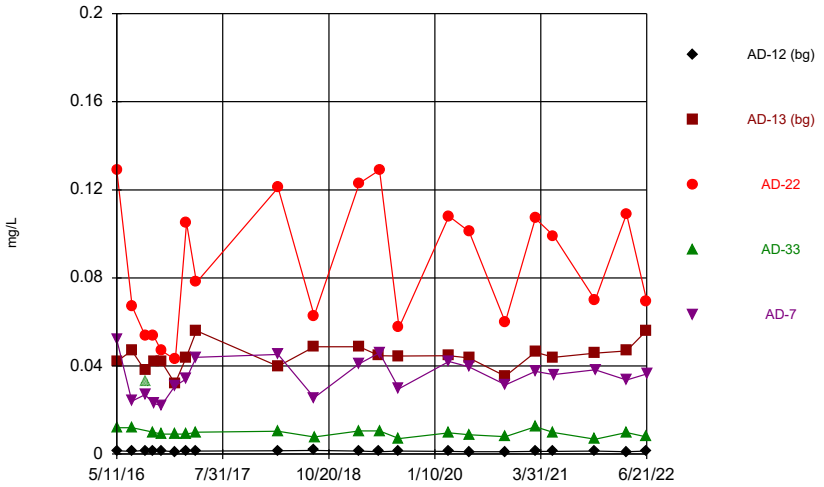
Time Series



Constituent: Chromium, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

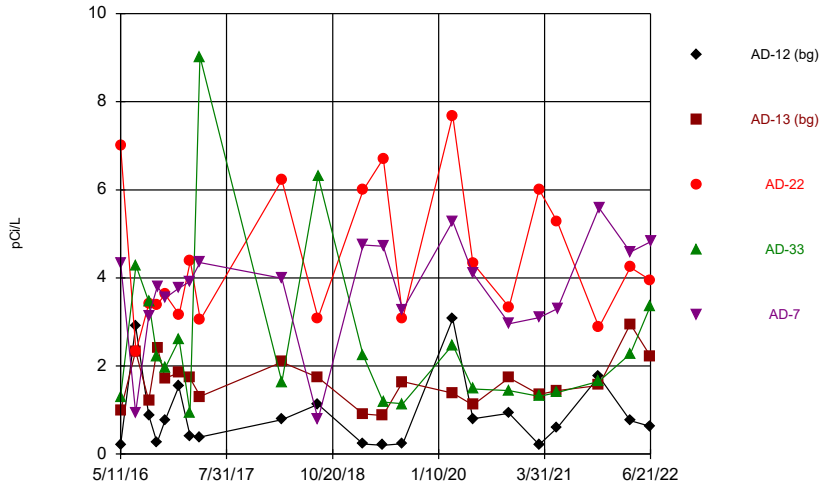
Time Series



Constituent: Cobalt, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

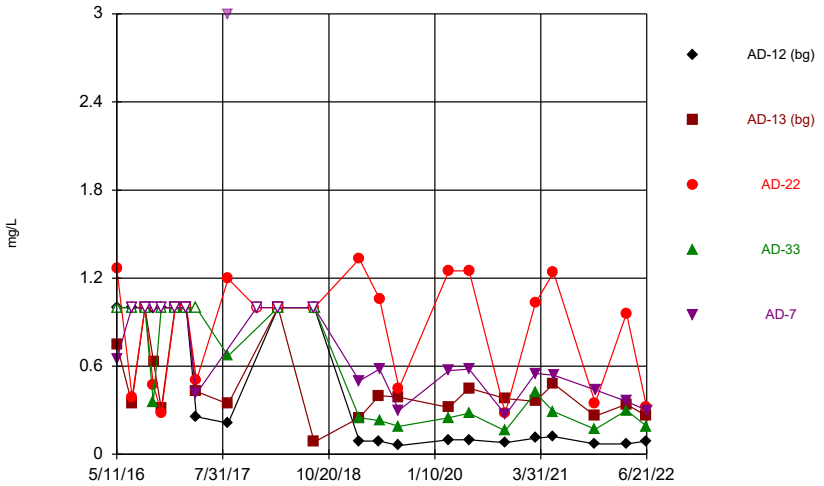
Time Series



Constituent: Combined Radium 226 + 228 Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

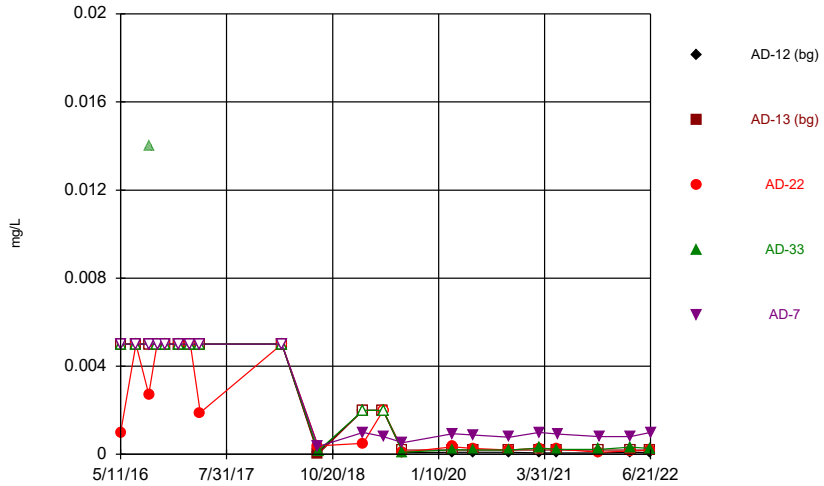
Time Series



Constituent: Fluoride, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

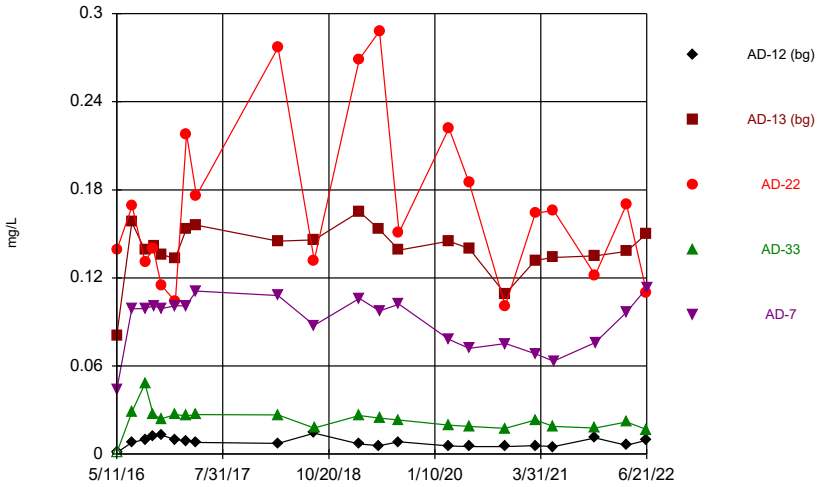
Time Series



Constituent: Lead, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

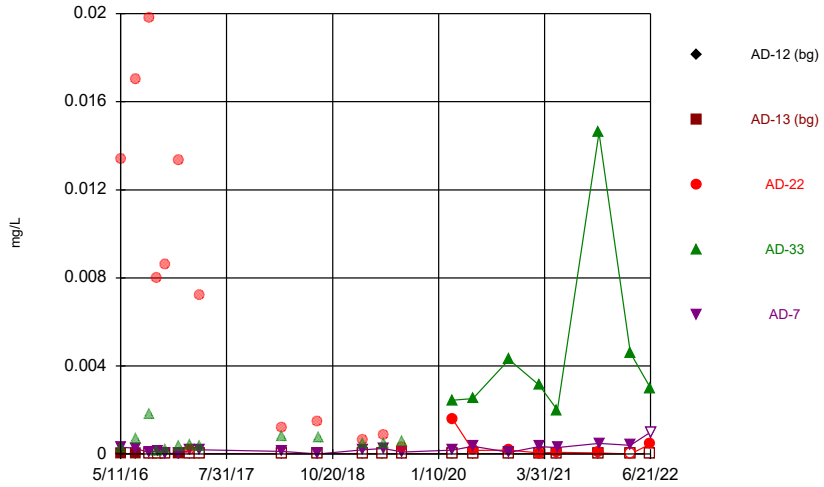
Time Series



Constituent: Lithium, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

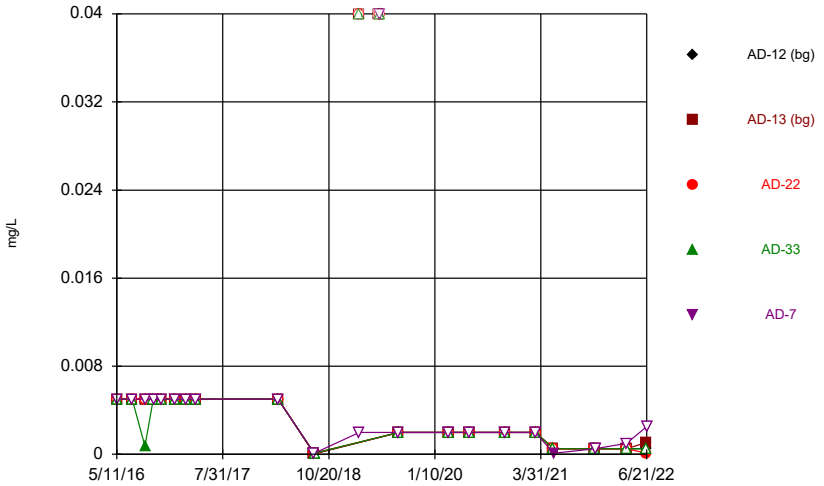
Time Series



Constituent: Mercury, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

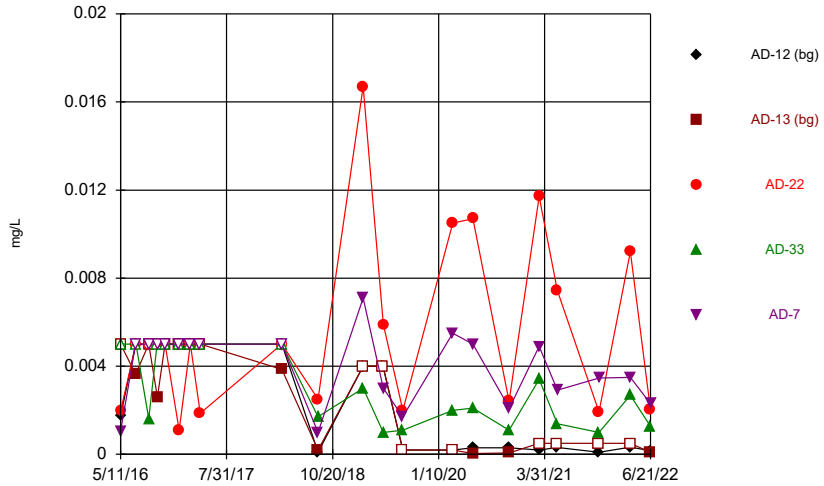
Time Series



Constituent: Molybdenum, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

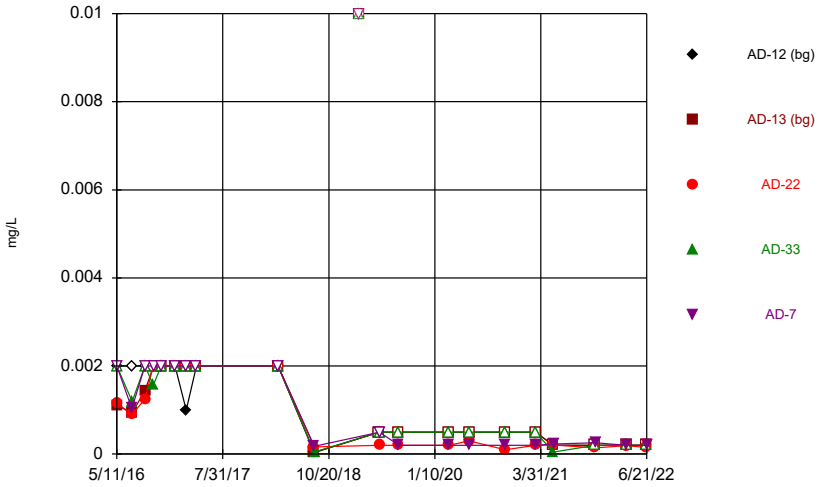
Time Series



Constituent: Selenium, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

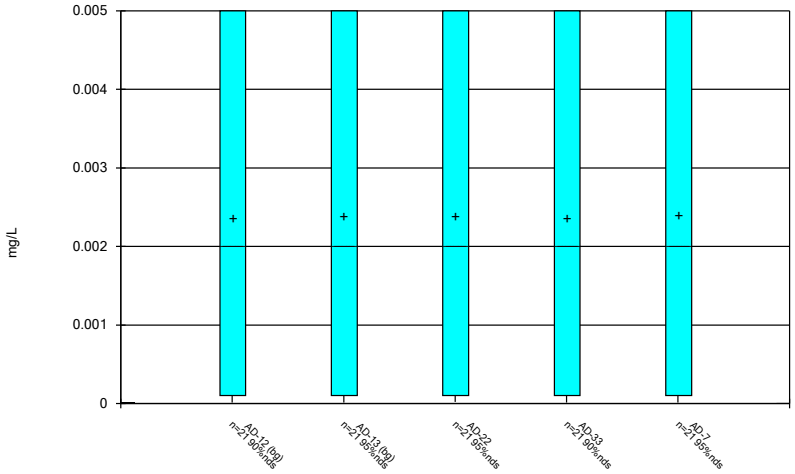
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



Constituent: Thallium, total Analysis Run 10/21/2022 8:16 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot

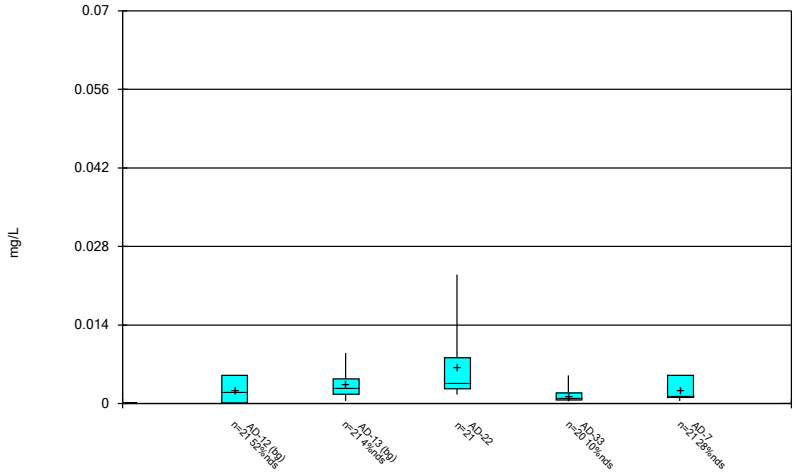


Constituent: Antimony, total Analysis Run 10/21/2022 8:17 AM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

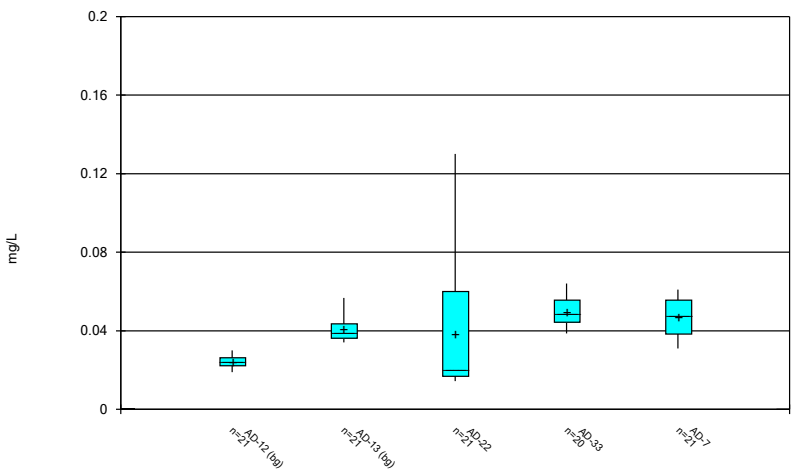


Constituent: Arsenic, total Analysis Run 10/21/2022 8:17 AM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

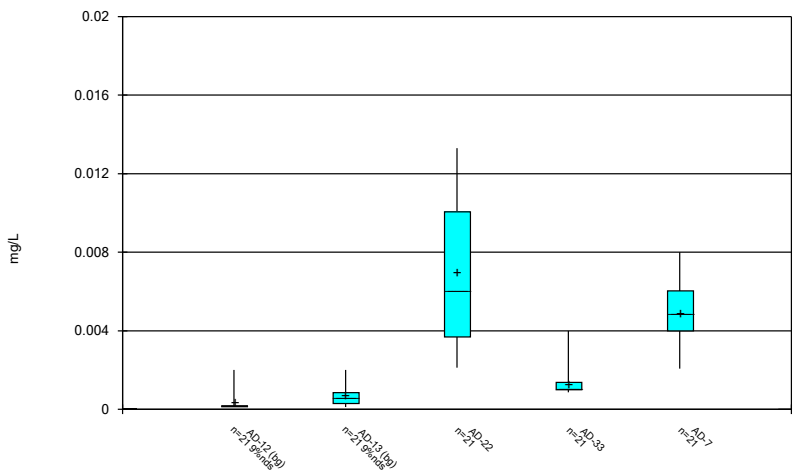


Constituent: Barium, total Analysis Run 10/21/2022 8:17 AM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

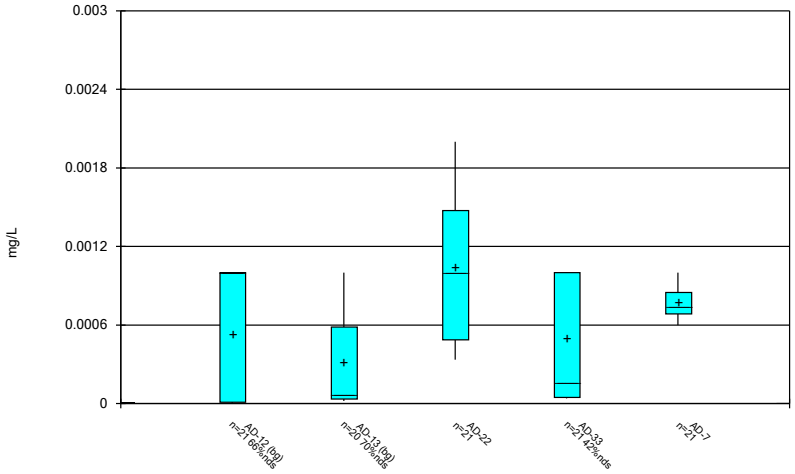
Box & Whiskers Plot



Constituent: Beryllium, total Analysis Run 10/21/2022 8:17 AM

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

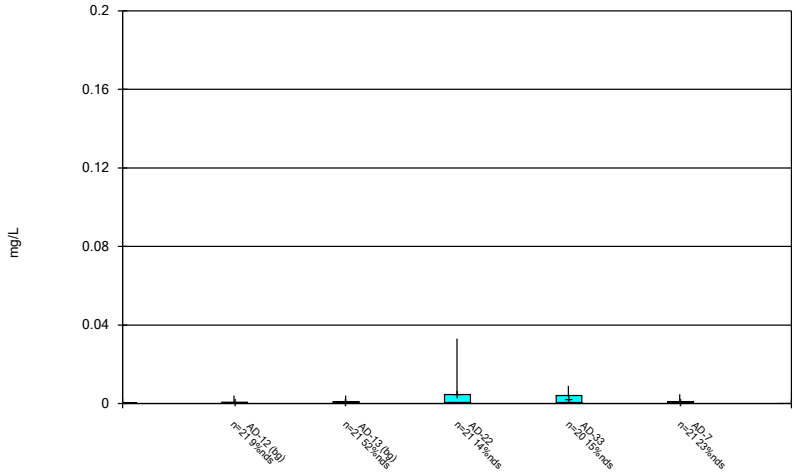
Box & Whiskers Plot



Constituent: Cadmium, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

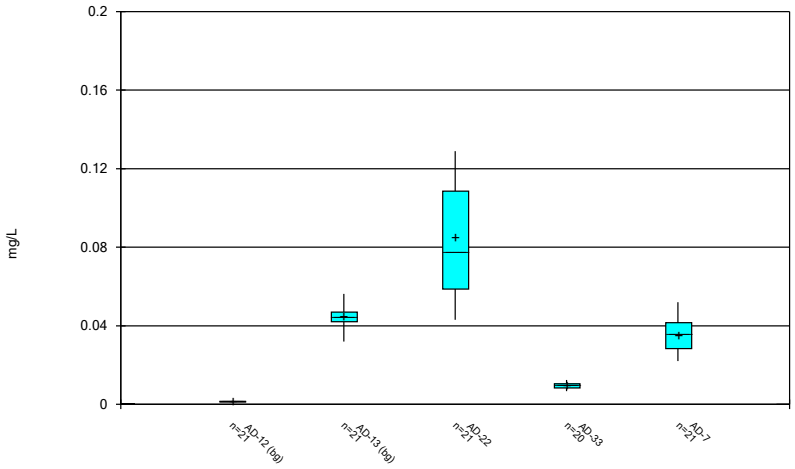
Box & Whiskers Plot



Constituent: Chromium, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

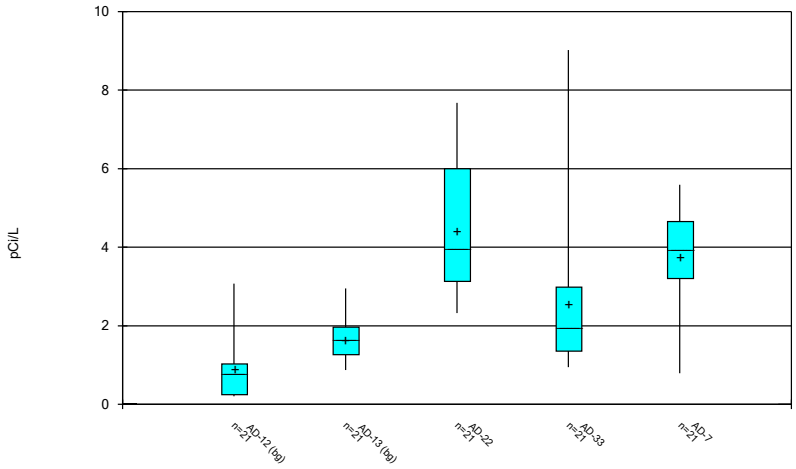
Box & Whiskers Plot



Constituent: Cobalt, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

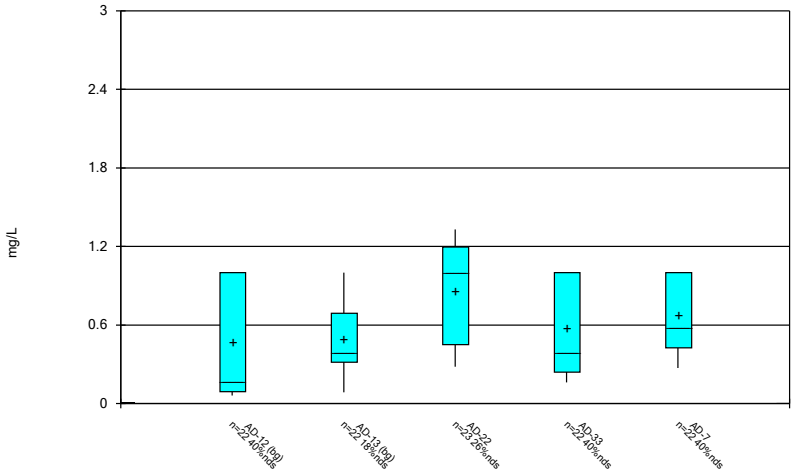
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



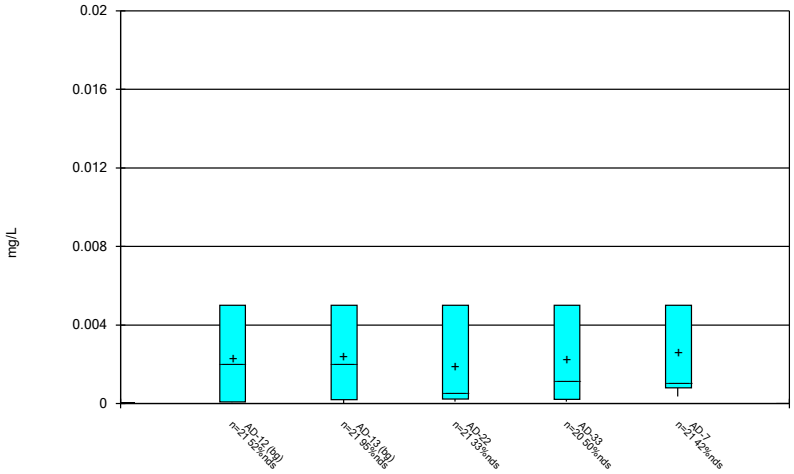
Constituent: Combined Radium 226 + 228 Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



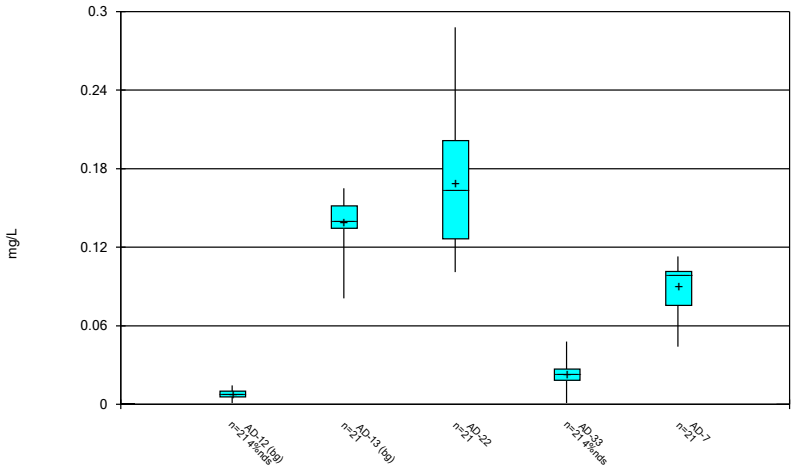
Constituent: Fluoride, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



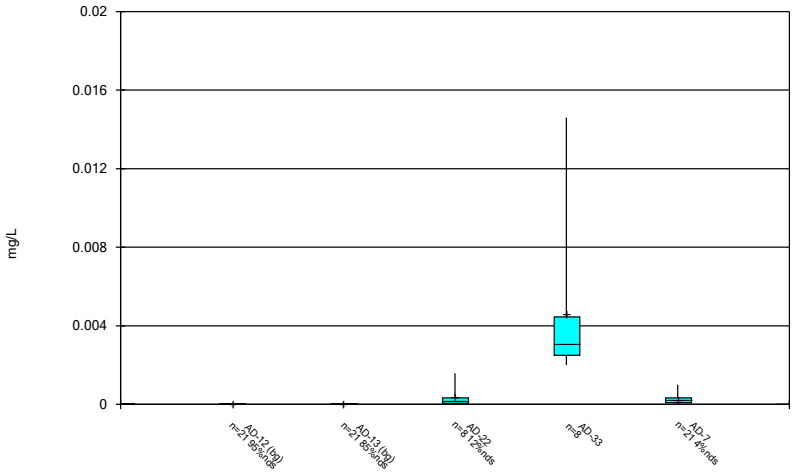
Constituent: Lead, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



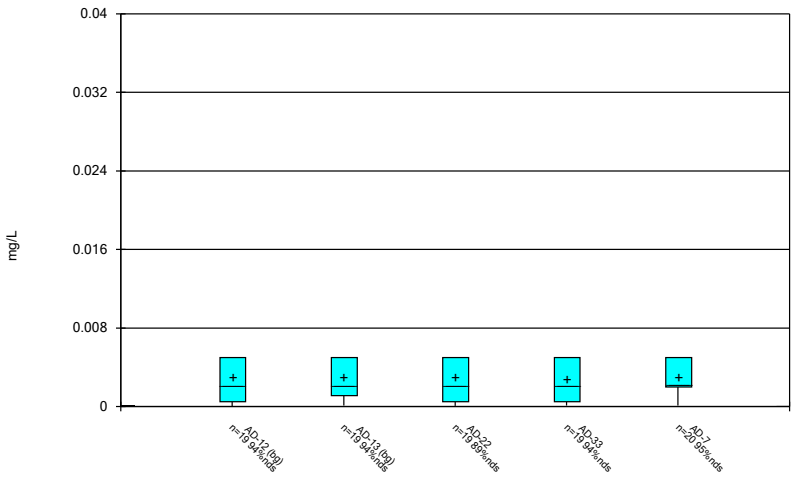
Constituent: Lithium, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Box & Whiskers Plot



Constituent: Mercury, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

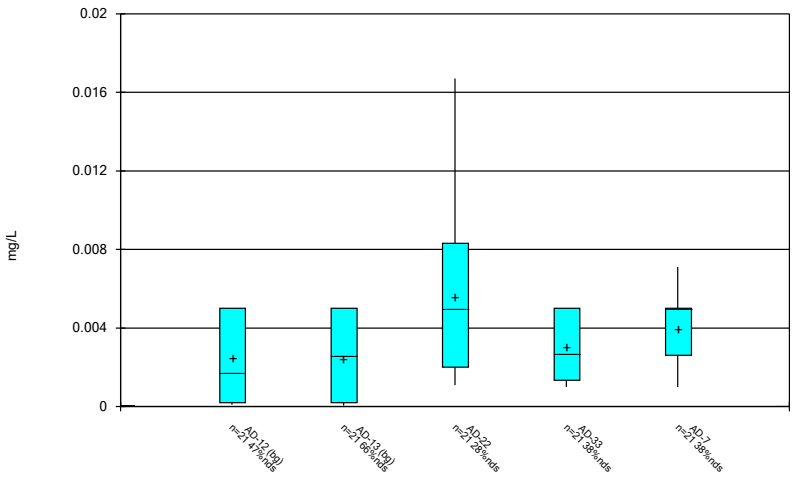
Box & Whiskers Plot



Constituent: Molybdenum, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

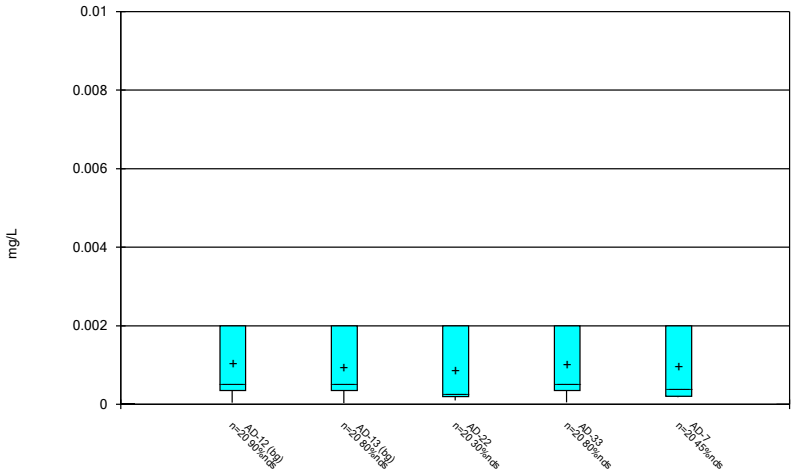
Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 10/21/2022 8:17 AM
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Outlier Summary

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 8/30/2022, 11:52 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-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)					

Appendix IV Trend Tests - Mercury AD-22 & AD-33 - All Results (All Significant)

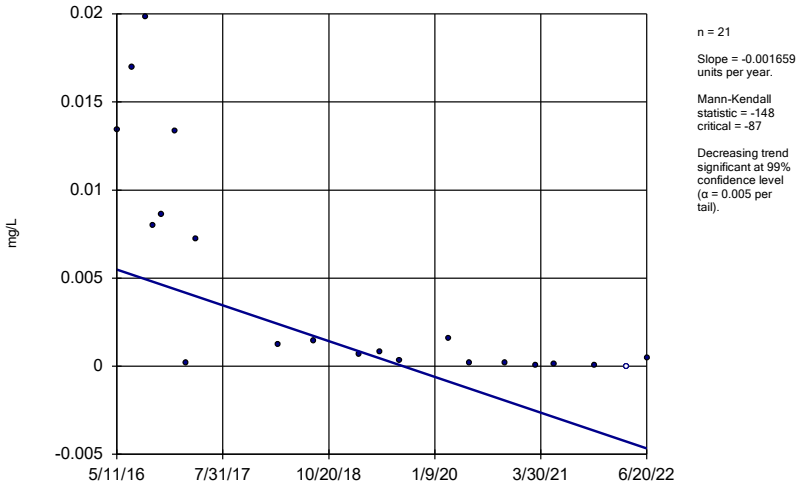
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 10/20/2022, 9:58 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Mercury, total (mg/L)	**AD-22**	**-0.001659**	**-148**	**-87**	**Yes**	**21**	**4.762**	**n/a**	**n/a**	**0.01**	**NP**
Mercury, total (mg/L)	**AD-33**	**0.0005011**	**132**	**87**	**Yes**	**21**	**0**	**n/a**	**n/a**	**0.01**	**NP**

Hollow symbols indicate censored values.

Sen's Slope Estimator

AD-22



n = 21

Slope = -0.001659 units per year.

Mann-Kendall statistic = -148
critical = -87

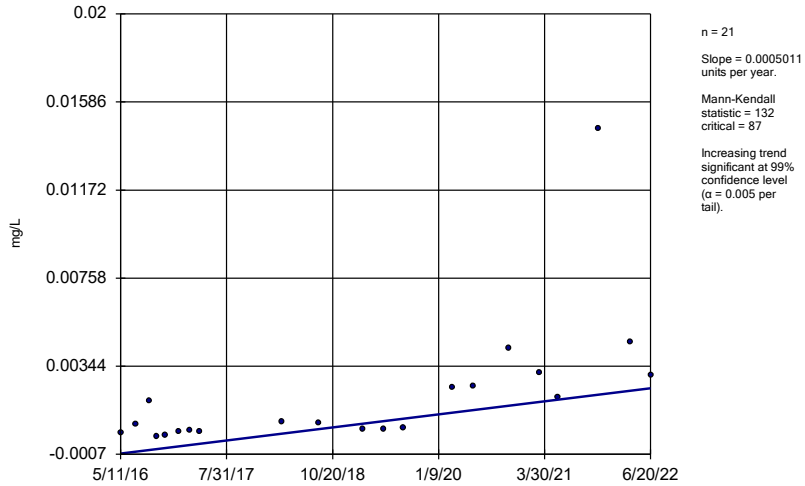
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Mercury, total Analysis Run 10/20/2022 9:57 AM View: Trend Tests
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Sen's Slope Estimator

AD-33



n = 21

Slope = 0.0005011 units per year.

Mann-Kendall statistic = 132
critical = 87

Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Mercury, total Analysis Run 10/20/2022 9:57 AM View: Trend Tests
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

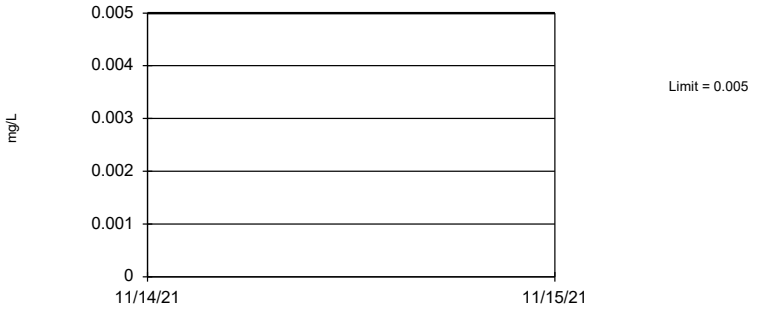
Tolerance Limits Summary Table

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 1/27/2022, 12:44 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.005	n/a	n/a	n/a	38	n/a	n/a	92.11	n/a	n/a	0.1424	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.009	n/a	n/a	n/a	38	n/a	n/a	31.58	n/a	n/a	0.1424	NP Inter(normality)
Barium, total (mg/L)	n/a	0.05192	n/a	n/a	n/a	38	0.03223	0.009191	0	None	No	0.05	Inter
Beryllium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	38	n/a	n/a	10.53	n/a	n/a	0.1424	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	n/a	n/a	n/a	37	n/a	n/a	70.27	n/a	n/a	0.1499	NP Inter(NDs)
Chromium, total (mg/L)	n/a	0.001364	n/a	n/a	n/a	38	-8.478	0.8777	34.21	Kaplan-Meier	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.056	n/a	n/a	n/a	38	n/a	n/a	0	n/a	n/a	0.1424	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	2.83	n/a	n/a	n/a	38	1.229	0.7474	0	None	No	0.05	Inter
Fluoride, total (mg/L)	n/a	1	n/a	n/a	n/a	40	n/a	n/a	32.5	n/a	n/a	0.1285	NP Inter(normality)
Lead, total (mg/L)	n/a	0.005	n/a	n/a	n/a	38	n/a	n/a	76.32	n/a	n/a	0.1424	NP Inter(NDs)
Lithium, total (mg/L)	n/a	0.165	n/a	n/a	n/a	38	n/a	n/a	2.632	n/a	n/a	0.1424	NP Inter(normality)
Mercury, total (mg/L)	n/a	0.000025	n/a	n/a	n/a	38	n/a	n/a	89.47	n/a	n/a	0.1424	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.005	n/a	n/a	n/a	34	n/a	n/a	97.06	n/a	n/a	0.1748	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	n/a	n/a	n/a	38	n/a	n/a	60.53	n/a	n/a	0.1424	NP Inter(NDs)
Thallium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	36	n/a	n/a	83.33	n/a	n/a	0.1578	NP Inter(NDs)

Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 38 background values. 92.11% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Antimony, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Non-parametric

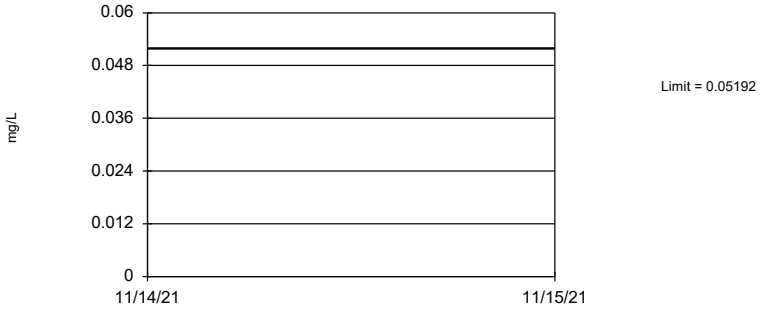
Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 38 background values. 31.58% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Arsenic, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Parametric



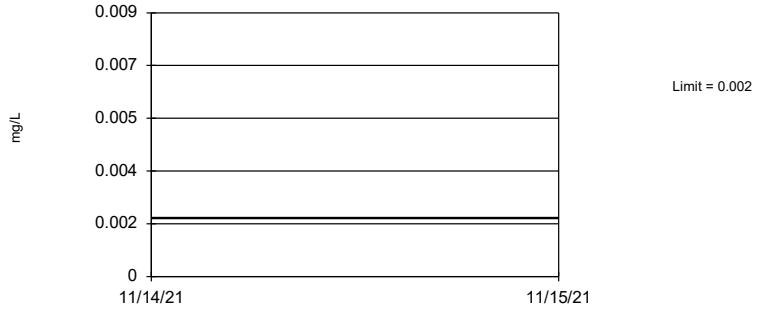
95% coverage. Background Data Summary: Mean=0.03223, Std. Dev.=0.009191, n=38. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9358, critical = 0.916. Report alpha = 0.05.

Constituent: Barium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Non-parametric

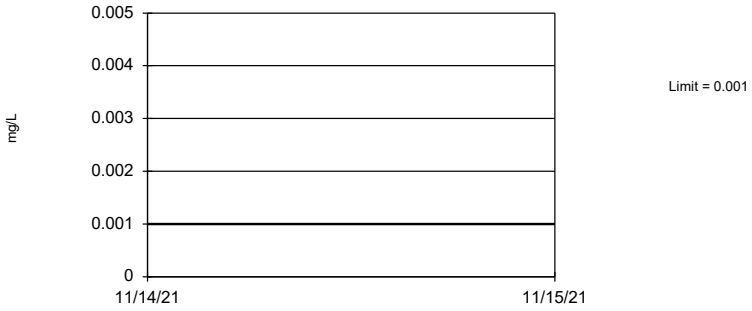


Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 38 background values. 10.53% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Beryllium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric

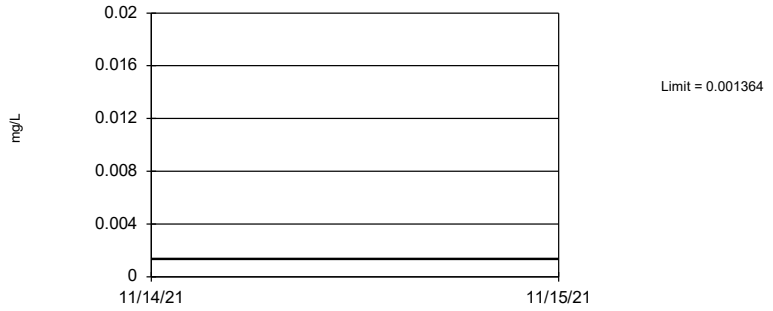


Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 37 background values. 70.27% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1499.

Constituent: Cadmium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Parametric

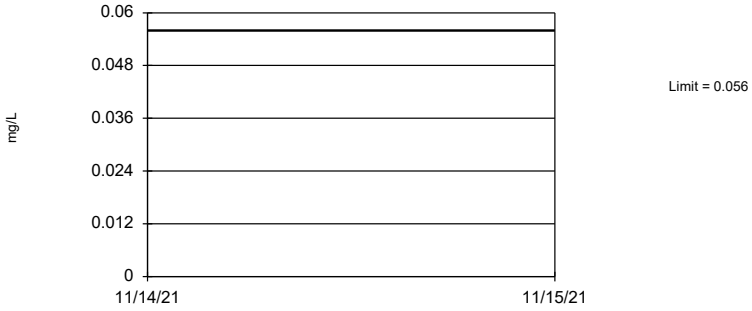


95% coverage. Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=-8.478, Std. Dev.=0.8777, n=38, 34.21% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.934, critical = 0.916. Report alpha = 0.05.

Constituent: Chromium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric

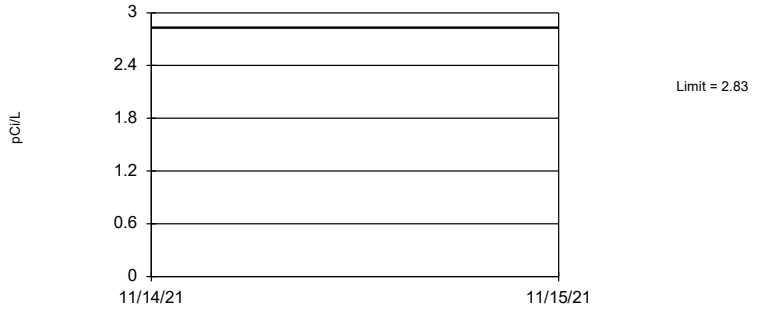


Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 38 background values. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Cobalt, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary: Mean=1.229, Std. Dev.=0.7474, n=38. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9445, critical = 0.916. Report alpha = 0.05.

Constituent: Combined Radium 226 + 228 Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limit
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric

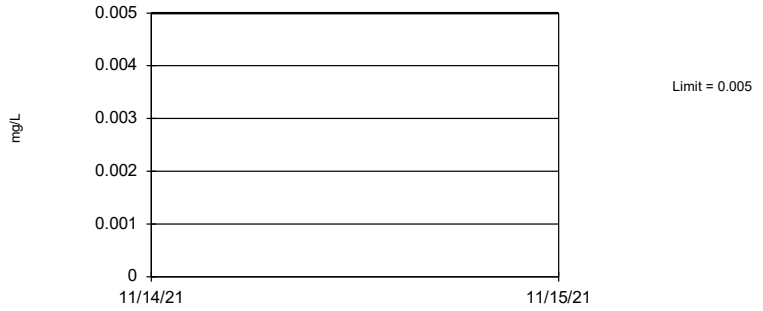
Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 40 background values. 32.5% NDs. 89.26% coverage at alpha=0.01; 92.77% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1285.

Constituent: Fluoride, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric



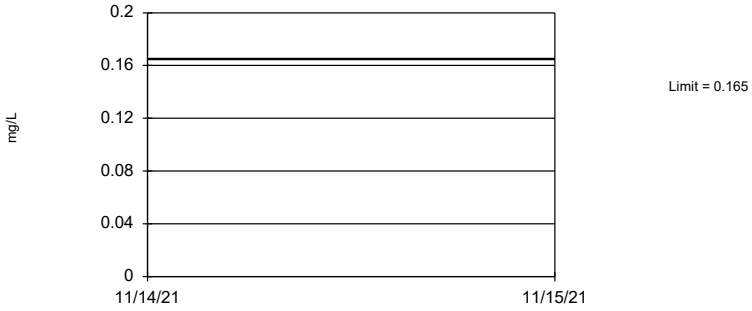
Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 38 background values. 76.32% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Lead, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric



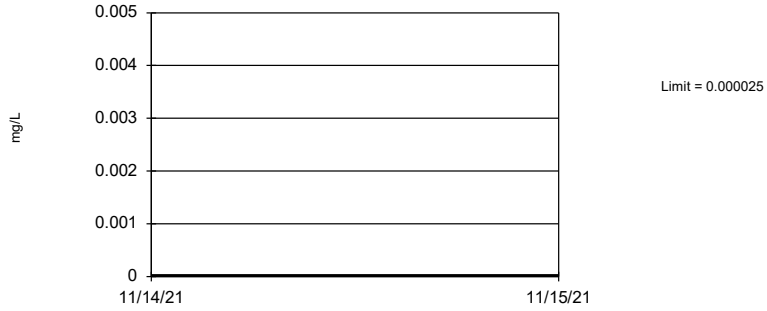
Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 38 background values. 2.632% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Lithium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric



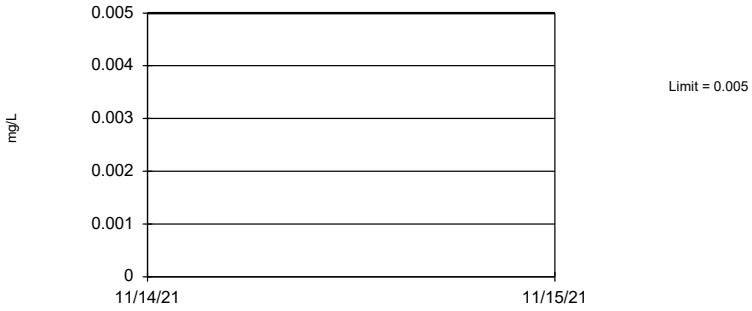
Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 38 background values. 89.47% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Mercury, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 34 background values. 97.06% NDs. 87.3% coverage at alpha=0.01; 91.6% coverage at alpha=0.05; 97.85% coverage at alpha=0.5. Report alpha = 0.1748.

Constituent: Molybdenum, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Non-parametric

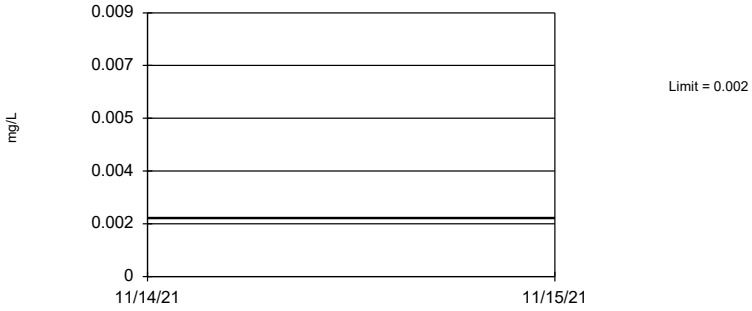
Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 38 background values. 60.53% NDs. 88.48% coverage at alpha=0.01; 92.38% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1424.

Constituent: Selenium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 36 background values. 83.33% NDs. 88.09% coverage at alpha=0.01; 91.99% coverage at alpha=0.05; 98.24% coverage at alpha=0.5. Report alpha = 0.1578.

