

Annual Groundwater Monitoring and Corrective Action Report

Appalachian Power Company
Clinch River Plant
Pond 1 CCR Management Unit
Cleveland, Virginia

January 31, 2022

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An **AEP** Company

BOUNDLESS ENERGYSM

Table of Contents

I.	Overview.....	1
II.	Groundwater Monitoring Well Locations and Identification Numbers.....	3
III.	Monitoring Wells Installed or Decommissioned.....	3
IV.	Groundwater Quality Data and Static Water Elevation Data, With Flow Rate and Direction Calculations and Discussion.....	4
V.	Groundwater Quality Data Statistical Analysis.....	4
VI.	Alternative Source Demonstrations Completed.....	5
VII.	Discussion About Transition Between Monitoring Requirements or Alternate Monitoring Frequency.....	5
VIII.	Other Information Required.....	6
IX.	Description of Any Problems Encountered and Actions Taken.....	6
X.	A Projection of Key Activities for the Upcoming Year.....	6

Appendix 1 – Groundwater Data Tables and Figures

Appendix 2 – Statistical Analyses

Appendix 3 – Alternate Source Demonstrations

Appendix 4 – Notices for Monitoring Program Transitions

Appendix 5 – Well Installation/Decommissioning Logs

Abbreviations:

ASD - Alternate Source Demonstration

CCR – Coal Combustion Residual

GWPS - Groundwater protection standards

SSI - Statistically Significant Increase

SSL - Statistically Significant Level

I. Overview

This *Annual Groundwater Monitoring and Corrective Action Report* (Report) has been prepared to report the status of activities for the preceding year for an inactive surface impoundment CCR unit at Appalachian Power Company's, a wholly-owned subsidiary of American Electric Power Company (AEP) Clinch River Power Plant. The USEPA's CCR rules require that the Annual Groundwater Monitoring and Corrective Action Report be posted to the operating record by August 1, 2019 and annually thereafter for inactive surface impoundments. The second annual report was prepared on January 31, 2020 to cover the 2019 activities, and future reports will be submitted annually on January 31st. This report is being prepared by January 31, 2022 to cover groundwater monitoring activities in 2021.

In general, the following activities were completed:

- At the start of the current annual monitoring period, Pond 1 was operating under the assessment monitoring program.
- At the end of the current annual reporting period, Pond 1 was operating under the assessment monitoring program.
- An assessment monitoring program was established for Pond 1 on July 15, 2019.
- On October 13, 2019 an Assessment of Corrective Measures (ACM) for Pond 1 was initiated. The ACM was completed on December 11, 2019, and a public meeting to discuss the proposed remedies was held on December 19, 2019.
- Two semi-annual progress report on selecting a remedy pursuant to §257.97 were completed on July 19, 2021 and 1/18/2022. A remedy has not yet been selected, or initiated.
- Data and statistical analysis not available from the previous reporting period indicates that during the October 2020 sampling event:
 - The following Appendix IV parameters exceeded the groundwater protection standards:
 - Barium at well MW-1604
 - Cobalt at wells MW-1607 and MW-1610
 - Lithium at wells MW-1605, MW-1606 and MW-1607
 - Molybdenum at wells MW-1607 and MW-1610
 - The following Appendix III parameters exceeded background concentrations:
 - Calcium at wells MW-1603, MW-1604, MW-1605, and MW-1612
 - Chloride at wells MW-1603, MW-1605, MW-1606, and MW-1607
 - Fluoride at wells MW-1604 and MW-1610

- Sulfate at wells MW-1606 and MW-1607
 - pH at wells MW-1603, MW-1604, MW-1605, MW-1610, and MW-1612
- During the April 2021 semi-annual sampling event
 - The following Appendix IV parameters exceeded established groundwater protection standards:
 - Barium at well MW-1604
 - Cobalt at wells MW-1607 and MW-1610
 - Lithium at wells MW-1605, MW-1606, MW-1607, and MW-1610
 - Molybdenum at wells MW-1607 and MW-1610
 - The following Appendix III parameters exceeded background:
 - Calcium at wells MW-1603, MW-1604, MW-1605, and MW-1612
 - Chloride at wells MW-1603, MW-1605, MW-1606, and MW-1607
 - Fluoride at wells MW-1604 and MW-1610
 - Sulfate at wells MW-1606 and MW-1607
 - TDS at well MW-1603
 - pH at wells MW-1603, MW-1604, MW-1605, and MW-1612
- The October 2021 data are still undergoing statistical analysis.

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 (Attached as **Appendix 1**);
- 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 background, detection monitoring, or assessment monitoring programs (Attached as **Appendix 1**);
- Statistical comparison of monitoring data to determine if there have been significant increase over background concentrations (Attached as **Appendix 2**, where applicable);
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (Attached as **Appendix 3**, where applicable);
- A summary of any transition between monitoring programs, for example the date and circumstances for transitioning from detection monitoring to assessment monitoring, in

addition to identifying the constituents detected at a statistically significant increase over background concentrations (Notices Attached as **Appendix 4**, 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 (Attached as **Appendix 5**, where applicable); and
- Other information required to be included in the annual report such as alternate source demonstration or assessment of corrective measures, if applicable.

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

There are three hydrogeological formations monitored at the facility: the Rome, Chattanooga, and Dumps Fault. The following is a list of wells (S = Shallow zone, D = Deep zone):

Rome Formation

Upgradient wells: MW-1609

Downgradient wells: MW-1606 and MW-1607

Nature and Extent wells: W-1906(S, D); W-1907(S, D), W-1913(S, D)

Chattanooga Formation

Upgradient wells: MW-1601; MW1602; and MW-1608

Downgradient wells: MW-1603; MW-1604; MW-1605; and MW-1612

Nature and Extent wells: W-1903(S, D); W-1904(S, D); W-1905(S, D); and W-2012(S, D)

Dumps Fault Formation

Upgradient wells: MW-1611

Downgradient wells: MW-1610

Nature and Extent wells: W-1910S

A figure that depicts the PE-certified groundwater monitoring network, the monitoring well locations and their corresponding identification numbers is provided in **Appendix 1**.

III. Monitoring Wells Installed or Decommissioned

The network design, as summarized in the *Groundwater Monitoring Network Design Report* (2019) and as posted at the CCR website for Clinch River Plant, did not change. That 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.

Since the facility entered assessment monitoring and no alternative source was identified, 13 monitoring wells were installed after initiating the assessment of corrective measures in 2019 to define the horizontal and vertical extent of constituents exceeding the groundwater protections standards at statistically significant levels. Six clusters of shallow and deep wells, and one shallow only well were installed near Dumps Creek and the Clinch River downgradient of the ash pond. The monitoring wells installed at the end of 2019 and were documented in the 2019 annual report. In 2020, two additional monitoring wells were installed to help define the extent of the plume. The monitoring well installation reports for those two wells were included in the 2020 annual report.

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

Appendix 1 contains tables showing the groundwater quality data collected during the establishment of background quality, 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 in February 2021 satisfies the requirement of 257.95(b).

V. Groundwater Quality Data Statistical Analysis

Appendix 2 contains the statistical analysis report(s).

- Data and statistical analysis not available from the previous reporting period indicates that during the October 2020 sampling event:
 - The following Appendix IV parameters exceeded the groundwater protection standards:
 - Barium at well MW-1604
 - Cobalt at wells MW-1607 and MW-1610
 - Lithium at wells MW-1605, MW-1606 and MW-1607
 - Molybdenum at wells MW-1607 and MW-1610
 - The following Appendix III parameters exceeded background concentrations:
 - Calcium at wells MW-1603, MW-1604, MW-1605, and MW-1612
 - Chloride at wells MW-1603, MW-1605, MW-1606, and MW-1607
 - Fluoride at wells MW-1604 and MW-1610
 - Sulfate at wells MW-1606 and MW-1607

- pH at wells MW-1603, MW-1604, MW-1605, MW-1610, and MW-1612
 - During the April 2021 semi-annual sampling event
 - The following Appendix IV parameters exceeded established groundwater protection standards:
 - Barium at well MW-1604
 - Cobalt at wells MW-1607 and MW-1610
 - Lithium at wells MW-1605, MW-1606, MW-1607, and MW-1610
 - Molybdenum at wells MW-1607 and MW-1610
 - The following Appendix III parameters exceeded background:
 - Calcium at wells MW-1603, MW-1604, MW-1605, and MW-1612
 - Chloride at wells MW-1603, MW-1605, MW-1606, and MW-1607
 - Fluoride at wells MW-1604 and MW-1610
 - Sulfate at wells MW-1606 and MW-1607
 - TDS at well MW-1603
 - pH at wells MW-1603, MW-1604, MW-1605, and MW-1612
 - The October 2021 data are still undergoing statistical analysis.

VI. Alternative Source Demonstrations Completed

No alternative source for the groundwater protection standard, or background concentration exceedances has been found at Pond 1, and the CCR unit remains in assessment monitoring and remedies are being evaluated for corrective measures.

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

A notification that Pond 1 established an assessment monitoring program was placed in the Operating Record on August 1, 2019 in accordance with the requirement of 257.94(e)(3). Pond 1 also initiated and completed an Assessment of Corrective Measures by December 11, 2019. A public meeting was held on December 19, 2019 to discuss the proposed remedies.

As of the writing of this report, there has been no remedy selected pursuant to § 257.97. Two semi-annual reports discussing the progress towards selecting a remedy have been prepared. The CCR Unit will continue to sample according to the assessment monitoring program.

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

Pond 1 has progressed from detection monitoring to its current status in assessment and corrective action monitoring. As required by the CCR assessment monitoring rules in 40 CFR 257.95 (b) and (d)(1), sampling all CCR wells for the required Appendix III and IV parameters was completed in 2021.

IX. Description of Any Problems Encountered 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.

X. A Projection of Key Activities for the Upcoming Year

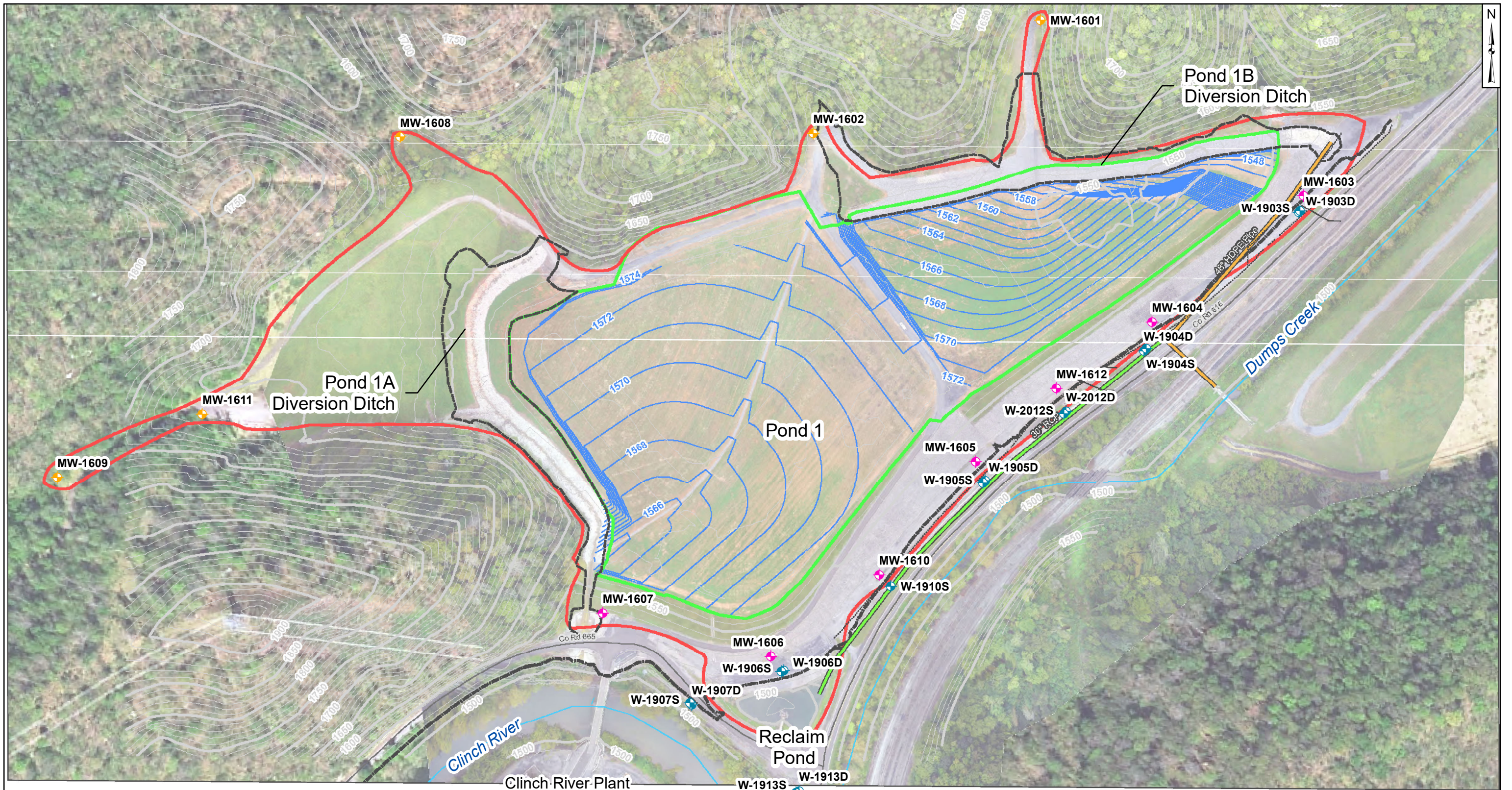
Key activities for 2022 include:

- Assessment monitoring on a twice per year schedule.
- Semi-annual progress report on selecting and designing remedial alternatives.
- Responding to any new data received in light of what the CCR rule requires.
- Preparation of the annual groundwater report.

APPENDIX 1 – Groundwater Data Tables and Figures

Figures and Tables follow, showing the groundwater monitoring network, data collected and the rate and direction of groundwater flow. The dates that the samples were collected and it also is shown whether the data were collected under background, detection, or assessment monitoring.

Groundwater Monitoring Network Figure



- Legend**
- ◆ Upgradient Monitoring Location
 - ◆ Downgradient Monitoring Location
 - ◆ Nature and Extent Well
 - Post-Closure Topographic Elevation
 - 100 yr Flood Elevation Approx. 1505 ft amsl
 - Diversion Ditch
 - Facility Boundary
 - Pond 1 CCR Unit Boundary

- Notes**
- Aerial basemap provided by AEP.
 - Site features based on information available in Groundwater Monitoring Network Evaluation (Amec, 2015).
 - Post-Closure Pond Topographic units are feet above mean sea level (ft amsl).



Site Layout Pond 1		Figure 1
AEP Clinch River Plant - Bottom Ash Pond Carbo, Virginia		
		1
Ann Arbor, Michigan	2021/01/14	

Groundwater Data Tables

Table 1 - Groundwater Data Summary: MW-1601

**Clinch River - Pond 1
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
10/19/2017	Background	0.447	5.58	23.8	1.86	7.8	166	1,180
12/12/2017	Background	0.473	5.88	31.9	1.82	8.3	250	1,340
2/13/2018	Background	0.496	5.99	30.8	2.13	8.4	248	1,380
4/11/2018	Background	0.514	7.49	41.0	2.10	8.3	319	1,620
6/7/2018	Background	0.576	6.34	31.4	2.22	8.4	245	1,440
8/20/2018	Background	0.517	8.42	45.8	2.10	8.3	358	1,730
10/17/2018	Background	0.542	6.84	34.3	2.20	8.5	258	1,500
12/6/2018	Background	0.593	5.65	28.1	2.22	8.5	210	1,410
2/7/2019	Detection	0.526	5.50	24.0	2.32	8.4	184	1,370
4/8/2019	Assessment	0.577	5.90	25.2	2.18	8.4	173	1,390
5/28/2019	Assessment	0.541	5.21	24.3	1.89	8.7	181	1,390
10/1/2019	Assessment	0.609	6.90	33.2	2.09	8.3	250	1,480
2/10/2020	Assessment	0.563	4.94	20.5	1.75	8.7	168	1,350
4/20/2020	Assessment	0.523	4.95	18.9	2.35	8.2	162	1,320
10/6/2020	Assessment	0.589	5.60	27.1	2.10	8.2	214	1,460
2/8/2021	Assessment	0.549	4.83	23.1	2.40	8.2	185	1,360
4/12/2021	Assessment	0.527	5.68	22.5	2.42	8.5	188	1,480
10/11/2021	Assessment	0.550	5.4	18.9	2.30	8.6	156	1,360

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1601
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/19/2017	Background	0.18	9.18	238	< 0.004 U1	< 0.005 U1	0.221	0.112	1.204	1.86	0.070	0.095	< 0.05 U1	25.7	0.04 J1	0.02 J1
12/12/2017	Background	0.19	8.39	306	0.007 J1	0.009 J1	0.281	0.149	2.077	1.82	0.153	0.092	0.08 J1	21.9	0.06 J1	< 0.01 U1
2/13/2018	Background	0.11	7.06	280	0.007 J1	< 0.005 U1	0.155	0.091	1.01	2.13	0.125	0.098	< 0.05 U1	12.0	0.05 J1	0.04 J1
4/11/2018	Background	0.12	14.9	293	0.007 J1	< 0.005 U1	0.544	0.092	0.862	2.10	0.096	0.110	0.05 J1	6.60	0.07 J1	0.01 J1
6/7/2018	Background	0.16	17.0	262	0.005 J1	0.006 J1	0.279	0.062	1.146	2.22	0.072	0.118	< 0.05 U1	3.77	< 0.03 U1	0.01 J1
8/20/2018	Background	0.25	25.8	296	0.005 J1	< 0.005 U1	0.402	0.099	0.711	2.10	0.047	0.108	< 0.05 U1	3.79	0.06 J1	0.01 J1
10/17/2018	Background	0.20	24.7	222	< 0.02 U1	< 0.01 U1	0.217	0.074	3.229	2.20	0.03 J1	0.098	< 0.05 U1	3.00	0.04 J1	< 0.1 U1
12/6/2018	Background	0.15	17.8	191	< 0.02 U1	< 0.01 U1	0.235	0.061	0.871	2.22	0.06 J1	0.092	< 0.05 U1	3.34	< 0.03 U1	< 0.1 U1
2/7/2019	Detection	0.17	17.8	176	< 0.02 U1	0.01 J1	0.292	0.072	0.157	2.32	0.08 J1	0.099	< 0.05 U1	2.85	< 0.03 U1	< 0.1 U1
4/8/2019	Assessment	0.15	21.7	184	< 0.02 U1	0.02 J1	0.258	0.072	0.337	2.18	0.07 J1	0.111	0.05 J1	1 J1	0.04 J1	< 0.1 U1
5/28/2019	Assessment	0.11	18.4	179	< 0.02 U1	< 0.01 U1	0.288	0.064	0.939	1.89	0.02 J1	0.090	0.1 J1	1 J1	< 0.03 U1	< 0.1 U1
10/1/2019	Assessment	0.11	21.1	239	< 0.02 U1	< 0.01 U1	0.291	0.088	0.481	2.09	< 0.05 U1	0.108	< 0.2 U1	1 J1	0.05 J1	< 0.1 U1
2/10/2020	Assessment	0.07 J1	10.1	156	< 0.02 U1	< 0.01 U1	0.231	0.073	2.076	1.75	< 0.05 U1	0.0901	< 0.2 U1	1 J1	0.04 J1	< 0.1 U1
4/20/2020	Assessment	0.09 J1	11.5	152	< 0.02 U1	< 0.01 U1	0.242	0.093	2.257	2.35	0.05 J1	0.0904	< 0.2 U1	1 J1	0.06 J1	< 0.1 U1
10/6/2020	Assessment	0.06 J1	11.4	172	< 0.02 U1	< 0.01 U1	0.2 J1	0.080	0.618	2.10	0.1 J1	0.0939	< 0.2 U1	2.10	0.06 J1	< 0.1 U1
2/8/2021	Assessment	0.06 J1	7.91	152	< 0.02 U1	< 0.01 U1	0.263	0.078	0.645	2.40	< 0.05 U1	0.0938	< 0.2 U1	1 J1	0.09 J1	< 0.1 U1
4/12/2021	Assessment	0.05 J1	8.77	176	< 0.007 U1	< 0.004 U1	0.1 J1	0.057	0.727	2.42	0.08 J1	0.0975	< 0.2 U1	0.9 J1	< 0.09 U1	< 0.04 U1
10/11/2021	Assessment	0.05 J1	7.00	161	< 0.007 U1	< 0.004 U1	0.14 J1	0.066	0.27	2.30	< 0.1 U1	0.0921	< 0.2 U1	0.9	< 0.09 U1	< 0.08 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: MW-1602

**Clinch River - Pond 1
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
10/19/2017	Background	0.654	3.09	4.2	1.45	8.0	32.8	525
12/12/2017	Background	0.584	2.64	4.2	1.57	8.7	29.2	516
2/13/2018	Background	0.621	2.93	4.9	1.61	8.5	32.2	528
4/11/2018	Background	0.614	2.78	5.6	1.63	8.7	32.4	500
6/7/2018	Background	0.672	2.74	5.2	1.64	8.6	29.1	525
8/20/2018	Background	0.547	2.84	6.5	1.57	8.5	37.5	567
10/15/2018	Background	0.664	2.94	5.6	1.61	8.6	29.0	544
12/6/2018	Background	0.637	2.78	3.8	1.64	8.7	16.7	500
2/7/2019	Detection	0.590	3.72	4.4	1.69	8.7	20.5	521
4/8/2019	Assessment	0.620	4.00	5.5	1.56	8.6	25.0	571
5/28/2019	Assessment	0.579	3.39	4.4	1.66	8.8	20.4	517
10/1/2019	Assessment	0.640	4.62	5.7	1.54	8.6	29.5	530
2/10/2020	Assessment	0.617	3.07	3.7	1.56	9.2	15.7	504
4/20/2020	Assessment	0.605	3.83	3.9	1.70	8.6	17.4	510
10/6/2020	Assessment	0.633	3.78	5.3	1.57	8.5	24.5	527
2/8/2021	Assessment	0.610	3.70	3.9	1.76	8.4	16.1	539
4/12/2021	Assessment	0.600	3.73	4.6	1.77	8.6	20.3	522
10/11/2021	Assessment	0.578	4.3	4.56	1.65	8.5	20.2	520

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

Table 1 - Groundwater Data Summary: MW-1602

Clinch River - Pond 1

Appendix IV Constituents

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/19/2017	Background	0.22	2.69	104	0.01 J1	< 0.005 U1	0.472	0.151	0.6	1.45	0.185	0.051	< 0.05 U1	9.80	0.04 J1	0.02 J1
12/12/2017	Background	0.12	2.15	111	0.01 J1	< 0.005 U1	0.291	0.100	0.6097	1.57	0.114	0.043	< 0.05 U1	7.77	< 0.03 U1	< 0.01 U1
2/13/2018	Background	0.07	3.54	111	0.008 J1	< 0.005 U1	0.153	0.060	0.748	1.61	0.093	0.043	< 0.05 U1	8.70	< 0.03 U1	0.03 J1
4/11/2018	Background	0.07	2.90	109	0.006 J1	< 0.005 U1	0.268	0.047	0.18727	1.63	0.140	0.040	< 0.05 U1	6.41	< 0.03 U1	< 0.01 U1
6/7/2018	Background	0.07	2.16	109	0.007 J1	< 0.005 U1	0.262	0.041	0.8588	1.64	0.062	0.045	< 0.05 U1	3.99	< 0.03 U1	< 0.01 U1
8/20/2018	Background	0.13	3.69	114	< 0.004 U1	0.03	0.245	0.042	0.4565	1.57	0.126	0.034	< 0.05 U1	4.84	< 0.03 U1	0.01 J1
10/15/2018	Background	0.06 J1	2.95	101	< 0.02 U1	< 0.01 U1	0.251	0.03 J1	0.2328	1.61	0.06 J1	0.032	< 0.05 U1	3.27	< 0.03 U1	< 0.1 U1
12/6/2018	Background	0.05 J1	1.49	106	< 0.02 U1	< 0.01 U1	0.246	0.04 J1	1.247	1.64	0.05 J1	0.048	< 0.05 U1	2.87	< 0.03 U1	< 0.1 U1
2/7/2019	Detection	0.08 J1	1.88	106	< 0.02 U1	< 0.01 U1	0.231	0.04 J1	0.2875	1.69	0.04 J1	0.045	< 0.05 U1	4.66	0.04 J1	< 0.1 U1
4/8/2019	Assessment	0.09 J1	2.02	103	< 0.02 U1	< 0.01 U1	0.2 J1	0.03 J1	0.135	1.56	0.05 J1	0.043	< 0.05 U1	4.76	< 0.03 U1	< 0.1 U1
5/28/2019	Assessment	0.07 J1	1.67	106	< 0.02 U1	< 0.01 U1	0.2 J1	0.02 J1	0.0613	1.66	0.03 J1	0.036	0.1 J1	3.70	< 0.03 U1	< 0.1 U1
10/1/2019	Assessment	0.09 J1	1.92	109	< 0.02 U1	< 0.01 U1	0.2 J1	0.02 J1	0.701	1.54	< 0.05 U1	0.0419	< 0.2 U1	4.21	< 0.03 U1	< 0.1 U1
2/10/2020	Assessment	0.04 J1	1.52	99.6	< 0.02 U1	< 0.01 U1	0.2 J1	0.060	1.37	1.56	< 0.05 U1	0.0386	< 0.2 U1	2 J1	< 0.03 U1	< 0.1 U1
4/20/2020	Assessment	0.05 J1	1.21	102	< 0.02 U1	< 0.01 U1	0.1 J1	0.02 J1	0.673	1.70	< 0.05 U1	0.0382	< 0.2 U1	2.52	0.06 J1	< 0.1 U1
10/6/2020	Assessment	0.23	2.03	107	< 0.02 U1	< 0.01 U1	0.329	0.04 J1	0.6456	1.57	0.08 J1	0.0373	< 0.2 U1	2.41	0.05 J1	< 0.1 U1
2/8/2021	Assessment	0.53	1.39	103	< 0.02 U1	< 0.01 U1	0.2 J1	0.03 J1	0.419	1.76	< 0.05 U1	0.0378	< 0.2 U1	2 J1	0.04 J1	< 0.1 U1
4/12/2021	Assessment	0.54	1.69	98.7	< 0.01 U1	< 0.004 U1	0.06 J1	0.02 J1	0.892	1.77	< 0.05 U1	0.0476	< 0.2 U1	2 J1	< 0.09 U1	< 0.04 U1
10/11/2021	Assessment	0.35	1.61	100	< 0.007 U1	< 0.004 U1	0.07 J1	0.023	0.51	1.65	< 0.05 U1	0.0350	< 0.2 U1	1.4	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1603

**Clinch River - Pond 1
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
10/17/2017	Background	0.202	23.3	182	0.17	7.3	45.1	678
12/11/2017	Background	0.193	22.1	121	0.1 J1	7.0	47.3	577
2/14/2018	Background	0.199	22.8	58.3	0.11	6.7	23.0	378
4/12/2018	Background	0.379	24.8	168	0.19	7.8	28.3	599
6/12/2018	Background	0.285	22.8	59.0	0.13	7.6	23.0	408
8/22/2018	Background	0.525	24.4	72.6	0.14	7.8	23.2	448
10/16/2018	Background	0.339	21.6	94.7	0.14	7.8	23.4	472
12/12/2018	Background	0.219	20.6	47.4	0.11	7.0	11.5	339
2/12/2019	Detection	0.177	19.8	59.5	0.11	6.8	8.1	374
4/10/2019	Assessment	0.211	21.7	69.5	0.10	7.2	16.2	434
5/30/2019	Assessment	0.197	20.0	77.0	0.13	7.7	6.2	401
10/2/2019	Assessment	0.313	26.7	124	0.10	7.7	8.7	480
2/11/2020	Assessment	0.362	26.6	162	0.12	8.0	1.9	515
4/21/2020	Assessment	0.256	24.6	128	0.10	6.8	2.3	528
10/7/2020	Assessment	0.300	25.7	171	0.15	7.7	0.6	624
2/9/2021	Assessment	0.345	30.9	184	0.12	7.1	1.9	734
4/13/2021	Assessment	0.374	33.1	263	0.17	7.3	1.6	848
10/12/2021	Assessment	0.252	24.1	127	0.12	7.2	0.63	450

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1603
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/17/2017	Background	0.04 J1	1.82	2,160	< 0.004 U1	< 0.005 U1	0.214	0.691	3.233	0.17	0.038	0.054	< 0.05 U1	4.71	0.1	0.02 J1
12/11/2017	Background	0.05 J1	1.70	1,950	0.01 J1	< 0.005 U1	0.190	0.541	0.901	0.1 J1	0.021	0.048	0.06 J1	2.55	0.07 J1	0.01 J1
2/14/2018	Background	0.04 J1	1.68	2,070	0.01 J1	< 0.005 U1	0.157	0.451	0.6982	0.11	0.008 J1	0.048	< 0.05 U1	2.12	0.1	0.01 J1
4/12/2018	Background	0.04 J1	1.98	2,250	< 0.004 U1	< 0.005 U1	0.187	0.616	1.091	0.19	0.01 J1	0.093	< 0.05 U1	1.79	0.04 J1	< 0.01 U1
6/12/2018	Background	0.06	2.20	2,140	0.008 J1	< 0.005 U1	0.231	0.795	0.888	0.13	0.009 J1	0.073	< 0.05 U1	1.24	0.06 J1	0.01 J1
8/22/2018	Background	0.07	2.98	2,280	< 0.004 U1	< 0.005 U1	0.324	0.776	1.103	0.14	0.02 J1	0.095	< 0.05 U1	1.51	0.05 J1	0.01 J1
10/16/2018	Background	< 0.02 U1	2.89	1,980	< 0.02 U1	< 0.01 U1	0.226	0.684	0.383	0.14	< 0.02 U1	0.064	< 0.05 U1	1 J1	0.08 J1	< 0.1 U1
12/12/2018	Background	< 0.02 U1	1.75	1,780	< 0.02 U1	< 0.01 U1	0.237	0.511	0.632	0.11	< 0.02 U1	0.042	< 0.05 U1	0.6 J1	0.1 J1	< 0.1 U1
2/12/2019	Detection	0.02 J1	1.63	1,860	< 0.02 U1	< 0.01 U1	0.222	0.486	0.3849	0.11	< 0.02 U1	0.049	< 0.05 U1	0.6 J1	0.08 J1	< 0.1 U1
4/10/2019	Assessment	0.02 J1	2.43	2,000	< 0.02 U1	< 0.01 U1	0.2 J1	0.477	1.643	0.10	< 0.02 U1	0.052	< 0.05 U1	0.5 J1	0.09 J1	< 0.1 U1
5/30/2019	Assessment	< 0.02 U1	2.44	2,100	< 0.02 U1	< 0.01 U1	0.233	0.432	1.05	0.13	< 0.02 U1	0.055	< 0.05 U1	0.5 J1	0.09 J1	< 0.1 U1
10/2/2019	Assessment	< 0.02 U1	2.84	2,380	< 0.02 U1	< 0.01 U1	0.208	0.318	1.399	0.10	< 0.05 U1	0.0767	< 0.2 U1	0.6 J1	0.08 J1	< 0.1 U1
2/11/2020	Assessment	0.03 J1	2.32	2,840	< 0.02 U1	< 0.01 U1	0.2 J1	0.172	2.02	0.12	< 0.05 U1	0.0873	< 0.2 U1	0.5 J1	< 0.03 U1	< 0.1 U1
4/21/2020	Assessment	0.03 J1	2.00	2,570	< 0.02 U1	< 0.01 U1	0.234	0.282	1.013	0.10	< 0.05 U1	0.0661	< 0.2 U1	0.9 J1	0.08 J1	< 0.1 U1
10/7/2020	Assessment	0.06 J1	2.09	2,770	< 0.02 U1	< 0.01 U1	0.08 J1	0.189	0.5813	0.15	< 0.05 U1	0.0716	< 0.2 U1	0.4 J1	0.04 J1	< 0.1 U1
2/9/2021	Assessment	0.08 J1	3.36	3,810	< 0.02 U1	< 0.01 U1	0.1 J1	0.153	1.392	0.12	< 0.05 U1	0.0977	< 0.2 U1	0.4 J1	0.08 J1	< 0.1 U1
4/13/2021	Assessment	0.08 J1	3.94	3,540	< 0.007 U1	< 0.004 U1	0.2 J1	0.118	1.565	0.17	< 0.05 U1	0.103	< 0.2 U1	0.5 J1	< 0.09 U1	< 0.04 U1
10/12/2021	Assessment	0.08 J1	2.81	2,740	< 0.007 U1	< 0.004 U1	0.24	0.206	1.85	0.12	< 0.05 U1	0.0613	< 0.2 U1	0.5	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1604

**Clinch River - Pond 1
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
10/17/2017	Background	0.428	27.7	29.9	0.27	6.9	8.2	404
12/11/2017	Background	0.476	29.3	22.5	0.22	6.7	6.3	395
2/14/2018	Background	0.396	26.3	22.6	0.23	7.1	6.7	378
4/12/2018	Background	0.399	27.2	22.5	0.27	7.2	5.6	410
6/12/2018	Background	0.406	26.2	21.0	0.25	7.1	4.2	374
8/22/2018	Background	0.471	27.3	20.3	0.26	7.1	4.1	390
10/16/2018	Background	0.444	27.2	17.8	0.22	7.1	3.4	390
12/12/2018	Background	0.468	28.9	19.4	0.22	7.1	2.8	375
2/12/2019	Detection	0.350	28.0	20.4	0.21	7.2	1.7	386
4/10/2019	Assessment	0.384	28.5	21.1	0.21	7.2	1.4	399
5/30/2019	Assessment	0.348	26.0	19.0	0.26	7.3	1.9	384
10/2/2019	Assessment	0.413	30.9	24.3	0.20	7.1	2.4	407
2/11/2020	Assessment	0.404	27.8	21.9	0.24	7.3	1.3	393
4/21/2020	Assessment	0.392	29.3	24.7	0.25	6.5	0.8	401
10/7/2020	Assessment	0.400	27.3	17.4	0.34	7.0	0.5	384
2/9/2021	Assessment	0.462	22.4	15.7	0.37	7.3	0.9	441
4/13/2021	Assessment	0.403	25.8	16.9	0.30	7.3	0.9	396
10/12/2021	Assessment	0.444	22.9	16.6	0.31	7.6	< 0.06 U1	390

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1604
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/17/2017	Background	0.05	1.64	3,330	< 0.004 U1	< 0.005 U1	0.331	0.585	2.503	0.27	0.060	0.078	< 0.05 U1	1.57	0.04 J1	0.01 J1
12/11/2017	Background	0.04 J1	1.39	3,160	< 0.004 U1	< 0.005 U1	0.113	0.347	0.46499	0.22	0.02 J1	0.090	0.06 J1	0.83	< 0.03 U1	0.01 J1
2/14/2018	Background	0.05 J1	1.61	3,320	< 0.004 U1	< 0.005 U1	0.116	0.487	1.265	0.23	0.01 J1	0.080	< 0.05 U1	0.92	0.05 J1	< 0.01 U1
4/12/2018	Background	0.18	3.10	2,880	0.007 J1	< 0.005 U1	0.255	0.427	1.117	0.27	0.068	0.078	< 0.05 U1	0.50	0.07 J1	< 0.01 U1
6/12/2018	Background	0.08	1.58	3,210	0.005 J1	< 0.005 U1	0.248	0.687	1.762	0.25	0.047	0.087	< 0.05 U1	0.47	0.05 J1	0.01 J1
8/22/2018	Background	0.07	1.71	3,260	< 0.004 U1	< 0.005 U1	0.244	1.03	1.185	0.26	0.01 J1	0.085	< 0.05 U1	0.54	0.05 J1	0.02 J1
10/16/2018	Background	< 0.02 U1	1.89	3,040	< 0.02 U1	< 0.01 U1	0.207	1.12	0.776	0.22	< 0.02 U1	0.080	< 0.05 U1	0.6 J1	0.06 J1	< 0.1 U1
12/12/2018	Background	0.04 J1	1.36	3,150	< 0.02 U1	< 0.01 U1	0.2 J1	0.634	1.019	0.22	0.02 J1	0.077	< 0.05 U1	0.5 J1	0.03 J1	< 0.1 U1
2/12/2019	Detection	< 0.02 U1	1.50	3,010	< 0.02 U1	< 0.01 U1	0.2 J1	0.590	0.6812	0.21	< 0.02 U1	0.076	< 0.05 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
4/10/2019	Assessment	0.03 J1	2.26	3,280	< 0.02 U1	< 0.01 U1	0.1 J1	0.701	1.561	0.21	< 0.02 U1	0.083	< 0.05 U1	0.4 J1	0.05 J1	< 0.1 U1
5/30/2019	Assessment	0.02 J1	2.44	3,280	< 0.02 U1	< 0.01 U1	0.262	0.766	0.653	0.26	< 0.02 U1	0.077	< 0.05 U1	0.4 J1	0.05 J1	< 0.1 U1
10/2/2019	Assessment	< 0.02 U1	2.98	3,320	< 0.02 U1	< 0.01 U1	0.213	0.672	1.521	0.20	< 0.05 U1	0.0887	< 0.2 U1	< 0.4 U1	0.05 J1	< 0.1 U1
2/11/2020	Assessment	0.05 J1	2.40	3,200	< 0.02 U1	< 0.01 U1	0.2 J1	0.574	1.596	0.24	< 0.05 U1	0.0636	< 0.2 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
4/21/2020	Assessment	0.03 J1	2.03	3,470	< 0.02 U1	< 0.01 U1	0.1 J1	0.580	2.091	0.25	< 0.05 U1	0.0759	< 0.2 U1	0.9 J1	0.03 J1	< 0.1 U1
10/7/2020	Assessment	0.42	2.99	2,940	< 0.02 U1	< 0.01 U1	0.286	0.463	0.6107	0.34	< 0.05 U1	0.0661	< 0.2 U1	2 J1	< 0.03 U1	< 0.1 U1
2/9/2021	Assessment	0.12	1.88	3,170	< 0.02 U1	< 0.01 U1	0.05 J1	0.329	1.288	0.37	< 0.05 U1	0.0710	< 0.2 U1	< 0.4 U1	0.07 J1	< 0.1 U1
4/13/2021	Assessment	0.05 J1	1.28	3,000	< 0.007 U1	< 0.004 U1	0.2 J1	0.299	1.096	0.30	< 0.05 U1	0.0713	< 0.2 U1	0.2 J1	< 0.09 U1	< 0.04 U1
10/12/2021	Assessment	0.06 J1	4.58	3,130	< 0.007 U1	< 0.004 U1	0.19 J1	0.210	1.37	0.31	< 0.05 U1	0.0739	< 0.2 U1	0.2 J1	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1605

**Clinch River - Pond 1
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
10/17/2017	Background	0.540	44.2	184	0.34	7.4	97.8	808
12/12/2017	Background	0.522	44.0	342	0.32	7.7	91.1	807
2/15/2018	Background	0.589	50.8	180	0.35	7.8	101	793
4/11/2018	Background	0.543	48.1	184	0.40	7.8	105	1,700
6/12/2018	Background	0.569	48.2	184	0.40	7.7	109	842
8/22/2018	Background	0.699	48.9	186	0.41	7.7	104	857
10/16/2018	Background	0.586	47.9	181	0.37	7.8	85.2	838
12/11/2018	Background	0.589	46.9	177	0.37	7.9	70.5	798
2/12/2019	Detection	0.582	45.1	174	0.35	7.9	61.8	808
4/10/2019	Assessment	0.583	42.9	173	0.33	7.9	46.5	777
5/30/2019	Assessment	0.523	39.5	180	0.39	7.9	47.4	772
10/2/2019	Assessment	0.613	47.6	179	0.31	7.8	35.1	768
2/11/2020	Assessment	0.571	38.7	160	0.36	8.0	11.2	699
4/21/2020	Assessment	0.535	42.3	163	0.33	7.0	5.0	678
10/7/2020	Assessment	0.545	43.4	154	0.38	7.6	< 0.06 U1	682
2/9/2021	Assessment	0.549	42.7	159	0.38	7.8	< 0.06 U1	705
4/13/2021	Assessment	0.529	43.0	161	0.30	7.9	< 0.06 U1	653
10/12/2021	Assessment	0.548	41.6	164	0.36	8.0	< 0.06 U1	660

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1605
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/17/2017	Background	0.28	5.81	1,670	< 0.004 U1	< 0.005 U1	0.163	0.403	2.122	0.34	0.029	0.191	< 0.05 U1	8.54	0.05 J1	< 0.01 U1
12/12/2017	Background	0.21	7.25	1,570	0.005 J1	< 0.005 U1	0.158	0.354	2.159	0.32	0.026	0.183	< 0.05 U1	7.42	0.08 J1	0.01 J1
2/15/2018	Background	0.10	4.59	1,560	< 0.004 U1	< 0.005 U1	0.136	0.306	1.134	0.35	0.051	0.220	< 0.05 U1	6.62	0.07 J1	0.02 J1
4/11/2018	Background	0.07	4.58	1,250	< 0.004 U1	< 0.005 U1	0.219	0.316	1.24	0.40	0.036	0.196	< 0.05 U1	4.35	0.05 J1	< 0.01 U1
6/12/2018	Background	0.14	4.50	1,290	0.004 J1	< 0.005 U1	0.230	0.357	1.132	0.40	0.085	0.207	< 0.05 U1	4.19	< 0.03 U1	0.01 J1
8/22/2018	Background	0.11	3.35	1,330	0.01 J1	< 0.005 U1	0.291	0.407	0.349	0.41	0.040	0.206	< 0.05 U1	3.38	0.05 J1	0.02 J1
10/16/2018	Background	0.04 J1	3.11	1,130	< 0.02 U1	< 0.01 U1	0.215	0.321	0.641	0.37	< 0.02 U1	0.198	< 0.05 U1	2.78	< 0.03 U1	< 0.1 U1
12/11/2018	Background	0.04 J1	3.83	1,170	< 0.02 U1	< 0.01 U1	0.2 J1	0.309	2.717	0.37	< 0.02 U1	0.199	< 0.05 U1	2.65	< 0.03 U1	< 0.1 U1
2/12/2019	Detection	0.07 J1	5.22	1,110	< 0.02 U1	0.02 J1	0.246	0.264	0.644	0.35	0.05 J1	0.206	< 0.05 U1	2.10	0.04 J1	< 0.1 U1
4/10/2019	Assessment	0.06 J1	4.11	1,100	< 0.02 U1	0.01 J1	0.288	0.200	1.137	0.33	0.05 J1	0.199	< 0.05 U1	2.34	0.05 J1	< 0.1 U1
5/30/2019	Assessment	0.04 J1	3.81	1,050	< 0.02 U1	< 0.01 U1	0.221	0.176	1.36	0.39	< 0.02 U1	0.178	< 0.05 U1	1 J1	< 0.03 U1	< 0.1 U1
10/2/2019	Assessment	0.03 J1	2.75	1,160	< 0.02 U1	< 0.01 U1	0.2 J1	0.125	0.868	0.31	< 0.05 U1	0.204	< 0.2 U1	1 J1	0.07 J1	< 0.1 U1
2/11/2020	Assessment	0.09 J1	3.14	1,390	< 0.02 U1	< 0.01 U1	0.455	0.068	0.6629	0.36	< 0.05 U1	0.174	< 0.2 U1	0.7 J1	< 0.03 U1	< 0.1 U1
4/21/2020	Assessment	0.06 J1	1.95	1,730	< 0.02 U1	< 0.01 U1	0.335	0.115	1.388	0.33	0.06 J1	0.191	< 0.2 U1	2.68	< 0.03 U1	< 0.1 U1
10/7/2020	Assessment	0.03 J1	2.07	1,890	< 0.02 U1	< 0.01 U1	0.300	0.060	6.63	0.38	< 0.05 U1	0.173	< 0.2 U1	0.7 J1	< 0.03 U1	< 0.1 U1
2/9/2021	Assessment	0.03 J1	1.54	2,160	< 0.02 U1	< 0.01 U1	0.06 J1	0.04 J1	1.713	0.38	< 0.05 U1	0.190	< 0.2 U1	0.6 J1	0.05 J1	< 0.1 U1
4/13/2021	Assessment	0.04 J1	1.78	2,150	< 0.007 U1	< 0.004 U1	0.256	0.04 J1	1.163	0.30	< 0.05 U1	0.182	< 0.2 U1	0.6 J1	< 0.09 U1	< 0.04 U1
10/12/2021	Assessment	0.02 J1	1.29	2,390	< 0.007 U1	< 0.004 U1	0.24	0.038	1.65	0.36	0.06 J1	0.191	< 0.2 U1	0.5	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1606**Clinch River - Pond 1
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
10/18/2017	Background	0.078	50.9	14.3	0.20	6.8	57.9	374
12/12/2017	Background	0.194	55.3	14.4	0.17	7.1	66.8	348
2/14/2018	Background	0.175	56.8	14.9	0.18	7.1	68.3	336
4/10/2018	Background	0.148	44.8	12.9	0.26	7.2	42.4	302
6/11/2018	Background	0.144	55.0	14.0	0.27	7.0	45.4	316
8/21/2018	Background	0.168	64.4	15.7	0.23	7.0	54.9	377
10/15/2018	Background	0.136	60.0	14.3	0.24	7.1	47.8	344
12/11/2018	Background	0.126	58.6	13.9	0.25	7.2	42.1	329
2/12/2019	Detection	0.110	56.8	14.1	0.24	7.2	39.7	341
4/9/2019	Assessment	0.07 J1	62.2	13.0	0.16	7.2	32.5	352
5/29/2019	Assessment	0.05 J1	55.9	11.5	0.16	7.3	27.6	336
10/1/2019	Assessment	0.084	58.9	13.6	0.19	7.0	32.4	350
2/10/2020	Assessment	0.084	54.5	11.8	0.19	7.3	35.4	321
4/20/2020	Assessment	0.04 J1	59.2	7.0	0.12	6.6	25.4	287
10/7/2020	Assessment	0.067	59.3	12.9	0.18	7.1	35.7	321
2/9/2021	Assessment	0.079	57.8	13.0	0.22	7.1	26.5	368
4/12/2021	Assessment	0.083	57.2	13.4	0.22	7.1	26.8	333
10/12/2021	Assessment	0.139	57.7	13.4	0.22	7.3	44.8	330

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1606
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/18/2017	Background	0.02 J1	7.03	117	< 0.004 U1	0.01 J1	0.139	6.00	2.331	0.20	0.628	0.089	< 0.05 U1	84.2	0.06 J1	0.04 J1
12/12/2017	Background	0.02 J1	6.77	117	0.005 J1	0.01 J1	0.216	6.33	0.7252	0.17	0.573	0.086	0.06 J1	82.4	0.1 J1	0.04 J1
2/14/2018	Background	0.03 J1	6.76	116	0.006 J1	< 0.005 U1	0.140	5.66	1.459	0.18	0.388	0.067	< 0.05 U1	65.1	0.1 J1	0.04 J1
4/10/2018	Background	0.02 J1	6.72	104	0.007 J1	0.01 J1	0.225	5.53	1.156	0.26	0.549	0.095	< 0.05 U1	89.6	0.1	0.04 J1
6/11/2018	Background	0.04 J1	6.89	114	0.006 J1	< 0.005 U1	0.205	4.98	1.154	0.27	0.451	0.099	< 0.05 U1	91.5	0.08 J1	0.05
8/21/2018	Background	0.04 J1	7.19	124	0.006 J1	0.006 J1	0.218	6.13	1.269	0.23	0.515	0.081	< 0.05 U1	66.1	0.08 J1	0.05
10/15/2018	Background	0.03 J1	7.13	116	< 0.02 U1	< 0.01 U1	0.211	5.34	1.148	0.24	0.391	0.087	< 0.05 U1	71.9	0.07 J1	< 0.1 U1
12/11/2018	Background	< 0.02 U1	7.71	117	< 0.02 U1	< 0.01 U1	0.2 J1	5.58	2.743	0.25	0.445	0.091	< 0.05 U1	80.7	0.05 J1	< 0.1 U1
2/12/2019	Detection	< 0.02 U1	7.90	117	< 0.02 U1	< 0.01 U1	0.2 J1	5.79	1.189	0.24	0.343	0.100	< 0.05 U1	87.4	0.04 J1	< 0.1 U1
4/9/2019	Assessment	< 0.02 U1	11.0	107	< 0.02 U1	< 0.01 U1	0.1 J1	4.99	1.491	0.16	0.225	0.044	< 0.05 U1	44.8	0.08 J1	< 0.1 U1
5/29/2019	Assessment	< 0.02 U1	11.6	106	< 0.02 U1	< 0.01 U1	0.2 J1	4.86	1.4097	0.16	0.255	0.038	< 0.05 U1	39.1	< 0.03 U1	< 0.1 U1
10/1/2019	Assessment	< 0.02 U1	8.33	120	< 0.02 U1	< 0.01 U1	0.2 J1	4.66	0.962	0.19	0.358	0.0717	< 0.2 U1	57.8	0.05 J1	< 0.1 U1
2/10/2020	Assessment	0.02 J1	8.09	105	< 0.02 U1	0.02 J1	0.380	5.03	2.82	0.19	0.713	0.0645	< 0.2 U1	61.4	0.1 J1	< 0.1 U1
4/20/2020	Assessment	0.03 J1	2.80	83.1	< 0.02 U1	0.02 J1	0.2 J1	2.15	2.82	0.12	0.253	0.0267	< 0.2 U1	29.3	0.2	0.1 J1
10/7/2020	Assessment	0.04 J1	15.0	106	< 0.02 U1	0.02 J1	0.2 J1	3.52	2.816	0.18	0.731	0.0220	< 0.2 U1	34.6	0.1 J1	< 0.1 U1
2/9/2021	Assessment	0.03 J1	10.5	124	< 0.02 U1	0.04 J1	0.572	4.68	1.63	0.22	1.03	0.0561	< 0.2 U1	56.7	0.1 J1	< 0.1 U1
4/12/2021	Assessment	< 0.02 U1	8.32	113	0.01 J1	0.02 J1	0.234	4.13	1.507	0.22	0.538	0.0558	< 0.2 U1	53.5	< 0.09 U1	< 0.04 U1
10/12/2021	Assessment	0.02 J1	8.37	127 M1	0.019 J1	0.032	0.48	4.19	6.15	0.22	0.98	0.0979 M1, P3	< 0.2 U1	69.4	0.13 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.

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

P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.

Table 1 - Groundwater Data Summary: MW-1607

**Clinch River - Pond 1
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
10/18/2017	Background	0.139	54.9	16.7	0.25	7.6	197	468
12/12/2017	Background	0.212	50.1	16.3	0.22	7.4	206	417
2/14/2018	Background	0.121	48.7	10.7	0.20	7.9	149	284
4/11/2018	Background	0.143	49.1	11.0	0.22	8.0	153	306
6/11/2018	Background	0.143	49.5	11.1	0.23	7.8	156	278
8/21/2018	Background	0.151	46.4	12.0	0.26	8.0	162	315
10/15/2018	Background	0.122	45.8	11.7	0.26	8.1	159	302
12/11/2018	Background	0.111	44.8	10.0	0.25	7.7	150	280
2/12/2019	Detection	0.1 J1	46.3	9.5	0.23	7.9	151	298
4/9/2019	Assessment	0.134	47.2	8.2	0.20	8.0	130	296
5/29/2019	Assessment	0.1 J1	44.5	8.4	0.23	7.9	146	293
10/2/2019	Assessment	0.112	49.4	8.5	0.18	7.8	147	290
2/11/2020	Assessment	0.106	47.3	6.6	0.21	8.1	124	279
4/21/2020	Assessment	0.108	48.5	6.7	0.19	7.0	125	275
10/6/2020	Assessment	0.111	42.7	7.4	0.24	7.7	136	270
2/9/2021	Assessment	0.113	41.5	7.0	0.26	7.5	128	303
4/13/2021	Assessment	0.099	43.9	6.3	0.23	7.9	120	275
10/11/2021	Assessment	0.108	44.1	6.74	0.24	8.0	128	260

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1607
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/18/2017	Background	0.05	4.38	141	< 0.004 U1	0.02 J1	0.273	4.06	2.733	0.25	0.228	0.110	< 0.05 U1	89.7	0.09 J1	< 0.01 U1
12/12/2017	Background	0.08	5.28	92.5	0.005 J1	0.12	0.194	8.94	1.062	0.22	0.614	0.119	0.08 J1	126	0.09 J1	0.01 J1
2/14/2018	Background	0.05 J1	0.96	71.5	< 0.004 U1	0.18	0.100	11.2	0.743	0.20	0.727	0.110	< 0.05 U1	160	0.1	0.01 J1
4/11/2018	Background	0.04 J1	1.05	71.1	< 0.004 U1	0.17	0.206	11.4	0.436	0.22	0.585	0.125	< 0.05 U1	144	0.1	0.03 J1
6/11/2018	Background	0.05	0.98	74.7	< 0.004 U1	0.09	0.208	11.3	0.975	0.23	0.524	0.133	< 0.05 U1	153	0.2	0.05 J1
8/21/2018	Background	0.06	1.29	75.7	< 0.004 U1	0.11	0.216	10.1	0.511	0.26	0.525	0.129	< 0.05 U1	165	0.2	0.03 J1
10/15/2018	Background	0.09 J1	1.46	71.9	< 0.02 U1	0.11	0.224	10.9	0.999	0.26	0.524	0.132	< 0.05 U1	164	0.04 J1	< 0.1 U1
12/11/2018	Background	0.03 J1	1.01	70.4	< 0.02 U1	0.25	0.2 J1	12.1	0.66	0.25	0.701	0.126	< 0.05 U1	168	0.1 J1	< 0.1 U1
2/12/2019	Detection	0.04 J1	0.86	73.1	< 0.02 U1	0.18	0.2 J1	12.7	0.885	0.23	0.586	0.139	< 0.05 U1	175	0.2 J1	< 0.1 U1
4/9/2019	Assessment	0.03 J1	1.59	75.3	< 0.02 U1	0.11	0.2 J1	8.87	0.701	0.20	0.423	0.127	< 0.05 U1	138	0.2 J1	< 0.1 U1
5/29/2019	Assessment	0.03 J1	1.08	74.2	< 0.02 U1	0.18	0.212	10.2	0.744	0.23	0.366	0.123	< 0.05 U1	154	0.2 J1	< 0.1 U1
10/2/2019	Assessment	< 0.02 U1	1.64	72.4	< 0.02 U1	0.18	0.2 J1	6.74	1.028	0.18	0.228	0.132	< 0.2 U1	148	0.1 J1	< 0.1 U1
2/11/2020	Assessment	0.03 J1	0.83	69.8	< 0.02 U1	0.17	0.1 J1	9.61	1.659	0.21	0.684	0.112	< 0.2 U1	131	0.4	< 0.1 U1
4/21/2020	Assessment	0.04 J1	0.96	72.4	< 0.02 U1	0.17	0.209	10.1	0.978	0.19	0.667	0.120	< 0.2 U1	134	0.7	0.1 J1
10/6/2020	Assessment	0.08 J1	1.27	68.2	< 0.02 U1	0.10	0.05 J1	7.82	0.315	0.24	0.323	0.125	< 0.2 U1	134	0.2	< 0.1 U1
2/9/2021	Assessment	0.04 J1	1.13	68.5	< 0.02 U1	0.07	0.842	8.45	1.624	0.26	0.394	0.126	< 0.2 U1	141	0.1 J1	< 0.1 U1
4/13/2021	Assessment	0.04 J1	1.00	62.0	< 0.007 U1	0.15	0.2 J1	8.87	0.807	0.23	0.626	0.112	< 0.2 U1	128	0.3 J1	0.05 J1
10/11/2021	Assessment	0.03 J1	1.42	66.8	< 0.007 U1	0.064	< 0.04 U1	6.25	1.63	0.24	0.22	0.108 M1	< 0.2 U1	122	0.12 J1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

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

Table 1 - Groundwater Data Summary: MW-1608

**Clinch River - Pond 1
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
10/19/2017	Background	0.359	1.92	7.6	0.45	8.1	179	484
12/11/2017	Background	0.375	1.31	7.3	0.40	8.0	176	468
2/13/2018	Background	0.349	1.09	8.7	0.45	8.7	182	466
4/10/2018	Background	0.334	0.779	8.0	0.48	8.8	178	466
6/7/2018	Background	0.389	0.708	7.2	0.44	8.7	171	437
8/20/2018	Background	0.315	1.31	7.4	0.43	8.7	173	441
10/17/2018	Background	0.344	1.37	6.8	0.43	0.1	167	439
12/6/2018	Background	0.365	1.24	6.1	0.42	8.7	166	423
2/7/2019	Detection	0.332	1.35	6.2	0.42	8.6	171	445
4/8/2019	Assessment	0.352	1.32	6.7	0.39	8.7	162	454
5/28/2019	Assessment	0.310	1.11	5.4	0.44	8.7	174	443
10/1/2019	Assessment	0.351	1.19	6.6	0.39	8.7	176	457
2/10/2020	Assessment	0.353	0.748	5.2	0.41	9.2	164	422
4/20/2020	Assessment	0.344	0.959	4.6	0.42	8.2	167	418
10/6/2020	Assessment	0.360	1.01	6.6	0.40	8.5	182	445
2/8/2021	Assessment	0.347	0.968	5.8	0.46	8.3	167	442
4/12/2021	Assessment	0.343	0.744	5.8	0.45	8.6	166	434
10/11/2021	Assessment	0.332	0.8	5.68	0.42	8.5	163	420

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1608
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/19/2017	Background	0.06	1.69	42.7	0.042	< 0.005 U1	0.956	0.442	0.661	0.45	0.405	0.027	< 0.05 U1	9.04	0.1	0.02 J1
12/11/2017	Background	0.06	1.96	42.9	0.066	< 0.005 U1	1.26	0.425	0.498	0.40	0.526	0.032	0.07 J1	7.35	0.1	0.02 J1
2/13/2018	Background	0.05 J1	2.00	43.8	0.062	< 0.005 U1	1.08	0.401	0.939	0.45	0.656	0.024	< 0.05 U1	6.43	0.09 J1	0.03 J1
4/10/2018	Background	0.05 J1	1.86	41.9	0.056	< 0.005 U1	1.11	0.372	0.484	0.48	0.675	0.023	< 0.05 U1	3.52	0.1	0.02 J1
6/7/2018	Background	0.06	2.99	44.3	0.041	0.006 J1	0.912	0.330	0.894	0.44	0.721	0.028	< 0.05 U1	2.49	0.09 J1	0.02 J1
8/20/2018	Background	0.06	1.88	38.4	0.031	0.02 J1	0.938	0.284	2.988	0.43	0.438	0.018	< 0.05 U1	3.20	0.07 J1	0.02 J1
10/17/2018	Background	0.03 J1	1.70	34.2	0.03 J1	< 0.01 U1	0.647	0.217	3.565	0.43	0.273	0.02 J1	< 0.05 U1	2.89	0.06 J1	< 0.1 U1
12/6/2018	Background	0.04 J1	1.36	33.1	0.03 J1	< 0.01 U1	0.639	0.229	0.518	0.42	0.284	0.01 J1	< 0.05 U1	2.67	0.04 J1	< 0.1 U1
2/7/2019	Detection	0.04 J1	1.64	35.3	0.02 J1	< 0.01 U1	0.633	0.233	0.1256	0.42	0.256	0.03 J1	< 0.05 U1	2.66	0.07 J1	< 0.1 U1
4/8/2019	Assessment	0.03 J1	1.46	32.9	< 0.02 U1	< 0.01 U1	0.696	0.227	0.4948	0.39	0.255	0.02 J1	< 0.05 U1	2.32	0.06 J1	< 0.1 U1
5/28/2019	Assessment	0.08 J1	1.35	34.4	0.03 J1	0.02 J1	0.722	0.262	0.163	0.44	0.418	< 0.009 U1	0.1 J1	2.11	< 0.03 U1	< 0.1 U1
10/1/2019	Assessment	0.03 J1	1.46	35.0	< 0.02 U1	< 0.01 U1	0.359	0.159	0.462	0.39	0.214	0.0211	< 0.2 U1	2 J1	0.04 J1	< 0.1 U1
2/10/2020	Assessment	0.03 J1	1.22	29.8	< 0.02 U1	< 0.01 U1	0.618	0.280	0.594	0.41	0.250	0.0197	< 0.2 U1	2 J1	0.04 J1	< 0.1 U1
4/20/2020	Assessment	0.02 J1	0.89	28.9	< 0.02 U1	< 0.01 U1	0.413	0.203	1.497	0.42	0.2 J1	0.0185	< 0.2 U1	1 J1	0.05 J1	< 0.1 U1
10/6/2020	Assessment	0.02 J1	1.25	32.0	< 0.02 U1	< 0.01 U1	0.302	0.200	0.79	0.40	0.1 J1	0.0196	< 0.2 U1	2 J1	0.03 J1	< 0.1 U1
2/8/2021	Assessment	< 0.02 U1	1.15	30.3	< 0.02 U1	< 0.01 U1	0.408	0.175	0.715	0.46	0.1 J1	0.0194	< 0.2 U1	1 J1	0.07 J1	< 0.1 U1
4/12/2021	Assessment	0.02 J1	1.06	28.1	0.008 J1	< 0.004 U1	0.207	0.120	0.646	0.45	0.1 J1	0.0183	< 0.2 U1	1 J1	< 0.09 U1	< 0.04 U1
10/11/2021	Assessment	0.03 J1	0.98	27.7	< 0.007 U1	< 0.004 U1	0.23	0.122	0.68	0.42	0.10 J1	0.0189	< 0.2 U1	1.0	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1609

**Clinch River - Pond 1
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
10/18/2017	Background	0.017	66.6	4.1	0.32	6.7	13.6	358
12/11/2017	Background	0.084	67.9	3.1	0.32	6.6	12.6	326
2/13/2018	Background	0.084	60.7	3.2	0.31	7.6	21.8	262
4/10/2018	Background	0.041	59.9	1.7	0.27	7.4	15.8	292
6/11/2018	Background	0.077	75.5	1.9	0.28	7.3	21.0	312
8/21/2018	Background	0.117	72.6	1.5	0.29	7.3	13.7	311
10/15/2018	Background	0.05 J1	70.0	1.6	0.27	7.5	16.8	276
12/6/2018	Background	0.04 J1	66.1	1.5	0.26	7.5	14.9	281
2/7/2019	Detection	< 0.02 U1	72.3	1.3	0.21	7.4	13.7	305
4/8/2019	Assessment	< 0.02 U1	82.5	1.2	0.20	7.5	13.6	323
5/28/2019	Assessment	< 0.02 U1	74.8	1.3	0.25	7.6	17.4	322
10/1/2019	Assessment	< 0.02 U1	69.0	1.3	0.25	7.4	13.2	282
2/10/2020	Assessment	< 0.02 U1	65.6	1.1	0.22	7.8	12.9	287
4/20/2020	Assessment	< 0.02 U1	66.0	1.1	0.21	7.0	12.4	276
10/6/2020	Assessment	< 0.02 U1	70.1	1.4	0.23	7.3	17.3	271
2/8/2021	Assessment	< 0.02 U1	66.4	1.5	0.26	7.4	19.6	284
4/12/2021	Assessment	< 0.009 U1	66.2	1.0	0.24	7.5	11.7	282
10/11/2021	Assessment	< 0.009 U1	71.1	1.40	0.24	7.7	17.0	260

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1609
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/18/2017	Background	0.06	0.97	476	< 0.004 U1	< 0.005 U1	0.126	0.338	3.258	0.32	0.142	< 0.0002 U1	< 0.05 U1	2.22	0.03 J1	< 0.01 U1
12/11/2017	Background	0.05	0.95	507	0.004 J1	< 0.005 U1	0.112	0.258	1.423	0.32	0.033	0.010	< 0.05 U1	1.78	< 0.03 U1	0.03 J1
2/13/2018	Background	0.05 J1	0.43	333	< 0.004 U1	< 0.005 U1	0.151	0.522	1.661	0.31	0.326	< 0.0002 U1	< 0.05 U1	1.55	0.1 J1	0.03 J1
4/10/2018	Background	0.03 J1	0.18	359	< 0.004 U1	0.02 J1	0.164	0.168	1.544	0.27	0.426	0.0009 J1	< 0.05 U1	1.34	0.2	0.01 J1
6/11/2018	Background	0.07	0.19	397	< 0.004 U1	0.04	0.154	0.082	1.893	0.28	0.524	0.005	< 0.05 U1	0.79	0.1	0.01 J1
8/21/2018	Background	0.13	0.28	435	< 0.004 U1	0.03	0.232	1.38	1.161	0.29	0.548	0.004	< 0.05 U1	0.46	0.03 J1	0.09
10/15/2018	Background	0.05 J1	0.19	345	< 0.02 U1	< 0.01 U1	0.319	0.558	0.8423	0.27	0.506	< 0.009 U1	< 0.05 U1	0.6 J1	< 0.03 U1	< 0.1 U1
12/6/2018	Background	0.02 J1	0.14	356	< 0.02 U1	0.01 J1	0.2 J1	0.114	1.794	0.26	0.350	0.01 J1	< 0.05 U1	0.6 J1	0.1 J1	< 0.1 U1
2/7/2019	Detection	0.03 J1	0.10	365	< 0.02 U1	0.02 J1	0.239	< 0.02 U1	1.569	0.21	0.362	< 0.009 U1	< 0.05 U1	0.4 J1	0.2 J1	< 0.1 U1
4/8/2019	Assessment	0.03 J1	0.10	443	< 0.02 U1	0.01 J1	0.1 J1	0.206	1.519	0.20	0.528	< 0.009 U1	< 0.05 U1	< 0.4 U1	0.06 J1	< 0.1 U1
5/28/2019	Assessment	0.02 J1	0.10	466	< 0.02 U1	0.01 J1	0.234	< 0.02 U1	1.387	0.25	0.337	< 0.009 U1	0.1 J1	< 0.4 U1	0.7	< 0.1 U1
10/1/2019	Assessment	0.02 J1	0.19	412	< 0.02 U1	0.02 J1	0.1 J1	0.634	2.24	0.25	0.935	0.00107	< 0.2 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
2/10/2020	Assessment	< 0.02 U1	0.13	355	< 0.02 U1	0.01 J1	0.1 J1	0.226	2.79	0.22	1.25	0.000755	< 0.2 U1	0.6 J1	0.1 J1	< 0.1 U1
4/20/2020	Assessment	< 0.02 U1	0.08 J1	337	< 0.02 U1	0.01 J1	0.2 J1	< 0.02 U1	5.26	0.21	0.323	0.000559	< 0.2 U1	< 0.4 U1	0.2	< 0.1 U1
10/6/2020	Assessment	0.03 J1	0.1 J1	424	< 0.02 U1	0.01 J1	0.203	0.212	1.938	0.23	0.324	0.000975	< 0.2 U1	1 J1	0.03 J1	< 0.1 U1
2/8/2021	Assessment	0.03 J1	0.1 J1	399	< 0.02 U1	0.01 J1	0.233	0.207	1.224	0.26	0.298	0.00101	< 0.2 U1	< 0.4 U1	0.1 J1	< 0.1 U1
4/12/2021	Assessment	0.02 J1	0.08 J1	340	< 0.007 U1	0.01 J1	0.08 J1	0.005 J1	4.39	0.24	0.242	0.000654	< 0.2 U1	0.3 J1	0.2 J1	< 0.04 U1
10/11/2021	Assessment	0.04 J1	0.09 J1	387	< 0.007 U1	0.015 J1	0.07 J1	0.241	1.3	0.24	0.57	0.00095	< 0.2 U1	0.3 J1	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1610

**Clinch River - Pond 1
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
10/17/2017	Background	0.097	35.5	11.9	0.18	7.3	47.7	260
12/12/2017	Background	0.092	35.0	11.1	0.17	7.1	46.2	241
2/15/2018	Background	0.105	37.3	11.8	0.20	7.5	49.1	247
4/11/2018	Background	0.060	36.1	11.7	0.21	7.6	46.4	254
6/12/2018	Background	0.053	35.8	13.4	0.21	7.5	53.2	258
8/21/2018	Background	0.139	35.2	11.7	0.22	7.6	48.7	258
10/16/2018	Background	0.07 J1	35.0	10.4	0.21	7.7	41.1	245
12/11/2018	Background	0.05 J1	33.6	10.5	0.22	7.7	43.3	233
2/12/2019	Detection	0.03 J1	35.4	10.8	0.21	7.7	41.2	257
4/9/2019	Assessment	0.05 J1	38.5	10.9	0.17	7.7	41.6	263
5/29/2019	Assessment	0.04 J1	35.6	10.5	0.18	7.8	44.1	263
10/1/2019	Assessment	0.04 J1	37.8	10.7	0.18	7.5	40.8	258
2/11/2020	Assessment	0.03 J1	36.8	10.5	0.19	7.8	36.4	245
4/20/2020	Assessment	0.04 J1	39.2	10.6	0.20	6.9	37.7	254
10/7/2020	Assessment	0.068	14.2	10.1	0.35	8.3	47.1	229
2/9/2021	Assessment	0.04 J1	31.2	10.0	0.26	7.7	38.7	251
4/12/2021	Assessment	0.04 J1	29.5	10.3	0.26	7.6	34.2	235
10/12/2021	Assessment	0.035 J1	30.9	9.84	0.20	8.0	14.5	210

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1610
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/17/2017	Background	0.22	1.67	212	< 0.004 U1	0.03	0.167	9.90	0.839	0.18	12.6	0.141	< 0.05 U1	139	0.4	0.03 J1
12/12/2017	Background	0.07	1.18	227	0.004 J1	0.01 J1	0.174	12.1	1.132	0.17	15.2	0.146	0.06 J1	152	0.3	0.01 J1
2/15/2018	Background	0.05 J1	1.56	203	0.007 J1	< 0.005 U1	0.159	11.7	0.688	0.20	11.1	0.180	< 0.05 U1	161	0.2	0.02 J1
4/11/2018	Background	0.09	1.37	193	0.004 J1	0.03	0.192	10.2	0.192	0.21	15.0	0.171	< 0.05 U1	135	0.4	0.02 J1
6/12/2018	Background	0.08	1.24	202	0.004 J1	< 0.005 U1	0.210	10.6	1.788	0.21	8.48	0.188	< 0.05 U1	132	0.3	0.02 J1
8/21/2018	Background	0.06	1.08	200	< 0.004 U1	< 0.005 U1	0.248	10.1	1.039	0.22	3.61	0.206	< 0.05 U1	172	0.1	0.02 J1
10/16/2018	Background	< 0.02 U1	1.28	203	< 0.02 U1	< 0.01 U1	0.262	8.25	0.938	0.21	4.33	0.207	< 0.05 U1	160	0.1 J1	< 0.1 U1
12/11/2018	Background	0.03 J1	1.69	200	< 0.02 U1	< 0.01 U1	0.208	8.97	1.759	0.22	7.18	0.219	< 0.05 U1	182	0.2	< 0.1 U1
2/12/2019	Detection	0.08 J1	1.59	253	< 0.02 U1	0.02 J1	0.2 J1	7.43	0.517	0.21	6.94	0.183	< 0.05 U1	159	0.5	< 0.1 U1
4/9/2019	Assessment	0.12	1.61	247	< 0.02 U1	0.03 J1	0.267	6.28	1.338	0.17	9.60	0.197	< 0.05 U1	156	0.5	< 0.1 U1
5/29/2019	Assessment	0.07 J1	1.29	241	< 0.02 U1	0.04 J1	0.243	7.92	0.331	0.18	6.54	0.191	< 0.05 U1	167	0.3	< 0.1 U1
10/1/2019	Assessment	0.02 J1	1.28	235	< 0.02 U1	< 0.01 U1	0.2 J1	6.35	0.883	0.18	3.28	0.192	< 0.2 U1	135	0.3	< 0.1 U1
2/11/2020	Assessment	0.35	1.00	272	< 0.02 U1	0.03 J1	0.209	6.77	1.182	0.19	4.96	0.173	< 0.2 U1	144	0.3	< 0.1 U1
4/20/2020	Assessment	1.46	1.39	261	< 0.02 U1	0.06	0.800	7.43	1.835	0.20	4.04	0.180	< 0.2 U1	143	0.3	< 0.1 U1
10/7/2020	Assessment	0.69	5.92	151	< 0.02 U1	< 0.01 U1	0.278	4.30	1.734	0.35	1.47	0.348	< 0.2 U1	345	0.3	< 0.1 U1
2/9/2021	Assessment	0.06 J1	1.67	311	< 0.02 U1	0.02 J1	0.248	5.31	0.944	0.26	0.551	0.215	< 0.2 U1	183	0.07 J1	< 0.1 U1
4/12/2021	Assessment	1.44	2.26	251	< 0.007 U1	0.01 J1	0.204	5.26	0.725	0.26	3.09	0.219	< 0.2 U1	185	0.5 J1	< 0.04 U1
10/12/2021	Assessment	0.08 J1	1.41	285	< 0.007 U1	0.007 J1	0.49	4.97	0.48	0.20	0.94	0.150	< 0.2 U1	83.0	0.13 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: MW-1611

**Clinch River - Pond 1
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
10/19/2017	Background	0.423	115	131	0.48	7.4	1,600	2,940
12/11/2017	Background	0.551	124	138	0.68	7.5	1,690	3,420
2/13/2018	Background	0.663	143	101	0.66	7.7	1,330	2,720
4/10/2018	Background	0.669	96.2	91.3	0.85	7.8	1,400	2,520
6/11/2018	Background	0.701	68.6	61.5	0.90	7.7	777	1,750
8/21/2018	Background	0.650	46.7	48.9	0.98	7.7	552	1,450
10/15/2018	Background	0.634	42.5	38.5	0.92	7.8	389	1,200
12/6/2018	Background	0.681	36.3	36.2	0.96	7.9	318	1,060
2/12/2019	Detection	0.559	31.9	31.3	0.98	7.8	259	989
4/9/2019	Assessment	0.622	32.8	26.9	0.92	7.9	222	939
5/29/2019	Assessment	0.536	27.7	24.2	0.99	8.0	201	852
10/1/2019	Assessment	0.617	28.2	21.7	1.06	7.8	166	771
2/11/2020	Assessment	0.586	25.8	17.9	1.00	8.0	139	697
4/20/2020	Assessment	0.569	26.0	17.0	1.07	7.1	125	662
10/6/2020	Assessment	0.556	24.0	16.0	1.02	7.7	98.1	622
2/8/2021	Assessment	0.558	22.6	14.7	1.15	7.7	82.9	619
4/12/2021	Assessment	0.546	22.7	14.8	1.18	7.9	71.8	580
10/11/2021	Assessment	0.549	22.6	13.5	0.91	8.1	48.3	540

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1611
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
10/19/2017	Background	0.33	7.16	91.8	< 0.004 U1	0.01 J1	0.656	0.311	1.295	0.48	1.05	0.109	< 0.05 U1	38.0	0.09 J1	< 0.01 U1
12/11/2017	Background	0.18	11.5	63.7	0.01 J1	< 0.01 U1	0.555	0.080	0.278	0.68	0.04 J1	0.130	0.08 J1	6.76	0.1 J1	0.04 J1
2/13/2018	Background	0.54	36.5	53.3	0.01 J1	< 0.005 U1	0.836	0.131	0.748	0.66	0.146	0.161	< 0.05 U1	2.19	0.1	0.11
4/10/2018	Background	0.50	39.5	51.0	0.009 J1	< 0.005 U1	0.864	0.122	0.257	0.85	0.142	0.130	< 0.05 U1	2.54	0.1	< 0.01 U1
6/11/2018	Background	0.23	27.5	57.2	0.008 J1	< 0.005 U1	0.640	0.092	0.766	0.90	0.169	0.110	< 0.05 U1	2.10	0.09 J1	< 0.01 U1
8/21/2018	Background	0.15	20.1	60.6	0.007 J1	< 0.005 U1	0.572	0.076	0.36	0.98	0.144	0.090	< 0.05 U1	1.85	0.08 J1	0.04 J1
10/15/2018	Background	0.10	19.2	63.3	< 0.02 U1	< 0.01 U1	0.454	0.062	0.467	0.92	0.133	0.079	< 0.05 U1	2 J1	0.05 J1	< 0.1 U1
12/6/2018	Background	0.06 J1	16.4	68.8	< 0.02 U1	< 0.01 U1	0.355	0.055	0.384	0.96	0.120	0.080	< 0.05 U1	2.41	0.04 J1	< 0.1 U1
2/12/2019	Detection	0.05 J1	13.2	75.7	< 0.02 U1	< 0.01 U1	0.326	0.056	0.3448	0.98	0.109	0.071	< 0.05 U1	2.52	0.04 J1	< 0.1 U1
4/9/2019	Assessment	0.05 J1	11.9	80.8	< 0.02 U1	< 0.01 U1	0.415	0.062	0.512	0.92	0.09 J1	0.087	< 0.05 U1	2.36	0.05 J1	< 0.1 U1
5/29/2019	Assessment	0.05 J1	9.20	85.3	< 0.02 U1	< 0.01 U1	0.343	0.03 J1	0.457	0.99	< 0.02 U1	0.073	< 0.05 U1	2.12	0.05 J1	< 0.1 U1
10/1/2019	Assessment	0.03 J1	9.46	100	< 0.02 U1	< 0.01 U1	0.295	0.055	0.524	1.06	0.08 J1	0.0699	< 0.2 U1	2.84	0.08 J1	< 0.1 U1
2/11/2020	Assessment	0.03 J1	8.01	112	< 0.02 U1	< 0.01 U1	0.221	0.03 J1	0.34769	1.00	0.06 J1	0.0629	< 0.2 U1	3.89	0.04 J1	< 0.1 U1
4/20/2020	Assessment	0.02 J1	7.30	113	< 0.02 U1	< 0.01 U1	0.2 J1	0.02 J1	1.935	1.07	< 0.05 U1	0.0646	< 0.2 U1	2.08	0.04 J1	< 0.1 U1
10/6/2020	Assessment	0.04 J1	6.69	130	< 0.02 U1	< 0.01 U1	0.293	0.03 J1	0.763	1.02	0.07 J1	0.0630	< 0.2 U1	2.21	0.06 J1	< 0.1 U1
2/8/2021	Assessment	0.02 J1	6.62	151	< 0.02 U1	< 0.01 U1	0.261	0.02 J1	0.915	1.15	< 0.05 U1	0.0620	< 0.2 U1	2 J1	0.03 J1	< 0.1 U1
4/12/2021	Assessment	0.02 J1	6.19	157	< 0.007 U1	< 0.004 U1	0.2 J1	0.02 J1	0.753	1.18	< 0.05 U1	0.0613	< 0.2 U1	1 J1	< 0.09 U1	< 0.04 U1
10/11/2021	Assessment	0.03 J1	6.64	208	< 0.007 U1	< 0.004 U1	0.11 J1	0.016 J1	0.36	0.91	< 0.05 U1	0.0604	< 0.2 U1	1.5	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1612

**Clinch River - Pond 1
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
12/13/2017	Background	0.453	38.7	13.3	0.12	7.1	6.0	384
2/14/2018	Background	0.532	43.0	14.5	0.12	6.9	9.3	506
4/12/2018	Background	0.476	44.9	21.6	0.17	7.1	13.9	546
6/12/2018	Background	0.452	42.4	22.7	0.17	7.0	16.9	524
8/22/2018	Background	0.543	42.0	20.9	0.19	7.1	15.6	550
10/16/2018	Background	0.5 J1	38.1	37.1	0.21	7.3	10.8	528
12/11/2018	Background	0.439	37.9	35.3	0.20	7.4	7.8	522
2/12/2019	Detection	0.393	36.4	32.8	0.19	7.3	5.4	537
4/10/2019	Assessment	0.527	41.0	27.5	0.18	7.4	4.6	551
5/30/2019	Assessment	0.355	34.9	32.8	0.22	7.4	3.3	537
10/2/2019	Assessment	0.423	45.9	30.7	0.14	7.1	1.9	533
2/11/2020	Assessment	0.367	40.1	33.3	0.17	7.3	1.2	520
4/21/2020	Assessment	0.381	54.4	9.9	0.08	6.2	0.2 J1	495
10/7/2020	Assessment	0.399	50.7	20.0	0.16	6.8	< 0.06 U1	526
2/9/2021	Assessment	0.369	41.4	26.8	0.19	7.2	0.3 J1	555
4/13/2021	Assessment	0.339	41.6	29.6	0.19	7.3	0.4	524
10/12/2021	Assessment	0.400	42.3	27.5	0.18	7.4	< 0.06 U1	520

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1612
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
12/13/2017	Background	0.30	3.86	2,020	0.045	< 0.005 U1	0.437	0.274	2.942	0.12	0.331	0.109	0.06 J1	3.60	0.1	0.01 J1
2/14/2018	Background	0.08	2.61	2,560	0.01 J1	< 0.005 U1	0.190	0.149	1.358	0.12	0.083	0.121	< 0.05 U1	1.59	0.06 J1	0.03 J1
4/12/2018	Background	0.11	2.26	2,170	0.005 J1	< 0.005 U1	0.196	0.115	2.209	0.17	0.040	0.128	< 0.05 U1	1.13	0.03 J1	< 0.01 U1
6/12/2018	Background	0.07	1.82	2,170	0.006 J1	< 0.005 U1	0.206	0.094	1.58	0.17	0.038	0.132	< 0.05 U1	0.83	0.04 J1	0.01 J1
8/22/2018	Background	0.05	1.56	2,090	< 0.004 U1	< 0.005 U1	0.251	0.124	2.76	0.19	0.025	0.136	< 0.05 U1	0.67	0.03 J1	0.01 J1
10/16/2018	Background	0.02 J1	1.17	1,640	< 0.02 U1	< 0.01 U1	0.2 J1	0.242	1.051	0.21	0.02 J1	< 0.09 U1	< 0.05 U1	0.8 J1	0.04 J1	< 0.1 U1
12/11/2018	Background	0.03 J1	0.92	1,880	< 0.02 U1	< 0.01 U1	0.2 J1	0.304	3.009	0.20	< 0.02 U1	0.134	< 0.05 U1	0.7 J1	< 0.03 U1	< 0.1 U1
2/12/2019	Detection	0.02 J1	0.71	1,880	< 0.02 U1	< 0.01 U1	0.204	0.320	0.574	0.19	< 0.02 U1	0.123	< 0.05 U1	0.50 J1	< 0.03 U1	< 0.1 U1
4/10/2019	Assessment	0.03 J1	0.74	2,060	< 0.02 U1	< 0.01 U1	0.1 J1	0.339	1.25	0.18	< 0.02 U1	0.133	< 0.05 U1	0.7 J1	< 0.03 U1	< 0.1 U1
5/30/2019	Assessment	0.02 J1	0.76	1,930	< 0.02 U1	< 0.01 U1	0.257	0.228	0.621	0.22	< 0.02 U1	0.113	< 0.05 U1	0.7 J1	< 0.03 U1	< 0.1 U1
10/2/2019	Assessment	< 0.02 U1	0.56	2,150	< 0.02 U1	< 0.01 U1	0.218	0.182	1.137	0.14	< 0.05 U1	0.128	< 0.2 U1	2.01	0.05 J1	< 0.1 U1
2/11/2020	Assessment	0.05 J1	0.45	2,050	< 0.02 U1	< 0.01 U1	0.2 J1	0.121	1.888	0.17	< 0.05 U1	0.106	< 0.2 U1	2 J1	0.03 J1	< 0.1 U1
4/21/2020	Assessment	0.15	0.39	2,600	< 0.02 U1	< 0.01 U1	0.216	0.176	2.65	0.08	0.07 J1	0.107	< 0.2 U1	0.8 J1	0.03 J1	< 0.1 U1
10/7/2020	Assessment	0.03 J1	0.76	2,450	< 0.02 U1	< 0.01 U1	0.1 J1	0.183	1.765	0.16	< 0.05 U1	0.103	< 0.2 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
2/9/2021	Assessment	0.03 J1	0.50	2,400	< 0.02 U1	< 0.01 U1	0.1 J1	0.097	2.053	0.19	< 0.05 U1	0.113	< 0.2 U1	0.6 J1	< 0.03 U1	< 0.1 U1
4/13/2021	Assessment	0.04 J1	0.37	2,120	< 0.007 U1	< 0.004 U1	0.2 J1	0.125	1.572	0.19	< 0.05 U1	0.113	< 0.2 U1	0.7 J1	< 0.09 U1	< 0.04 U1
10/12/2021	Assessment	0.03 J1	0.48	2,470	< 0.007 U1	< 0.004 U1	0.18 J1	0.116	1.9	0.18	< 0.05 U1	0.115	< 0.2 U1	0.3 J1	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1903D**Clinch River - Pond 1
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
4/22/2020	Assessment	0.302	196	4,170	< 0.4 U1	7.0	< 2 U1	7,060
11/9/2020	Assessment	0.270	231	4,780	0.4 J1	8.0	< 0.8 U1	8,000
2/16/2021	Assessment	< 0.4 U1	169	4,940	0.5 J1	8.1	< 0.8 U1	7,440
4/14/2021	Assessment	0.275	177	4,790	0.6 J1	8.2	< 0.8 U1	7,060
10/13/2021	Assessment	0.25 J1	145	4,020	0.6 J1	8.3	< 0.8 U1	6,400

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1903D
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/22/2020	Assessment	0.22	8.73	15,000	< 0.04 U1	< 0.02 U1	0.2 J1	0.471	7.24	< 0.4 U1	0.1 J1	0.425	< 0.2 U1	13.7	0.1 J1	< 0.2 U1
11/9/2020	Assessment	< 0.1 U1	6.47	24,700	< 0.1 U1	< 0.05 U1	< 0.2 U1	< 0.1 U1	8.28	0.4 J1	< 0.2 U1	0.459	< 0.2 U1	20.9	< 0.2 U1	< 0.5 U1
2/16/2021	Assessment	< 0.4 U1	7.88	23,200	< 0.4 U1	< 0.2 U1	< 0.8 U1	< 0.4 U1	10.34	0.5 J1	< 1 U1	0.442	< 0.2 U1	20 J1	< 0.6 U1	< 2 U1
4/14/2021	Assessment	0.1 J1	7.27	20,300	< 0.04 U1	< 0.02 U1	< 0.2 U1	0.06 J1	6.54	0.6 J1	< 0.2 U1	0.430	< 0.2 U1	21.9	< 0.4 U1	< 0.2 U1
10/13/2021	Assessment	0.3 J1	6.8	15,100	< 0.07 U1	< 0.04 U1	< 0.4 U1	0.07 J1	4.02	0.6 J1	< 0.5 U1	0.402	< 0.2 U1	25	< 0.9 U1	< 0.4 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: MW-1903S**Clinch River - Pond 1
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
4/22/2020	Assessment	0.350	95.4	1,190	0.11	6.3	< 0.06 U1	2,320
11/9/2020	Assessment	0.383	80.0	937	0.1 J1	7.0	< 0.2 U1	2,020
2/16/2021	Assessment	0.355	70.2	879	0.15	7.2	< 0.2 U1	1,520
4/14/2021	Assessment	0.355	83.6	1,050	0.15	7.3	< 0.2 U1	1,780
10/13/2021	Assessment	0.381	83.4	989	0.13 J1	7.4	< 0.2 U1	2,000

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1903S
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/22/2020	Assessment	0.06 J1	2.99	9,280	0.03 J1	< 0.01 U1	0.362	0.208	4.55	0.11	0.713	0.194	< 0.2 U1	1 J1	0.06 J1	< 0.1 U1
11/9/2020	Assessment	0.13	1.76	7,420	< 0.02 U1	< 0.01 U1	0.1 J1	0.120	3.71	0.1 J1	< 0.05 U1	0.169	< 0.2 U1	0.9 J1	< 0.03 U1	< 0.1 U1
2/16/2021	Assessment	0.04 J1	1.51	7,610	< 0.02 U1	< 0.01 U1	0.2 J1	0.097	6.772	0.15	0.1 J1	0.158	< 0.2 U1	0.6 J1	< 0.03 U1	< 0.1 U1
4/14/2021	Assessment	0.07 J1	1.44	8,020	0.01 J1	< 0.004 U1	0.08 J1	0.079	3.68	0.15	0.08 J1	0.164	< 0.2 U1	0.5 J1	< 0.09 U1	< 0.04 U1
10/13/2021	Assessment	0.06 J1	1.18	7,790 M1, P3	< 0.07 U1	< 0.004 U1	0.19 J1	0.081	0.96	0.13 J1	< 0.05 U1	0.186	< 0.2 U1	0.5	< 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.