Constituent: Thallium, total Analysis Run 1/27/2022 12:41 PM View: Upper Tolerance Limits
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

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	0.009	0.01
Barium, Total (mg/L)	2	0.052	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	0.0014	0.1
Cobalt, Total (mg/L)	n/a	0.056	0.056
Combined Radium, Total (pCi/L)	5	2.83	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*

Confidence Intervals - Significant Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 10/21/2022, 8:21 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Lower Compl.	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Beryllium, total (mg/L)	**AD-22**	**0.009016**	**0.004871**	**0.004**	**n/a**	**Yes**	**21**	**0.006943**	**0.003756**	**0**	**None**	**No**	**0.01**	**Param.**
Beryllium, total (mg/L)	**AD-7**	**0.005747**	**0.004064**	**0.004**	**n/a**	**Yes**	**21**	**0.004906**	**0.001525**	**0**	**None**	**No**	**0.01**	**Param.**
Cobalt, total (mg/L)	**AD-22**	**0.1015**	**0.0694**	**0.056**	**n/a**	**Yes**	**21**	**0.08543**	**0.02906**	**0**	**None**	**No**	**0.01**	**Param.**

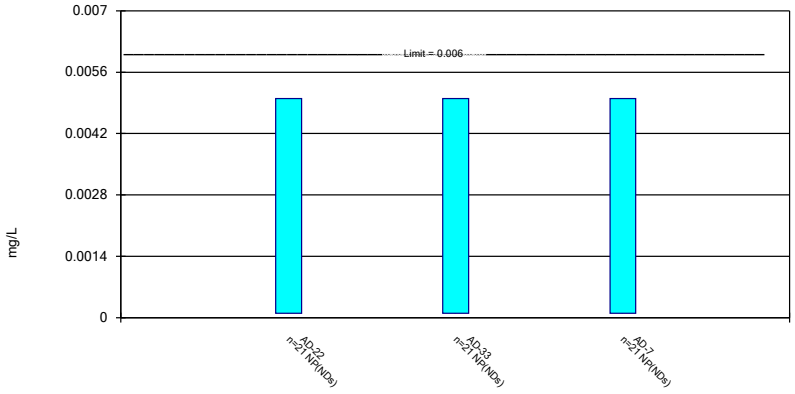
Confidence Intervals - All Results

Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 10/21/2022, 8:21 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Lower Compl.	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-22	0.005	0.0001	0.006	n/a	No	21	0.002377	0.002392	95.24	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-33	0.005	0.0001	0.006	n/a	No	21	0.002374	0.002395	90.48	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-7	0.005	0.0001	0.006	n/a	No	21	0.0024	0.00237	95.24	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-22	0.008017	0.003119	0.01	n/a	No	21	0.006491	0.006244	0	None	x^(1/3)	0.01	Param.
Arsenic, total (mg/L)	AD-33	0.001857	0.0007289	0.01	n/a	No	20	0.001482	0.00134	10	None	x^(1/3)	0.01	Param.
Arsenic, total (mg/L)	AD-7	0.001358	0.0008445	0.01	n/a	No	21	0.00228	0.001805	28.57	Kaplan-Meier	ln(x)	0.01	Param.
Barium, total (mg/L)	AD-22	0.066	0.0167	2	n/a	No	21	0.03859	0.03292	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-33	0.05395	0.04582	2	n/a	No	20	0.04989	0.00716	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-7	0.05205	0.04197	2	n/a	No	21	0.04701	0.009136	0	None	No	0.01	Param.
Beryllium, total (mg/L)	**AD-22**	**0.009016**	**0.004871**	**0.004**	**n/a**	**Yes**	**21**	**0.006943**	**0.003756**	**0**	**None**	**No**	**0.01**	**Param.**
Beryllium, total (mg/L)	AD-33	0.0014	0.000939	0.004	n/a	No	21	0.001298	0.0006993	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	**AD-7**	**0.005747**	**0.004064**	**0.004**	**n/a**	**Yes**	**21**	**0.004906**	**0.001525**	**0**	**None**	**No**	**0.01**	**Param.**
Cadmium, total (mg/L)	AD-22	0.001359	0.0007364	0.005	n/a	No	21	0.001048	0.0005643	0	None	No	0.01	Param.
Cadmium, total (mg/L)	AD-33	0.001	0.000043	0.005	n/a	No	21	0.0005053	0.0004824	42.86	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-7	0.0008338	0.0007086	0.005	n/a	No	21	0.0007712	0.0001135	0	None	No	0.01	Param.
Chromium, total (mg/L)	AD-22	0.003082	0.0005681	0.1	n/a	No	21	0.004577	0.008579	14.29	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-33	0.002622	0.0004958	0.1	n/a	No	20	0.001967	0.002353	15	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	AD-7	0.0005195	0.0001949	0.1	n/a	No	21	0.0008961	0.001217	23.81	Kaplan-Meier	ln(x)	0.01	Param.
Cobalt, total (mg/L)	**AD-22**	**0.1015**	**0.0694**	**0.056**	**n/a**	**Yes**	**21**	**0.08543**	**0.02906**	**0**	**None**	**No**	**0.01**	**Param.**
Cobalt, total (mg/L)	AD-33	0.01041	0.0086	0.056	n/a	No	20	0.009504	0.001592	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-7	0.03979	0.03066	0.056	n/a	No	21	0.03522	0.008275	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-22	5.302	3.569	5	n/a	No	21	4.436	1.57	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-33	2.92	1.538	5	n/a	No	21	2.557	1.951	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-7	4.43	3.101	5	n/a	No	21	3.765	1.205	0	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-22	1.196	0.45	4	n/a	No	23	0.8535	0.3711	26.09	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-33	1	0.23	4	n/a	No	22	0.5799	0.3724	40.91	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-7	1	0.44	4	n/a	No	22	0.6841	0.2855	40.91	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-22	0.005	0.0002	0.005	n/a	No	21	0.00192	0.002114	33.33	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-33	0.005	0.000208	0.005	n/a	No	20	0.002309	0.002315	50	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-7	0.005	0.0008	0.005	n/a	No	21	0.00261	0.002126	42.86	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-22	0.2001	0.1379	0.17	n/a	No	21	0.169	0.05644	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-33	0.0267	0.0178	0.17	n/a	No	21	0.02294	0.008375	4.762	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-7	0.1004	0.08043	0.17	n/a	No	21	0.09043	0.01813	0	None	No	0.01	Param.
Mercury, total (mg/L)	AD-22	0.0006615	0.00001412	0.002	n/a	No	8	0.0003237	0.0005271	12.5	None	x^(1/3)	0.01	Param.
Mercury, total (mg/L)	AD-33	0.0146	0.002	0.002	n/a	No	8	0.004575	0.004149	0	None	No	0.004	NP (normality)
Mercury, total (mg/L)	AD-7	0.0003135	0.0001097	0.002	n/a	No	21	0.0002395	0.0002176	4.762	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-22	0.005	0.0005	0.005	n/a	No	19	0.002983	0.002065	89.47	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-33	0.005	0.0005	0.005	n/a	No	19	0.002781	0.002036	94.74	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-7	0.005	0.001	0.005	n/a	No	20	0.00306	0.001909	95	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-22	0.006152	0.002236	0.05	n/a	No	21	0.005614	0.004097	28.57	Kaplan-Meier	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	AD-33	0.005	0.00127	0.05	n/a	No	21	0.003017	0.00171	38.1	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-7	0.003943	0.002177	0.05	n/a	No	21	0.003977	0.001642	38.1	Kaplan-Meier	No	0.01	Param.
Thallium, total (mg/L)	AD-22	0.002	0.00019	0.002	n/a	No	20	0.0008679	0.0008289	30	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-33	0.002	0.0002	0.002	n/a	No	20	0.001023	0.0008135	80	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-7	0.002	0.0002	0.002	n/a	No	20	0.0009801	0.0008747	45	None	No	0.01	NP (normality)

Non-Parametric Confidence Interval

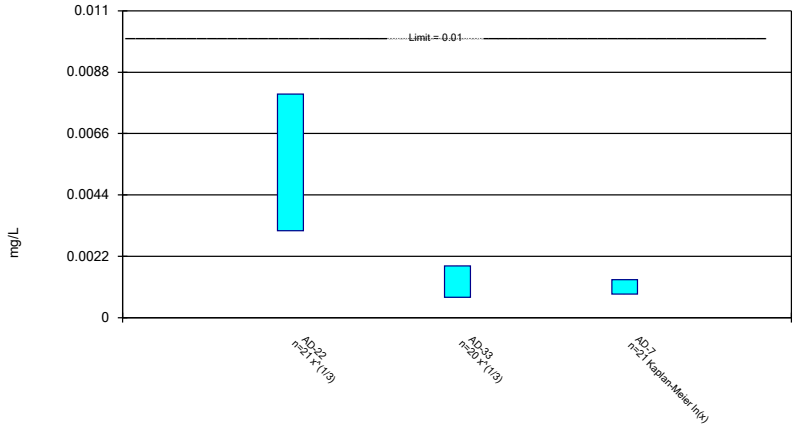
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 10/21/2022 8:18 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

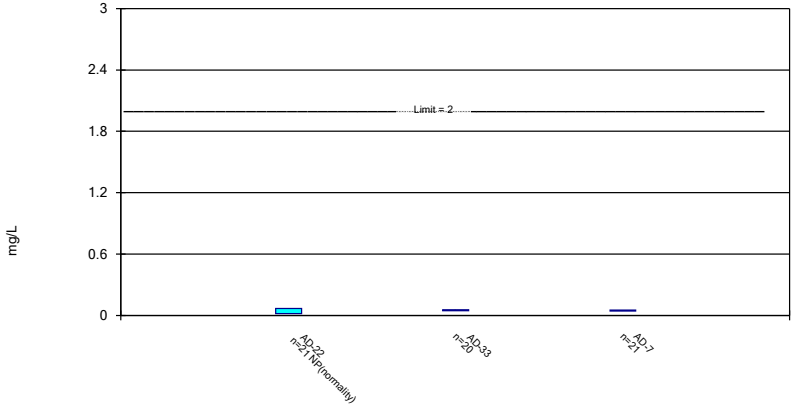
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 10/21/2022 8:18 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

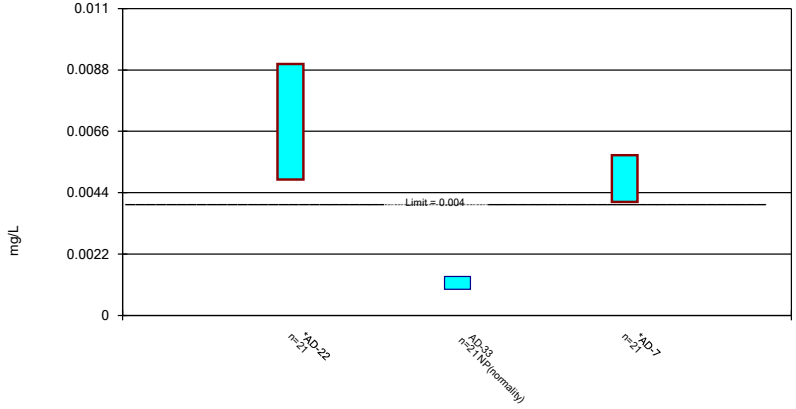
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 10/21/2022 8:18 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

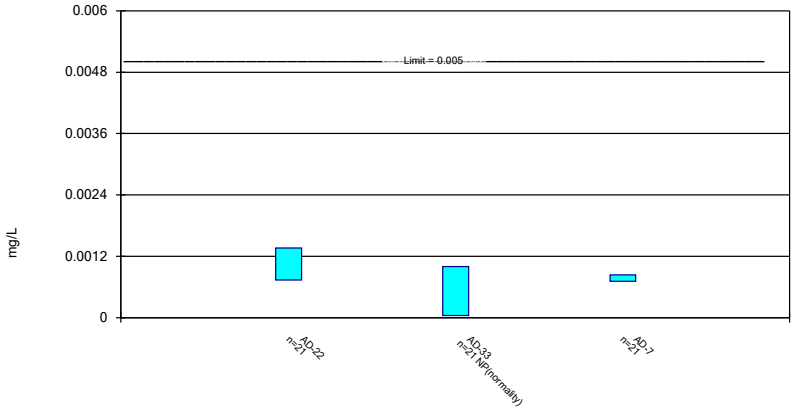
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 10/21/2022 8:18 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

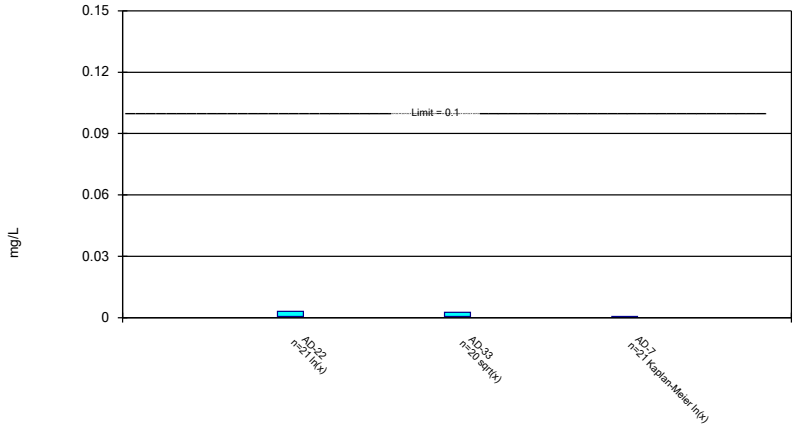
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 10/21/2022 8:18 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

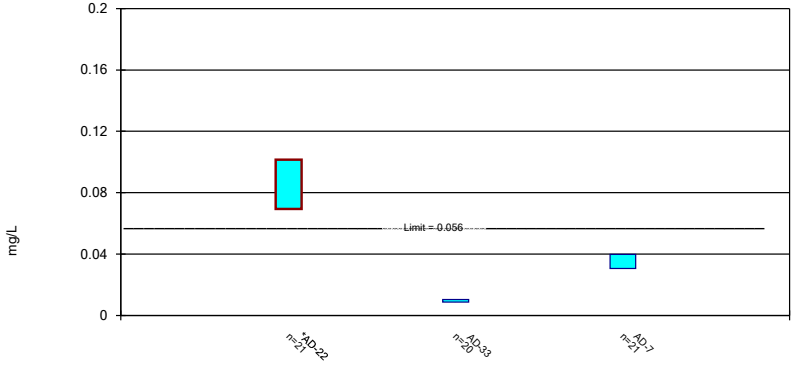
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 10/21/2022 8:18 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 10/21/2022 8:18 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric Confidence Interval

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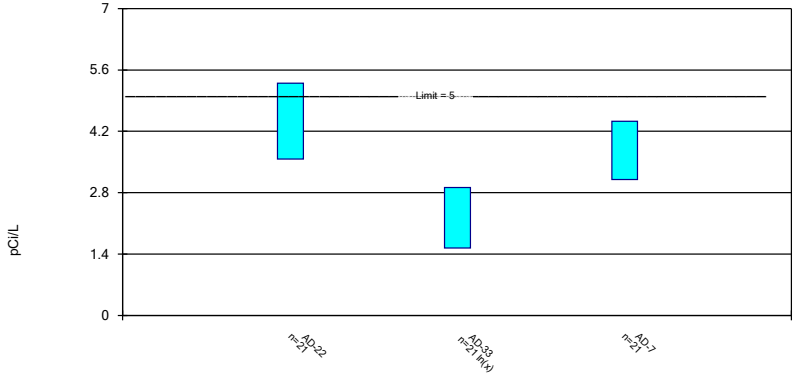
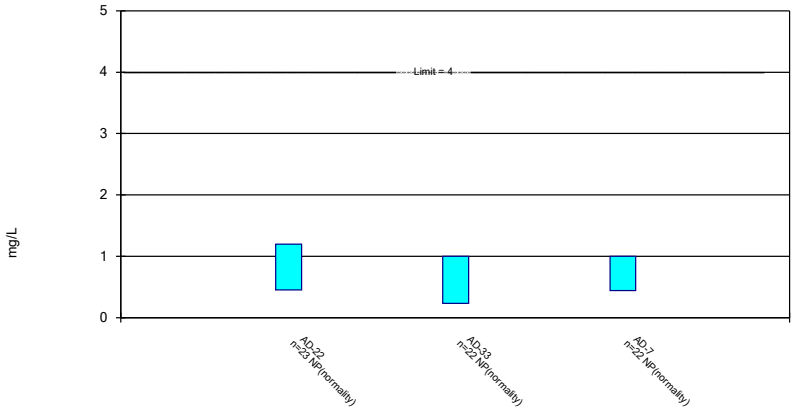


Constituent: Combined Radium 226 + 228 Analysis Run 10/21/2022 8:18 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

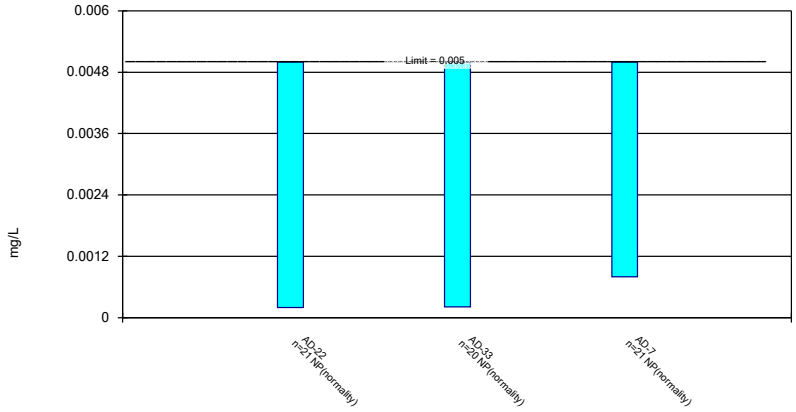
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Fluoride, total Analysis Run 10/21/2022 8:18 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

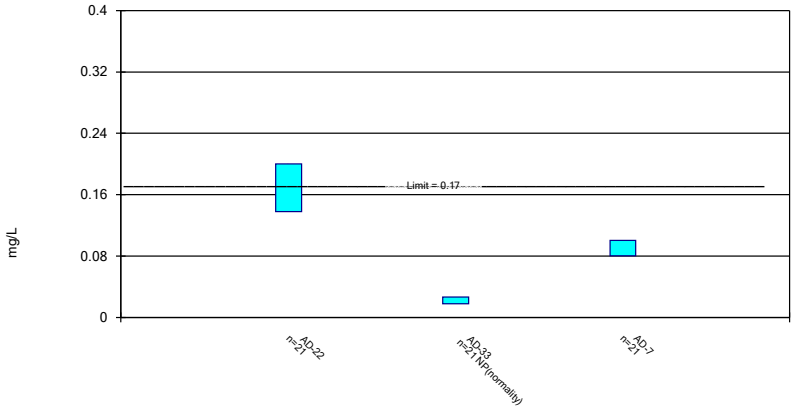
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 10/21/2022 8:18 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

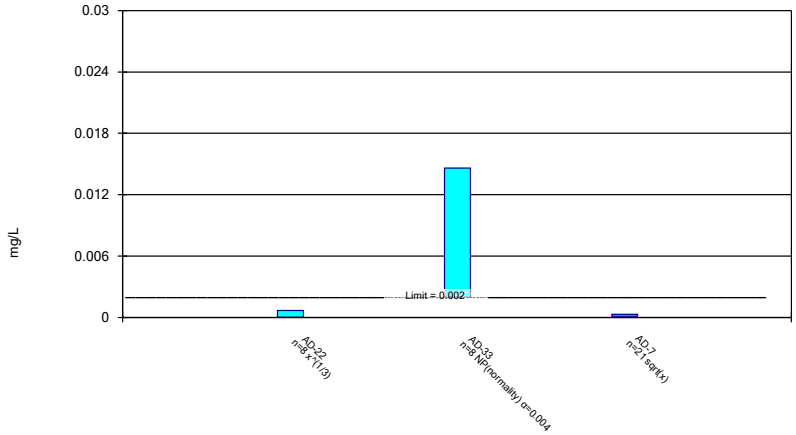
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 10/21/2022 8:19 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

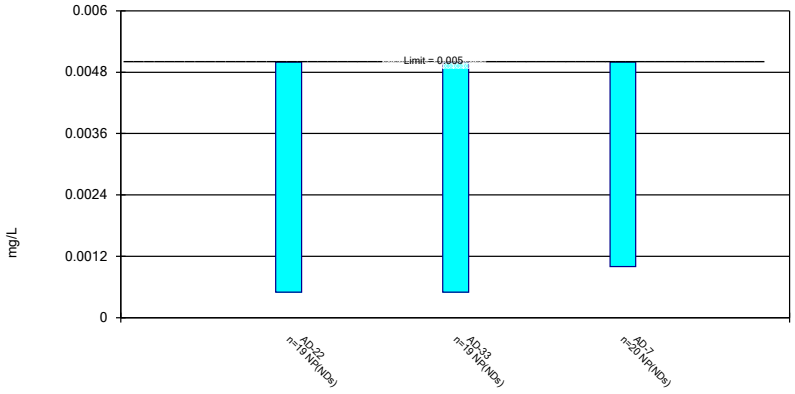
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 10/21/2022 8:19 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 10/21/2022 8:19 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Parametric and Non-Parametric (NP) Confidence Interval

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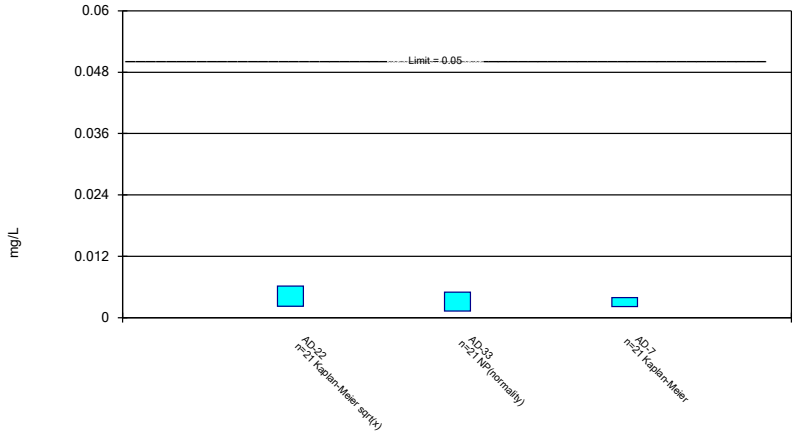
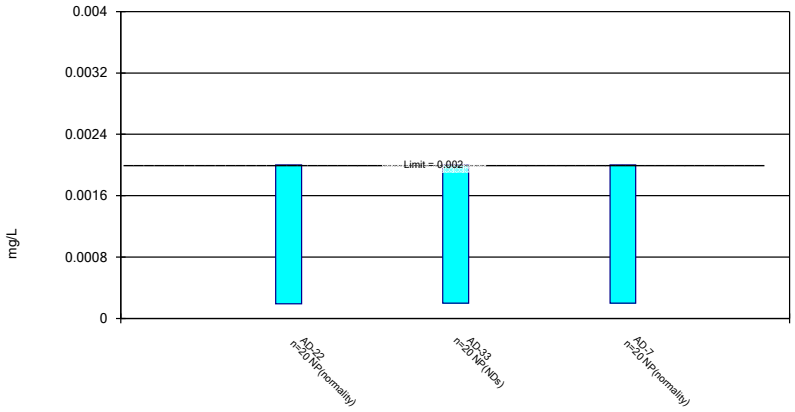


Constituent: Selenium, total Analysis Run 10/21/2022 8:19 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Non-Parametric Confidence Interval

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



Constituent: Thallium, total Analysis Run 10/21/2022 8:19 AM View: Confidence Intervals
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Confidence Intervals - Well AD-22 (Deseasonalized Results)

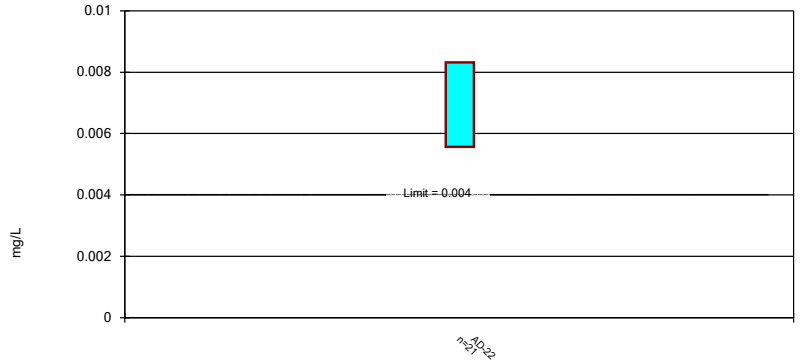
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout Printed 8/30/2022, 12:00 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Beryllium, total (mg/L)	**AD-22**	**0.008319**	**0.005568**	**0.004**	**Yes**	**21**	**0.006943**	**0.002494**	**0**	**None**	**No**	**0.01**	**Param.**
Cobalt, total (mg/L)	**AD-22**	**0.09671**	**0.07415**	**0.056**	**Yes**	**21**	**0.08543**	**0.02044**	**0**	**None**	**No**	**0.01**	**Param.**
Combined Radium 226 + 228 (pCi/L)	AD-22	5.071	3.8	5	No	21	4.436	1.152	0	None	No	0.01	Param.
Lithium, total (mg/L)	AD-22	0.1944	0.1436	0.17	No	21	0.169	0.04605	0	None	No	0.01	Param.

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

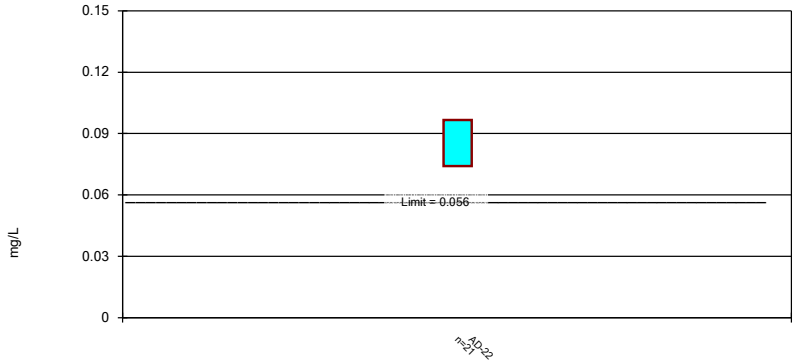


Constituent: Beryllium, total, Alt. Values Analysis Run 8/30/2022 11:58 AM View: Deseasonalized Confide
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

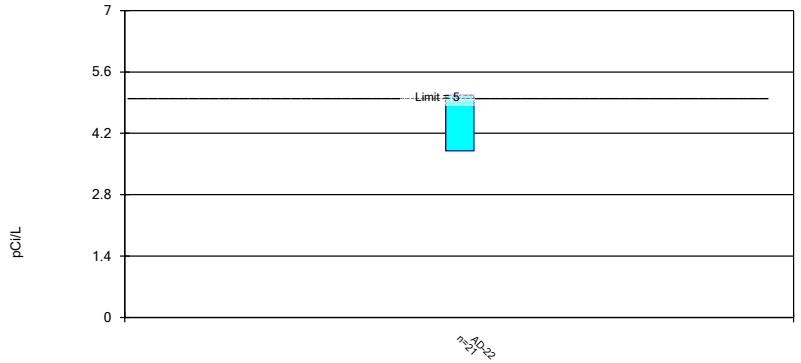


Constituent: Cobalt, total, Alt. Values Analysis Run 8/30/2022 11:58 AM View: Deseasonalized Confidenc
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

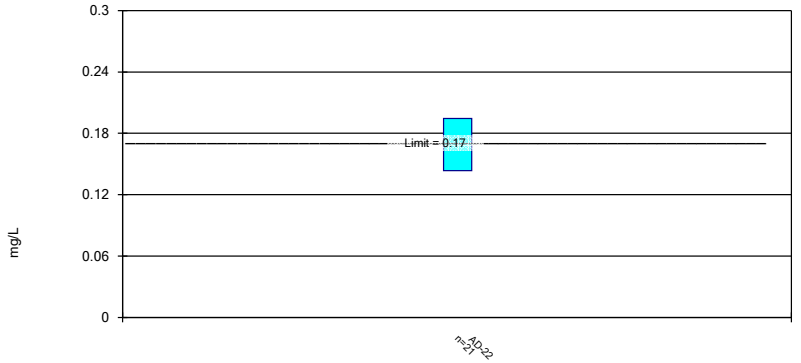


Constituent: Combined Radium 226 + 228, Alt. Values Analysis Run 8/30/2022 11:59 AM View: Deseaso
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

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 8/30/2022 11:59 AM View: Deseasonalized Confiden
Pirkey Stackout Client: Geosyntec Data: Pirkey Stackout

Geosyntec consultants

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Worthington, Ohio 43085
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Memorandum

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

This memorandum summarizes the findings of a data quality review for groundwater samples collected at the H.W. Pirkey Power Plant, located in Pittsburg, Texas in November 2022. The groundwater samples were collected to comply with the Texas Commission on Environmental Quality's (TCEQ's) regulations regarding the disposal of coal combustion residuals (CCRs) in landfills and surface impoundments (Title 30 Chapter 352, "CCR Rule"). The groundwater samples were analyzed for 40 CFR 257 Appendix III and IV constituents, plus additional constituents collected to support site evaluation efforts.

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

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

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

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

The following data quality issues were identified:

- As reported in SDG 223664, chromium, cobalt, and molybdenum were detected in the equipment blank sample "Equipment Blank" collected on 11/16/2022. The detected chromium concentration in the equipment blank (0.47 µg/L) was more than 10% of the detected values in the groundwater samples, which could result in high bias for all groundwater chromium results. The detected cobalt concentration in the equipment blank (0.143 µg/L) was more than 10% of the detected value in sample "AD-18" (0.723 µg/L), which could result in high bias in the "AD-18" cobalt results. The estimated molybdenum concentration in the equipment blank (0.2 µg/L) was more than 10% of the detected value in sample "Duplicate-2" (0.2 µg/L), which could result in high bias in the "Duplicate-2" molybdenum results. Molybdenum was not detected in the other groundwater samples.

- As reported in SDG 223649, the relative percent difference (RPD) for sulfate concentrations from parent sample "AD-36" and duplicate sample "Landfill Duplicate" was 86%. The "AD-36" sulfate results should be considered estimated.

- As reported in SDG 223664, the following matrix spike (MS) and matrix spike duplicate (MSD) recovery for sodium (160% and 223%, respectively) associated with sample "AD-2" was above the acceptable range of 75-125%. The MS recovery for sodium (50.4%) associated with sample "AD-30" was below the acceptable range of 75-125%. The associated samples ("AD-2" and "AD-30") were flagged M1: the associated MS or MSD recovery was outside acceptance limits. The "AD-2" and "AD-30" sodium results should be considered estimated. Sodium is not a regulated Appendix III or IV constituent.

- As reported in SDG 223664, the RPD for radium-226 (52.5%) in the laboratory duplicate was above the acceptable limit of 25%. The "AD-12" radium-226 result was flagged P1: the precision between duplicate results was above acceptance limits. The "AD-12" radium-226 results should be considered estimated.

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

APPENDIX 3- Alternate Source Demonstrations

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

ALTERNATIVE SOURCE DEMONSTRATION REPORT TEXAS STATE CCR RULE

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

Submitted to

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

941 Chatham Lane, Suite 103
Columbus, OH 43221

June 2022

CHA8495

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

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 second semi-annual assessment monitoring event of 2021.

The H.W. Pirkey Plant has four coal combustion residuals (CCR) storage units regulated by the Texas Commission on Environmental Quality (TCEQ) under Registration No. CCR104, including the FGD Stackout Area (**Figure 1**). The FGD Stackout Area is also registered as a waste pile under TCEQ Industrial and Hazardous Waste Solid Waste Registration No. 33240.

In November 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 SSLs above the GWPSs. Seasonal patterns were observed for beryllium, cadmium, cobalt, combined radium, fluoride, and lithium at AD-22 (Geosyntec, 2022). 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, 2022):

- The deseasonalized LCL for beryllium exceeded the GWPS of 0.0040 mg/L at AD-22 (0.0056 mg/L); and
- The deseasonalized LCL for cobalt exceeded the GWPS of 0.0056 mg/L at AD-22 (0.0724 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. Descriptions of the regional geology and site hydrogeology, and the methodology used to evaluate the SSLs and proposed alternative source are described below.

2.1 Regional Geology/Site Hydrogeology

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

The Stackout Area monitoring well network monitors groundwater within the uppermost aquifer, which was defined by Arcadis (2016) as very fine to fine grained clayey and silty sand located about 10 to 20 feet below the Stackout Area with an average thickness of approximately 20 feet. Geologic cross-sections B-B' and E-E' from Arcadis (2016) show the subsurface structure of the uppermost aquifer (indicated on the figures as clayey silty sand, brown to gray in color) underlying the Stackout Area. These figures as well as a cross-section location map are provided in **Attachment A**. The geologic cross-sections demonstrate lateral continuity of the uppermost aquifer at and around the Stackout Area.

Groundwater flow direction at and near the Stackout Area is west-northwesterly (**Figure 1**). Groundwater flow velocities in the uppermost aquifer in the vicinity of the Stackout Area have been reported as approximately 5 to 35 feet/year. The Stackout Area monitoring well network consists of upgradient monitoring wells AD-12 and AD-13, and downgradient compliance wells AD-7, AD-22, and AD-33, all of which are screened within the uppermost aquifer.

2.2 Proposed Alternative Source

An initial review of site geochemistry, site historical data, and laboratory quality assurance/quality control (QA/QC) data did not identify alternative sources for beryllium and cobalt due to Type I (sampling), Type II (laboratory), Type III (statistical evaluation), or Type V (alternative: anthropologic) issues. Groundwater sampling, laboratory analysis, and statistical evaluations were generally completed in accordance with 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.

2.2.1 Beryllium

An SSL was identified for beryllium at AD-22 using deseasonalized statistics (Geosyntec, 2022). 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 at AD-22 was 0.00878 milligrams per liter (mg/L) in March 2022, in contrast to 0.0025 mg/L in November 2021. Previous ASDs for the FGD Stackout Area showed that beryllium concentrations at AD-22 appear to correlate with groundwater elevations (Geosyntec, 2019; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021a; Geosyntec, 2021d). This relationship still holds true (**Figure 2**). Beryllium concentrations at AD-22 are correlated with seasonal changes in other relatively mobile cationic 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 present in the seasonally saturated zones above the permanent water table. The boring log for SP-B4 is provided in **Attachment B,** and the original boring log and well construction diagram is provided in **Attachment C**. 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 clay minerals 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 characteristically high cation exchange capacity (compared to low-activity 1:1 clay minerals), make up the majority of the clay minerals present at that interval.

Sorption and desorption of beryllium from smectite-type clays is well documented (You, et al., 1989; Boschi and Willenbring, 2016a). Desorption was found to be affected by pH, with 75% of beryllium desorbing 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 since 2016 ranged from 3.5 to 5.1 SU, suggesting that conditions are favorable for beryllium desorption from smectite-type clays. The presence of these exchangeable clays coupled with groundwater pH conditions indicate that the exceedance of beryllium at AD-22 is due to the effects of seasonal groundwater elevation changes and the resulting cation exchange between groundwater and the exchangeable clay within the seasonal water table.

2.2.2 Cobalt

An SSL was identified for cobalt at AD-22 using deseasonalized statistics (Geosyntec, 2022). As shown in previous ASDs (Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021a; Geosyntec, 2021d), 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 groundwater-mineral interactions within the seasonally saturated zone is governing dissolved cobalt concentrations.

A sample of the solid FGD sludge material accumulated on the FGD Stackout Area was collected in July 2019 and submitted for laboratory analyses. 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) to evaluate the material as a potential source of cobalt. No changes to material handling or plant operations have occurred which would alter the anticipated chemical composition since this sample was initially collected. Calcium-cobalt ratios for the leached sludge material and site groundwater are displayed on **Figure 8**. The concentration ratio between calcium and cobalt is consistently on the order of 100:1 at both upgradient and downgradient locations (**Figure 8**). Calcium concentrations in groundwater are generally consistent between AD-22 and upgradient well AD-13 (**Figure 9**); however, leached calcium concentrations from the FGD sludge material are approximately two to three orders of magnitude greater than site groundwater. The difference between the ratio of calcium to cobalt in the leached FGD sludge material (about 45,000:1) compared to the ratio for groundwater suggests that dissolved calcium concentrations at AD-22 would be significantly higher if the groundwater at this location were affected by leachate.

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, 2021b) and West Bottom Ash Pond (WBAP; Geosyntec, 2021c).

Goethite (an iron hydroxide) 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 and siderite) to oxidized (goethite) iron minerals, isomorphically substituted cobalt may be released from the mineral structure into groundwater. 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.

2.2.3 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 fluctuation of beryllium and cobalt as the amount of aquifer solids that are saturated increases.

2.3 Sampling Requirements

As the ASD presented above supports the position that the identified SSLs are not due to a release from the Pirkey 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 second semi-annual 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 of beryllium and dissolution of cobalt-bearing minerals comprising 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 D.**

SECTION 4

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TABLES

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

Geosyntec Consultants, Inc.

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:

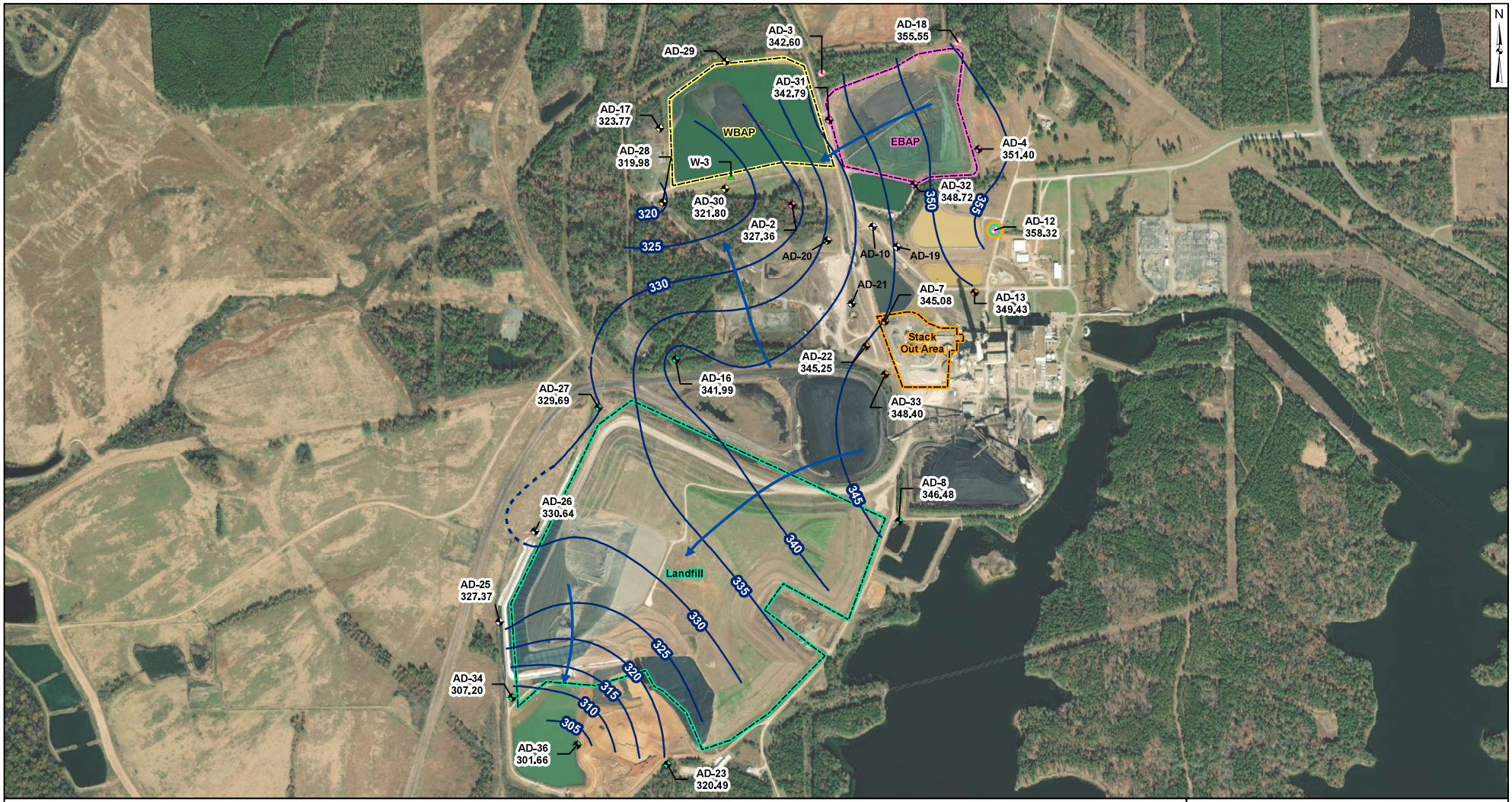
-: not detected

Mineral constituents are reported in percentage abundance.

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

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

STATE OF TEXAS
BETH ANN GROSS
79864
LICENSED
PROFESSIONAL ENGINEER

Beth Ann Gross

Jan 14, 2022

Geosyntec Consultants, Inc.
Texas Firm
Registration No. 1182

Potentiometric Contours - Uppermost Aquifer
November 2021

AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec consultants

Columbus, Ohio | 01/13/2022

Figure **1**

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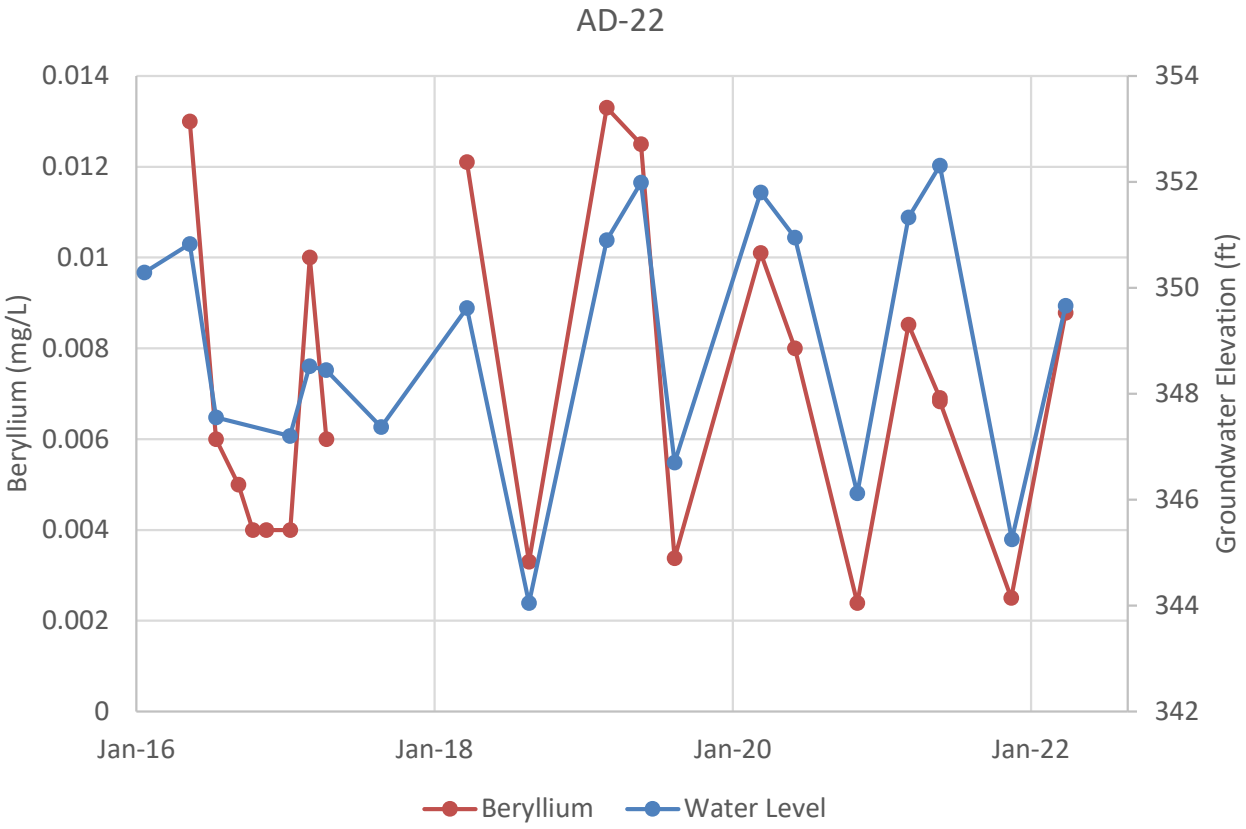

Notes: Beryllium concentrations are shown in milligrams per liter (mg/L). Water level is shown as groundwater elevation (ft). The gap in beryllium data represents the time period in which detection monitoring took place and samples were not analyzed for beryllium.

Beryllium Concentration v. Groundwater Elevation

Pirkey FGD Stackout Pad

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Figure 2

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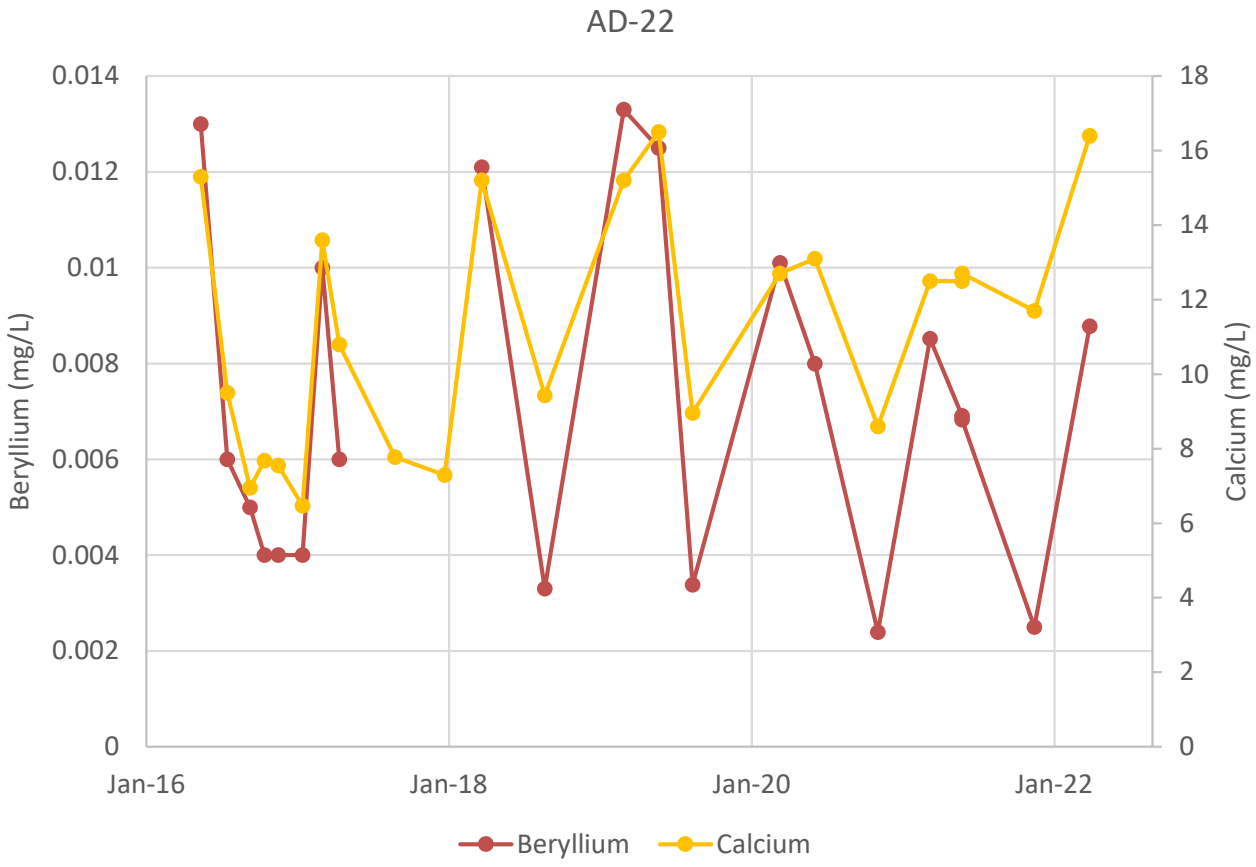
June-2022



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

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Columbus, Ohio | June-2022

Figure 3

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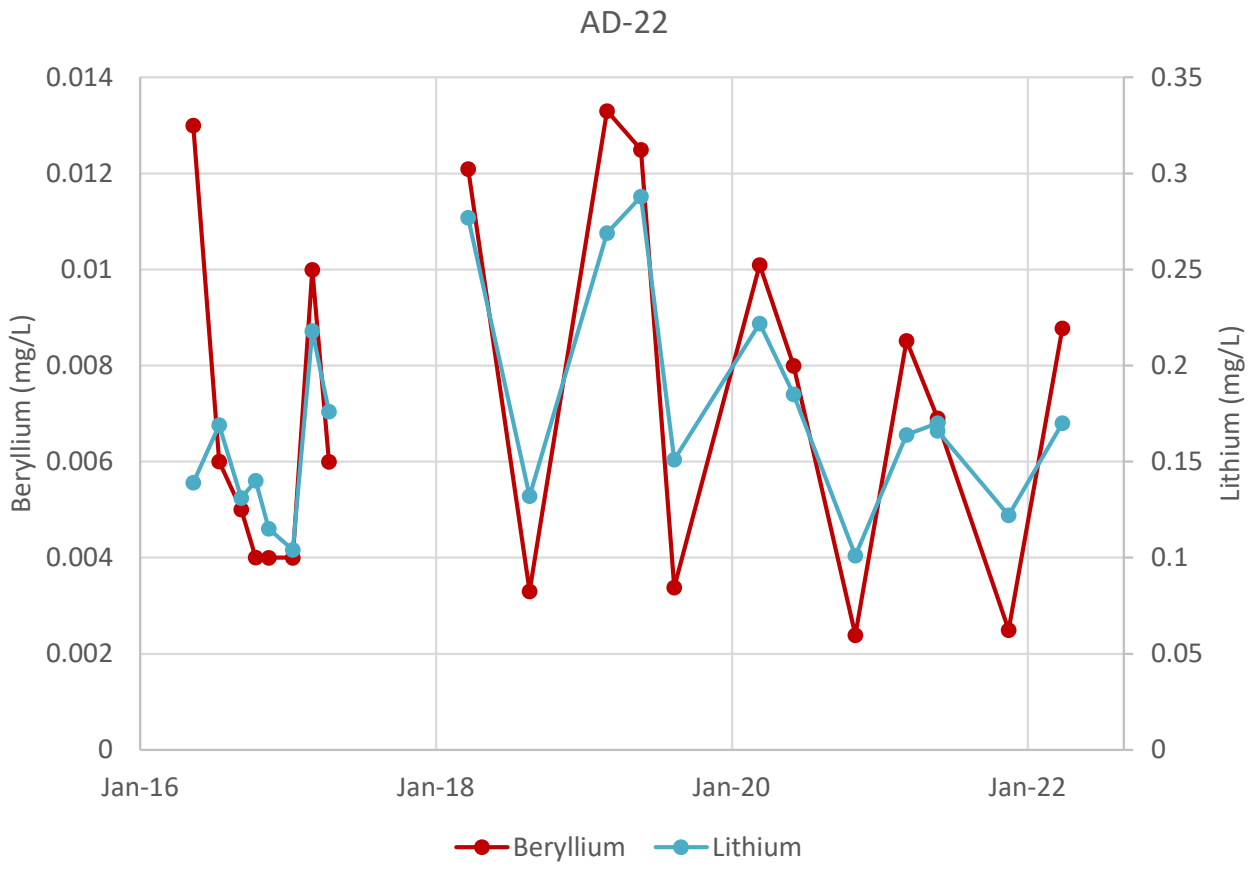

Notes: Beryllium and lithium concentrations are shown in milligrams per liter (mg/L). The gaps in data represents the time period in which detection monitoring took place and samples were not analyzed for beryllium or lithium.

Beryllium v. Lithium Concentrations
Pirkey FGD Stackout Pad

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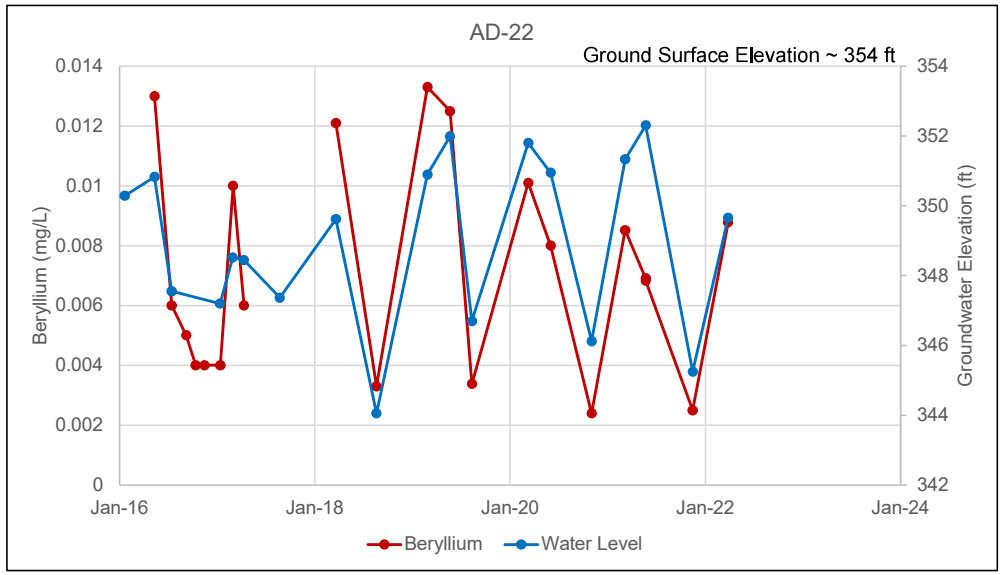

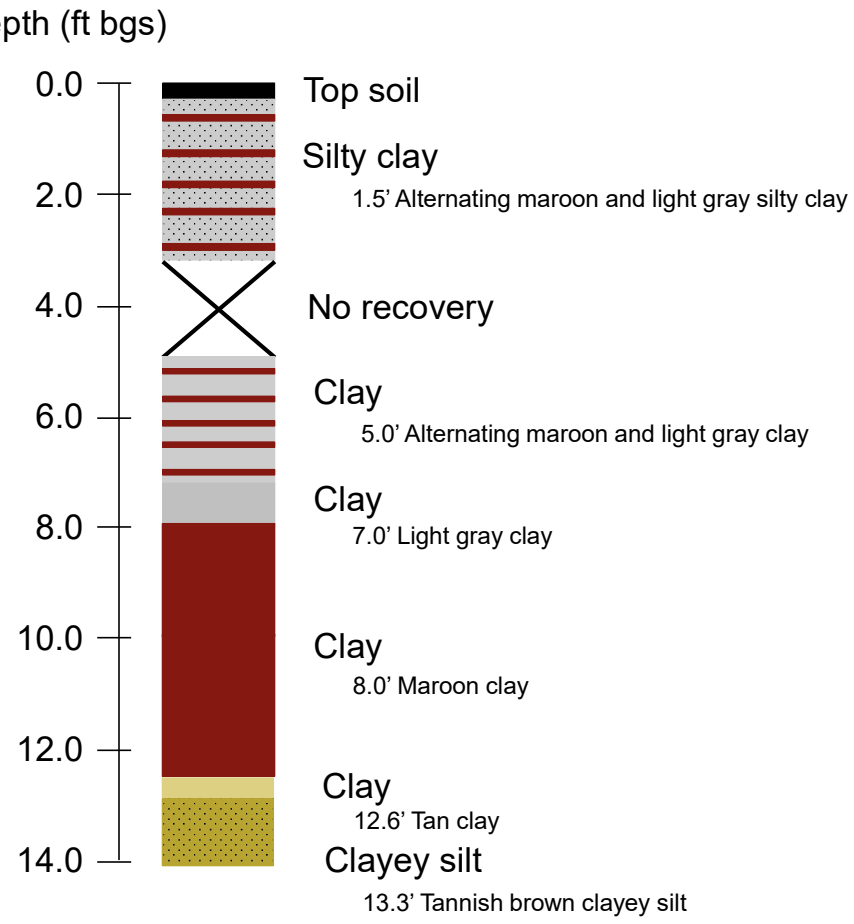

Notes:
-A sample was collected for analysis of mineralogy from 6-8 ft bgs.
-The full boring log is available in Attachment A.