P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.

Table 1 - Groundwater Data Summary: MW-1904D**Clinch River - Pond 1
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
4/22/2020	Assessment	0.504	8.82	84.3	1.17	7.3	8.0	795
11/9/2020	Assessment	0.472	8.68	92.3	1.18	8.0	< 0.06 U1	802
2/15/2021	Assessment	0.500	8.24	91.5	1.17	8.2	< 0.06 U1	829
4/14/2021	Assessment	0.505	8.52	93.9	1.16	8.3	< 0.06 U1	809
10/13/2021	Assessment	0.489	8.3	93.4	1.09	8.5	< 0.3 U1	830

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1904D
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/22/2020	Assessment	0.26	2.76	712	< 0.02 U1	< 0.01 U1	0.229	0.162	2.18	1.17	0.06 J1	0.154	< 0.2 U1	4.60	< 0.03 U1	< 0.1 U1
11/9/2020	Assessment	3.23	2.48	850	< 0.02 U1	< 0.01 U1	0.1 J1	0.05 J1	3.103	1.18	< 0.05 U1	0.168	< 0.2 U1	4.32	0.08 J1	< 0.1 U1
2/15/2021	Assessment	0.91	2.78	848	< 0.1 U1	< 0.05 U1	0.3 J1	< 0.1 U1	1.402	1.17	< 0.05 U1	0.165	< 0.2 U1	6 J1	< 0.2 U1	< 0.1 U1
4/14/2021	Assessment	0.59	2.51	841	< 0.007 U1	< 0.004 U1	0.08 J1	0.03 J1	1.186	1.16	< 0.05 U1	0.160	< 0.2 U1	5.07	< 0.09 U1	< 0.04 U1
10/13/2021	Assessment	0.59	2.47	881	< 0.007 U1	< 0.004 U1	0.27	0.027	0.99	1.09	< 0.05 U1	0.157	< 0.2 U1	6.0	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1904S**Clinch River - Pond 1
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
4/22/2020	Assessment	0.541	11.5	10.9	0.42	7.3	0.2 J1	411
11/9/2020	Assessment	0.452	18.5	10.1	0.29	7.3	< 0.06 U1	384
2/15/2021	Assessment	0.451	18.4	9.8	0.30	7.4	< 0.06 U1	405
4/14/2021	Assessment	0.457	21.1	10.0	0.28	7.3	< 0.06 U1	366
10/13/2021	Assessment	0.405	20.1	10.2	0.25	7.5	< 0.06 U1	380

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1904S
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/22/2020	Assessment	0.18	3.13	866	< 0.02 U1	< 0.01 U1	0.2 J1	0.218	1.471	0.42	0.1 J1	0.115	< 0.2 U1	3.52	< 0.03 U1	< 0.1 U1
11/9/2020	Assessment	0.16	2.64	1,230	< 0.02 U1	< 0.01 U1	0.1 J1	0.118	4.591	0.29	< 0.05 U1	0.113	< 0.2 U1	2 J1	0.07 J1	< 0.1 U1
2/15/2021	Assessment	0.08 J1	2.97	1,260	< 0.02 U1	< 0.01 U1	0.2 J1	0.123	3.355	0.30	< 0.05 U1	0.0966	< 0.2 U1	2.30	< 0.03 U1	< 0.1 U1
4/14/2021	Assessment	0.07 J1	2.63	1,300	0.009 J1	< 0.004 U1	0.06 J1	0.141	1.438	0.28	< 0.05 U1	0.0990	< 0.2 U1	1 J1	< 0.09 U1	< 0.04 U1
10/13/2021	Assessment	0.05 J1	2.08	1,290	0.008 J1	< 0.004 U1	0.44	0.116	2.42	0.25	< 0.05 U1	0.0940	< 0.2 U1	1.3	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1905D**Clinch River - Pond 1
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
4/22/2020	Assessment	0.515	155	3,220	< 0.4 U1	7.0	8.1	5,180
11/9/2020	Assessment	0.519	181	3,140	0.3 J1	7.7	< 0.3 U1	5,240
2/16/2021	Assessment	< 0.2 U1	156	3,260	0.32	7.8	< 0.3 U1	5,580
4/14/2021	Assessment	0.534	172	3,350	0.43	7.9	< 0.3 U1	5,380
10/13/2021	Assessment	0.407	171	3,350	0.4	8.1	< 0.3 U1	5,600

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1905D
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/22/2020	Assessment	0.31	5.40	5,080	< 0.04 U1	< 0.02 U1	0.3 J1	0.163	7.36	< 0.4 U1	< 0.1 U1	0.991	< 0.2 U1	7.17	< 0.06 U1	< 0.1 U1
11/9/2020	Assessment	< 0.1 U1	5.21	12,600	< 0.1 U1	< 0.05 U1	< 0.2 U1	< 0.1 U1	10.38	0.3 J1	< 0.2 U1	0.935	< 0.2 U1	4 J1	< 0.2 U1	< 0.5 U1
2/16/2021	Assessment	< 0.2 U1	3.03	5,320	< 0.2 U1	< 0.1 U1	< 0.4 U1	< 0.2 U1	11.05	0.32	1 J1	0.501	< 0.2 U1	< 4 U1	< 0.3 U1	< 1 U1
4/14/2021	Assessment	< 0.2 U1	4.92	10,800	< 0.07 U1	< 0.04 U1	< 0.4 U1	0.04 J1	8.19	0.43	< 0.05 U1	1.05	< 0.4 U1	4 J1	< 0.9 U1	< 0.04 U1
10/13/2021	Assessment	0.04 J1	3.42	10,200	< 0.07 U1	0.005 J1	0.21	0.016 J1	6.2	0.4	< 0.5 U1	1.05	< 0.2 U1	4.2	< 0.09 U1	< 0.4 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: MW-1905S**Clinch River - Pond 1
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
4/22/2020	Assessment	0.184	83.5	334	0.33	6.7	69.3	810
11/9/2020	Assessment	0.236	66.8	177	0.36	7.5	72.5	598
2/16/2021	Assessment	0.230	81.8	1,660	0.32	7.8	6.4	2,930
4/14/2021	Assessment	0.551	234	1,740	0.35	7.7	4.0	2,840
10/13/2021	Assessment	0.500	242	1,730	0.33	7.9	2.6	3,400

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: MW-1905S
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/22/2020	Assessment	0.12	2.39	166	< 0.02 U1	< 0.01 U1	0.348	1.22	1.886	0.33	0.1 J1	0.110	< 0.2 U1	97.0	0.7	< 0.1 U1
11/9/2020	Assessment	1.62	6.25	285	< 0.02 U1	< 0.01 U1	0.285	0.642	2.515	0.36	0.1 J1	0.113	< 0.2 U1	93.6	0.6	< 0.1 U1
2/16/2021	Assessment	5.15	2.12	519	< 0.02 U1	0.02 J1	0.210	0.462	5.84	0.32	0.218	0.137	< 0.2 U1	82.6	0.5	< 0.1 U1
4/14/2021	Assessment	0.08 J1	7.06	3,490	0.01 J1	< 0.004 U1	0.05 J1	0.120	4.36	0.35	< 0.05 U1	0.517	< 0.2 U1	8.42	< 0.09 U1	< 0.04 U1
10/13/2021	Assessment	0.05 J1	2.66	3,960	< 0.04 U1	< 0.004 U1	0.41	0.118	7.03	0.33	< 0.05 U1	0.530	< 0.2 U1	7.9	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1906D**Clinch River - Pond 1
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
4/22/2020	Assessment	< 0.02 U1	11.7	14.7	0.21	8.6	30.5	116
11/10/2020	Assessment	< 0.02 U1	19.0	13.1	0.14	8.6	26.5	132
2/15/2021	Assessment	< 0.02 U1	23.0	3.6	0.24	8.3	6.2	135
4/13/2021	Assessment	0.009 J1	22.6	11.5	0.14	8.4	23.9	146
10/12/2021	Assessment	0.011 J1	27.4	10.8	0.12	8.5	24.2	170

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1906D
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/22/2020	Assessment	0.77	6.47	18.4	< 0.02 U1	0.01 J1	0.2 J1	0.623	2.814	0.21	0.09 J1	0.0139	< 0.2 U1	39.9	0.3	< 0.1 U1
11/10/2020	Assessment	1.03	4.63	23.5	< 0.02 U1	0.02 J1	0.09 J1	0.500	1.845	0.14	0.2 J1	0.0141	< 0.2 U1	34.8	0.3	< 0.1 U1
2/15/2021	Assessment	0.15	2.37	27.2	< 0.02 U1	< 0.01 U1	0.1 J1	0.572	1.015	0.24	0.05 J1	0.0104	< 0.2 U1	12.5	0.09 J1	< 0.1 U1
4/13/2021	Assessment	0.54	3.44	24.6	< 0.007 U1	0.01 J1	0.2 J1	0.486	1.034	0.14	0.08 J1	0.0141	< 0.2 U1	21.1	0.2 J1	< 0.04 U1
10/12/2021	Assessment	0.25	3.34	27.9	< 0.007 U1	0.005 J1	0.23	0.433	2.03	0.12	< 0.05 U1	0.0139	< 0.2 U1	17.2	0.12 J1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1906S

**Clinch River - Pond 1
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
4/22/2020	Assessment	0.375	39.3	19.7	0.51	6.4	147	297
11/10/2020	Assessment	0.407	45.6	15.4	0.45	8.7	124	294
2/15/2021	Assessment	0.415	41.3	14.6	0.52	8.3	133	297
4/13/2021	Assessment	0.404	43.0	15.0	0.49	7.8	131	283
10/12/2021	Assessment	0.431	47.5	13.4	0.50	9.0	133	290

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: MW-1906S
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/22/2020	Assessment	0.16	3.61	62.4	< 0.02 U1	< 0.01 U1	0.2 J1	1.31	2.366	0.51	0.2 J1	0.121	< 0.2 U1	451	0.5	< 0.1 U1
11/10/2020	Assessment	0.29	4.15	57.6	< 0.02 U1	< 0.01 U1	0.07 J1	0.457	5.343	0.45	< 0.05 U1	0.150	< 0.2 U1	389	0.4	< 0.1 U1
2/15/2021	Assessment	0.15	3.79	58.4	< 0.02 U1	0.03 J1	0.07 J1	0.443	1.7664	0.52	< 0.05 U1	0.151	< 0.2 U1	337	0.4	< 0.1 U1
4/13/2021	Assessment	0.20	3.67	59.4	< 0.007 U1	< 0.004 U1	0.2 J1	0.485	1.169	0.49	< 0.05 U1	0.146	< 0.2 U1	380	0.5 J1	< 0.04 U1
10/12/2021	Assessment	0.25	5.39	61.7	< 0.007 U1	0.005 J1	0.24	0.320	2.11	0.50	< 0.05 U1	0.172	< 0.2 U1	413	0.43 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: MW-1907D**Clinch River - Pond 1
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
4/23/2020	Assessment	< 0.02 U1	53.1	5.1	0.13	6.8	61.2	360
11/10/2020	Assessment	< 0.02 U1	59.9	3.6	0.14	7.4	37.1	300
2/16/2021	Assessment	< 0.02 U1	53.7	3.6	0.15	7.6	34.9	325
4/15/2021	Assessment	0.01 J1	57.1	3.5	0.16	7.6	33.5	299
10/14/2021	Assessment	0.01 J1	53.1	3.38	0.12	7.9	30.4	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.

**Table 1 - Groundwater Data Summary: MW-1907D
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/23/2020	Assessment	0.25	2.19	43.0	< 0.02 U1	< 0.01 U1	0.432	1.55	1.12	0.13	0.09 J1	0.00423	< 0.2 U1	7.64	0.04 J1	< 0.1 U1
11/10/2020	Assessment	0.08 J1	2.11	37.7	< 0.02 U1	< 0.01 U1	0.07 J1	1.01	2.074	0.14	< 0.05 U1	0.00399	< 0.2 U1	2.09	< 0.03 U1	< 0.1 U1
2/16/2021	Assessment	0.07 J1	1.88	38.4	< 0.02 U1	< 0.01 U1	0.210	0.633	1.718	0.15	< 0.05 U1	0.00376	< 0.2 U1	2.36	0.1 J1	< 0.1 U1
4/15/2021	Assessment	0.06 J1	1.60	36.8	0.009 J1	< 0.004 U1	0.05 J1	0.387	1.282	0.16	< 0.05 U1	0.00380	< 0.2 U1	2.33	< 0.09 U1	< 0.04 U1
10/14/2021	Assessment	0.05 J1	0.98	34.9	< 0.007 U1	< 0.004 U1	0.25	0.206	1.83	0.12	0.06 J1	0.00383	< 0.2 U1	1.6	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-1907S**Clinch River - Pond 1
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
4/23/2020	Assessment	< 0.02 U1	69.3	12.9	0.06 J1	7.0	30.9	433
11/10/2020	Assessment	< 0.02 U1	73.8	11.9	0.06 J1	7.3	20.5	399
2/16/2021	Assessment	< 0.02 U1	66.4	11.9	0.06	7.5	18.4	403
4/15/2021	Assessment	0.01 J1	70.7	12.1	0.07	7.6	17.7	383
10/14/2021	Assessment	0.01 J1	64.0	11.7	0.06	8.0	15.4	400

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1907S
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/23/2020	Assessment	1.62	0.79	55.6	< 0.02 U1	0.01 J1	0.242	13.3	2.091	0.06 J1	0.07 J1	0.00691	8.87	7.40	0.3	< 0.1 U1
11/10/2020	Assessment	0.34	0.50	49.9	< 0.02 U1	< 0.01 U1	0.1 J1	12.8	2.158	0.06 J1	0.07 J1	0.00701	8.01	1 J1	0.2 J1	< 0.1 U1
2/16/2021	Assessment	0.09 J1	0.59	55.2	< 0.02 U1	< 0.01 U1	0.221	14.0	2.061	0.06	< 0.05 U1	0.00689	9.68	1 J1	0.2 J1	< 0.1 U1
4/15/2021	Assessment	0.12	0.48	54.9	< 0.007 U1	0.009 J1	< 0.04 U1	13.2	0.921	0.07	< 0.05 U1	0.00701	10.4	1 J1	0.2 J1	< 0.04 U1
10/14/2021	Assessment	0.06 J1	0.45	51.0	< 0.007 U1	0.005 J1	0.24	11.3	1.91	0.06	< 0.05 U1	0.00708	13.4 H2	1.1	0.18 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.

H2: Sample analysis performed past holding time.

Table 1 - Groundwater Data Summary: MW-1910S**Clinch River - Pond 1
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
4/21/2020	Assessment	0.055	27.1	13.7	0.20	7.0	2.7	246
11/9/2020	Assessment	0.053	28.0	12.5	0.18	7.1	0.9	240
2/15/2021	Assessment	0.05 J1	24.1	13.6	0.22	7.8	0.7	256
4/15/2021	Assessment	0.057	25.8	13.3	0.21	7.8	0.9	247
10/13/2021	Assessment	0.062	20.1	15.3	0.22	8.1	0.67	250

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1910S
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/21/2020	Assessment	0.17	2.32	283	< 0.02 U1	< 0.01 U1	0.397	0.619	1.635	0.20	0.466	0.0136	< 0.2 U1	17.1	0.2 J1	< 0.1 U1
11/9/2020	Assessment	0.17	1.88	268	< 0.02 U1	< 0.01 U1	0.1 J1	0.388	2.39	0.18	0.310	0.0124	< 0.2 U1	4.37	0.4	< 0.1 U1
2/15/2021	Assessment	0.1 J1	2.32	281	< 0.02 U1	< 0.01 U1	0.211	0.469	2.033	0.22	0.487	0.0128	< 0.2 U1	5.17	0.2	< 0.1 U1
4/15/2021	Assessment	0.08 J1	1.94	313	< 0.007 U1	< 0.004 U1	< 0.04 U1	0.408	1.009	0.21	0.732	0.0134	< 0.2 U1	4.54	0.3 J1	< 0.04 U1
10/13/2021	Assessment	0.03 J1	2.05	249	< 0.007 U1	< 0.004 U1	0.28	0.614	1.5	0.22	0.35	0.0161	< 0.2 U1	4.1	0.21 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: MW-1913D**Clinch River - Pond 1
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
4/23/2020	Assessment	0.727	56.8	21.9	0.18	9.9	132	326
11/10/2020	Assessment	0.816	55.6	15.2	0.33	11.0	131	295
2/17/2021	Assessment	0.791	51.5	14.1	0.38	11.0	137	315
4/15/2021	Assessment	0.714	43.1	16.3	0.31	10.7	127	290
10/14/2021	Assessment	0.747	49.1	12.9	0.34	10.8	131	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.

**Table 1 - Groundwater Data Summary: MW-1913D
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/23/2020	Assessment	0.22	10.8	50.6	< 0.02 U1	< 0.01 U1	0.253	0.280	0.931	0.18	0.2 J1	0.0597	< 0.2 U1	362	0.4	< 0.1 U1
11/10/2020	Assessment	0.29	9.69	45.9	< 0.02 U1	< 0.01 U1	0.09 J1	0.161	0.853	0.33	0.1 J1	0.139	< 0.2 U1	403	0.5	< 0.1 U1
2/17/2021	Assessment	0.31	9.16	47.1	< 0.02 U1	0.02 J1	0.2 J1	0.135	1.684	0.38	0.07 J1	0.154	< 0.2 U1	402	0.5	< 0.1 U1
4/15/2021	Assessment	0.24	9.86	43.2	< 0.007 U1	< 0.004 U1	0.06 J1	0.154	1.49	0.31	0.06 J1	0.115	< 0.2 U1	387	0.4 J1	< 0.04 U1
10/14/2021	Assessment	0.26	9.63	44.7	< 0.007 U1	< 0.004 U1	0.26	0.137	0.93	0.34	0.08 J1	0.152	< 0.2 U1	437	0.49 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: MW-1913S

**Clinch River - Pond 1
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
4/22/2020	Assessment	0.059	59.6	32.5	0.1 J1	7.0	139	373
11/10/2020	Assessment	0.057	62.5	32.6	0.13	7.7	134	357
2/16/2021	Assessment	0.05 J1	52.8	32.3	0.17	7.9	135	370
4/15/2021	Assessment	0.058	59.3	33.7	0.19	7.6	132	375
10/14/2021	Assessment	0.071	54.6	30.3	0.17	8.0	132	350

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-1913S
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
4/22/2020	Assessment	0.07 J1	1.33	111	< 0.02 U1	< 0.01 U1	0.2 J1	29.7	2.94	0.1 J1	4.54	0.00221	< 0.2 U1	63.3	0.1 J1	0.1 J1
11/10/2020	Assessment	0.33	1.14	94.0	< 0.02 U1	< 0.01 U1	0.05 J1	32.9	2.934	0.13	5.36	0.00161	< 0.2 U1	57.5	0.03 J1	0.2 J1
2/16/2021	Assessment	0.04 J1	1.32	93.7	< 0.02 U1	< 0.01 U1	0.2 J1	31.8	7.833	0.17	3.87	0.00140	< 0.2 U1	58.2	0.08 J1	0.1 J1
4/15/2021	Assessment	0.29	0.93	95.5	< 0.007 U1	0.007 J1	< 0.04 U1	29.3	2.177	0.19	5.33	0.00135	< 0.2 U1	59.7	< 0.09 U1	0.2 J1
10/14/2021	Assessment	< 0.02 U1	0.89	90.2	< 0.007 U1	0.006 J1	0.25	27.5	2.25	0.17	5.71	0.00092	< 0.2 U1	72.3	< 0.09 U1	0.29

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: MW-2012D**Clinch River - Pond 1
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
2/17/2021	Assessment	0.511	12.1	456	1.06	8.2	44.8	1,230
4/14/2021	Assessment	0.513	11.9	407	1.03	8.3	12.0	1,080
10/13/2021	Assessment	0.447	11.5	379	0.98	8.5	11.9	1,190

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-2012D
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
2/17/2021	Assessment	0.2 J1	7.62	749	0.4 J1	< 0.05 U1	10.1	5.09	0.7405	1.06	17.7	0.245	< 0.2 U1	8 J1	0.3 J1	< 0.5 U1
4/14/2021	Assessment	0.08 J1	2.55	934	0.05 J1	< 0.004 U1	1.01	0.884	1.363	1.03	3.21	0.258	< 0.2 U1	2 J1	0.09 J1	< 0.04 U1
10/13/2021	Assessment	0.04 J1	1.55	604	0.01 J1	< 0.004 U1	0.68	0.298	2.77	0.98	1.14	0.172	< 0.2 U1	1	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: MW-2012S

**Clinch River - Pond 1
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
2/17/2021	Assessment	0.360	30.3	81.6	0.37	7.9	4.8	567
4/14/2021	Assessment	0.376	33.1	78.7	0.37	7.9	5.0	512
10/13/2021	Assessment	0.353	34.6	94.9	0.35	8.1	0.88	590

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

- -: Not analyzed

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

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

**Table 1 - Groundwater Data Summary: MW-2012S
Clinch River - Pond 1
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
2/17/2021	Assessment	0.17	2.03	1,960	< 0.02 U1	< 0.01 U1	0.2 J1	0.412	2.169	0.37	0.1 J1	0.134	< 0.2 U1	8.78	< 0.03 U1	< 0.1 U1
4/14/2021	Assessment	0.15	3.08	1,870	< 0.007 U1	< 0.004 U1	0.08 J1	0.561	1.029	0.37	< 0.05 U1	0.135	< 0.2 U1	6.12	< 0.09 U1	< 0.04 U1
10/13/2021	Assessment	0.09 J1	2.69	1,500	< 0.01 U1	< 0.004 U1	0.32	0.786	3.62	0.35	0.08 J1	0.101	< 0.2 U1	5.5	< 0.09 U1	< 0.04 U1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

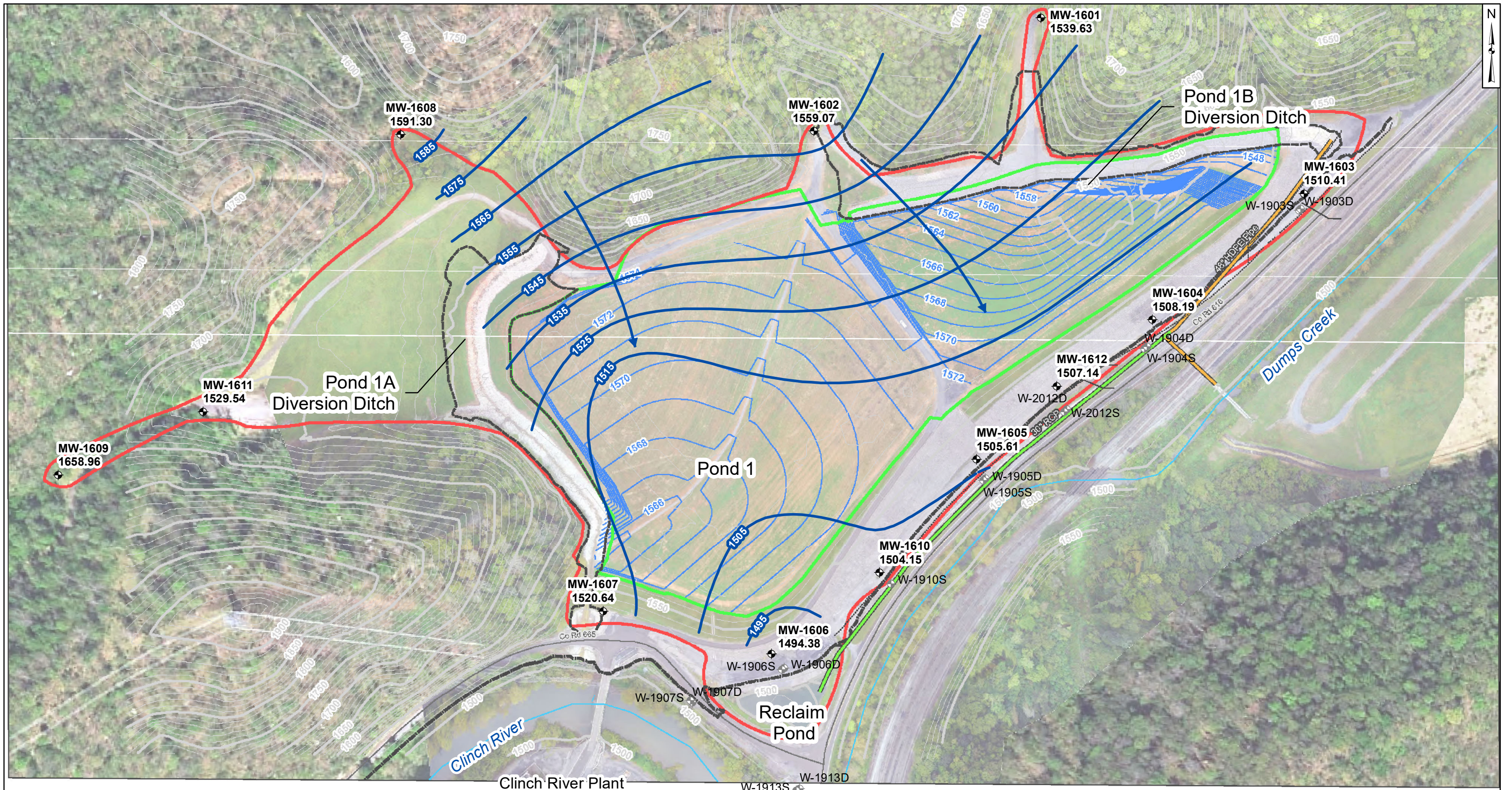
pCi/L: picocuries per liter

<: 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.

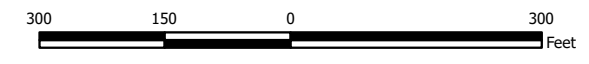
Groundwater Flow Direction Maps



- Legend**
- ⊕ Groundwater Monitoring Well
 - ⊕ Nature and Extent Well
 - Groundwater Elevation Contour
 - Groundwater Flow Direction
 - Post-Closure Topographic Elevation
 - - - 100 yr Flood Elevation Approx. 1505 ft amsl
 - - - Diversion Ditch
 - ▭ Facility Boundary
 - ▭ Pond 1 CCR Unit Boundary

Notes

- Monitoring well coordinates and water level data (collected on February 8, 2021) provided by AEP.
- Site features based on information available in Groundwater Monitoring Network Evaluation (Amec, 2015) provided by AEP.
- Aerial basemap provided by AEP.
- Groundwater elevation units and Post-Closure Pond Topographic units are feet above mean sea level (ft amsl).
- MW-1609 is not included in the contouring. It is a background cross-gradient monitoring well screened in the Rome Formation.
- MW-1611 is not included in the contouring. It is a special condition background monitoring well screened across the Dumps Fault to monitor potential lateral migration of groundwater.



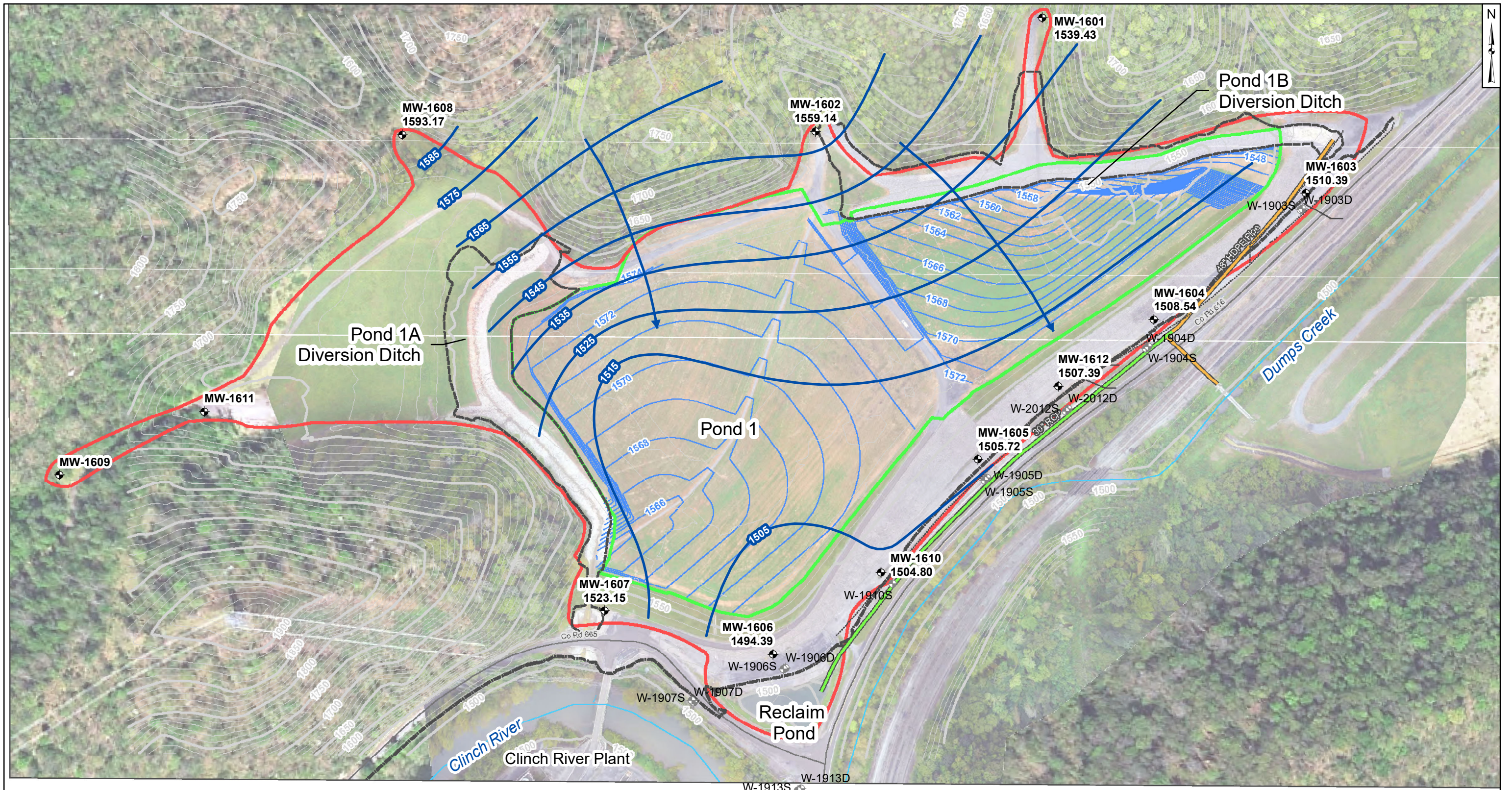
**Potentiometric Surface Map - Uppermost Aquifer
February 2021**

AEP Clinch River Plant - Bottom Ash Pond
Carbo, Virginia

Geosyntec
consultants

Ann Arbor, Michigan 2021/07/02

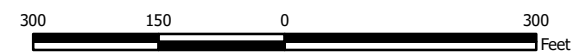
Figure X



- Legend**
- ⊕ Groundwater Monitoring Well
 - ⊕ Nature and Extent Well
 - Groundwater Elevation Contour
 - Groundwater Flow Direction
 - Post-Closure Topographic Elevation
 - - - 100 yr Flood Elevation Approx. 1505 ft amsl
 - - - Diversion Ditch
 - ▭ Facility Boundary
 - ▭ Pond 1 CCR Unit Boundary

Notes

- Monitoring well coordinates and water level data (collected on April 12 and 13, 2021) provided by AEP.
- Site features based on information available in Groundwater Monitoring Network Evaluation (Amec, 2015) provided by AEP.
- Aerial basemap provided by AEP.
- Groundwater elevation units and Post-Closure Pond Topographic units are feet above mean sea level (ft amsl).
- MW-1609 (1663.08 ft amsl) is not included in the contouring. It is a background cross-gradient monitoring well screened in the Rome Formation.
- MW-1611 (1520.04 ft amsl) is not included in the contouring. It is a special condition background monitoring well screened across the Dumps Fault to monitor potential lateral migration of groundwater.



**Potentiometric Surface Map - Uppermost Aquifer
April 2021**

AEP Clinch River Plant - Bottom Ash Pond
Carbo, Virginia

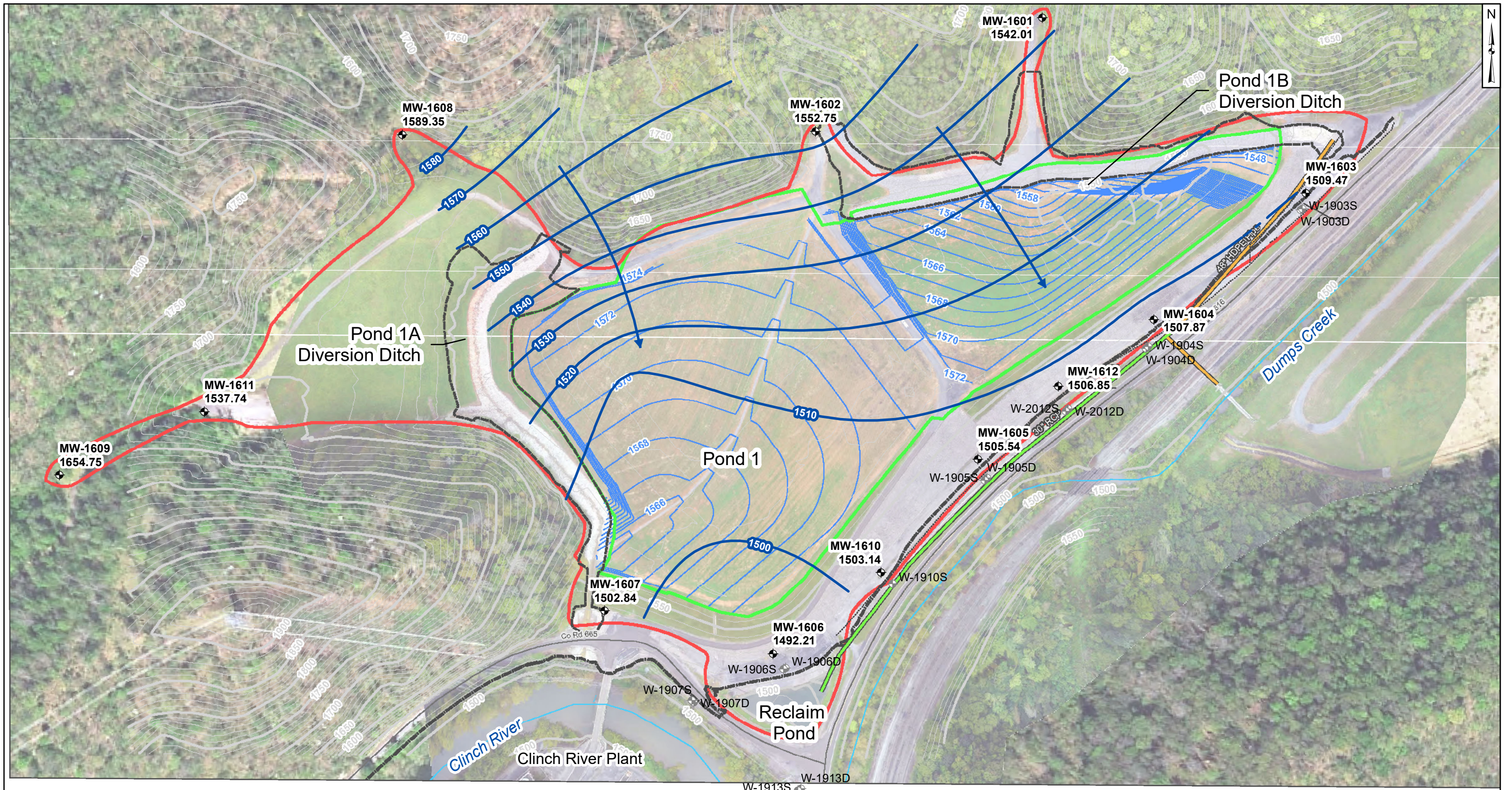
Geosyntec
consultants

Ann Arbor, Michigan

2021/09/20

Figure

X



- Legend**
- ⊕ Groundwater Monitoring Well
 - ⊕ Nature and Extent Well
 - Groundwater Elevation Contour
 - Groundwater Flow Direction
 - Post-Closure Topographic Elevation
 - - - 100 yr Flood Elevation Approx. 1505 ft amsl
 - - - Diversion Ditch
 - ▭ Facility Boundary
 - ▭ Pond 1 CCR Unit Boundary

Notes

- Monitoring well coordinates and water level data (collected on October 7, 2021) provided by AEP.
- Site features based on information available in Groundwater Monitoring Network Evaluation (Amec, 2015) provided by AEP.
- Aerial basemap provided by AEP.
- Groundwater elevation units and Post-Closure Pond Topographic units are feet above mean sea level (ft amsl).
- MW-1609 (1654.75 ft amsl) is not included in the contouring. It is a background cross-gradient monitoring well screened in the Rome Formation.
- MW-1611 (1537.74 ft amsl) is not included in the contouring. It is a special condition background monitoring well screened across the Dumps Fault to monitor potential lateral migration of groundwater.



**Potentiometric Surface Map - Uppermost Aquifer
October 2021**

AEP Clinch River Plant - Bottom Ash Pond
Carbo, Virginia

Geosyntec
consultants

Ann Arbor, Michigan

2022/01/19

Figure

X

Groundwater Flow Velocity Calculations

**Table 1: Residence Time Calculation Summary
Clinch River Pond 1A/1B**

CCR Management Unit	Monitoring Well	Well Diameter (inches)	2021-02		2021-04		2021-10	
			Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Pond 1A/1B	MW-1601 ^[1]	2.0	155	0.4	152	0.4	169	0.4
	MW-1602 ^[1]	2.0	331	0.2	331	0.2	281	0.2
	MW-1603 ^[2]	2.0	122	0.5	123	0.5	144	0.4
	MW-1604 ^[2]	2.0	147	0.4	143	0.4	138	0.4
	MW-1605 ^[2]	2.0	136	0.4	136	0.4	113	0.5
	MW-1606 ^[2]	2.0	244	0.2	267	0.2	143	0.4
	MW-1607 ^[2]	2.0	297	0.2	323	0.2	129	0.5
	MW-1608 ^[1]	2.0	327	0.2	337	0.2	346	0.2
	MW-1609 ^[1]	2.0	NC	NC	NC	NC	NC	NC
	MW-1610 ^[2]	2.0	85	0.7	13	4.8	139	0.4
	MW-1611 ^[1]	2.0	NC	NC	NC	NC	NC	NC
	MW-1612 ^[2]	2.0	167	0.4	166	0.4	206	0.3

Notes:

[1] - Background Well

[2] - Downgradient Well

NC - Not Calculated

Hydraulic conductivity was updated in 2021 to reflect current data

APPENDIX 2 – Statistical Analyses

The memorandums summarizing the statistical evaluation follow.

STATISTICAL ANALYSIS SUMMARY
ASH POND 1
Clinch River Plant
Carbo, Virginia

Submitted to



1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by



engineers | scientists | innovators

941 Chatham Lane
Suite 103
Columbus, Ohio 43221

February 2, 2021

CHA8500

TABLE OF CONTENTS

SECTION 1 Executive Summary	1
SECTION 2 Ash Pond 1 Evaluation.....	2-1
2.1 Data Validation & QA/QC	2-1
2.2 Statistical Analysis.....	2-1
2.2.1 Establishment of GWPSs.....	2-1
2.2.2 Evaluation of Potential Appendix IV SSLs	2-2
2.2.3 Establishment of Appendix III Prediction Limits.....	2-2
2.2.4 Evaluation of Potential Appendix III SSIs	2-4
2.3 Conclusions.....	2-5
SECTION 3 References	3-1

LIST OF TABLES

Table 1	Groundwater Data Summary
Table 2	Groundwater Protection Standards
Table 3	Identified Statistically Significant Levels
Table 4	Appendix III Data Summary

LIST OF ATTACHMENTS

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

LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
QA	Quality Assurance
QC	Quality Control
SSD	Statistically Significant Decrease
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
SU	Standard Units
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

SECTION 1

EXECUTIVE SUMMARY

In accordance with the United States Environmental Protection Agency's (USEPA's) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (40 CFR 257.90-257.98, "CCR rule"), groundwater monitoring has been conducted at Ash Pond 1, an existing CCR unit at the Clinch River Plant located in Carbo, Virginia.

Eight monitoring events were completed from December 2017 to December 2018 to establish background concentrations for Appendix III and Appendix IV parameters under the CCR rule. Data collected through April 2019 were compared to the background concentrations to evaluate whether statistically significant increases (SSIs) or statistically significant levels (SSLs) of Appendix III or Appendix IV constituents, respectively, were identified. An alternative source was not identified, so Ash Pond 1 initiated an assessment of corrective measures in accordance with 40 CFR 257.96 and has been completing assessment monitoring since. During 2020, an annual sampling event for Appendix IV parameters required by 257.95(b) was completed in February, and semi-annual sampling events for Appendix III and the detected Appendix IV parameters required by 257.95(d)(1) were completed in April and October. Statistical analysis of the February and April events was completed previously, and this report summarizes the results of the October 2020 semi-annual assessment monitoring event.

Monitoring data from the October 2020 event 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.

Groundwater data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. The statistics were completed in three separate groups which correspond to differences in the underlying geology at the monitoring locations. Groundwater protection standards (GWPSs) were re-established for the Appendix IV parameters to assess whether Appendix IV parameters were present at an SSL above the GWPS. SSLs were identified for barium, cobalt, lithium, and molybdenum. Thus, the unit will continue the assessment of corrective measures process and will monitor the groundwater monitoring network in accordance with the assessment monitoring program as required by 40 CFR 275.96(b). Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

SECTION 2

ASH POND 1 EVALUATION

2.1 Data Validation & QA/QC

During the assessment monitoring program, one set of samples was collected for analysis from each background and compliance well throughout three geologically distinct monitoring well networks to meet the requirements of 40 CFR 257.95(d)(1) (October 2020). The geological units consist of the Chattanooga Shale, the Rome Limestone, and the Dumps Fault water-bearing unit. Samples from the October 2020 event were analyzed for all Appendix III and Appendix IV parameters. A summary of data collected during this assessment monitoring event may be found 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 information 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.9.6.27b statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

2.2 Statistical Analysis

Statistical analyses for Ash Pond 1 were conducted in accordance with the October 2020 *Statistical Analysis Plan* (Geosyntec, 2020b), except where noted below. Time series plots and results for all completed statistical tests are provided in Attachment B.

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

2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with 40 CFR 257.95(h) and the *Statistical Analysis Plan* (Geosyntec 2020b). The established GWPS was determined to be the greater value of (1) the background concentration and (2) the maximum contaminant level (MCL) or the level specified in 40 CFR 257.95(h)(2) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment

monitoring events. Generally, tolerance limits were calculated parametrically with 95% coverage and 95% confidence. Non-parametric tolerance limits were calculated in instances where data have either non-normal distributions or a high non-detect frequency. Non-parametric tolerance limits for Chattanooga Shale wells were calculated for arsenic, barium, fluoride, lithium, and selenium due to apparent non-normal distributions, and for beryllium, cadmium, mercury, and thallium due to a high non-detect frequency. Non-parametric tolerance limits for Rome Limestone wells were calculated for cadmium and selenium due to apparent non-normal distributions, and for beryllium, mercury, and thallium due to a high non-detect frequency. Non-parametric tolerance limits for Dumps Fault wells were calculated for molybdenum due to apparent non-normal distributions, and for beryllium, cadmium, mercury, and thallium due to a high non-detect frequency. Tolerance limits and the final GWPSs are summarized in Tables 2A-2C.

2.2.2 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ($\alpha = 0.01$); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high). An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B and summarized in Table 3.

The following SSLs were identified at Clinch River Ash Pond 1:

- The LCL for barium at MW-1604 (3.07 mg/L) exceeded the GWPS of 2.00 mg/L, and the LCL for lithium at MW-1605 (0.187 mg/L) exceeded the GWPS of 0.118 mg/L in the Chattanooga Shale formation.
- The LCL for cobalt at MW-1607 (0.00806 mg/L) exceeded the GWPS of 0.00600 mg/L, the LCLs for lithium at MW-1606 (0.0607 mg/L) and MW-1607 (0.118 mg/L) exceeded the GWPS of 0.0400 mg/L, and the LCL for molybdenum at MW-1607 (0.129 mg/L) exceeded the GWPS of 0.100 mg/L in the Rome Limestone formation.
- The LCL for cobalt at MW-1610 (0.00698 mg/L) exceeded the GWPS of 0.00600 mg/L and the LCL for molybdenum at MW-1610 (0.135 mg/L) exceeded the GWPS of 0.100 mg/L in the Dumps Fault water bearing unit.

As a result, Clinch River Ash Pond 1 will continue the assessment of corrective measures and continue to monitor the groundwater monitoring network in accordance with the assessment monitoring program per 40 CFR 257.96(b).

2.2.3 Establishment of Appendix III Prediction Limits

Upper prediction limits (UPL) were previously established for all Appendix III parameters following the background monitoring period (Geosyntec, 2019). As described in the August 2020 *Statistical Analysis Summary* report (Geosyntec, 2020a):

- Intrawell tests were used to evaluate potential SSIs for boron, fluoride, sulfate, and total dissolved solids (TDS) in the Chattanooga Shale formation, whereas interwell tests were used for calcium, chloride, and pH in the Chattanooga Shale formation.
- Intrawell tests were used to evaluate potential SSIs for boron, calcium, fluoride, pH, and TDS in the Rome Limestone formation, whereas interwell tests were used for chloride and sulfate in the Rome Limestone formation.
- Intrawell tests were used to evaluate potential SSIs for all Appendix III parameters in the Dumps Fault formation.

While interwell prediction limits have been updated periodically during the assessment monitoring period as sufficient data became available, this represents the first update to the background dataset for parameters evaluated using intrawell tests.

Mann-Whitney (Wilcoxon rank-sum) tests were performed to determine whether the newer data are affected by a release from the Ash Pond 1. Because the interwell Appendix III limits and the Appendix IV GWPSs are based on data from upgradient wells which we would not expect to have been impacted by a release, these tests were used for intrawell Appendix III tests only. Mann-Whitney tests were used to compare the medians of historical data (October 2017 – December 2018) to the new compliance samples (February 2019 – April 2020) for the intrawell Appendix III parameters at each formation. Results were evaluated to determine if the medians of the two groups were similar at the 99% confidence level. Where no significant difference was found, the new compliance data were added to the background dataset. Where a statistically significant difference was found between the medians of the two groups, the data were reviewed to evaluate the cause of the difference and to determine if adding newer data to the background dataset, replacing the background dataset with the newer data, or continuing to use the existing background dataset was most appropriate. If the differences appeared to have been caused by a release, then the previous background dataset would have continued to be used.

The complete Mann-Whitney test results and a summary of the significant findings can be found in Attachment B and discussed below:

- For Chattanooga Shale, significant differences were found between the two groups for sulfate in downgradient wells MW-1603, MW-1604, MW-1605, and MW-1612.
- For Rome Limestone, significant differences were found between the two groups for fluoride in upgradient well MW-1609.
- For Dumps Fault, significant differences were found between the groups for boron in downgradient well MW-1610, calcium in upgradient well MW-1611, chloride in upgradient well MW-1611, sulfate in upgradient well MW-1611 and downgradient well MW-1610, and for TDS in upgradient well MW-1611.

Because MW-1609 at Rome Limestone and MW-1610 at Dumps Fault are upgradient monitoring wells and more recent data are similar to background and better represent the groundwater quality upgradient of the facility, the background dataset was updated to include the compliance data for fluoride at MW-1609 and for boron and sulfate at MW-1610. For sulfate in MW-1603, MW-1604, MW-1605, and MW-1612 at Chattanooga Shale, and calcium, chloride, sulfate, and TDS in MW-1611 at Dumps Fault, the test showed significant differences, and the historically data appeared to be substantially higher than the compliance concentrations. In order to best characterize the background well concentration at these downgradient locations, the prediction limits for sulfate in MW-1603, MW-1604, MW-1605, and MW-1612 at Chattanooga Shale and calcium, chloride, sulfate, and TDS in MW-1611 at Dumps Fault were calculated with data from August 2018 through April 2020.

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

Both interwell and intrawell UPLs were calculated for a one-of-two retesting procedure; i.e., if at least one sample in a series of two does not exceed the UPL, then it can be concluded that an SSI has not occurred. In practice, where the initial result did not exceed the UPL, a second sample was not collected. The retesting procedures allowed achieving an acceptably high statistical power to detect changes at downgradient wells for constituents evaluated using intrawell prediction limits.

2.2.4 Evaluation of Potential Appendix III SSIs

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

Data collected during the October 2020 assessment monitoring event from downgradient compliance wells were compared to previously calculated prediction limits to evaluate results above background values. The results from this event and the prediction limits are summarized in Tables 4A-4C. The following SSIs above the upper prediction limits (UPLs) were noted:

- Calcium concentrations exceeded the Chattanooga Shale interwell UPL of 8.28 mg/L at MW-1603 (25.7 mg/L), MW-1604 (27.3 mg/L), MW-1605 (43.4 mg/L), and MW-1612 (50.7 mg/L).
- Chloride concentrations exceeded the Chattanooga Shale interwell UPL of 45.8 mg/L at MW-1603 (171 mg/L) and MW-1605 (154 mg/L).
- Fluoride concentrations exceeded the Chattanooga Shale intrawell UPL of 0.287 mg/L at MW-1604 (0.34 mg/L).
- Chloride concentrations exceeded the Rome Limestone interwell UPL of 3.72 mg/L at MW-1606 (12.9 mg/L) and MW-1607 (7.4 mg/L).
- Sulfate concentrations exceeded the Rome Limestone interwell UPL of 21.0 mg/L at MW-1606 (35.7 mg/L) and MW-1607 (136 mg/L).
- Fluoride concentrations exceeded the Dumps Fault intrawell UPL of 0.227 mg/L at MW-1610 (0.35 mg/L).
- pH values exceeded the Dumps Fault intrawell UPL of 7.9 SU for MW-1610 (8.3 SU).

Additionally, the following statistically significant decreases (SSDs) below the lower prediction limits (LPLs) for pH were noted:

- pH values were below the Chattanooga Shale interwell LPL of 8.0 SU for MW-1603 (7.7 SU), MW-1604 (7.0 SU), MW-1605 (7.6 SU), and MW-1612 (6.8 SU).

While the prediction limits were calculated for a one-of-two or one-of-three retesting procedure, SSIs were conservatively assumed if the initial (October 2020) sample was above the UPL or below the LPL.

2.3 Conclusions

A semi-annual assessment monitoring event was conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. 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 barium, cobalt, lithium, and molybdenum.

Appendix III parameters were compared to recalculated prediction limits. Calcium, chloride, fluoride, pH, and sulfate results exceeded background levels, and pH results were lower than background levels.

Based on this evaluation, the Clinch River Ash Pond 1 CCR unit will continue with the assessment of corrective measures and continue to monitor the groundwater monitoring network in accordance with the assessment monitoring program per 40 CFR 257.96b.

SECTION 3

REFERENCES

Geosyntec Consultants (Geosyntec). 2019. Statistical Analysis Summary – Ash Pond 1, Clinch River Plant, Carbo, Virginia. July 15, 2019.

Geosyntec. 2020a. Statistical Analysis Summary – Ash Pond 1, Clinch River Plant, Carbo, Virginia. August 17, 2020.

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

TABLES

**Table 1 - Groundwater Data Summary
Clinch River Plant - Ash Pond 1**

Parameter	Unit	MW-1601	MW-1602	MW-1603	MW-1604	MW-1605	MW-1606	MW-1607	MW-1608	MW-1609	MW-1610	MW-1611	MW-1612
		10/6/2020	10/6/2020	10/7/2020	10/7/2020	10/7/2020	10/7/2020	10/6/2020	10/6/2020	10/6/2020	10/7/2020	10/6/2020	10/7/2020
Antimony	µg/L	0.06 J	0.23	0.06 J	0.42	0.03 J	0.04 J	0.08 J	0.02 J	0.03 J	0.69	0.04 J	0.03 J
Arsenic	µg/L	11.4	2.03	2.09	2.99	2.07	15.0	1.27	1.25	0.1 J	5.92	6.69	0.76
Barium	µg/L	172	107	2,770	2,940	1,890	106	68.2	32.0	424	151	130	2,450
Beryllium	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Boron	mg/L	0.589	0.633	0.300	0.400	0.545	0.067	0.111	0.360	0.05 U	0.068	0.556	0.399
Cadmium	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 J	0.10	0.05 U	0.01 J	0.05 U	0.05 U	0.05 U
Calcium	mg/L	5.60	3.78	25.7	27.3	43.4	59.3	42.7	1.01	70.1	14.2	24.0	50.7
Chloride	mg/L	27.1	5.3	171	17.4	154	12.9	7.4	6.6	1.4	10.1	16.0	20.0
Chromium	µg/L	0.2 J	0.329	0.08 J	0.286	0.300	0.2 J	0.05 J	0.302	0.203	0.278	0.293	0.1 J
Cobalt	µg/L	0.080	0.04 J	0.189	0.463	0.060	3.52	7.82	0.200	0.212	4.30	0.03 J	0.183
Combined Radium	pCi/L	0.618	0.6456	0.5813	0.6107	6.63	2.816	0.315	0.79	1.938	1.734	0.763	1.765
Fluoride	mg/L	2.10	1.57	0.15	0.34	0.38	0.18	0.24	0.40	0.23	0.35	1.02	0.16
Lead	µg/L	0.1 J	0.08 J	0.2 U	0.2 U	0.2 U	0.731	0.323	0.1 J	0.324	1.47	0.07 J	0.2 U
Lithium	mg/L	0.0939	0.0373	0.0716	0.0661	0.173	0.0220	0.125	0.0196	0.000975	0.348	0.0630	0.103
Mercury	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Molybdenum	µg/L	2.10	2.41	0.4 J	2 J	0.7 J	34.6	134	2 J	1 J	345	2.21	2 U
Selenium	µg/L	0.06 J	0.05 J	0.04 J	0.2 U	0.2 U	0.1 J	0.2	0.03 J	0.03 J	0.3	0.06 J	0.2 U
Sulfate	mg/L	214	24.5	0.6	0.5	0.4 U	35.7	136	182	17.3	47.1	98.1	0.4 U
Thallium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Dissolved Solids	mg/L	1,460	527	624	384	682	321	270	445	271	229	622	526
pH	SU	8.2	8.5	7.7	7.0	7.6	7.1	7.7	8.5	7.3	8.3	7.7	6.8

Notes:

mg/L: milligrams per liter

µg/L: micrograms per liter

SU: standard unit

pCi/L: picocuries per liter

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

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

All samples were collected as part of the assessment monitoring program in accordance with 40 CFR 257.90(e)(3).

**Table 2A: Groundwater Protection Standards
Clinch River Plant - Ash Pond 1**

Chattanooga Shale Monitoring Well Network			
Constituent Name	MCL	CCR Rule-Specified	Calculated UTL
Antimony, Total (mg/L)	0.0060		0.00025
Arsenic, Total (mg/L)	0.0100		0.0258
Barium, Total (mg/L)	2.00		0.306
Beryllium, Total (mg/L)	0.004		0.0001
Cadmium, Total (mg/L)	0.005		0.00005
Chromium, Total (mg/L)	0.0500		0.00128
Cobalt, Total (mg/L)	n/a	0.00600	0.000467
Combined Radium, Total (pCi/L)	5.000		3.013
Fluoride, Total (mg/L)	4.0		2.4
Lead, Total (mg/L)	n/a	0.015	0.00072
Lithium, Total (mg/L)	n/a	0.0400	0.118
Mercury, Total (mg/L)	0.002		0.001
Molybdenum, Total (mg/L)	n/a	0.100	0.0182
Selenium, Total (mg/L)	0.05		0.0002
Thallium, Total (mg/L)	0.002		0.0005

Notes:

Grey cell indicates calculated UTL is higher than MCL or CCR Rule-specified value

MCL = Maximum Contaminant Level

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

The higher of the calculated UTL or MCL/Rule-Specified Level is used as the GWPS.

**Table 2B: Groundwater Protection Standards
Clinch River Plant - Ash Pond 1**

Rome Limestone Monitoring Well Network			
Constituent Name	MCL	CCR Rule-Specified	Calculated UTL
Antimony, Total (mg/L)	0.006		0.0001
Arsenic, Total (mg/L)	0.010		0.0016
Barium, Total (mg/L)	2.00		0.540
Beryllium, Total (mg/L)	0.004		0.0001
Cadmium, Total (mg/L)	0.005		0.00005
Chromium, Total (mg/L)	0.0500		0.000340
Cobalt, Total (mg/L)	n/a	0.00600	0.00152
Combined Radium, Total (pCi/L)	5.000		5.249
Fluoride, Total (mg/L)	4.0		0.37
Lead, Total (mg/L)	n/a	0.015	0.00127
Lithium, Total (mg/L)	n/a	0.0400	0.017
Mercury, Total (mg/L)	0.002		0.001
Molybdenum, Total (mg/L)	n/a	0.100	0.0025
Selenium, Total (mg/L)	0.05		0.0002
Thallium, Total (mg/L)	0.002		0.0005

Notes:

Grey cell indicates calculated UTL is higher than MCL or CCR Rule-specified value

MCL = Maximum Contaminant Level

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

The higher of the calculated UTL or MCL/Rule-Specified Level is used as the GWPS.

**Table 2C: Groundwater Protection Standards
Clinch River Plant - Ash Pond 1**

Dumps Fault Monitoring Well Network			
Constituent Name	MCL	CCR Rule-Specified	Calculated UTL
Antimony, Total (mg/L)	0.0060		0.00078
Arsenic, Total (mg/L)	0.0100		0.0450
Barium, Total (mg/L)	2.00		0.146
Beryllium, Total (mg/L)	0.004		0.0001
Cadmium, Total (mg/L)	0.005		0.00005
Chromium, Total (mg/L)	0.0500		0.00104
Cobalt, Total (mg/L)	n/a	0.00600	0.000156
Combined Radium, Total (pCi/L)	5.000		2.008
Fluoride, Total (mg/L)	4.0		1.3
Lead, Total (mg/L)	n/a	0.015	0.00021
Lithium, Total (mg/L)	n/a	0.0400	0.173
Mercury, Total (mg/L)	0.002		0.001
Molybdenum, Total (mg/L)	n/a	0.100	0.00676
Selenium, Total (mg/L)	0.05		0.0001
Thallium, Total (mg/L)	0.002		0.0005

Notes:

Grey cell indicates calculated UTL is higher than MCL or CCR Rule-specified value

MCL = Maximum Contaminant Level

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

The higher of the calculated UTL or MCL/Rule-Specified Level is used as the GWPS.

**Table 3 - Identified Statistically Significant Levels
Clinch River - Ash Pond 1**

Formation	Well ID	Constituent	GPS	LCL
Chattanooga Shale	MW-1604	Barium	2.00	3.07
	MW-1605	Lithium	0.118	0.187
Rome Limestone	MW-1606	Lithium	0.0400	0.0607
	MW-1607	Cobalt	0.00600	0.00806
		Lithium	0.0400	0.118
		Molybdenum	0.100	0.129
Dumps Fault	MW-1610	Cobalt	0.00600	0.00698
		Molybdenum	0.100	0.135

Notes:

All values are in mg/L

GWPS - Groundwater protection standard

LCL - lower confidence limit

**Table 4A - Appendix III Data Summary
Clinch River Plant - Ash Pond 1**

Analyte	Unit	Description	Chattanooga Shale			
			MW-1603	MW-1604	MW-1605	MW-1612
			10/7/2020	10/7/2020	10/7/2020	10/7/2020
Boron	mg/L	Intrawell Background Value (UPL)	0.502	0.501	0.677	0.591
		Analytical Result	0.300	0.400	0.545	0.399
Calcium	mg/L	Interwell Background Value (UPL)	8.28			
		Analytical Result	25.7	27.3	43.4	50.7
Chloride	mg/L	Interwell Background Value (UPL)	45.8			
		Analytical Result	171	17.4	154	20.0
Fluoride	mg/L	Intrawell Background Value (UPL)	0.188	0.287	0.427	0.248
		Analytical Result	0.15	0.34	0.38	0.16
pH	SU	Interwell Background Value (UPL)	9.0			
		Interwell Background Value (LPL)	8.0			
		Analytical Result	7.7	7.0	7.6	6.8
Sulfate	mg/L	Intrawell Background Value (UPL)	33.9	5.22	143	19.7
		Analytical Result	0.6	0.5	0.06	0.06
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	695	418	910	584
		Analytical Result	624	384	682	526

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

Bold values exceed the background value.

Background values are shaded gray.

**Table 4B - Appendix III Data Summary
Clinch River Plant - Ash Pond 1**

Analyte	Unit	Description	Rome Limestone	
			MW-1606	MW-1607
			10/7/2020	10/6/2020
Boron	mg/L	Intrawell Background Value (UPL)	0.209	0.187
		Analytical Result	0.067	0.111
Calcium	mg/L	Intrawell Background Value (UPL)	66.3	53.2
		Analytical Result	59.3	42.7
Chloride	mg/L	Interwell Background Value (UPL)	3.72	
		Analytical Result	12.9	7.4
Fluoride	mg/L	Intrawell Background Value (UPL)	0.293	0.274
		Analytical Result	0.18	0.24
pH	SU	Intrawell Background Value (UPL)	7.4	8.4
		Intrawell Background Value (LPL)	6.7	7.2
		Analytical Result	7.1	7.7
Sulfate	mg/L	Interwell Background Value (UPL)	21.0	
		Analytical Result	35.7	136
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	386	318
		Analytical Result	321	270

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

Bold values exceed the background value.

Background values are shaded gray.

**Table 4C - Appendix III Data Summary
Clinch River Plant - Ash Pond 1**

Analyte	Unit	Description	Dumps Fault
			MW-1610
			10/7/2020
Boron	mg/L	Intrawell Background Value (UPL)	0.121
		Analytical Result	0.068
Calcium	mg/L	Intrawell Background Value (UPL)	38.9
		Analytical Result	14.2
Chloride	mg/L	Intrawell Background Value (UPL)	12.6
		Analytical Result	10.1
Fluoride	mg/L	Intrawell Background Value (UPL)	0.227
		Analytical Result	0.35
pH	SU	Intrawell Background Value (UPL)	7.9
		Intrawell Background Value (LPL)	7.1
		Analytical Result	8.3
Sulfate	mg/L	Intrawell Background Value (UPL)	52.2
		Analytical Result	47.1
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	266
		Analytical Result	229

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

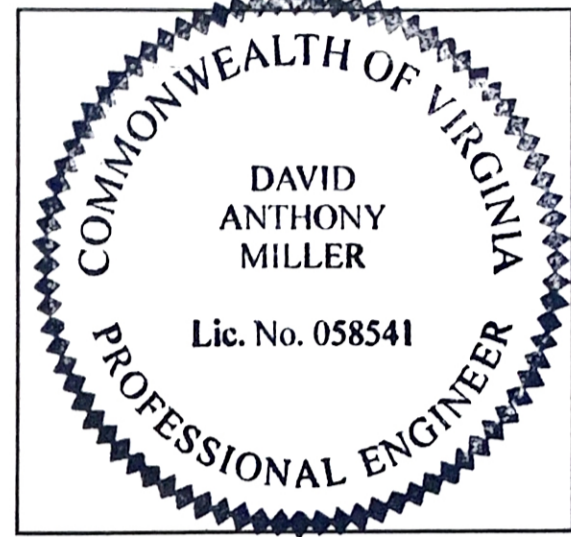
I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Clinch River Ash Pond 1 CCR management area and that the requirements of 40 CFR 257.93(f) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



058541

License Number

VIRGINIA

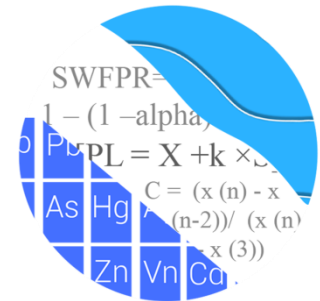
Licensing State

02.02.2021

Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING



February 1, 2021

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

RE: Clinch River Pond 1 – Assessment Monitoring Report & Background Update – 2020

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical evaluation and background update of 2020 groundwater data for American Electric Power Company's Clinch River Pond 1. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009).

Sampling began at the Clinch River Pond 1 for the CCR program in 2017 at each of the groundwater monitoring wells. The monitoring well network, as provided by Geosyntec Consultants, consists of the following three formations:

Chattanooga Shale:

Upgradient Wells: MW-1601, MW-1602, MW-1608

Downgradient Wells: MW-1603, MW-1604, MW-1605, MW-1612

Rome Limestone:

Cross-gradient (background) Well: MW-1609

Downgradient Wells: MW-1606, MW-1607

Dumps Fault:

Upgradient Well: MW-1611

Downgradient Well: MW-1610

Data were sent electronically to Groundwater Stats Consulting, and the statistical 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 listed below. The terms “constituent” and “parameter” are interchangeable.

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

For all constituents, a substitution of the most recent reporting limit is used for nondetect data. In the time series plots, a single reporting limit substitution is used across all wells for a given parameter since the wells are plotted as a group. For calculating intrawell prediction limits, the substitution is performed for individual wells and may differ across wells. This generally gives the most conservative limit in each case. Note that when there are no detections present in downgradient wells for a given constituent, statistical analyses are not required. A summary of well/constituent pairs with 100% nondetects follows this letter.

A separate section is provided for each formation and includes time series plots for Appendix III and IV parameters at all wells within the same formation, for the purpose of screening data (Figure A for each formation). Additionally, box plots are included for all constituents at upgradient and downgradient wells (Figure B for each formation). 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.

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 are provided to demonstrate that the selected statistical methods for Appendix III parameters comply with the USEPA Unified Guidance recommendations as discussed below.

Summary of Statistical Methods:

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

Chattanooga Shale:

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

Rome Limestone:

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

Dumps Fault:

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

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are nondetects, a nonparametric test is utilized. While the false positive rate associated with the parametric limits is based on an annual 10% (5% per semi-annual event) as recommended by the EPA Unified Guidance (2009), the false positive rate associated with the nonparametric limits is dependent upon the available background sample size, number of future comparisons, and verification resample plan. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction limits. Nondetects are handled as follows:

- No statistical analyses are required on wells and analytes containing 100% nondetects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% nondetects in background, simple substitution of one half the reporting limit is utilized in the statistical analysis. The reporting limit

utilized for nondetects is the practical quantification limit (PQL) as reported by the laboratory.

- When data contain between 15-50% nondetects, the Kaplan-Meier nondetect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% nondetects.

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

Summary of Original Background Screening – June 2019

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, flagged in the computer database with "o" and deselected prior to construction of statistical limits. A current list of flagged outliers is included with this report. A discussion of Tukey's test results and individual outliers for each formation is included later in the section for the October 2020 background update.

No distinct seasonal patterns were observed on the time series plots for any of the detected data; therefore, no deseasonalizing adjustments were made. When seasonal patterns are observed, data may be deseasonalized so that the resulting limits will

correctly account for the seasonality as a predictable pattern rather than random variation or a release.

While a trend may be visually apparent, a quantification of the trend and its significance is needed. 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. This step serves to eliminate the trend and, thus, reduce variation in background. When statistically significant decreasing trends are present, earlier data are evaluated to determine whether earlier concentration levels are significantly different than current reported concentrations and will be deselected as necessary. When the historical records of data are truncated for the reasons above, a summary report will be provided to show the date ranges used in construction of the statistical limits.

The results of the trend analyses showed that all data are fairly stable over time. A few statistically significant increasing and decreasing trends were noted; however, due to the limited data and the low magnitudes of the trends relative to the average concentrations, no adjustments were required to any data sets at this time. In the case of molybdenum in the Chattanooga Shale formation, it was noted that recent reported concentrations are trending downward across several of the wells. If this pattern continues, it is recommended that historical higher concentrations be deselected in the calculation of the confidence intervals, discussed later in this letter, so that present-day water quality is represented. Results of the trend tests were included with the original screening.

Appendix III – Determination of Spatial Variation

The Analysis of Variance (ANOVA) is used when 2 or more upgradient wells are available to statistically evaluate whether there are significant differences in average concentrations among the wells, and assists in identifying the most appropriate statistical approach. Interwell tests, which compare downgradient well data to statistical limits constructed from pooled upgradient well data, are appropriate when average concentrations are similar across upgradient wells. Intrawell tests, which compare compliance data from a single well to screened historical data within the same well, are appropriate when upgradient wells exhibit spatial variation; when statistical limits constructed from upgradient wells would not be conservative from a regulatory perspective; and when downgradient water quality is unimpacted compared to upgradient water quality for the same parameter.

For the Chattanooga formation, the ANOVA identified variation for each of the Appendix III parameters, suggesting that an intrawell approach should be considered for these parameters. Data were further evaluated as described below for the appropriateness of intrawell testing.

For the Rome and Dumps Fault formations, the ANOVA could not be used as only one upgradient well is installed at each formation. Therefore, downgradient well data were further evaluated as described below.

Exploratory data analysis was used as a general comparison of concentrations in downgradient wells to concentrations in upgradient wells for all Appendix III parameters recommended for intrawell analyses. Upper tolerance limits (UTLs) were used in conjunction with confidence intervals to determine whether the estimated averages in downgradient wells are higher than observed levels upgradient of the facility. The upper tolerance limits represent the extreme upper range of background levels that may occur at the site when there are no impacts of the facility.

In cases where downgradient average concentrations are higher than the upper limit of observed upgradient concentrations (UTLs) for a given constituent, an independent study and hydrogeological investigation would be required to identify local geochemical conditions and expected groundwater quality for the region to justify an intrawell approach. Such an assessment is beyond the scope of services provided by Groundwater Stats Consulting. When there is not an obvious explanation for observed concentration differences in downgradient wells relative to concentrations in upgradient wells, interwell prediction limits will initially be selected for the statistical method until further evidence shows that concentrations are due to natural variation rather than a result of the facility.

Parametric tolerance limits were constructed with a target of 99% confidence and 95% coverage using all screened upgradient well data for each of the Appendix III parameters. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. As more data are collected, the background population is better represented, and the confidence and coverage levels increase.

Confidence intervals were constructed on all data for each downgradient well for each of the Appendix III parameters, and compared against the tolerance limits discussed above, to determine intrawell eligibility. When the entire confidence interval is above a background standard for a given parameter, interwell methods are initially recommended as the statistical method. Therefore, only parameters with confidence intervals which did not exceed background standards are eligible for intrawell prediction limits.

For the Chattanooga formation, confidence intervals were found to be within their respective limits for boron, fluoride, sulfate and TDS. Those four constituents are, therefore, eligible for intrawell prediction limits. Interwell prediction limits are initially recommended for calcium, chloride and pH due to at least one confidence interval in the downgradient well network exceeding its respective limit.

For the Rome formation, confidence intervals were found to be within their respective limits for boron, calcium, fluoride, pH and TDS making these parameters eligible for intrawell prediction limits. Interwell prediction limits are initially recommended for chloride and sulfate due to at least one confidence interval in the downgradient well network exceeding its respective limit.

For the Dumps Fault formation, all confidence intervals were found to be within their respective limits. Additionally, concentrations in upgradient well MW-1611 are notably higher than concentrations in the downgradient well for all Appendix III constituents other than pH. For pH, upgradient and downgradient levels are very similar. The higher upgradient concentrations would result in interwell prediction limits that are not conservative from a regulatory perspective. Therefore, intrawell prediction limits are recommended for all Dumps Fault Appendix III parameters.

Background Update Summary - Appendix III Constituents – October 2020

Outlier Analysis

Prior to updating background data during this analysis, Tukey's outlier test and visual screening were used to re-evaluate data for outliers at all wells for parameters utilizing intrawell prediction limits, and at all upgradient wells for parameters utilizing interwell prediction limits. When the most recent value is identified as an outlier, values are not flagged in the database at this time as they may represent the beginning of a trend. If future values do not remain at similar concentrations, these values will be flagged as outliers and deselected. Several low values exist in the data sets and appear on the graphs as possible low outliers relative to the laboratory's Practical Quantitation Limit. However, these values are observed trace values (i.e. measurements reported by the laboratory between the Method Detection Limit and the Practical Quantitation Limit) and, therefore, were not flagged as outliers.

Any values flagged as outliers (o-flag) are plotted in a disconnected symbol and lighter font on the time series graph. A substitution of the most recent reporting limit was applied when varying detection limits existed in data.

Tukey's outlier analysis results for upgradient and downgradient wells and outlier summaries for each formation are included with this report in Figure C – Chattanooga Shale, Figure C – Rome Limestone, and Figure C – Dump's Fault. Note that outlier analysis results are combined for Appendix III and Appendix IV constituents. Also note that for the tables of downgradient Tukey's results, the upgradient wells for the same parameters are included for comparison.

Tukey's outlier test on pooled upgradient well data did not identify any potential outliers for any of the formations, and no values were flagged in upgradient wells for Appendix III parameters.

For Chattanooga Shale, Tukey's outlier test identified a high value for TDS in well MW-1605, which was flagged accordingly. For Rome Limestone, Tukey's outlier test identified a high value for TDS in well MW-1607 that was flagged accordingly. Additionally, a similar high value for TDS in well MW-1607 was identified visually and flagged as an outlier in order to generate statistical limits that were conservative (i.e. lower) from a regulatory perspective. For Dumps Fault, Tukey's outlier test did not identify any potential outliers, and no Appendix III values were flagged.

Intrawell Parameters—Mann-Whitney Testing

For parameters that require intrawell prediction limits, the Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data through December 2018 to the new compliance samples at each well through April 2020 (Figure D). The test evaluates whether the groups are statistically different at the 99% confidence level. If no statistically significant differences are noted, background data may be updated to include more recent data. Complete graphical results of the Mann-Whitney tests are included at the end of this report (Figure D for each of the three formations). Statistically significant differences were identified for the following well/constituent pairs at the following formations:

Chattanooga Shale

- Sulfate: MW-1603, MW-1604, MW-1605, and MW-1612

Rome Limestone

- Fluoride: MW-1609 (upgradient)

Dumps Fault

- Boron: MW-1610
- Calcium: MW-1611 (upgradient)

- Chloride: MW-1611 (upgradient)
- Sulfate: MW-1611 (upgradient) and MW-1610
- TDS: MW-1611 (upgradient)

Typically, when the test concludes that the medians of the two groups are significantly different, particularly in the downgradient wells, the background data are not updated to include the newer data but will be reconsidered in the future. Even though significant Mann-Whitney differences were identified, background data for fluoride in upgradient well MW-1609 at Rome Limestone and for boron and sulfate in well MW-1610 at Dumps Fault were updated with more recent data. In these three cases, compliance data were at lower concentrations than original background data and should generally result in more conservative prediction limits when added to background.

Background limits for other well/constituent pairs with significant results from the Mann-Whitney test (sulfate at downgradient wells MW-1603, MW-1604, MW-1605, and MW-1612 at Chattanooga Shale, and calcium, chloride, sulfate, and TDS in well MW-1611, at Dumps Fault), will utilize the most recent 8 measurements beginning from August 2018 through April 2020. The earlier portions of the records appeared to be substantially higher than the compliance concentrations, and were deselected prior to construction of statistical limits so that limits are more representative of present-day water quality conditions. A list of well/constituent pairs utilizing a truncated portion of their records follows this report (Date Ranges Table).

Intrawell Parameters—Prediction Limits

All available background data through April 2020, except in cases mentioned above, were used to establish intrawell background limits, combined with a 1-of-2 resample plan, that will be used for future comparisons (Figure E for each formation).

Interwell Parameters—Trend Testing

For parameters tested using interwell analyses, the Sen's Slope/Mann-Kendall trend test was used on upgradient wells to determine whether concentrations are statistically increasing, decreasing or stable (Figure F for each formation). Statistically significant trends were identified for the following upgradient well/constituent pairs:

Chattanooga Shale

- Chloride: MW-1608

Rome Limestone

- Chloride: MW-1609

The magnitudes of the trends above are either fairly small relative to average concentrations within each well or would not greatly affect the interwell prediction limits. With limited background samples collected to date, all data from upgradient wells were used to construct interwell prediction limits. As more data are collected, all upgradient well data will be re-evaluated for possible deselection of earlier measurements if they no longer represent present-day groundwater quality conditions.

Interwell Parameters—Prediction Limits

Interwell prediction limits using data through October 2020 for parameters mentioned above, combined with a 1-of-2 resample plan, were constructed from pooled upgradient well data for the Chattanooga Shale and Rome Limestone formations (Figure G for each formation). Downgradient measurements will be compared to these background limits during each subsequent semi-annual sampling event.

Evaluation of Appendix IV Parameters – October 2020

Prior to evaluating Appendix IV parameters, background data in upgradient wells 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 Chattanooga Shale and Rome Limestone did not identify any potential outliers, and none were flagged. For Dumps Fault Tukey's test identified a high value of molybdenum for well MW-1611, and this value was flagged. In addition high values for cobalt and lead in well MW-1611 were identified visually and flagged. Summaries of all flagged outliers and Tukey's test results for downgradient and upgradient wells are included in Figure C for each of the three formations

For each Appendix IV parameter and each of the three formations, Interwell upper tolerance limits were used to calculate background limits from all available pooled upgradient well data through October 2020 (Figure H for each formation).

Parametric limits use a target of 95% confidence and 95% coverage. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. These limits were compared to the Maximum Contaminant Levels (MCLs) and CCR-Rule specified levels, as shown in the Groundwater Protection Standards

(GWPS) table following this letter (Figure I for each formation), to determine the highest limit for use as the GWPS in the Confidence Interval comparisons.