AD-22 Seasonal Water Table Geology
H. W. Pirkey Plant – FGD Stackout Pad

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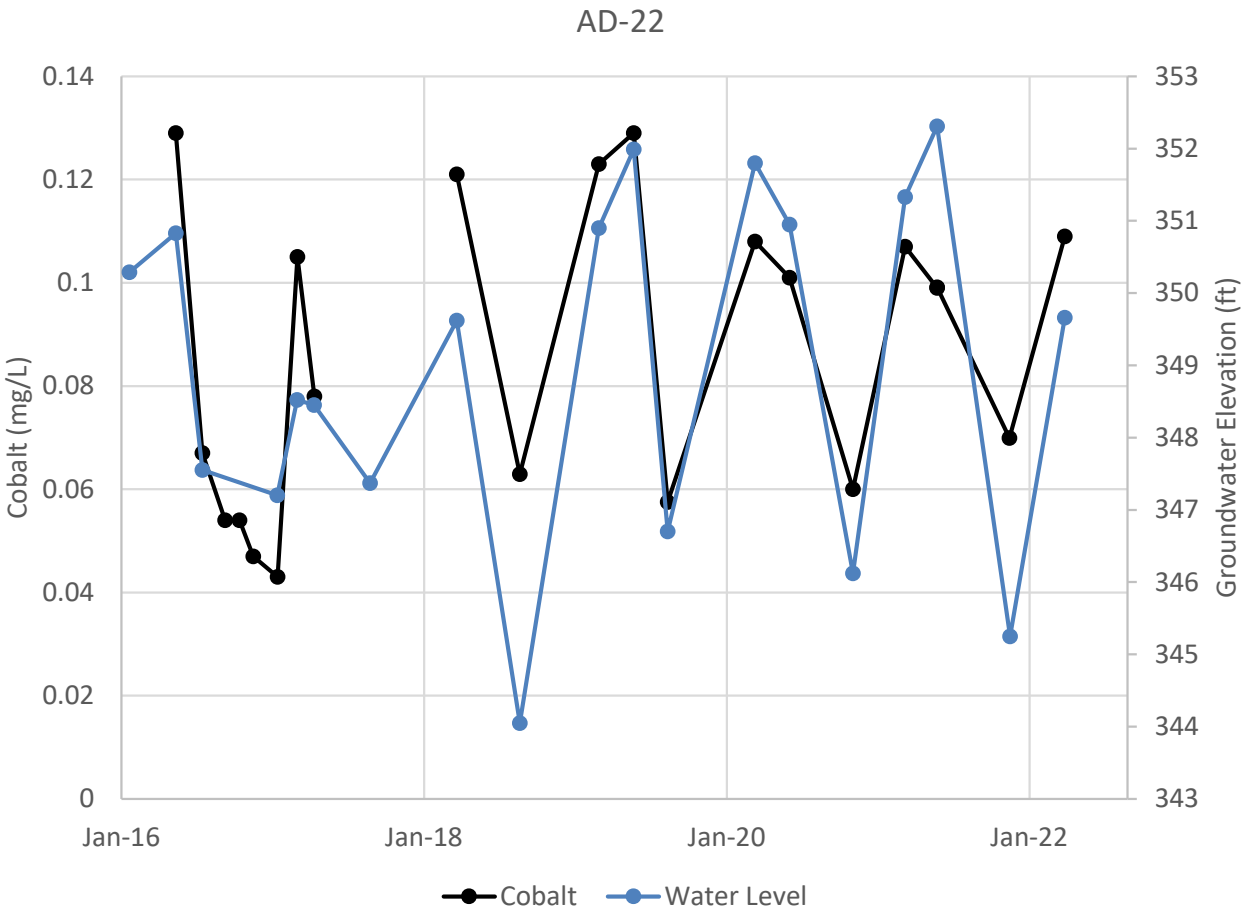
Figure **5**



Notes: Cobalt concentrations are shown in milligrams per liter (mg/L). Water level is shown as groundwater elevation (ft). 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 Concentration v. Groundwater Elevation

Pirkey FGD Stackout Pad

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Figure 6

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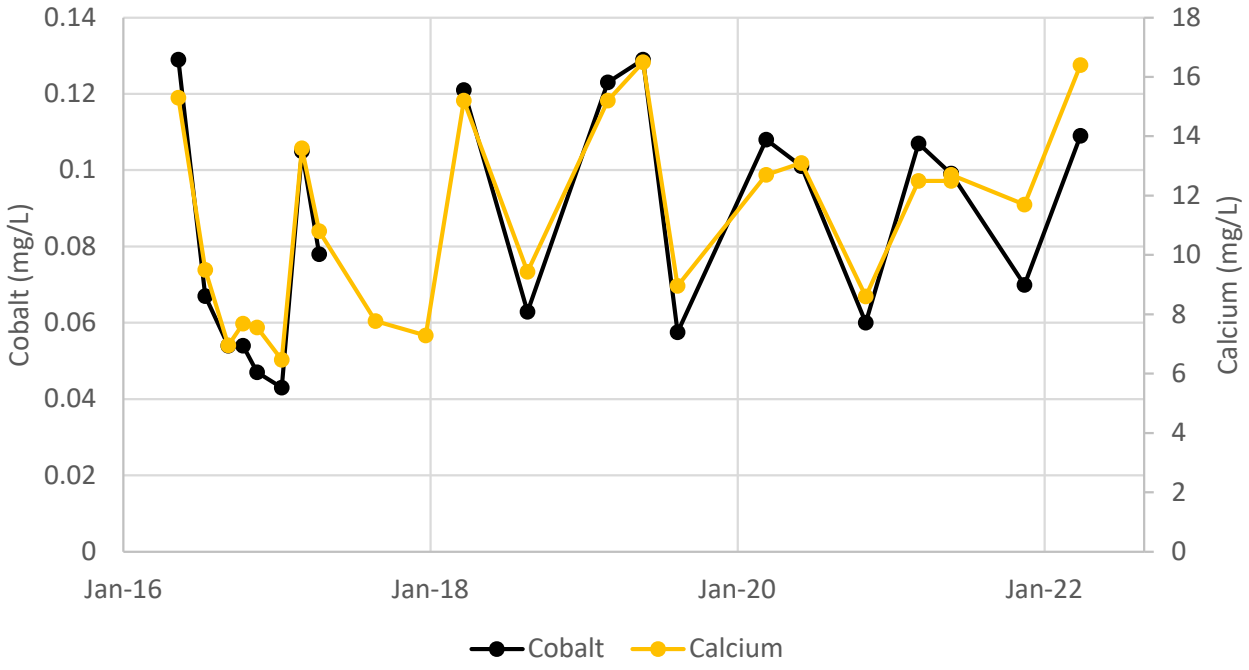

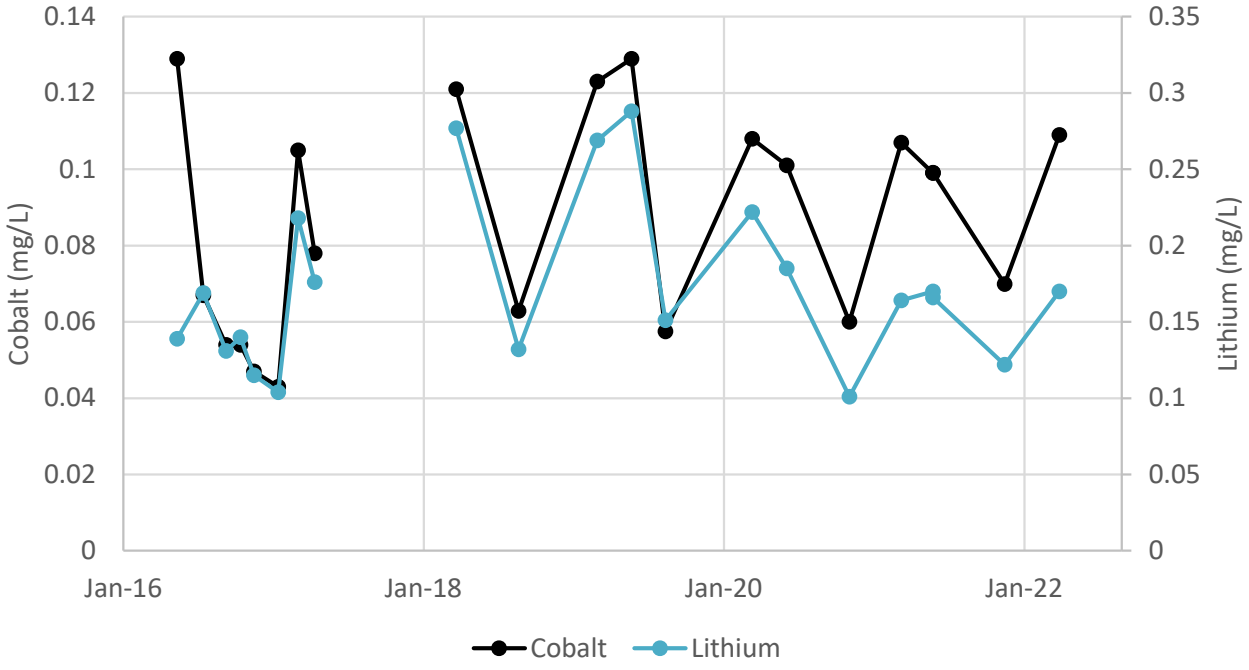

Notes: Cobalt, calcium, and lithium concentrations are shown in milligrams per liter (mg/L). The gaps in cobalt and lithium data represent the time period during which detection monitoring took place and samples were not analyzed for cobalt and lithium.

AD-22 Cobalt v. Calcium and Lithium Concentrations

Pirkey FGD Stackout Pad

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Figure 7

Columbus, Ohio

June-2022

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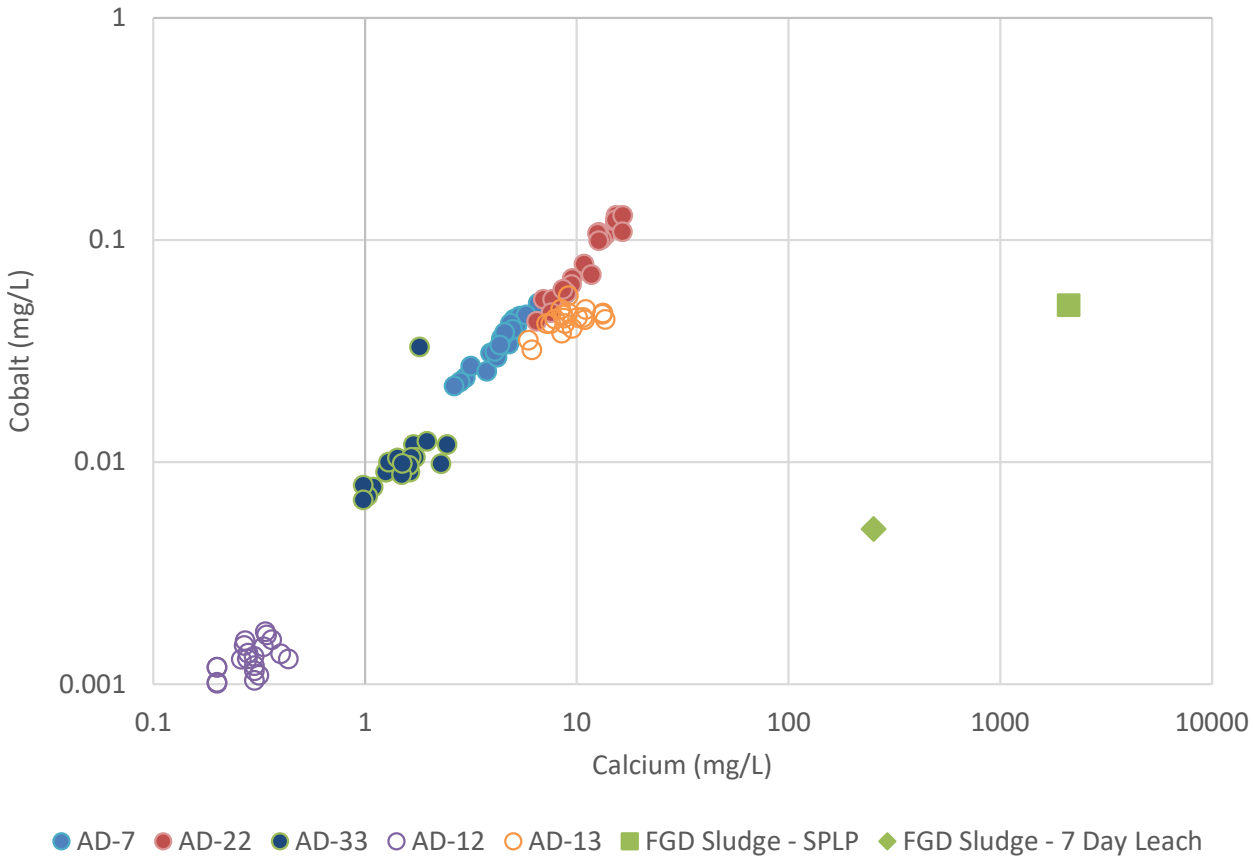

Notes: Cobalt and calcium concentrations are shown in milligrams per liter (mg/L). Upgradient wells are shown with hollow circles. 'FGD Sludge-SPLP' and 'FGD Sludge 7 Day Leach' present the leached concentrations of cobalt and calcium using the Synthetic Precipitation Leaching Procedure (SW-846 Test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

Cobalt and Calcium Concentration Distributions

Pirkey FGD Stackout Pad

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Figure 8

Columbus, Ohio

June-2022

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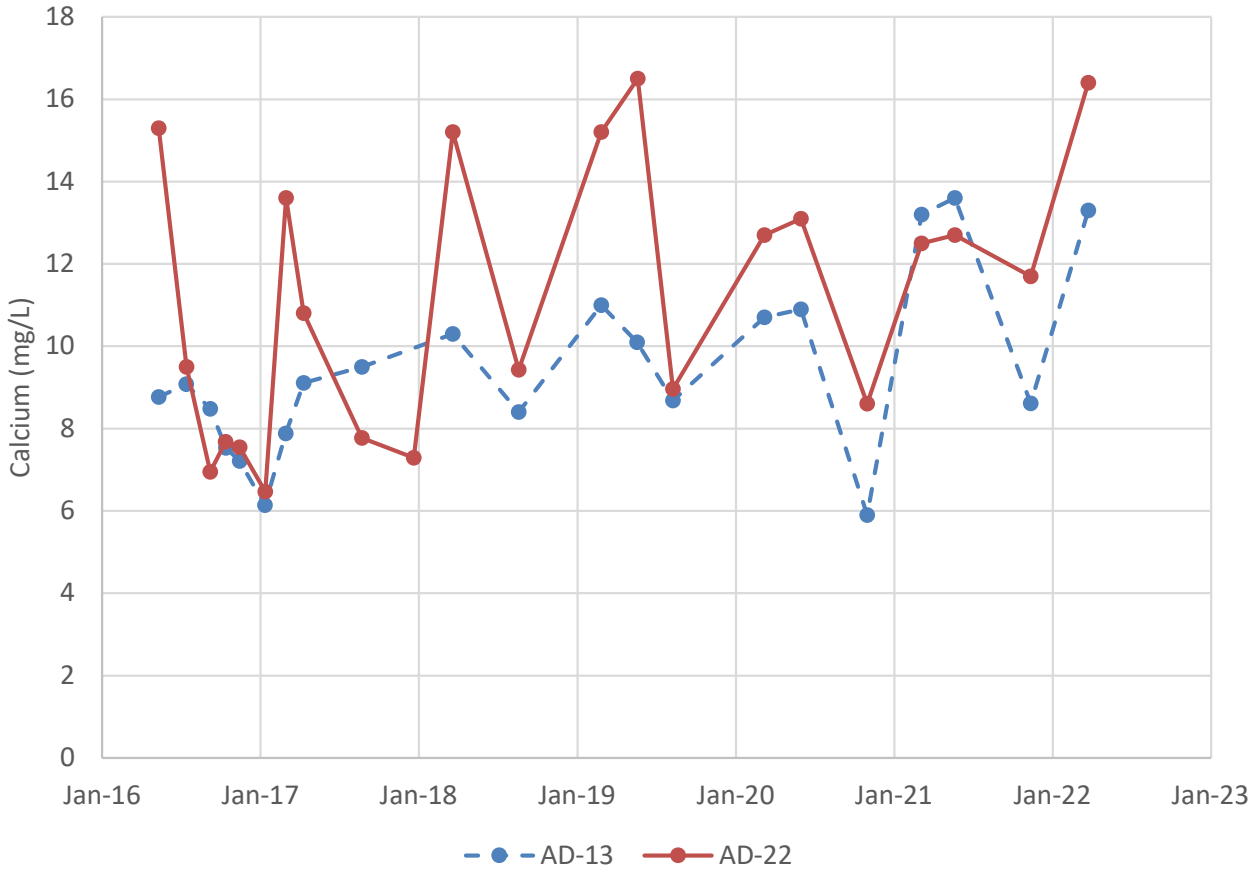

Notes: Calcium concentrations are shown in milligrams per liter (mg/L). Upgradient monitoring well AD-13 is shown with a dashed line.

Calcium Time Series Graph
Pirkey FGD Stackout Pad

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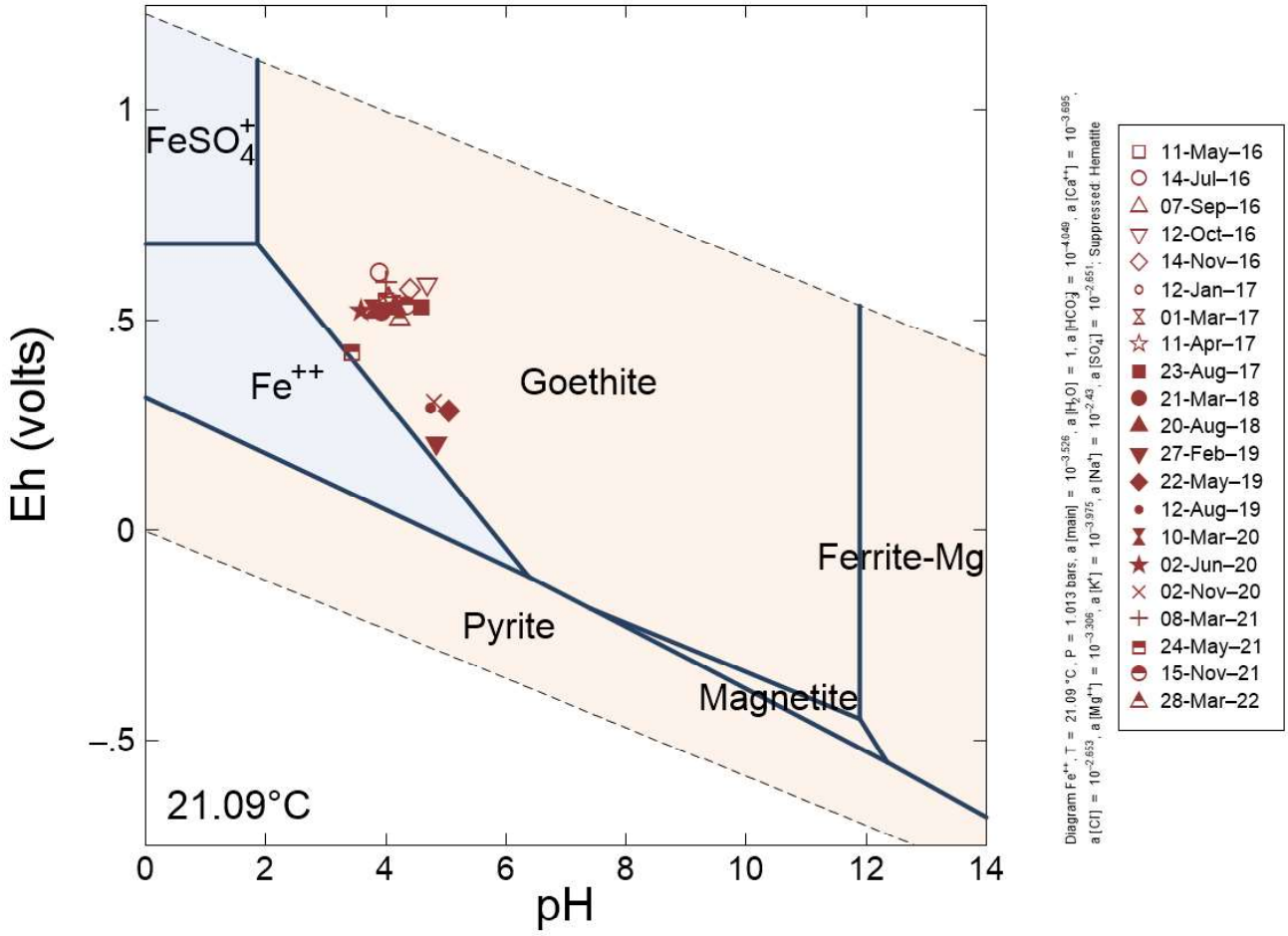
Figure 9

Columbus, Ohio

June-2022



Notes: Groundwater concentrations of major cations and anions at AD-22 from the November 2021 sampling event 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

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Columbus, Ohio | June-2022

Figure **10**

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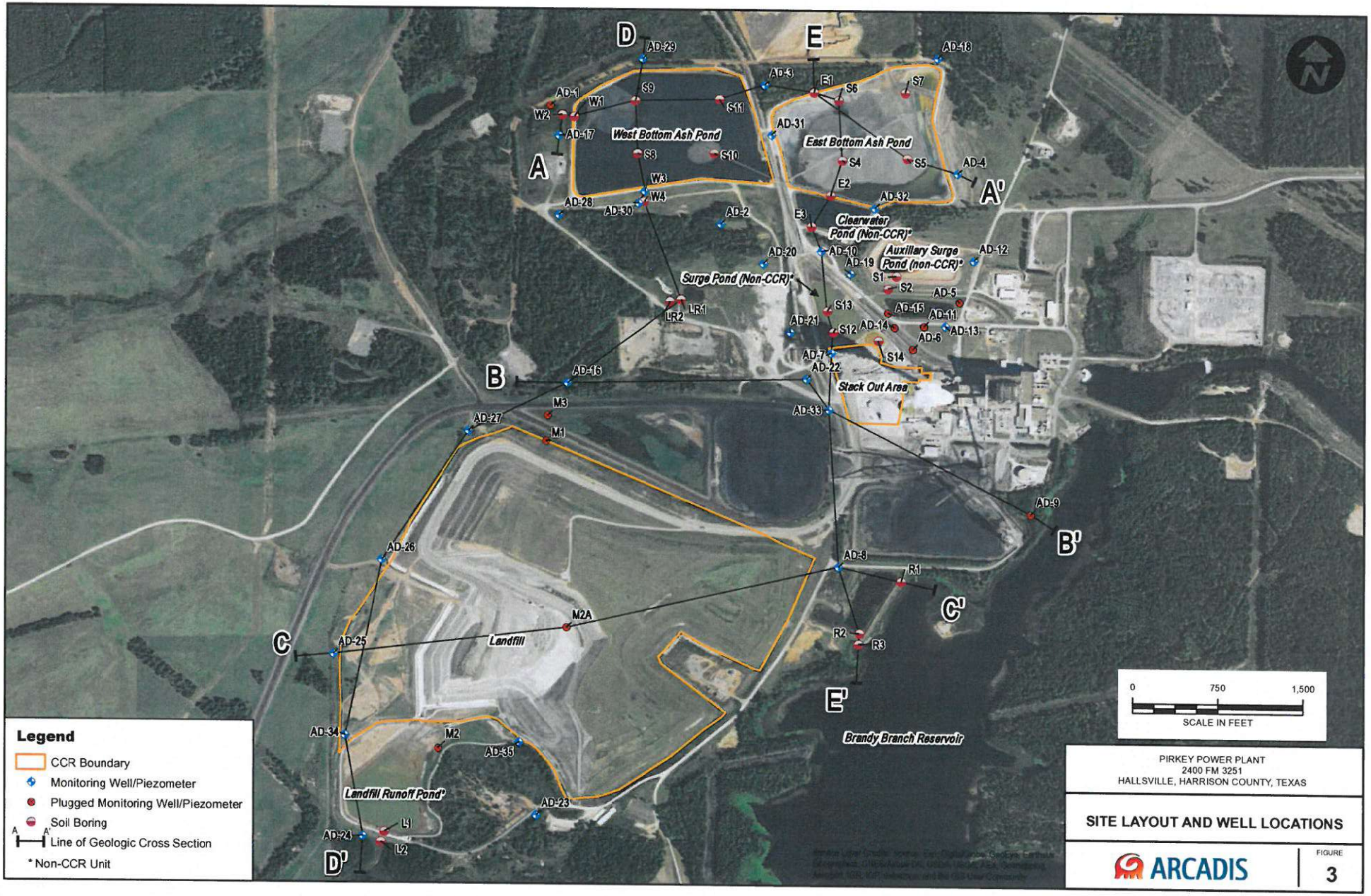
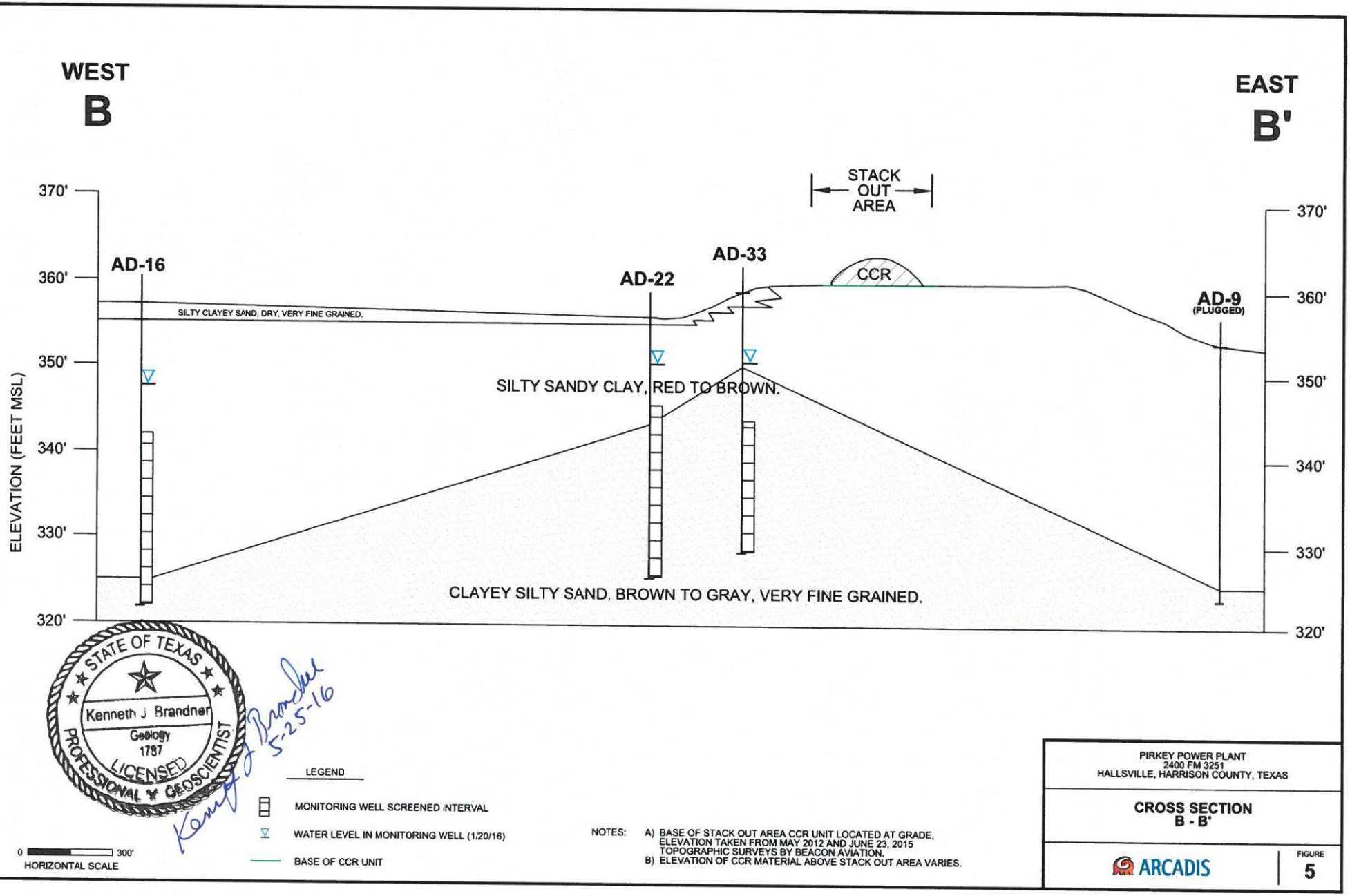
ATTACHMENT A
Geologic Cross Sections



Document Path: Z:\GIS\PROJECTS_ENVAEP\Pirkey Plant\MXD\Figure 3 - Site Layout and Well Locations.mxd



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LEGEND

- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (1/20/16)
- BASE OF CCR UNIT

0 300'
HORIZONTAL SCALE

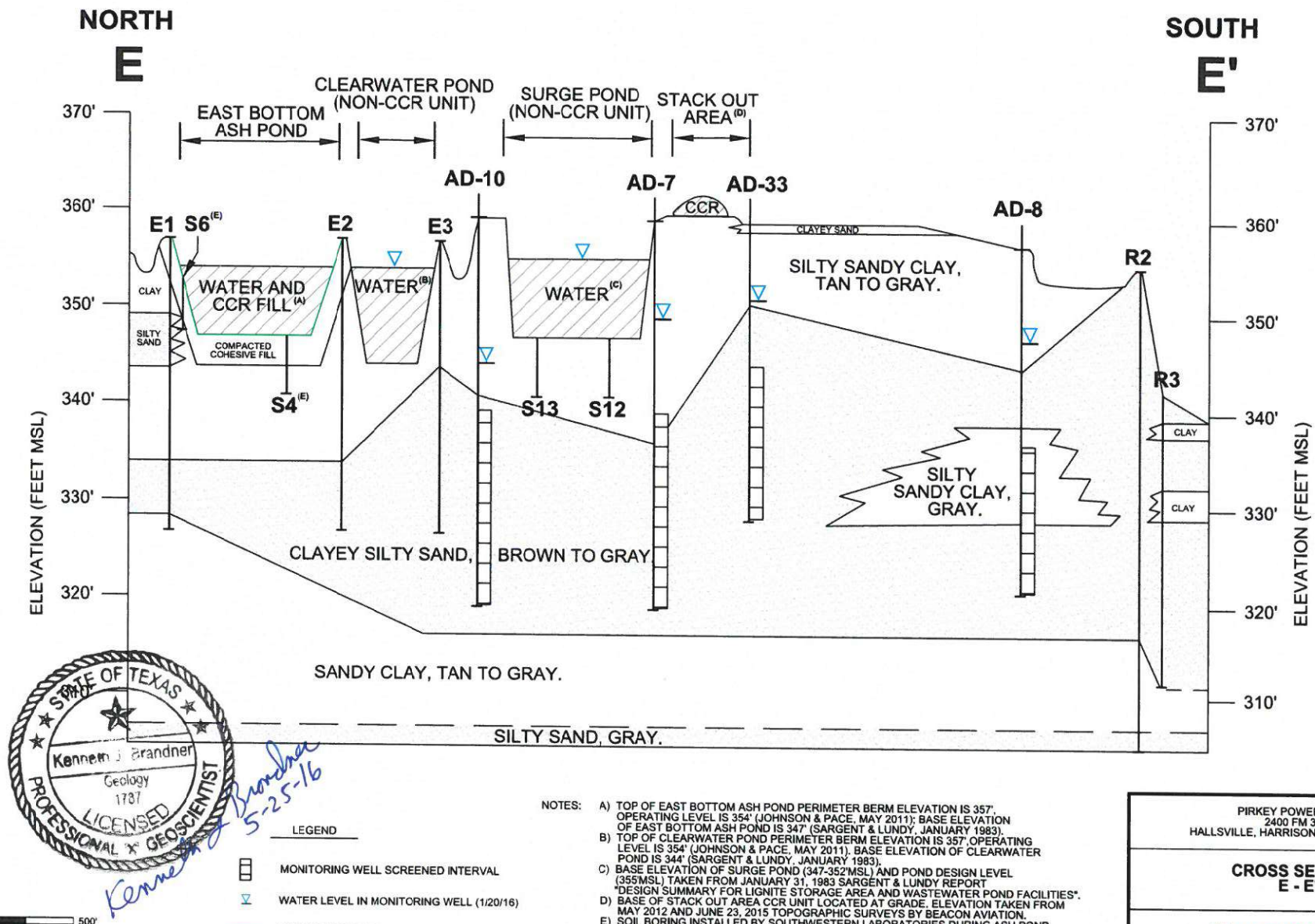
NOTES:
A) BASE OF STACK OUT AREA CCR UNIT LOCATED AT GRADE, ELEVATION TAKEN FROM MAY 2012 AND JUNE 23, 2015 TOPOGRAPHIC SURVEYS BY BEACON AVIATION.
B) ELEVATION OF CCR MATERIAL ABOVE STACK OUT AREA VARIES.

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

CROSS SECTION B - B'

ARCADIS

FIGURE 5



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LEGEND

- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (1/20/16)
- BASE OF CCR UNIT

0 500'
HORIZONTAL SCALE

NOTES:

A) TOP OF EAST BOTTOM ASH POND PERIMETER BERM ELEVATION IS 357', OPERATING LEVEL IS 354' (JOHNSON & PACE, MAY 2011); BASE ELEVATION OF EAST BOTTOM ASH POND IS 347' (SARGENT & LUNDY, JANUARY 1983).
B) TOP OF CLEARWATER POND PERIMETER BERM ELEVATION IS 357',OPERATING LEVEL IS 354' (JOHNSON & PACE, MAY 2011). BASE ELEVATION OF CLEARWATER POND IS 344' (SARGENT & LUNDY, JANUARY 1983).
C) BASE ELEVATION OF SURGE POND (347-352'MSL) AND POND DESIGN LEVEL (355'MSL) TAKEN FROM JANUARY 31, 1983 SARGENT & LUNDY REPORT "DESIGN SUMMARY FOR LIGNITE STORAGE AREA AND WASTEWATER POND FACILITIES".
D) BASE OF STACK OUT AREA CCR UNIT LOCATED AT GRADE. ELEVATION TAKEN FROM MAY 2012 AND JUNE 23, 2015 TOPOGRAPHIC SURVEYS BY BEACON AVIATION.
E) SOIL BORING INSTALLED BY SOUTHWESTERN LABORATORIES DURING ASH POND CONSTRUCTION IN 1983.

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

CROSS SECTION
E - E'

ARCADIS

FIGURE
8

ATTACHMENT B
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*
			pp= pocket penetrometer	
0		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	
		24.4'-27.8':	Dark green/gray fine grained sand, well sorted; wet; glauconite present	
25		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 C

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

LATTITUDE: 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							
19					Very firm 18-18.5'		
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

Apex geoscience inc.

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 E
Certification by a Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

I certify that the selected and above described alternative source demonstration is appropriate for evaluating the groundwater monitoring data for the Pirkey 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	Texas	6/16/2022
License Number	Licensing State	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

Geosyntec consultants

engineers | scientists | innovators

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

January 2023

CHA8495

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LIST OF ACRONYMS

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

In June 2022, a semiannual 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 SSLs above the GWPSs. Seasonal patterns were observed for beryllium, cadmium, cobalt, combined radium, fluoride, and lithium at AD-22 (Geosyntec, 2022a). 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, 2022a):

- The LCL for beryllium exceeded the GWPS of 0.00400 milligrams per liter (mg/L) at AD-7 (0.00406 mg/L). The deseasonalized LCL for beryllium exceeded the GWPS of 0.00400 at AD-22 (0.00557 mg/L).

- The deseasonalized LCL for cobalt exceeded the GWPS of 0.0560 mg/L at AD-22 (0.0742 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 at AD-7 and AD-22 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 rules allows the owner or operator 90 days from the determination of an SSL to demonstrate that a source other than the CCR unit caused the SSL. Descriptions of the Stackout Area design and construction, regional geology and site hydrogeology, methodology used to evaluate the SSLs, and proposed alternative source are described below.

2.1 FGD Stackout Area Design and Construction

The Pirkey FGD Stackout Area is an approximately 7-acre storage area located due west of the Pirkey Plant (**Figure 1**). It was designed for temporary stockpiling of stabilized FGD material placed on the native clay soil in the in the unit until it can be hauled to the on-site landfill for disposal (Arcadis, 2016). The ground surface elevation in the Stackout Area ranges from approximately 360 to 365 feet above mean sea level. Based on lithological borings advanced in the vicinity, the Stackout Pad is underlain by approximately 20 feet of clay (Arcadis, 2016).

The maximum height of the stockpiles in the Stackout Area is approximately 41 feet above ground surface. Containment of contact water from the stockpiles is provided by a stone berm with a geomembrane cover constructed around the Stackout Area perimeter. Also, stockpiles are located no closer than approximately 50 feet from the Stackout Area perimeter (Arcadis, 2016).

2.2 Regional Geology/Site Hydrogeology

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

The Stackout Area monitoring well network monitors groundwater within the uppermost aquifer, which was defined by Arcadis (2016) as very fine to fine grained clayey and silty sand located about 10 to 20 feet below the Stackout Area with an average thickness of approximately 20 feet. Geologic cross-sections B-B’ and E-E’ from Arcadis (2016) show the subsurface structure of the uppermost aquifer (indicated on the figures as clayey silty sand, brown to gray in color) underlying the Stackout Area. These figures as well as a cross-section location map are provided in **Attachment A**. The geologic cross-sections demonstrate lateral continuity of the uppermost aquifer at and around the Stackout Area.

Groundwater flow direction at and near the Stackout Area is west-northwesterly (**Figure 1**). Groundwater flow velocities in the uppermost aquifer in the vicinity of the Stackout Area have been reported as approximately 5 to 35 feet/year. The Stackout Area monitoring well network

consists of upgradient monitoring wells AD-12 and AD-13, and downgradient compliance wells AD-7, AD-22, and AD-33, all of which are screened within the uppermost aquifer.

2.3 Proposed Alternative Source

An initial review of site geochemistry, site historical data, and laboratory quality assurance/quality control (QA/QC) data did not identify alternative sources for beryllium and cobalt due to Type I (sampling), Type II (laboratory), Type III (statistical evaluation), or Type V (anthropogenic) 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.

2.3.1 Beryllium

An SSL was identified for beryllium at AD-22 using deseasonalized statistics (Geosyntec, 2022a). 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). An SSL was also identified for beryllium at AD-7, although deseasonalized statistics were not used.

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 at AD-22 was 0.00878 milligrams per liter (mg/L) in March 2022, in contrast to 0.0025 mg/L in November 2021. Previous ASDs for the FGD Stackout Area showed that beryllium concentrations at AD-7 and AD-22 appear to correlate with groundwater elevations (Geosyntec, 2019; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021a; Geosyntec, 2021d; Geosyntec, 2022b). This relationship generally still holds true (**Figure 2**). Beryllium concentrations at AD-7 and AD-22 are generally correlated with seasonal changes in other relatively mobile cationic 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.

In March of 2020, the geology near AD-7 was relogged at soil boring SP-B2. Silty clay was identified from approximately 2.5-6.9 feet below ground surface (bgs) before transitioning to clay until 18.8 ft bgs (**Figure 5a**). It was also noted that the depth to water fluctuated between approximately 9 and 15 ft bgs. The boring log for SP-B2 is provided in **Attachment B**, and the original boring log and well construction diagram is provided in **Attachment C**. Soil boring SP-B4, which was advanced in March 2020 to re-log AD-22, found that clay materials were present in the seasonally saturated zones above the permanent water table (**Figure 5b**). The boring log for SP-B4 is provided in **Attachment D,** and the original boring log and well construction diagram is

provided in **Attachment E**. At AD-22, the depth to water fluctuated between approximately 3 and 12 ft bgs. Clay was identified from approximately 1.5 ft bgs to 13.3 ft bgs, where it transitioned to a clayey silt (**Figure 5b**). Analysis by X-ray diffraction (XRD) confirmed the presence of clay minerals within the seasonal water table and sand within the screened intervals for both AD-7 and AD-22, as summarized in **Table 1**. The clay fraction of the uppermost samples 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 characteristically high cation exchange capacity (compared to low-activity 1:1 clay minerals), make up the majority of the clay minerals present at those intervals.

Sorption and desorption of beryllium from smectite-type clays is well documented (You, et al., 1989; Boschi and Willenbring, 2016a). Desorption was found to be affected by pH, with 75% of beryllium desorbing 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-7 and AD-22 for samples collected under the Texas CCR Rule ranged from 2.9 to 4.1 SU and 3.9 to 5.1 SU, respectively, suggesting that conditions are favorable for beryllium desorption from smectite-type clays. The presence of these exchangeable clays provides further evidence that the exceedances of beryllium at AD-7 and 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.

2.3.2 Cobalt

An SSL was identified for cobalt at AD-22 using deseasonalized statistics (Geosyntec, 2022a). As shown in previous ASDs (Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021a; Geosyntec, 2021d; Geosyntec, 2022b), the cobalt groundwater 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 groundwater-mineral interactions within the seasonally saturated zone is governing dissolved cobalt concentrations.

A sample of the solid FGD sludge material accumulated on the FGD Stackout Area was collected in July 2019 and submitted for laboratory analyses. 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) to evaluate the material as a potential source of cobalt. No changes to material handling or plant operations have occurred which would alter the anticipated chemical composition since this sample was initially collected. Calcium-cobalt ratios for the leached sludge material and site groundwater are displayed on **Figure 8**. The concentration ratio between calcium and cobalt is consistently on the order of 100:1 at both upgradient and downgradient locations (**Figure 8**). Calcium concentrations in groundwater are generally consistent between AD-22 and upgradient well AD-13 (**Figure 9**); however, leached calcium concentrations from the FGD sludge material are approximately two to three orders of magnitude greater than site groundwater. The

difference between the ratio of calcium to cobalt in the leached FGD sludge material (about 45,000:1) compared to the ratio for groundwater suggests that dissolved calcium concentrations at AD-22 would be significantly higher if the groundwater at this location were affected by leachate.

Siderite and pyrite, both reduced iron-bearing minerals, were identified below the seasonal water table (within the saturated zone) at AD-22 (**Table 1**). 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, 2022b) and West Bottom Ash Pond (WBAP; Geosyntec, 2022c).

Goethite (an iron hydroxide) 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 and siderite) to oxidized (goethite) iron minerals, isomorphically substituted cobalt may be released from the mineral structure into groundwater. 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.

2.3.3 Conceptual Site Model

The seasonal fluctuations in beryllium at AD-7 and AD-22 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 fluctuation of beryllium and cobalt as the amount of aquifer solids that are saturated increases.

2.4 Sampling Requirements

As the ASD presented above supports the position that the identified SSLs are not due to a release from the Pirkey 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 semiannual basis.

SECTION 3

CONCLUSIONS AND RECOMMENDATIONS

The preceding information serves as the ASD prepared in accordance with 30 TAC §352.951(e) and supports the position that the SSLs of beryllium at AD-7 and AD-22 as well as cobalt at AD-22 identified during the first semiannual assessment monitoring event of 2022 were not due to a release from the FGD Stackout Area. The identified SSLs were, instead, attributed to natural variation related to seasonal desorption of beryllium and dissolution of cobalt-bearing minerals comprising 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 F.**

SECTION 4

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TABLES

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

Geosyntec Consultants, Inc.

Boring Location	SP-B2			SP-B4		
Associated Well	AD-7			AD-22		
Depth (ft bgs)	10-12	16-18	27-29	6-8	18-20	28-30
Sample Location	Within Seasonal Water Table	Below Seasonal Water Table	Within Screened Interval	Within Seasonal Water Table	Below Seasonal Water Table	Within Screened Interval
Quartz	39	37	79	28	47.5	95
Plagioclase Feldspar	-	1	-	<0.5	<0.5	1
K-Feldspar	<0.5	1	-	1	0.5	-
Goethite	1	2	0.5	1	-	2
Hematite	-	-	0.5	-	-	-
Chlorite	-	-	-	1	-	-
Siderite		-			10	-
Pyrite	-	-	-	-	2	-
Clays	*	59	20	*	40	2
Kaolinite	9			13		
Illite/Mica	1			2		
Smectite	50			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-B2-10-12 and SP-B4-6-8 were further analyzed to characterize the types of clays present, as listed below.

FIGURES

Legend

Groundwater Monitoring Wells

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

Notes

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

1,000 500 0 1,000 Feet

STATE OF TEXAS
BETH ANN GROSS
79864
LICENSED
PROFESSIONAL ENGINEER

Beth Ann Gross
12/29/2022

Geosyntec Consultants, Inc.
Texas Firm
Registration No. 1182

Potentiometric Contours - Uppermost Aquifer
June 2022

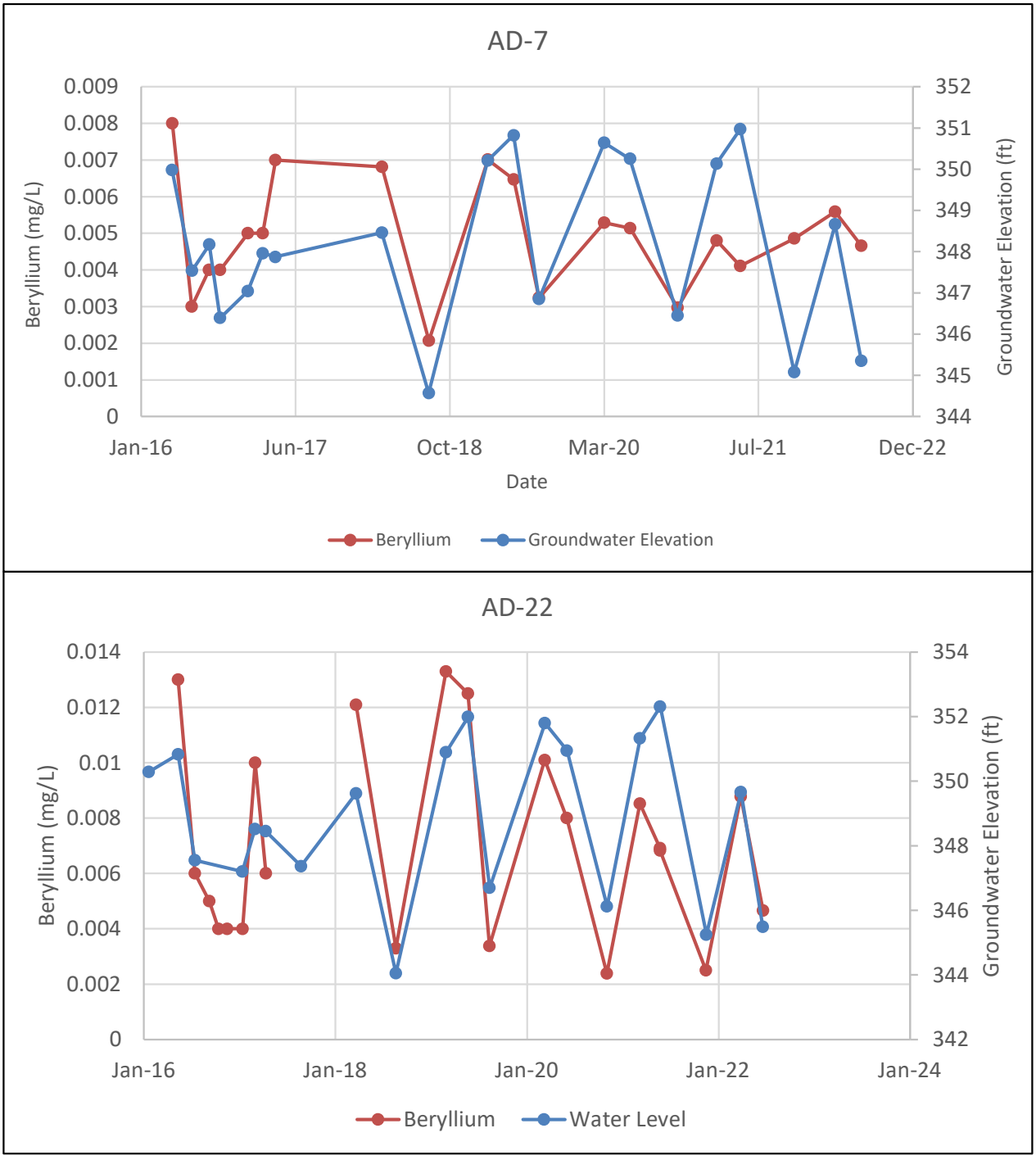
AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec consultants

Columbus, Ohio | 2022/12/21

Figure 1

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



Notes: Beryllium concentrations are shown in milligrams per liter (mg/L). Water level is shown as groundwater elevation (ft). The gap in beryllium data represents the time period in which detection monitoring took place and samples were not analyzed for beryllium.

Beryllium Concentration v. Groundwater Elevation

Pirkey FGD Stackout Pad

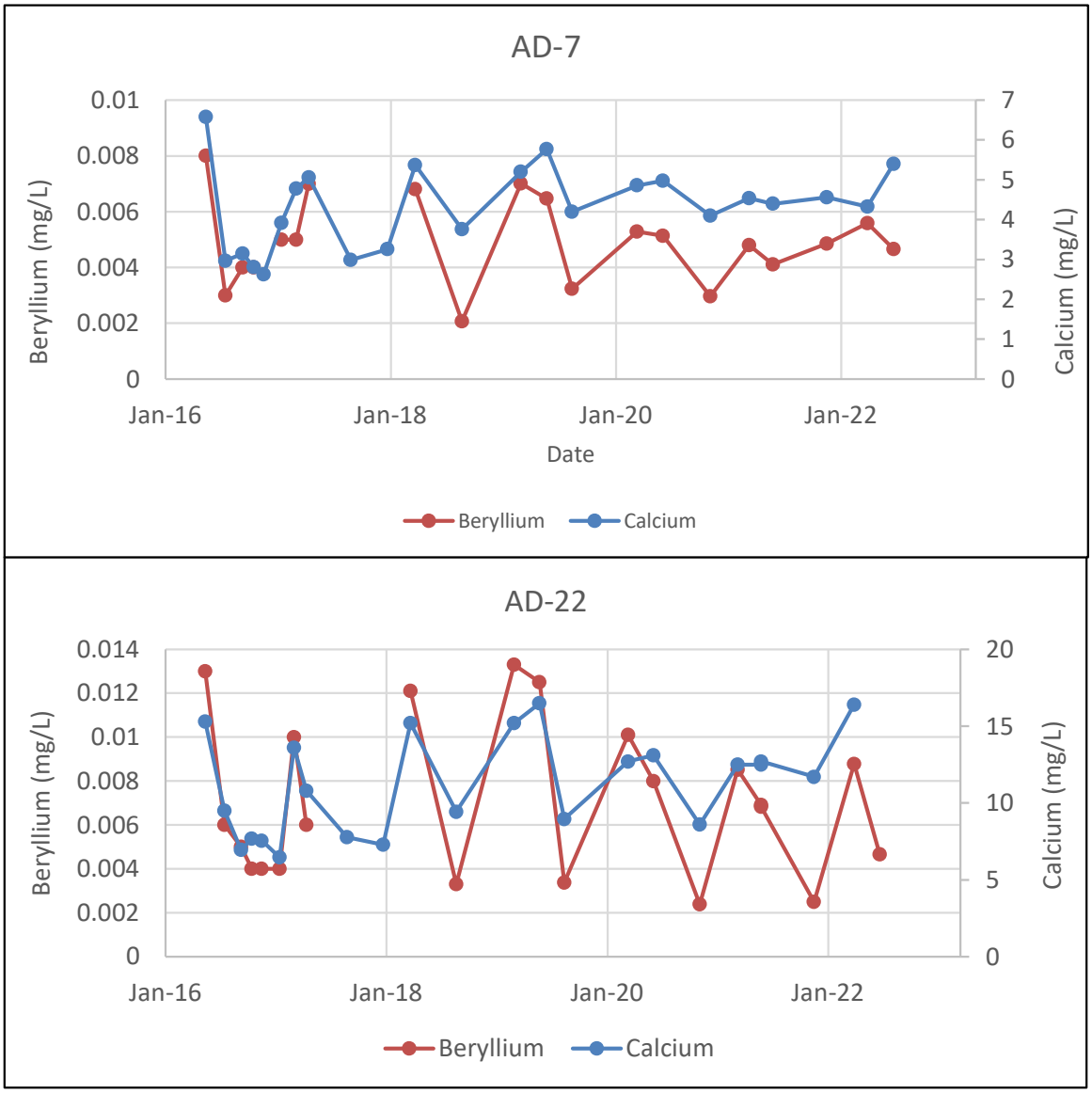
Geosyntec consultants

AMERICAN ELECTRIC POWER

Figure 2

Columbus, Ohio

December-2022



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

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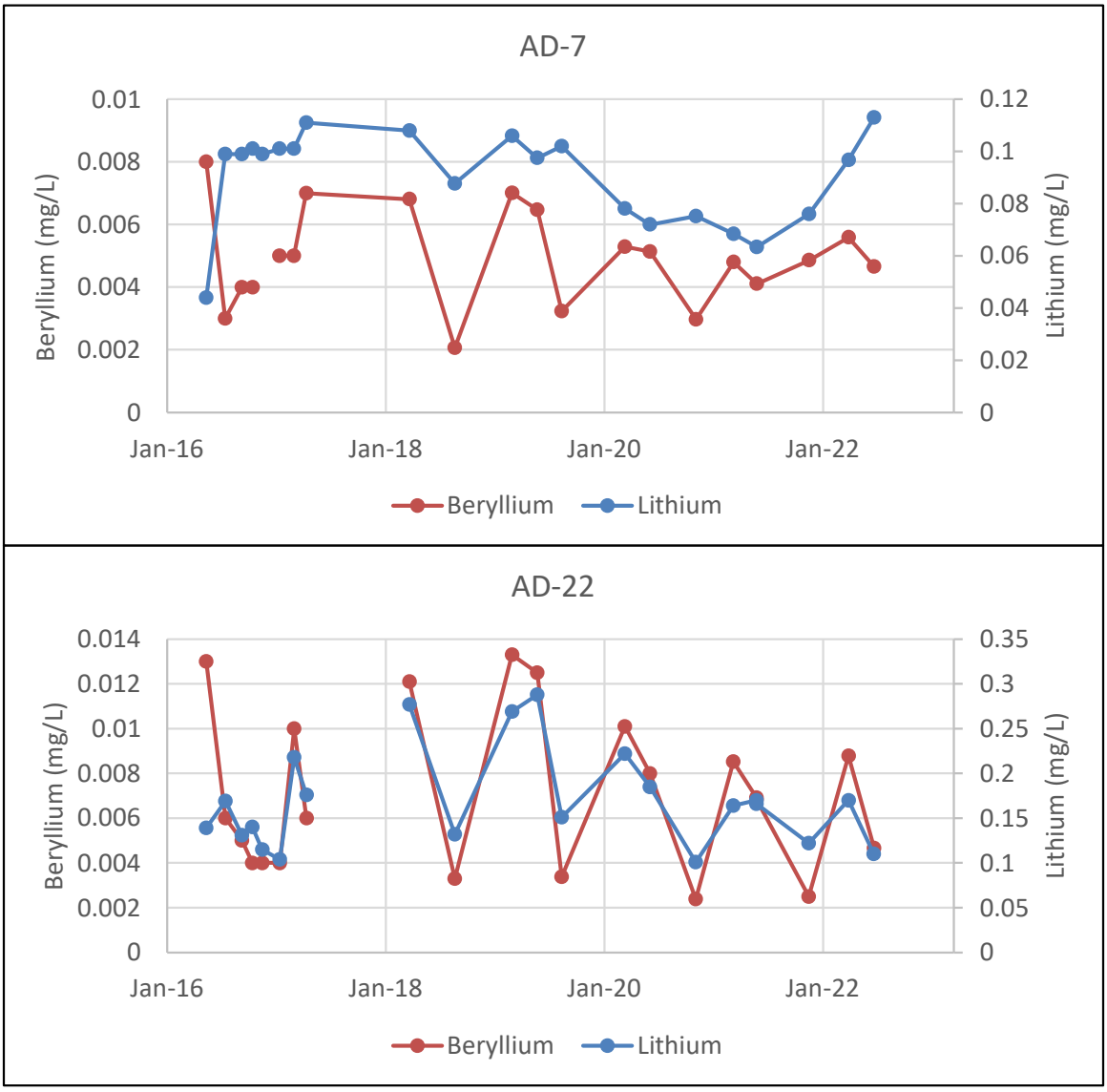
AMERICAN ELECTRIC POWER

Figure
3

Columbus, Ohio

December-2022

internal info: path, date revised, author



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

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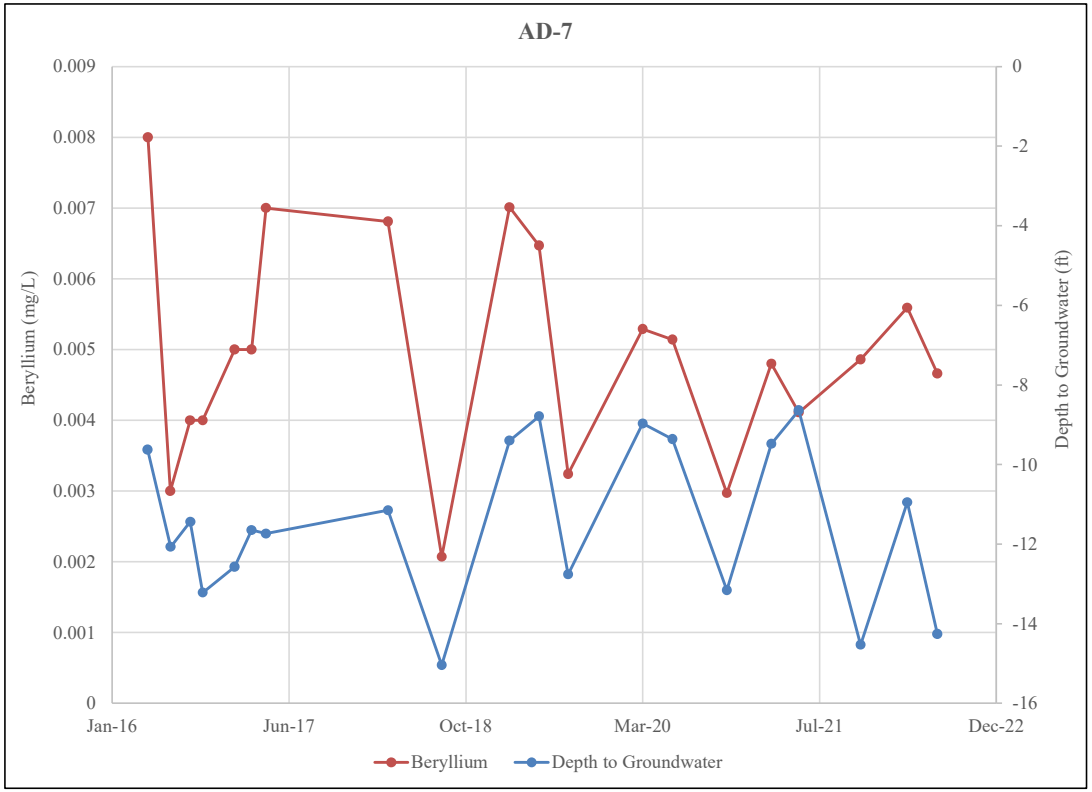
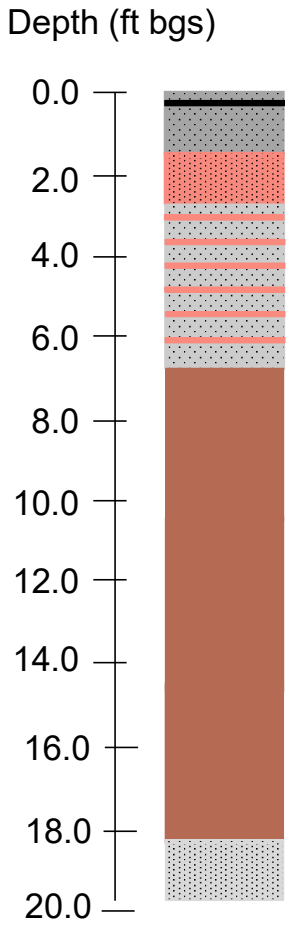
Figure
4

Columbus, Ohio

December-2022

internal info: path, date revised, author





Silt (Fly Ash)
Brittle grey fly ash with coal dust layer

Silt
1.7' Brittle red silt

Silty clay
2.6' Mottled grey/red silty clay

Clay
6.9' Greyish maroon clay

Clay
10.0' Stiff greyish maroon clay

Clayey silty sand
18.8' Light grey very fine grained clayey silty sand

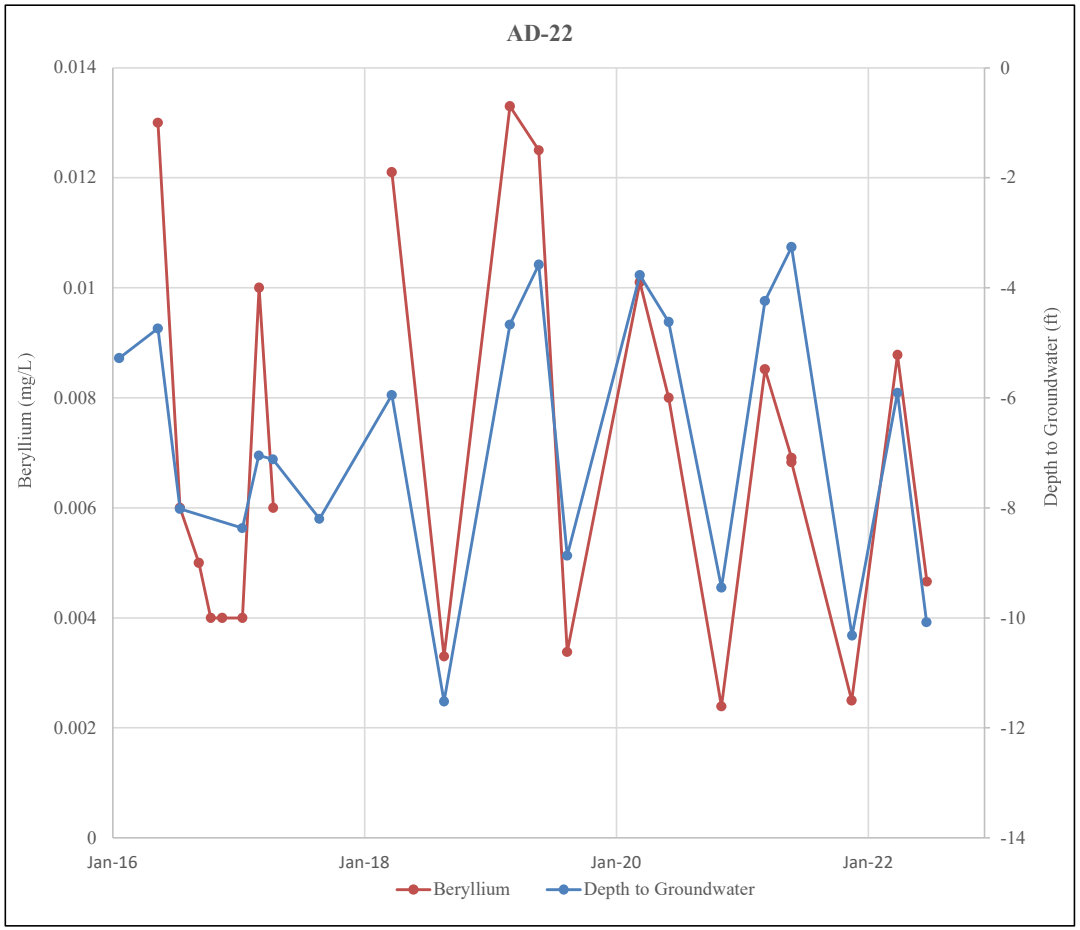
Notes:
-A sample was collected for analysis of mineralogy from 10-12 ft bgs.
-This illustration represents the log for boring SP-B2. The full boring log is available in Attachment B.
-AD-7 is screened at the interval of 19-39 ft bgs.

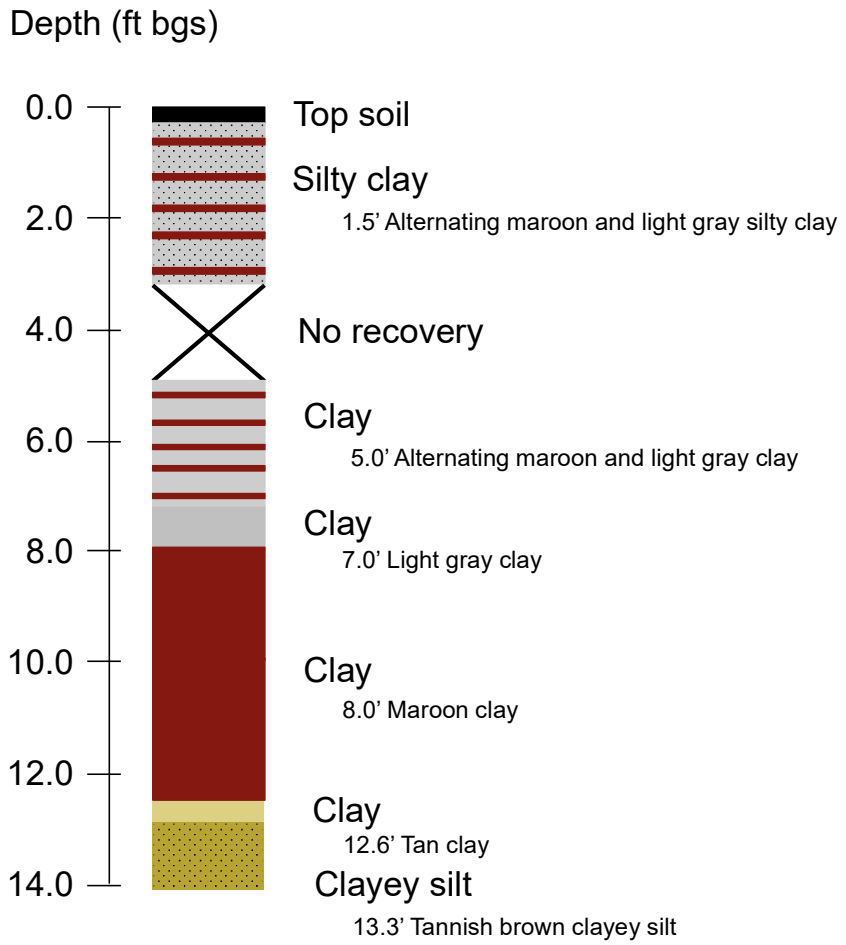
AD-7 Seasonal Water Table Geology
H.W. Pirkey Plant – FGD Stackout Pad

Geosyntec consultants

Columbus, OH | January - 2023

Figure **5a**





Notes:
-A sample was collected for analysis of mineralogy from 6-8 ft bgs.
-This illustration represents the log for boring SP-B4. The full boring log is available in Attachment D.
-AD-22 is screened at the interval of 10-30 ft bgs.

AD-22 Seasonal Water Table Geology
H. W. Pirkey Plant – FGD Stackout Pad

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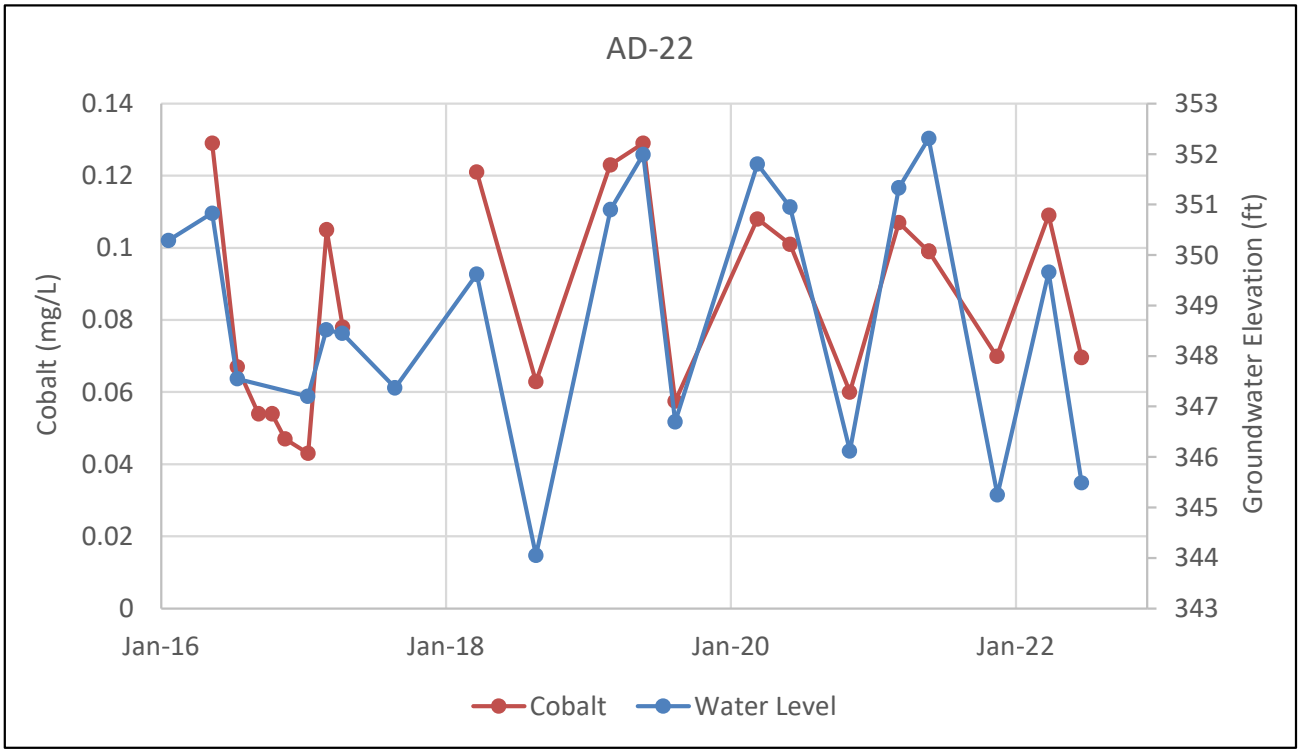
Columbus, OH | January - 2023

Figure **5b**



Notes: Cobalt concentrations are shown in milligrams per liter (mg/L). Water level is shown as groundwater elevation (ft). 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 Concentration v. Groundwater Elevation

Pirkey FGD Stackout Pad

Geosyntec consultants

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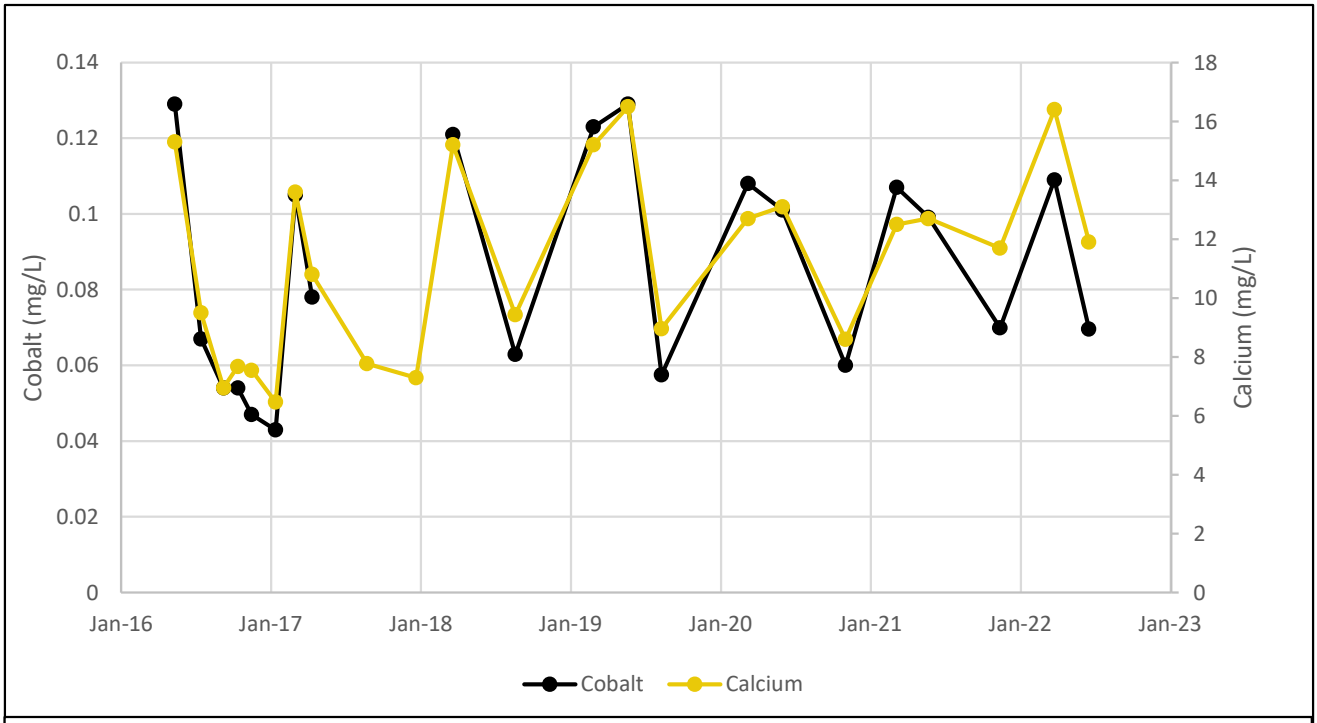
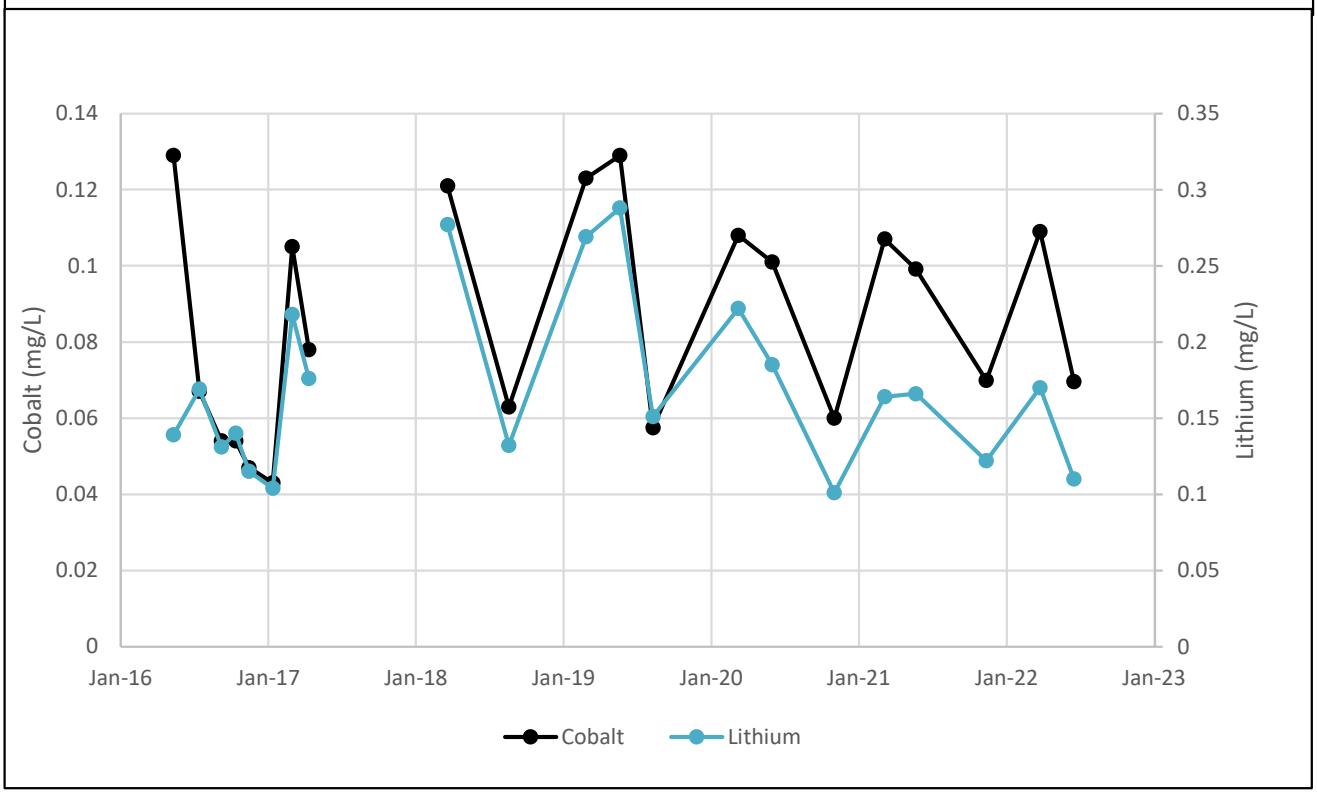
Figure 6

Columbus, Ohio

December-2022

internal info: path, date revised, author





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 Concentrations

Pirkey FGD Stackout Pad

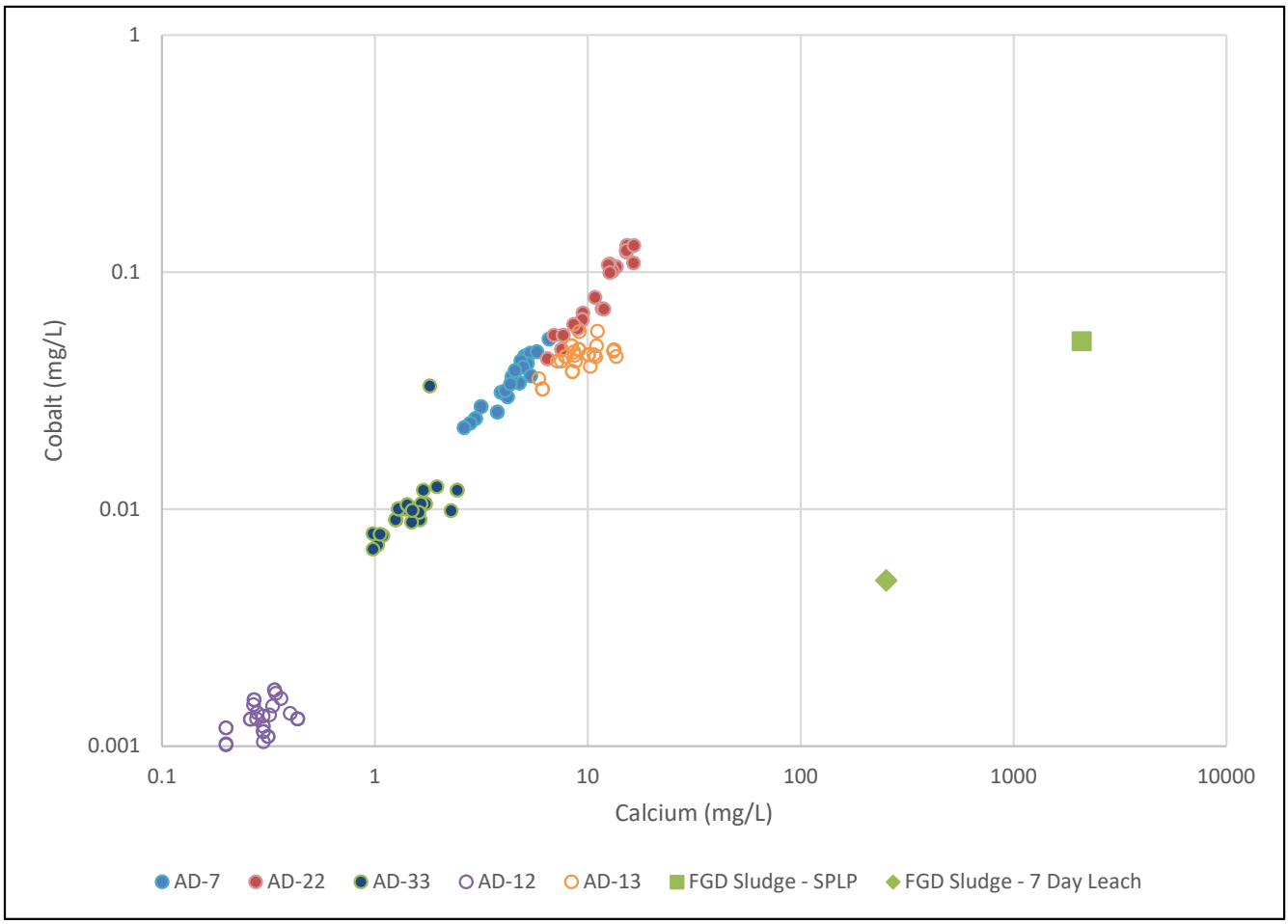
Geosyntec consultants

AMERICAN ELECTRIC POWER

Figure 7

Columbus, Ohio

December-2022



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

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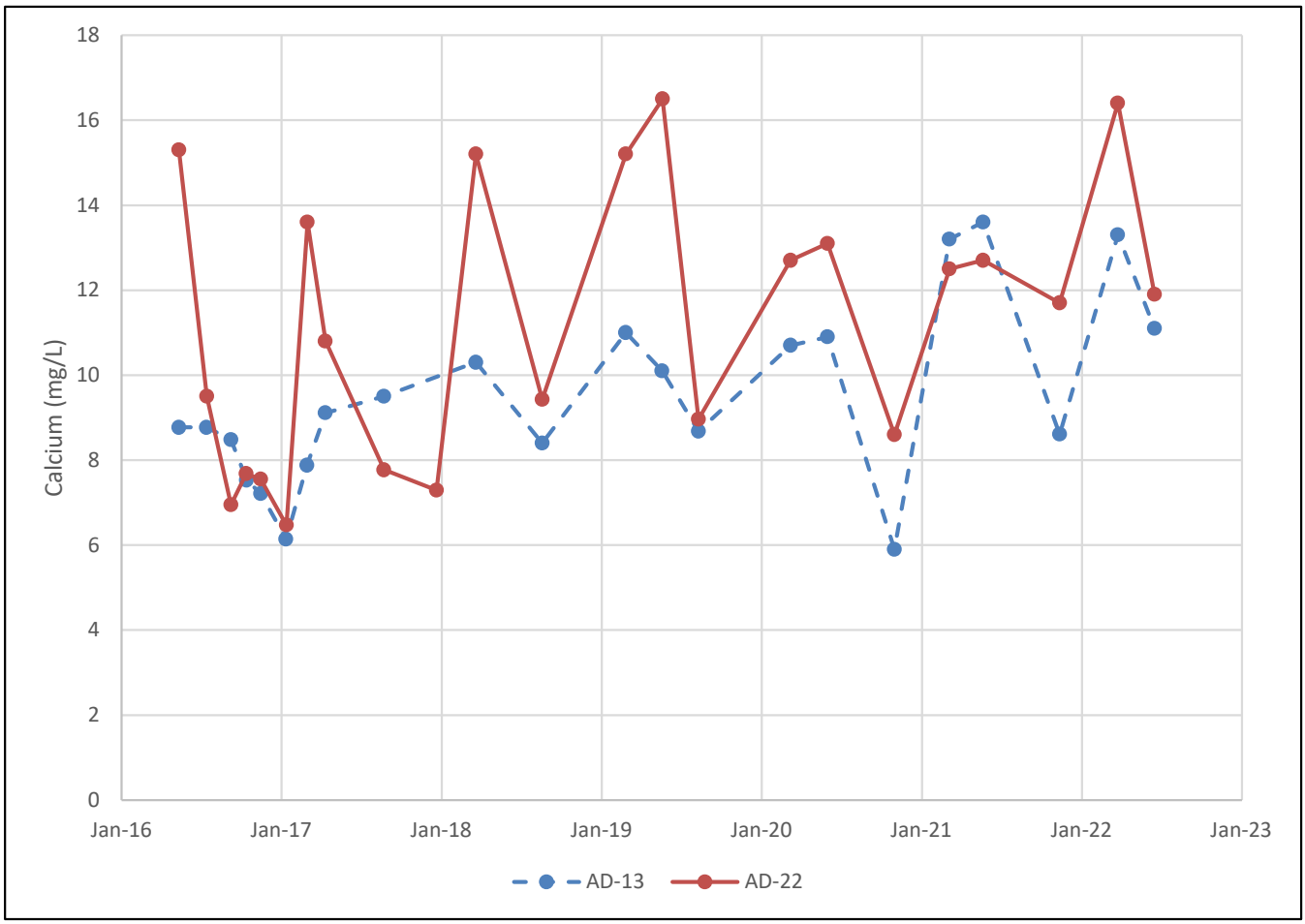
Figure 8

Columbus, Ohio

December-2022



Notes: Calcium concentrations are shown in milligrams per liter (mg/L). Upgradient monitoring well AD-13 is shown with a dashed line.

Calcium Time Series Graph
Pirkey FGD Stackout Pad

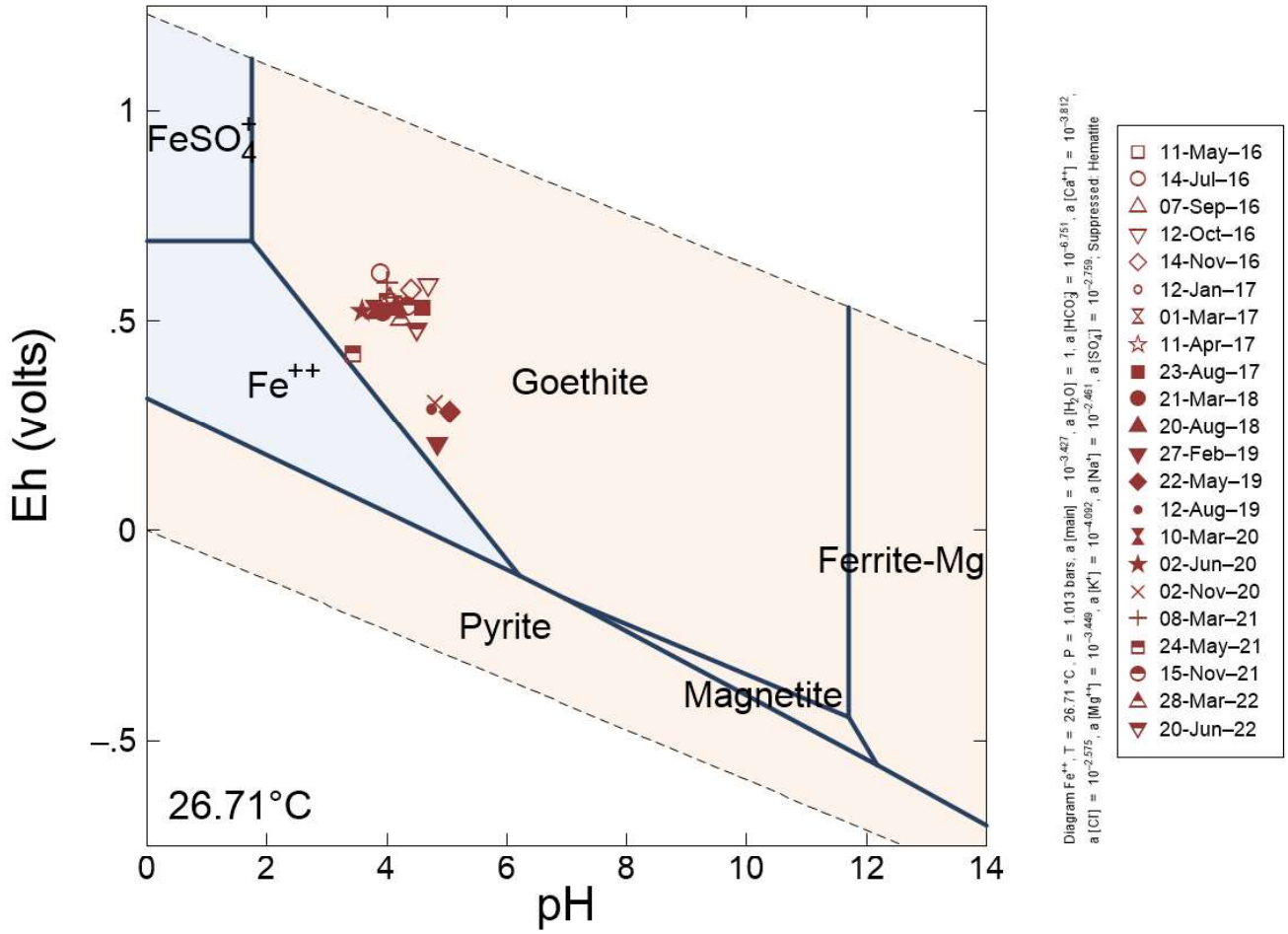
Geosyntec consultants

AMERICAN ELECTRIC POWER

Figure 9

Columbus, Ohio

December-2022



Notes: Groundwater concentrations of major cations and anions at AD-22 from the March 2022 sampling event 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

AMERICAN ELECTRIC POWER

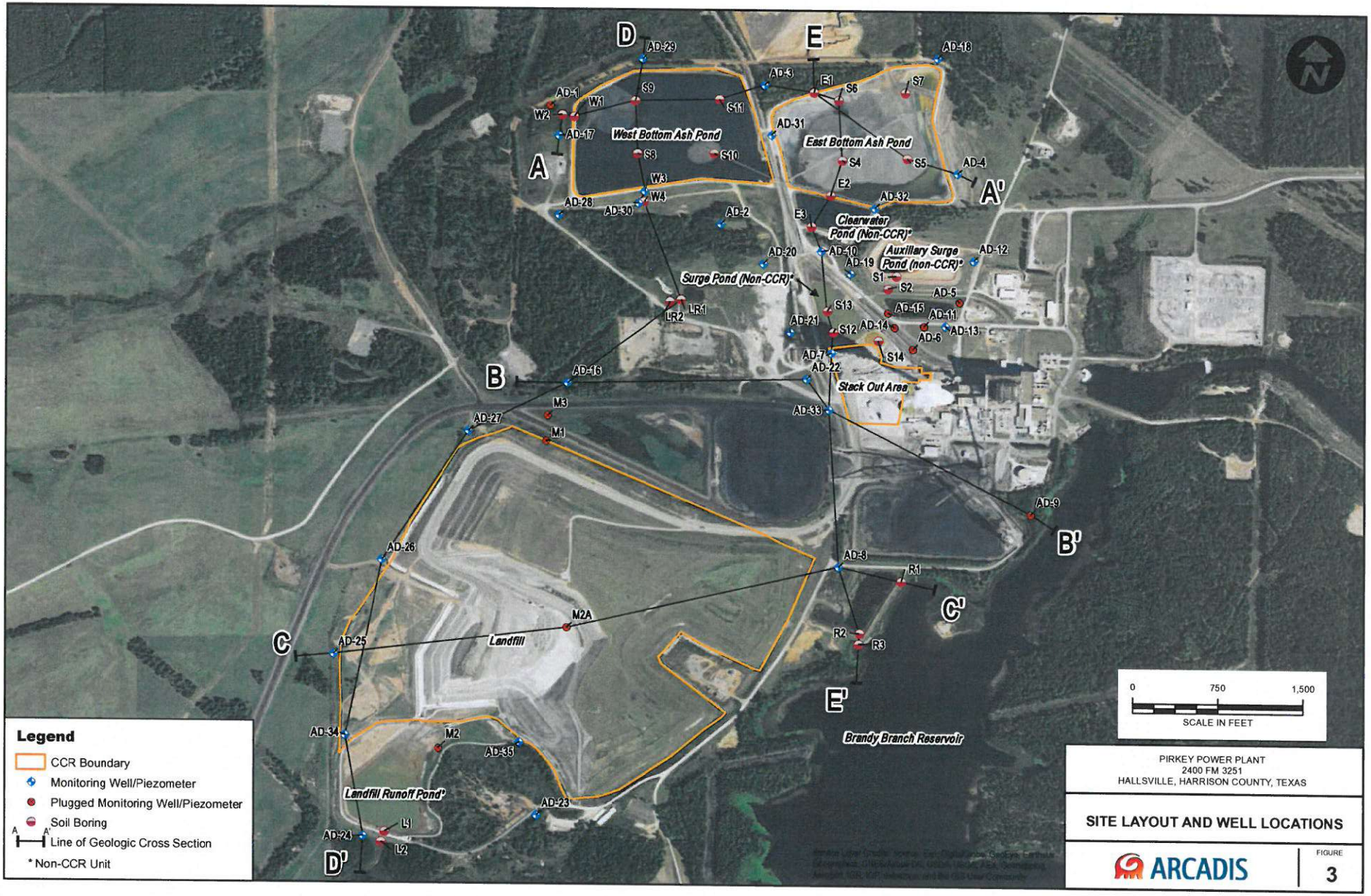
Figure **10**

Columbus, Ohio

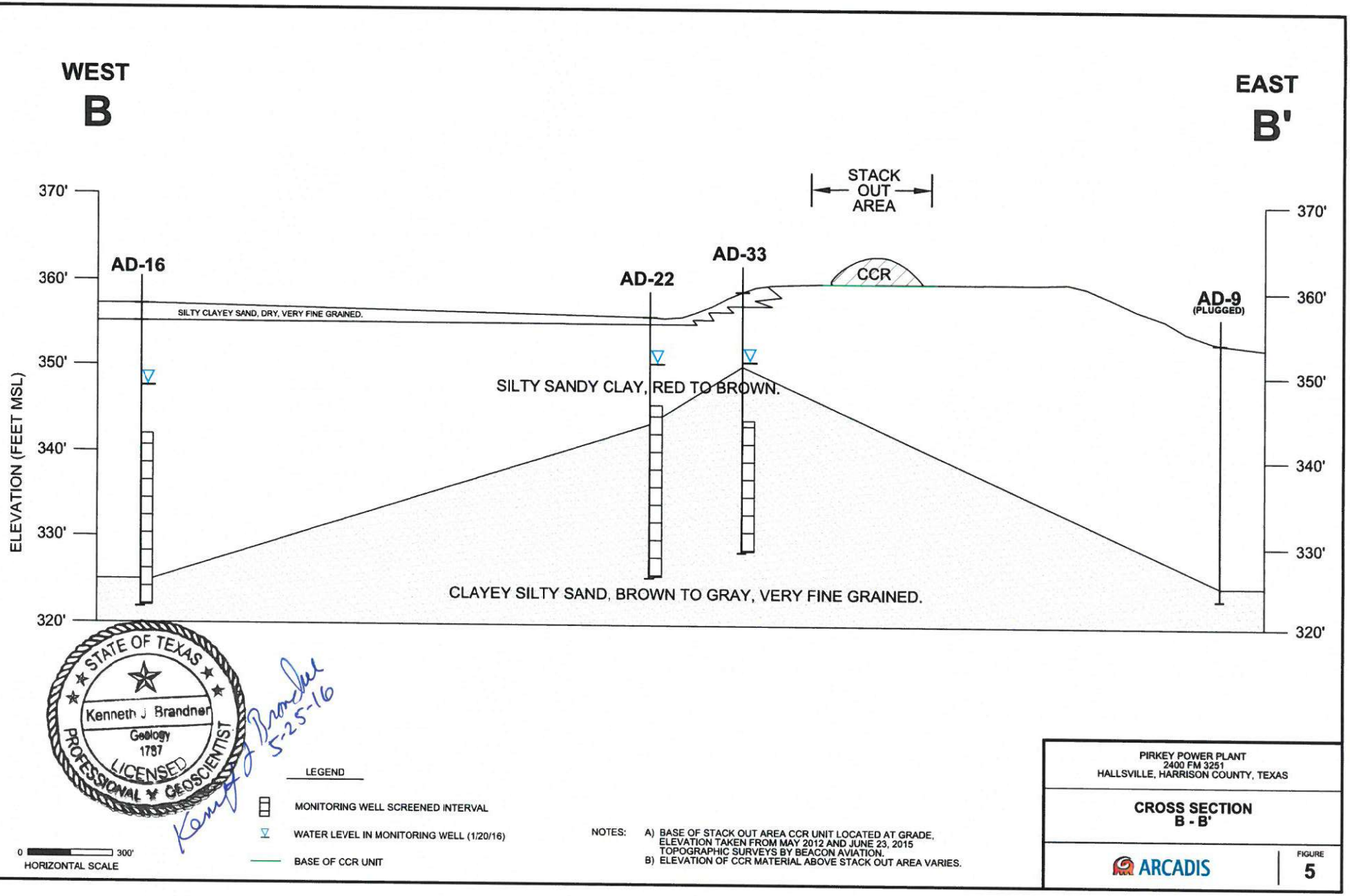
December-2022

internal info: path, date revised, author

ATTACHMENT A
Geologic Cross Sections



Document Path: Z:\GIS\PROJECTS_ENVAEP\Pirkey Plant\MXD\Figure 3 - Site Layout and Well Locations.mxd



STATE OF TEXAS
Kenneth J Brandner
Geology
1797
LICENSED PROFESSIONAL GEOSCIENTIST

Kenneth J Brandner 5-25-16

LEGEND

- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (1/20/16)
- BASE OF CCR UNIT

0 300'
HORIZONTAL SCALE

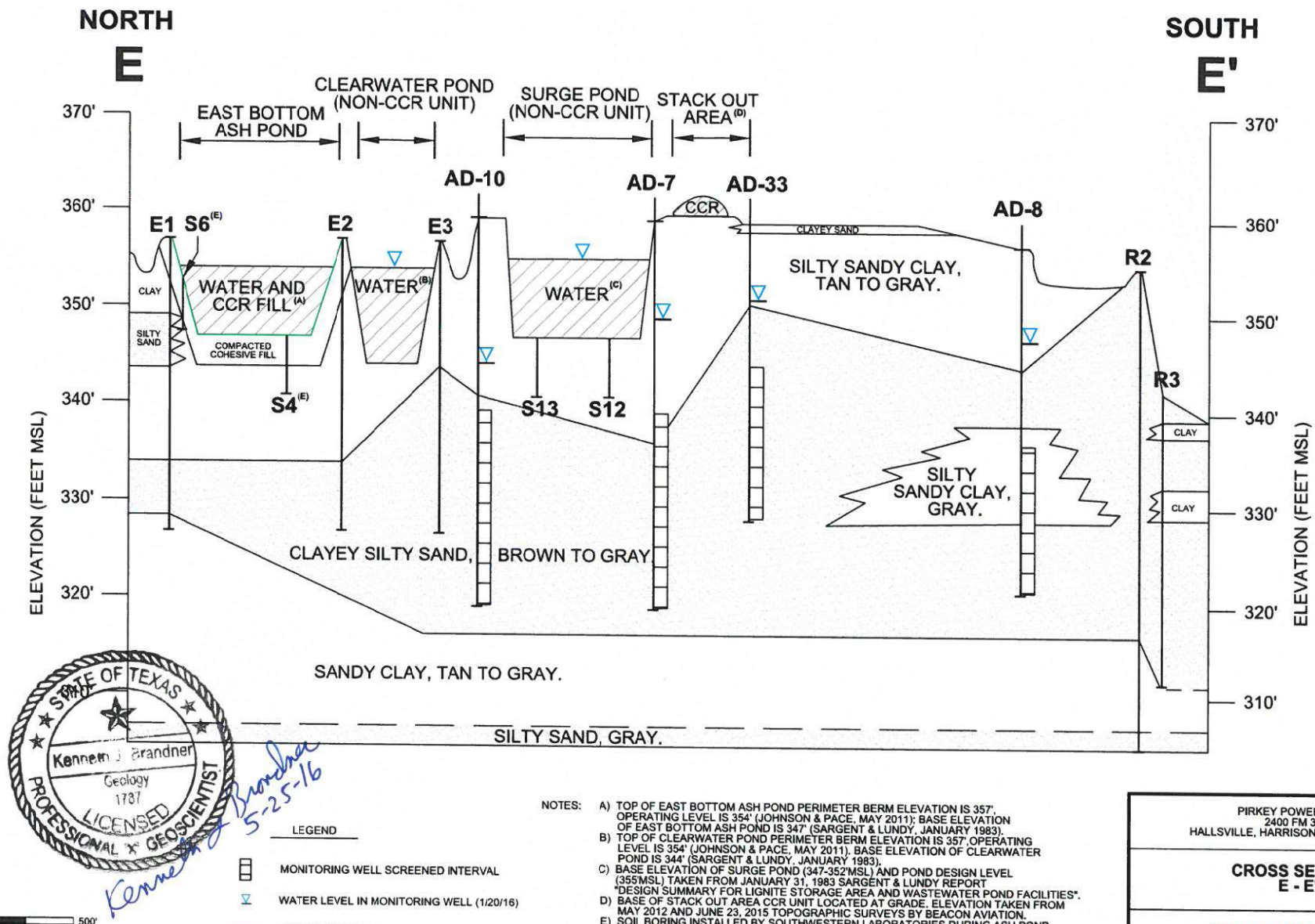
NOTES:
A) BASE OF STACK OUT AREA CCR UNIT LOCATED AT GRADE, ELEVATION TAKEN FROM MAY 2012 AND JUNE 23, 2015 TOPOGRAPHIC SURVEYS BY BEACON AVIATION.
B) ELEVATION OF CCR MATERIAL ABOVE STACK OUT AREA VARIES.

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

CROSS SECTION B - B'

ARCADIS

FIGURE 5



STATE OF TEXAS
Kenneth J. Brandner
Geology
1737
LICENSED
PROFESSIONAL GEOSCIENTIST

Kenneth J Brandner 5-25-16

LEGEND

- MONITORING WELL SCREENED INTERVAL
- WATER LEVEL IN MONITORING WELL (1/20/16)
- BASE OF CCR UNIT

0 500'
HORIZONTAL SCALE

NOTES:

A) TOP OF EAST BOTTOM ASH POND PERIMETER BERM ELEVATION IS 357', OPERATING LEVEL IS 354' (JOHNSON & PACE, MAY 2011); BASE ELEVATION OF EAST BOTTOM ASH POND IS 347' (SARGENT & LUNDY, JANUARY 1983).
B) TOP OF CLEARWATER POND PERIMETER BERM ELEVATION IS 357',OPERATING LEVEL IS 354' (JOHNSON & PACE, MAY 2011). BASE ELEVATION OF CLEARWATER POND IS 344' (SARGENT & LUNDY, JANUARY 1983).
C) BASE ELEVATION OF SURGE POND (347-352'MSL) AND POND DESIGN LEVEL (355'MSL) TAKEN FROM JANUARY 31, 1983 SARGENT & LUNDY REPORT "DESIGN SUMMARY FOR LIGNITE STORAGE AREA AND WASTEWATER POND FACILITIES".
D) BASE OF STACK OUT AREA CCR UNIT LOCATED AT GRADE. ELEVATION TAKEN FROM MAY 2012 AND JUNE 23, 2015 TOPOGRAPHIC SURVEYS BY BEACON AVIATION.
E) SOIL BORING INSTALLED BY SOUTHWESTERN LABORATORIES DURING ASH POND CONSTRUCTION IN 1983.

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

CROSS SECTION
E - E'

ARCADIS

FIGURE
8

ATTACHMENT B
SP-B2 Boring Log

Soil Boring Log

Project: AEP Pirkey

Boring/Well Name: SP-B2

Project Location: Hallsville, TX

Boring Date: 3/2/2020

Soil Profile

Depth Scale Feet	Water Table	Description	PID*
		pp= pocket penetrometer	
0		0.0'-0.2': Gray silt, dry, brittle (fly ash)	
		0.2'-0.4': Black, coal dust, strong odor	
		0.4'-1.7': Gray silt, dry, brittle (fly ash)	
		1.7'-2.6': red silt, brittle, dry	
		2.6'-6.5': Gray and red silty clay, high stiffness (pp. 4.0-5.0), low plasticity, iron ore/mottling present	
5		6.5'-6.9': Light gray, red and tan clay, low stiffness (pp. 1.5), moderate plasticity	
		6.9'-10.0': Light gray and maroon clay, moderate stiffness (pp. 3.5), low plasticity, iron ore/mottling present; moist near 9'	
10	▼	10.0'-15.0': Light gray and maroon clay, moderate/high stiffness (pp. 3.5-4.5), low plasticity, iron ore/mottling present; wet	
15		15.0'-18.5': Maroon and light gray clay, moderate/high stiffness (pp. 3.0-4.0), low plasticity; wet	
		18.5'-18.8': Red/brown silt, trace clay, good cohesion	
		18.8'-20.5': Light gray clayey silty sand, very fine grained, moderate sorting, mottling present; wet	
20		20.5'-23.4': Light gray and orange clayey silty sand, very fine grained; mottling present, moderate sorting; wet	
		23.4'-25.0': Maroon and orange silty clay, low stiffness (pp. 0.5), high plasticity; wet	
25		25.0'-29.0': Same as above; interchanging between silty clay and clayey silt throughout interval, iron ore/mottling present throughout	
		29.0'-29.5': Black clay, moderate stiffness (pp.3.0), low plasticity	
		29.5'-30.0': Gray fine grained sand, well sorted; wet	
30		Samples collected at 10-12'; 16-18'; 27-29'	
		TD at 30' bgs	
		*PID readings not collected	
35			

Drill Rig: Geoprobe 3230 DT

Drilling Contractor: C&S

Driller: DJ Diduch

Geosyntec Consultants

ATTACHMENT C
AD-7 Boring Log

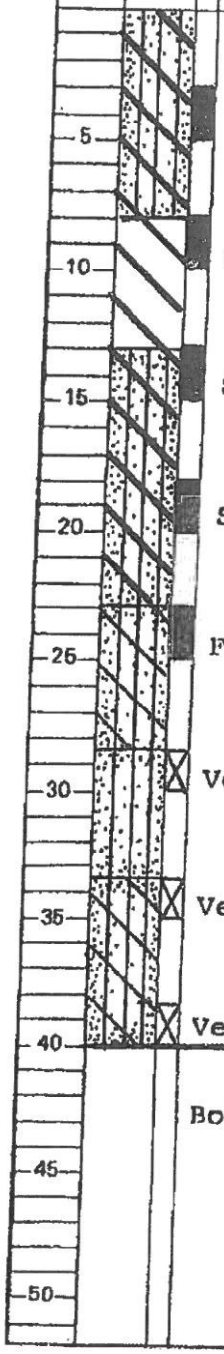
832964

LOG OF BORING

PROJECT: Waste Water Ponds
CLIENT: SWEPCO

BORING NO.: MW-7
LOCATION: Hallsville

Date: 10-3-83 Type: Auger Ground Elevation:



Legend: ■ Sample X Penetration ▼ Water

Description of Stratum
Stiff red, tan and grey sandy silty clay w/iron ore
Stiff tan and grey clay w/iron ore
Stiff tan and grey silty sandy clay lenses w/iron ore
Stiff tan and grey very sandy silty clay
Firm tan and grey clayey silty sand
Very dense grey silty sand 23-27=12" 50 B/F
Very dense grey clayey silty sand 17-35=12" 50 B/F
Very dense grey clayey silty sand 25-25=10½" 50 B/10½"
Bottom of boring at 40 feet.

ATTACHMENT D
SP-B4 Boring Log

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*
			pp= pocket penetrometer	
0		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	
		24.4'-27.8':	Dark green/gray fine grained sand, well sorted; wet; glauconite present	
25		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 E

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

LATTITUDE: 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							
19					Very firm 18-18.5'		
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

Apex geoscience inc.