Confidence intervals were then constructed for each Appendix IV constituent and each downgradient well using data through October 2020. The confidence intervals were then compared against the GWPS for each constituent to assess compliance. Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. Complete results of the confidence interval analysis follow this letter (Figure J for each formation). The following confidence interval exceedances were identified:

Chattanooga Shale

- Barium: MW-1604
- Lithium: MW-1605

Rome Limestone

- Cobalt: MW-1607
- Lithium: MW-1606 and MW-1607
- Molybdenum: MW-1607

Dumps Fault

- Cobalt: MW-1610
- Molybdenum: MW-1610

Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for the Clinch River Pond 1. 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: 1/19/2021 12:09 PM

Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Calcium (mg/L)

MW-1611 background:8/21/2018-4/20/2020

Chloride (mg/L)

MW-1611 background:8/21/2018-4/20/2020

Sulfate (mg/L)

MW-1603 background:8/22/2018-4/21/2020

MW-1604 background:8/22/2018-4/21/2020

MW-1605 background:8/22/2018-4/21/2020

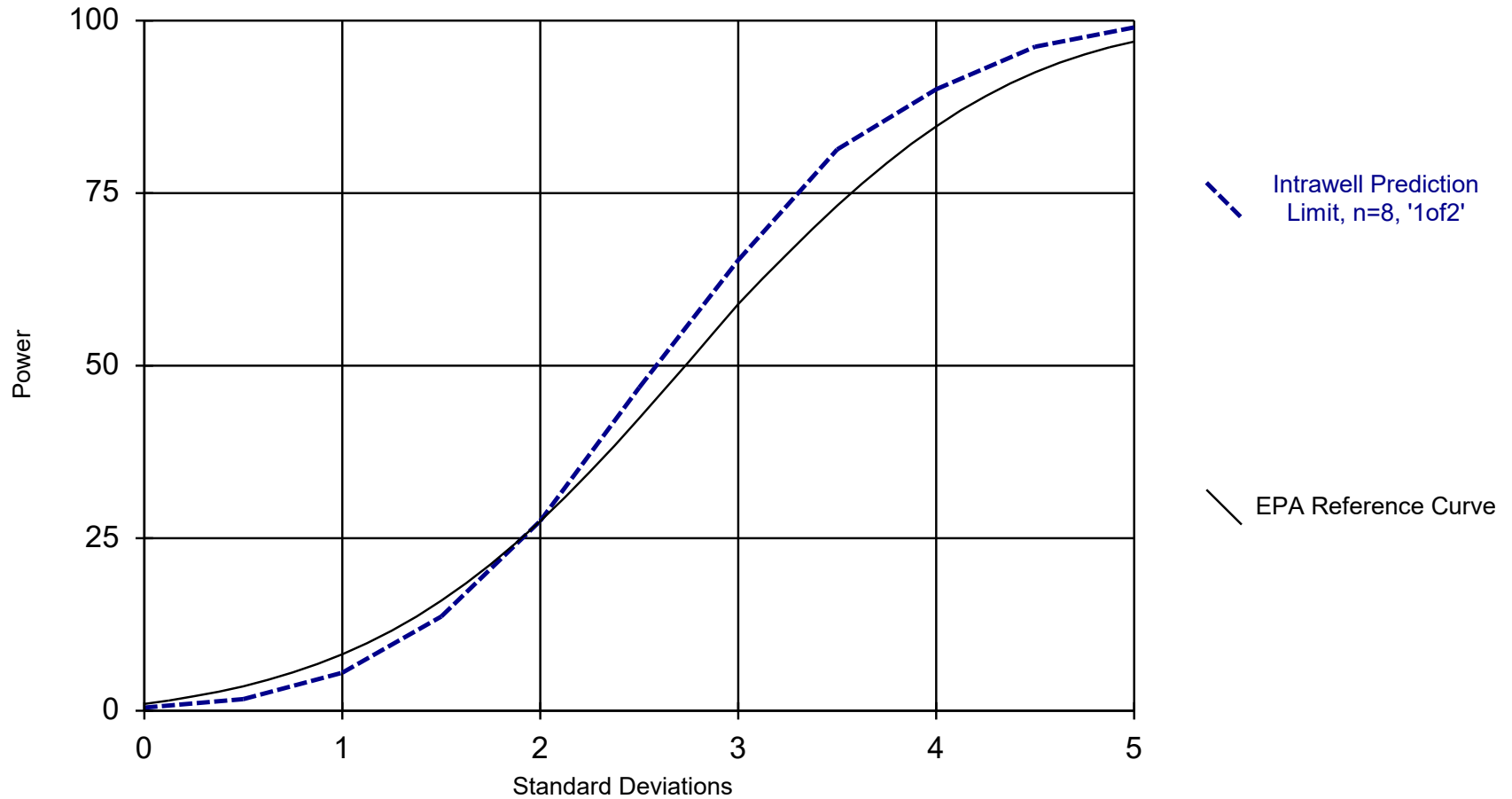
MW-1611 background:8/21/2018-4/20/2020

MW-1612 background:8/22/2018-4/21/2020

Total Dissolved Solids (mg/L)

MW-1611 background:8/21/2018-4/20/2020

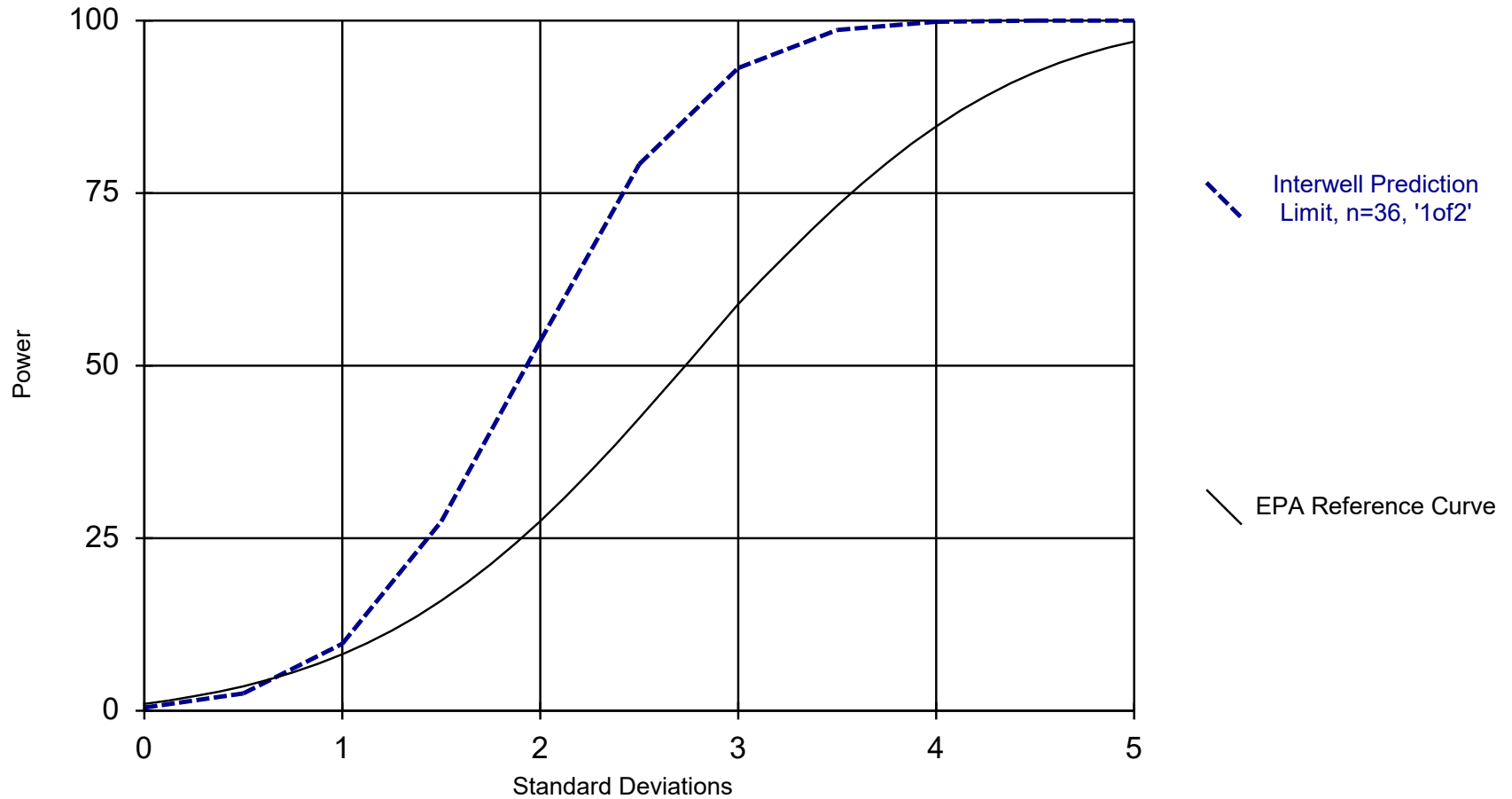
Intrawell Power Curve - Chattanooga Shale



Kappa = 2.616, based on 4 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 1/18/2021 5:24 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

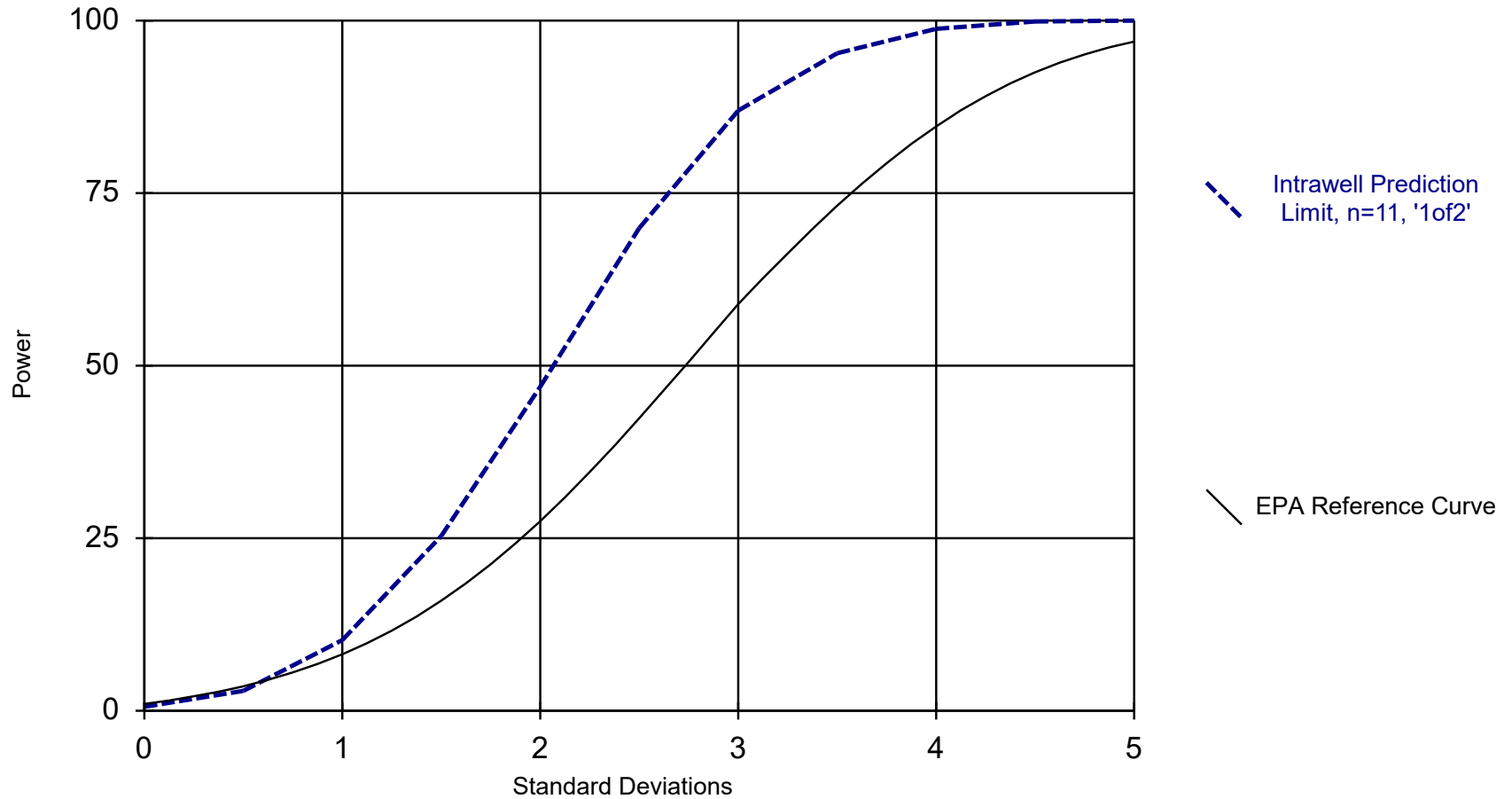
Interwell Power Curve - Chattanooga Shale



Kappa = 1.845, based on 4 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 1/18/2021 5:25 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

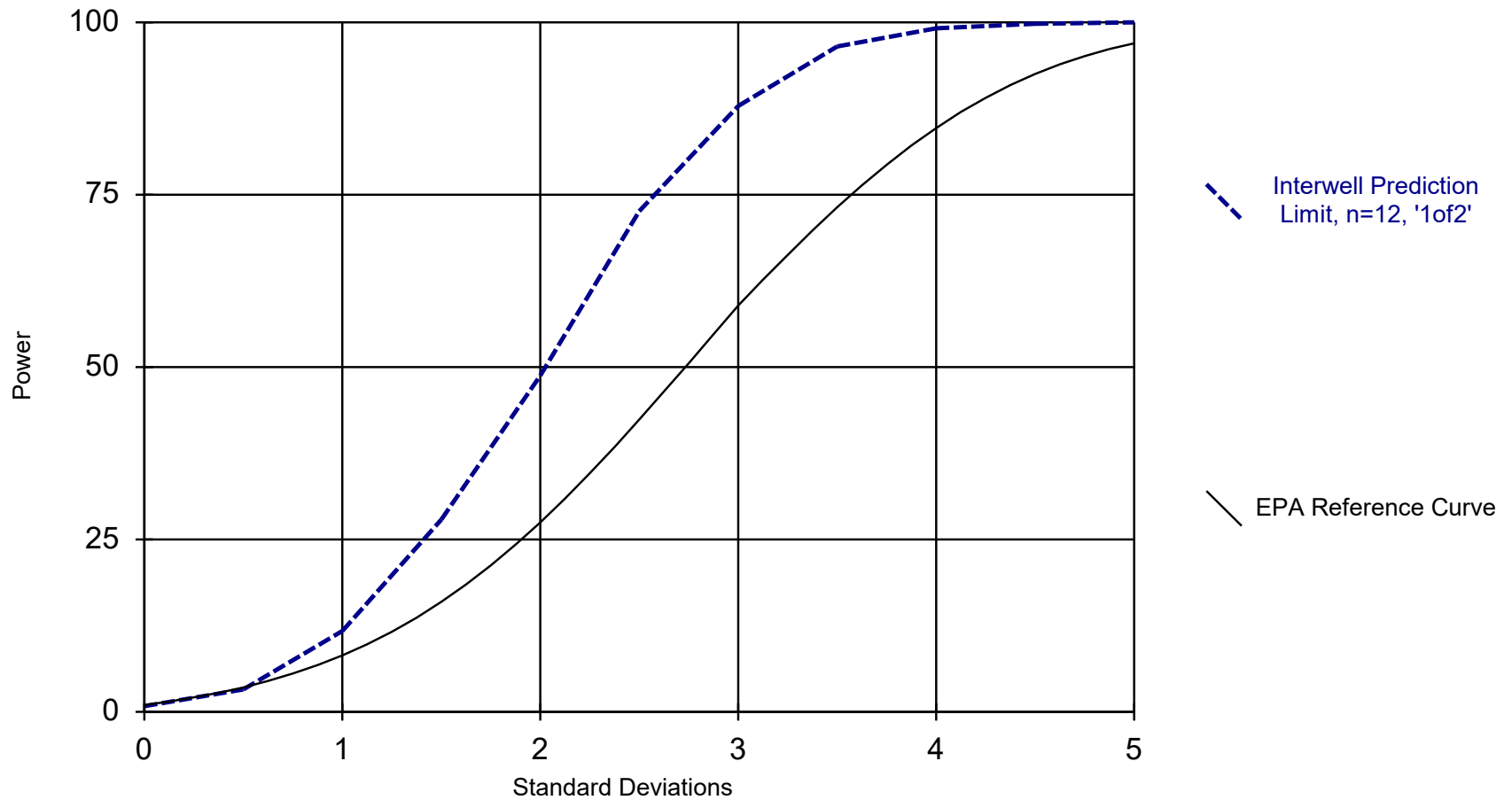
Intrawell Power Curve - Rome Limestone



Kappa = 2.003, based on 2 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 1/18/2021 5:21 PM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

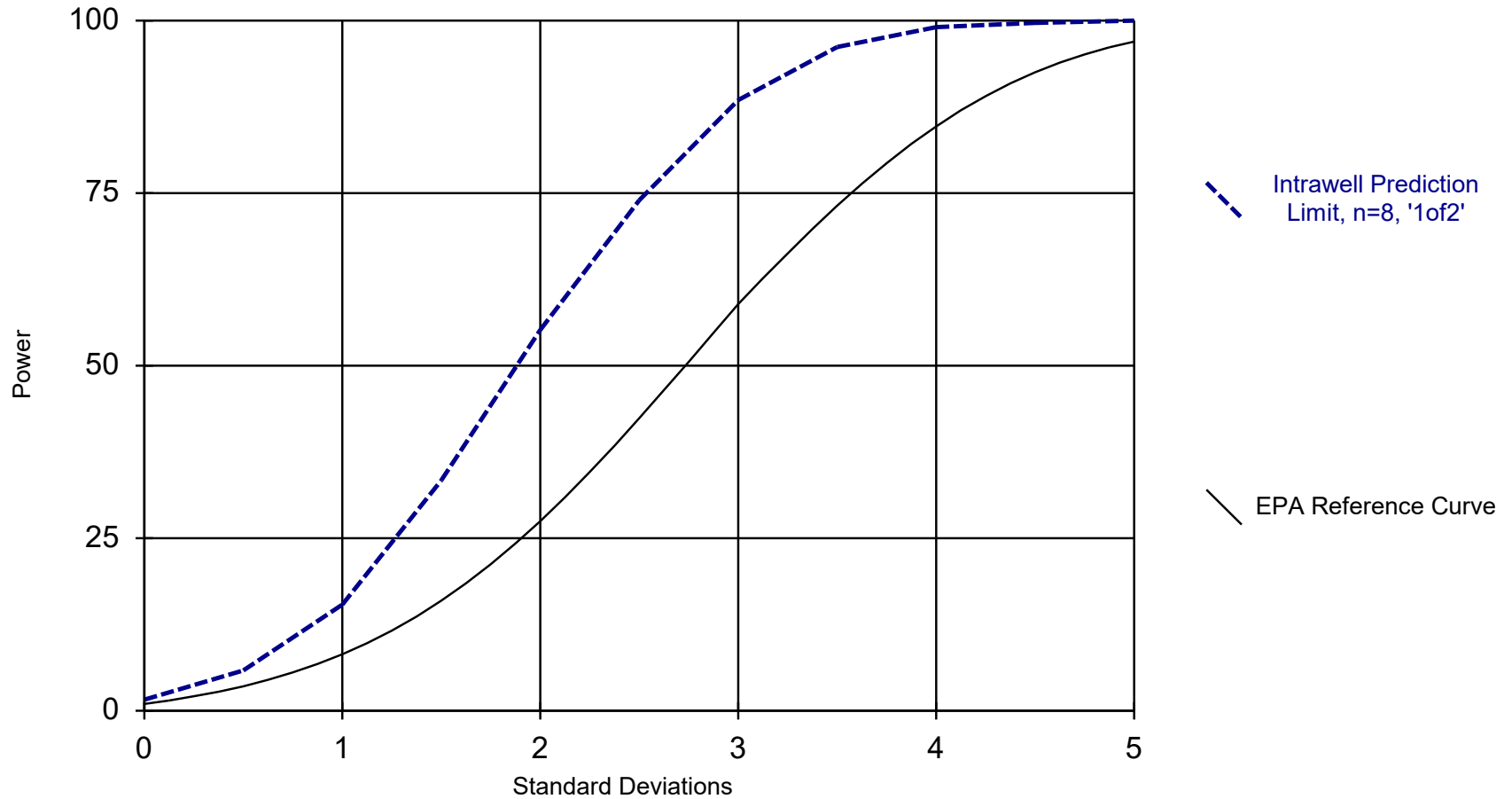
Interwell Power Curve - Rome Limestone



Kappa = 1.942, based on 2 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 1/18/2021 5:22 PM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Intrawell Power Curve - Dumps Fault



Kappa = 1.88, based on 1 compliance well and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 1/18/2021 5:26 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

100% Non-Detects - Chattanooga Shale

Analysis Run 1/13/2021 6:35 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Cadmium (mg/L)
MW-1603, MW-1604, MW-1612

Mercury (mg/L)
MW-1605

Tukey's Outlier Test - Downgradient Wells (Chattanooga) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:49 PM

Constituent	Well	OutlierValue(s)	Date(s)	MethodAlpha	N	Mean	Std. Dev.	Distribution	Normality Test
Total Dissolved Solids (mg/L)	MW-1605	Yes 1700	4/11/2018	NP	NaN	14 846.8	252.2	In(x)	ShapiroWilk

Tukey's Outlier Test - Downgradient Wells (Chattanooga) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:49 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Boron (mg/L)	MW-1601 (bg)	No	n/a	n/a	NP	NaN	14	0.5389	0.04797	x^3	ShapiroWilk
Boron (mg/L)	MW-1602 (bg)	No	n/a	n/a	NP	NaN	14	0.6213	0.03331	x^5	ShapiroWilk
Boron (mg/L)	MW-1603	No	n/a	n/a	NP	NaN	14	0.2829	0.0966	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1604	No	n/a	n/a	NP	NaN	14	0.4165	0.03659	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1605	No	n/a	n/a	NP	NaN	14	0.5761	0.04389	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1608 (bg)	No	n/a	n/a	NP	NaN	14	0.3516	0.01842	sqrt(x)	ShapiroWilk
Boron (mg/L)	MW-1612	No	n/a	n/a	NP	NaN	13	0.4527	0.05968	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1601 (bg)	No	n/a	n/a	NP	NaN	14	2.103	0.1788	x^6	ShapiroWilk
Fluoride (mg/L)	MW-1602 (bg)	No	n/a	n/a	NP	NaN	14	1.596	0.06454	x^4	ShapiroWilk
Fluoride (mg/L)	MW-1603	No	n/a	n/a	NP	NaN	14	0.1264	0.02845	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1604	No	n/a	n/a	NP	NaN	14	0.2421	0.0362	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1605	No	n/a	n/a	NP	NaN	14	0.3586	0.03134	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1608 (bg)	No	n/a	n/a	NP	NaN	14	0.4236	0.0256	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1612	No	n/a	n/a	NP	NaN	13	0.1615	0.03716	x^3	ShapiroWilk
Sulfate (mg/L)	MW-1601 (bg)	No	n/a	n/a	NP	NaN	14	228.9	58.84	ln(x)	ShapiroWilk
Sulfate (mg/L)	MW-1602 (bg)	No	n/a	n/a	NP	NaN	14	26.54	6.765	x^2	ShapiroWilk
Sulfate (mg/L)	MW-1603	No	n/a	n/a	NP	NaN	14	18.76	14.77	sqrt(x)	ShapiroWilk
Sulfate (mg/L)	MW-1604	No	n/a	n/a	NP	NaN	14	3.529	2.416	x^(1/3)	ShapiroWilk
Sulfate (mg/L)	MW-1605	No	n/a	n/a	NP	NaN	14	65.96	39.69	x^2	ShapiroWilk
Sulfate (mg/L)	MW-1608 (bg)	No	n/a	n/a	NP	NaN	14	172.4	6.607	ln(x)	ShapiroWilk
Sulfate (mg/L)	MW-1612	No	n/a	n/a	NP	NaN	13	7.215	5.779	sqrt(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1601 (bg)	No	n/a	n/a	NP	NaN	14	1426	133.5	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1602 (bg)	No	n/a	n/a	NP	NaN	14	526.3	21.96	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1603	No	n/a	n/a	NP	NaN	14	489.6	102.2	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1604	No	n/a	n/a	NP	NaN	14	391.9	11.6	x^4	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1605	Yes	1700	4/11/2018	NP	NaN	14	846.8	252.2	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1608 (bg)	No	n/a	n/a	NP	NaN	14	447.5	19.47	x^(1/3)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1612	No	n/a	n/a	NP	NaN	13	517.1	43.13	x^6	ShapiroWilk

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

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/28/2021, 2:38 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.00009429	0.00006236	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.006522	0.007395	ln(x)	ShapiroWilk
Barium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.1232	0.08507	x^(1/3)	ShapiroWilk
Beryllium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.00006548	0.00004085	sqrt(x)	ShapiroWilk
Cadmium (mg/L)	MW-1601,MW-1602,M...	n/a	n/a	n/a w/combined bg	NP	NaN	42	0.00004407	0.00001386	unknown	ShapiroWilk
Calcium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	3.525	2.171	sqrt(x)	ShapiroWilk
Chloride (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	13.8	12.19	ln(x)	ShapiroWilk
Chromium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.0004252	0.0002974	ln(x)	ShapiroWilk
Cobalt (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.0001415	0.000119	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.9599	0.8187	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	1.374	0.7199	x^3	ShapiroWilk
Lead (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.0001835	0.0001794	ln(x)	ShapiroWilk
Lithium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.05463	0.03426	ln(x)	ShapiroWilk
Mercury (mg/L)	MW-1601,MW-1602,M...	n/a	n/a	n/a w/combined bg	NP	NaN	42	0.0009107	0.0002786	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.004925	0.005015	ln(x)	ShapiroWilk
pH (SU)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	8.504	0.2824	normal	ShapiroWilk
Selenium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.0001024	0.00006828	ln(x)	ShapiroWilk
Thallium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.00034	0.0002291	ln(x)	ShapiroWilk

Tukey's Outlier Test - Downgradient Wells (Rome) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:35 AM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Date(s)</u>	<u>Method</u>	<u>Alpha</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Total Dissolved Solids (mg/L)	MW-1607	Yes	468	10/18/2017	NP	NaN	14	311.3	57.93	In(x)	ShapiroWilk

Tukey's Outlier Test - Downgradient Wells (Rome) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:35 AM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Boron (mg/L)	MW-1606	No	n/a	n/a	NP	NaN	14	0.116	0.04674	sqrt(x)	ShapiroWilk
Boron (mg/L)	MW-1607	No	n/a	n/a	NP	NaN	14	0.1295	0.02875	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.04714	0.03093	ln(x)	ShapiroWilk
Calcium (mg/L)	MW-1606	No	n/a	n/a	NP	NaN	14	56.91	4.854	x^5	ShapiroWilk
Calcium (mg/L)	MW-1607	No	n/a	n/a	NP	NaN	14	47.91	2.88	ln(x)	ShapiroWilk
Calcium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	68.91	5.805	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1606	No	n/a	n/a	NP	NaN	14	0.2057	0.04345	normal	ShapiroWilk
Fluoride (mg/L)	MW-1607	No	n/a	n/a	NP	NaN	14	0.2243	0.02593	normal	ShapiroWilk
Fluoride (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.26	0.04151	sqrt(x)	ShapiroWilk
pH (SU)	MW-1606	No	n/a	n/a	NP	NaN	14	7.059	0.191	x^6	ShapiroWilk
pH (SU)	MW-1607	No	n/a	n/a	NP	NaN	14	7.784	0.2921	x^6	ShapiroWilk
pH (SU)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	7.308	0.332	x^6	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1606	No	n/a	n/a	NP	NaN	14	335.6	25.21	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1607	Yes	468	10/18/2017	NP	NaN	14	311.3	57.93	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	297.3	26.47	ln(x)	ShapiroWilk

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

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:35 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.00004786	0.00002806	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0002879	0.0002987	ln(x)	ShapiroWilk
Barium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.396	0.05488	ln(x)	ShapiroWilk
Beryllium (mg/L)	MW-1609 (bg)	n/a	n/a	n/a	NP	NaN	14	0.00009314	0.00002566	unknown	ShapiroWilk
Cadmium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.00002714	0.00001729	x^(1/3)	ShapiroWilk
Chloride (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	1.857	0.9255	ln(x)	ShapiroWilk
Chromium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0001714	0.00006464	ln(x)	ShapiroWilk
Cobalt (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0003391	0.0003561	x^(1/3)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	2.063	1.11	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.26	0.04151	sqrt(x)	ShapiroWilk
Lead (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0004698	0.0003074	sqrt(x)	ShapiroWilk
Lithium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.01309	0.01343	ln(x)	ShapiroWilk
Mercury (mg/L)	MW-1609 (bg)	n/a	n/a	n/a	NP	NaN	14	0.001	0	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.001239	0.0006733	ln(x)	ShapiroWilk
Selenium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.000125	0.00007208	sqrt(x)	ShapiroWilk
Sulfate (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	15.24	3.014	ln(x)	ShapiroWilk
Thallium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0003336	0.0002324	ln(x)	ShapiroWilk

Tukey's Outlier Test - Downgradient Wells (Dumps Fault) - All Results (No Significant)

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 1:10 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Boron (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	0.066	0.03183	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.6058	0.0723	x^4	ShapiroWilk
Calcium (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	34.67	6.087	x^6	ShapiroWilk
Calcium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	60.07	41.7	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	11.15	0.8707	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	55.51	42.61	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	0.2086	0.04418	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.8914	0.171	x^5	ShapiroWilk
pH (SU)	MW-1610	No	n/a	n/a	NP	NaN	14	7.565	0.3266	sqrt(x)	ShapiroWilk
pH (SU)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	7.7	0.2366	x^6	ShapiroWilk
Sulfate (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	44.32	4.767	normal	ShapiroWilk
Sulfate (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	647.5	596.4	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	250.1	10.42	x^6	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	1553	953.7	ln(x)	ShapiroWilk

Tukey's Outlier Test - Upgradient Wells (Dumps Fault) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:26 PM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u> <u>Value(s)</u>	<u>Date(s)</u>	<u>Method</u> <u>Alpha</u> <u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Molybdenum (mg/L)	MW-1611 (bg)	Yes 0.038	10/19/2017	NP NaN 14	0.005268	0.009505	In(x)	ShapiroWilk

Tukey's Outlier Test - Upgradient Wells (Dumps Fault) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:26 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.000165	0.0001753	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.01674	0.0108	ln(x)	ShapiroWilk
Barium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.08009	0.02525	ln(x)	ShapiroWilk
Beryllium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.00006743	0.00004535	ln(x)	ShapiroWilk
Cadmium (mg/L)	MW-1611 (bg)	n/a	n/a	n/a	NP	NaN	14	0.00004714	0.00001069	unknown	ShapiroWilk
Chromium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.0004773	0.0002155	ln(x)	ShapiroWilk
Cobalt (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.00008443	0.00007269	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.6419	0.4649	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.8914	0.171	x^5	ShapiroWilk
Lead (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.0001752	0.0002545	ln(x)	ShapiroWilk
Lithium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.09339	0.03031	ln(x)	ShapiroWilk
Mercury (mg/L)	MW-1611 (bg)	n/a	n/a	n/a	NP	NaN	14	0.0009343	0.0002459	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-1611 (bg)	Yes	0.038	10/19/2017	NP	NaN	14	0.005268	0.009505	ln(x)	ShapiroWilk
Selenium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.00006857	0.00002507	normal	ShapiroWilk
Thallium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.0004064	0.0001866	x^(1/3)	ShapiroWilk

Welch's t-test/Mann-Whitney (Chattanooga Shale) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/14/2021, 8:49 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Sulfate (mg/L)	MW-1603	-2.858	Yes	Mann-W
Sulfate (mg/L)	MW-1604	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1605	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1612	-2.923	Yes	Mann-W

Welch's t-test/Mann-Whitney (Chattanooga Shale) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/14/2021, 8:49 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Boron (mg/L)	MW-1601 (bg)	1.537	No	Mann-W
Boron (mg/L)	MW-1602 (bg)	-0.8051	No	Mann-W
Boron (mg/L)	MW-1603	-0.366	No	Mann-W
Boron (mg/L)	MW-1604	-2.269	No	Mann-W
Boron (mg/L)	MW-1605	-0.07329	No	Mann-W
Boron (mg/L)	MW-1608 (bg)	-0.7329	No	Mann-W
Boron (mg/L)	MW-1612	-2.111	No	Mann-W
Fluoride (mg/L)	MW-1601 (bg)	0.367	No	Mann-W
Fluoride (mg/L)	MW-1602 (bg)	-0.2208	No	Mann-W
Fluoride (mg/L)	MW-1603	-2.093	No	Mann-W
Fluoride (mg/L)	MW-1604	-1.774	No	Mann-W
Fluoride (mg/L)	MW-1605	-1.914	No	Mann-W
Fluoride (mg/L)	MW-1608 (bg)	-2.439	No	Mann-W
Fluoride (mg/L)	MW-1612	-0.7386	No	Mann-W
Sulfate (mg/L)	MW-1601 (bg)	-1.906	No	Mann-W
Sulfate (mg/L)	MW-1602 (bg)	-1.976	No	Mann-W
Sulfate (mg/L)	MW-1603	-2.858	Yes	Mann-W
Sulfate (mg/L)	MW-1604	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1605	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1608 (bg)	-1.764	No	Mann-W
Sulfate (mg/L)	MW-1612	-2.923	Yes	Mann-W
Total Dissolved Solids (mg/L)	MW-1601 (bg)	-1.098	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1602 (bg)	0.07339	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1603	-0.2196	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1604	0.9528	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1605	-2.359	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1608 (bg)	-1.246	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1612	0.3248	No	Mann-W

Welch's t-test/Mann-Whitney (Rome Limestone) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:40 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Fluoride (mg/L)	MW-1609 (bg)	-3.013	Yes	Mann-W

Welch's t-test/Mann-Whitney (Rome Limestone) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:40 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Boron (mg/L)	MW-1606	-2.565	No	Mann-W
Boron (mg/L)	MW-1607	-2.419	No	Mann-W
Boron (mg/L)	MW-1609 (bg)	-2.337	No	Mann-W
Calcium (mg/L)	MW-1606	0.7329	No	Mann-W
Calcium (mg/L)	MW-1607	-0.6587	No	Mann-W
Calcium (mg/L)	MW-1609 (bg)	0.366	No	Mann-W
Fluoride (mg/L)	MW-1606	-1.761	No	Mann-W
Fluoride (mg/L)	MW-1607	-2.285	No	Mann-W
Fluoride (mg/L)	MW-1609 (bg)	-3.013	Yes	Mann-W
pH (SU)	MW-1606	0.6605	No	Mann-W
pH (SU)	MW-1607	0.1466	No	Mann-W
pH (SU)	MW-1609 (bg)	0.9528	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1606	-0.366	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1607	-1.004	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1609 (bg)	-0.4398	No	Mann-W

Welch's t-test/Mann-Whitney (Dumps Fault) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 1:13 PM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Boron (mg/L)	MW-1610	-2.94	Yes	Mann-W
Calcium (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Chloride (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1610	-2.708	Yes	Mann-W
Sulfate (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Total Dissolved Solids (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W

Welch's t-test/Mann-Whitney (Dumps Fault) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 1:13 PM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Boron (mg/L)	MW-1610	-2.94	Yes	Mann-W
Boron (mg/L)	MW-1611 (bg)	-1.537	No	Mann-W
Calcium (mg/L)	MW-1610	2.126	No	Mann-W
Calcium (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Chloride (mg/L)	MW-1610	-1.615	No	Mann-W
Chloride (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Fluoride (mg/L)	MW-1610	-1.418	No	Mann-W
Fluoride (mg/L)	MW-1611 (bg)	2.422	No	Mann-W
pH (SU)	MW-1610	0.2196	No	Mann-W
pH (SU)	MW-1611 (bg)	1.026	No	Mann-W
Sulfate (mg/L)	MW-1610	-2.708	Yes	Mann-W
Sulfate (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Total Dissolved Solids (mg/L)	MW-1610	0.8118	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W

Intrawell Prediction Limits - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/18/2021, 4:49 PM

Constituent	Well	Upper Lim	Lower Lim	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-1601	0.6395	n/a	n/a	1 future	n/a	13	0.5351	0.04762	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1602	0.696	n/a	n/a	1 future	n/a	13	0.6204	0.0345	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1603	0.5017	n/a	n/a	1 future	n/a	13	0.2815	0.1004	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1604	0.5006	n/a	n/a	1 future	n/a	13	0.4178	0.03776	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1605	0.6766	n/a	n/a	1 future	n/a	13	0.5785	0.04472	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1608	0.3926	n/a	n/a	1 future	n/a	13	0.3509	0.019	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1612	0.5911	n/a	n/a	1 future	n/a	12	0.4572	0.06002	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1601	2.511	n/a	n/a	1 future	n/a	13	2.103	0.1861	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1602	1.744	n/a	n/a	1 future	n/a	13	1.598	0.06673	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1603	0.1877	n/a	n/a	1 future	n/a	13	0.1246	0.02876	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1604	0.2865	n/a	n/a	1 future	n/a	13	0.2346	0.02367	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1605	0.4271	n/a	n/a	1 future	n/a	13	0.3569	0.03199	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1608	0.4817	n/a	n/a	1 future	n/a	13	0.4254	0.0257	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1612	0.2483	n/a	n/a	1 future	n/a	12	0.1617	0.03881	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1601	364	n/a	n/a	1 future	n/a	13	230.1	61.08	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1602	42.08	n/a	n/a	1 future	n/a	13	26.69	7.015	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1603	33.92	n/a	n/a	1 future	n/a	8	11.91	8.413	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1604	5.22	n/a	n/a	1 future	n/a	8	2.238	1.14	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1605	143.2	n/a	n/a	1 future	n/a	8	52.41	34.71	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1608	185.4	n/a	n/a	1 future	n/a	13	171.7	6.25	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1612	19.72	n/a	n/a	1 future	n/a	8	5.938	5.267	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1601	1728	n/a	n/a	1 future	n/a	13	1424	138.5	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1602	576.4	n/a	n/a	1 future	n/a	13	526.2	22.86	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1603	695	n/a	n/a	1 future	n/a	13	479.2	98.41	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1604	418.4	n/a	n/a	1 future	n/a	13	392.5	11.84	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1605	909.8	n/a	n/a	1 future	n/a	12	789.4	53.92	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1608	492.1	n/a	n/a	1 future	n/a	13	447.7	20.25	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1612	583.9	n/a	n/a	1 future	n/a	12	7.4e10	1.9e10	0	None	x^4	0.00188	Param Intra 1 of 2

Intrawell Prediction Limits - Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-1606	0.2089	n/a	n/a	1 future	n/a	13	0.1198	0.04638	0	None	No	0.003756	Param Intra 1 of 2
Boron (mg/L)	MW-1607	0.1874	n/a	n/a	1 future	n/a	13	0.1309	0.02941	0	None	No	0.003756	Param Intra 1 of 2
Boron (mg/L)	MW-1609	0.1023	n/a	n/a	1 future	n/a	13	0.05015	0.02716	38.46	Kaplan-Meier	No	0.003756	Param Intra 1 of 2
Calcium (mg/L)	MW-1606	66.33	n/a	n/a	1 future	n/a	13	56.72	5.001	0	None	No	0.003756	Param Intra 1 of 2
Calcium (mg/L)	MW-1607	53.23	n/a	n/a	1 future	n/a	13	48.31	2.559	0	None	No	0.003756	Param Intra 1 of 2
Calcium (mg/L)	MW-1609	80.41	n/a	n/a	1 future	n/a	13	68.82	6.032	0	None	No	0.003756	Param Intra 1 of 2
Fluoride (mg/L)	MW-1606	0.2933	n/a	n/a	1 future	n/a	13	0.2077	0.04456	0	None	No	0.003756	Param Intra 1 of 2
Fluoride (mg/L)	MW-1607	0.2741	n/a	n/a	1 future	n/a	13	0.2231	0.02658	0	None	No	0.003756	Param Intra 1 of 2
Fluoride (mg/L)	MW-1609	0.3435	n/a	n/a	1 future	n/a	13	0.2623	0.04226	0	None	No	0.003756	Param Intra 1 of 2
pH (SU)	MW-1606	7.437	6.675	n/a	1 future	n/a	13	7.056	0.1984	0	None	No	0.001878	Param Intra 1 of 2
pH (SU)	MW-1607	8.372	7.209	n/a	1 future	n/a	13	7.791	0.3027	0	None	No	0.001878	Param Intra 1 of 2
pH (SU)	MW-1609	7.969	6.642	n/a	1 future	n/a	13	7.305	0.3455	0	None	No	0.001878	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1606	386.4	n/a	n/a	1 future	n/a	13	336.7	25.88	0	None	No	0.003756	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1607	317.6	n/a	n/a	1 future	n/a	11	291.2	13.17	0	None	No	0.003756	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1609	350	n/a	n/a	1 future	n/a	13	299.3	26.41	0	None	No	0.003756	Param Intra 1 of 2

Intrawell Prediction Limits - Dumps Fault - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 1:17 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-1610	0.1205	n/a	n/a	1 future	n/a	13	0.06585	0.03312	0	None	No	0.007498	Param Intra 1 of 2
Boron (mg/L)	MW-1611	0.7312	n/a	n/a	1 future	n/a	13	0.6096	0.07376	0	None	No	0.007498	Param Intra 1 of 2
Calcium (mg/L)	MW-1610	38.87	n/a	n/a	1 future	n/a	13	36.25	1.59	0	None	No	0.007498	Param Intra 1 of 2
Calcium (mg/L)	MW-1611	48.15	n/a	n/a	1 future	n/a	8	33.78	7.645	0	None	No	0.007498	Param Intra 1 of 2
Chloride (mg/L)	MW-1610	12.63	n/a	n/a	1 future	n/a	13	11.23	0.8499	0	None	No	0.007498	Param Intra 1 of 2
Chloride (mg/L)	MW-1611	50.68	n/a	n/a	1 future	n/a	8	29.8	11.1	0	None	No	0.007498	Param Intra 1 of 2
Fluoride (mg/L)	MW-1610	0.2272	n/a	n/a	1 future	n/a	13	0.1977	0.01787	0	None	No	0.007498	Param Intra 1 of 2
Fluoride (mg/L)	MW-1611	1.168	n/a	n/a	1 future	n/a	13	0.8815	0.1737	0	None	No	0.007498	Param Intra 1 of 2
pH (SU)	MW-1610	7.945	7.075	n/a	1 future	n/a	13	7.51	0.2639	0	None	No	0.003749	Param Intra 1 of 2
pH (SU)	MW-1611	8.105	7.293	n/a	1 future	n/a	13	7.699	0.2463	0	None	No	0.003749	Param Intra 1 of 2
Sulfate (mg/L)	MW-1610	52.17	n/a	n/a	1 future	n/a	13	44.11	4.891	0	None	No	0.007498	Param Intra 1 of 2
Sulfate (mg/L)	MW-1611	544.1	n/a	n/a	1 future	n/a	8	271.3	145.1	0	None	No	0.007498	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1610	266.3	n/a	n/a	1 future	n/a	13	251.8	8.805	0	None	No	0.007498	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1611	1474	n/a	n/a	1 future	n/a	8	971	267.7	0	None	No	0.007498	Param Intra 1 of 2

Upgradient Wells Trend Tests - Chattanooga Shale - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:08 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Chloride (mg/L)	MW-1608 (bg)	-1.074	-60	-48	Yes	14	0	n/a	n/a	0.01	NP

Upgradient Wells Trend Tests - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:08 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Calcium (mg/L)	MW-1601 (bg)	-0.317	-19	-48	No	14	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-1602 (bg)	0.4044	44	48	No	14	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-1608 (bg)	-0.1253	-22	-48	No	14	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-1601 (bg)	-4.878	-27	-48	No	14	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-1602 (bg)	0	1	48	No	14	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-1608 (bg)	-1.074	-60	-48	Yes	14	0	n/a	n/a	0.01	NP
pH (SU)	MW-1601 (bg)	0.0784	11	48	No	14	0	n/a	n/a	0.01	NP
pH (SU)	MW-1602 (bg)	0.01017	7	48	No	14	0	n/a	n/a	0.01	NP
pH (SU)	MW-1608 (bg)	0	-1	-48	No	14	0	n/a	n/a	0.01	NP

Upgradient Wells Trend Tests - Rome Limestone - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:51 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Chloride (mg/L)	MW-1609 (bg)	-0.6024	-70	-48	Yes	14	0	n/a	n/a	0.01	NP

Upgradient Wells Trend Tests - Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:51 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Chloride (mg/L)	MW-1609 (bg)	-0.6024	-70	-48	Yes	14	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-1609 (bg)	-0.8295	-25	-48	No	14	0	n/a	n/a	0.01	NP

Interwell Prediction Limits - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:10 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>TransformAlpha</u>	<u>Method</u>
Calcium (mg/L)	n/a	8.281	n/a	n/a	4 future	n/a	42	1.781	0.602	0	None	sqrt(x)	0.00188 Param Inter 1 of 2
Chloride (mg/L)	n/a	45.8	n/a	n/a	4 future	n/a	42	n/a	n/a	0	n/a	n/a	0.001062 NP Inter (normality) 1 of 2
pH (SU)	n/a	9.019	7.99	n/a	4 future	n/a	42	8.504	0.2824	0	None	No	0.0009398 Param Inter 1 of 2

Interwell Prediction Limits - Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:53 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>TransformAlpha</u>	<u>Method</u>
Chloride (mg/L)	n/a	3.718	n/a	n/a	2 future	n/a	14	0.5281	0.4174	0	None	ln(x)	0.003756 Param Inter 1 of 2
Sulfate (mg/L)	n/a	20.99	n/a	n/a	2 future	n/a	14	3.887	0.369	0	None	sqrt(x)	0.003756 Param Inter 1 of 2

Upper Tolerance Limit Summary Table - Chattanooga Shale

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/13/2021, 6:34 PM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	0.0002482	n/a	n/a	42	0.009216	0.003094	0	None	sqrt(x)	0.05	Inter
Arsenic (mg/L)	0.0258	n/a	n/a	42	n/a	n/a	0	n/a	n/a	0.116	NP Inter(normality)
Barium (mg/L)	0.306	n/a	n/a	42	n/a	n/a	0	n/a	n/a	0.116	NP Inter(normality)
Beryllium (mg/L)	0.0001	n/a	n/a	42	n/a	n/a	54.76	n/a	n/a	0.116	NP Inter(NDs)
Cadmium (mg/L)	0.00005	n/a	n/a	42	n/a	n/a	83.33	n/a	n/a	0.116	NP Inter(NDs)
Chromium (mg/L)	0.001276	n/a	n/a	42	-7.961	0.6138	0	None	ln(x)	0.05	Inter
Cobalt (mg/L)	0.0004673	n/a	n/a	42	0.04836	0.01384	0	None	x^(1/3)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	3.013	n/a	n/a	42	0.9229	0.2469	0	None	x^(1/3)	0.05	Inter
Fluoride (mg/L)	2.35	n/a	n/a	42	n/a	n/a	0	n/a	n/a	0.116	NP Inter(normality)
Lead (mg/L)	0.0007226	n/a	n/a	42	-8.96	0.8179	11.9	None	ln(x)	0.05	Inter
Lithium (mg/L)	0.118	n/a	n/a	42	n/a	n/a	0	n/a	n/a	0.116	NP Inter(normality)
Mercury (mg/L)	0.001	n/a	n/a	42	n/a	n/a	90.48	n/a	n/a	0.116	NP Inter(NDs)
Molybdenum (mg/L)	0.01824	n/a	n/a	42	-5.637	0.773	0	None	ln(x)	0.05	Inter
Selenium (mg/L)	0.0002	n/a	n/a	42	n/a	n/a	30.95	n/a	n/a	0.116	NP Inter(normality)
Thallium (mg/L)	0.0005	n/a	n/a	42	n/a	n/a	66.67	n/a	n/a	0.116	NP Inter(NDs)