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 F

Certification by a Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

I certify that the above described alternative source demonstration is appropriate for evaluating the groundwater monitoring data for the Pirkey 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
Digitally signed by Beth Gross,
Date: 2023.01.25 16:49:31 -05'00'

Signature

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

Texas Registered Engineering Firm
No. F-1182

79864	Texas	January 25, 2023
License Number	Licensing State	Date

APPENDIX 4- Field Reports

CCR Groundwater Monitoring Well Inspection Form

Facility: PIRKEY PP

Sampling Contractor: EAGLE ENVIRONMENTAL

Sampling Period: MARCH 2022

Signature: [signature]

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

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

CCR Groundwater Monitoring Well Inspection Form

Facility: Pirkey

Sampling Period: March 2022

Sampling Contractor: Eagle Env

Signature:

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
								Metal Cover Won't close
B-2					✓		✓	-No lock -No label
AD-12	✓	✓	✓	✓	✓	labeled as MW-12	✓	
AD-32	✓	✓	✓	✓	✓	✓	✓	
AD-31	✓	✓	✓	✓	✓	✓	✓	
AD-30	✓	✓	✓	✓	✓	✓	✓	
AD-26	✓	✓	✓	✓	✓	✓	✓	
AD-25	✓	✓	✓		✓	✓	✓	overgrown
AD-28	✓	✓	✓	✓	✓	✓	✓	
AD-3	✓	✓	✓	✓	✓	labeled as MW-3	✓	access Not Maintained overgrown

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

Facility Name	PINKERTON
Sample by	KENNY McDONALD

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

Sample Location ID	AD-2
Depth to water date	03/29/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1108	16.24	220	3.97	658	0.0	6.21	445	21.17		
1113	16.30	220	3.95	666	0.0	4.29	449	21.20		
1118	16.32	220	3.90	675	0.0	4.34	454	21.29		
1123	16.34	220	3.91	675	0.0	4.31	456	21.31		

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

Facility Name	Pilkey
Sample by	Matt Hamilton

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

Sample Location ID	AD-03
Depth to water date	3-25-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1121	31.55	300	4.42	131	57.5	4.76	272	21.83		
1126	31.69	300	4.58	130	28.7	0.45	225	21.30		
1131	31.78	300	4.66	137	24.6	0.40	202	21.25		
1136	31.89	300	4.71	145	25.4	0.34	175	21.21		
1141	31.97	300	4.76	155	25.6	0.32	166	21.17		
1146	32.07	300	4.78	161	25.7	0.31	162	21.16		

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

Facility Name	Pinkos PP
Sample by	Kenny McDonald

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

Sample Location ID	AP-4
Depth to water date	03/29/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1154	7.30	178	4.84	148	57.1	7.59	402	23.74		
1159	7.44	178	4.90	98	42.4	3.72	400	22.86		
1204	7.61	178	4.92	95	41.7	3.67	399	22.83		
1209	7.68	178	4.93	94	41.2	3.68	396	22.82		
1214	7.74	178	4.94	94	40.6	3.63	395	22.79		

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

Facility Name	Pinkey PP
Sample by	Penny McDonald

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

Sample Location ID	AO-7
Depth to water date	03/28/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1133	14.31	152	3.67	327	3.6	6.31	451	23.64		
1138	14.50	152	3.64	330	5.5	3.02	446	23.59		
1143	14.76	152	3.61	334	3.2	2.91	440	23.52		
1148	14.91	152	3.60	336	0.0	2.87	437	23.50		

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

Facility Name	Pilkey
Sample by	M. & Hamilton

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

Sample Location ID	AD-12
Depth to water date	3-28-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
950	9.02	300	4.20	47	2.1	3.48	214	21.19		
955	9.24	300	3.42	46	1.2	3.07	245	21.11		
1000	9.45	300	3.85	45	1.3	3.10	259	21.14		

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

Facility Name	Pinson PP
Sample by	Kenny McDonald

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

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0816	10.95	180	5.24	399	261	6.41	294	20.35		
0821	11.06	180	5.25	393	255	2.83	290	20.37		
0826	11.14	180	5.25	384	217	1.57	236	20.43		
0831	11.20	180	5.25	379	206	1.56	232	20.37		
0836	11.26	180	5.25	377	208	1.52	229	20.39		

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

Facility Name	Pinney PP
Sample by	Kenny McDonald

Depth to water, feet (TOC)	20.24
Measured Total Depth, feet (TOC)	33.05

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1008	20.37	216	4.16	98	14.9	8.24	429	21.63		
1013	20.40	216	4.16	98	12.1	2.69	429	21.54		
1018	20.40	216	4.15	98	11.6	2.66	434	21.68		
1023	20.41	216	4.13	98	11.2	2.64	440	21.70		

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

Facility Name	PIRAMA PP
Sample by	Mandy McDonald

Depth to water, feet (TOC)	4.25
Measured Total Depth, feet (TOC)	28.42

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1257	5.69	100	4.25	153	60.3	9.70	341	20.98		
1302	6.54	100	4.40	64	0.0	3.75	382	20.86		
				WON'T HOLD WATER LEVEL						

Total volume purged	
Sample appearance	BROWN TINT
Sample time	0936
Sample date	03/29/22

Facility Name	PINAM PP
Sample by	Kimmy McDonald

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

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0918	9.95	200	4.25	957	1.1	6.49	342	20.82		
0923	9.96	200	4.27	966	0.0	1.97	311	20.96		
0928	10.01	200	4.26	968	0.0	2.01	307	21.05		
0933	10.06	200	4.25	971	0.0	1.92	301	21.09		

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

DUPLICATE-1

1200

Facility Name	Pillcy
Sample by	Matt Hamm

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

Sample Location ID	AD-25
Depth to water date	3-29-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
941	8.15	120	3.22	926	15.9	1.67	245	21.77		
946	8.43	120	3.22	870	23.5	0.56	212	21.66		
951	8.56	120	3.22	873	7.2	0.36	240	21.84		
956	8.65	120	3.24	504	8.5	0.35	257	21.85		
1001	8.72	120	3.25	911	8.4	0.34	286	21.87		

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

Facility Name	Pitney
Sample by	Matt Hamilton

Depth to water, feet (TOC)	15.06
Measured Total Depth, feet (TOC)	42.75

Sample Location ID	MW-28
Depth to water date	3-29-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
855	15.48	300	3.30	2,010	21.7	1.28	3-6	22.33		
900	15.71	300	3.15	2,050	48.9	0.65	290	21.98		
905	15.44	300	3.10	2,085	44.5	0.62	291	21.88		
910	16.15	300	3.05	2,100	36.7	0.58	294	21.82		
915	16.24	300	3.04	2,120	17.2	0.55	300	21.80		
920	16.33	300	3.03	2,140	9.6	0.52	306	21.95		

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

Landfill

Dup

930

Facility Name	Pillsbury
Sample by	NAE Hamilton

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

Sample Location ID	AD 28
Depth to water date	3-25-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1022	18.51	220	3.66	123	3.3	2.52	273	22.05		
1027	18.51	220	3.68	120	2.1	1.67	278	21.18		
1032	18.51	220	3.66	118	2.0	1.59	284	21.04		

Total volume purged	
Sample appearance	clear
Sample time	1034
Sample date	3-25-22

Dup.-2

1055

Facility Name	Pinkey
Sample by	MJH Hamilton

Depth to water, feet (TOC)	8.58
Measured Total Depth, feet (TOC)	27.15

Sample Location ID	AD-30
Depth to water date	3-28-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1234	14.00	220	3.99	536	61	2.11	275	25.96		
1239	14.01	220	4.00	535	13.1	1.78	270	23.41		
1244	14.01	220	3.97	536	8.2	1.76	272	23.35		
1249	14.01	220	3.96	529	8.4	1.74	271	23.37		

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

Facility Name	Pinney
Sample by	Matt / Hamilton

Depth to water, feet (TOC)	16.17
Measured Total Depth, feet (TOC)	37.32

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1137	16.47	220	3.46	298	51.4	1.39	316	22.98		
1142	16.48	220	3.42	297	50.4	0.88	306	23.35		
1147	16.51	220	3.42	294	31.4	0.83	303	23.72		
1152	16.51	220	3.41	300	16.7	0.64	302	23.65		
1157	16.51	220	3.41	300	7.6	0.78	302	23.63		
1202	16.51	220	3.41	300	7.5	0.75	302	23.54		

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

Facility Name	
Sample by	P. Pilkey M-H H-mi Hm

Depth to water, feet (TOC)	7.45
Measured Total Depth, feet (TOC)	34.69

Sample Location ID	MD-32
Depth to water date	3.28.22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1035	7.98	220	3.27	435	181	1.23	3-7	22.11		
1040	8.03	220	3.21	444	67.1	0.53	3-9	21.51		
1045	8.07	220	3.17	450	41.5	0.51	312	21.47		
1050	8.07	220	3.15	446	25.3	0.51	315	21.30		
1055	8.07	220	3.13	446	12.7	0.42	317	21.32		
1100	8.08	220	3.12	447	8.2	0.34	316	21.20		
1105	8.08	220	3.12	445	8.2	0.38	317	21.31		

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

Facility Name	Pinney PP
Sample by	Henry McDonald

Depth to water, feet (TOC)	12.22
Measured Total Depth, feet (TOC)	32.50

Sample Location ID	AD-33
Depth to water date	03/28/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1037	12.29	180	3.98	269	6.4	12.45	375	22.68		
1042	12.29	180	3.98	230	6.3	2.29	375	22.61		
1047	12.30	180	3.98	227	3.5	2.26	370	22.57		
1052	12.30	180	3.97	222	0.3	2.19	367	22.51		

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

Facility Name	PIPPIN PP
Sample by	KENNY McDONALD

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

Sample Location ID	AD-34
Depth to water date	03/29/22

Purge Stabilization Data

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

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

AD-34 DUP
0837

Facility Name	Pixley
Sample by	M-H Hamilton

Depth to water, feet (TOC)	15.77
Measured Total Depth, feet (TOC)	51.44

Sample Location ID	B-2
Depth to water date	3-28-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
847	16.05	300	4.73	161	18.2	3.03	211	20.62		
852	16.14	300	4.55	131	8.4	1.43	128	20.19		
857	16.18	300	4.55	136	5.4	1.20	120	20.17		
902	16.19	300	4.54	136	5.3	1.14	115	20.14		

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

Dup-1

1-55

Facility Name	Pinson PP
Sample by	Kenny McDonald

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

Sample Location ID	B-3
Depth to water date	03/28/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1236	12.21	100	5.26	314	32.3	7.58	343	24.28		
1241	13.07	100	5.21	307	20.6	5.17	352	24.39		
				WON'T HOLD WATER LEVEL						

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

CCR Groundwater Monitoring Well Inspection Form

Facility: Pirkey

Sampling Contractor: Eagle

Sampling Period: June 2022

Signature:

Well No.	Well Locked	Fastener and Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Protective Cover, Barriers and Pad in Good Shape	Well Properly Labeled	Well Cap Present and Vented*	Comments
								All wells - no fill - no weep hole - no inside label
AD-12	S	S	S	S	S	U	S	labeled as MW-12
AD-32	S	S	S	S	S	S	S	
AD-31	S	S	S	S	S	S	S	
AD-30	S	S	S	S	S	S	S	
B-2	U	U	U	U	S	U	S	- No lock - access not maintained - No label
AD-28	S	S	S	S	S	S	S	
AD-17	S	S	S	S	S	S	S	- needs weedeating to see pad
AD-3	S	S	S	S	S	S	S	
AD-26	S	S	S	S	S	S	S	- needs new lock
AD-25	S	S	S	S	S	S	S	
AD-23	S	S	S	S	S	S	S	
AD-27	S	S	S	S	S	S	S	

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

CCR Groundwater Monitoring Well Inspection Form

Facility: APP PLANT PP Sampling Period: JUNE 2022

Sampling Contractor: EAGLE ENVIRONMENTAL Signature: [signature]

Well No.	Well Locked	Fastener and Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Protective Cover, Barriers and Pad in Good Shape	Well Properly Labeled	Well Cap Present and Vented*	Comments
AD-13	S	S	S	S	U	U	U	NO WEEP HOLE, NO GRANULAR FILL, WELL LABELED MW-13, CAP NOT VENTED
AD-22	S	S	S	S	U	U	U	NO WEEP HOLE, NO GRANULAR FILL CAP NOT VENTED, NOT LABELED INSIDE
AD-73	S	S	S	U	U	U	U	NOT WEEP PATTED, NO WEEP HOLE, NO GRANULAR FILL, CANNOT VENTED, NOT LABELED INSIDE
AD-7R	S	S	S	S	U	U	U	NOT LABELED INSIDE OR OUTSIDE, NO WEEP HOLE, CAP NOT VENTED, NO GRANULAR FILL
AD-2	S	S	S	S	U	U	U	NO WEEP HOLE, NO GRANULAR FILL, CAP NOT VENTED, LABELED AS MW-2, NOT LABELED INSIDE
AD-[illegible]	S	S	S	S	U	U	U	
AD-4	U	U	U	U	U	U	U	NOCAP NOT WEEP PATTED NO GOOD WAY TO GET TO WELL
AD-18	S	S	S	U	U	U	U	OVERGROWN DOWN TREE IN WAY NOT LABELED INSIDE, NO WEEP HOLE, CAP NOT VENTED NO FILL
B-3	U	U	U	U	U	U	U	NOLOCK NO LABEL INSIDE OR OUTSIDE NO WEEP HOLE NO VENT NO GRANULAR FILL
AD-16	S	S	S	U	U	U	U	OVERGROWN TRAIL, WELL OVERGROWN NO WEEP HOLE NO INTERNAL LABEL CAP NOT VENTED
AD-34	S	S	S	S	U	U	U	HINGE BROKEN WELL NOT SECURE NOT LABELED INSIDE NO GRANULAR FILL NO WEEP
AD-36	S	S	S	S	U	U	U	NOT LABELED INSIDE NO GRANULAR FILL CAP NOT VENTED NO WEEP
AD-8	S	S	S	S	U	U	U	LABELED AS MW-8 NO WEEP CANNOT VENTED

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

Facility Name	ACP Flanagan PP
Sample by	Kenny McDonald

Sample Location ID	AO-02

Depth to water, feet (TOC)	16.97
Measured Total Depth, feet (TOC)	40.36

Depth to water date	06/21/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0832	17.01	200	4.02	668	16.5	8.31	475	23.82		
0837	17.13	200	4.00	674	1.8	5.00	475	23.16		
0842	17.21	200	3.96	675	0.0	4.47	475	23.04		
0847	17.28	200	3.96	677	0.0	4.42	476	22.92		

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

Facility Name	Pixley
Sample by	Matt Hamilton

Depth to water, feet (TOC)	33.08
Measured Total Depth, feet (TOC)	57.41

Sample Location ID	AD-3
Depth to water date	6-21-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1106	33.51	220	4.38	92	41.3	1.88	274	31.70		
1111	33.68	220	4.40	90	10.8	1.04	275	25.5c		
1116	33.77	220	4.34	90	4.2	1.02	275	24.62		
1121	33.85	220	4.38	90	4.2	1.00	276	24.51		

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

Facility Name	AGP Plant PP
Sample by	Kerry McDonald

Sample Location ID	AD-4

Depth to water, feet (TOC)	15.48
Measured Total Depth, feet (TOC)	47.29

Depth to water date	06/21/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1017	15.81	160	4.27	127	228	8.21	329	24.82		
1022	15.86	160	4.36	113	216	3.17	341	24.63		
1027	15.93	160	4.39	110	201	3.06	355	24.57		
1032	15.99	160	4.40	108	204	3.02	357	24.51		

Total volume purged	
Sample appearance	Clear
Sample time	1034
Sample date	06/21/22

Facility Name	AEP Pinnacle PP
Sample by	Kenny McDonald

Sample Location ID	AD-7

Depth to water, feet (TOC)	17.44
Measured Total Depth, feet (TOC)	41.98

Depth to water date	06/21/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0930	18.02	150	3.55	410	20.6	9.74	472	26.83		
0935	18.11	150	3.54	406	5.9	2.80	472	26.42		
0940	18.19	150	3.54	397	2.6	2.71	472	26.11		
0945	18.25	150	3.52	399	0.0	2.63	467	25.94		

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

Facility Name	ACP Pinnacle
Sample by	Kerry McDonald

Sample Location ID	AD-7R

Depth to water, feet (TOC)	10.95
Measured Total Depth, feet (TOC)	33.03

Depth to water date	06/20/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1104	11.01	120	4.56	210	4.1	10.21	383	28.27		
1109	11.02	120	4.59	211	0.0	3.21	360	26.97		
1114	11.05	120	4.58	212	0.0	3.19	351	27.52		
1119	11.11	120	4.57	213	0.0	3.12	346	26.25		

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

Facility Name	AEP Plant PP
Sample by	Kerry McDonald

Sample Location ID	AD-8

Depth to water, feet (TOC)	13.57
Measured Total Depth, feet (TOC)	31.33

Depth to water date	06/22/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1154	13.82	160	5.25	334	26.0	9.45	350	27.41		
1159	13.87	160	5.16	335	13.1	2.47	346	26.46		
1204	13.88	160	5.03	337	6.8	2.22	350	26.28		
1209	13.89	160	5.00	337	4.8	2.19	352	26.19		
1214	13.88	160	5.01	337	5.2	2.17	354	26.13		

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

Facility Name	Pinkerton
Sample by	Matt Hamilton

Depth to water, feet (TOC)	21.44
Measured Total Depth, feet (TOC)	52.00

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
840	21.67	300	4.61	123	0	3.71	254	27.28		
845	21.78	300	4.30	57	0	1.63	242	24.73		
850	21.90	300	4.25	56	0	1.48	300	24.58		

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

Facility Name	AP Pirkom PD
Sample by	Kenny McDonald

Sample Location ID	AD-13

Depth to water, feet (TOC)	15.01
Measured Total Depth, feet (TOC)	40.70

Depth to water date	06/20/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0821	15.22	170	5.79	539	556	12.75	-33	24.29		
0826	15.28	170	5.71	537	321	6.37	-22	24.31		
0831	15.37	170	5.68	536	339	6.30	-8	24.02		
0836	15.48	170	5.68	535	306	5.97	-10	24.07		
0841	15.55	170	5.68	533	298	5.91	-18	24.08		

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

COMPLETE DUPLICATE-1400

Facility Name	APP Kimoy PP
Sample by	Kenny McDonald

Sample Location ID	AO-16

Depth to water, feet (TOC)	17.69
Measured Total Depth, feet (TOC)	38.24

Depth to water date	06/22/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0948	18.01	210	4.57	131	35.5	3.87	421	23.87		
0953	18.09	210	4.54	136	28.6	1.97	419	23.91		
0958	18.13	210	4.51	136	27.1	2.03	419	23.94		
1003	18.17	210	4.51	136	26.9	2.11	414	23.97		

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

Facility Name	Pillcox
Sample by	M-NT Hamilton

Sample Location ID	AD-17

Depth to water, feet (TOC)	22.61
Measured Total Depth, feet (TOC)	23.05

Depth to water date	6.21.22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1023	22.76	200	3.75	146	6.7	3.24	330	26.48		
1028	22.76	200	3.35	147	7.8	1.07	328	23.42		
1033	22.76	200	3.32	145	4.8	0.95	321	23.22		
1038	22.76	200	3.30	145	2.2	0.89	316	23.01		

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

Facility Name	AEP PIRKEY PP
Sample by	KENNY McDONALD

Sample Location ID	AD-18

Depth to water, feet (TOC)	9.91
Measured Total Depth, feet (TOC)	28.42

Depth to water date	06/21/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1108	8.37	102	4.83	58	56.4	5.28	365	25.12		
1113	9.41	102	4.61	51	18.2	3.79	374	24.68		
			WON'T	HOLD	WATER	LEVEL				

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

Facility Name	AEP Pinhook PP
Sample by	Kenny McDonald

Sample Location ID	AD-22

Depth to water, feet (TOC)	13.02
Measured Total Depth, feet (TOC)	32.70

Depth to water date	06/20/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0936	13.22	164	4.80	766	13.0	8.21	274	27.21		
0941	13.29	164	4.57	778	5.5	3.63	290	26.69		
0946	13.31	164	4.54	787	5.1	3.59	277	26.75		
0951	13.36	164	4.51	791	4.6	3.52	274	26.71		

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

Facility Name	Pickett
Sample by	Matt Hamilton

Depth to water, feet (TOC)	30.23
Measured Total Depth, feet (TOC)	38.20

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1050	30.45	220	3.56	231	96.2	2.33	260	31.16		
1055	30.50	220	3.58	94	85.7	1.93	264	26.41		
1100	30.52	220	3.59	82	55.7	1.78	260	26.04		
1105	30.53	220	3.59	79	@36.8	1.66	284	25.94		
1110	30.53	220	3.62	77	32.2	1.61	281	25.84		
1115	30.53	220	3.62	76	32.6	1.57	288	25.85		

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

Facility Name	Pinkey
Sample by	Matt Hamilton

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

Sample Location ID	AD-25
Depth to water date	6-22-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
955	9.91	120	3.81	867	54.6	1.45	218	24.00		
1000	9.95	120	3.83	834	32.3	0.38	208	25.12		
1005	10.06	120	3.77	849	10.1	0.24	209	25.15		
1010	10.14	120	3.75	856	9.9	0.22	210	25.17		

Total volume purged	
Sample appearance	clear
Sample time	1012
Sample date	6-22-22

Facility Name	Pinkley
Sample by	Matt Hamilton

Depth to water, feet (TOC)	15.28
Measured Total Depth, feet (TOC)	42.71

Sample Location ID	AD-26
Depth to water date	6-22-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
857	15.61	300	3.41	2,050	51.40	1.61	261	27.41		
902	15.76	300	3.34	2,110	54.30	2.41	248	25.10		
907	15.85	300	3.23	2,110	50.0	3.27	249	24.91		
912	15.99	300	3.24	2,110	28.20	4.01	245	24.82		
917	16.07	300	3.24	2,120	17.5	4.42	244	24.75		
922	16.15	300	3.25	2,120	17.8	4.53	243	24.70		

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

Facility Name	Pixley
Sample by	Matt Hamilton

Sample Location ID	AD-27
Depth to water date	6-22-22

Depth to water, feet (TOC)	22.52
Measured Total Depth, feet (TOC)	40.07

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1140	22.67	300	3.37	221	87	2.01	312	31.84		
1145	22.81	300	3.33	224	17.6	0.60	324	28.55		
1150	22.90	300	3.30	230	5.9	0.43	332	27.17		
1155	22.97	300	3.30	232	5.8	0.39	335	27.02		

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

Facility Name	Pinion
Sample by	M+T / Hamilton

Sample Location ID	AD-28

Depth to water, feet (TOC)	19.29
Measured Total Depth, feet (TOC)	38.59

Depth to water date	6.21.22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
944	19.60	220	4.27	103	7	4.60	208	26.52		
949	19.68	220	4.06	107	3.1	1.76	237	24.30		
954	19.74	220	4.00	105	1.3	1.63	245	24.01		

Total volume purged	
Sample appearance	Clear
Sample time	956
Sample date	6-21-22

Facility Name	Pinkey
Sample by	Matt Hamilton

Sample Location ID	MW-3
Depth to water date	6-2-22

Depth to water, feet (TOC)	20.48
Measured Total Depth, feet (TOC)	27.15

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1107	20.48	220	4.15	495	48.8	1.69	296	32.09		
1112	20.99	220	4.23	518	57.1	0.97	294	27.38		
1117	21.00	220	4.20	520	13.1	0.47	297	26.28		
1122	20.00	220	4.17	521	3.2	0.65	300	26.05		
1127	20.01	220	4.15	522	3.1	0.51	301	25.91		

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

Facility Name	Pixley
Sample by	Matt / Hamilton

Sample Location ID	MW-31
Depth to water date	6.20.22

Depth to water, feet (TOC)	18.31
Measured Total Depth, feet (TOC)	37.32

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1021	18.71	220	3.51	308	79.4	1.96	311	24.33		
1026	18.77	220	3.48	295	24.6	0.43	336	25.81		
1031	18.75	220	3.47	296	14.3	0.34	296	25.57		
1036	18.80	220	3.46	295	7.6	0.29	313	25.55		
1041	18.81	220	3.45	296	7.5	0.28	317	25.51		

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

Facility Name	Pinkey
Sample by	Matt Hamilton

Sample Location ID	AD-32

Depth to water, feet (TOC)	9.24
Measured Total Depth, feet (TOC)	34.69

Depth to water date	6-20-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
925	11.71	220	3.31	415	82.6	1.14	351	26.89		
930	11.79	220	3.15	421	51.4	0.48	355	24.93		
935	11.85	220	3.06	410	31.3	0.38	383	24.59		
940	11.87	220	3.05	417	9.9	0.31	386	24.48		
945	11.88	220	3.03	413	9.8	0.30	387	24.45		

Total volume purged	
Sample appearance	clear
Sample time	951
Sample date	6-20-22

Facility Name	ATO Pinkney PP
Sample by	Kathy McDonald

Sample Location ID	AP-33

Depth to water, feet (TOC)	14.02
Measured Total Depth, feet (TOC)	32.50

Depth to water date	06/20/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1020	14.09	200	4.60	180	9.5	6.93	323	26.42		
1025	14.10	200	4.44	163	9.3	3.45	297	26.33		
1030	14.11	200	4.39	161	9.3	3.37	294	25.91		
1035	14.13	200	4.37	158	8.9	3.31	290	25.87		

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

Facility Name	AEP Pinney
Sample by	Kevin McDonald

Sample Location ID	AD-34

Depth to water, feet (TOC)	0.61
Measured Total Depth, feet (TOC)	26.05

Depth to water date	06/22/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1031	1.01	120	3.76	1610	10.4	10.84	457	28.41		
1036	1.10	120	3.70	1650	0.0	2.99	434	27.72		
1041	1.14	120	3.66	1670	3.3	2.87	428	27.49		
1046	1.20	120	3.66	1670	5.6	2.79	423	27.48		

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

Duplicate - 3

1400

Facility Name	APP Pinon PP
Sample by	Kenny McDonald

Sample Location ID	AO-36

Depth to water, feet (TOC)	7.71
Measured Total Depth, feet (TOC)	17.10

Depth to water date	06/22/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1113	7.83	146	4.63	63	62.7	2.87	354	29.71		
1118	7.85	146	4.53	64	24.1	1.87	353	29.64		
1123	7.89	146	4.55	64	11.4	1.42	350	29.63		
1128	7.89	146	4.58	64	10.9	1.37	349	29.72		
1133	7.92	146	4.58	63	11.2	1.32	347	29.78		

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

Facility Name	Pixley
Sample by	M. Hamilton

Sample Location ID	B-2

Depth to water, feet (TOC)	24.40
Measured Total Depth, feet (TOC)	51.44

Depth to water date	6-21-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
823	24.71	300	4.64	106	7.4	5.84	275	25.44		
828	24.78	300	4.52	103	0	4.51	251	22.51		
833	24.85	300	4.61	121	0	1.13	161	22.27		
838	24.90	300	4.68	125	0	1.07	158	22.15		

Total volume purged	
Sample appearance	clear
Sample time	840
Sample date	6-21-22

Duplicate
1000

Facility Name	AEP Primary PP
Sample by	Kenny McDonald

Sample Location ID	B-3

Depth to water, feet (TOC)	16.24
Measured Total Depth, feet (TOC)	37.49

Depth to water date	06/21/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1142	17.13	106	4.84	246	35.2	8.31	414	23.34		
1147	18.27	106	4.88	248	7.8	2.75	407	23.73		
				Won't Hold WATER LEVEL						

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

Facility Name	
Sample by	Pilkey Matt Hamilton

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

Sample Location ID	EBAD
Depth to water date	6-22-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1216			5.02	4,460	246	7.51	176	27.31		

Total volume purged	
Sample appearance	cloudy
Sample time	1216
Sample date	6-22-22

CCR Groundwater Monitoring Well Inspection Form

Facility: Pirkey

Sampling Period: Nov 2022

Sampling Contractor: Eagle

Signature:

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

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

CCR Groundwater Monitoring Well Inspection Form

Facility: PIRKEY PP

Sampling Period: NOVEMBER 2022

Sampling Contractor: EAGLE

Signature: [signature]

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

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

CCR Groundwater Monitoring Well Inspection Form

Facility: PIRRM

Sampling Period: NOVEMBER 2022

Sampling Contractor: EAGLE

Signature:

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

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

Facility Name	AEP Pirkey PP
Sample by	Kenny McDonald

Sample Location ID	AD-2

Depth to water, feet (TOC)	16.52
Measured Total Depth, feet (TOC)	40.36

Depth to water date	11/15/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0948	16.71	210	3.97	581	2.4	3.97	280	15.52		
0953	16.76	210	3.96	592	1.8	2.54	276	16.28		
0958	16.83	210	3.96	594	1.7	2.46	276	16.39		
1003	16.87	210	3.96	595	1.3	2.49	275	16.47		

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

Facility Name	
Sample by	Pilley Matt Hamlin

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

Sample Location ID	AM-3
Depth to water date	11-16-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1128	34.86	220	5.76	132	25.4	1.21	243	17.54		
1133	34.99	220	5.84	144	7.6	0.71	212	18.33		
1138	35.07	220	5.91	148	6.5	0.26	194	18.68		
1143	35.18	220	5.94	147	6.4	0.28	186	18.74		

Total volume purged	
Sample appearance	clear
Sample time	1145
Sample date	11-16-22

Facility Name	AGP Pinhook PP
Sample by	Kenny McDonald

Sample Location ID	AD-4

Depth to water, feet (TOC)	15.64
Measured Total Depth, feet (TOC)	47.29

Depth to water date	11/16/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1116	15.69	170	4.59	77	13.2	4.82	339	19.86		
1121	15.73	170	4.63	77	14.3	3.31	330	20.65		
1126	15.99	170	4.65	77	15.9	3.27	330	20.71		
1131	16.03	170	4.68	76	16.2	3.22	329	20.74		

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

Facility Name	AEP Pirkey PP
Sample by	Kenny McDonald

Sample Location ID	AO-7

Depth to water, feet (TOC)	17.23
Measured Total Depth, feet (TOC)	41.98

Depth to water date	11/16/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0853	17.82	160	3.66	424	4.2	3.62	367	16.82		
0858	17.91	160	3.67	424	2.7	2.09	372	17.46		
0903	17.98	160	3.64	427	3.2	2.03	369	17.51		
0908	18.03	160	3.62	429	5.6	1.97	366	17.57		

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

RA MS/MSD

Facility Name	AP Finney PP
Sample by	Kimmy McDonald

Sample Location ID	AD-7R

Depth to water, feet (TOC)	10.75
Measured Total Depth, feet (TOC)	33.03

Depth to water date	11/15/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0859	10.90	126	4.92	209	12.9	6.21	142	15.62		
0904	10.81	126	4.89	208	2.4	2.48	151	16.13		
0909	10.82	126	4.90	208	2.8	2.46	156	16.18		
0914	10.85	126	4.90	208	3.1	2.45	161	16.27		

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

Facility Name	AEP Pinnacle PP
Sample by	Kinny McDonald

Sample Location ID	AD-8

Depth to water, feet (TOC)	15.61
Measured Total Depth, feet (TOC)	31.33

Depth to water date	11/14/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0950	15.63	168	4.43	310	8.2	3.84	322	19.07		
0955	15.64	168	4.44	312	7.6	2.13	331	19.19		
1000	15.64	168	4.43	314	7.4	2.09	333	19.22		
1005	15.66	168	4.46	323	6.9	2.14	333	19.26		

Total volume purged	
Sample appearance	CLEAR
Sample time	1007
Sample date	11/14/22

Facility Name	Pitney
Sample by	Matt Hamilton

Depth to water, feet (TOC)	18.53
Measured Total Depth, feet (TOC)	52.0

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1036	18.48	300	4.38	72	12	2.44	72	17.14		
1041	19.57	300	4.56	67	33.8	1.88	325	19.00		
1046	20.21	300	4.66	67	36.2	1.63	323	19.17		
1051	20.52	300	4.71	67	30.1	1.82	318	19.25		
1056	20.93	300	4.73	66	30.0	1.80	320	19.29		

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

MS/MSD

Facility Name	APP PIRKEY PP
Sample by	KENNY McDONALD

Sample Location ID	AD-13

Depth to water, feet (TOC)	14.83
Measured Total Depth, feet (TOC)	40.70

Depth to water date	11/15/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0804	15.01	180	5.65	400	126	8.21	224	17.21		
0809	15.10	180	5.83	400	88.2	4.63	140	18.06		
0814	15.21	180	5.81	399	86.4	4.59	131	18.32		
0819	15.33	180	5.81	398	85.1	4.54	124	18.51		

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

DUPLICATE-2

WQ + METALS ONLY

1400

Facility Name	Pinney PP
Sample by	Kenny McDonald

Sample Location ID	AD-16

Depth to water, feet (TOC)	18.40
Measured Total Depth, feet (TOC)	38.24

Depth to water date	11/14/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1038	18.62	200	4.26	132	21.7	2.87	313	18.14		
1043	18.68	200	4.31	132	19.9	1.94	321	18.71		
1048	18.71	200	4.33	132	19.7	1.94	324	19.02		
1053	18.73	200	4.33	134	18.8	1.90	331	19.13		

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

Facility Name	Pillcox
Sample by	Matt / Hamilton

Depth to water, feet (TOC)	23.48
Measured Total Depth, feet (TOC)	33.05

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1026	23.59	200	4.87	154	42.7	1.00	286	17.43		
1031	23.60	200	4.76	153	55.2	0.77	283	16.87		
1036	23.61	200	4.66	156	43.1	0.45	285	14.33		
1041	23.61	200	4.60	160	32.2	1.07	284	14.54		
1046	23.62	200	4.56	163	21.8	1.13	285	14.72		
1051	23.62	200	4.53	165	9.6	1.09	286	14.75		
1056	23.62	200	4.51	166	4.6	1.07	285	14.71		

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

Facility Name	AEP PIRKEY PP
Sample by	KENNY McDONALD

Sample Location ID	AD-18

Depth to water, feet (TOC)	8.31
Measured Total Depth, feet (TOC)	28.42

Depth to water date	11/15/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1201	9.27	110	4.37	55	16.5	3.87	332	15.50		
1206	10.42	110	4.46	52	8.2	2.19	331	16.97		
				WON'T HOLD	WATER	LEVEL				

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

Facility Name	AFPIRMM PP
Sample by	KENNY MCDONALD

Sample Location ID	AO-22

Depth to water, feet (TOC)	13.31
Measured Total Depth, feet (TOC)	32.70

Depth to water date	11/14/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1114	13.46	160	4.64	769	10.7	4.21	311	17.45		
1119	13.48	160	4.76	767	5.2	2.87	300	17.50		
1124	13.49	160	4.77	768	4.8	2.83	295	17.56		
1129	13.51	160	4.77	770	5.5	2.80	292	17.61		

Total volume purged	
Sample appearance	CLEAR
Sample time	1131
Sample date	11/14/22

Facility Name	Pitzer
Sample by	Matt Humility

Depth to water, feet (TOC)	3-38
Measured Total Depth, feet (TOC)	38.20

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1034	30.61	220	4.77	500	258	7.15	160	10.06		
1039	30.63	220	4.32	151	376	6.32	216	13.75		
1044	30.64	220	4.38	104	212	5.17	224	14.62		
1049	30.65	220	4.43	87	204	4.58	228	14.80		
1054	30.65	220	4.46	79	201	3.42	231	14.94		
1059	30.65	220	4.46	71	204	3.81	233	15.07		

Total volume purged	
Sample appearance	turbid
Sample time	1102
Sample date	11-14-22

Facility Name	Pirley
Sample by	Wyatt Hamilton

Depth to water, feet (TOC)	11.82
Measured Total Depth, feet (TOC)	27.38

Sample Location ID	AD-25
Depth to water date	11-14-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
944	12.00	120	4.88	1,040	12.6	7.04	172	11.41		
949	12.08	120	5.01	1,000	21.5	0.85	158	13.67		
954	12.14	120	4.89	981	38.6	0.93	153	14.43		
959	12.19	120	4.90	975	37.1	0.95	151	14.78		
1004	12.23	120	4.91	971	37.8	0.97	150	14.87		

Total volume purged	
Sample appearance	clear
Sample time	1006
Sample date	11-14-22

Facility Name	
Sample by	P. Pikey Matt Hamilton

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

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
841	16.59	300	3.52	2,23c	56.1	17.06	346	13.06		
852	17.02	300	3.78	2,23c	31.8	1.82	274	14.78		
857	17.14	300	3.92	2,22c	31.1	0.56	251	15.23		
902	17.22	300	3.98	2,22c	31.2	0.70	243	15.06		
907	17.27	300	3.99	2,22c	31.1	0.65	238	15.04		

Total volume purged	
Sample appearance	clear
Sample time	907
Sample date	11-14-22

Facility Name	Pirkey
Sample by	Matt Hamilton

Depth to water, feet (TOC)	24.14
Measured Total Depth, feet (TOC)	40.07

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1122	24.34	300	3.76	159	52.1	7.42	163	11.03		
1127	24.44	300	3.61	214	47.8	3.43	36	13.56		
1132	24.48	300	3.81	215	24.2	2.26	303	14.21		
1137	24.51	300	3.97	223	23.5	1.03	211	14.46		
1142	24.56	300	4.02	225	9.8	0.87	287	14.48		
1149	24.60	300	4.04	226	9.9	0.82	285	14.55		

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

Facility Name	Pitkal
Sample by	M.H Hamilton

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

Sample Location ID	AD-28
Depth to water date	11-16-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
826	20.02	220	4.54	95	10.4	2.35	302	16.53		
831	20.13	220	4.46	96	22.0	2.26	307	17.63		
836	20.24	220	4.43	97	12.7	2.84	308	17.52		
841	20.31	220	4.32	97	4.8	1.58	301	18.11		
846	20.36	220	4.24	100	4.4	1.52	310	18.16		

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

Facility Name	Pillsbury
Sample by	Mott Hamilton

Depth to water, feet (TOC)	20.21
Measured Total Depth, feet (TOC)	27.15

Sample Location ID	AD-3a

Depth to water date	11-16-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
916	20.52	220	4.81	447	24.7	2.54	246	14.08		
924	20.60	220	4.44	516	23.1	1.36	254	15.22		
929	20.63	220	4.48	523	22.5	1.24	276	14.64		
934	20.65	220	5.03	526	22.2	1.22	264	14.65		
939	20.65	220	5.05	527	11.8	1.14	265	14.72		
944	20.65	220	5.05	528	10.7	1.17	264	14.75		

Total volume purged	
Sample appearance	clear
Sample time	946
Sample date	11-16-22

Facility Name	Pilley
Sample by	Mark Hamilton

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

Sample Location ID	AB-31
Depth to water date	11-15-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
930	14.03	220	3.97	407	12.7	3.81	361	12.13		
935	14.10	220	4.15	313	111	0.66	345	16.71		
940	14.12	220	4.24	362	65.9	0.46	338	17.67		
945	14.12	220	4.26	362	57.2	0.46	335	17.84		
950	14.13	220	4.27	362	40.6	0.41	333	17.97		
955	14.13	220	4.27	301	12.5	0.45	332	18.06		
1000	14.13	220	4.28	302	13.3	0.45	331	18.16		

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

Facility Name	AFP Pinnon PP
Sample by	Kinny McDonald

Sample Location ID	AP-33

Depth to water, feet (TOC)	14.94
Measured Total Depth, feet (TOC)	32.50

Depth to water date	11/15/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1049	15.00	192	3.97	171	5.6	5.12	312	18.95		
1054	15.01	192	3.97	166	4.8	3.27	306	18.97		
1059	15.01	192	3.98	164	4.3	3.24	302	18.96		
1104	15.02	192	3.96	163	4.5	3.20	297	18.95		

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

Facility Name	Pixley
Sample by	Matt Hamilton

Depth to water, feet (TOC)	11.18
Measured Total Depth, feet (TOC)	34.65

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

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
831	11.62	220	3.76	616	77.3	8.81	401	15.65		
836	11.71	220	3.75	618	66.4	0.71	341	17.01		
841	11.77	220	3.82	606	46.4	0.57	376	16.16		
846	11.83	220	3.91	598	34.8	0.58	371	16.1-		
851	11.84	220	3.96	597	15.5	0.62	363	17.74		
856	11.85	220	3.98	596	4.2	0.64	359	17.85		
901	11.85	220	3.95	596	20.4	0.65	357	17.92		

Total volume purged	
Sample appearance	clear
Sample time	923
Sample date	11-15-22

Facility Name	AEP Rockport PP
Sample by	Kenny McDonald

Sample Location ID	AD-34

Depth to water, feet (TOC)	TOP OF CASING
Measured Total Depth, feet (TOC)	26.05

Depth to water date	11/14/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0802	0.61	124	3.63	1750	3.8	3.02	78	14.94		
0807	0.73	124	3.61	1730	6.11	2.55	98	15.37		
0812	0.88	124	3.59	1720	4.2	2.54	104	15.40		
0817	0.97	124	3.54	1690	4.5	2.51	106	15.44		

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

Facility Name	ATP PIEDMONT PP
Sample by	KENNY MCDONALD

Sample Location ID	AD-36

Depth to water, feet (TOC)	7.85
Measured Total Depth, feet (TOC)	17.10

Depth to water date	11/14/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
0901	7.92	150	4.18	125	41.2	13.21	184	15.39		
0906	7.93	150	4.39	90	16.8	7.48	177	16.54		
0911	7.93	150	4.41	83	10.1	6.13	169	17.61		
0916	7.95	150	4.45	75	7.6	5.52	170	18.20		
0921	7.95	150	4.45	74	7.8	5.52	168	18.24		
0926	7.95	150	4.46	72	7.4	5.50	168	18.26		

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

LAND FILL DUPLICATE 1400

Facility Name	Pinkey
Sample by	Matt Hamilton

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

Sample Location ID	B-2
Depth to water date	11-15-22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1141	27.58	300	5.68	113	41.9	2.11	266	17.77		
1146	27.66	300	5.87	125	42.0	0.83	197	18.54		
1151	27.61	300	5.89	124	42.2	0.56	155	18.45		

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

Dup-1

1023

Facility Name	AEP Pirkey PP
Sample by	Kenny McDonald

Sample Location ID	B-3

Depth to water, feet (TOC)	15.83
Measured Total Depth, feet (TOC)	37.49

Depth to water date	11/15/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1216	16.71	108	4.99	224	11.4	4.11	335	15.82		
1221	17.93	108	5.03	216	6.1	2.97	314	16.04		
				Wont hold water level						

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

APPENDIX 5- Analytical Laboratory Reports

Water Analysis Report

Reissued

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

Job ID: 221004 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-2 Customer Description:
Lab Number: 221004-001 Preparation:
Date Collected: 03/29/2022 12:25 EDT Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.31	mg/L	2	0.10	0.02		CRJ	04/05/2022 15:40	EPA 300.1 -1997, Rev. 1.0
Chloride	31.4	mg/L	2	0.04	0.02		CRJ	04/05/2022 15:40	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.02		CRJ	04/05/2022 15:40	EPA 300.1 -1997, Rev. 1.0
Sulfate	241	mg/L	10	2.0	0.3		CRJ	04/05/2022 15:14	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

Customer Sample ID: AD-3 Customer Description:
Lab Number: 221004-002 Preparation:
Date Collected: 03/29/2022 12:48 EDT Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.07	mg/L	2	0.10	0.02	J1	CRJ	04/05/2022 14:47	EPA 300.1 -1997, Rev. 1.0
Chloride	6.84	mg/L	2	0.04	0.02		CRJ	04/05/2022 14:47	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.21	mg/L	2	0.06	0.02		CRJ	04/05/2022 14:47	EPA 300.1 -1997, Rev. 1.0
Sulfate	34.0	mg/L	2	0.40	0.06		CRJ	04/05/2022 14:47	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

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

Job ID: 221004 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

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

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.16	mg/L	2	0.10	0.02		CRJ	04/05/2022 16:33	EPA 300.1 -1997, Rev. 1.0
Chloride	3.80	mg/L	2	0.04	0.02		CRJ	04/05/2022 16:33	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.08	mg/L	2	0.06	0.02		CRJ	04/05/2022 16:33	EPA 300.1 -1997, Rev. 1.0
Sulfate	22.2	mg/L	2	0.40	0.06		CRJ	04/05/2022 16:33	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

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

Ion Chromatography

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

Wet Chemistry

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

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Water Analysis Report

Reissued

Job ID: 221004 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-12
Customer Description:
Lab Number: 221004-005
Preparation:
Date Collected: 03/28/2022 11:02 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

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

Wet Chemistry

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

Customer Sample ID: AD-13
Customer Description:
Lab Number: 221004-006
Preparation:
Date Collected: 03/28/2022 09:38 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.23	mg/L	2	0.10	0.02		CRJ	04/05/2022 17:26	EPA 300.1 -1997, Rev. 1.0
Chloride	46.5	mg/L	10	0.2	0.1		CRJ	04/05/2022 17:00	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.34	mg/L	2	0.06	0.02		CRJ	04/05/2022 17:26	EPA 300.1 -1997, Rev. 1.0
Sulfate	79.2	mg/L	2	0.40	0.06		CRJ	04/05/2022 17:26	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

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Water Analysis Report

Reissued

Job ID: 221004 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-17
Customer Description:
Lab Number: 221004-007
Preparation:
Date Collected: 03/29/2022 11:25 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.16	mg/L	2	0.10	0.02		CRJ	04/05/2022 21:24	EPA 300.1 -1997, Rev. 1.0
Chloride	16.2	mg/L	2	0.04	0.02		CRJ	04/05/2022 21:24	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.26	mg/L	2	0.06	0.02		CRJ	04/05/2022 21:24	EPA 300.1 -1997, Rev. 1.0
Sulfate	6.77	mg/L	2	0.40	0.06		CRJ	04/05/2022 21:24	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

Customer Sample ID: AD-18
Customer Description:
Lab Number: 221004-008
Preparation:
Date Collected: 03/29/2022 10:36 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.04	mg/L	2	0.10	0.02	J1	CRJ	04/05/2022 23:10	EPA 300.1 -1997, Rev. 1.0
Chloride	5.26	mg/L	2	0.04	0.02		CRJ	04/05/2022 23:10	EPA 300.1 -1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	04/05/2022 23:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.31	mg/L	2	0.40	0.06		CRJ	04/05/2022 23:10	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

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Water Analysis Report

Reissued

Job ID: 221004 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-22 **Customer Description:**
Lab Number: 221004-009 **Preparation:**
Date Collected: 03/28/2022 10:35 EDT **Date Received: 03/31/2022 10:30 EDT**

Ion Chromatography

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

Wet Chemistry

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

Customer Sample ID: AD-28 **Customer Description:**
Lab Number: 221004-010 **Preparation:**
Date Collected: 03/29/2022 11:34 EDT **Date Received: 03/31/2022 10:30 EDT**

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	04/06/2022 00:55	EPA 300.1 -1997, Rev. 1.0
Chloride	5.07	mg/L	2	0.04	0.02		CRJ	04/06/2022 00:55	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.68	mg/L	2	0.06	0.02		CRJ	04/06/2022 00:55	EPA 300.1 -1997, Rev. 1.0
Sulfate	28.9	mg/L	2	0.40	0.06		CRJ	04/06/2022 00:55	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

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Water Analysis Report

Reissued

Job ID: 221004 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-30
Customer Description:
Lab Number: 221004-011
Preparation:
Date Collected: 03/28/2022 13:51 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.39	mg/L	2	0.10	0.02		CRJ	04/06/2022 00:03	EPA 300.1 -1997, Rev. 1.0
Chloride	29.5	mg/L	2	0.04	0.02		CRJ	04/06/2022 00:03	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.07	mg/L	2	0.06	0.02		CRJ	04/06/2022 00:03	EPA 300.1 -1997, Rev. 1.0
Sulfate	170	mg/L	10	2.0	0.3		CRJ	04/05/2022 23:36	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

Customer Sample ID: AD-31
Customer Description:
Lab Number: 221004-012
Preparation:
Date Collected: 03/28/2022 13:04 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

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

Wet Chemistry

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

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Water Analysis Report

Reissued

Job ID: 221004 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-32
Customer Description:
Lab Number: 221004-013
Preparation:
Date Collected: 03/28/2022 12:07 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

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

Wet Chemistry

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

Customer Sample ID: AD-33
Customer Description:
Lab Number: 221004-014
Preparation:
Date Collected: 03/28/2022 11:54 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.24	mg/L	2	0.10	0.02		CRJ	04/06/2022 05:46	EPA 300.1 -1997, Rev. 1.0
Chloride	8.88	mg/L	2	0.04	0.02		CRJ	04/06/2022 05:46	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.30	mg/L	2	0.06	0.02		CRJ	04/06/2022 05:46	EPA 300.1 -1997, Rev. 1.0
Sulfate	67.0	mg/L	2	0.40	0.06		CRJ	04/06/2022 05:46	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

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4001 Bixby Road
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Water Analysis Report

Reissued

Job ID: 221004 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: Duplicate 1
Customer Description:
Lab Number: 221004-015
Preparation:
Date Collected: 03/28/2022 13:00 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

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

Wet Chemistry

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

Customer Sample ID: Duplicate 2
Customer Description:
Lab Number: 221004-016
Preparation:
Date Collected: 03/29/2022 11:55 EDT
Date Received: 03/31/2022 10:30 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	04/05/2022 13:28	EPA 300.1 -1997, Rev. 1.0
Chloride	5.02	mg/L	2	0.04	0.02		CRJ	04/05/2022 13:28	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.64	mg/L	2	0.06	0.02		CRJ	04/05/2022 13:28	EPA 300.1 -1997, Rev. 1.0
Sulfate	29.1	mg/L	2	0.40	0.06		CRJ	04/05/2022 13:28	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

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

221004
Job Comments:

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

Water Analysis Report

Reissued

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

Job ID: 221004 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist
Email: msohlinger@aep.com
Phone: 614-836-4184
Audinet: 8-210-4184

Data Qualifer Legend

U1 - Not detected at or above method detection limit (MDL).
L1 - The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
P1 - The precision between duplicate results was above acceptance limits.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Jonathan Barnhill (318-673-3803)
Michael Ohlinger (614-836-4184)

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

Site Contact:

Date:

For Lab Use Only:
COC/Order #: 221004

Analysis Turnaround Time (in Calendar Days)

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 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL and Na, K, Mg, Sr	Field-filter 250 mL bottle, then pH<2, HNO_3 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	1 L bottle, Cool, 0-6°C TDS, F, Cl, SO_4, Br, andAlkalinity	Three (six every 10th*) 1 L bottles, pH<2, HNO_3 Ra-226, Ra-228	40 mL Glass vial or 250 mL PTFE lined bottle, HCL**, pH<2 Hg	40 mL Glass vial or 250 mL PTFE lined bottle, HCL**, pH<2 Hg	Sample Specific Notes
AD-2	3/29/2022	1125	G	GW	1				X				
AD-3	3/29/2022	1148	G	GW	1				X				
AD-4	3/29/2022	1216	G	GW	1				X				
AD-7	3/28/2022	1150	G	GW	1				X				
AD-12	3/28/2022	1002	G	GW	1				X				
AD-13	3/28/2022	838	G	GW	1				X				
AD-17	3/29/2022	1025	G	GW	1				X				
AD-18	3/29/2022	936	G	GW	1				X				
AD-22	3/28/2022	935	G	GW	1				X				
AD-28	3/29/2022	1034	G	GW	1				X				
AD-30	3/28/2022	1251	G	GW	1				X				
Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4	2	2	

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

Special Instructions/QC Requirements & Comments:

TG-32

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Matt Hamilton	Eagle	3-3-22 1300		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:
			J A Beach	3/31/22 10:15AM

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Jonathan Barnhill (318-673-3803)
Michael Ohlinger (614-836-4184)

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

Site Contact:

Date:

For Lab Use Only:
COC/Order #:

Analysis Turnaround Time (in Calendar Days)

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 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, Tl and Na, K, Mg, Sr	Field-filter 250 mL bottle, then pH<2, HNO_3 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, Tl and Na, K, Mg, Sr	1 L bottle, Cool, 0-6°C TDS, F, Cl, SO_4, Br, and Alkalinity	Three (six every 10th*) 1 L bottles, pH<2, HNO_3 Ra-226, Ra-228	40 mL Glass vial or 250 mL PTFE lined bottle, HCL**, pH<2 Hg	40 mL Glass vial or 250 mL PTFE lined bottle, HCL**, pH<2 Hg		Sample Specific Notes:
AD-31	3/28/2022	1204	G	GW	1				X					
AD-32	3/28/2022	1107	G	GW	1				X					
AD-33	3/28/2022	1054	G	GW	1				X					
DUPLICATE 1	3/28/2022	1200	G	GW	1				X					
DUPLICATE 2	3/29/2022	1055	G	GW	1				X					
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4	2	2		

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

Special Instructions/QC Requirements & Comments:

TG-32

Relinquished by:	Company: Eagle	Date/Time: 3-30-22 1300	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time: 3/31/22 10:15AM

AEP WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

Package Type	Delivery Type
(Cooler) Box Bag Envelope	PONY (UPS) FedEX USPS
	Other _____

Plant/Customer Pirkey

Number of Plastic Containers: 16

Opened By MGK

Number of Glass Containers: —

Date/Time 3/31/22 10:15AM

Number of Mercury Containers: —

Were all temperatures within 0-6°C? (Y) / N or N/A Initial: MGK (on ice) / no ice

(IR Gun Ser# 210441568, *Expir.5/27/2023*) - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

Requested turnaround: Routine If RUSH, who was notified? _____

pH (15 min)	Cr^{+6} (pres.) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres.) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? (Y) / N Comments _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A Initial & Date: MGK

pH paper (circle one): MQuant pH Cat 1.09535.0001 lot HC904495 _____ [OR] Lab rat pH Cat # LRS -4801 Lot X000RWDG21 ✓

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

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

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

Initial & Date & Time : _____

Lab ID# 221004

Comments: ~~Waiting~~ JAB 3/31/22 Error

Logged by MSO

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.