Upper Tolerance Limit Summary Table - Rome Limestone

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/18/2021, 4:59 PM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	0.0001305	n/a	n/a	14	0.006694	0.00181	14.29	None	sqrt(x)	0.05	Inter
Arsenic (mg/L)	0.001623	n/a	n/a	14	-8.503	0.7957	0	None	ln(x)	0.05	Inter
Barium (mg/L)	0.5395	n/a	n/a	14	0.396	0.05488	0	None	No	0.05	Inter
Beryllium (mg/L)	0.0001	n/a	n/a	14	n/a	n/a	92.86	n/a	n/a	0.4877	NP Inter(NDs)
Cadmium (mg/L)	0.00005	n/a	n/a	14	n/a	n/a	28.57	n/a	n/a	0.4877	NP Inter(normality)
Chromium (mg/L)	0.0003404	n/a	n/a	14	0.0001714	0.00006464	0	None	No	0.05	Inter
Cobalt (mg/L)	0.001524	n/a	n/a	14	0.01642	0.008652	14.29	None	sqrt(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	5.249	n/a	n/a	14	1.398	0.3416	0	None	sqrt(x)	0.05	Inter
Fluoride (mg/L)	0.3685	n/a	n/a	14	0.26	0.04151	0	None	No	0.05	Inter
Lead (mg/L)	0.001273	n/a	n/a	14	0.0004698	0.0003074	0	None	No	0.05	Inter
Lithium (mg/L)	0.0165	n/a	n/a	14	-6.539	0.9315	35.71	Kaplan-Meier	ln(x)	0.05	Inter
Mercury (mg/L)	0.001	n/a	n/a	14	n/a	n/a	100	n/a	n/a	0.4877	NP Inter(NDs)
Molybdenum (mg/L)	0.0025	n/a	n/a	14	0.0009739	0.0005839	21.43	Kaplan-Meier	No	0.05	Inter
Selenium (mg/L)	0.0002	n/a	n/a	14	n/a	n/a	21.43	n/a	n/a	0.4877	NP Inter(normality)
Thallium (mg/L)	0.0005	n/a	n/a	14	n/a	n/a	64.29	n/a	n/a	0.4877	NP Inter(NDs)

Upper Tolerance Limit Summary Table - Dumps Fault

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/14/2021, 9:19 AM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	0.0007762	n/a	n/a	14	0.0113	0.006334	0	None	sqrt(x)	0.05	Inter
Arsenic (mg/L)	0.04497	n/a	n/a	14	0.01674	0.0108	0	None	No	0.05	Inter
Barium (mg/L)	0.1461	n/a	n/a	14	0.08009	0.02525	0	None	No	0.05	Inter
Beryllium (mg/L)	0.0001	n/a	n/a	14	n/a	n/a	64.29	n/a	n/a	0.4877	NP Inter(NDs)
Cadmium (mg/L)	0.00005	n/a	n/a	14	n/a	n/a	92.86	n/a	n/a	0.4877	NP Inter(NDs)
Chromium (mg/L)	0.001041	n/a	n/a	14	0.0004773	0.0002155	0	None	No	0.05	Inter
Cobalt (mg/L)	0.0001562	n/a	n/a	13	0.000067	0.00003342	0	None	No	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	2.008	n/a	n/a	14	0.7642	0.2498	0	None	sqrt(x)	0.05	Inter
Fluoride (mg/L)	1.338	n/a	n/a	14	0.8914	0.171	0	None	No	0.05	Inter
Lead (mg/L)	0.0002111	n/a	n/a	13	0.0001079	0.00003866	7.692	None	No	0.05	Inter
Lithium (mg/L)	0.1726	n/a	n/a	14	0.09339	0.03031	0	None	No	0.05	Inter
Mercury (mg/L)	0.001	n/a	n/a	14	n/a	n/a	92.86	n/a	n/a	0.4877	NP Inter(NDs)
Molybdenum (mg/L)	0.00676	n/a	n/a	13	n/a	n/a	0	n/a	n/a	0.5133	NP Inter(normality)
Selenium (mg/L)	0.0001341	n/a	n/a	14	0.00006857	0.00002507	0	None	No	0.05	Inter
Thallium (mg/L)	0.0005	n/a	n/a	14	n/a	n/a	78.57	n/a	n/a	0.4877	NP Inter(NDs)

CLINCH RIVER GWPS - CHATTANOOGA SHALE				
Constituent Name	MCL	CCR Rule Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00025	0.006
Arsenic, Total (mg/L)	0.01		0.026	0.026
Barium, Total (mg/L)	2		0.31	2
Beryllium, Total (mg/L)	0.004		0.0001	0.004
Cadmium, Total (mg/L)	0.005		0.00005	0.005
Chromium, Total (mg/L)	0.1		0.0013	0.1
Cobalt, Total (mg/L)		0.006	0.00047	0.006
Combined Radium, Total (pCi/L)	5		3	5
Fluoride, Total (mg/L)	4		2.4	4
Lead, Total (mg/L)		0.015	0.0007	0.015
Lithium, Total (mg/L)		0.04	0.12	0.12
Mercury, Total (mg/L)	0.002		0.001	0.002
Molybdenum, Total (mg/L)		0.1	0.02	0.1
Selenium, Total (mg/L)	0.05		0.0002	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**Grey cell indicates background is higher than MCL or CCR Rule*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

CLINCH RIVER GWPS - ROME LIMESTONE				
Constituent Name	MCL	CCR Rule Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00013	0.006
Arsenic, Total (mg/L)	0.01		0.0016	0.01
Barium, Total (mg/L)	2		0.54	2
Beryllium, Total (mg/L)	0.004		0.0001	0.004
Cadmium, Total (mg/L)	0.005		0.00005	0.005
Chromium, Total (mg/L)	0.1		0.00034	0.1
Cobalt, Total (mg/L)		0.006	0.0015	0.006
Combined Radium, Total (pCi/L)	5		5.25	5.25
Fluoride, Total (mg/L)	4		0.37	4
Lead, Total (mg/L)		0.015	0.0013	0.015
Lithium, Total (mg/L)		0.04	0.017	0.04
Mercury, Total (mg/L)	0.002		0.001	0.002
Molybdenum, Total (mg/L)		0.1	0.0025	0.1
Selenium, Total (mg/L)	0.05		0.0002	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**Grey cell indicates background is higher than MCL or CCR Rule*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

CLINCH RIVER GWPS - DUMPS FAULT				
Constituent Name	MCL	CCR Rule Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00078	0.006
Arsenic, Total (mg/L)	0.01		0.045	0.045
Barium, Total (mg/L)	2		0.15	2
Beryllium, Total (mg/L)	0.004		0.0001	0.004
Cadmium, Total (mg/L)	0.005		0.00005	0.005
Chromium, Total (mg/L)	0.1		0.001	0.1
Cobalt, Total (mg/L)		0.006	0.00016	0.006
Combined Radium, Total (pCi/L)	5		2	5
Fluoride, Total (mg/L)	4		1.3	4
Lead, Total (mg/L)		0.015	0.00021	0.015
Lithium, Total (mg/L)		0.04	0.173	0.173
Mercury, Total (mg/L)	0.002		0.001	0.002
Molybdenum, Total (mg/L)		0.1	0.0068	0.1
Selenium, Total (mg/L)	0.05		0.00013	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**Grey cell indicates background is higher than MCL or CCR Rule*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

Confidence Intervals - Chattanooga Shale - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/13/2021, 6:41 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig. N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Barium (mg/L)	MW-1604	3.302	3.067	2	Yes 14	3.184	0.1658	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1605	0.2055	0.187	0.12	Yes 14	0.1962	0.01305	0	None	No	0.01	Param.

Confidence Intervals - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/13/2021, 6:41 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	MW-1603	0.00004727	0.00002404	0.006	No 14	0.00006	0.00002935	28.57	Kaplan-Meier	sqrt(x)	0.01	Param.
Antimony (mg/L)	MW-1604	0.0000954	0.0000314	0.006	No 14	0.00009571	0.0001017	21.43	Kaplan-Meier	ln(x)	0.01	Param.
Antimony (mg/L)	MW-1605	0.0001337	0.00004689	0.006	No 14	0.000095	0.0000723	0	None	sqrt(x)	0.01	Param.
Antimony (mg/L)	MW-1612	0.0001139	0.00002503	0.006	No 13	0.00008615	0.000075	15.38	Kaplan-Meier	sqrt(x)	0.01	Param.
Arsenic (mg/L)	MW-1603	0.002496	0.001816	0.026	No 14	0.002156	0.0004797	0	None	No	0.01	Param.
Arsenic (mg/L)	MW-1604	0.00243	0.001584	0.026	No 14	0.002026	0.000622	0	None	sqrt(x)	0.01	Param.
Arsenic (mg/L)	MW-1605	0.005053	0.002984	0.026	No 14	0.004019	0.001461	0	None	No	0.01	Param.
Arsenic (mg/L)	MW-1612	0.001976	0.0006394	0.026	No 13	0.001369	0.001028	0	None	sqrt(x)	0.01	Param.
Barium (mg/L)	MW-1603	2.447	1.986	2	No 14	2.216	0.3251	0	None	No	0.01	Param.
Barium (mg/L)	MW-1604	3.302	3.067	2	Yes 14	3.184	0.1658	0	None	No	0.01	Param.
Barium (mg/L)	MW-1605	1.565	1.199	2	No 14	1.382	0.2586	0	None	No	0.01	Param.
Barium (mg/L)	MW-1612	2.336	1.928	2	No 13	2.132	0.2741	0	None	No	0.01	Param.
Beryllium (mg/L)	MW-1603	0.0001	0.00001	0.004	No 14	0.00008057	0.00003861	78.57	None	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-1604	0.0001	0.000007	0.004	No 14	0.00008657	0.00003414	85.71	None	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-1605	0.0001	0.00001	0.004	No 14	0.00007993	0.0000399	78.57	None	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-1612	0.0001	0.000006	0.004	No 13	0.00007431	0.00004124	69.23	None	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-1605	0.00005	0.00002	0.005	No 14	0.000045	0.00001286	85.71	None	No	0.01	NP (NDs)
Cobalt (mg/L)	MW-1603	0.0006382	0.0003479	0.006	No 14	0.0004931	0.0002049	0	None	No	0.01	Param.
Cobalt (mg/L)	MW-1604	0.0007888	0.0004879	0.006	No 14	0.0006384	0.0002124	0	None	No	0.01	Param.
Cobalt (mg/L)	MW-1605	0.0003434	0.0001716	0.006	No 14	0.0002575	0.0001213	0	None	No	0.01	Param.
Cobalt (mg/L)	MW-1612	0.0002616	0.0001389	0.006	No 13	0.0002002	0.00008248	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1603	1.561	0.6305	5	No 14	1.14	0.76	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604	1.711	0.8835	5	No 14	1.297	0.5841	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605	2.246	0.7146	5	No 14	1.63	1.588	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1612	2.451	1.268	5	No 13	1.86	0.7952	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-1603	0.1451	0.1065	4	No 14	0.1264	0.02845	0	None	sqrt(x)	0.01	Param.
Fluoride (mg/L)	MW-1604	0.2662	0.217	4	No 14	0.2421	0.0362	0	None	sqrt(x)	0.01	Param.
Fluoride (mg/L)	MW-1605	0.3808	0.3364	4	No 14	0.3586	0.03134	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-1612	0.1892	0.1339	4	No 13	0.1615	0.03716	0	None	No	0.01	Param.
Lead (mg/L)	MW-1603	0.0002	0.00001	0.015	No 14	0.0001219	0.00009391	57.14	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-1604	0.0002	0.00002	0.015	No 14	0.0001168	0.00008792	50	None	No	0.01	NP (normality)
Lead (mg/L)	MW-1605	0.0002	0.000036	0.015	No 14	0.0001019	0.00007715	35.71	None	No	0.01	NP (normality)
Lead (mg/L)	MW-1612	0.000331	0.000025	0.015	No 13	0.000139	0.00009757	46.15	None	No	0.01	NP (normality)
Lithium (mg/L)	MW-1603	0.07823	0.05315	0.12	No 14	0.06569	0.0177	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1604	0.08458	0.07375	0.12	No 14	0.07916	0.007651	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1605	0.2055	0.187	0.12	Yes 14	0.1962	0.01305	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1612	0.1343	0.1134	0.12	No 13	0.1238	0.0141	7.692	None	No	0.01	Param.
Mercury (mg/L)	MW-1603	0.001	0.00006	0.002	No 14	0.0009329	0.0002512	92.86	None	No	0.01	NP (NDs)
Mercury (mg/L)	MW-1604	0.001	0.00006	0.002	No 14	0.0009329	0.0002512	92.86	None	No	0.01	NP (NDs)
Mercury (mg/L)	MW-1612	0.001	0.00006	0.002	No 13	0.0009277	0.0002607	92.31	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-1603	0.001977	0.0006411	0.1	No 14	0.001387	0.001159	7.143	None	sqrt(x)	0.01	Param.
Molybdenum (mg/L)	MW-1604	0.001428	0.000541	0.1	No 14	0.001159	0.001194	14.29	None	ln(x)	0.01	Param.
Molybdenum (mg/L)	MW-1605	0.005277	0.001788	0.1	No 14	0.003532	0.002463	0	None	No	0.01	Param.
Molybdenum (mg/L)	MW-1612	0.0036	0.0007	0.1	No 13	0.002756	0.005248	7.692	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-1603	0.0001194	0.00005814	0.05	No 14	0.00009214	0.0000501	14.29	None	x^(1/3)	0.01	Param.
Selenium (mg/L)	MW-1604	0.0002	0.00004	0.05	No 14	0.00009143	0.00007199	28.57	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-1605	0.0002	0.00005	0.05	No 14	0.0001186	0.00007389	42.86	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-1612	0.0002	0.00003	0.05	No 13	0.00009308	0.00007653	30.77	None	No	0.01	NP (normality)
Thallium (mg/L)	MW-1603	0.0005	0.00001	0.002	No 14	0.0003257	0.0002427	64.29	None	No	0.01	NP (NDs)
Thallium (mg/L)	MW-1604	0.0005	0.00001	0.002	No 14	0.0003607	0.0002286	71.43	None	No	0.01	NP (NDs)
Thallium (mg/L)	MW-1605	0.0005	0.00002	0.002	No 14	0.0003614	0.0002274	71.43	None	No	0.01	NP (NDs)
Thallium (mg/L)	MW-1612	0.0005	0.00001	0.002	No 13	0.0003508	0.000233	69.23	None	No	0.01	NP (NDs)

Confidence Intervals- Rome Limestone - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/18/2021, 5:05 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig. N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt (mg/L)	MW-1607	0.01134	0.008064	0.006	Yes 14	0.009703	0.002314	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1606	0.09078	0.0607	0.04	Yes 14	0.07314	0.02571	0	None	x^2	0.01	Param.
Lithium (mg/L)	MW-1607	0.1306	0.1178	0.04	Yes 14	0.1242	0.008989	0	None	No	0.01	Param.
Molybdenum (mg/L)	MW-1607	0.1607	0.1293	0.1	Yes 14	0.145	0.02218	0	None	No	0.01	Param.

Confidence Intervals- Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/18/2021, 5:05 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	MW-1606	0.0001	0.00002	0.006	No 14	0.00004929	0.00003407	28.57	None	No	0.01	NP (normality)
Antimony (mg/L)	MW-1607	0.00007161	0.00003839	0.006	No 14	0.000055	0.00002345	7.143	None	No	0.01	Param.
Arsenic (mg/L)	MW-1606	0.00833	0.00676	0.01	No 14	0.007809	0.002675	0	None	No	0.01	NP (normality)
Arsenic (mg/L)	MW-1607	0.00164	0.00086	0.01	No 14	0.001683	0.00137	0	None	No	0.01	NP (normality)
Barium (mg/L)	MW-1606	0.1184	0.1058	2	No 14	0.1117	0.0102	0	None	x^3	0.01	Param.
Barium (mg/L)	MW-1607	0.0757	0.0704	2	No 14	0.07857	0.01888	0	None	No	0.01	NP (normality)
Beryllium (mg/L)	MW-1606	0.0001	0.000006	0.004	No 14	0.00006643	0.00004674	64.29	None	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-1607	0.0001	0.000005	0.004	No 14	0.00009321	0.00002539	92.86	None	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-1606	0.00005	0.00001	0.005	No 14	0.00003186	0.00001927	50	None	No	0.01	NP (normality)
Cadmium (mg/L)	MW-1607	0.0001799	0.0001001	0.005	No 14	0.00014	0.0000563	0	None	No	0.01	Param.
Chromium (mg/L)	MW-1606	0.000218	0.00014	0.1	No 14	0.0002024	0.00006263	0	None	No	0.01	NP (normality)
Chromium (mg/L)	MW-1607	0.000216	0.0001	0.1	No 14	0.0001843	0.00005911	0	None	No	0.01	NP (normality)
Cobalt (mg/L)	MW-1606	0.00585	0.00453	0.006	No 14	0.005121	0.001112	0	None	x^2	0.01	Param.
Cobalt (mg/L)	MW-1607	0.01134	0.008064	0.006	Yes 14	0.009703	0.002314	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606	2.159	1.126	5.25	No 14	1.72	0.7925	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607	1.312	0.5802	5.25	No 14	0.9771	0.6036	0	None	sqrt(x)	0.01	Param.
Fluoride (mg/L)	MW-1606	0.2365	0.1749	4	No 14	0.2057	0.04345	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-1607	0.2427	0.2059	4	No 14	0.2243	0.02593	0	None	No	0.01	Param.
Lead (mg/L)	MW-1606	0.00058	0.0003575	0.015	No 14	0.0004688	0.0001571	0	None	No	0.01	Param.
Lead (mg/L)	MW-1607	0.0006421	0.0004063	0.015	No 14	0.0005242	0.0001664	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1606	0.09078	0.0607	0.04	Yes 14	0.07314	0.02571	0	None	x^2	0.01	Param.
Lithium (mg/L)	MW-1607	0.1306	0.1178	0.04	Yes 14	0.1242	0.008989	0	None	No	0.01	Param.
Mercury (mg/L)	MW-1606	0.001	0.00006	0.002	No 14	0.0009329	0.0002512	92.86	None	No	0.01	NP (NDs)
Mercury (mg/L)	MW-1607	0.001	0.00008	0.002	No 14	0.0009343	0.0002459	92.86	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-1606	0.082	0.05326	0.1	No 14	0.06763	0.02029	0	None	No	0.01	Param.
Molybdenum (mg/L)	MW-1607	0.1607	0.1293	0.1	Yes 14	0.145	0.02218	0	None	No	0.01	Param.
Selenium (mg/L)	MW-1606	0.0001096	0.00006009	0.05	No 14	0.00008643	0.00003895	0	None	sqrt(x)	0.01	Param.
Selenium (mg/L)	MW-1607	0.0002491	0.00009026	0.05	No 14	0.0001943	0.0001708	0	None	ln(x)	0.01	Param.
Thallium (mg/L)	MW-1606	0.0005	0.00004	0.002	No 14	0.0002757	0.0002332	50	None	No	0.01	NP (normality)
Thallium (mg/L)	MW-1607	0.0005	0.00003	0.002	No 14	0.0003021	0.000238	57.14	None	No	0.01	NP (NDs)

Confidence Intervals - Dumps Fault - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 2/1/2021, 1:50 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Cobalt (mg/L)	MW-1610	0.01021	0.006983	0.006	Yes 14	0.008599	0.002281	0	None	No	0.01	Param.
Molybdenum (mg/L)	MW-1610	0.172	0.135	0.1	Yes 14	0.1654	0.05375	0	None	No	0.01	NP (normality)

Confidence Intervals - Dumps Fault - All Results

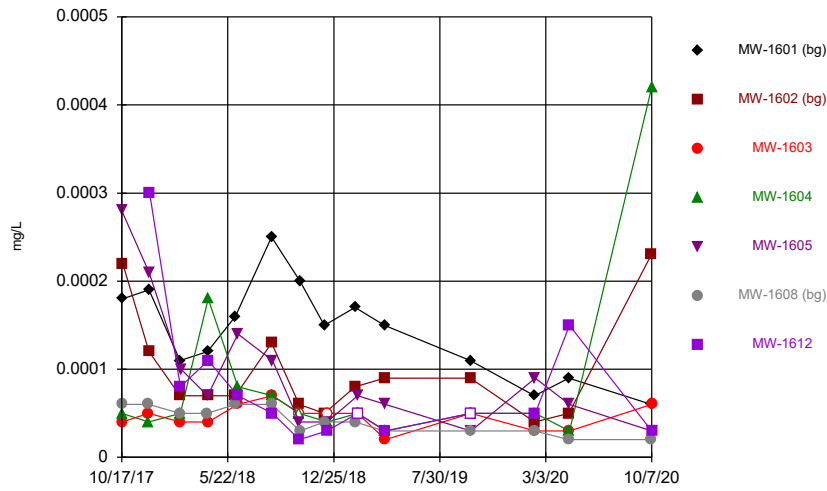
Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 2/1/2021, 1:50 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	MW-1610	0.0002542	0.00004682	0.006	No 14	0.0002407	0.0003939	7.143	None	In(x)	0.01	Param.
Arsenic (mg/L)	MW-1610	0.00167	0.00118	0.045	No 14	0.001704	0.001233	0	None	No	0.01	NP (normality)
Barium (mg/L)	MW-1610	0.2415	0.1955	2	No 14	0.2185	0.03246	0	None	No	0.01	Param.
Beryllium (mg/L)	MW-1610	0.0001	0.000004	0.004	No 14	0.00007279	0.00004466	71.43	None	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-1610	0.00006	0.00002	0.005	No 14	0.00004	0.00001468	50	None	No	0.01	NP (normality)
Chromium (mg/L)	MW-1610	0.000267	0.000174	0.1	No 14	0.0002553	0.0001612	0	None	No	0.01	NP (normality)
Cobalt (mg/L)	MW-1610	0.01021	0.006983	0.006	Yes 14	0.008599	0.002281	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1610	1.495	0.7721	5	No 14	1.133	0.5101	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-1610	0.22	0.18	4	No 14	0.2086	0.04418	0	None	No	0.01	NP (normality)
Lead (mg/L)	MW-1610	0.01085	0.004547	0.015	No 14	0.007699	0.004451	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1610	0.207	0.171	0.173	No 14	0.1951	0.04905	0	None	No	0.01	NP (normality)
Mercury (mg/L)	MW-1610	0.001	0.00006	0.002	No 14	0.0009329	0.0002512	92.86	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-1610	0.172	0.135	0.1	Yes 14	0.1654	0.05375	0	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-1610	0.0003879	0.0002121	0.05	No 14	0.0003	0.000124	0	None	No	0.01	Param.
Thallium (mg/L)	MW-1610	0.0005	0.00002	0.002	No 14	0.0002943	0.0002465	57.14	None	No	0.01	NP (NDs)

FIGURE A.

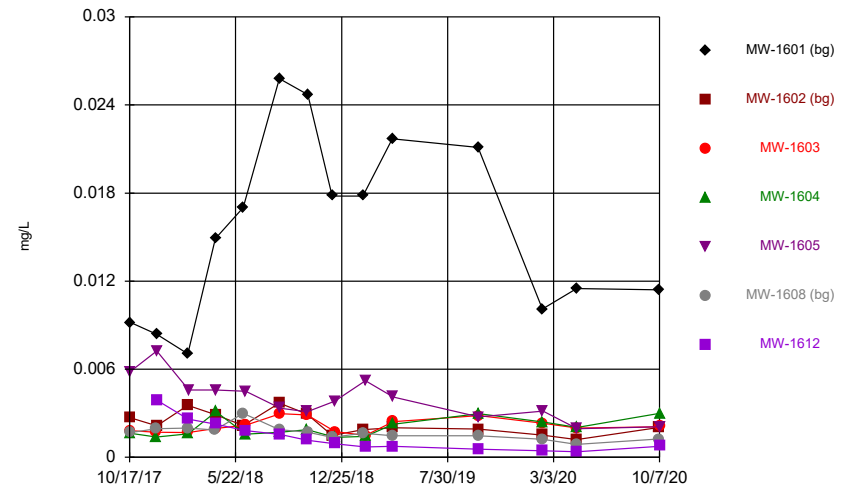
Time Series - Chattanooga Shale

Time Series



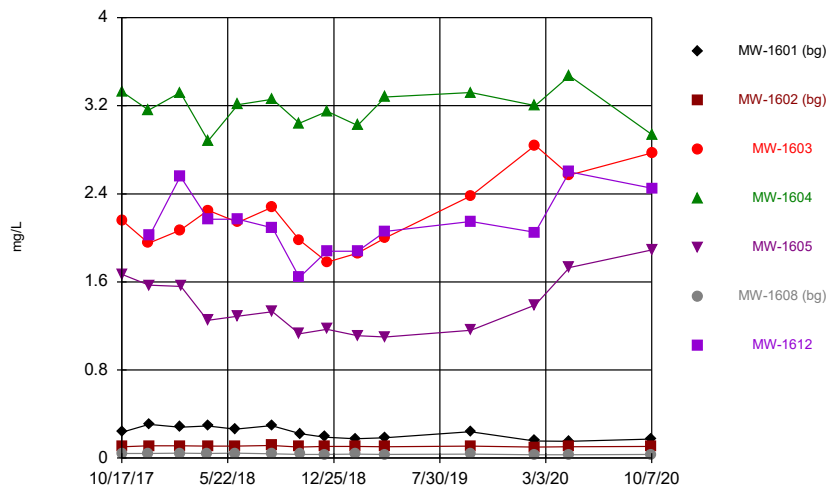
Constituent: Antimony Analysis Run 1/28/2021 2:31 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



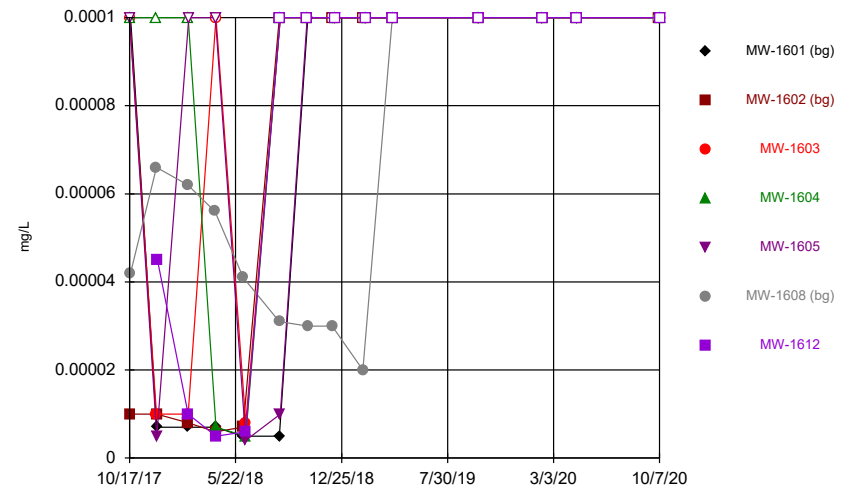
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



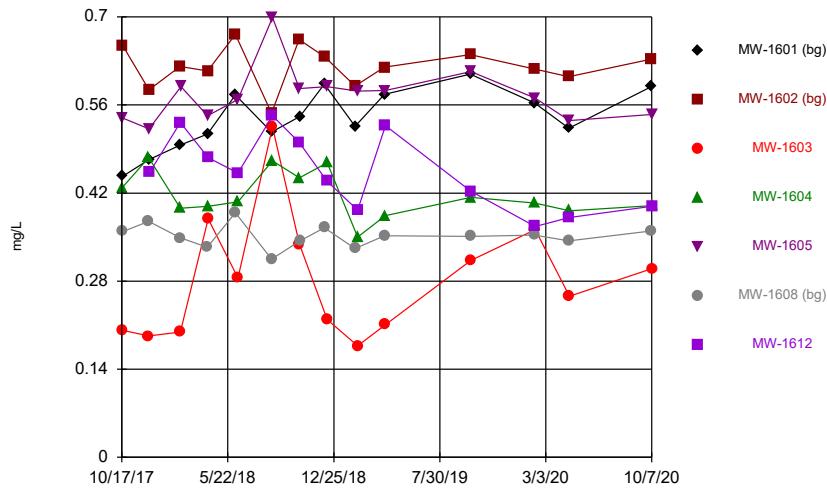
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



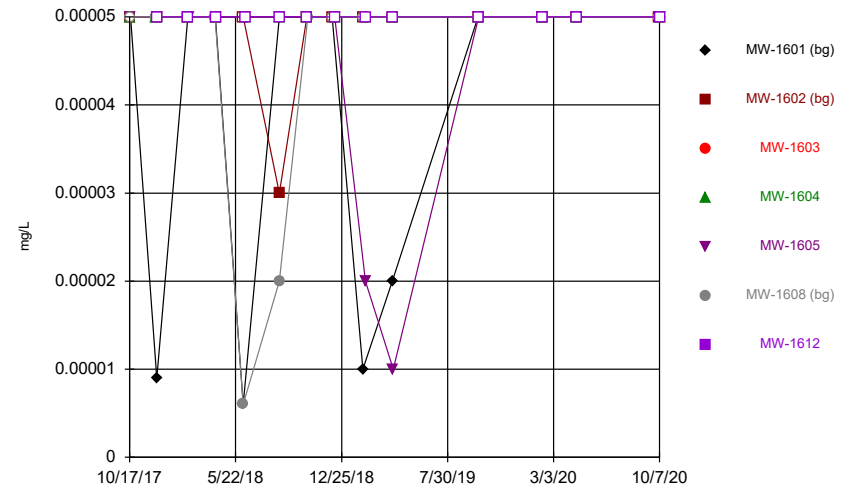
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



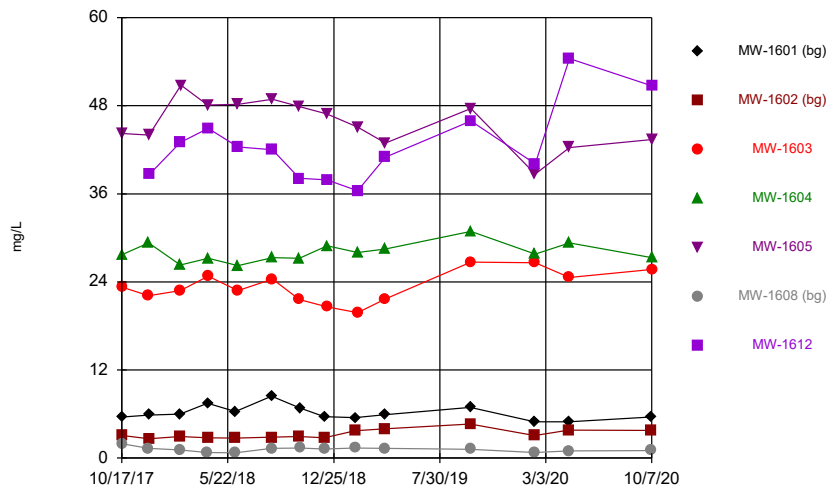
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Time Series



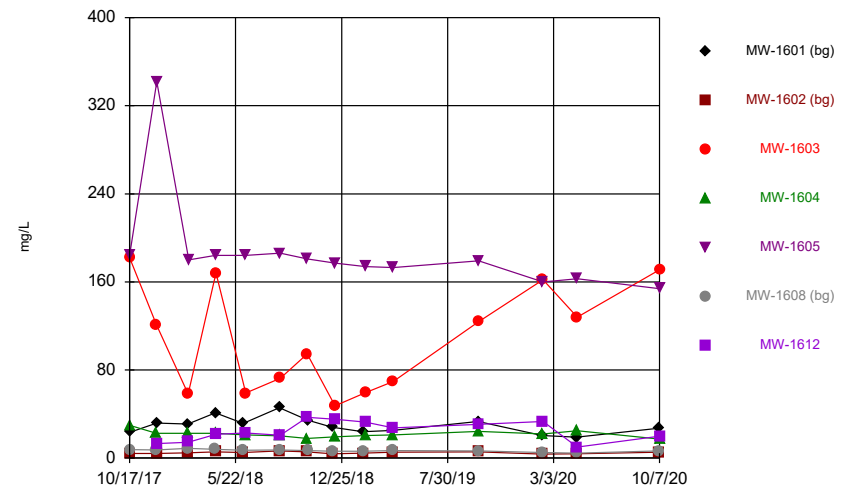
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Time Series



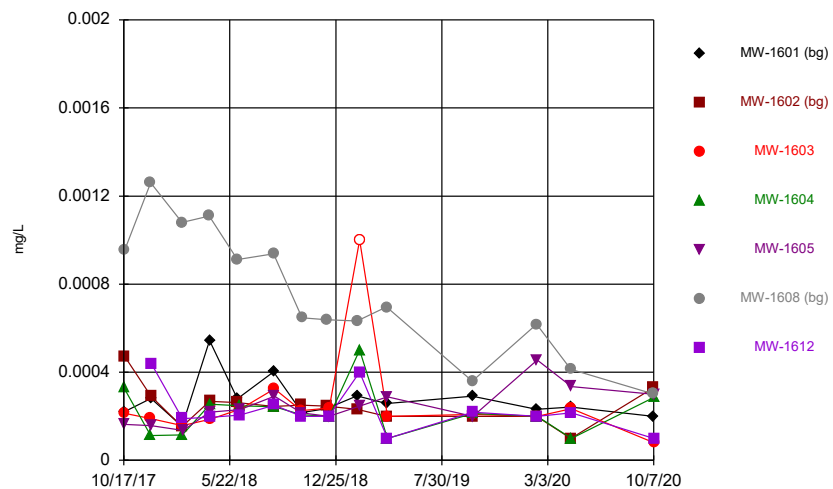
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



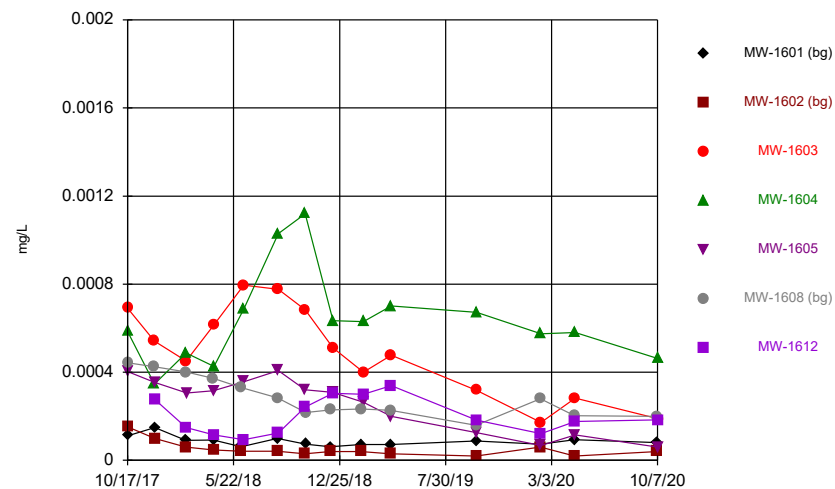
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Time Series



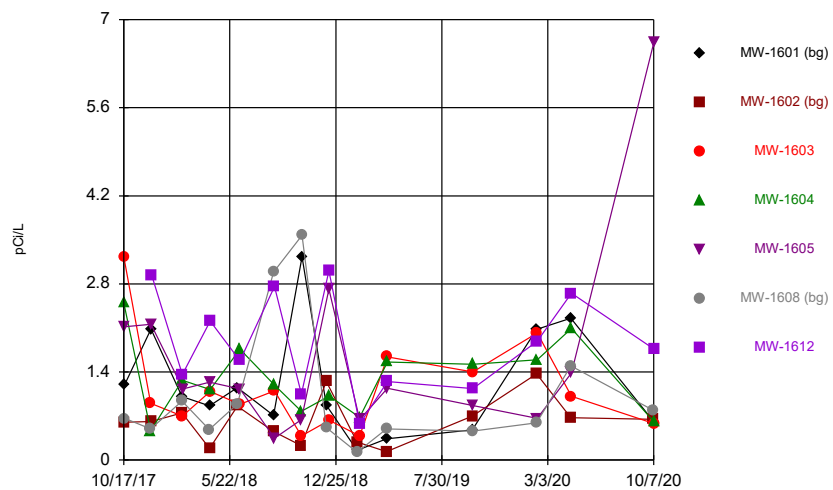
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Time Series



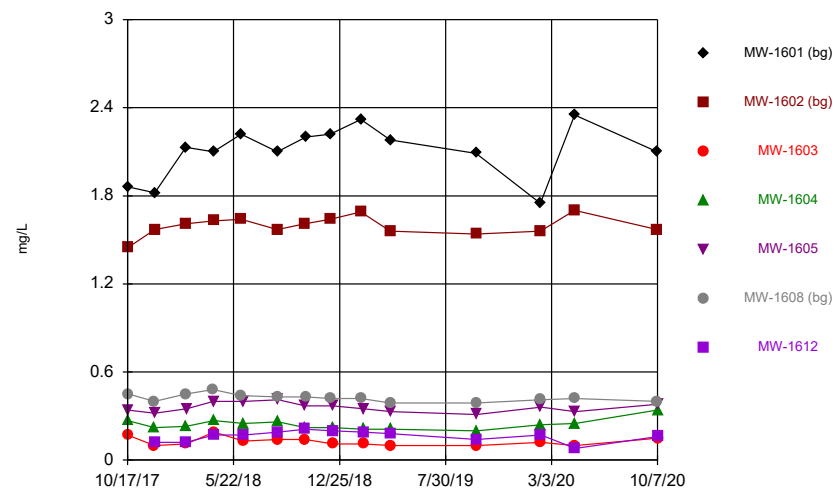
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Time Series



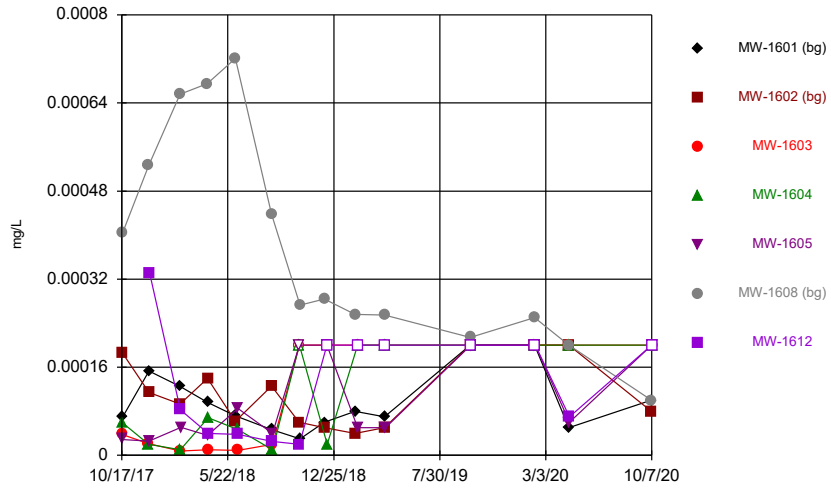
Constituent: Combined Radium 226 + 228 Analysis Run 1/28/2021 2:31 PM View: Chattanooga Shale - F
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



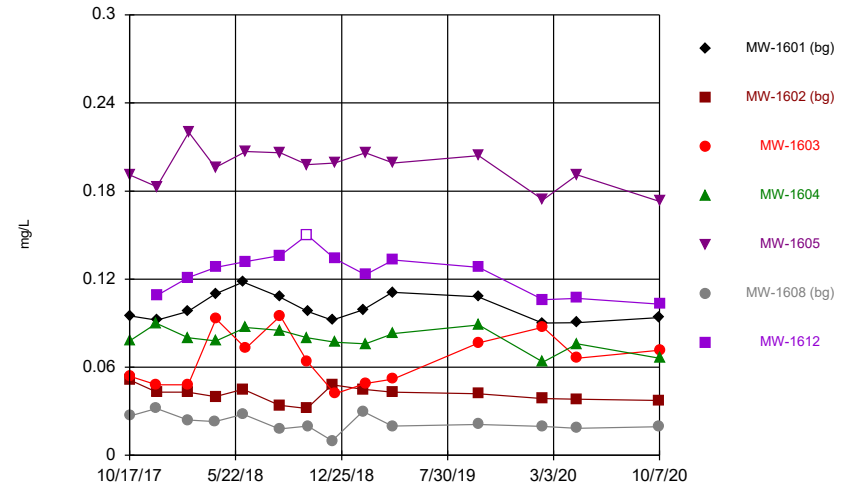
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Time Series



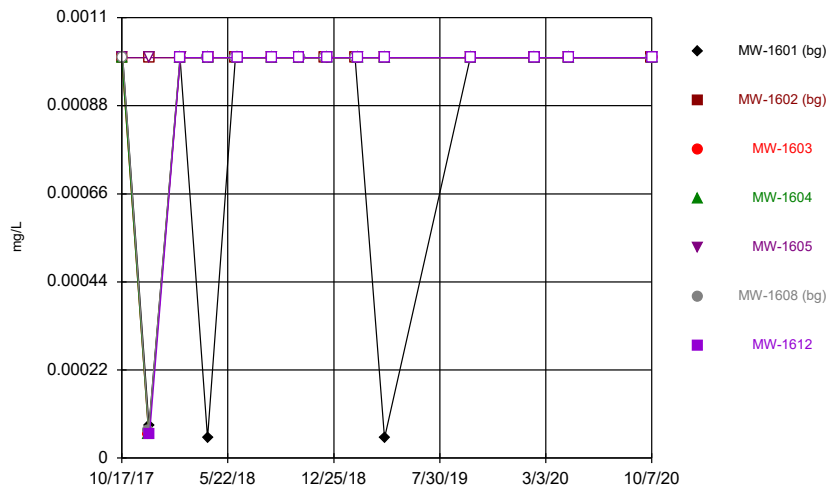
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Time Series



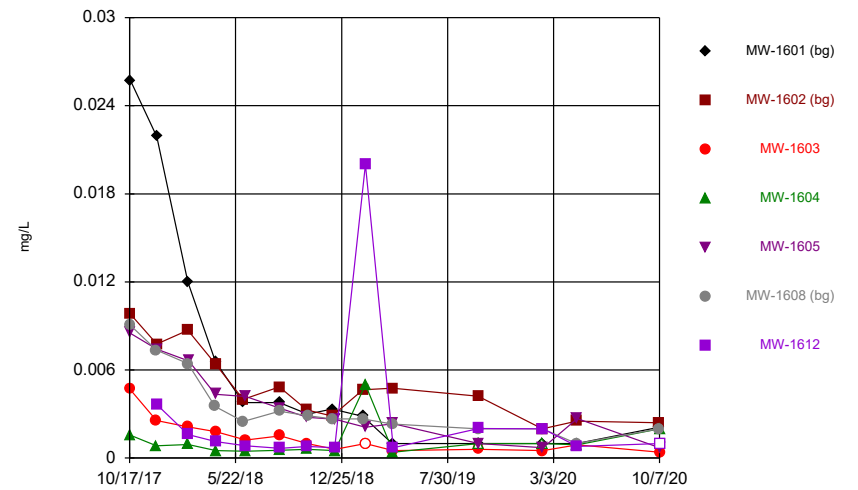
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



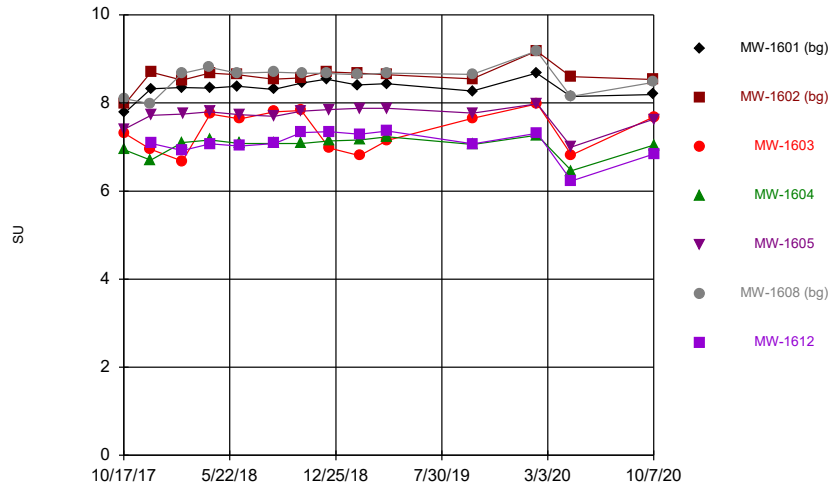
Constituent: Mercury Analysis Run 1/28/2021 2:31 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



Constituent: Molybdenum Analysis Run 1/28/2021 2:31 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

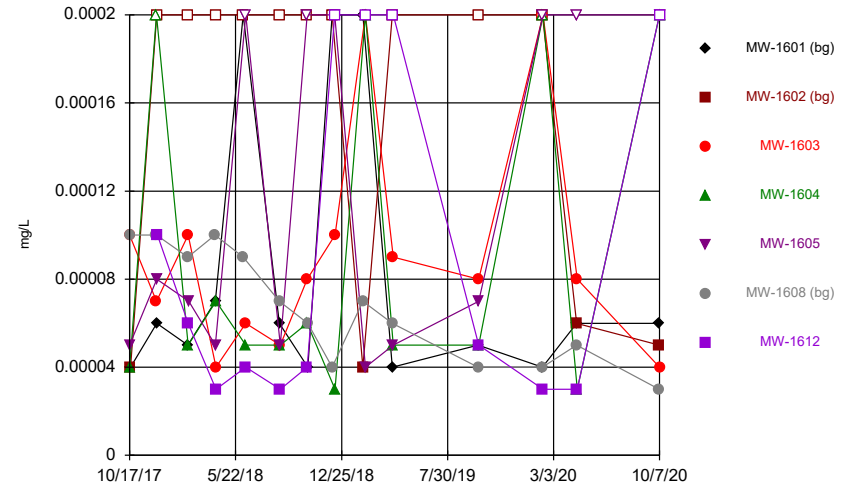
Time Series



Constituent: pH Analysis Run 1/28/2021 2:31 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Hollow symbols indicate censored values.