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger	Michael Ohlinger	Chemist	4/11/22
Name (printed)	Signature	Official Title	Date

Alkalinity Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey - CCR

Reviewer Name: Michael Ohlinger

LRC Date: 4/11/22

Laboratory Job Number: 221004

Prep Batch Number(s): QC2204008

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?		
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Alkalinity Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?		
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?		
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	No	ER2
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Alkalinity Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey - CCR

Reviewer Name: Michael Ohlinger

LRC Date: 4/11/22

Laboratory Job Number: 221004

Prep Batch Number(s): QC2204008

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?		
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Alkalinity Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Alkalinity Laboratory Review Checklist

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey - CCR

Reviewer Name: Michael Ohlinger

LRC Date: 4/11/22

Laboratory Job Number: 221004

Prep Batch Number(s): QC2204008

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

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

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

[3] NA - Not applicable; NR - Not reviewed.

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

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [x] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tim E. Arnold	Tim E. Arnold	Principle Chemist	4/11/22
Name (printed)	Signature	Official Title	Date

Ion Chromatography Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey - CCR

Reviewer Name: Tim Arnold

LRC Date: 4/11/2022

Laboratory Job Number: 221004

Prep Batch Number(s): QC2204049

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey - CCR

Reviewer Name: Tim Arnold

LRC Date: 4/11/2022

Laboratory Job Number: 221004

Prep Batch Number(s): QC2204049

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Ion Chromatography Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey - CCR

Reviewer Name: Tim Arnold

LRC Date: 4/11/2022

Laboratory Job Number: 221004

Prep Batch Number(s): QC2204049

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<MQL.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Water Analysis Report

Reissued

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

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-2
Lab Number: 221028-001
Date Collected: 03/29/2022 12:25 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.04	µg/L	2	0.20	0.04	U1	GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Arsenic	0.82	µg/L	2	0.20	0.06		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Barium	18.2	µg/L	2	0.4	0.1		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Beryllium	0.75	µg/L	2	0.10	0.01		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Boron	3.02	mg/L	2	0.10	0.02		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.102	µg/L	2	0.040	0.008		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Calcium	3.13	mg/L	2	0.10	0.04		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.90	µg/L	2	0.40	0.08		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Cobalt	22.7	µg/L	2	0.040	0.006		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Lead	0.5	µg/L	2	0.4	0.1		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.0653	mg/L	2	0.0004	0.0001		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Magnesium	6.51	mg/L	2	0.20	0.04		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Mercury	92	ng/L	2	10	4		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.2	µg/L	2	1.0	0.2	U1	GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Potassium	1.36	mg/L	2	0.20	0.04		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Selenium	2.7	µg/L	2	1.0	0.2		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Sodium	103	mg/L	2	0.4	0.1	M1	GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Strontium	0.0455	mg/L	2	0.0040	0.0008		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Thallium	0.10	µg/L	2	0.40	0.08	J1	GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.57	pCi/L	0.12	0.15		ST	04/12/2022 10:28	SW-846 9315-1986, Rev. 0
Carrier Recovery	92.3	%						
Radium-228	1.19	pCi/L	0.18	0.54		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	88.3	%						

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

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-2
Customer Description:
Lab Number: 221028-001-01
Preparation: Dissolved
Date Collected: 03/29/2022 12:25 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.04	µg/L	2	0.20	0.04	U1	GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Arsenic	0.81	µg/L	2	0.20	0.06		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Barium	18.4	µg/L	2	0.4	0.1		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Beryllium	0.73	µg/L	2	0.10	0.01		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Boron	3.09	mg/L	2	0.10	0.02		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Cadmium	0.097	µg/L	2	0.040	0.008		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Calcium	3.13	mg/L	2	0.10	0.04		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Chromium	1.30	µg/L	2	0.40	0.08		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Cobalt	22.7	µg/L	2	0.040	0.006		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Iron	0.07	mg/L	2	0.04	0.01		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Lead	0.5	µg/L	2	0.4	0.1		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Lithium	0.0649	mg/L	2	0.0004	0.0001		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Magnesium	6.46	mg/L	2	0.20	0.04		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Manganese	0.0859	mg/L	2	0.0020	0.0004		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.2	µg/L	2	1.0	0.2	U1	GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Potassium	1.35	mg/L	2	0.20	0.04		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Selenium	2.6	µg/L	2	1.0	0.2		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Sodium	103	mg/L	2	0.4	0.1		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Strontium	0.0455	mg/L	2	0.0040	0.0008		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Thallium	0.13	µg/L	2	0.40	0.08	J1	GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-3
Lab Number: 221028-002
Date Collected: 03/29/2022 12:48 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Arsenic	1.51	µg/L	1	0.10	0.03		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Barium	68.3	µg/L	1	0.20	0.05		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Beryllium	0.163	µg/L	1	0.050	0.007		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Boron	0.059	mg/L	1	0.050	0.009		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Calcium	6.09	mg/L	1	0.05	0.02		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Cobalt	7.88	µg/L	1	0.020	0.003		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Lead	0.28	µg/L	1	0.20	0.05		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Lithium	0.0934	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Magnesium	4.69	mg/L	1	0.10	0.02		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Potassium	3.60	mg/L	1	0.10	0.02		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Sodium	13.2	mg/L	1	0.20	0.05		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Strontium	0.0434	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.59	pCi/L	0.12	0.14		ST	04/12/2022 10:28	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.2	%						
Radium-228	1.32	pCi/L	0.18	0.54		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	76.9	%						

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

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Phone: 614-836-4221
Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-3
Customer Description:
Lab Number: 221028-002-01
Preparation: Dissolved
Date Collected: 03/29/2022 12:48 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Arsenic	0.98	µg/L	1	0.10	0.03		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Barium	65.0	µg/L	1	0.20	0.05		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Beryllium	0.124	µg/L	1	0.050	0.007		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Boron	0.053	mg/L	1	0.050	0.009		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Cadmium	0.014	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Calcium	6.04	mg/L	1	0.05	0.02		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Chromium	0.39	µg/L	1	0.20	0.04		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Cobalt	7.81	µg/L	1	0.020	0.003		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Iron	10.1	mg/L	1	0.020	0.006		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Lithium	0.0934	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Magnesium	4.67	mg/L	1	0.10	0.02		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Manganese	0.119	mg/L	1	0.0010	0.0002		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Potassium	3.61	mg/L	1	0.10	0.02		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Sodium	13.1	mg/L	1	0.20	0.05		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Strontium	0.0420	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-4
Lab Number: 221028-003
Date Collected: 03/29/2022 13:16 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Arsenic	1.10	µg/L	1	0.10	0.03		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Barium	93.2	µg/L	1	0.20	0.05		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Beryllium	0.641	µg/L	1	0.050	0.007		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Boron	0.019	mg/L	1	0.050	0.009	J1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Cadmium	0.010	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Calcium	1.84	mg/L	1	0.05	0.02		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Cobalt	6.16	µg/L	1	0.020	0.003		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Lithium	0.0383	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Magnesium	1.24	mg/L	1	0.10	0.02		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Mercury	17	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Potassium	2.51	mg/L	1	0.10	0.02		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Sodium	9.25	mg/L	1	0.20	0.05		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Strontium	0.0160	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.54	pCi/L	0.12	0.17		ST	04/12/2022 10:28	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.7	%						
Radium-228	0.61	pCi/L	0.18	0.60		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.9	%						

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

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-4
Customer Description:
Lab Number: 221028-003-01
Preparation: Dissolved
Date Collected: 03/29/2022 13:16 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Barium	94.9	µg/L	1	0.20	0.05		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Beryllium	0.629	µg/L	1	0.050	0.007		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Boron	0.019	mg/L	1	0.050	0.009	J1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Calcium	1.88	mg/L	1	0.05	0.02		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Cobalt	6.29	µg/L	1	0.020	0.003		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Iron	0.148	mg/L	1	0.020	0.006		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Lithium	0.0391	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Magnesium	1.29	mg/L	1	0.10	0.02		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Manganese	0.0570	mg/L	1	0.0010	0.0002		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Potassium	2.52	mg/L	1	0.10	0.02		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Sodium	9.36	mg/L	1	0.20	0.05		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Strontium	0.0162	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-7
Lab Number: 221028-004
Date Collected: 03/28/2022 12:50 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.04	µg/L	2	0.20	0.04	U1	GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Arsenic	1.08	µg/L	2	0.20	0.06		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Barium	58.8	µg/L	2	0.4	0.1		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Beryllium	5.59	µg/L	2	0.10	0.01		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Boron	3.78	mg/L	2	0.10	0.02		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Cadmium	0.998	µg/L	2	0.040	0.008		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Calcium	4.33	mg/L	2	0.10	0.04		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Chromium	4.78	µg/L	2	0.40	0.08		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Cobalt	33.6	µg/L	2	0.040	0.006		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Lead	0.8	µg/L	2	0.4	0.1		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Lithium	0.0967	mg/L	2	0.0004	0.0001		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Magnesium	7.54	mg/L	2	0.20	0.04		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Mercury	400	ng/L	100	500	200	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.2	µg/L	2	1.0	0.2	U1	GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Potassium	2.80	mg/L	2	0.20	0.04		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Selenium	3.5	µg/L	2	1.0	0.2		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Sodium	18.3	mg/L	2	0.4	0.1		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Strontium	0.0561	mg/L	2	0.0040	0.0008		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Thallium	0.20	µg/L	2	0.40	0.08	J1	GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.15	pCi/L	0.19	0.18		ST	04/12/2022 10:28	SW-846 9315-1986, Rev. 0
Carrier Recovery	80.7	%						
Radium-228	3.44	pCi/L	0.24	0.70		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	81.6	%						

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

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-7
Customer Description:
Lab Number: 221028-004-01
Preparation: Dissolved
Date Collected: 03/28/2022 12:50 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.04	µg/L	2	0.20	0.04	U1	GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Arsenic	1.05	µg/L	2	0.20	0.06		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Barium	59.2	µg/L	2	0.4	0.1		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Beryllium	5.56	µg/L	2	0.10	0.01		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Boron	3.76	mg/L	2	0.10	0.02		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Cadmium	0.994	µg/L	2	0.040	0.008		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Calcium	4.38	mg/L	2	0.10	0.04		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Chromium	2.35	µg/L	2	0.40	0.08		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Cobalt	33.7	µg/L	2	0.040	0.006		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Iron	0.09	mg/L	2	0.04	0.01		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Lead	0.8	µg/L	2	0.4	0.1		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Lithium	0.0956	mg/L	2	0.0004	0.0001		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Magnesium	7.62	mg/L	2	0.20	0.04		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Manganese	0.0952	mg/L	2	0.0020	0.0004		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Mercury	30	ng/L	10	50	20	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.2	µg/L	2	1.0	0.2	U1	GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Potassium	2.79	mg/L	2	0.20	0.04		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Selenium	3.6	µg/L	2	1.0	0.2		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Sodium	18.2	mg/L	2	0.4	0.1		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Strontium	0.0565	mg/L	2	0.0040	0.0008		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Thallium	0.17	µg/L	2	0.40	0.08	J1	GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-12
Lab Number: 221028-005
Date Collected: 03/28/2022 11:02 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Barium	20.2	µg/L	1	0.20	0.05		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Beryllium	0.127	µg/L	1	0.050	0.007		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Calcium	0.20	mg/L	1	0.05	0.02		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Cobalt	1.01	µg/L	1	0.020	0.003		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Lead	0.09	µg/L	1	0.20	0.05	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.00604	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Magnesium	0.35	mg/L	1	0.10	0.02		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Potassium	0.33	mg/L	1	0.10	0.02		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Sodium	4.07	mg/L	1	0.20	0.05		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Strontium	0.0021	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.21	pCi/L	0.09	0.21		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	101	%						
Radium-228	0.55	pCi/L	0.18	0.57		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	82.3	%						

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

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-12
Customer Description:
Lab Number: 221028-005-01
Preparation: Dissolved
Date Collected: 03/28/2022 11:02 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Barium	19.4	µg/L	1	0.20	0.05		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Beryllium	0.123	µg/L	1	0.050	0.007		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Boron	0.016	mg/L	1	0.050	0.009	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Cadmium	0.006	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Calcium	0.24	mg/L	1	0.05	0.02		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Cobalt	1.01	µg/L	1	0.020	0.003		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Iron	0.015	mg/L	1	0.020	0.006	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Lead	0.12	µg/L	1	0.20	0.05	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Lithium	0.00591	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Magnesium	0.34	mg/L	1	0.10	0.02		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Manganese	0.0037	mg/L	1	0.0010	0.0002		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Potassium	0.34	mg/L	1	0.10	0.02		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Selenium	0.28	µg/L	1	0.50	0.09	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Sodium	4.15	mg/L	1	0.20	0.05		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Strontium	0.0021	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-13
Lab Number: 221028-006
Date Collected: 03/28/2022 09:38 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Arsenic	2.18	µg/L	1	0.10	0.03		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Barium	52.1	µg/L	1	0.20	0.05		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Beryllium	0.579	µg/L	1	0.050	0.007		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Boron	0.065	mg/L	1	0.050	0.009		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Calcium	13.3	mg/L	1	0.05	0.02		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Chromium	0.52	µg/L	1	0.20	0.04		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Cobalt	46.9	µg/L	1	0.020	0.003		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Lithium	0.138	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Magnesium	13.8	mg/L	1	0.10	0.02		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Potassium	5.16	mg/L	1	0.10	0.02		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Sodium	19.6	mg/L	1	0.20	0.05		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Strontium	0.117	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.10	pCi/L	0.24	0.29		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	77.6	%						
Radium-228	1.85	pCi/L	0.20	0.57		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	76.6	%						

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

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-13
Customer Description:
Lab Number: 221028-006-01
Preparation: Dissolved
Date Collected: 03/28/2022 09:38 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25	µg/L	1	0.10	0.03		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Barium	50.1	µg/L	1	0.20	0.05		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Beryllium	0.471	µg/L	1	0.050	0.007		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Boron	0.067	mg/L	1	0.050	0.009		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Calcium	12.8	mg/L	1	0.05	0.02		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Cobalt	45.7	µg/L	1	0.020	0.003		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Iron	12.8	mg/L	1	0.020	0.006		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Lithium	0.142	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Magnesium	13.5	mg/L	1	0.10	0.02		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Manganese	0.466	mg/L	1	0.0010	0.0002		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Potassium	5.03	mg/L	1	0.10	0.02		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Sodium	19.6	mg/L	1	0.20	0.05		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Strontium	0.112	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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4001 Bixby Road
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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-17
Customer Description:
Lab Number: 221028-007
Preparation:
Date Collected: 03/29/2022 11:25 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Barium	112	µg/L	1	0.20	0.05		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Beryllium	0.481	µg/L	1	0.050	0.007		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Boron	0.031	mg/L	1	0.050	0.009	J1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Cadmium	0.028	µg/L	1	0.020	0.004		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Calcium	0.24	mg/L	1	0.05	0.02		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Chromium	0.70	µg/L	1	0.20	0.04		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Cobalt	6.48	µg/L	1	0.020	0.003		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Lead	0.1	µg/L	1	0.20	0.05	J1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Lithium	0.0126	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Magnesium	2.05	mg/L	1	0.10	0.02		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Mercury	300	ng/L	100	500	200	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Potassium	0.42	mg/L	1	0.10	0.02		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Selenium	0.26	µg/L	1	0.50	0.09	J1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Sodium	6.73	mg/L	1	0.20	0.05		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Strontium	0.0099	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.48	pCi/L	0.24	0.24		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.0	%						
Radium-228	1.53	pCi/L	0.16	0.47		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.5	%						

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

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-17
Customer Description:
Lab Number: 221028-007-01
Preparation: Dissolved
Date Collected: 03/29/2022 11:25 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Barium	111	µg/L	1	0.20	0.05		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Beryllium	0.469	µg/L	1	0.050	0.007		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Boron	0.031	mg/L	1	0.050	0.009	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Cadmium	0.027	µg/L	1	0.020	0.004		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Calcium	0.24	mg/L	1	0.05	0.02		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Chromium	1.28	µg/L	1	0.20	0.04		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Cobalt	6.40	µg/L	1	0.020	0.003		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Iron	0.013	mg/L	1	0.020	0.006	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Lithium	0.0126	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Magnesium	2.01	mg/L	1	0.10	0.02		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Manganese	0.0052	mg/L	1	0.0010	0.0002		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Mercury	<200	ng/L	100	500	200	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Potassium	0.40	mg/L	1	0.10	0.02		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Selenium	0.21	µg/L	1	0.50	0.09	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Sodium	6.63	mg/L	1	0.20	0.05		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Strontium	0.0096	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-18
Lab Number: 221028-008
Date Collected: 03/29/2022 10:36 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.02	µg/L	1	0.10	0.02	J1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Arsenic	1.55	µg/L	1	0.10	0.03		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Barium	90.1	µg/L	1	0.20	0.05		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Beryllium	0.106	µg/L	1	0.050	0.007		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Boron	0.009	mg/L	1	0.050	0.009	J1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Cadmium	0.01	µg/L	1	0.020	0.004	J1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Calcium	0.24	mg/L	1	0.05	0.02		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Chromium	1.40	µg/L	1	0.20	0.04		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Cobalt	0.842	µg/L	1	0.020	0.003		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Lead	0.53	µg/L	1	0.20	0.05		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Lithium	0.0137	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Magnesium	0.34	mg/L	1	0.10	0.02		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Mercury	21	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Potassium	0.77	mg/L	1	0.10	0.02		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Selenium	0.38	µg/L	1	0.50	0.09	J1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Sodium	5.33	mg/L	1	0.20	0.05		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Strontium	0.0050	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.60	pCi/L	0.13	0.18		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	140	%						
Radium-228	1.41	pCi/L	0.20	0.60		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	82.3	%						

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

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-18
Customer Description:
Lab Number: 221028-008-01
Preparation: Dissolved
Date Collected: 03/29/2022 10:36 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Arsenic	0.03	µg/L	1	0.10	0.03	J1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Barium	82.7	µg/L	1	0.20	0.05		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Beryllium	0.084	µg/L	1	0.050	0.007		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Boron	0.009	mg/L	1	0.050	0.009	J1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Calcium	0.27	mg/L	1	0.05	0.02		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Chromium	2.02	µg/L	1	0.20	0.04		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Cobalt	0.743	µg/L	1	0.020	0.003		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Iron	0.039	mg/L	1	0.020	0.006		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.0140	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Magnesium	0.30	mg/L	1	0.10	0.02		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Manganese	0.0035	mg/L	1	0.0010	0.0002		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Potassium	0.73	mg/L	1	0.10	0.02		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Sodium	5.21	mg/L	1	0.20	0.05		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Strontium	0.0041	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-22
Customer Description:
Lab Number: 221028-009
Preparation:
Date Collected: 03/28/2022 10:35 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Arsenic	3.21	µg/L	1	0.10	0.03		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Barium	19.3	µg/L	1	0.20	0.05		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Beryllium	8.78	µg/L	1	0.050	0.007		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Boron	0.068	mg/L	1	0.050	0.009		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Cadmium	1.27	µg/L	1	0.020	0.004		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Calcium	16.4	mg/L	1	0.05	0.02		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Chromium	0.43	µg/L	1	0.20	0.04		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Cobalt	109	µg/L	1	0.020	0.003		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.170	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Magnesium	22.7	mg/L	1	0.10	0.02		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Mercury	<4	ng/L	2	10	4	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Potassium	4.73	mg/L	1	0.10	0.02		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Selenium	9.20	µg/L	1	0.50	0.09		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Sodium	96.7	mg/L	1	0.20	0.05		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.140	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.48	pCi/L	0.26	0.26		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	80.4	%						
Radium-228	2.76	pCi/L	0.21	0.55		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	74.9	%						

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

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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-22
Customer Description:
Lab Number: 221028-009-01
Preparation: Dissolved
Date Collected: 03/28/2022 10:35 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Arsenic	3.30	µg/L	1	0.10	0.03		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Barium	19.3	µg/L	1	0.20	0.05		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Beryllium	8.78	µg/L	1	0.050	0.007		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Boron	0.069	mg/L	1	0.050	0.009		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Cadmium	1.28	µg/L	1	0.020	0.004		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Calcium	16.5	mg/L	1	0.05	0.02		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Chromium	0.53	µg/L	1	0.20	0.04		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Cobalt	111	µg/L	1	0.020	0.003		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Iron	31.8	mg/L	1	0.020	0.006		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Lead	0.17	µg/L	1	0.20	0.05	J1	GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Lithium	0.171	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Magnesium	23.1	mg/L	1	0.10	0.02		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Manganese	0.407	mg/L	1	0.0010	0.0002		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Mercury	12	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Potassium	4.80	mg/L	1	0.10	0.02		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Selenium	9.49	µg/L	1	0.50	0.09		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Sodium	97.9	mg/L	1	0.20	0.05		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Strontium	0.142	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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4001 Bixby Road
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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-28
Customer Description:
Lab Number: 221028-010
Preparation:
Date Collected: 03/29/2022 11:34 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Barium	120	µg/L	1	0.20	0.05		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Beryllium	0.605	µg/L	1	0.050	0.007		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Boron	0.356	mg/L	1	0.050	0.009		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Cadmium	0.057	µg/L	1	0.020	0.004		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Calcium	1.31	mg/L	1	0.05	0.02		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Cobalt	12.5	µg/L	1	0.020	0.003		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Lead	0.05	µg/L	1	0.20	0.05	J1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Lithium	0.0242	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Magnesium	2.94	mg/L	1	0.10	0.02		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Mercury	12	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Potassium	0.73	mg/L	1	0.10	0.02		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Selenium	0.26	µg/L	1	0.50	0.09	J1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Sodium	7.52	mg/L	1	0.20	0.05		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Strontium	0.0197	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.61	pCi/L	0.26	0.26		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.5	%						
Radium-228	1.37	pCi/L	0.16	0.47		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	81.5	%						

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

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-28
Customer Description:
Lab Number: 221028-010-01
Preparation: Dissolved
Date Collected: 03/29/2022 11:34 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Arsenic	0.08	µg/L	1	0.10	0.03	J1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Barium	125	µg/L	1	0.20	0.05		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Beryllium	0.576	µg/L	1	0.050	0.007		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Boron	0.359	mg/L	1	0.050	0.009		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Cadmium	0.052	µg/L	1	0.020	0.004		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Calcium	1.29	mg/L	1	0.05	0.02		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Chromium	0.36	µg/L	1	0.20	0.04		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Cobalt	12.4	µg/L	1	0.020	0.003		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Iron	0.013	mg/L	1	0.020	0.006	J1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Lead	0.06	µg/L	1	0.20	0.05	J1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Lithium	0.0245	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Magnesium	2.92	mg/L	1	0.10	0.02		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Manganese	0.0497	mg/L	1	0.0010	0.0002		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Potassium	0.76	mg/L	1	0.10	0.02		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Selenium	0.25	µg/L	1	0.50	0.09	J1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Sodium	7.49	mg/L	1	0.20	0.05		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Strontium	0.0198	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4

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Dolan Chemical Laboratory
4001 Bixby Road
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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-30
Lab Number: 221028-011
Date Collected: 03/28/2022 13:51 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Arsenic	0.19	µg/L	1	0.10	0.03		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Barium	129	µg/L	1	0.20	0.05		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Beryllium	0.125	µg/L	1	0.050	0.007		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Boron	2.45	mg/L	1	0.050	0.009		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Calcium	0.66	mg/L	1	0.05	0.02		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Chromium	0.45	µg/L	1	0.20	0.04		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Cobalt	4.76	µg/L	1	0.020	0.003		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Lithium	0.0101	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Magnesium	2.73	mg/L	1	0.10	0.02		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Mercury	35	ng/L	2	10	4		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:09	EPA 200.8-1994, Rev. 5.4
Potassium	0.92	mg/L	1	0.10	0.02		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Selenium	0.44	µg/L	1	0.50	0.09	J1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Sodium	90.3	mg/L	1	0.20	0.05	M1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Strontium	0.0116	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.85	pCi/L	0.19	0.25		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.7	%						
Radium-228	1.45	pCi/L	0.26	0.81		TTP	04/13/2022 13:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	57.2	%						

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

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-30
Customer Description:
Lab Number: 221028-011-01
Preparation: Dissolved
Date Collected: 03/28/2022 13:51 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Barium	114	µg/L	1	0.20	0.05		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Beryllium	0.130	µg/L	1	0.050	0.007		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Boron	2.50	mg/L	1	0.050	0.009		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Calcium	0.66	mg/L	1	0.05	0.02		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Cobalt	4.73	µg/L	1	0.020	0.003		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Iron	0.009	mg/L	1	0.020	0.006	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Lead	0.06	µg/L	1	0.20	0.05	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Lithium	0.0103	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Magnesium	2.70	mg/L	1	0.10	0.02		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Manganese	0.0166	mg/L	1	0.0010	0.0002		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Mercury	11	ng/L	2	10	4		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	04/18/2022 19:24	EPA 200.8-1994, Rev. 5.4
Potassium	0.93	mg/L	1	0.10	0.02		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Selenium	0.20	µg/L	1	0.50	0.09	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Sodium	91.4	mg/L	1	0.20	0.05		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Strontium	0.0116	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-31
Lab Number: 221028-012
Date Collected: 03/28/2022 13:04 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Arsenic	0.26	µg/L	1	0.10	0.03		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Barium	32.8	µg/L	1	0.20	0.05		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Beryllium	0.854	µg/L	1	0.050	0.007		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Boron	0.026	mg/L	1	0.050	0.009	J1	GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Cadmium	0.068	µg/L	1	0.020	0.004		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Calcium	2.75	mg/L	1	0.05	0.02		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Chromium	0.51	µg/L	1	0.20	0.04		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Cobalt	9.14	µg/L	1	0.020	0.003		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Lead	0.29	µg/L	1	0.20	0.05		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Lithium	0.0687	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Magnesium	4.03	mg/L	1	0.10	0.02		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Mercury	103	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:29	EPA 200.8-1994, Rev. 5.4
Potassium	1.65	mg/L	1	0.10	0.02		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Selenium	0.38	µg/L	1	0.50	0.09	J1	GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Sodium	32.4	mg/L	1	0.20	0.05		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Strontium	0.0392	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.95	pCi/L	0.19	0.22		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	90.5	%						
Radium-228	1.46	pCi/L	0.16	0.46		TTP	04/13/2022 13:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	91.7	%						

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

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-31
Customer Description:
Lab Number: 221028-012-01
Preparation: Dissolved
Date Collected: 03/28/2022 13:04 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Barium	31.8	µg/L	1	0.20	0.05		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Beryllium	0.765	µg/L	1	0.050	0.007		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Cadmium	0.063	µg/L	1	0.020	0.004		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Calcium	2.78	mg/L	1	0.05	0.02		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Cobalt	8.83	µg/L	1	0.020	0.003		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Iron	0.109	mg/L	1	0.020	0.006		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Lead	0.39	µg/L	1	0.20	0.05		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Lithium	0.0679	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Magnesium	3.84	mg/L	1	0.10	0.02		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Manganese	0.0252	mg/L	1	0.0010	0.0002		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:34	EPA 200.8-1994, Rev. 5.4
Potassium	1.63	mg/L	1	0.10	0.02		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Selenium	0.14	µg/L	1	0.50	0.09	J1	GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Sodium	32.6	mg/L	1	0.20	0.05		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Strontium	0.0386	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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4001 Bixby Road
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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-32
Lab Number: 221028-013
Date Collected: 03/28/2022 12:07 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Arsenic	1.05	µg/L	1	0.10	0.03		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Barium	30.0	µg/L	1	0.20	0.05		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Beryllium	2.89	µg/L	1	0.050	0.007		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Boron	0.773	mg/L	1	0.050	0.009		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Cadmium	0.323	µg/L	1	0.020	0.004		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Calcium	8.05	mg/L	1	0.05	0.02		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Chromium	0.60	µg/L	1	0.20	0.04		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Cobalt	25.1	µg/L	1	0.020	0.003		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Lead	0.38	µg/L	1	0.20	0.05		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Lithium	0.0731	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Magnesium	9.45	mg/L	1	0.10	0.02		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Mercury	1900	ng/L	100	500	200		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:39	EPA 200.8-1994, Rev. 5.4
Potassium	2.99	mg/L	1	0.10	0.02		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Selenium	3.42	µg/L	1	0.50	0.09		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Sodium	33.6	mg/L	1	0.20	0.05		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Strontium	0.150	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Thallium	0.17	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.34	pCi/L	0.24	0.27		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.3	%						
Radium-228	4.56	pCi/L	0.21	0.52		TTP	04/13/2022 13:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	80.4	%						

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

AMERICAN ELECTRIC POWER

Dolan Chemical Laboratory
4001 Bixby Road
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Phone: 614-836-4221
Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-32
Customer Description:
Lab Number: 221028-013-01
Preparation: Dissolved
Date Collected: 03/28/2022 12:07 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Arsenic	0.92	µg/L	1	0.10	0.03		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Barium	28.9	µg/L	1	0.20	0.05		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Beryllium	2.86	µg/L	1	0.050	0.007		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Boron	0.747	mg/L	1	0.050	0.009		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Cadmium	0.317	µg/L	1	0.020	0.004		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Calcium	7.84	mg/L	1	0.05	0.02		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Chromium	0.56	µg/L	1	0.20	0.04		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Cobalt	24.1	µg/L	1	0.020	0.003		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Iron	0.719	mg/L	1	0.020	0.006		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Lead	0.34	µg/L	1	0.20	0.05		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Lithium	0.0719	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Magnesium	8.96	mg/L	1	0.10	0.02		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Manganese	0.0455	mg/L	1	0.0010	0.0002		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Mercury	<20	ng/L	10	50	20	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:45	EPA 200.8-1994, Rev. 5.4
Potassium	2.87	mg/L	1	0.10	0.02		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Selenium	3.30	µg/L	1	0.50	0.09		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Sodium	32.5	mg/L	1	0.20	0.05		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Strontium	0.145	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Thallium	0.12	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-33
Lab Number: 221028-014
Date Collected: 03/28/2022 11:54 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Arsenic	0.87	µg/L	1	0.10	0.03		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Barium	45.0	µg/L	1	0.20	0.05		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Beryllium	1.35	µg/L	1	0.050	0.007		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Boron	0.146	mg/L	1	0.050	0.009		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Cadmium	0.057	µg/L	1	0.020	0.004		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Calcium	2.28	mg/L	1	0.05	0.02		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Cobalt	9.82	µg/L	1	0.020	0.003		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Lead	0.32	µg/L	1	0.20	0.05		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Lithium	0.0219	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Magnesium	4.10	mg/L	1	0.10	0.02		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Mercury	4600	ng/L	100	500	200		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:50	EPA 200.8-1994, Rev. 5.4
Potassium	0.30	mg/L	1	0.10	0.02		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Selenium	2.68	µg/L	1	0.50	0.09		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Sodium	18.7	mg/L	1	0.20	0.05		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Strontium	0.0345	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.27	pCi/L	0.23	0.24		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.2	%						
Radium-228	1.01	pCi/L	0.23	0.72		TTP	04/13/2022 13:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	53.6	%						

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

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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-33
Customer Description:
Lab Number: 221028-014-01
Preparation: Dissolved
Date Collected: 03/28/2022 11:54 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Arsenic	0.82	µg/L	1	0.10	0.03		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Barium	45.7	µg/L	1	0.20	0.05		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Beryllium	1.35	µg/L	1	0.050	0.007		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Boron	0.143	mg/L	1	0.050	0.009		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Cadmium	0.058	µg/L	1	0.020	0.004		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Calcium	2.29	mg/L	1	0.05	0.02		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Chromium	0.39	µg/L	1	0.20	0.04		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Cobalt	9.88	µg/L	1	0.020	0.003		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Iron	0.030	mg/L	1	0.020	0.006		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Lead	0.29	µg/L	1	0.20	0.05		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Lithium	0.0220	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Magnesium	4.21	mg/L	1	0.10	0.02		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Manganese	0.0090	mg/L	1	0.0010	0.0002		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Mercury	34	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:55	EPA 200.8-1994, Rev. 5.4
Potassium	0.30	mg/L	1	0.10	0.02		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Selenium	2.70	µg/L	1	0.50	0.09		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Sodium	18.6	mg/L	1	0.20	0.05		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Strontium	0.0353	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: Duplicate 1
Lab Number: 221028-015
Date Collected: 03/28/2022 13:00 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Arsenic	3.19	µg/L	1	0.10	0.03		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Barium	19.2	µg/L	1	0.20	0.05		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Beryllium	9.06	µg/L	1	0.050	0.007		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Boron	0.068	mg/L	1	0.050	0.009		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Cadmium	1.23	µg/L	1	0.020	0.004		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Calcium	16.4	mg/L	1	0.05	0.02		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Cobalt	109	µg/L	1	0.020	0.003		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.176	mg/L	1	0.00020	0.00005		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Magnesium	22.7	mg/L	1	0.10	0.02		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Mercury	14	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 20:00	EPA 200.8-1994, Rev. 5.4
Potassium	4.79	mg/L	1	0.10	0.02		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Selenium	8.93	µg/L	1	0.50	0.09		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Sodium	96.9	mg/L	1	0.20	0.05		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Strontium	0.141	mg/L	1	0.0020	0.0004		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: Duplicate 1
Customer Description:
Lab Number: 221028-015-01
Preparation: Dissolved
Date Collected: 03/28/2022 13:00 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Arsenic	3.18	µg/L	1	0.10	0.03		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Barium	19.4	µg/L	1	0.20	0.05		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Beryllium	8.88	µg/L	1	0.050	0.007		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Boron	0.069	mg/L	1	0.050	0.009		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Cadmium	1.26	µg/L	1	0.020	0.004		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Calcium	16.5	mg/L	1	0.05	0.02		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Chromium	1.10	µg/L	1	0.20	0.04		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Cobalt	109	µg/L	1	0.020	0.003		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Iron	31.7	mg/L	1	0.020	0.006		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Lead	0.17	µg/L	1	0.20	0.05	J1	GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.174	mg/L	1	0.00020	0.00005		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Magnesium	23.0	mg/L	1	0.10	0.02		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Manganese	0.408	mg/L	1	0.0010	0.0002		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 20:05	EPA 200.8-1994, Rev. 5.4
Potassium	4.85	mg/L	1	0.10	0.02		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Selenium	8.99	µg/L	1	0.50	0.09		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Sodium	98.3	mg/L	1	0.20	0.05		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.141	mg/L	1	0.0020	0.0004		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: Duplicate 2 Customer Description:
Lab Number: 221028-016 Preparation:
Date Collected: 03/29/2022 11:55 EDT Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Barium	125	µg/L	1	0.20	0.05		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Beryllium	0.633	µg/L	1	0.050	0.007		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Boron	0.355	mg/L	1	0.050	0.009		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Cadmium	0.059	µg/L	1	0.020	0.004		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Calcium	1.31	mg/L	1	0.05	0.02		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Chromium	0.75	µg/L	1	0.20	0.04		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Cobalt	12.5	µg/L	1	0.020	0.003		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Lead	0.05	µg/L	1	0.20	0.05	J1	GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Lithium	0.0253	mg/L	1	0.00020	0.00005		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Magnesium	2.98	mg/L	1	0.10	0.02		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Mercury	13	ng/L	2	10	4		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 21:12	EPA 200.8-1994, Rev. 5.4
Potassium	0.77	mg/L	1	0.10	0.02		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Selenium	0.22	µg/L	1	0.50	0.09	J1	GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Sodium	7.52	mg/L	1	0.20	0.05		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Strontium	0.0205	mg/L	1	0.0020	0.0004		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: Duplicate 2
Customer Description:
Lab Number: 221028-016-01
Preparation: Dissolved
Date Collected: 03/29/2022 11:55 EDT
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Arsenic	0.07	µg/L	1	0.10	0.03	J1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Barium	127	µg/L	1	0.20	0.05		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Beryllium	0.595	µg/L	1	0.050	0.007		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Boron	0.346	mg/L	1	0.050	0.009		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Cadmium	0.050	µg/L	1	0.020	0.004		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Calcium	1.34	mg/L	1	0.05	0.02		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Cobalt	12.0	µg/L	1	0.020	0.003		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Iron	0.012	mg/L	1	0.020	0.006	J1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Lithium	0.0252	mg/L	1	0.00020	0.00005		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Magnesium	2.87	mg/L	1	0.10	0.02		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Manganese	0.0493	mg/L	1	0.0010	0.0002		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Mercury	5	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 21:17	EPA 200.8-1994, Rev. 5.4
Potassium	0.75	mg/L	1	0.10	0.02		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Selenium	0.21	µg/L	1	0.50	0.09	J1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Sodium	7.20	mg/L	1	0.20	0.05		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Strontium	0.0199	mg/L	1	0.0020	0.0004		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: Equipment Blank
Lab Number: 221028-017
Date Collected: 03/28/2022 11:30 EDT

Customer Description:
Preparation:
Date Received: 04/01/2022 12:20 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Barium	0.05	µg/L	1	0.20	0.05	J1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Calcium	<0.02	mg/L	1	0.05	0.02	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Chromium	0.25	µg/L	1	0.20	0.04		GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Cobalt	0.009	µg/L	1	0.020	0.003	J1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00005	mg/L	1	0.00020	0.00005	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 21:22	EPA 200.8-1994, Rev. 5.4
Potassium	<0.02	mg/L	1	0.10	0.02	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Sodium	<0.05	mg/L	1	0.20	0.05	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Strontium	<0.0004	mg/L	1	0.0020	0.0004	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4

221028
Job Comments:

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

Water Analysis Report

Reissued

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

Job ID: 221028 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

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

Data Qualifer Legend

U1 - Not detected at or above method detection limit (MDL).
M1 - The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Jonathan Barnhill (318-673-3803)
Michael Ohlinger (614-836-4184)

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

Analysis Turnaround Time (in Calendar Days)

Site Contact:

Date:

For Lab Use Only:
COC/Order #: 221028

221028

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 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL and Na, K, Mg, Sr	Field-filter 250 mL bottle, then pH<2, HNO_3 B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	1 L bottle, Cool, 0-6°C TDS, F, Cl, SO_4, and Br, Alkalinity	Three (six every 10th*) 1 L bottles, pH<2, HNO_3 Ra-226, Ra-228	40 mL Glass vial or 250 mL PTFE lined bottle, HCL**, pH<2 Hg	40 mL Glass vial or 250 mL PTFE lined bottle, HCL**, pH<2 Hg		Sample Specific Notes
AD-2	3/29/2022	1125	G	GW	7		X	X		X	X	X		
AD-3	3/29/2022	1148	G	GW	7		X	X		X	X	X		
AD-4	3/29/2022	1216	G	GW	7		X	X		X	X	X		
AD-7	3/28/2022	1150	G	GW	7		X	X		X	X	X		
AD-12	3/28/2022	1002	G	GW	7		X	X		X	X	X		
AD-13	3/28/2022	838	G	GW	7		X	X		X	X	X		
AD-17	3/29/2022	1025	G	GW	7		X	X		X	X	X		
AD-18	3/29/2022	936	G	GW	7		X	X		X	X	X		
AD-22	3/28/2022	935	G	GW	10		X	X		X	X	X		
AD-28	3/29/2022	1034	G	GW	10		X	X		X	X	X		
AD-30	3/28/2022	1251	G	GW	7		X	X		X	X	X		
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4	2	2		

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

Special Instructions/QC Requirements & Comments:

TG-32

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	Eagle	3-30-22 1300		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Date/Time: 4/1/22 1230PM

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Jonathan Barnhill (318-673-3803)
Michael Ohlinger (614-836-4184)

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

Analysis Turnaround Time (In Calendar Days)

Site Contact:

Date:

For Lab Use Only:
COC/Order #:

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: B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, TL and Na, K, Mg, Sr	Field-filter 250 mL bottle, then pH<2, HNO_3: B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	1 L bottle, Cool, 0-6°C: TDS, F, Cl, SO_4, and Br, Alkalinity	Three (six every 10th*) 1 L bottles, pH<2, HNO_3: Ra-226, Ra-228	40 mL Glass vial or 250 mL PTFE lined bottle, HCL**, pH<2: Hg	40 mL Glass vial or 250 mL PTFE lined bottle, HCL**, pH<2: Hg		Sample Specific Notes:
AD-31	3/28/2022	1204	G	GW	7		X	X		X	X	X		
AD-32	3/28/2022	1107	G	GW	7		X	X		X	X	X		
AD-33	3/28/2022	1054	G	GW	7		X	X		X	X	X		
DUPLICATE 1	3/28/2022	1200	G	GW	4		X	X			X	X		
DUPLICATE 2	3/29/2022	1055	G	GW	4		X	X			X	X		
EQUIPMENT BLANK	3/28/2022	1030	G	GW	2		X				X			

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field — 4 | F4 | 1 | 4 | 2 | 2

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

Special Instructions/QC Requirements & Comments:

TG-32

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	Eagle	3-30-22 1300		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Date/Time: 4/1/22 12:30pm

AEP WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

Package Type	Delivery Type
(Cooler) Box Bag Envelope	PONY UPS (FedEX) USPS
	Other _____

Plant/Customer Pinkey **Number of Plastic Containers:** 8

Opened By MGK **Number of Glass Containers:** _____

Date/Time 4/1/22 1230 **Number of Mercury Containers:** 33

Were all temperatures within 0-6°C? Y / N or (N/A) **Initial:** _____ on ice / (no ice)

(IR Gun Ser# 210441568, *Expir.5/27/2023)* - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

Requested turnaround: Routine **If RUSH,** who was notified? _____

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? Y / N Comments _____

Were correct containers used? Y / N Comments _____

Was pH checked & Color Coding done? Y / N or N/A **Initial & Date:** _____

pH paper (circle one): MQuant pH Cat 1.09535.0001 lot HC904495 [OR] Lab rat pH Cat # LRS -4801 Lot X000RWDG21

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

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

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

Lab ID# 221028 Initial & Date & Time : _____

Comments: _____

Logged by MSO _____

_____

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.

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Susann Henschen	Susann Henschen	Chemist	5-11-2022
Name (printed)	Signature	Official Title	Date

Mercury Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Susann Henschen

LRC Date: 5-6-2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22041805, PB22041806, PB22042503

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER 2
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?		
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Mercury Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Susann Henschen

LRC Date: 5-6-2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22041805, PB22041806, PB22042503

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?		
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Mercury Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Susann Henschen

LRC Date: 5-6-2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22041805, PB22041806, PB22042503

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<MQL.
ER 2	Sample result was less than 10% above the Curve and less than the LDR.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

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

[3] NA - Not applicable; NR - Not reviewed.

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

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tamisha Palmer	Tami T. Palmer	Chemical Tech Princ.	04/20/2022
Name (printed)	Signature	Official Title	Date

Radium Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Tamisha Palmer

LRC Date: 04/20/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040403, PB22040405

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	ER1
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Radium Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Tamisha Palmer

LRC Date: 04/20/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040403, PB22040405

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Radium Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Tamisha Palmer

LRC Date: 04/20/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040403, PB22040405

Exception Report No.	Description
ER1	PB22040405 RPD exceeded 25%; results less than critical value/MDA 0.95

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

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

[3] NA - Not applicable; NR - Not reviewed.

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

Municipal Solid Waste Laboratory Review Checklist

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  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

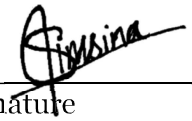
Sunita Timsina		Chemist Associate	04/13/2022
Name (printed)	Signature	Official Title	Date

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 04/13/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040402

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	NA	
	I	Were analytical duplicates analyzed at the appropriate frequency?	NA	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	NA	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 04/13/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040402

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 04/13/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040402

Exception Report No.	Description

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

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  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
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- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

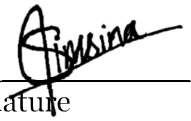
Sunita Timsina		Chemist Associate	04/22/2022
Name (printed)	Signature	Official Title	Date

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 04/22/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040708

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	NA	
	I	Were analytical duplicates analyzed at the appropriate frequency?	NA	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	NA	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 04/22/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040708

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 04/22/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040708

Exception Report No.	Description

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Jonathan Barnhill	Jonathan Barnhill	Supervisor	12/5/2022
Name (printed)	Signature	Official Title	Date

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey CCR

Reviewer Name: Jonathan Barnhill

LRC Date: 12/5/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040605 PB22040606 QC2204153 QC2204159

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?		
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER1
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	No	ER3
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey CCR

Reviewer Name: Jonathan Barnhill

LRC Date: 12/5/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040605 PB22040606 QC2204153 QC2204159

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	Yes	
	I	Were ion abundance data within the method-required QC limits?	Yes	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey CCR

Reviewer Name: Jonathan Barnhill

LRC Date: 12/5/2022

Laboratory Job Number: 221028

Prep Batch Number(s): PB22040605 PB22040606 QC2204153 QC2204159

Exception Report No.	Description
ER1	Linear Dynamic Range (LDR) study used to determine upper limit of analyte calibration.
ER2	CCB acceptance criteria is CCB<2.2*MDL.
ER3	MS/MSD failure on sample 221028-001 for Na.
	MS/MSD failure on sample 221028-011 for Na.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Water Analysis Report

Reissued

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

Job ID: 221988 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-32 Customer Description:
Lab Number: 221988-001 Preparation:
Date Collected: 06/20/2022 10:51 EDT Date Received: 06/24/2022 11:48 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	6.70	mg/L	2	0.10	0.02		CRJ	07/08/2022 00:31	EPA 300.1 -1997, Rev. 1.0
Chloride	30.6	mg/L	2	0.04	0.02		CRJ	07/08/2022 00:31	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.42	mg/L	2	0.06	0.02		CRJ	07/08/2022 00:31	EPA 300.1 -1997, Rev. 1.0
Sulfate	147	mg/L	25	5.0	0.8		CRJ	07/07/2022 22:22	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	320	mg/L	1	50	20		SDW	06/27/2022 08:39	SM 2540C-2015

Customer Sample ID: AD-33 Customer Description:
Lab Number: 221988-002 Preparation:
Date Collected: 06/20/2022 11:37 EDT Date Received: 06/24/2022 11:48 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.21	mg/L	2	0.10	0.02		CRJ	07/08/2022 01:23	EPA 300.1 -1997, Rev. 1.0
Chloride	8.49	mg/L	2	0.04	0.02		CRJ	07/08/2022 01:23	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.19	mg/L	2	0.06	0.02		CRJ	07/08/2022 01:23	EPA 300.1 -1997, Rev. 1.0
Sulfate	57.7	mg/L	10	2.0	0.3		CRJ	07/07/2022 22:47	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	06/27/2022 08:39	SM 2540C-2015

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

Water Analysis Report

Reissued

Job ID: 221988 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: Duplicate-1
Lab Number: 221988-003
Date Collected: 06/20/2022 15:00 EDT

Customer Description:
Preparation:
Date Received: 06/24/2022 11:48 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.26	mg/L	5	0.25	0.05		CRJ	07/08/2022 01:48	EPA 300.1 -1997, Rev. 1.0
Chloride	55.1	mg/L	5	0.10	0.05		CRJ	07/08/2022 01:48	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.33	mg/L	5	0.15	0.05		CRJ	07/08/2022 01:48	EPA 300.1 -1997, Rev. 1.0
Sulfate	165	mg/L	50	10	2		CRJ	07/07/2022 23:13	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

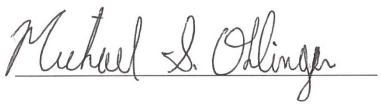
Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	260	mg/L	1	50	20		SDW	06/27/2022 08:48	SM 2540C-2015

221988
Job Comments:

Original report issued 7/28/2022. Report reissued with amended Matrix Spike precision calculations.

Report Verification

This report and the above data have been confirmed by the following analyst.



Michael Ohlinger, Chemist
Email: msohlinger@aep.com
Phone: 614-836-4184
Audinet: 8-210-4184

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

Water Analysis Report

Reissued

Job ID: 221988

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Data Qualifer Legend

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

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Michael Ohlinger (614-836-4184)
Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR
Contact Name: Leslie Fuerschbach
Contact Phone: 318-673-2744
Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (In Calendar Days)
◉ Routine (28 days for Monitoring Wells)

Site Contact: **Date:**

For Lab Use Only:
COC/Order #: 221988

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Mercury (250 mL bottle, pH<2, HNO3)	Dissolved Mercury (Field-filter 250 mL bottle, then pH<2, HNO3)	F, Cl, SO4, Br, TDS, Alkalinity (1 L bottle, Cool, 0-6C)	Ra-226, Ra-228 (Three (six every 10th*) 1 L bottles, pH<2, HNO3)				Sample Specific Notes:
AD-32	6/20/2022	951	G	GW	1				X					
AD-33	6/20/2022	1037	G	GW	1				X					
Duplicate - 1	6/20/2022	1400	G	GW	1				X					
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company: Eagle	Date/Time: 6/23/22 1600	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time: 6/24/22
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time: 6/24/22 10:30 AM

WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

Package Type	Delivery Type
(Cooler) Box Bag Envelope	PONY UPS (FedEX) USPS
	Other _____

Plant/Customer Purkey Number of Plastic Containers: 3

Opened By MGK Number of Glass Containers: _____

Date/Time 6/24/22 10:30 AM Number of Mercury Containers: _____

Were all temperatures within 0-6°C? (Y) / N or N/A Initial: MGK (on ice) / no ice

(IR Gun Ser# 210441568, *Expir.5/27/2023*) - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

Requested turnaround: Routine If **RUSH**, who was notified? _____

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) N Comments _____

Were samples labeled properly? (Y) / N Comments _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A **Initial & Date:** MGK 6/24/22

pH paper (circle one): MQuant pH Cat 1.09535.0001 lot HC904495 [OR] Lab rat pH Cat # LRS -4801 Lot X000RWDG21 ✓

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

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

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

Lab ID# 221988 Initial & Date & Time : _____

Comments: _____

Logged by JMB

Reviewed by _____

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.