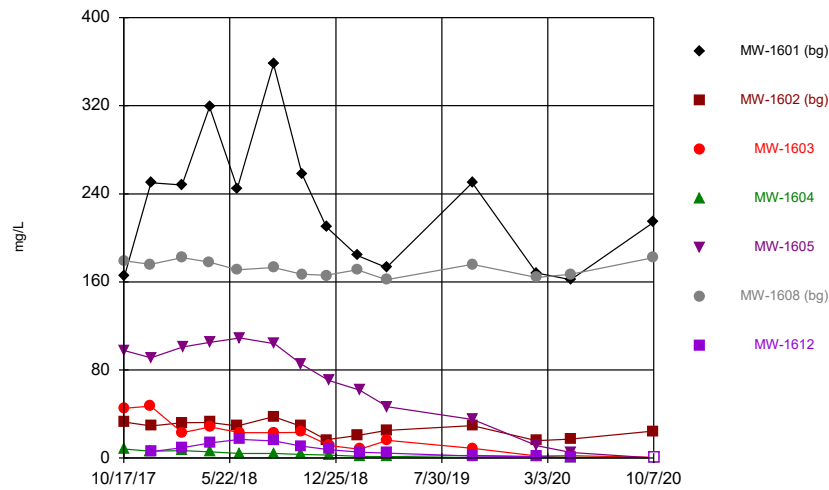
Time Series



Constituent: Selenium Analysis Run 1/28/2021 2:31 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Hollow symbols indicate censored values.

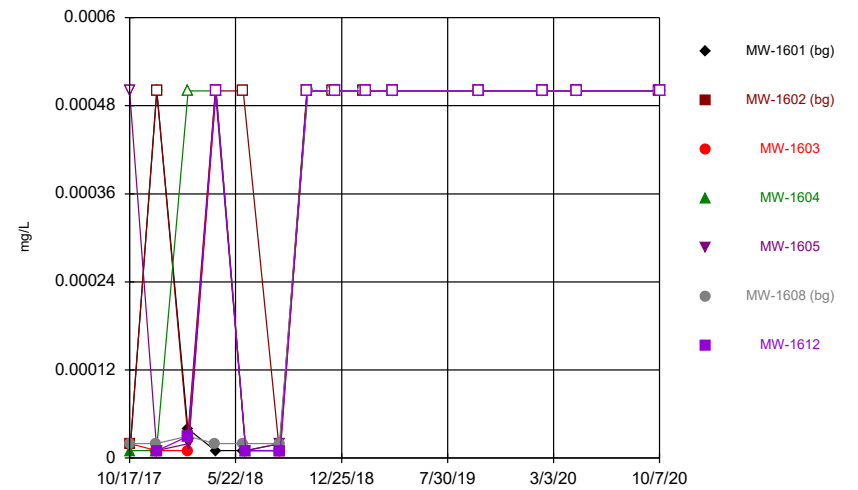
Time Series



Constituent: Sulfate Analysis Run 1/28/2021 2:31 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

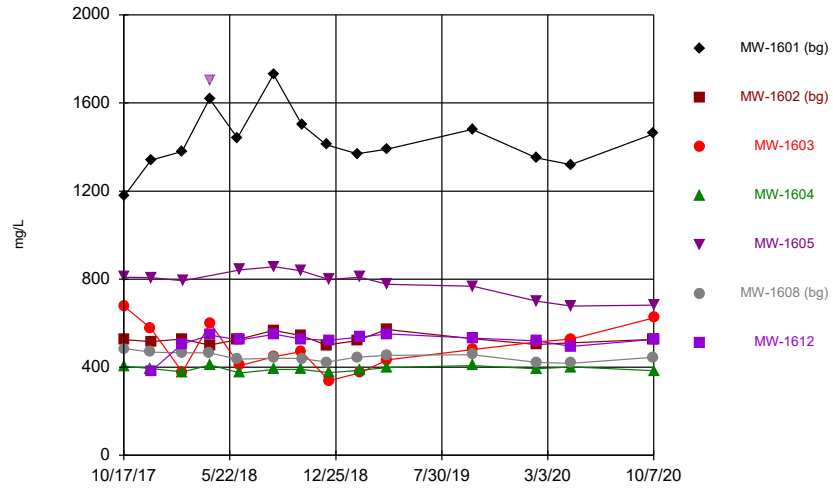
Hollow symbols indicate censored values.

Time Series



Constituent: Thallium Analysis Run 1/28/2021 2:31 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

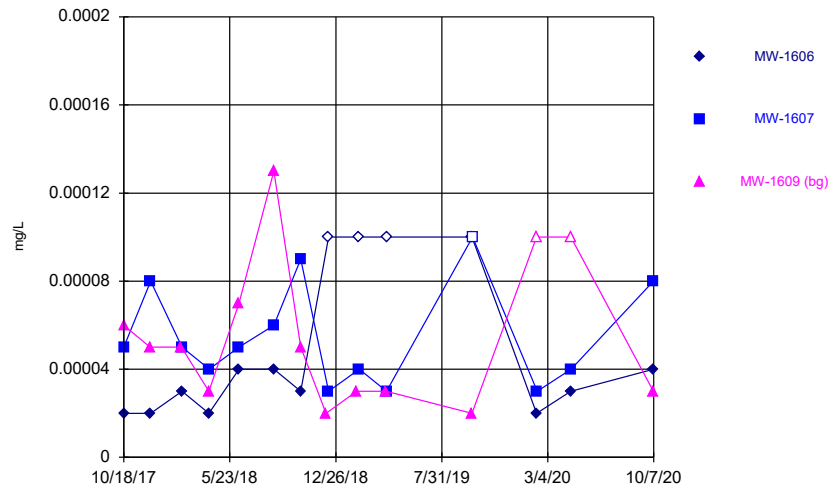
Time Series



Constituent: Total Dissolved Solids Analysis Run 1/28/2021 2:31 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

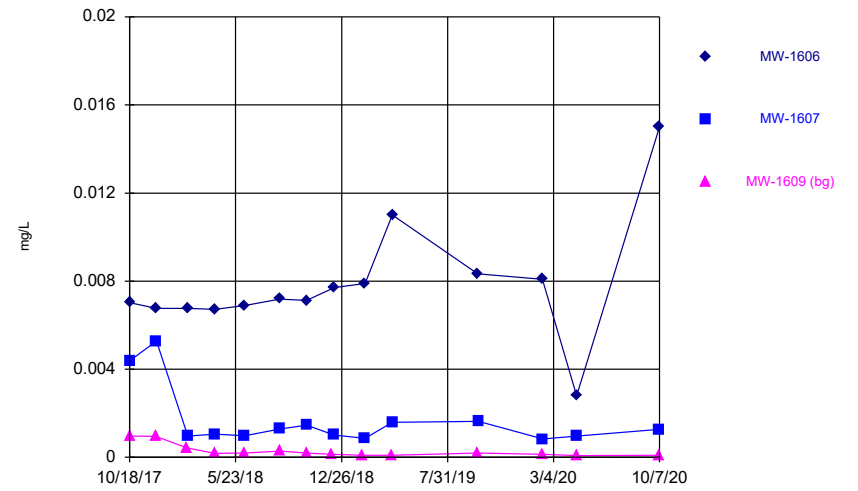
Time Series - Rome Limestone

Time Series



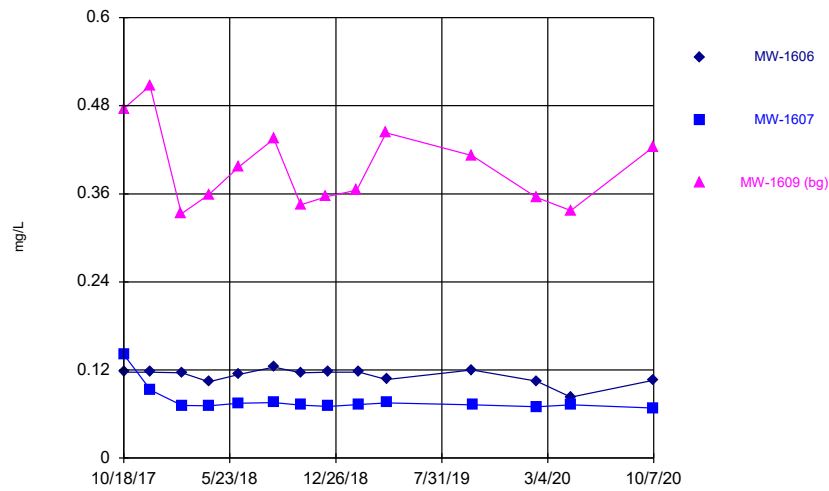
Constituent: Antimony Analysis Run 1/29/2021 10:26 AM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



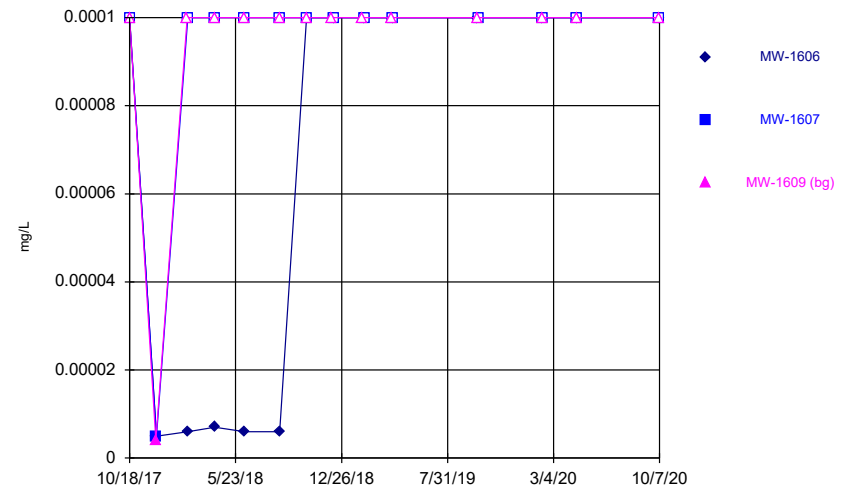
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



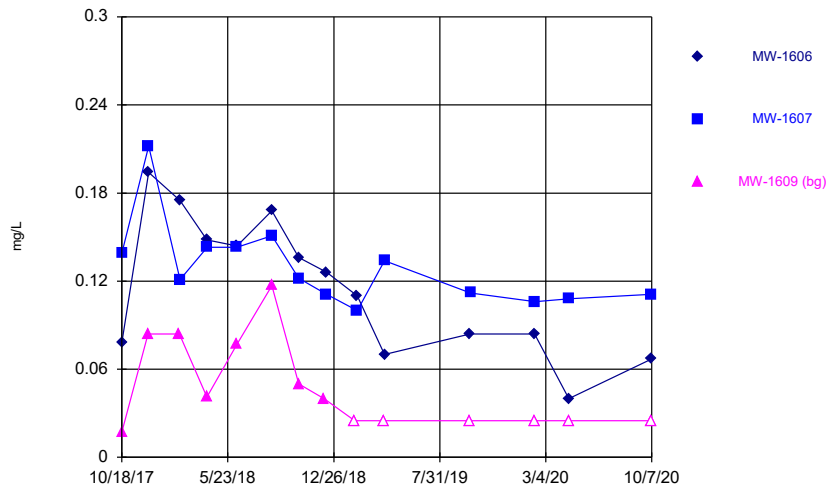
Constituent: Barium Analysis Run 1/29/2021 10:26 AM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



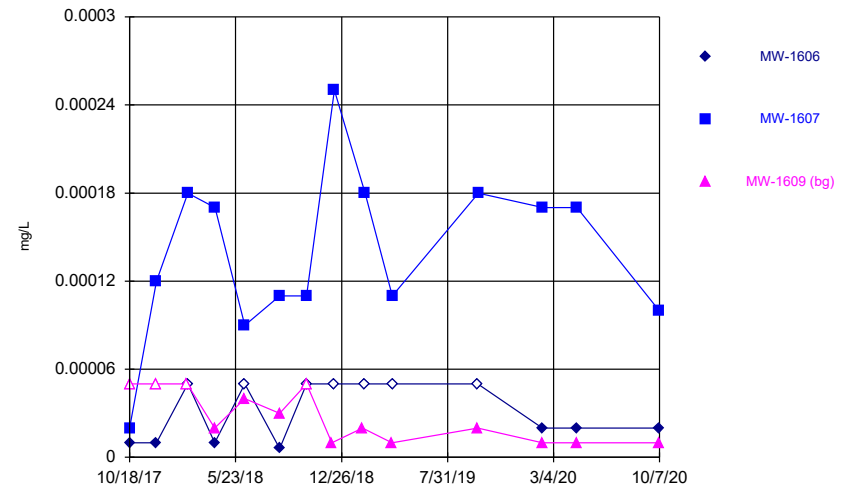
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



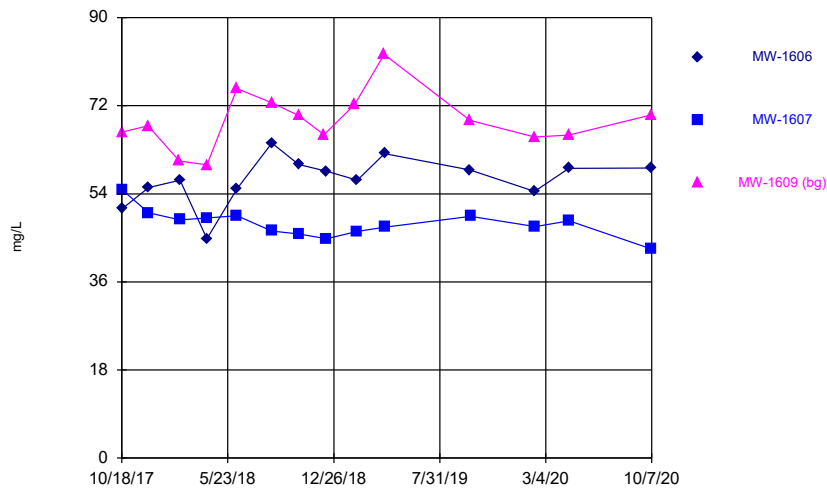
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Time Series



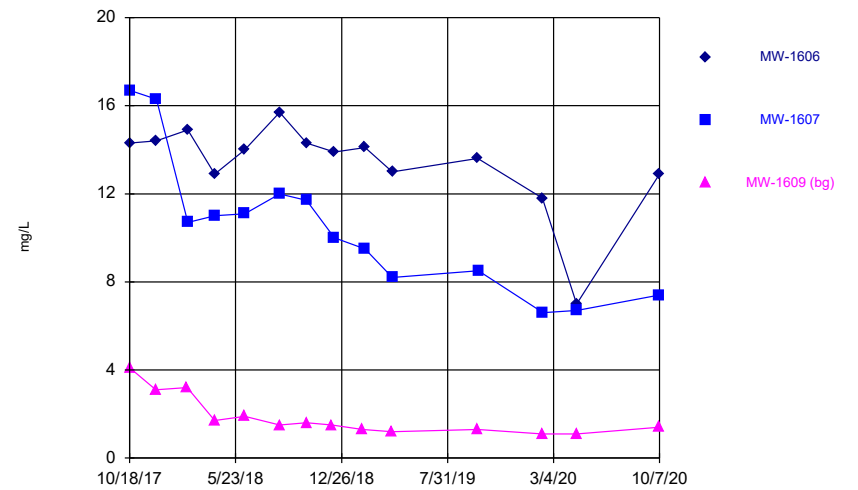
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



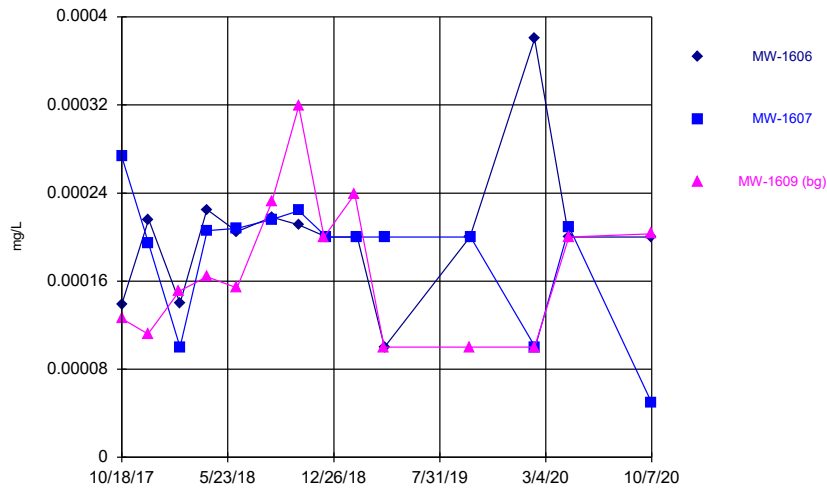
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



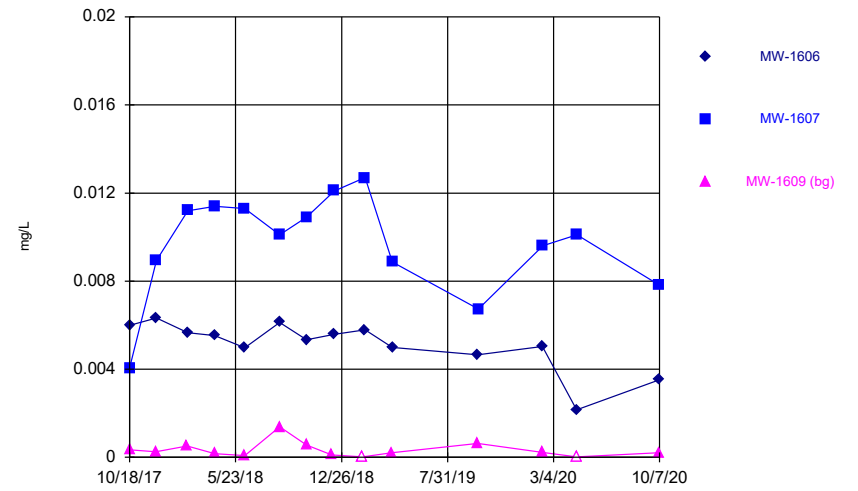
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Time Series



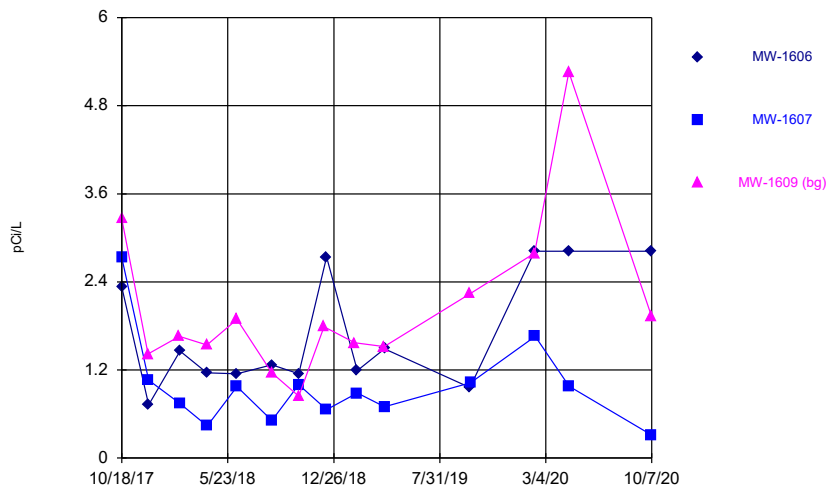
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Time Series



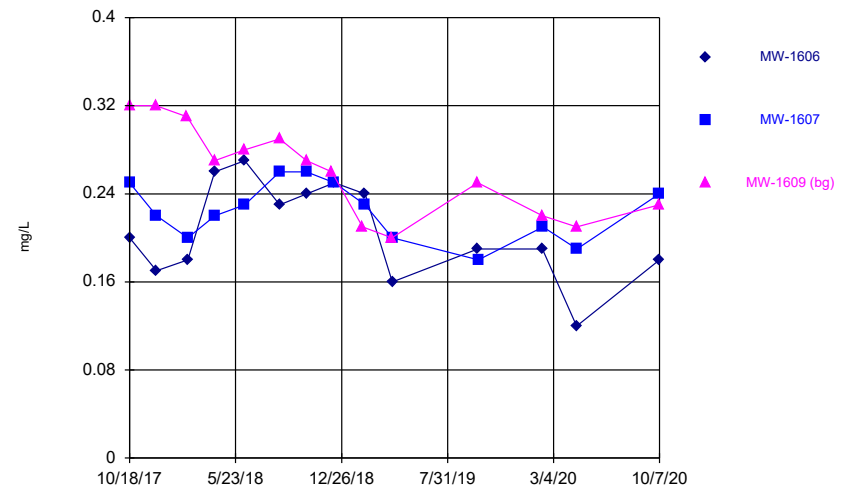
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Time Series



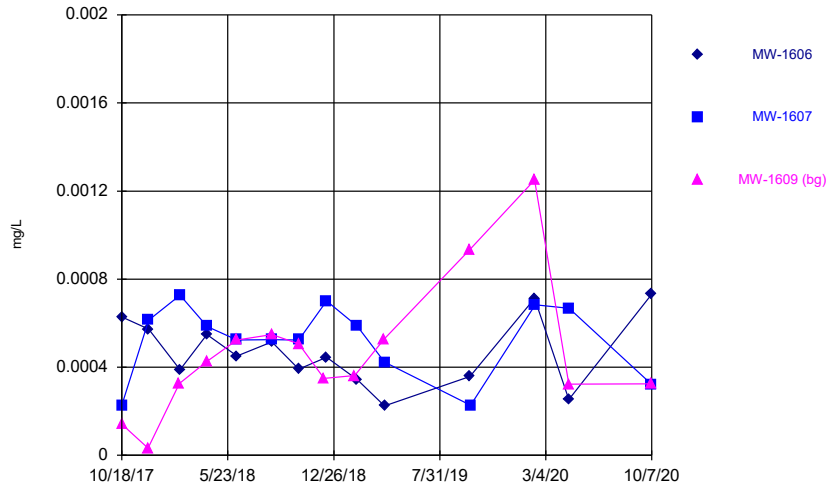
Constituent: Combined Radium 226 + 228 Analysis Run 1/29/2021 10:26 AM View: Rome Limestone - Federal Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



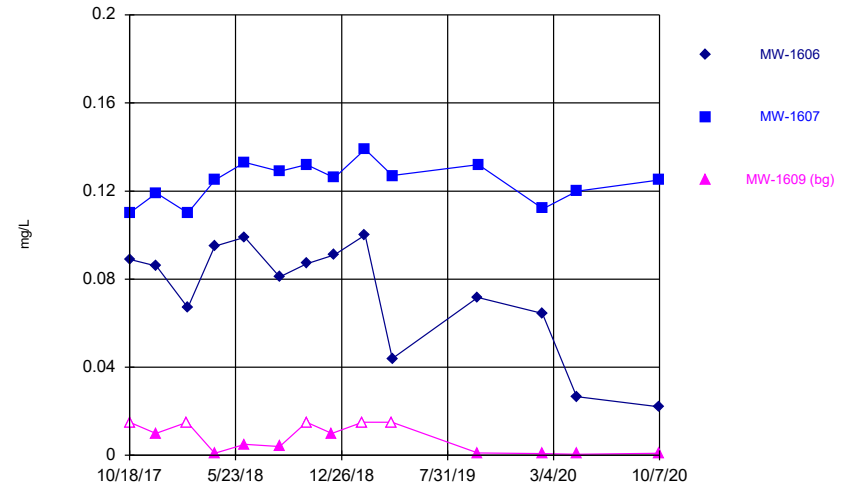
Constituent: Fluoride Analysis Run 1/29/2021 10:26 AM View: Rome Limestone - Federal Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



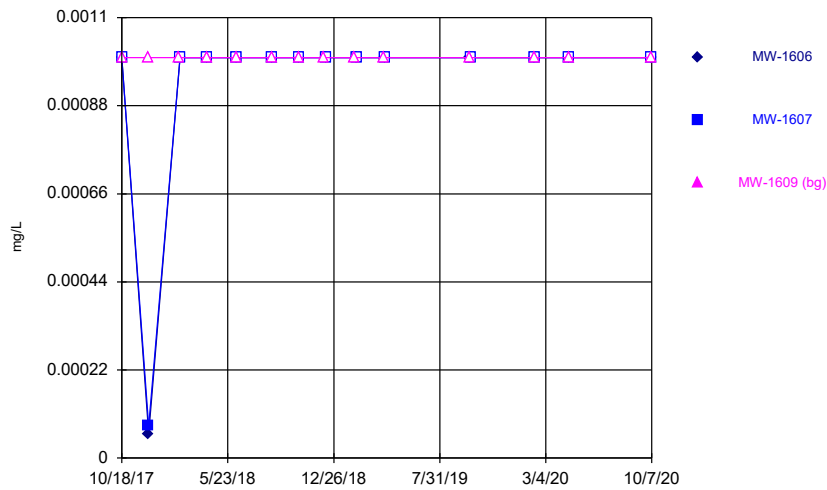
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



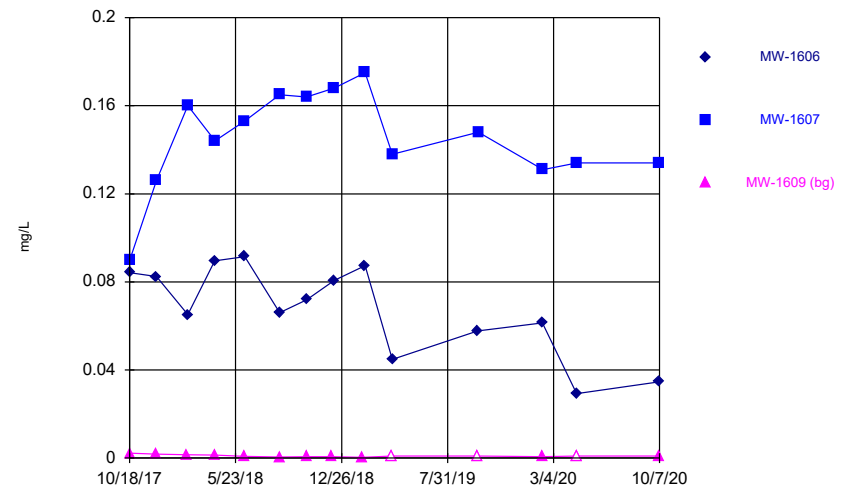
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



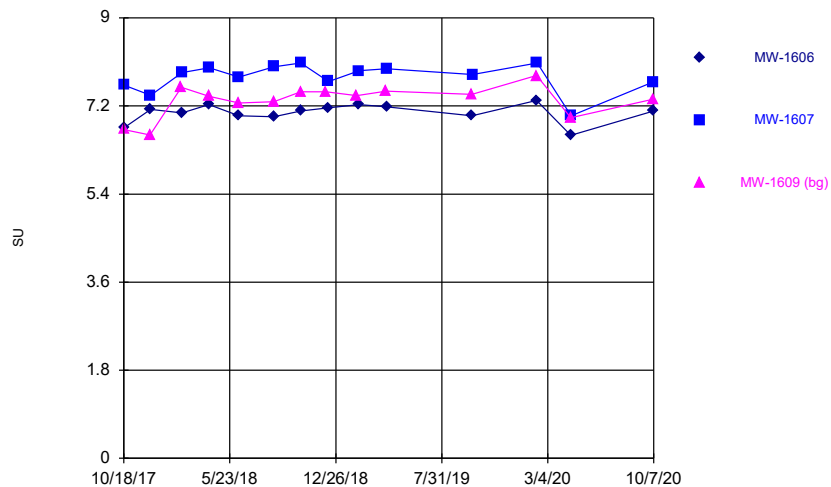
Constituent: Mercury Analysis Run 1/29/2021 10:26 AM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



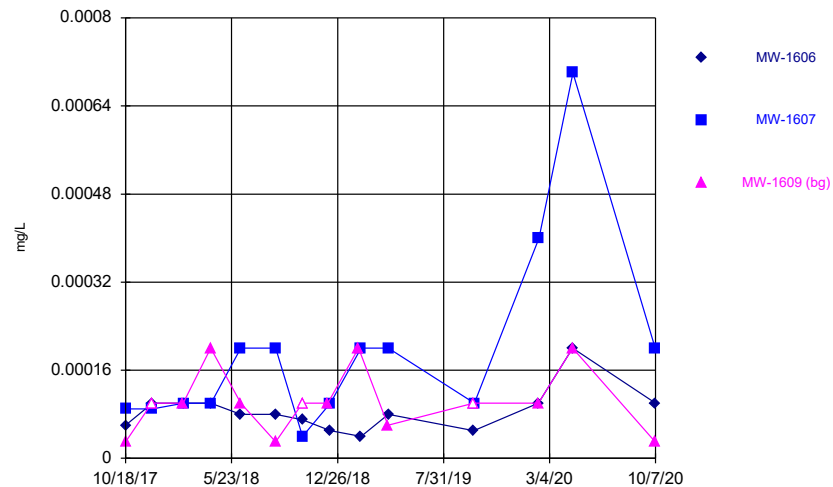
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



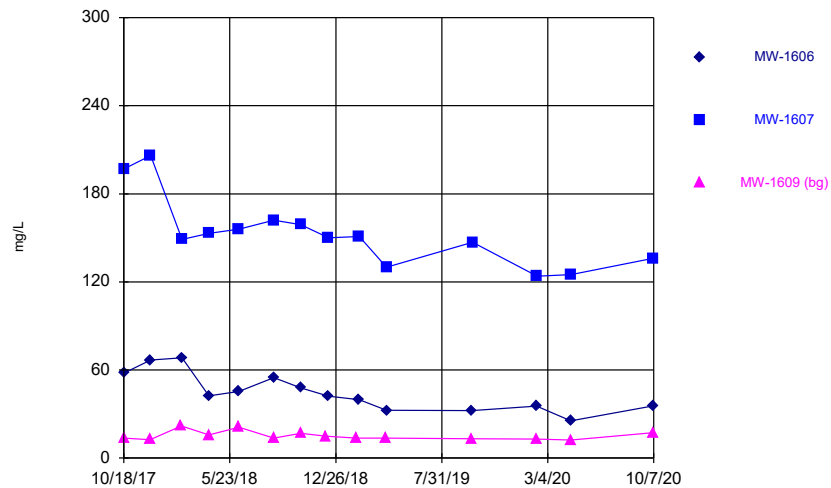
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Time Series



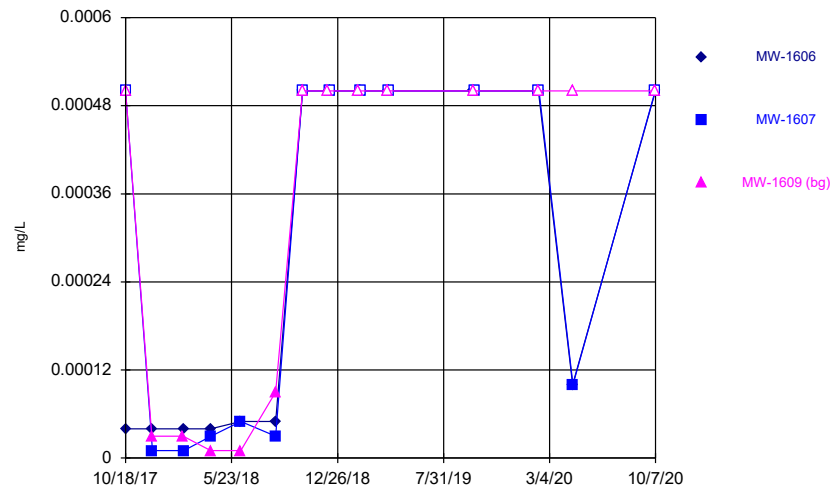
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Time Series



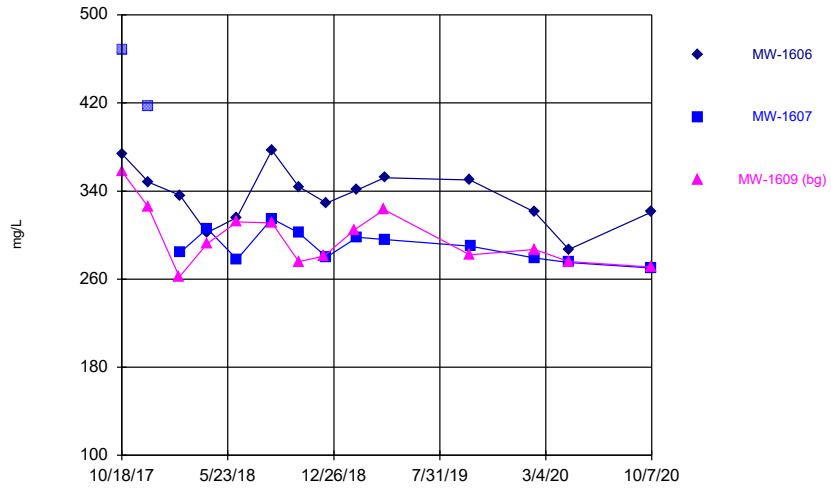
Constituent: Sulfate Analysis Run 1/29/2021 10:26 AM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



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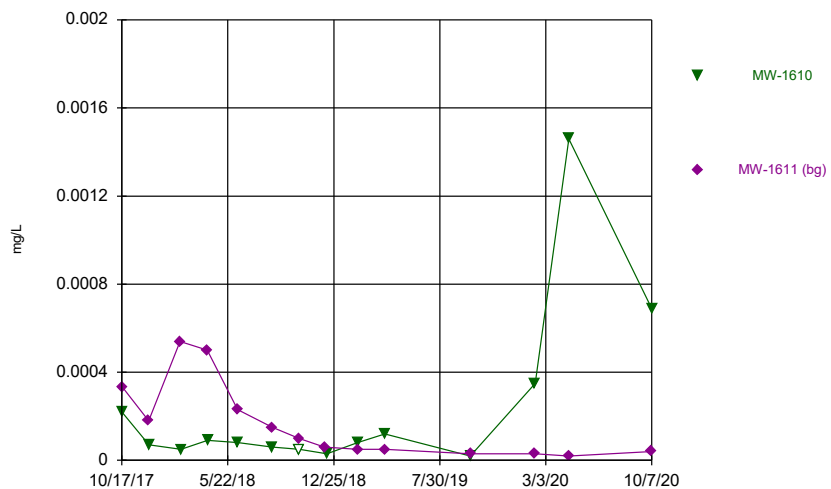
Time Series



Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:26 AM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

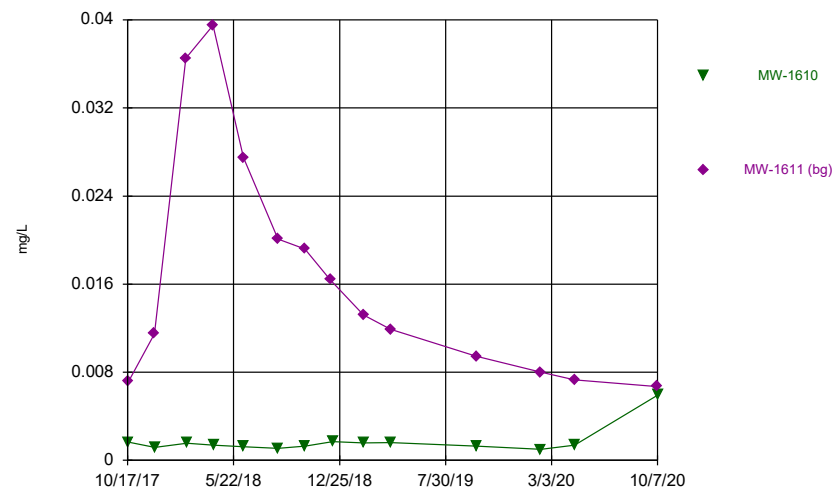
Time Series - Dumps Fault

Time Series



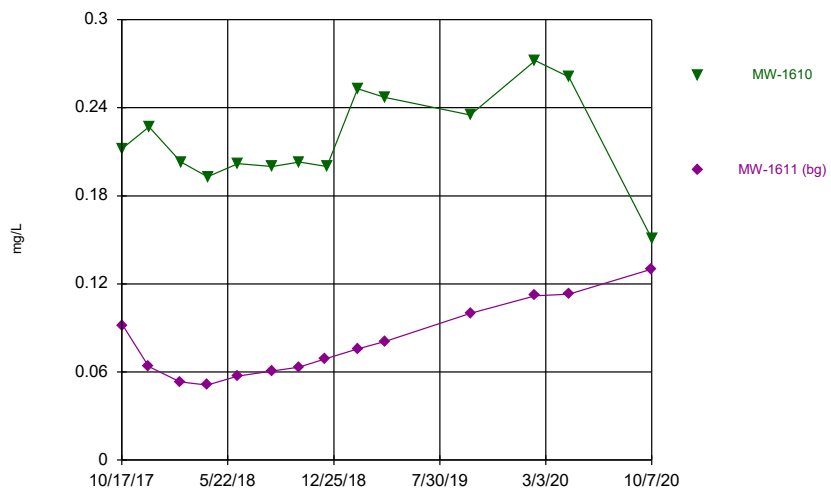
Constituent: Antimony Analysis Run 1/29/2021 1:27 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



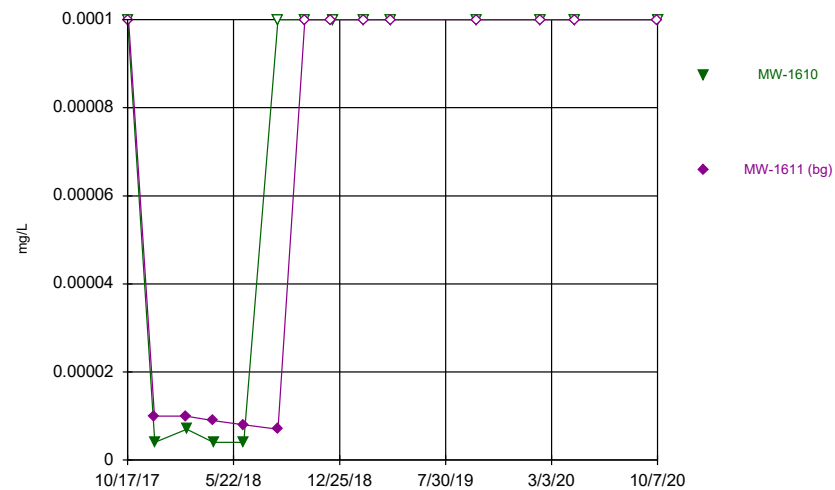
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



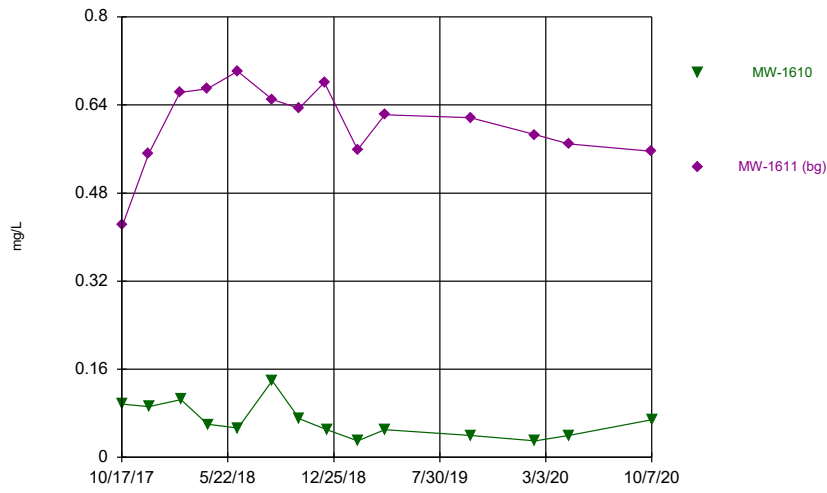
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Time Series