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger	Michael Ohlinger	Chemist	7/28/22
Name (printed)	Signature	Official Title	Date

Alkalinity Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/28/22

Laboratory Job Number: 221988

Prep Batch Number(s): QC2206187

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Alkalinity Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Alkalinity Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/28/22

Laboratory Job Number: 221988

Prep Batch Number(s): QC2206187

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Alkalinity Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Alkalinity Laboratory Review Checklist

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/28/22

Laboratory Job Number: 221988

Prep Batch Number(s): QC2206187

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<0.5*MQL.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

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- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [x] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Timothy E. Arnold	Timothy E. Arnold	Chemist Principle	7/11/2022
Name (printed)	Signature	Official Title	Date

Ion Chromatography Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Timothy E. Arnold

LRC Date: 7/11/2022

Laboratory Job Number: 221988

Prep Batch Number(s): QC2207069

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Ion Chromatography Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Timothy E. Arnold

LRC Date: 7/11/2022

Laboratory Job Number: 221988

Prep Batch Number(s): QC2207069

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Ion Chromatography Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Timothy E. Arnold

LRC Date: 7/11/2022

Laboratory Job Number: 221988

Prep Batch Number(s): QC2207069

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<MQL.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

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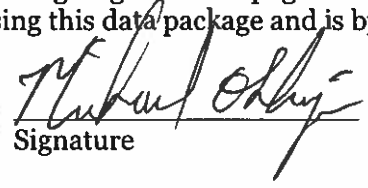
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger		Chemist	7/28/22
Name (printed)	Signature	Official Title	Date

TDS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/28/22

Laboratory Job Number: 221988

Prep Batch Number(s): QC2207061

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Michael Ohlinger

LRC Date: 4/5/22

Laboratory Job Number: 221988

Prep Batch Number(s): QC2207061

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

TDS Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/28/22

Laboratory Job Number: 221988

Prep Batch Number(s): QC2207061

Exception Report No.	Description

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Water Analysis Report

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Audinet: 210-4221

Job ID: 221989 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-2
Lab Number: 221989-001
Date Collected: 06/21/2022 09:49 EDT
Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.32	mg/L	2	0.10	0.02		CRJ	07/06/2022 20:44	EPA 300.1-1997, Rev. 1.0
Chloride	29.7	mg/L	10	0.2	0.1		CRJ	07/06/2022 20:18	EPA 300.1-1997, Rev. 1.0
Fluoride	0.21	mg/L	2	0.06	0.02		CRJ	07/06/2022 20:44	EPA 300.1-1997, Rev. 1.0
Sulfate	259	mg/L	10	2.0	0.3		CRJ	07/06/2022 20:18	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	490	mg/L	1	50	20		SDW	06/27/2022 13:08	SM 2540C-2015

Customer Sample ID: AD-3
Lab Number: 221989-002
Date Collected: 06/21/2022 12:23 EDT
Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.04	mg/L	2	0.10	0.02	J1	CRJ	07/06/2022 19:53	EPA 300.1-1997, Rev. 1.0
Chloride	5.65	mg/L	2	0.04	0.02		CRJ	07/06/2022 19:53	EPA 300.1-1997, Rev. 1.0
Fluoride	0.04	mg/L	2	0.06	0.02	J1	CRJ	07/06/2022 19:53	EPA 300.1-1997, Rev. 1.0
Sulfate	21.2	mg/L	2	0.40	0.06		CRJ	07/06/2022 19:53	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20	P1, H2	SDW	06/29/2022 11:00	SM 2540C-2015

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Water Analysis Report

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Job ID: 221989 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-4
Lab Number: 221989-003
Date Collected: 06/21/2022 11:34 EDT

Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.20	mg/L	2	0.10	0.02		CRJ	07/06/2022 21:36	EPA 300.1-1997, Rev. 1.0
Chloride	3.92	mg/L	2	0.04	0.02		CRJ	07/06/2022 21:36	EPA 300.1-1997, Rev. 1.0
Fluoride	0.05	mg/L	2	0.06	0.02	J1	CRJ	07/06/2022 21:36	EPA 300.1-1997, Rev. 1.0
Sulfate	20.5	mg/L	2	0.40	0.06		CRJ	07/06/2022 21:36	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	160	mg/L	1	50	20		SDW	06/27/2022 13:15	SM 2540C-2015

Customer Sample ID: AD-7
Lab Number: 221989-004
Date Collected: 06/21/2022 10:47 EDT

Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	3.56	mg/L	2	0.10	0.02		CRJ	07/06/2022 22:28	EPA 300.1-1997, Rev. 1.0
Chloride	53.1	mg/L	10	0.2	0.1		CRJ	07/06/2022 22:02	EPA 300.1-1997, Rev. 1.0
Fluoride	0.30	mg/L	2	0.06	0.02		CRJ	07/06/2022 22:28	EPA 300.1-1997, Rev. 1.0
Sulfate	71.1	mg/L	10	2.0	0.3		CRJ	07/06/2022 22:02	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	290	mg/L	1	50	20		SDW	06/27/2022 13:15	SM 2540C-2015

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Water Analysis Report

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Job ID: 221989 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-12
Customer Description:
Lab Number: 221989-005
Preparation:
Date Collected: 06/20/2022 09:52 EDT
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.11	mg/L	2	0.10	0.02		CRJ	07/06/2022 23:19	EPA 300.1-1997, Rev. 1.0
Chloride	7.59	mg/L	2	0.04	0.02		CRJ	07/06/2022 23:19	EPA 300.1-1997, Rev. 1.0
Fluoride	0.09	mg/L	2	0.06	0.02		CRJ	07/06/2022 23:19	EPA 300.1-1997, Rev. 1.0
Sulfate	4.81	mg/L	2	0.40	0.06		CRJ	07/06/2022 23:19	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	80	mg/L	1	50	20		SDW	06/27/2022 08:30	SM 2540C-2015

Customer Sample ID: AD-13
Customer Description:
Lab Number: 221989-006
Preparation:
Date Collected: 06/20/2022 09:43 EDT
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.30	mg/L	2	0.10	0.02		CRJ	07/07/2022 03:12	EPA 300.1-1997, Rev. 1.0
Chloride	54.5	mg/L	25	0.5	0.3		CRJ	07/07/2022 02:46	EPA 300.1-1997, Rev. 1.0
Fluoride	0.26	mg/L	2	0.06	0.02		CRJ	07/07/2022 03:12	EPA 300.1-1997, Rev. 1.0
Sulfate	138	mg/L	25	5.0	0.8		CRJ	07/07/2022 02:46	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	270	mg/L	2	100	40		SDW	06/27/2022 08:30	SM 2540C-2015

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Water Analysis Report

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Job ID: 221989 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-17
Lab Number: 221989-007
Date Collected: 06/21/2022 11:40 EDT
Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.20	mg/L	2	0.10	0.02		CRJ	07/06/2022 23:45	EPA 300.1-1997, Rev. 1.0
Chloride	30.2	mg/L	2	0.04	0.02		CRJ	07/06/2022 23:45	EPA 300.1-1997, Rev. 1.0
Fluoride	0.30	mg/L	2	0.06	0.02		CRJ	07/06/2022 23:45	EPA 300.1-1997, Rev. 1.0
Sulfate	5.78	mg/L	2	0.40	0.06		CRJ	07/06/2022 23:45	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	90	mg/L	1	50	20		SDW	06/27/2022 13:22	SM 2540C-2015

Customer Sample ID: AD-18
Lab Number: 221989-008
Date Collected: 06/21/2022 09:17 EDT
Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	07/07/2022 02:20	EPA 300.1-1997, Rev. 1.0
Chloride	5.20	mg/L	2	0.04	0.02		CRJ	07/07/2022 02:20	EPA 300.1-1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	07/07/2022 02:20	EPA 300.1-1997, Rev. 1.0
Sulfate	6.47	mg/L	2	0.40	0.06		CRJ	07/07/2022 02:20	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	110	mg/L	1	50	20		SDW	06/27/2022 13:22	SM 2540C-2015

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Job ID: 221989 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-22
Lab Number: 221989-009
Date Collected: 06/20/2022 10:53 EDT
Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.79	mg/L	2	0.10	0.02		CRJ	07/07/2022 07:57	EPA 300.1-1997, Rev. 1.0
Chloride	107	mg/L	25	0.5	0.3		CRJ	07/07/2022 05:47	EPA 300.1-1997, Rev. 1.0
Fluoride	0.32	mg/L	2	0.06	0.02		CRJ	07/07/2022 07:57	EPA 300.1-1997, Rev. 1.0
Sulfate	293	mg/L	25	5.0	0.8		CRJ	07/07/2022 05:47	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	580	mg/L	2	100	40		SDW	06/27/2022 08:48	SM 2540C-2015

Customer Sample ID: AD-28
Lab Number: 221989-010
Date Collected: 06/21/2022 10:56 EDT
Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.04	mg/L	2	0.10	0.02	J1	CRJ	07/07/2022 04:04	EPA 300.1-1997, Rev. 1.0
Chloride	4.36	mg/L	2	0.04	0.02		CRJ	07/07/2022 04:04	EPA 300.1-1997, Rev. 1.0
Fluoride	0.61	mg/L	2	0.06	0.02		CRJ	07/07/2022 04:04	EPA 300.1-1997, Rev. 1.0
Sulfate	28.0	mg/L	2	0.40	0.06		CRJ	07/07/2022 04:04	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	110	mg/L	1	50	20		SDW	06/27/2022 13:29	SM 2540C-2015

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Water Analysis Report

Reissued

Job ID: 221989 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Customer Sample ID: AD-30
Lab Number: 221989-011
Date Collected: 06/20/2022 12:29 EDT
Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.34	mg/L	2	0.10	0.02		CRJ	07/07/2022 04:56	EPA 300.1-1997, Rev. 1.0
Chloride	26.0	mg/L	2	0.04	0.02		CRJ	07/07/2022 04:56	EPA 300.1-1997, Rev. 1.0
Fluoride	0.06	mg/L	2	0.06	0.02		CRJ	07/07/2022 04:56	EPA 300.1-1997, Rev. 1.0
Sulfate	177	mg/L	10	2.0	0.3		CRJ	07/07/2022 04:30	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	340	mg/L	1	50	20		SDW	06/27/2022 09:01	SM 2540C-2015

Customer Sample ID: AD-31
Lab Number: 221989-012
Date Collected: 06/20/2022 11:43 EDT
Customer Description:
Preparation:
Date Received: 06/24/2022 11:56 EDT

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.29	mg/L	5	0.25	0.05		CRJ	07/11/2022 15:51	EPA 300.1-1997, Rev. 1.0
Chloride	23.2	mg/L	5	0.10	0.05		CRJ	07/11/2022 15:51	EPA 300.1-1997, Rev. 1.0
Fluoride	0.14	mg/L	5	0.15	0.05	J1	CRJ	07/11/2022 15:51	EPA 300.1-1997, Rev. 1.0
Sulfate	89.0	mg/L	10	2.0	0.3		CRJ	07/07/2022 06:13	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	270	mg/L	1	50	20		SDW	06/27/2022 08:55	SM 2540C-2015

221989
Job Comments:

Original report issued 7/29/2022. Report reissued with amended Matrix Spike precision calculations.

Water Analysis Report

Reissued

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

Job ID: 221989 **Customer: Pirkey Power Station** **Date Reported: 12/27/2022**

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist
Email: msohlinger@aep.com
Phone: 614-836-4184
Audinet: 8-210-4184

Data Qualifer Legend

U1 - Not detected at or above method detection limit (MDL).
J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
P1 - The precision between duplicate results was above acceptance limits.
H2 - Sample analysis performed past holding time.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Michael Ohlinger (614-836-4184)
Dave Conover (614-836-4219)

Project Name: Pirkey PP Semi-Annual CCR
Contact Name: Leslie Fuerschbach
Contact Phone: 318-673-2744
Sampler(s): Matt Hamilton Kenny McDonald

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

Site Contact:

Date:

For Lab Use Only:
COC/Order #: ~~221889~~ 221989 JAB 6/24/22

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Mercury (250 mL bottle, pH<2, HNO3)	Dissolved Mercury (Field-filter 250 mL bottle, then pH<2, HNO3)	F, Cl, SO4, Br, TDS, Alkalinity (1 L bottle, Cool, 0-6C)	Ra-226, Ra-228 (Three (six every 10th*) 1 L bottles, pH<2, HNO3)				Sample Specific Notes:
AD-2	6/21/2022	849	G	GW	1				X					
AD-3	6/21/2022	1123	G	GW	1				X					
AD-4	6/21/2022	1034	G	GW	1				X					
AD-7	6/21/2022	947	G	GW	1				X					
AD-12	6/20/2022	852	G	GW	1				X					
AD-13	6/20/2022	843	G	GW	1				X					
AD-17	6/21/2022	1040	G	GW	1				X					
AD-18	6/21/2022	817	G	GW	1				X					
AD-22	6/20/2022	953	G	GW	1				X					
AD-28	6/21/2022	956	G	GW	1				X					
AD-30	6/20/2022	1129	G	GW	1				X					
AD-31	6/20/2022	1043	G	GW	1				X					
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	Eqst	6/23/22 16:00		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:
			[signature]	6/24/22 10:30AM

WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

Package Type: (Cooler) Box Bag Envelope

Delivery Type: PONY (UPS) (FedEX) USPS Other _____

Plant/Customer Pinkney

Number of Plastic Containers: 12

Opened By MGK

Number of Glass Containers: _____

Date/Time 6/24/22 10:30AM

Number of Mercury Containers: _____

Were all temperatures within 0-6°C? (Y) / N or N/A Initial: MGK (on ice) no ice

(IR Gun Ser# 210441568, *Expir.5/27/2023)* - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

Requested turnaround: Routine If **RUSH**, who was notified? _____

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) N Comments _____

Were samples labeled properly? (Y) / N Comments _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) N or N/A **Initial & Date:** MGK 6/24/22

pH paper (circle one): MQuant pH Cat 1.09535.0001 lot HC904495 _____ [OR] Lab rat pH Cat # LRS -4801 Lot X000RWDG21 ✓

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

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

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

Lab ID# 221989 Initial & Date & Time : _____

Comments: _____

Logged by JMB _____

_____

Reviewed by _____ _____

_____

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.

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger		Chemist	7/29/22
Name (printed)	Signature	Official Title	Date

Alkalinity Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/29/22

Laboratory Job Number: 221989

Prep Batch Number(s): QC2206187

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Alkalinity Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Alkalinity Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/29/22

Laboratory Job Number: 221989

Prep Batch Number(s): QC2206187

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Alkalinity Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Alkalinity Laboratory Review Checklist

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/29/22

Laboratory Job Number: 221989

Prep Batch Number(s): QC2206187

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<0.5*MQL.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

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

[3] NA - Not applicable; NR - Not reviewed.

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

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [x] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Timothy E. Arnold		Chemist Principle	7/13/2022
Name (printed)	Signature	Official Title	Date

Ion Chromatography Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Timothy E. Arnold

LRC Date: 7/13/2022

Laboratory Job Number: 221989

Prep Batch Number(s): QC2207051

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	YES	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Ion Chromatography Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Timothy E. Arnold

LRC Date: 7/13/2022

Laboratory Job Number: 221989

Prep Batch Number(s): QC2207051

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Ion Chromatography Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Ion Chromatography Laboratory Review Checklist

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Timothy E. Arnold

LRC Date: 7/13/2022

Laboratory Job Number: 221989

Prep Batch Number(s): QC2207051

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<MQL.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger	Michael Ohlinger	Chemist	7/29/22
Name (printed)	Signature	Official Title	Date

TDS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/29/22

Laboratory Job Number: 221989

Prep Batch Number(s): QC2207061 & QC2207063

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	No	ER1
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	No	ER2
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Michael Ohlinger

LRC Date: 4/5/22

Laboratory Job Number: 221989

Prep Batch Number(s): QC2207061 & QC2207063

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Michael Ohlinger

LRC Date: 7/29/22

Laboratory Job Number: 221989

Prep Batch Number(s): QC2207061 & QC2207063

Exception Report No.	Description
ER1	Sample analysis performed past holding time for 221989-002.
ER2	The precision between duplicate results was above acceptance limits for the duplicate analyzed on 221989-002.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

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

[3] NA - Not applicable; NR - Not reviewed.

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

Water Analysis Report

Reissued

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-2
Lab Number: 222015-001
Date Collected: 06/21/2022 09:49 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Arsenic	2.0	µg/L	5	0.5	0.2		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Barium	17.5	µg/L	5	1.0	0.3		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Beryllium	0.85	µg/L	5	0.25	0.04		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Boron	3.26	mg/L	5	0.25	0.05		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Cadmium	0.11	µg/L	5	0.10	0.02		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Calcium	3.4	mg/L	5	0.3	0.1		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Chromium	0.5	µg/L	5	1.0	0.2	J1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Cobalt	25.7	µg/L	5	0.10	0.02		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Lead	0.6	µg/L	5	1.0	0.3	J1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Lithium	0.0688	mg/L	5	0.0010	0.0003		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Magnesium	7.1	mg/L	5	0.5	0.1		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Mercury	244	ng/L	4	20	7		JAB	07/12/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Potassium	1.4	mg/L	5	0.5	0.1		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Selenium	2.7	µg/L	5	2.5	0.5		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Sodium	111	mg/L	5	1.0	0.3	M1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Strontium	0.048	mg/L	5	0.010	0.002		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Thallium	0.3	µg/L	5	1.0	0.2	J1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.59	pCi/L	0.17	0.28		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.1	%						
Radium-228	1.28	pCi/L	0.17	0.52		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	87.8	%						

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

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Water Analysis Report

Reissued

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-2
Customer Description:
Lab Number: 222015-001-01
Preparation: Dissolved
Date Collected: 06/21/2022 09:49 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Arsenic	1.6	µg/L	5	0.5	0.2		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Barium	17.8	µg/L	5	1.0	0.3		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Beryllium	0.80	µg/L	5	0.25	0.04		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Cadmium	0.11	µg/L	5	0.10	0.02		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Chromium	0.5	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Cobalt	25.4	µg/L	5	0.10	0.02		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Iron	0.13	mg/L	5	0.10	0.03		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Lead	0.7	µg/L	5	1.0	0.3	J1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Lithium	0.0673	mg/L	5	0.0010	0.0003		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Manganese	0.096	mg/L	5	0.005	0.001		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Selenium	2.2	µg/L	5	2.5	0.5	J1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Thallium	<0.2	µg/L	5	1.0	0.2	U1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4

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

Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-3
Lab Number: 222015-002
Date Collected: 06/21/2022 12:23 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Arsenic	0.2	µg/L	5	0.5	0.2	J1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Barium	55.6	µg/L	5	1.0	0.3		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Beryllium	0.22	µg/L	5	0.25	0.04	J1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Boron	0.08	mg/L	5	0.25	0.05	J1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.02	µg/L	5	0.10	0.02	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Calcium	3.1	mg/L	5	0.3	0.1		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Chromium	0.3	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Cobalt	2.70	µg/L	5	0.10	0.02		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Lead	<0.3	µg/L	5	1.0	0.3	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Lithium	0.0457	mg/L	5	0.0010	0.0003		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Magnesium	1.4	mg/L	5	0.5	0.1		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Potassium	2.1	mg/L	5	0.5	0.1		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Selenium	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Sodium	7.5	mg/L	5	1.0	0.3		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Strontium	0.020	mg/L	5	0.010	0.002		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Thallium	<0.2	µg/L	5	1.0	0.2	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.04	pCi/L	0.23	0.29		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	88.2	%						
Radium-228	0.64	pCi/L	0.14	0.45		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.1	%						

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

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Water Analysis Report

Reissued

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-3
Customer Description:
Lab Number: 222015-002-01
Preparation: Dissolved
Date Collected: 06/21/2022 12:23 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.2	µg/L	5	0.5	0.2	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Barium	49.5	µg/L	5	1.0	0.3		GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Beryllium	0.14	µg/L	5	0.25	0.04	J1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.02	µg/L	5	0.10	0.02	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Chromium	0.4	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Cobalt	2.25	µg/L	5	0.10	0.02		GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Iron	<0.03	mg/L	5	0.10	0.03	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Lead	<0.3	µg/L	5	1.0	0.3	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Lithium	0.0459	mg/L	5	0.0010	0.0003		GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Manganese	0.025	mg/L	5	0.005	0.001		GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Selenium	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Thallium	<0.2	µg/L	5	1.0	0.2	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-4
Lab Number: 222015-003
Date Collected: 06/21/2022 11:34 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Barium	124	µg/L	1	0.20	0.05		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Beryllium	0.407	µg/L	1	0.050	0.007		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Boron	0.020	mg/L	1	0.050	0.009	J1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Cadmium	0.021	µg/L	1	0.020	0.004		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Calcium	2.51	mg/L	1	0.05	0.02		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Chromium	0.46	µg/L	1	0.20	0.04		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Cobalt	4.10	µg/L	1	0.020	0.003		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Lithium	0.0220	mg/L	1	0.00020	0.00005		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Magnesium	0.76	mg/L	1	0.10	0.02		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Potassium	2.21	mg/L	1	0.10	0.02		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Sodium	6.94	mg/L	1	0.20	0.05		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Strontium	0.0184	mg/L	1	0.0020	0.0004		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.66	pCi/L	0.18	0.26		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.3	%						
Radium-228	0.65	pCi/L	0.14	0.47		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	89.0	%						

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

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Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-4
Customer Description:
Lab Number: 222015-003-01
Preparation: Dissolved
Date Collected: 06/21/2022 11:34 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Barium	104	µg/L	1	0.20	0.05		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Beryllium	0.226	µg/L	1	0.050	0.007		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Cadmium	0.016	µg/L	1	0.020	0.004	J1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Cobalt	3.12	µg/L	1	0.020	0.003		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Iron	0.019	mg/L	1	0.020	0.006	J1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Lead	0.14	µg/L	1	0.20	0.05	J1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.0233	mg/L	1	0.00020	0.00005		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.0289	mg/L	1	0.0010	0.0002		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

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Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-7
Lab Number: 222015-004
Date Collected: 06/21/2022 10:47 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Arsenic	1.3	µg/L	5	0.5	0.2		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Barium	58.7	µg/L	5	1.0	0.3		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Beryllium	4.66	µg/L	5	0.25	0.04		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Boron	6.13	mg/L	5	0.25	0.05		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Cadmium	0.95	µg/L	5	0.10	0.02		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Calcium	5.4	mg/L	5	0.3	0.1		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Chromium	0.4	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Cobalt	36.4	µg/L	5	0.10	0.02		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Lead	1.0	µg/L	5	1.0	0.3		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Lithium	0.113	mg/L	5	0.0010	0.0003		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Magnesium	8.9	mg/L	5	0.5	0.1		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Mercury	<400	ng/L	200	1000	400	U1	JAB	07/12/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Potassium	3.2	mg/L	5	0.5	0.1		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Selenium	2.3	µg/L	5	2.5	0.5	J1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Sodium	22.6	mg/L	5	1.0	0.3		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Strontium	0.058	mg/L	5	0.010	0.002		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Thallium	0.2	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.59	pCi/L	0.38	0.35		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	79.1	%						
Radium-228	2.23	pCi/L	0.16	0.46		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.4	%						

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

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Water Analysis Report

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Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-7
Customer Description:
Lab Number: 222015-004-01
Preparation: Dissolved
Date Collected: 06/21/2022 10:47 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Arsenic	1.38	µg/L	1	0.10	0.03		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Barium	54.1	µg/L	1	0.20	0.05		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Beryllium	3.55	µg/L	1	0.050	0.007		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.972	µg/L	1	0.020	0.004		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Cobalt	35.4	µg/L	1	0.020	0.003		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Iron	0.324	mg/L	1	0.020	0.006		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Lead	1.06	µg/L	1	0.20	0.05		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.0887	mg/L	1	0.00020	0.00005		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Manganese	0.142	mg/L	1	0.0010	0.0002		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Mercury	<20	ng/L	10	50	20	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Selenium	2.15	µg/L	1	0.50	0.09		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-12
Lab Number: 222015-005
Date Collected: 06/20/2022 09:52 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Arsenic	0.08	µg/L	1	0.10	0.03	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Barium	24.2	µg/L	1	0.20	0.05		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Beryllium	0.135	µg/L	1	0.050	0.007		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Boron	0.042	mg/L	1	0.050	0.009	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Cadmium	0.008	µg/L	1	0.020	0.004	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Calcium	0.32	mg/L	1	0.05	0.02		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Chromium	0.63	µg/L	1	0.20	0.04		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Cobalt	1.35	µg/L	1	0.020	0.003		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Lithium	0.00949	mg/L	1	0.00020	0.00005		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Magnesium	0.45	mg/L	1	0.10	0.02		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Potassium	0.53	mg/L	1	0.10	0.02		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Selenium	0.16	µg/L	1	0.50	0.09	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Sodium	5.28	mg/L	1	0.20	0.05		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Strontium	0.0030	mg/L	1	0.0020	0.0004		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.51	pCi/L	0.16	0.28		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.1	%						
Radium-228	0.12	pCi/L	0.11	0.37		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	96.0	%						

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

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Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-12
Customer Description:
Lab Number: 222015-005-01
Preparation: Dissolved
Date Collected: 06/20/2022 09:52 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Barium	24.4	µg/L	1	0.20	0.05		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Beryllium	0.131	µg/L	1	0.050	0.007		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Cobalt	1.30	µg/L	1	0.020	0.003		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Iron	0.006	mg/L	1	0.020	0.006	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Lithium	0.00918	mg/L	1	0.00020	0.00005		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Manganese	0.0052	mg/L	1	0.0010	0.0002		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Selenium	0.12	µg/L	1	0.50	0.09	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-13
Lab Number: 222015-006
Date Collected: 06/20/2022 09:43 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Arsenic	4.30	µg/L	1	0.10	0.03		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Barium	41.4	µg/L	1	0.20	0.05		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Beryllium	0.409	µg/L	1	0.050	0.007		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Boron	0.075	mg/L	1	0.050	0.009		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Calcium	11.1	mg/L	1	0.05	0.02		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Cobalt	56.2	µg/L	1	0.020	0.003	M1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Lithium	0.150	mg/L	1	0.00020	0.00005	M1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Magnesium	15.7	mg/L	1	0.10	0.02		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	1.1	µg/L	1	0.5	0.1		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Potassium	5.19	mg/L	1	0.10	0.02		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Selenium	0.1	µg/L	1	0.50	0.09	J1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Sodium	21.4	mg/L	1	0.20	0.05		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Strontium	0.0509	mg/L	1	0.0020	0.0004		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.15	pCi/L	0.24	0.29		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.3	%						
Radium-228	1.07	pCi/L	0.14	0.45		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	95.1	%						

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

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Water Analysis Report

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-13
Customer Description:
Lab Number: 222015-006-01
Preparation: Dissolved
Date Collected: 06/20/2022 09:43 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Arsenic	0.80	µg/L	1	0.10	0.03		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Barium	40.0	µg/L	1	0.20	0.05		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Beryllium	0.203	µg/L	1	0.050	0.007		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Cadmium	0.005	µg/L	1	0.020	0.004	J1	GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Cobalt	55.8	µg/L	1	0.020	0.003		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Iron	47.8	mg/L	1	0.020	0.006		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Lithium	0.146	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Manganese	0.550	mg/L	1	0.0010	0.0002		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.8	µg/L	1	0.5	0.1		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4

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

Water Analysis Report

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Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-17
Lab Number: 222015-007
Date Collected: 06/21/2022 11:40 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Arsenic	0.39	µg/L	1	0.10	0.03		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Barium	250	µg/L	1	0.20	0.05		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Beryllium	0.650	µg/L	1	0.050	0.007		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Cadmium	0.063	µg/L	1	0.020	0.004		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Calcium	1.10	mg/L	1	0.05	0.02		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Chromium	0.51	µg/L	1	0.20	0.04		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Cobalt	12.2	µg/L	1	0.020	0.003		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Lead	0.13	µg/L	1	0.20	0.05	J1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Lithium	0.0206	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Magnesium	4.35	mg/L	1	0.10	0.02		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Mercury	200	ng/L	100	500	200	J1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Potassium	1.11	mg/L	1	0.10	0.02		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Selenium	0.44	µg/L	1	0.50	0.09	J1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Sodium	8.53	mg/L	1	0.20	0.05		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Strontium	0.0206	mg/L	1	0.0020	0.0004		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	7.36	pCi/L	0.63	0.30		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	94.4	%						
Radium-228	4.60	pCi/L	0.17	0.41		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	94.6	%						

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

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Water Analysis Report

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-17
Customer Description:
Lab Number: 222015-007-01
Preparation: Dissolved
Date Collected: 06/21/2022 11:40 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Arsenic	0.17	µg/L	1	0.10	0.03		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Barium	245	µg/L	1	0.20	0.05		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Beryllium	0.489	µg/L	1	0.050	0.007		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Cadmium	0.061	µg/L	1	0.020	0.004		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Cobalt	11.5	µg/L	1	0.020	0.003		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Iron	0.021	mg/L	1	0.020	0.006		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Lead	0.24	µg/L	1	0.20	0.05		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Lithium	0.0198	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Manganese	0.0377	mg/L	1	0.0010	0.0002		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Mercury	<200	ng/L	100	500	200	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Selenium	0.20	µg/L	1	0.50	0.09	J1	GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4

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Dolan Chemical Laboratory
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Phone: 614-836-4221
Audinet: 210-4221

Water Analysis Report

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Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-18
Lab Number: 222015-008
Date Collected: 06/21/2022 09:17 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Barium	79.3	µg/L	1	0.20	0.05		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Beryllium	0.073	µg/L	1	0.050	0.007		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Calcium	1.49	mg/L	1	0.05	0.02		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Cobalt	0.790	µg/L	1	0.020	0.003		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Lead	0.11	µg/L	1	0.20	0.05	J1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Lithium	0.0108	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Magnesium	0.30	mg/L	1	0.10	0.02		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Mercury	<7	ng/L	4	20	7	U1	JAB	07/12/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Potassium	0.70	mg/L	1	0.10	0.02		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Selenium	0.14	µg/L	1	0.50	0.09	J1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Sodium	5.16	mg/L	1	0.20	0.05		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Strontium	0.0069	mg/L	1	0.0020	0.0004		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.55	pCi/L	0.17	0.30		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.7	%						
Radium-228	0.18	pCi/L	0.17	0.58		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	92.3	%						

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

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Water Analysis Report

Reissued

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-18
Customer Description:
Lab Number: 222015-008-01
Preparation: Dissolved
Date Collected: 06/21/2022 09:17 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Arsenic	0.05	µg/L	1	0.10	0.03	J1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Barium	31.8	µg/L	1	0.20	0.05		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Cobalt	0.237	µg/L	1	0.020	0.003		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Iron	0.024	mg/L	1	0.020	0.006		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.0107	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.0008	mg/L	1	0.0010	0.0002	J1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Mercury	8	ng/L	4	20	7	J1	JAB	07/12/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4

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Audinet: 210-4221

Water Analysis Report

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Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-22
Lab Number: 222015-009
Date Collected: 06/20/2022 10:53 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Arsenic	3.02	µg/L	1	0.10	0.03		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Barium	16.2	µg/L	1	0.20	0.05		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Beryllium	2.11	µg/L	1	0.050	0.007		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Boron	0.028	mg/L	1	0.050	0.009	J1	GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.587	µg/L	1	0.020	0.004		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Calcium	11.9	mg/L	1	0.05	0.02		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.66	µg/L	1	0.20	0.04		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Cobalt	69.6	µg/L	1	0.020	0.003		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Lead	0.18	µg/L	1	0.20	0.05	J1	GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.110	mg/L	1	0.00020	0.00005		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Magnesium	15.6	mg/L	1	0.10	0.02		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Mercury	460	ng/L	10	50	20		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Potassium	3.63	mg/L	1	0.10	0.02		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Selenium	2.01	µg/L	1	0.50	0.09		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Sodium	90.5	mg/L	1	0.20	0.05		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Strontium	0.0955	mg/L	1	0.0020	0.0004		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Thallium	0.15	µg/L	1	0.20	0.04	J1	GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.96	pCi/L	0.31	0.33		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.0	%						
Radium-228	1.99	pCi/L	0.19	0.58		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	92.5	%						

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

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Water Analysis Report

Reissued

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-22
Customer Description:
Lab Number: 222015-009-01
Preparation: Dissolved
Date Collected: 06/20/2022 10:53 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Arsenic	2.14	µg/L	1	0.10	0.03		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Barium	16.3	µg/L	1	0.20	0.05		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Beryllium	2.25	µg/L	1	0.050	0.007		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Cadmium	0.564	µg/L	1	0.020	0.004		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Cobalt	74.5	µg/L	1	0.020	0.003		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Iron	38.1	mg/L	1	0.020	0.006		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Lead	0.1	µg/L	1	0.20	0.05	J1	GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Lithium	0.125	mg/L	1	0.00020	0.00005		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Manganese	0.351	mg/L	1	0.0010	0.0002		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Selenium	2.13	µg/L	1	0.50	0.09		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Thallium	0.15	µg/L	1	0.20	0.04	J1	GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-28
Lab Number: 222015-010
Date Collected: 06/21/2022 10:56 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Barium	130	µg/L	1	0.20	0.05		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Beryllium	0.463	µg/L	1	0.050	0.007		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Boron	0.311	mg/L	1	0.050	0.009		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Cadmium	0.047	µg/L	1	0.020	0.004		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Calcium	1.40	mg/L	1	0.05	0.02		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Cobalt	13.3	µg/L	1	0.020	0.003		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Lithium	0.0213	mg/L	1	0.00020	0.00005		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Magnesium	2.95	mg/L	1	0.10	0.02		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Mercury	7	ng/L	1	5	2		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Potassium	0.78	mg/L	1	0.10	0.02		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Selenium	0.15	µg/L	1	0.50	0.09	J1	GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Sodium	6.84	mg/L	1	0.20	0.05		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Strontium	0.0192	mg/L	1	0.0020	0.0004		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	5.02	pCi/L	0.51	0.30		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	85.4	%						
Radium-228	0.94	pCi/L	0.15	0.49		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	93.6	%						

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

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Water Analysis Report

Reissued

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-28
Customer Description:
Lab Number: 222015-010-01
Preparation: Dissolved
Date Collected: 06/21/2022 10:56 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Arsenic	0.11	µg/L	1	0.10	0.03		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Barium	131	µg/L	1	0.20	0.05		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Beryllium	0.486	µg/L	1	0.050	0.007		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Cadmium	0.054	µg/L	1	0.020	0.004		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Chromium	0.38	µg/L	1	0.20	0.04		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Cobalt	13.0	µg/L	1	0.020	0.003		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Iron	0.070	mg/L	1	0.020	0.006		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Lithium	0.0226	mg/L	1	0.00020	0.00005		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Manganese	0.0530	mg/L	1	0.0010	0.0002		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Selenium	0.21	µg/L	1	0.50	0.09	J1	GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

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Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-30
Lab Number: 222015-011
Date Collected: 06/20/2022 12:29 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Arsenic	0.23	µg/L	1	0.10	0.03		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Barium	106	µg/L	1	0.20	0.05		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Beryllium	0.089	µg/L	1	0.050	0.007		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Boron	2.49	mg/L	1	0.050	0.009		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Cadmium	0.014	µg/L	1	0.020	0.004	J1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Calcium	0.75	mg/L	1	0.05	0.02		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Chromium	0.42	µg/L	1	0.20	0.04		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Cobalt	4.90	µg/L	1	0.020	0.003		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Lithium	0.0100	mg/L	1	0.00020	0.00005		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Magnesium	2.48	mg/L	1	0.10	0.02		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Mercury	14	ng/L	2	10	4		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Potassium	0.89	mg/L	1	0.10	0.02		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Selenium	0.34	µg/L	1	0.50	0.09	J1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Sodium	87.2	mg/L	1	0.20	0.05		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Strontium	0.0114	mg/L	1	0.0020	0.0004		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.72	pCi/L	0.35	0.28		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.5	%						
Radium-228	0.99	pCi/L	0.15	0.47		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	91.7	%						

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

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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-30
Customer Description:
Lab Number: 222015-011-01
Preparation: Dissolved
Date Collected: 06/20/2022 12:29 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Arsenic	0.10	µg/L	1	0.10	0.03		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Barium	90.4	µg/L	1	0.20	0.05		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Beryllium	0.092	µg/L	1	0.050	0.007		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Chromium	0.36	µg/L	1	0.20	0.04		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Cobalt	4.45	µg/L	1	0.020	0.003		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Iron	0.014	mg/L	1	0.020	0.006	J1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Lead	0.05	µg/L	1	0.20	0.05	J1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.00993	mg/L	1	0.00020	0.00005		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Manganese	0.0194	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Mercury	6	ng/L	2	10	4	J1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Selenium	0.18	µg/L	1	0.50	0.09	J1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4

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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-31
Lab Number: 222015-012
Date Collected: 06/20/2022 11:43 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Arsenic	0.42	µg/L	1	0.10	0.03		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Barium	34.1	µg/L	1	0.20	0.05		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Beryllium	1.03	µg/L	5	0.25	0.04		GES	07/14/2022 13:04	EPA 200.8-1994, Rev. 5.4
Boron	0.028	mg/L	1	0.050	0.009	J1	GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Cadmium	0.071	µg/L	1	0.020	0.004		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Calcium	2.65	mg/L	1	0.05	0.02		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Chromium	0.59	µg/L	1	0.20	0.04		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Cobalt	9.61	µg/L	1	0.020	0.003		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Lead	0.35	µg/L	1	0.20	0.05		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.0844	mg/L	5	0.0010	0.0003		GES	07/14/2022 13:04	EPA 200.8-1994, Rev. 5.4
Magnesium	3.85	mg/L	1	0.10	0.02		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Mercury	89	ng/L	2	10	4		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Potassium	1.50	mg/L	1	0.10	0.02		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Sodium	30.7	mg/L	1	0.20	0.05		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.0376	mg/L	1	0.0020	0.0004		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.51	pCi/L	0.34	0.27		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	94.2	%						
Radium-228	2.09	pCi/L	0.15	0.42		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.8	%						

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

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Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-31
Customer Description:
Lab Number: 222015-012-01
Preparation: Dissolved
Date Collected: 06/20/2022 11:43 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Arsenic	0.23	µg/L	1	0.10	0.03		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Barium	33.1	µg/L	1	0.20	0.05		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Beryllium	0.96	µg/L	5	0.25	0.04		GES	07/14/2022 13:09	EPA 200.8-1994, Rev. 5.4
Cadmium	0.061	µg/L	1	0.020	0.004		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Chromium	0.50	µg/L	1	0.20	0.04		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Cobalt	9.49	µg/L	1	0.020	0.003		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Iron	0.114	mg/L	1	0.020	0.006		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Lead	0.31	µg/L	1	0.20	0.05		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Lithium	0.0860	mg/L	5	0.0010	0.0003		GES	07/14/2022 13:09	EPA 200.8-1994, Rev. 5.4
Manganese	0.0253	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Mercury	9	ng/L	1	5	2		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Selenium	0.18	µg/L	1	0.50	0.09	J1	GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4

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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-32
Lab Number: 222015-013
Date Collected: 06/20/2022 10:51 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Arsenic	1.81	µg/L	1	0.10	0.03		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Barium	32.3	µg/L	1	0.20	0.05		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Beryllium	3.28	µg/L	5	0.25	0.04		GES	07/14/2022 13:14	EPA 200.8-1994, Rev. 5.4
Boron	0.909	mg/L	1	0.050	0.009		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Cadmium	0.318	µg/L	1	0.020	0.004		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Calcium	7.25	mg/L	1	0.05	0.02		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Chromium	0.68	µg/L	1	0.20	0.04		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Cobalt	27.2	µg/L	1	0.020	0.003		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Lead	0.43	µg/L	1	0.20	0.05		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Lithium	0.0923	mg/L	5	0.0010	0.0003		GES	07/14/2022 13:14	EPA 200.8-1994, Rev. 5.4
Magnesium	9.33	mg/L	1	0.10	0.02		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Mercury	2700	ng/L	100	500	200		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Potassium	3.05	mg/L	1	0.10	0.02		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Selenium	2.67	µg/L	1	0.50	0.09		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Sodium	33.8	mg/L	1	0.20	0.05		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Strontium	0.128	mg/L	1	0.0020	0.0004		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Thallium	0.17	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	6.24	pCi/L	0.56	0.29		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	85.8	%						
Radium-228	7.63	pCi/L	0.23	0.55		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	89.7	%						

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

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Water Analysis Report

Reissued

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-32
Customer Description:
Lab Number: 222015-013-01
Preparation: Dissolved
Date Collected: 06/20/2022 10:51 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Arsenic	1.69	µg/L	1	0.10	0.03		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Barium	37.4	µg/L	1	0.20	0.05		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Beryllium	3.48	µg/L	5	0.25	0.04		GES	07/14/2022 13:19	EPA 200.8-1994, Rev. 5.4
Cadmium	0.342	µg/L	1	0.020	0.004		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Chromium	0.45	µg/L	1	0.20	0.04		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Cobalt	26.6	µg/L	1	0.020	0.003		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Iron	1.20	mg/L	1	0.020	0.006		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Lead	0.38	µg/L	1	0.20	0.05		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Lithium	0.0952	mg/L	5	0.0010	0.0003		GES	07/14/2022 13:19	EPA 200.8-1994, Rev. 5.4
Manganese	0.0517	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Mercury	80	ng/L	20	100	40	J1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Selenium	2.57	µg/L	1	0.50	0.09		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Thallium	0.18	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4

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

Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-33
Lab Number: 222015-014
Date Collected: 06/20/2022 11:37 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.04	µg/L	1	0.10	0.02	J1	GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Arsenic	1.19	µg/L	1	0.10	0.03		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Barium	42.0	µg/L	1	0.20	0.05		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Beryllium	0.939	µg/L	1	0.050	0.007		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Boron	0.093	mg/L	1	0.050	0.009		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Cadmium	0.039	µg/L	1	0.020	0.004		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Calcium	1.06	mg/L	1	0.05	0.02		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Chromium	0.64	µg/L	1	0.20	0.04		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Cobalt	7.81	µg/L	1	0.020	0.003		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Lead	0.27	µg/L	1	0.20	0.05		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Lithium	0.0166	mg/L	1	0.00020	0.00005		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Magnesium	3.11	mg/L	1	0.10	0.02		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Mercury	3000	ng/L	100	500	200		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Potassium	0.27	mg/L	1	0.10	0.02		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Selenium	1.27	µg/L	1	0.50	0.09		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Sodium	16.7	mg/L	1	0.20	0.05		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Strontium	0.0218	mg/L	1	0.0020	0.0004		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.21	pCi/L	0.32	0.30		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.6	%						
Radium-228	1.16	pCi/L	0.14	0.42		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.0	%						

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

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Water Analysis Report

Reissued

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-33
Customer Description:
Lab Number: 222015-014-01
Preparation: Dissolved
Date Collected: 06/20/2022 11:37 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Arsenic	0.72	µg/L	1	0.10	0.03		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Barium	41.3	µg/L	1	0.20	0.05		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Beryllium	0.863	µg/L	1	0.050	0.007		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Cadmium	0.038	µg/L	1	0.020	0.004		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Cobalt	7.29	µg/L	1	0.020	0.003		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Iron	0.553	mg/L	1	0.020	0.006		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Lead	0.22	µg/L	1	0.20	0.05		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Lithium	0.0183	mg/L	1	0.00020	0.00005		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Manganese	0.0059	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Mercury	410	ng/L	20	100	40		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Selenium	0.77	µg/L	1	0.50	0.09		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4

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

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: Duplicate 1
Lab Number: 222015-015
Date Collected: 06/20/2022 15:00 EDT

Customer Description:
Preparation:
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Arsenic	4.50	µg/L	1	0.10	0.03		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Barium	41.7	µg/L	1	0.20	0.05		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Beryllium	0.427	µg/L	1	0.050	0.007	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Boron	0.083	mg/L	1	0.050	0.009		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Calcium	11.6	mg/L	1	0.05	0.02	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Cobalt	61.1	µg/L	1	0.020	0.003	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Lithium	0.163	mg/L	1	0.00020	0.00005	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Magnesium	16.9	mg/L	1	0.10	0.02	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	1.1	µg/L	1	0.5	0.1		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Potassium	5.48	mg/L	1	0.10	0.02	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Selenium	0.09	µg/L	1	0.50	0.09	J1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Sodium	23.3	mg/L	1	0.20	0.05	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Strontium	0.0519	mg/L	1	0.0020	0.0004		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: Duplicate 1
Customer Description:
Lab Number: 222015-015-01
Preparation: Dissolved
Date Collected: 06/20/2022 15:00 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Arsenic	0.84	µg/L	1	0.10	0.03		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Barium	39.6	µg/L	1	0.20	0.05		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Beryllium	0.203	µg/L	1	0.050	0.007		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Cobalt	57.9	µg/L	1	0.020	0.003		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Iron	50.0	mg/L	1	0.020	0.006		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.147	mg/L	1	0.00020	0.00005		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.561	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.8	µg/L	1	0.5	0.1		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4

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

Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: Equipment Blank
Customer Description:
Lab Number: 222015-016
Preparation:
Date Collected: 06/20/2022 11:13 EDT
Date Received: 06/27/2022 14:08 EDT

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Calcium	<0.02	mg/L	1	0.05	0.02	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Cobalt	0.013	µg/L	1	0.020	0.003	J1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00005	mg/L	1	0.00020	0.00005	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Potassium	<0.02	mg/L	1	0.10	0.02	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Sodium	<0.05	mg/L	1	0.20	0.05	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Strontium	<0.0004	mg/L	1	0.0020	0.0004	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4

222015
Job Comments:

Original report issued 8/9/2022. Report reissued with amended matrix spike precision calculations.

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

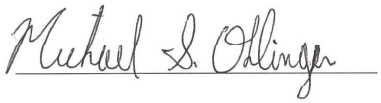
Water Analysis Report

Reissued

Job ID: 222015 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Report Verification

This report and the above data have been confirmed by the following analyst.



Michael Ohlinger, Chemist
Email: msohlinger@aep.com
Phone: 614-836-4184
Audinet: 8-210-4184

Data Qualifer 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.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Michael Ohlinger (614-836-4184)
Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR
Contact Name: Leslie Fuerschbach
Contact Phone: 318-673-2744
Sampler(s): Matt Hamilton Kenny McDonald

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

Site Contact:

Date:

For Lab Use Only:
COC/Order #: 222015

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 Sb, As, B, Ba, Be, Ca Cd, Cr, Co, K, Li, Mg, Mo, Na, Pb, Se, Sr, Tl	Field-filter 250 mL bottle, then pH<2, HNO_3 Dissolved Sb, As, Ba, Be, Cd, Cr, Co, Fe, Li, Mn, Mo, Pb, Se, Tl	Three (six every 10th*) 1 L bottles, pH<2, HNO3 Ra-226, Ra-228	250 mL Glass bottle, HCL**, pH<2 Mercury	250 mL Glass bottle, HCL**, pH<2 Dissolved Mercury			Sample Specific Notes:
AD-2	6/21/2022	849	G	GW	7		X	X	X	X	X			
AD-3	6/21/2022	1123	G	GW	7		X	X	X	X	X			
AD-4	6/21/2022	1034	G	GW	7		X	X	X	X	X			
AD-7	6/21/2022	947	G	GW	7		X	X	X	X	X			
AD-12	6/20/2022	852	G	GW	7		X	X	X	X	X			
AD-13	6/20/2022	843	G	GW	10		X	X	X	X	X			
AD-17	6/21/2022	1040	G	GW	7		X	X	X	X	X			
AD-18	6/21/2022	817	G	GW	7		X	X	X	X	X			
AD-22	6/20/2022	953	G	GW	7		X	X	X	X	X			
AD-28	6/21/2022	956	G	GW	7		X	X	X	X	X			
AD-30	6/20/2022	1129	G	GW	7		X	X	X	X	X			
AD-31	6/20/2022	1043	G	GW	7		X	X	X	X	X			
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							**4**	**F4**	**4**	**2**	**F2**			

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

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	Eagle	6/23/22 1600		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Date/Time: 6/27/22 1:00pm

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Michael Ohlinger (614-836-4184)
Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR
Contact Name: Leslie Fuerschbach
Contact Phone: 318-673-2744
Sampler(s): Matt Hamilton Kenny McDonald

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

Site Contact:

Date:

For Lab Use Only:
COC/Order #: 222015

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 — Sb, As, B, Ba, Be, Ca, Cd, Cr, Co, K, Li, Mg, Mo, Na, Pb, Se, Sr, Tl	Field-filter 250 mL bottle, then pH<2, HNO_3 — Dissolved Sb, As, Ba, Be, Cd, Cr, Co, Fe, Li, Mn, Mo, Pb, Se, Tl	Three (six every 10th*) 1 L bottles, pH<2, HNO3 — Ra-226, Ra-228	250 mL Glass bottle, HCL**, pH<2 — Mercury	250 mL Glass bottle, HCL**, pH<2 — Dissolved Mercury			Sample Specific Notes:
AD-32	6/20/2022	951	G	GW	7		X	X	X	X	X			
AD-33	6/20/2022	1037	G	GW	7		X	X	X	X	X			
Duplicate - 1	6/20/2022	1400	G	GW	4		X	X		X	X			
Equipment Blank	6/20/2022	1013	G	GW	2		X			X				
Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	4	2	F2			

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

Special Instructions/QC Requirements & Comments:

Relinquished by: Matt Hamilton	Company: Eqk	Date/Time: 6/23/22 16:00	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: JA Beach	Date/Time: 6/27/22 1:00pm

AEP WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

45+31

Package Type	Delivery Type
(Cooler) Box Bag Envelope	PONY UPS FedEX USPS
	Other _____

Plant/Customer Pukey Number of Plastic Containers: 76

Opened By JAB/JDB/JWB Number of Glass Containers: _____

Date/Time 6/27/22 1:00pm Number of Mercury Containers: 31

Were all temperatures within 0-6°C? Y / N or (N/A) Initial: _____ on ice / (no ice)

(IR Gun Ser# 210441568, *Expir.5/27/2023)* - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

Requested turnaround: Routine If **RUSH**, who was notified? _____

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) N Comments _____

Were samples labeled properly? (Y) N Comments _____

Were correct containers used? (Y) N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A **Initial & Date:** JWB 6/27/22 ✓

pH paper (circle one): MQuant pH Cat 1.09535.0001 lot HC904495 [OR] Lab rat pH Cat # LRS -4801 Lot X000RWDG21

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

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

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

Lab ID# 222015 Initial & Date & Time : _____

Comments: _____

Logged by JAB _____

Reviewed by _____ _____

_____

_____

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.

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Jonathan Barnhill	Jonathan Barnhill	Lab Supervisor	12-12-2022
Name (printed)	Signature	Official Title	Date

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name:

Reviewer Name: Jonathan Barnhill

LRC Date: 12-12-2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22070101 PB2207151 QC2207105 QC2207151

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?		
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER1
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

ICP-MS Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NO	ER3
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name:

Reviewer Name: Jonathan Barnhill

LRC Date: 12-12-2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22070101 PB2207151 QC2207105 QC2207151

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	Yes	
	I	Were ion abundance data within the method-required QC limits?	Yes	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name:

Reviewer Name: Jonathan Barnhill

LRC Date: 12-12-2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22070101 PB2207151 QC2207105 QC2207151

Exception Report No.	Description
ER1	Linear Dynamic Range (LDR) study used to determine upper limit of analyte calibration.
ER2	CCB acceptance criteria is CCB<2.2*MDL.
ER3	Matrix Spike failure for Na on sample 222015-001
	Matrix Spike failure for Co Li on sample 222015-006
	Matrix Spike failure for Ca Li Mg Na Co K on sample 222015-015

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

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- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tamisha T. Palmer	Tamisha T. Palmer	Chemical Technician, Principal	07/07/2022
Name (printed)	Signature	Official Title	Date

Radium Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Tamisha Palmer

LRC Date: 07/07/2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22062803, PB22062804

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes, No	ER1
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Radium Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Tamisha Palmer

LRC Date: 07/07/2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22062803, PB22062804

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Radium Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Tamisha Palmer

LRC Date: 07/07/2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22062803, PB22062804

Exception Report No.	Description
ER1	PB22062804 the RPD was slightly above 25%

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

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

[3] NA - Not applicable; NR - Not reviewed.

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

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Sunita Timsina		Chemist Associate	07/07/2022
Name (printed)	Signature	Official Title	Date

Radium Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 07/07/2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22062806

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	N/A	
	I	Were analytical duplicates analyzed at the appropriate frequency?	N/A	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	N/A	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 07/07/2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22062806

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 07/07/2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22062806

Exception Report No.	Description

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

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- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Susann Sulzmann	Susann Sulzmann	Senior Chemist	08-03-2022
Name (printed)	Signature	Official Title	Date

Mercury Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Susann Sulzmann

LRC Date: 8-03-2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22070805, PB22070708, PB22071112

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Were MS/MSD RPDs within laboratory QC limits?		
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Mercury Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Susann Sulzmann

LRC Date: 8-03-2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22070805, PB22070708, PB22071112

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Mercury Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Mercury Laboratory Review Checklist

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Susann Sulzmann

LRC Date: 8-03-2022

Laboratory Job Number: 222015

Prep Batch Number(s): PB22070805, PB22070708, PB22071112

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<MQL.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Water Analysis Report

Reissued

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-2
Customer Description: TG-32
Lab Number: 223664-001
Preparation:
Date Collected: 11/15/2022 11:05 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Arsenic	0.40	µg/L	1	0.10	0.03		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Barium	16.8	µg/L	1	0.20	0.05		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Beryllium	0.561	µg/L	1	0.050	0.007		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Boron	2.83	mg/L	1	0.050	0.009		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Cadmium	0.086	µg/L	1	0.020	0.004		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Calcium	2.80	mg/L	1	0.05	0.02		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Chromium	0.43	µg/L	1	0.20	0.04		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Cobalt	19.6	µg/L	1	0.020	0.003		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Lead	0.60	µg/L	1	0.20	0.05		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Lithium	0.0556	mg/L	1	0.00020	0.00005		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Magnesium	5.23	mg/L	1	0.10	0.02		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Mercury	58	ng/L	2	10	4		JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Potassium	1.43	mg/L	1	0.10	0.02		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Selenium	1.28	µg/L	1	0.50	0.09		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Sodium	90.6	mg/L	1	0.20	0.05	M1	GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Strontium	0.0408	mg/L	1	0.0020	0.0004		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Thallium	0.11	µg/L	1	0.20	0.04	J1	GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.40	pCi/L	0.12	0.23		ST	12/07/2022 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	77.9	%						
Radium-228	1.01	pCi/L	0.13	0.39		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	85.0	%						

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

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Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-2
Customer Description: TG-32
Lab Number: 223664-001-01
Preparation: Dissolved
Date Collected: 11/15/2022 11:05 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Arsenic	0.41	µg/L	1	0.10	0.03		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Barium	16.8	µg/L	1	0.20	0.05		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Beryllium	0.559	µg/L	1	0.050	0.007		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Cadmium	0.090	µg/L	1	0.020	0.004		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Cobalt	19.9	µg/L	1	0.020	0.003		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Iron	0.257	mg/L	1	0.020	0.006		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Lead	0.60	µg/L	1	0.20	0.05		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Lithium	0.0554	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Manganese	0.0853	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Selenium	1.30	µg/L	1	0.50	0.09		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Thallium	0.13	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-3
Customer Description: TG-32
Lab Number: 223664-002
Preparation:
Date Collected: 11/16/2022 12:45 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Arsenic	1.22	µg/L	1	0.10	0.03		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Barium	63.7	µg/L	1	0.20	0.05		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Beryllium	0.186	µg/L	1	0.050	0.007		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Boron	0.063	mg/L	1	0.050	0.009		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Calcium	5.05	mg/L	1	0.05	0.02		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Chromium	0.63	µg/L	1	0.20	0.04		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Cobalt	7.40	µg/L	1	0.020	0.003		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Lead	0.31	µg/L	1	0.20	0.05		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Lithium	0.0837	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Magnesium	4.15	mg/L	1	0.10	0.02		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Potassium	3.44	mg/L	1	0.10	0.02		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Selenium	0.09	µg/L	1	0.50	0.09	J1	GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Sodium	12.3	mg/L	1	0.20	0.05		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Strontium	0.0380	mg/L	1	0.0020	0.0004		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.72	pCi/L	0.14	0.20		ST	12/07/2022 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.9	%						
Radium-228	0.79	pCi/L	0.11	0.36		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	99.5	%						

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

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Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-3
Customer Description: TG-32
Lab Number: 223664-002-01
Preparation: Dissolved
Date Collected: 11/16/2022 00:45 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Arsenic	0.91	µg/L	1	0.10	0.03		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Barium	61.6	µg/L	1	0.20	0.05		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Beryllium	0.139	µg/L	1	0.050	0.007		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Cobalt	7.92	µg/L	1	0.020	0.003		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Iron	9.45	mg/L	1	0.020	0.006		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Lithium	0.0933	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Manganese	0.115	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-4
Customer Description: TG-32
Lab Number: 223664-003
Preparation:
Date Collected: 11/16/2022 12:32 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Arsenic	0.21	µg/L	1	0.10	0.03		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Barium	128	µg/L	1	0.20	0.05		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Beryllium	0.195	µg/L	1	0.050	0.007		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Boron	0.019	mg/L	1	0.050	0.009	J1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Cadmium	0.019	µg/L	1	0.020	0.004	J1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Calcium	2.25	mg/L	1	0.05	0.02		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Chromium	0.44	µg/L	1	0.20	0.04		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Cobalt	3.00	µg/L	1	0.020	0.003		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Lithium	0.0212	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Magnesium	0.55	mg/L	1	0.10	0.02		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Mercury	5	ng/L	1	5	2		JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Potassium	2.15	mg/L	1	0.10	0.02		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Sodium	6.41	mg/L	1	0.20	0.05		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Strontium	0.0183	mg/L	1	0.0020	0.0004		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Thallium	0.10	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.40	pCi/L	0.10	0.17		ST	12/07/2022 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.5	%						
Radium-228	-0.01	pCi/L	0.13	0.46		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	89.2	%						

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

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Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-4
Customer Description: TG-32
Lab Number: 223664-003-01
Preparation: Dissolved
Date Collected: 11/16/2022 12:32 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Arsenic	0.13	µg/L	1	0.10	0.03		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Barium	128	µg/L	1	0.20	0.05		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Beryllium	0.197	µg/L	1	0.050	0.007		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Cadmium	0.021	µg/L	1	0.020	0.004		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Cobalt	2.98	µg/L	1	0.020	0.003		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Iron	2.40	mg/L	1	0.020	0.006		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Lithium	0.0215	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Manganese	0.0291	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Thallium	0.1	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-7
Customer Description: TG-32
Lab Number: 223664-004
Preparation:
Date Collected: 11/16/2022 10:10 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Arsenic	0.43	µg/L	1	0.10	0.03		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Barium	55.2	µg/L	1	0.20	0.05		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Beryllium	2.49	µg/L	1	0.050	0.007		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Boron	9.38	mg/L	1	0.050	0.009		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Cadmium	0.880	µg/L	1	0.020	0.004		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Calcium	5.20	mg/L	1	0.05	0.02		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Cobalt	31.8	µg/L	1	0.020	0.003		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Lead	0.27	µg/L	1	0.20	0.05		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Lithium	0.110	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Magnesium	8.25	mg/L	1	0.10	0.02		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Mercury	37	ng/L	1	5	2		JAB	12/05/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Potassium	3.50	mg/L	1	0.10	0.02		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Selenium	1.49	µg/L	1	0.50	0.09		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Sodium	32.3	mg/L	1	0.20	0.05		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Strontium	0.0575	mg/L	1	0.0020	0.0004		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.65	pCi/L	0.21	0.20		ST	12/07/2022 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.9	%						
Radium-228	2.48	pCi/L	0.15	0.41		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	98.0	%						

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

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Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-7
Customer Description: TG-32
Lab Number: 223664-004-01
Preparation: Dissolved
Date Collected: 11/16/2022 10:10 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Arsenic	0.43	µg/L	1	0.10	0.03		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Barium	54.5	µg/L	1	0.20	0.05		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Beryllium	2.55	µg/L	1	0.050	0.007		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Cadmium	0.879	µg/L	1	0.020	0.004		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Cobalt	31.8	µg/L	1	0.020	0.003		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Iron	10.8	mg/L	1	0.020	0.006		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Lead	0.23	µg/L	1	0.20	0.05		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Lithium	0.110	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Manganese	0.157	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	12/05/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Selenium	1.53	µg/L	1	0.50	0.09		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Thallium	0.17	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4

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Audinet: 210-4221

Water Analysis Report

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Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-12 | Customer Description: TG-32
Lab Number: 223664-005 | Preparation:
Date Collected: 11/15/2022 11:58 EST | Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Barium	30.6	µg/L	1	0.20	0.05		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Beryllium	0.153	µg/L	1	0.050	0.007		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Boron	0.013	mg/L	1	0.050	0.009	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Cadmium	0.007	µg/L	1	0.020	0.004	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Calcium	0.36	mg/L	1	0.05	0.02		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Chromium	0.45	µg/L	1	0.20	0.04		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Cobalt	1.59	µg/L	1	0.020	0.003		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Lithium	0.0119	mg/L	1	0.00020	0.00005		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Magnesium	0.54	mg/L	1	0.10	0.02		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Potassium	0.81	mg/L	1	0.10	0.02		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Selenium	0.23	µg/L	1	0.50	0.09	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Sodium	5.83	mg/L	1	0.20	0.05		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Strontium	0.0035	mg/L	1	0.0020	0.0004		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.72	pCi/L	0.15	0.19	P1	TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	102	%						
Radium-228	0.74	pCi/L	0.14	0.44		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	95.6	%						

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

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Water Analysis Report

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-12 Customer Description: TG-32
Lab Number: 223664-005-01 Preparation: Dissolved
Date Collected: 11/15/2022 11:58 EST Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Arsenic	0.05	µg/L	1	0.10	0.03	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Barium	30.0	µg/L	1	0.20	0.05		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Beryllium	0.149	µg/L	1	0.050	0.007		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Cadmium	0.008	µg/L	1	0.020	0.004	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Cobalt	1.59	µg/L	1	0.020	0.003		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Iron	<0.006	mg/L	1	0.020	0.006	U1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.0116	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Manganese	0.0061	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Selenium	0.28	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

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Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-13
Customer Description: TG-32
Lab Number: 223664-006
Preparation:
Date Collected: 11/15/2022 09:21 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Arsenic	1.62	µg/L	1	0.10	0.03		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Barium	44.2	µg/L	1	0.20	0.05		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Beryllium	0.131	µg/L	1	0.050	0.007		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Boron	0.095	mg/L	1	0.050	0.009		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Calcium	8.57	mg/L	1	0.05	0.02		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Cobalt	45.9	µg/L	1	0.020	0.003		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Lithium	0.141	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Magnesium	12.4	mg/L	1	0.10	0.02		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Potassium	5.16	mg/L	1	0.10	0.02		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Sodium	16.3	mg/L	1	0.20	0.05		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Strontium	0.0402	mg/L	1	0.0020	0.0004		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.55	pCi/L	0.26	0.35		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	84.9	%						
Radium-228	-0.86	pCi/L	0.14	0.50		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	102	%						

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

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Water Analysis Report

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-13 Customer Description: TG-32
Lab Number: 223664-006-01 Preparation: Dissolved
Date Collected: 11/15/2022 09:21 EST Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Arsenic	1.43	µg/L	1	0.10	0.03		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Barium	44.7	µg/L	1	0.20	0.05		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Beryllium	0.116	µg/L	1	0.050	0.007		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Cobalt	47.2	µg/L	1	0.020	0.003		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Iron	39.9	mg/L	5	0.10	0.03		GES	12/05/2022 09:18	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Lithium	0.140	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Manganese	0.428	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4

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Water Analysis Report

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Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-17
Customer Description: TG-32
Lab Number: 223664-007
Preparation:
Date Collected: 11/16/2022 11:58 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Arsenic	0.13	µg/L	1	0.10	0.03		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Barium	276	µg/L	1	0.20	0.05		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Beryllium	0.662	µg/L	1	0.050	0.007		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Boron	0.026	mg/L	1	0.050	0.009	J1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Cadmium	0.061	µg/L	1	0.020	0.004		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Calcium	1.23	mg/L	1	0.05	0.02		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Chromium	0.37	µg/L	1	0.20	0.04		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Cobalt	12.7	µg/L	1	0.020	0.003		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Lead	0.16	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.0267	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Magnesium	4.53	mg/L	1	0.10	0.02		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Mercury	400	ng/L	100	500	200	J1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Potassium	1.40	mg/L	1	0.10	0.02		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Selenium	0.36	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Sodium	9.35	mg/L	1	0.20	0.05		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.0231	mg/L	1	0.0020	0.0004		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	3.34	pCi/L	0.33	0.23		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	101	%						
Radium-228	3.41	pCi/L	0.19	0.52		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	95.3	%						

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

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Water Analysis Report

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-17
Customer Description: TG-32
Lab Number: 223664-007-01
Preparation: Dissolved
Date Collected: 11/16/2022 11:58 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Arsenic	0.12	µg/L	1	0.10	0.03		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Barium	273	µg/L	1	0.20	0.05		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Beryllium	0.648	µg/L	1	0.050	0.007		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Cadmium	0.053	µg/L	1	0.020	0.004		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Chromium	0.39	µg/L	1	0.20	0.04		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Cobalt	12.3	µg/L	1	0.020	0.003		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Iron	0.269	mg/L	1	0.020	0.006		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Lead	0.16	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Lithium	0.0262	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Manganese	0.0545	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Mercury	<200	ng/L	100	500	200	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Selenium	0.30	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4

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4001 Bixby Road
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Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-18
Customer Description: TG-32
Lab Number: 223664-008
Preparation:
Date Collected: 11/16/2022 11:13 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25	µg/L	1	0.10	0.03		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Barium	77.4	µg/L	1	0.20	0.05		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Beryllium	0.071	µg/L	1	0.050	0.007		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Boron	0.011	mg/L	1	0.050	0.009	J1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Calcium	0.19	mg/L	1	0.05	0.02		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Chromium	0.54	µg/L	1	0.20	0.04		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Cobalt	0.723	µg/L	1	0.020	0.003		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Lithium	0.0125	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Magnesium	0.27	mg/L	1	0.10	0.02		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Mercury	18	ng/L	1	5	2		JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Potassium	0.73	mg/L	1	0.10	0.02		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Selenium	0.12	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Sodium	5.46	mg/L	1	0.20	0.05		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Strontium	0.0040	mg/L	1	0.0020	0.0004		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1	pCi/L	0.18	0.21		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	103	%						
Radium-228	0.61	pCi/L	0.12	0.39		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	92.6	%						

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

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Water Analysis Report

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-18
Customer Description: TG-32
Lab Number: 223664-008-01
Preparation: Dissolved
Date Collected: 11/16/2022 11:13 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Barium	77.2	µg/L	1	0.20	0.05		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Beryllium	0.069	µg/L	1	0.050	0.007		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Cobalt	0.719	µg/L	1	0.020	0.003		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Iron	0.060	mg/L	1	0.020	0.006		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Lithium	0.0127	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Manganese	0.0028	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4

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Dolan Chemical Laboratory
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Water Analysis Report

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Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-22
Customer Description: TG-32
Lab Number: 223664-009
Preparation:
Date Collected: 11/14/2022 12:31 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Arsenic	2.40	µg/L	1	0.10	0.03		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Barium	20.8	µg/L	1	0.20	0.05		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Beryllium	2.16	µg/L	1	0.050	0.007		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Cadmium	0.494	µg/L	1	0.020	0.004		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Calcium	10.5	mg/L	1	0.05	0.02		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Cobalt	60.3	µg/L	1	0.020	0.003		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Lead	0.22	µg/L	1	0.20	0.05		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Lithium	0.0905	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Magnesium	15.1	mg/L	1	0.10	0.02		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Mercury	410	ng/L	10	50	20		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Potassium	3.37	mg/L	1	0.10	0.02		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Selenium	1.93	µg/L	1	0.50	0.09		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Sodium	83.9	mg/L	1	0.20	0.05		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Strontium	0.0898	mg/L	1	0.0020	0.0004		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Thallium	0.14	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.96	pCi/L	0.21	0.31		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	76.7	%						
Radium-228	1.74	pCi/L	0.18	0.53		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	88.6	%						

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

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Water Analysis Report

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-22 Customer Description: TG-32
Lab Number: 223664-009-01 Preparation: Dissolved
Date Collected: 11/14/2022 12:31 EST Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Arsenic	1.28	µg/L	1	0.10	0.03		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Barium	20.5	µg/L	1	0.20	0.05		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Beryllium	2.04	µg/L	1	0.050	0.007		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Cadmium	0.503	µg/L	1	0.020	0.004		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Chromium	0.46	µg/L	1	0.20	0.04		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Cobalt	60.0	µg/L	1	0.020	0.003		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Iron	29.8	mg/L	1	0.020	0.006		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Lead	0.12	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Lithium	0.0883	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Manganese	0.295	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Mercury	51	ng/L	1	5	2		JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Selenium	2.06	µg/L	1	0.50	0.09		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Thallium	0.13	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4

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Dolan Chemical Laboratory
4001 Bixby Road
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Audinet: 210-4221

Water Analysis Report

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Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-28
Customer Description: TG-32
Lab Number: 223664-010
Preparation:
Date Collected: 11/16/2022 09:48 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Arsenic	0.10	µg/L	1	0.10	0.03		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Barium	125	µg/L	1	0.20	0.05		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Beryllium	0.459	µg/L	1	0.050	0.007		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Boron	0.334	mg/L	1	0.050	0.009		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Cadmium	0.046	µg/L	1	0.020	0.004		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Calcium	1.34	mg/L	1	0.05	0.02		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Chromium	0.54	µg/L	1	0.20	0.04		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Cobalt	11.8	µg/L	1	0.020	0.003		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Lithium	0.0270	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Magnesium	2.76	mg/L	1	0.10	0.02		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Mercury	8	ng/L	1	5	2		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Potassium	0.85	mg/L	1	0.10	0.02		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Selenium	0.16	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Sodium	6.45	mg/L	1	0.20	0.05		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Strontium	0.0182	mg/L	1	0.0020	0.0004		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	3.79	pCi/L	0.35	0.26		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.0	%						
Radium-228	1.36	pCi/L	0.13	0.39		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	96.6	%						

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

Dolan Chemical Laboratory
4001 Bixby Road
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Phone: 614-836-4221
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Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-28
Customer Description: TG-32
Lab Number: 223664-010-01
Preparation: Dissolved
Date Collected: 11/16/2022 09:48 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Barium	128	µg/L	1	0.20	0.05		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Beryllium	0.447	µg/L	1	0.050	0.007		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Cadmium	0.045	µg/L	1	0.020	0.004		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Cobalt	11.8	µg/L	1	0.020	0.003		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Iron	0.493	mg/L	1	0.020	0.006		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Lithium	0.0267	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Manganese	0.0556	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Selenium	0.17	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4

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Dolan Chemical Laboratory
4001 Bixby Road
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Water Analysis Report

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Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-30
Customer Description: TG-32
Lab Number: 223664-011
Preparation:
Date Collected: 11/16/2022 10:46 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Arsenic	0.16	µg/L	1	0.10	0.03		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Barium	89.4	µg/L	1	0.20	0.05		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Beryllium	0.108	µg/L	1	0.050	0.007		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Boron	2.86	mg/L	1	0.050	0.009		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Cadmium	0.013	µg/L	1	0.020	0.004	J1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Calcium	0.71	mg/L	1	0.05	0.02		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Chromium	0.55	µg/L	1	0.20	0.04		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Cobalt	4.86	µg/L	1	0.020	0.003		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Lithium	0.0119	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Magnesium	2.58	mg/L	1	0.10	0.02		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Mercury	17	ng/L	2	10	4		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Potassium	1.01	mg/L	1	0.10	0.02		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Selenium	0.35	µg/L	1	0.50	0.09	J1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Sodium	94.0	mg/L	1	0.20	0.05	M1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Strontium	0.0113	mg/L	1	0.0020	0.0004		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.75	pCi/L	0.16	0.23		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.5	%						
Radium-228	0.77	pCi/L	0.14	0.46		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	93.5	%						

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

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Water Analysis Report

Reissued

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-30 Customer Description: TG-32
Lab Number: 223664-011-01 Preparation: Dissolved
Date Collected: 11/16/2022 10:46 EST Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Barium	79.7	µg/L	1	0.20	0.05		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Beryllium	0.108	µg/L	1	0.050	0.007		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Chromium	0.50	µg/L	1	0.20	0.04		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Cobalt	4.76	µg/L	1	0.020	0.003		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Iron	0.033	mg/L	1	0.020	0.006		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Lithium	0.0119	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Manganese	0.0215	mg/L	1	0.0010	0.0002		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Mercury	<4	ng/L	2	10	4	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Selenium	0.37	µg/L	1	0.50	0.09	J1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4

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Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
Phone: 614-836-4221
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Water Analysis Report

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Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-31
Customer Description: TG-32
Lab Number: 223664-012
Preparation:
Date Collected: 11/15/2022 11:02 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Barium	35.8	µg/L	1	0.20	0.05		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Beryllium	0.863	µg/L	1	0.050	0.007		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Boron	0.035	mg/L	1	0.050	0.009	J1	GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Cadmium	0.066	µg/L	1	0.020	0.004		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Calcium	2.63	mg/L	1	0.05	0.02		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Chromium	0.74	µg/L	1	0.20	0.04		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Cobalt	9.41	µg/L	1	0.020	0.003		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Lead	0.34	µg/L	1	0.20	0.05		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Lithium	0.0681	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Magnesium	3.94	mg/L	1	0.10	0.02		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Mercury	610	ng/L	10	50	20		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Potassium	1.67	mg/L	1	0.10	0.02		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Selenium	0.38	µg/L	1	0.50	0.09	J1	GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Sodium	30.6	mg/L	1	0.20	0.05		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Strontium	0.0388	mg/L	1	0.0020	0.0004		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Thallium	0.10	µg/L	1	0.20	0.04	J1	GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.05	pCi/L	0.18	0.24		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.4	%						
Radium-228	2.76	pCi/L	0.18	0.50		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	94.8	%						

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

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-31
Customer Description: TG-32
Lab Number: 223664-012-01
Preparation: Dissolved
Date Collected: 11/15/2022 11:02 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Barium	35.7	µg/L	1	0.20	0.05		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Beryllium	0.868	µg/L	1	0.050	0.007		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Cadmium	0.065	µg/L	1	0.020	0.004		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Chromium	0.44	µg/L	1	0.20	0.04		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Cobalt	9.60	µg/L	1	0.020	0.003		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Iron	0.113	mg/L	1	0.020	0.006		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Lead	0.27	µg/L	1	0.20	0.05		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Lithium	0.0694	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Manganese	0.0262	mg/L	1	0.0010	0.0002		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Selenium	0.35	µg/L	1	0.50	0.09	J1	GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4

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Dolan Chemical Laboratory
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Water Analysis Report

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Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-32
Customer Description: TG-32
Lab Number: 223664-013
Preparation:
Date Collected: 11/15/2022 10:03 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Arsenic	1.73	µg/L	1	0.10	0.03		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Barium	24.4	µg/L	1	0.20	0.05		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Beryllium	3.77	µg/L	1	0.050	0.007		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Boron	1.26	mg/L	1	0.050	0.009		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Cadmium	0.404	µg/L	1	0.020	0.004		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Calcium	12.0	mg/L	1	0.05	0.02		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Chromium	0.82	µg/L	1	0.20	0.04		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Cobalt	34.8	µg/L	1	0.020	0.003		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Lead	0.66	µg/L	1	0.20	0.05		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Lithium	0.0812	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Magnesium	12.3	mg/L	1	0.10	0.02		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Mercury	1500	ng/L	100	500	200		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Potassium	3.76	mg/L	1	0.10	0.02		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Selenium	5.95	µg/L	1	0.50	0.09		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Sodium	48.7	mg/L	1	0.20	0.05		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Strontium	0.219	mg/L	1	0.0020	0.0004		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Thallium	0.24	µg/L	1	0.20	0.04		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.26	pCi/L	0.21	0.24		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	86.8	%						
Radium-228	4.02	pCi/L	0.19	0.46		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.0	%						

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

AMERICAN ELECTRIC POWER®

Water Analysis Report

Reissued

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-32
Customer Description: TG-32
Lab Number: 223664-013-01
Preparation: Dissolved
Date Collected: 11/15/2022 10:03 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Arsenic	1.57	µg/L	1	0.10	0.03		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Barium	23.9	µg/L	1	0.20	0.05		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Beryllium	3.79	µg/L	1	0.050	0.007		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Cadmium	0.409	µg/L	1	0.020	0.004		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Chromium	0.67	µg/L	1	0.20	0.04		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Cobalt	34.9	µg/L	1	0.020	0.003		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Iron	2.03	mg/L	1	0.020	0.006		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Lead	0.59	µg/L	1	0.20	0.05		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Lithium	0.0809	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Manganese	0.0661	mg/L	1	0.0010	0.0002		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Mercury	20	ng/L	2	10	4		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Selenium	5.88	µg/L	1	0.50	0.09		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Thallium	0.20	µg/L	1	0.20	0.04		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-33
Customer Description: TG-32
Lab Number: 223664-014
Preparation:
Date Collected: 11/15/2022 12:06 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Arsenic	0.37	µg/L	1	0.10	0.03		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Barium	49.4	µg/L	1	0.20	0.05		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Beryllium	0.945	µg/L	1	0.050	0.007		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Boron	0.086	mg/L	1	0.050	0.009		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Cadmium	0.038	µg/L	1	0.020	0.004		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Calcium	0.90	mg/L	1	0.05	0.02		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Chromium	0.44	µg/L	1	0.20	0.04		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Cobalt	6.83	µg/L	1	0.020	0.003		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Lead	0.22	µg/L	1	0.20	0.05		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Lithium	0.0185	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Magnesium	2.64	mg/L	1	0.10	0.02		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Mercury	5900	ng/L	100	500	200		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Potassium	0.28	mg/L	1	0.10	0.02		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Selenium	0.96	µg/L	1	0.50	0.09		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Sodium	14.9	mg/L	1	0.20	0.05		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Strontium	0.0201	mg/L	1	0.0020	0.0004		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.68	pCi/L	0.30	0.24		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.9	%						
Radium-228	0.98	pCi/L	0.13	0.40		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	99.2	%						

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

AMERICAN ELECTRIC POWER®

Water Analysis Report

Reissued

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: AD-33
Customer Description: TG-32
Lab Number: 223664-014-01
Preparation: Dissolved
Date Collected: 11/15/2022 12:06 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Arsenic	0.29	µg/L	1	0.10	0.03		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Barium	48.7	µg/L	1	0.20	0.05		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Beryllium	0.936	µg/L	1	0.050	0.007		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Cadmium	0.035	µg/L	1	0.020	0.004		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Chromium	0.32	µg/L	1	0.20	0.04		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Cobalt	6.65	µg/L	1	0.020	0.003		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Iron	0.009	mg/L	1	0.020	0.006	J1	GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Lead	0.22	µg/L	1	0.20	0.05		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Lithium	0.0182	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Manganese	0.0054	mg/L	1	0.0010	0.0002		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Mercury	47	ng/L	1	5	2		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Selenium	0.91	µg/L	1	0.50	0.09		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4

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

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: Duplicate - 2
Customer Description: TG-32
Lab Number: 223664-015
Preparation:
Date Collected: 11/15/2022 15:00 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Arsenic	1.69	µg/L	1	0.10	0.03		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Barium	45.3	µg/L	1	0.20	0.05		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Beryllium	0.129	µg/L	1	0.050	0.007		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Boron	0.061	mg/L	1	0.050	0.009		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Calcium	8.71	mg/L	1	0.05	0.02		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Cobalt	46.5	µg/L	1	0.020	0.003		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.139	mg/L	1	0.00020	0.00005		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Magnesium	12.6	mg/L	1	0.10	0.02		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Potassium	5.32	mg/L	1	0.10	0.02		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Sodium	16.4	mg/L	1	0.20	0.05		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.0419	mg/L	1	0.0020	0.0004		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: Duplicate - 2
Customer Description: TG-32
Lab Number: 223664-015-01
Preparation: Dissolved
Date Collected: 11/15/2022 15:00 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Arsenic	1.44	µg/L	1	0.10	0.03		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Barium	45.2	µg/L	1	0.20	0.05		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Beryllium	0.115	µg/L	1	0.050	0.007		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Chromium	0.42	µg/L	1	0.20	0.04		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Cobalt	46.3	µg/L	1	0.020	0.003		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Iron	39.7	mg/L	5	0.10	0.03		GES	12/05/2022 09:23	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Lithium	0.140	mg/L	1	0.00020	0.00005		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Manganese	0.420	mg/L	1	0.0010	0.0002		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4

Dolan Chemical Laboratory
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Phone: 614-836-4221
Audinet: 210-4221

Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Customer Sample ID: Equipment Blank
Customer Description: TG-32
Lab Number: 223664-016
Preparation:
Date Collected: 11/16/2022 11:22 EST
Date Received: 11/21/2022 12:30 EST

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Calcium	<0.02	mg/L	1	0.05	0.02	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Cobalt	0.143	µg/L	1	0.020	0.003		GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00005	mg/L	1	0.00020	0.00005	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Potassium	<0.02	mg/L	1	0.10	0.02	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Sodium	<0.05	mg/L	1	0.20	0.05	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Strontium	<0.0004	mg/L	1	0.0020	0.0004	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4

223664
Job Comments:

Original report issued 12/29/22 . Report reissued with boron added to TM on 1/23/23.

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

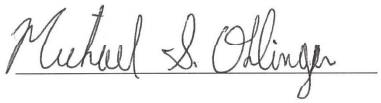
Water Analysis Report

Reissued

Job ID: 223664 **Customer: Pirkey Power Station** **Date Reported: 01/23/2023**

Report Verification

This report and the above data have been confirmed by the following analyst.



Michael Ohlinger, Chemist
Email: msohlinger@aep.com
Phone: 614-836-4184
Audinet: 8-210-4184

Data Qualifer Legend

U1 - Not detected at or above method detection limit (MDL).
M1 - The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
P1 - The precision between duplicate results was above acceptance limits.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Michael Ohlinger (614-836-4184)
Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR
Contact Name: Leslie Fuerschbach
Contact Phone: 318-673-2744
Sampler(s): Matt Hamilton Kenny McDonald

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

Site Contact: | Date: | For Lab Use Only: COC/Order #: 223664

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 — Sb, As, B, Ba, Be, Ca, Cd, Cr, Co, K, Li, Mg, Mo, Na, Pb, Se, Sr, Tl	Field-filter 250 mL bottle, then pH<2, HNO_3 — Dissolved Sb, As, Ba, Be, Cd, Cr, Co, Fe, Li, Mn, Mo, Pb, Se, Tl	Three (six every 10th*) 1 L bottles, pH<2, HNO3 — Ra-226, Ra-228	250 mL Glass bottle, HCL**, pH<2 — Mercury	250 mL Glass bottle, HCL**, pH<2 — Dissolved Mercury			Sample Specific Notes:
AD-2	11/15/2022	1005	G	GW	7		X	X	X	X	X			
AD-3	11/16/2022	1145	G	GW	7		X	X	X	X	X			
AD-4	11/16/2022	1132	G	GW	7		X	X	X	X	X			
AD-7	11/16/2022	910	G	GW	10		X	X	X	X	X			
AD-12	11/15/2022	1058	G	GW	10		X	X	X	X	X			
AD-13	11/15/2022	821	G	GW	7		X	X	X	X	X			
AD-17	11/16/2022	1058	G	GW	7		X	X	X	X	X			
AD-18	11/16/2022	1013	G	GW	7		X	X	X	X	X			
AD-22	11/14/2022	1131	G	GW	7		X	X	X	X	X			
AD-28	11/16/2022	848	G	GW	7		X	X	X	X	X			
AD-30	11/16/2022	946	G	GW	7		X	X	X	X	X			
AD-31	11/15/2022	1002	G	GW	7		X	X	X	X	X			
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	4	2	F2			

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

Special Instructions/QC Requirements & Comments: TG-32 needed

Relinquished by	Company	Date/Time	Received by	Date/Time
[signature]	Engk	11-17-22 13:00		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Date/Time: 11/21/22 12:00pm

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Michael Ohlinger (614-836-4184)
Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR
Contact Name: Leslie Fuerschbach
Contact Phone: 318-673-2744
Sampler(s): Matt Hamilton Kenny McDonald

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

Site Contact:

Date:

For Lab Use Only:
COC/Order #:

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 — Sb, As, B, Ba, Be, Ca, Cd, Cr, Co, K, Li, Mg, Mo, Na, Pb, Se, Sr, Tl	Field-filter 250 mL bottle, then pH<2, HNO_3 — Dissolved Sb, As, Ba, Be, Cd, Cr, Co, Fe, Li, Mn, Mo, Pb, Se, Tl	Three (six every 10th*) 1 L bottles, pH<2, HNO3 — Ra-226, Ra-228	250 mL Glass bottle, HCL**, pH<2 — Mercury	250 mL Glass bottle, HCL**, pH<2 — Dissolved Mercury			Sample Specific Notes:
AD-32	11/15/2022	903	G	GW	7		X	X	X	X	X			
AD-33	11/15/2022	1106	G	GW	7		X	X	X	X	X			
Duplicate - 2	11/15/2022	1400	G	GW	4		X	X		X	X			
Equipment Blank	11/16/2022	1022	G	GW	2		X			X				
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	4	2	F2			

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

Special Instructions/QC Requirements & Comments:

TG-32 needed

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	Engle	11-17-22 1300		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:

AEP WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

Package Type	Delivery Type
(Cooler) Box Bag Envelope	PONY UPS (FedEX) USPS
	Other _____

Plant/Customer Pirkey — Number of Plastic Containers: 79

Opened By Mark — Number of Glass Containers: 31

Date/Time 11/21/22 12:00PM — Number of Mercury Containers: —

Were all temperatures within 0-6°C? Y / N or (N/A) Initial: _____ (on ice) / no ice

(IR Gun Ser# 210441568, *Expir.5/27/2023*) - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

Requested turnaround: Routine — If RUSH, who was notified? _____

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? (Y) / N *Comments* _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A Initial & Date: Mark 11/21/21

pH paper (circle one): MQuant pH Cat 1.09535.0001 lot HC904495 [OR] Lab rat pH Cat # LRS -4801 Lot X000RWDG21

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

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

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

Lab ID# 223664 — Initial & Date & Time : _____

Comments: _____

Logged by MSD

Reviewed by JAB

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

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Jonathan Barnhill	Jonathan Barnhill	Lab Supervisor	12/14/2022
Name (printed)	Signature	Official Title	Date

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name:

Reviewer Name: Jonathan Barnhill

LRC Date: 12/14/2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112206 PB22112207 QC2212035 QC2212036

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?		
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER1
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	No	ER3
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name:

Reviewer Name: Jonathan Barnhill

LRC Date: 12/14/2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112206 PB22112207 QC2212035 QC2212036

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	Yes	
	I	Were ion abundance data within the method-required QC limits?	Yes	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name:

Reviewer Name: Jonathan Barnhill

LRC Date: 12/14/2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112206 PB22112207 QC2212035 QC2212036

Exception Report No.	Description
ER1	Linear Dynamic Range (LDR) study used to determine upper limit of analyte calibration.
ER2	CCB acceptance criteria is CCB<2.2*MDL.
ER3	Matrix Spike Failure for Na on sample 223664-001
	Matrix Spike Failure for Na on sample 223664-011

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tamisha Palmer	Tamisha T. Palmer	Chemical Technician, Prin	12/20/2022
Name (printed)	Signature	Official Title	Date

Radium Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Tamisha Palmer

LRC Date: 12/20/2022

Laboratory Job Number: PB22112803

Prep Batch Number(s): 223664

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Tamisha Palmer

LRC Date: 12/20/2022

Laboratory Job Number: PB22112803

Prep Batch Number(s): 223664

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power

Reviewer Name: Tamisha Palmer

LRC Date: 12/20/2022

Laboratory Job Number: PB22112803

Prep Batch Number(s): 223664

Exception Report No.	Description

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

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  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Sunita Timsina		Chemist Associate	12/20/2022
Name (printed)	Signature	Official Title	Date

Radium Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 12/20/2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112804

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	NO	ER1
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 12/20/2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112804

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 12/20/2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112804

Exception Report No.	Description
ER1	RPD for duplicate sample exceeds 25%.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

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  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Sunita Timsina		Chemist Associate	12/29/2022
Name (printed)	Signature	Official Title	Date

Radium Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 12/29/2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112203, PB22112805

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	N/A	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 12/29/2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112203, PB22112805

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power Station

Reviewer Name: Sunita Timsina

LRC Date: 12/29/2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112203, PB22112805

Exception Report No.	Description

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Susann Sulzmann	S. Sulzmann	Senior Chemist	12-20-2022
Name (printed)	Signature	Official Title	Date

Mercury Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power station

Reviewer Name: Susann Sulzmann

LRC Date: 12-20-2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112503,-906,-907,-908

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Mercury Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power station

Reviewer Name: Susann Sulzmann

LRC Date: 12-20-2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112503,-906,-907,-908

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Mercury Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey Power station

Reviewer Name: Susann Sulzmann

LRC Date: 12-20-2022

Laboratory Job Number: 223664

Prep Batch Number(s): PB22112503,-906,-907,-908

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<MQL.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Water Analysis Report

Reissued

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

Job ID: 223647 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-2
Customer Description: TG-32
Lab Number: 223647-001
Preparation:
Date Collected: 11/15/2022 11:05 EST
Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.37	mg/L	2	0.10	0.02		CRJ	11/30/2022 14:27	EPA 300.1-1997, Rev. 1.0
Chloride	30.5	mg/L	2	0.04	0.02		CRJ	11/30/2022 14:27	EPA 300.1-1997, Rev. 1.0
Fluoride	0.21	mg/L	2	0.06	0.02		CRJ	11/30/2022 14:27	EPA 300.1-1997, Rev. 1.0
Sulfate	259	mg/L	10	2.0	0.3		CRJ	11/30/2022 13:54	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	480	mg/L	1	50	20		SDW	11/20/2022 10:00	SM 2540C-2015

Customer Sample ID: AD-3
Customer Description: TG-32
Lab Number: 223647-002
Preparation:
Date Collected: 11/16/2022 12:45 EST
Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.07	mg/L	2	0.10	0.02	J1	CRJ	11/30/2022 13:21	EPA 300.1-1997, Rev. 1.0
Chloride	7.40	mg/L	2	0.04	0.02		CRJ	11/30/2022 13:21	EPA 300.1-1997, Rev. 1.0
Fluoride	0.18	mg/L	2	0.06	0.02		CRJ	11/30/2022 13:21	EPA 300.1-1997, Rev. 1.0
Sulfate	34.4	mg/L	2	0.40	0.06		CRJ	11/30/2022 13:21	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	29	mg/L	1	20	5		MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	160	mg/L	1	50	20		SDW	11/20/2022 10:05	SM 2540C-2015

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 223647 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-4
Customer Description: TG-32
Lab Number: 223647-003
Preparation:
Date Collected: 11/16/2022 12:32 EST
Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.19	mg/L	2	0.10	0.02		CRJ	11/30/2022 15:33	EPA 300.1-1997, Rev. 1.0
Chloride	4.14	mg/L	2	0.04	0.02		CRJ	11/30/2022 15:33	EPA 300.1-1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	11/30/2022 15:33	EPA 300.1-1997, Rev. 1.0
Sulfate	16.6	mg/L	2	0.40	0.06		CRJ	11/30/2022 15:33	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	130	mg/L	1	50	20		SDW	11/20/2022 10:10	SM 2540C-2015

Customer Sample ID: AD-7
Customer Description: TG-32
Lab Number: 223647-004
Preparation:
Date Collected: 11/16/2022 10:10 EST
Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	4.29	mg/L	2	0.10	0.02		CRJ	11/30/2022 17:45	EPA 300.1-1997, Rev. 1.0
Chloride	69.7	mg/L	10	0.2	0.1		CRJ	12/01/2022 08:54	EPA 300.1-1997, Rev. 1.0
Fluoride	0.23	mg/L	2	0.06	0.02		CRJ	11/30/2022 17:45	EPA 300.1-1997, Rev. 1.0
Sulfate	60.5	mg/L	2	0.40	0.06		CRJ	11/30/2022 17:45	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	300	mg/L	1	50	20		SDW	11/20/2022 10:10	SM 2540C-2015

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

Job ID: 223647 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-12 Customer Description: TG-32
Lab Number: 223647-005 Preparation:
Date Collected: 11/15/2022 11:58 EST Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.14	mg/L	2	0.10	0.02		CRJ	11/30/2022 18:17	EPA 300.1-1997, Rev. 1.0
Chloride	8.03	mg/L	2	0.04	0.02		CRJ	11/30/2022 18:17	EPA 300.1-1997, Rev. 1.0
Fluoride	0.08	mg/L	2	0.06	0.02		CRJ	11/30/2022 18:17	EPA 300.1-1997, Rev. 1.0
Sulfate	3.39	mg/L	2	0.40	0.06		CRJ	11/30/2022 18:17	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	70	mg/L	1	50	20		SDW	11/20/2022 10:15	SM 2540C-2015

Customer Sample ID: AD-13 Customer Description: TG-32
Lab Number: 223647-006 Preparation:
Date Collected: 11/15/2022 09:21 EST Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.23	mg/L	2	0.10	0.02		CRJ	11/30/2022 16:39	EPA 300.1-1997, Rev. 1.0
Chloride	41.3	mg/L	2	0.04	0.02		CRJ	11/30/2022 16:39	EPA 300.1-1997, Rev. 1.0
Fluoride	0.36	mg/L	2	0.06	0.02		CRJ	11/30/2022 16:39	EPA 300.1-1997, Rev. 1.0
Sulfate	69.6	mg/L	2	0.40	0.06		CRJ	11/30/2022 16:39	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	66	mg/L	1	20	5		MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	260	mg/L	1	50	20		SDW	11/20/2022 10:15	SM 2540C-2015

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 223647 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-17
Customer Description: TG-32
Lab Number: 223647-007
Preparation:
Date Collected: 11/16/2022 11:58 EST
Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.20	mg/L	2	0.10	0.02		CRJ	11/30/2022 18:50	EPA 300.1-1997, Rev. 1.0
Chloride	35.0	mg/L	2	0.04	0.02		CRJ	11/30/2022 18:50	EPA 300.1-1997, Rev. 1.0
Fluoride	0.26	mg/L	2	0.06	0.02		CRJ	11/30/2022 18:50	EPA 300.1-1997, Rev. 1.0
Sulfate	2.91	mg/L	2	0.40	0.06		CRJ	11/30/2022 18:50	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	80	mg/L	1	50	20		SDW	11/20/2022 10:23	SM 2540C-2015

Customer Sample ID: AD-18
Customer Description: TG-32
Lab Number: 223647-008
Preparation:
Date Collected: 11/16/2022 11:13 EST
Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.04	mg/L	2	0.10	0.02	J1	CRJ	11/30/2022 19:56	EPA 300.1-1997, Rev. 1.0
Chloride	4.94	mg/L	2	0.04	0.02		CRJ	11/30/2022 19:56	EPA 300.1-1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	11/30/2022 19:56	EPA 300.1-1997, Rev. 1.0
Sulfate	6.55	mg/L	2	0.40	0.06		CRJ	11/30/2022 19:56	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	90	mg/L	1	50	20		SDW	11/20/2022 10:23	SM 2540C-2015

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 223647 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-22 Customer Description: TG-32
Lab Number: 223647-009 Preparation:
Date Collected: 11/14/2022 12:31 EST Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.79	mg/L	2	0.10	0.02		CRJ	11/30/2022 23:47	EPA 300.1-1997, Rev. 1.0
Chloride	101	mg/L	25	0.5	0.3		CRJ	11/30/2022 23:14	EPA 300.1-1997, Rev. 1.0
Fluoride	0.28	mg/L	2	0.06	0.02		CRJ	11/30/2022 23:47	EPA 300.1-1997, Rev. 1.0
Sulfate	251	mg/L	25	5.0	0.8		CRJ	11/30/2022 23:14	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	570	mg/L	1	50	20		SDW	11/20/2022 10:29	SM 2540C-2015

Customer Sample ID: AD-28 Customer Description: TG-32
Lab Number: 223647-010 Preparation:
Date Collected: 11/16/2022 09:48 EST Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.07	mg/L	2	0.10	0.02	J1	CRJ	12/01/2022 00:53	EPA 300.1-1997, Rev. 1.0
Chloride	4.96	mg/L	2	0.04	0.02		CRJ	12/01/2022 00:53	EPA 300.1-1997, Rev. 1.0
Fluoride	0.48	mg/L	2	0.06	0.02		CRJ	12/01/2022 00:53	EPA 300.1-1997, Rev. 1.0
Sulfate	23.3	mg/L	2	0.40	0.06		CRJ	12/01/2022 00:53	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	80	mg/L	1	50	20		SDW	11/20/2022 10:29	SM 2540C-2015

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

Water Analysis Report

Reissued

Job ID: 223647 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-30
Customer Description: TG-32
Lab Number: 223647-011
Preparation:
Date Collected: 11/16/2022 10:46 EST
Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.37	mg/L	2	0.10	0.02		CRJ	12/01/2022 01:58	EPA 300.1-1997, Rev. 1.0
Chloride	27.4	mg/L	2	0.04	0.02		CRJ	12/01/2022 01:58	EPA 300.1-1997, Rev. 1.0
Fluoride	0.07	mg/L	2	0.06	0.02		CRJ	12/01/2022 01:58	EPA 300.1-1997, Rev. 1.0
Sulfate	177	mg/L	10	2.0	0.3		CRJ	12/01/2022 01:25	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	340	mg/L	1	50	20		SDW	11/20/2022 10:35	SM 2540C-2015

Customer Sample ID: AD-31
Customer Description: TG-32
Lab Number: 223647-012
Preparation:
Date Collected: 11/15/2022 11:02 EST
Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.35	mg/L	2	0.10	0.02		CRJ	12/01/2022 03:04	EPA 300.1-1997, Rev. 1.0
Chloride	24.3	mg/L	2	0.04	0.02		CRJ	12/01/2022 03:04	EPA 300.1-1997, Rev. 1.0
Fluoride	0.14	mg/L	2	0.06	0.02		CRJ	12/01/2022 03:04	EPA 300.1-1997, Rev. 1.0
Sulfate	79.1	mg/L	2	0.40	0.06		CRJ	12/01/2022 03:04	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	250	mg/L	1	50	20		SDW	11/20/2022 10:35	SM 2540C-2015

AMERICAN ELECTRIC POWER

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

Water Analysis Report

Reissued

Job ID: 223647 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: AD-32 Customer Description: TG-32
Lab Number: 223647-013 Preparation:
Date Collected: 11/15/2022 10:03 EST Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.58	mg/L	2	0.10	0.02		CRJ	12/01/2022 05:49	EPA 300.1-1997, Rev. 1.0
Chloride	22.7	mg/L	2	0.04	0.02		CRJ	12/01/2022 05:49	EPA 300.1-1997, Rev. 1.0
Fluoride	0.49	mg/L	2	0.06	0.02		CRJ	12/01/2022 05:49	EPA 300.1-1997, Rev. 1.0
Sulfate	244	mg/L	25	5.0	0.8		CRJ	12/01/2022 05:16	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	450	mg/L	1	50	20		SDW	11/20/2022 10:40	SM 2540C-2015

Customer Sample ID: AD-33 Customer Description: TG-32
Lab Number: 223647-014 Preparation:
Date Collected: 11/15/2022 12:06 EST Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.25	mg/L	2	0.10	0.02		CRJ	12/01/2022 06:55	EPA 300.1-1997, Rev. 1.0
Chloride	9.18	mg/L	2	0.04	0.02		CRJ	12/01/2022 06:55	EPA 300.1-1997, Rev. 1.0
Fluoride	0.16	mg/L	2	0.06	0.02		CRJ	12/01/2022 06:55	EPA 300.1-1997, Rev. 1.0
Sulfate	42.7	mg/L	2	0.40	0.06		CRJ	12/01/2022 06:55	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	140	mg/L	1	50	20		SDW	11/20/2022 10:40	SM 2540C-2015

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

Water Analysis Report

Reissued

Job ID: 223647 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Customer Sample ID: Duplicate - 2
Customer Description: TG-32
Lab Number: 223647-015
Preparation:
Date Collected: 11/15/2022 15:00 EST
Date Received: 11/18/2022 10:20 EST

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.23	mg/L	2	0.10	0.02		CRJ	12/01/2022 04:10	EPA 300.1-1997, Rev. 1.0
Chloride	41.3	mg/L	2	0.04	0.02		CRJ	12/01/2022 04:10	EPA 300.1-1997, Rev. 1.0
Fluoride	0.36	mg/L	2	0.06	0.02		CRJ	12/01/2022 04:10	EPA 300.1-1997, Rev. 1.0
Sulfate	70.2	mg/L	2	0.40	0.06		CRJ	12/01/2022 04:10	EPA 300.1-1997, Rev. 1.0

Wet Chemistry

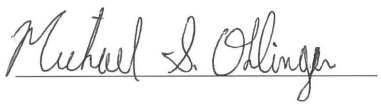
Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	65	mg/L	1	20	5		MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	270	mg/L	1	50	20		SDW	11/20/2022 10:47	SM 2540C-2015

223647
Job Comments:

Original report issued 12/21/22. Report reissued without P1 flag for alkalinity as sample and duplicate results < RL.

Report Verification

This report and the above data have been confirmed by the following analyst.



Michael Ohlinger, Chemist
Email: msohlinger@aep.com
Phone: 614-836-4184
Audinet: 8-210-4184

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

Water Analysis Report

Reissued

Job ID: 223647 **Customer: Pirkey Power Station** **Date Reported: 12/22/2022**

Data Qualifer Legend

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

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

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Michael Ohlinger (614-836-4184)
Dave Conover (614-836-4219)

Project Name: Pirkey PP Semi-Annual CCR
Contact Name: Leslie Fuerschbach
Contact Phone: 318-673-2744
Sampler(s): Matt Hamilton Kenny McDonald

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

Site Contact: | Date:

For Lab Use Only:
COC/Order #: 223647

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Mercury (250 mL bottle, pH<2, HNO3)	Dissolved Mercury (Field-filter 250 mL bottle, then pH<2, HNO3)	F, Cl, SO4, Br, TDS, Alkalinity (1 L bottle, Cool, 0-6C)	Ra-226, Ra-228 (Three (six every 10th*) 1 L bottles, pH<2, HNO3)				Sample Specific Notes:
AD-2	11/15/2022	1005	G	GW	1				X					
AD-3	11/16/2022	1145	G	GW	1				X					
AD-4	11/16/2022	1132	G	GW	1				X					
AD-7	11/16/2022	910	G	GW	1				X					
AD-12	11/15/2022	1058	G	GW	1				X					
AD-13	11/15/2022	821	G	GW	1				X					
AD-17	11/16/2022	1058	G	GW	1				X					
AD-18	11/16/2022	1013	G	GW	1				X					
AD-22	11/14/2022	1131	G	GW	1				X					
AD-28	11/16/2022	848	G	GW	1				X					
AD-30	11/16/2022	946	G	GW	1				X					
AD-31	11/15/2022	1002	G	GW	1				X					
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

TG-32 needed

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Matt Hamilton	Eagle	11-17-22 1300		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:
			Michael Ohlinger	11/18/22 10:20AM

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Contacts: Michael Ohlinger (614-836-4184)
Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR
Contact Name: Leslie Fuerschbach
Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (In Calendar Days)
◉ Routine (28 days for Monitoring Wells)

Site Contact:

Date:

For Lab Use Only:
COC/Order #:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Mercury (250 mL bottle, pH<2, HNO3)	Dissolved Mercury (Field-filter 250 mL bottle, then pH<2, HNO3)	F, Cl, SO4, Br, TDS, Alkalinity (1 L bottle, Cool, 0-6C)	Ra-226, Ra-228 (Three (six every 10th*) 1 L bottles, pH<2, HNO3)				Sample Specific Notes:
AD-32	11/15/2022	903	G	GW	1				X					
AD-33	11/15/2022	1106	G	GW	1				X					
Duplicate - 2	11/15/2022	1400	G	GW	1				X					
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field							4	F4	1	4				

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

Special Instructions/QC Requirements & Comments:

TG-32 needed

Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
[signature]	Eagle	11-17-22 1300		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:
			[signature] Only	11/18/22 10:30Am

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

WATER & WASTE SAMPLE RECEIPT FORM (Temp Gun 1)

Package Type	Delivery Type
(Cooler) Box Bag Envelope Pulley	PONY (UPS) FedEX USPS
	Other _____

Plant/Customer ~~Clinch River~~ **Number of Plastic Containers:** 15

Opened By MSD **Number of Glass Containers:** —

Date/Time 11/18/22 10:20AM **Number of Mercury Containers:** —

Were all temperatures within 0-6°C? (Y) / N or N/A **Initial:** JMB (on ice) / no ice (IR Gun Ser# 221368900, *Expir. 3/22/2024)* - If No, specify each deviation: _____

Was container in good condition? (Y) / N Comments _____

Was Chain of Custody received? (Y) / N Comments _____

Requested turnaround: Routine If **RUSH**, who was notified? _____

pH (15 min)	Cr^{+6} (pres) (24 hr)	NO_2 or NO_3 (48 hr)	*ortho*-PO_4 (48 hr)	Hg-diss (pres) (48 hr)

Was COC filled out properly? (Y) / N Comments _____

Were samples labeled properly? (Y) / N Comments _____

Were correct containers used? (Y) / N Comments _____

Was pH checked & Color Coding done? (Y) / N or N/A **Initial & Date:** JMB 11/18/22

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

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

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

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

Initial & Date & Time : _____

Lab ID# 223647

Comments: TG-32

Logged by MSD AD 4 Bottle ~~Sample~~ Says 11:33 COC 1132

Reviewed by JMB

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.

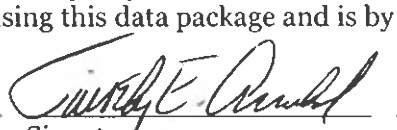
Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [x] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Timothy E Arnold		Prin Chemist	12/21/2022
Name (printed)	Signature	Official Title	Date

Ion Chromatography Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Timothy E Arnold

LRC Date: 12/21/2022

Laboratory Job Number: 223647

Prep Batch Number(s): QC2212004

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Ion Chromatography Laboratory Review Checklist

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Timothy E Arnold

LRC Date: 12/21/2022

Laboratory Job Number: 223647

Prep Batch Number(s): QC2212004

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Ion Chromatography Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP Semi-Annual CCR

Reviewer Name: Timothy E Arnold

LRC Date: 12/21/2022

Laboratory Job Number: 223647

Prep Batch Number(s): QC2212004

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<MQL.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

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

[3] NA - Not applicable; NR - Not reviewed.

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

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger	Michael Ohlinger	Chemist	12/20/22
Name (printed)	Signature	Official Title	Date

TDS Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey CCR

Reviewer Name: Michael Ohlinger

LRC Date: 12/20/2022

Laboratory Job Number: 223647

Prep Batch Number(s): QC2211231

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey CCR

Reviewer Name: Michael Ohlinger

LRC Date: 4/5/22

Laboratory Job Number: 223647

Prep Batch Number(s): QC2211231

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

TDS Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey CCR

Reviewer Name: Michael Ohlinger

LRC Date: 12/20/2022

Laboratory Job Number: 223647

Prep Batch Number(s): QC2211231

Exception Report No.	Description

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- [x] This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- [x] R1 Field chain-of-custody documentation
- [x] R2 Sample identification cross-reference
- [x] R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- [NA] R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- [x] R5 Test reports/summary forms for blank samples
- [x] R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- [x] R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- [x] R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- [x] R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- [x] R10 Other problems or anomalies
- [x] The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: (●) This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger	Michael Ohlinger	Chemist	12/22/2022
Name (printed)	Signature	Official Title	Date

Alkalinity Laboratory Review Checklist

Table 1. Reportable Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Michael Ohlinger

LRC Date: 12/22/2022

Laboratory Job Number: 223647

Prep Batch Number(s): QC2211194

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	**Sample and quality control (QC) identification**		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	**Test reports**		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	**Surrogate recovery data**		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	**Test reports/summary forms for blank samples**		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Alkalinity Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	**Laboratory control samples (LCS):**		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	**Analytical duplicate data**		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	No	ER1
R9	O, I	**Method quantitation limits (MQLs):**		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	**Other problems/anomalies**		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

Table 2. Supporting Data.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Michael Ohlinger

LRC Date: 12/22/2022

Laboratory Job Number: 223647

Prep Batch Number(s): QC2211194

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	**Mass spectral tuning:**		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	**Internal standards (IS):**		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

Alkalinity Laboratory Review Checklist

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	**Tentatively identified compounds (TICs):**		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	**Interference Check Sample (ICS) results:**		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	**Method detection limit (MDL) studies**		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	**Proficiency test reports:**		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	**Standards documentation**		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	**Compound/analyte identification procedures**		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	**Demonstration of analyst competency (DOC)**		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Table 3. Exception Reports.

Laboratory Name: American Electric Power Dolan Chemical Laboratory

Project Name: Pirkey PP CCR

Reviewer Name: Michael Ohlinger

LRC Date: 12/22/2022

Laboratory Job Number: 223647

Prep Batch Number(s): QC2211194

Exception Report No.	Description
ER1	The RPD between duplicate results > acceptance limits, not flagged as results < MQL.
ER2	CCB acceptance criteria is CCB<0.5*MQL.

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."