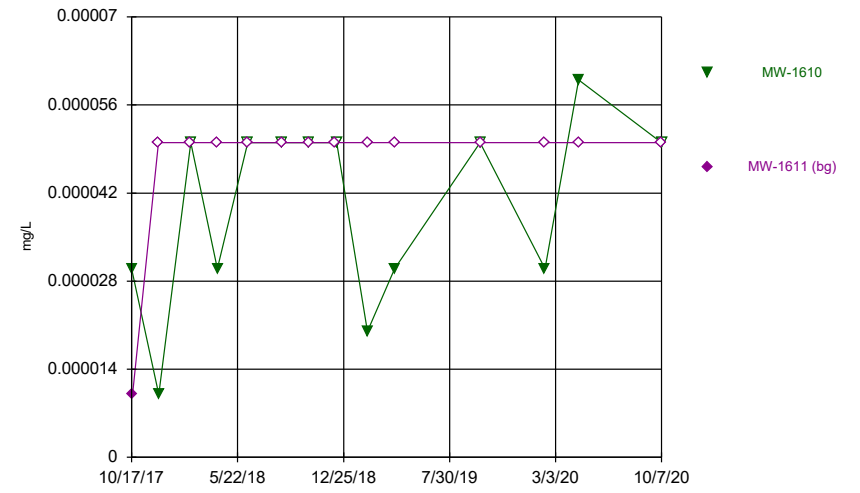
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



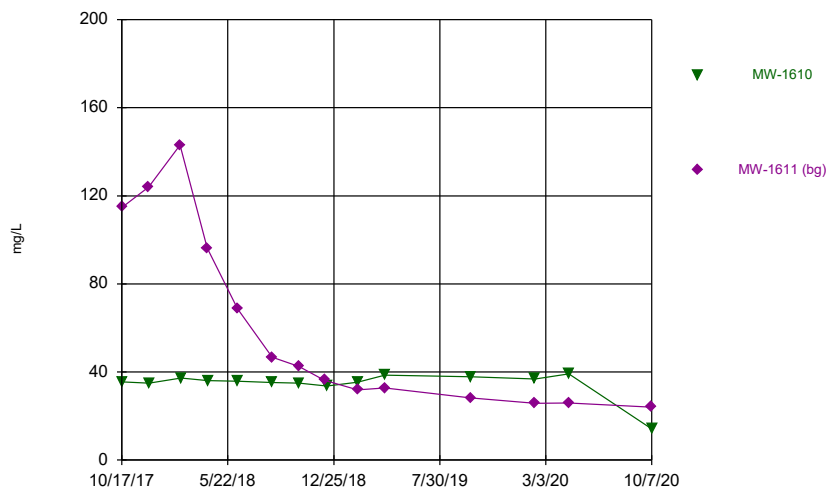
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Time Series



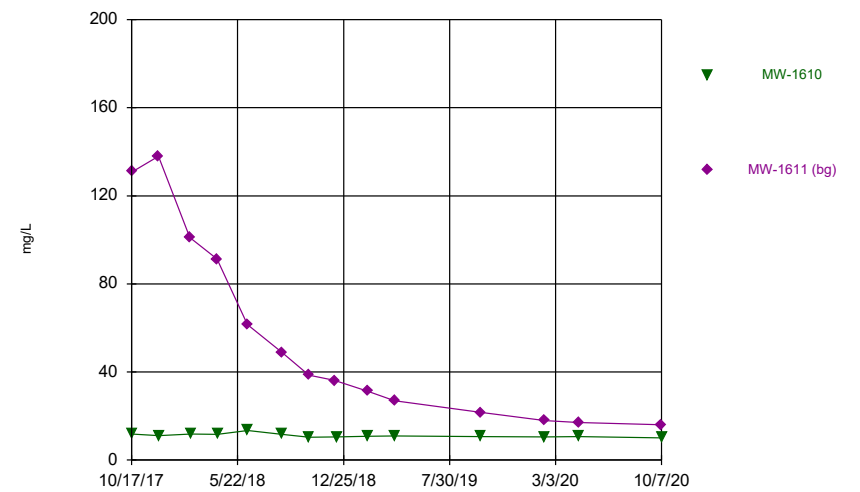
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Time Series



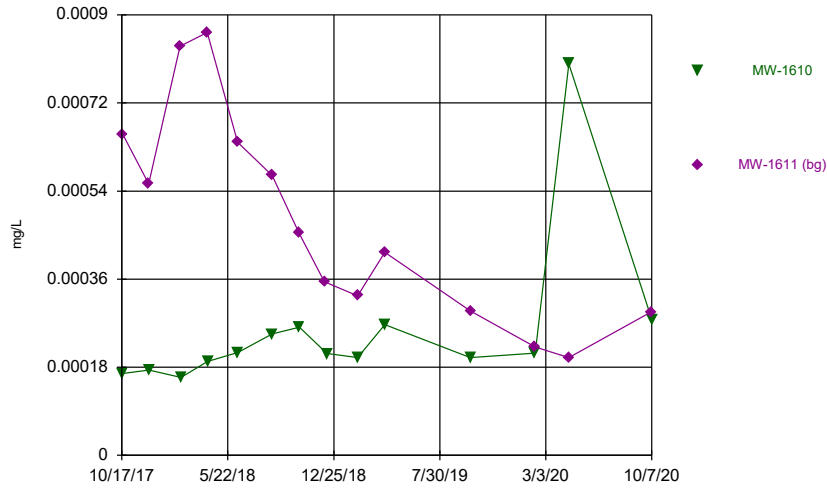
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Time Series



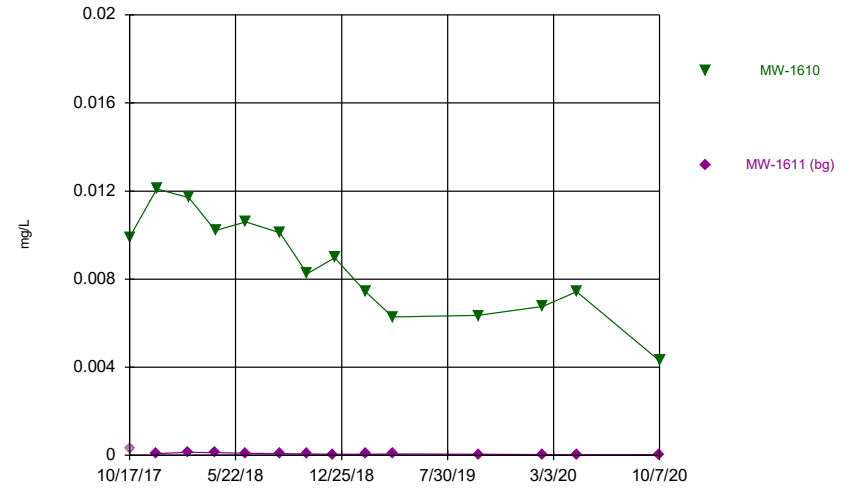
Constituent: Chloride Analysis Run 1/29/2021 1:27 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



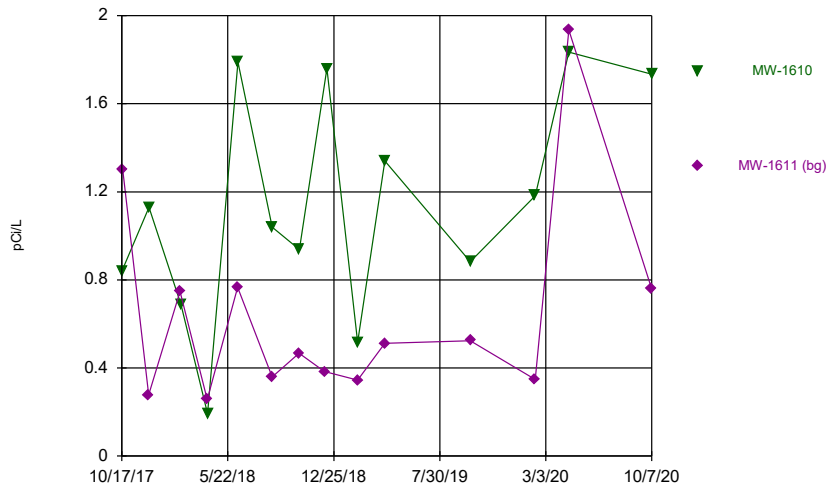
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



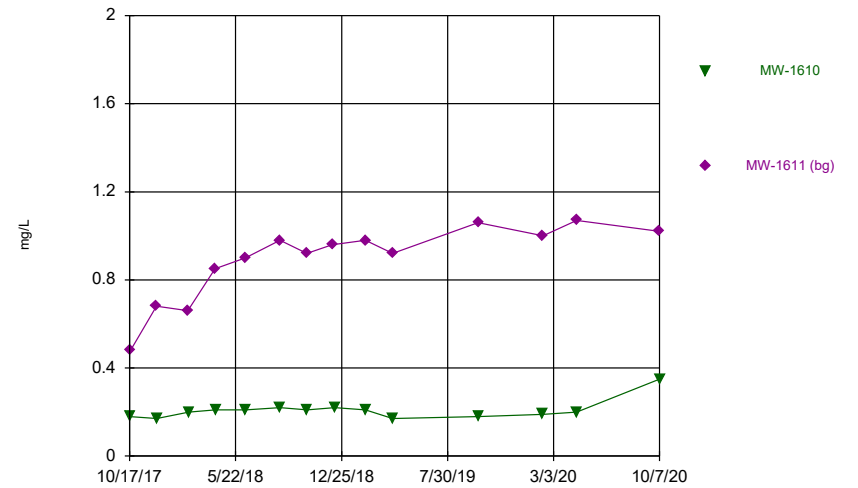
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



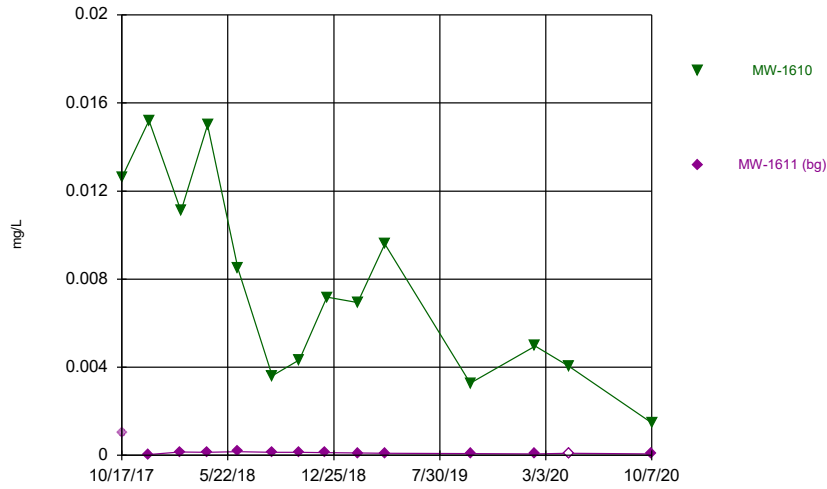
Constituent: Combined Radium 226 + 228 Analysis Run 1/29/2021 1:27 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



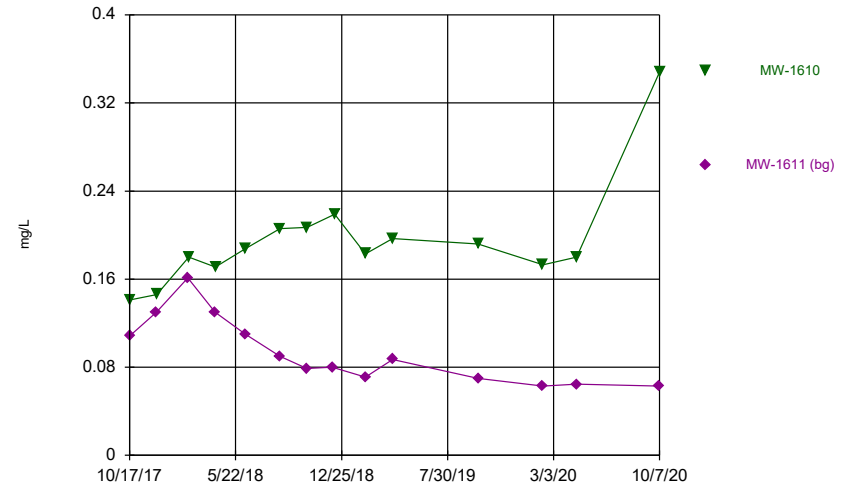
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Time Series



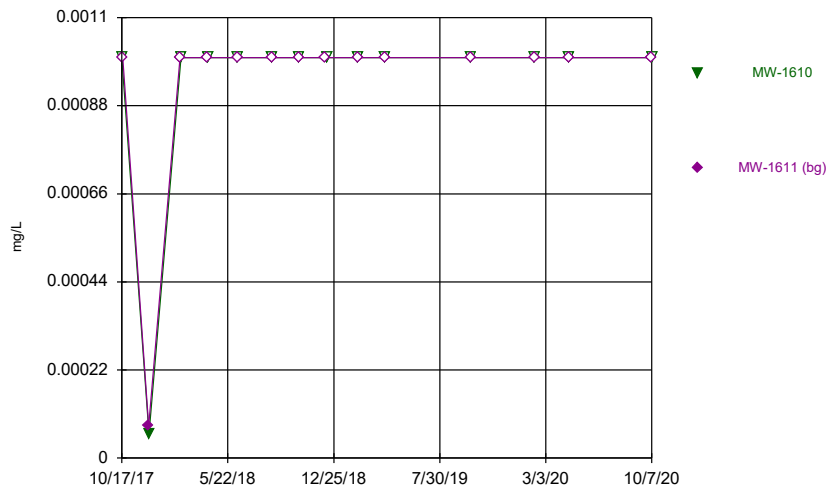
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 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



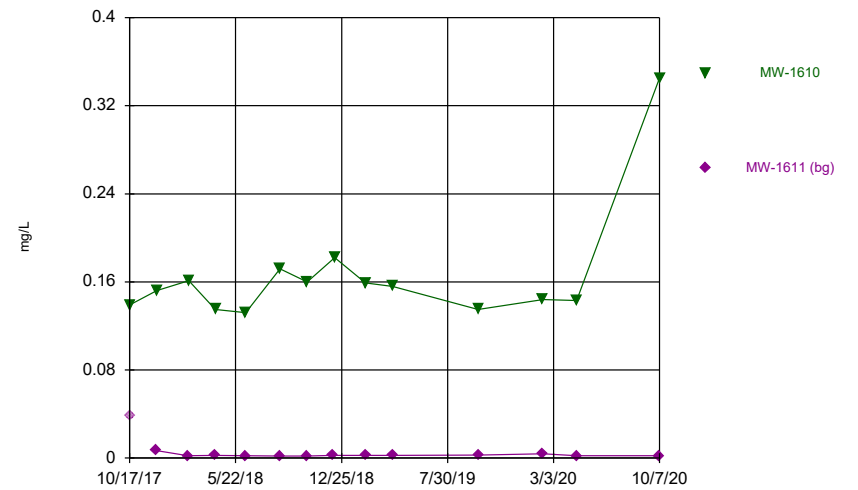
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 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



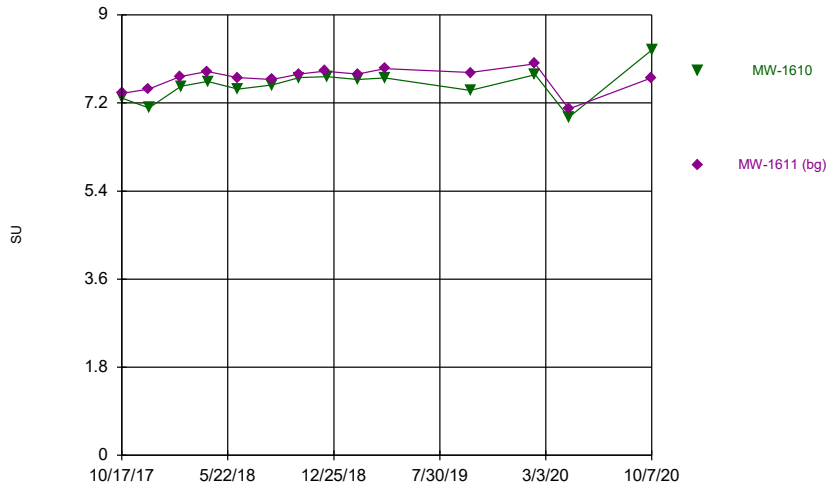
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 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



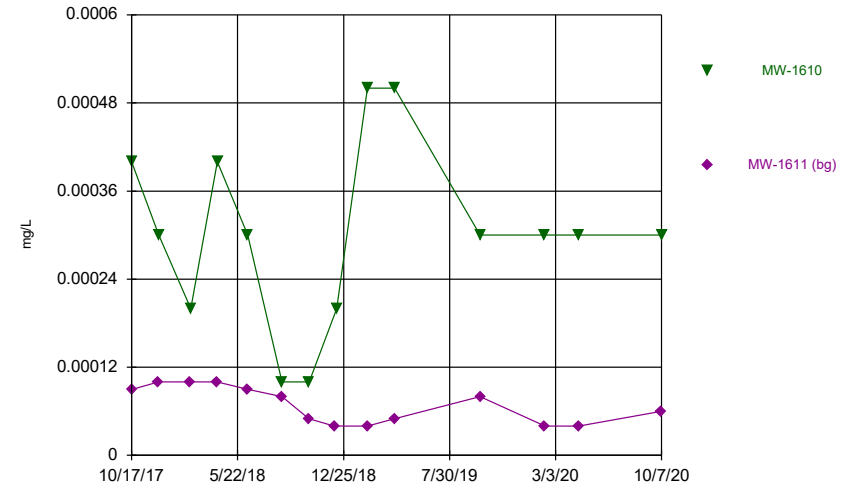
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 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



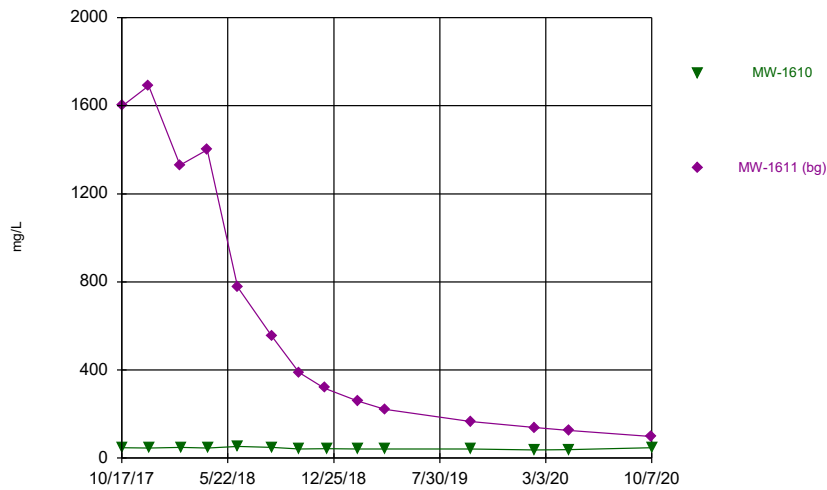
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



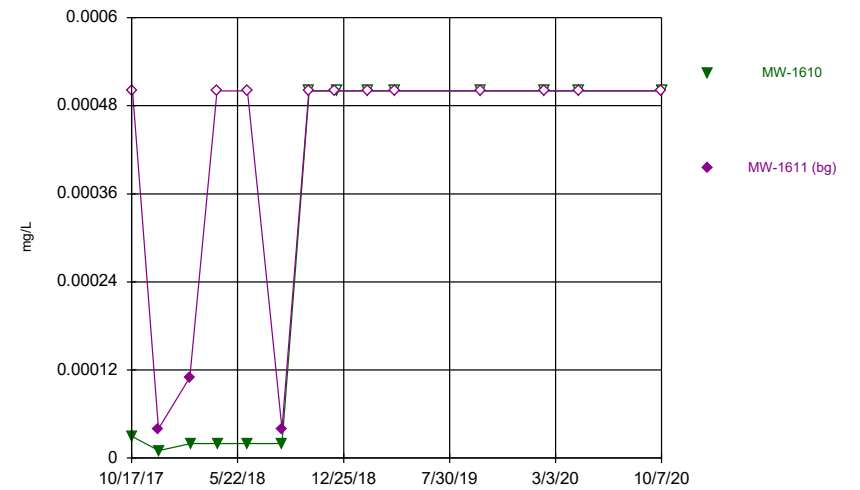
Constituent: Selenium Analysis Run 1/29/2021 1:27 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



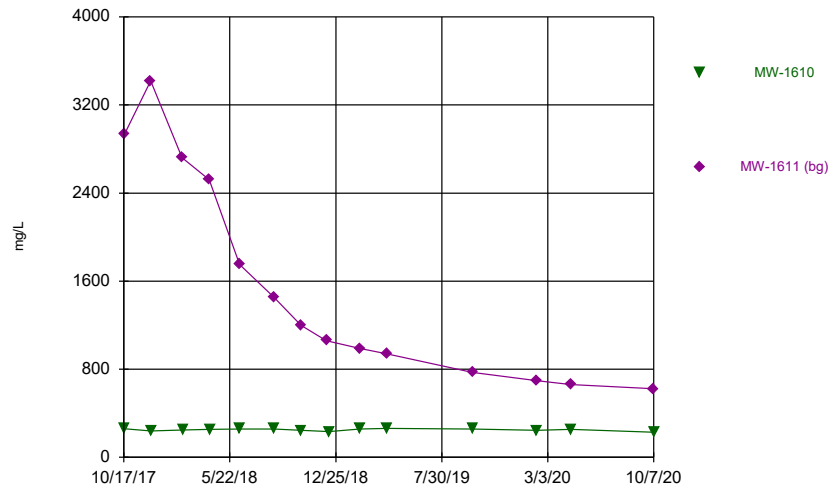
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series



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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Time Series

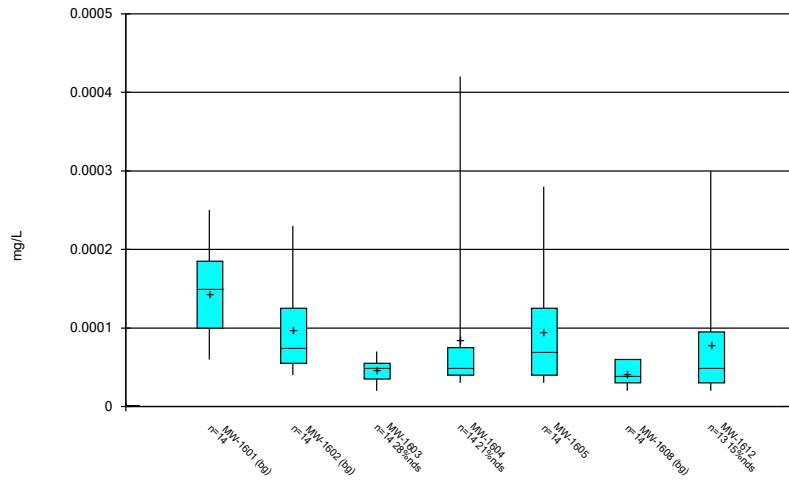


Constituent: Total Dissolved Solids Analysis Run 1/29/2021 1:27 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

FIGURE B.

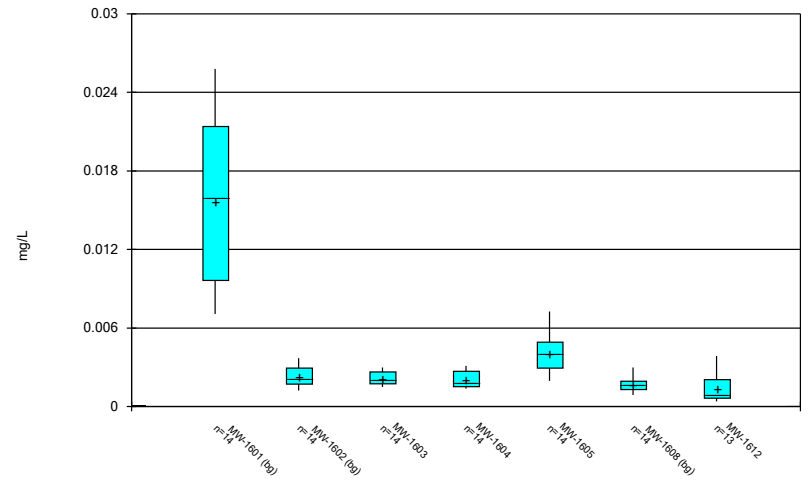
Box Plots - Chattanooga Shale

Box & Whiskers Plot



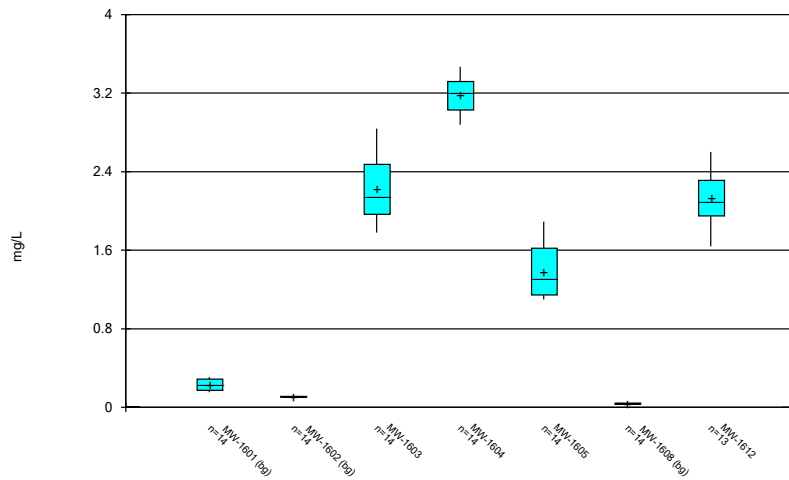
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Box & Whiskers Plot



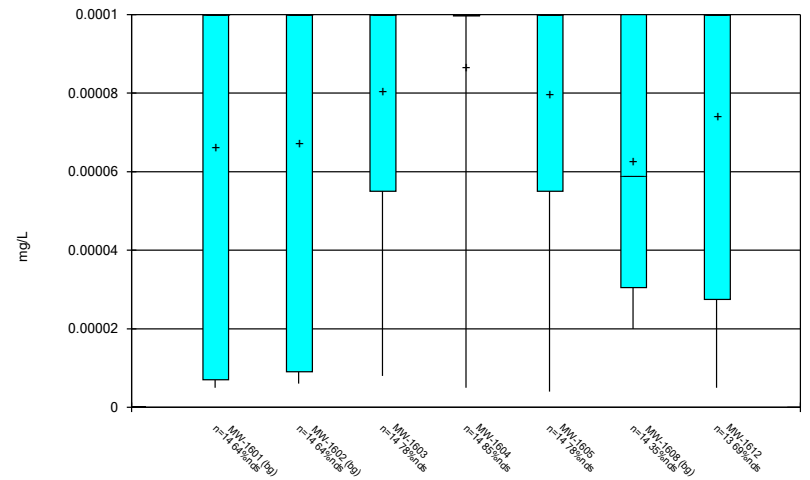
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Box & Whiskers Plot



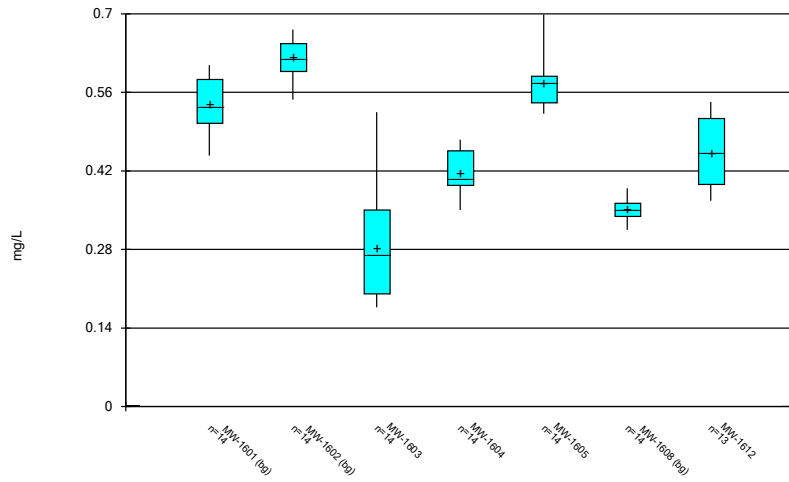
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Box & Whiskers Plot



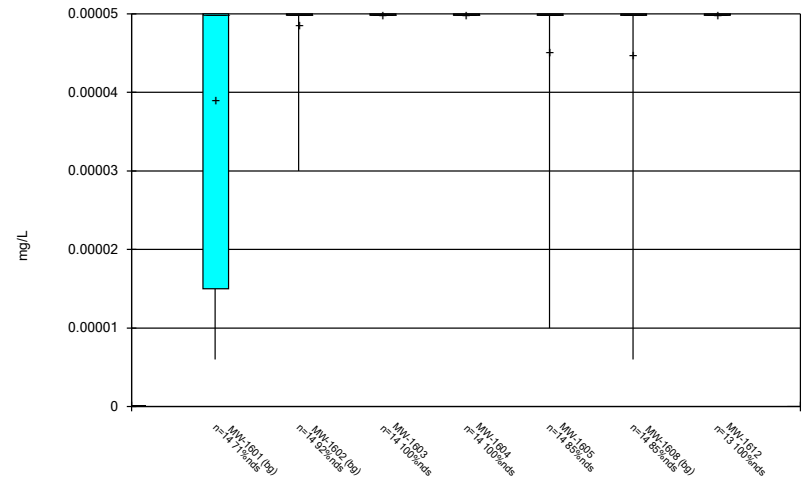
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Box & Whiskers Plot



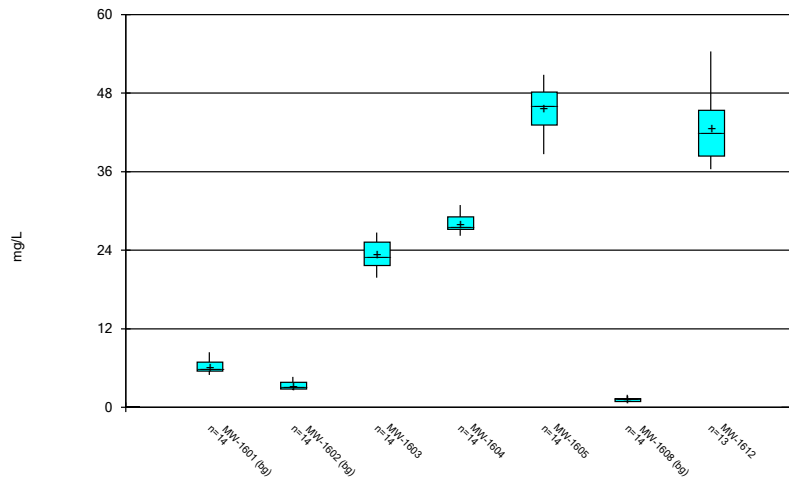
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Box & Whiskers Plot



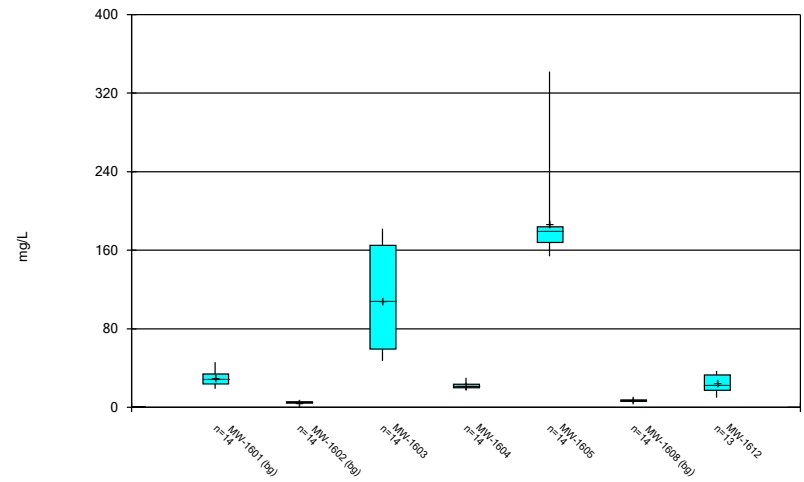
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Box & Whiskers Plot



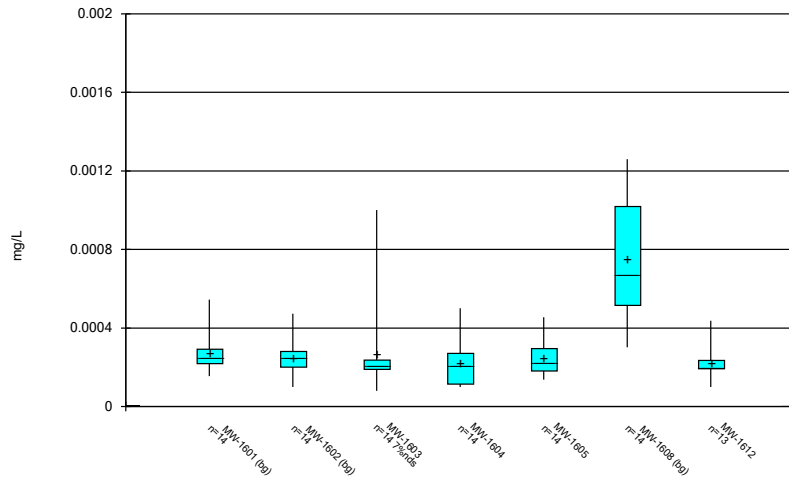
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Box & Whiskers Plot



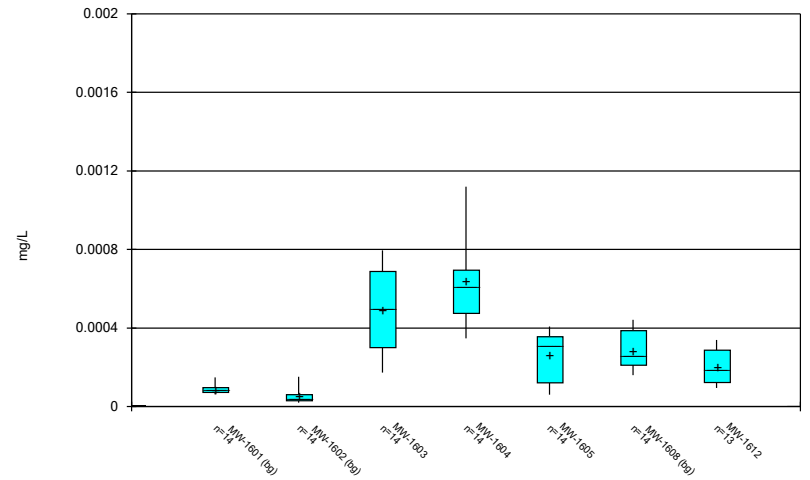
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



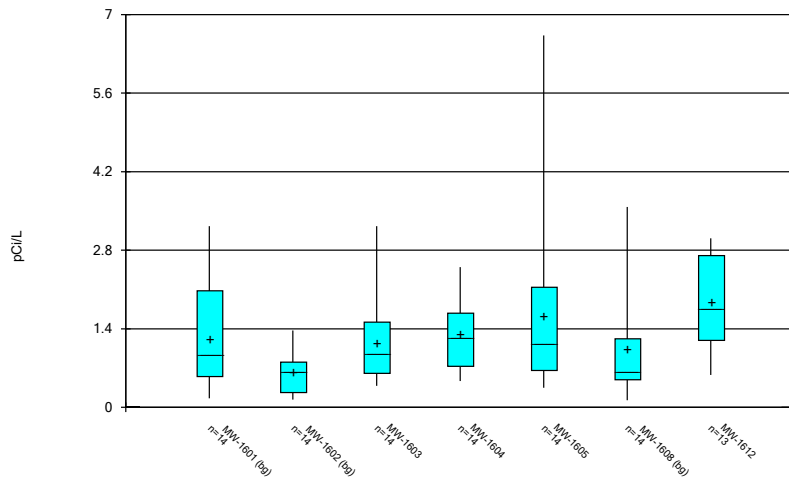
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Box & Whiskers Plot



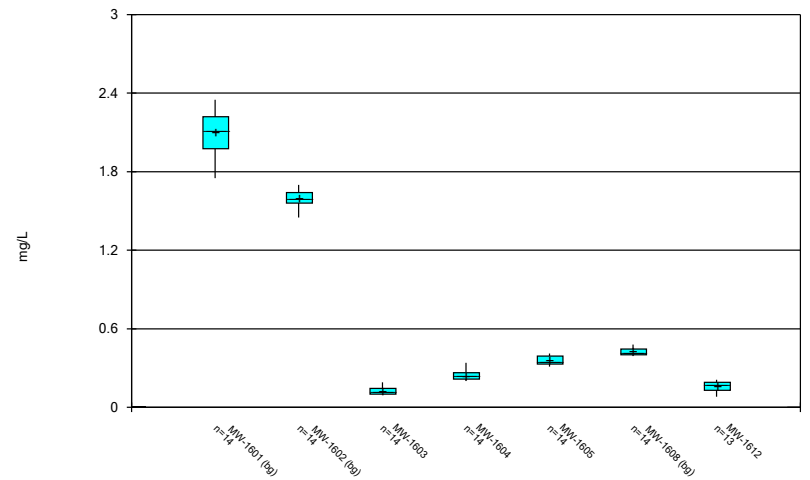
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Box & Whiskers Plot



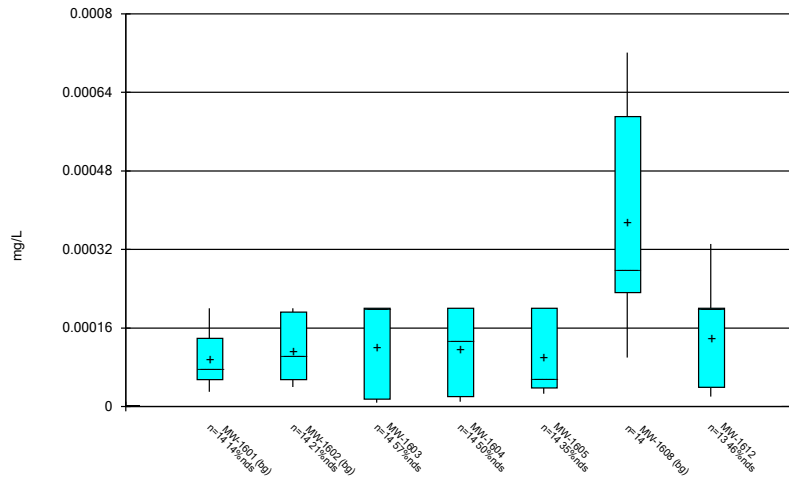
Constituent: Combined Radium 226 + 228 Analysis Run 1/28/2021 2:32 PM View: Chattanooga Shale - F Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



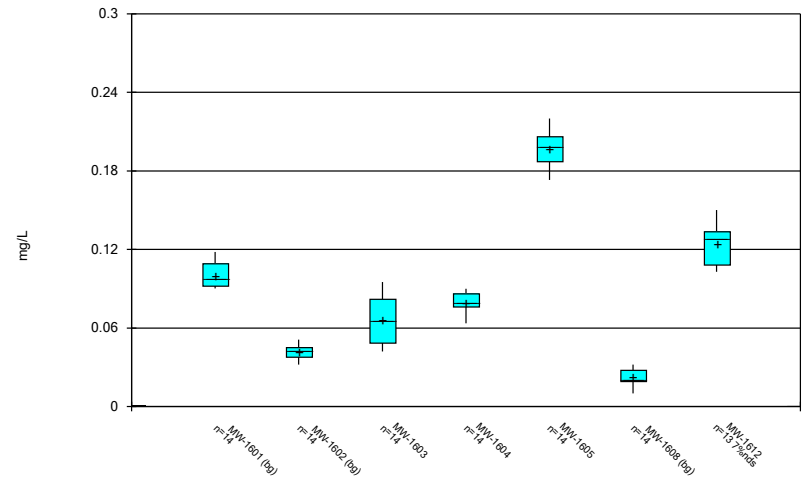
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Box & Whiskers Plot



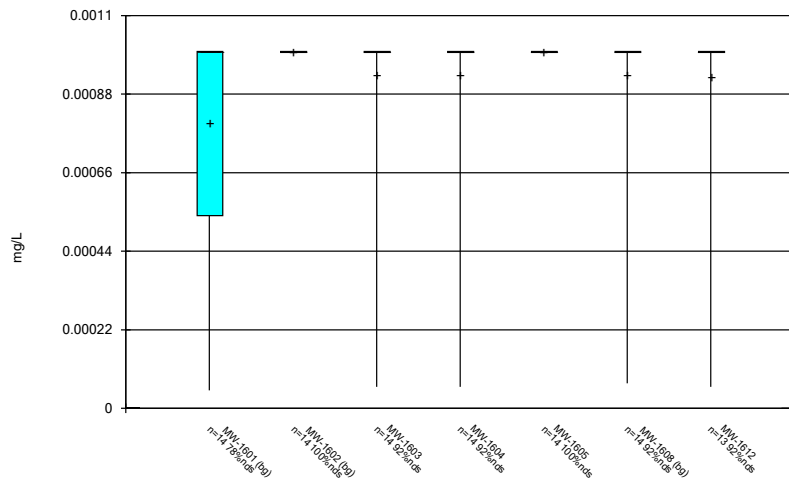
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



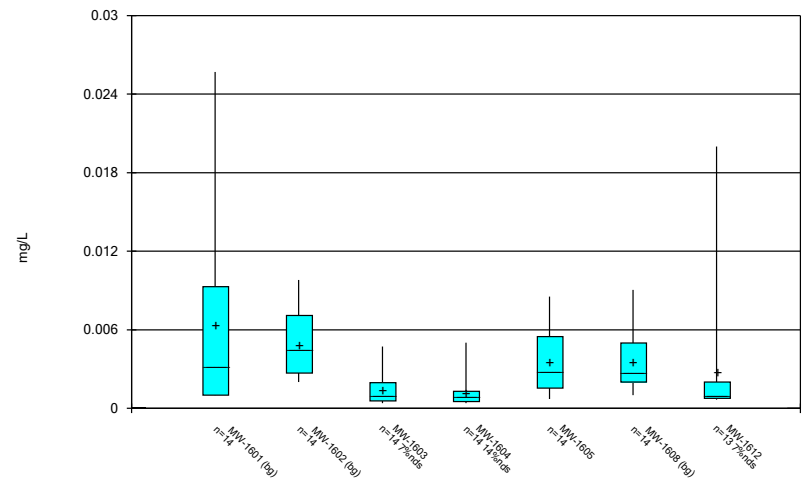
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



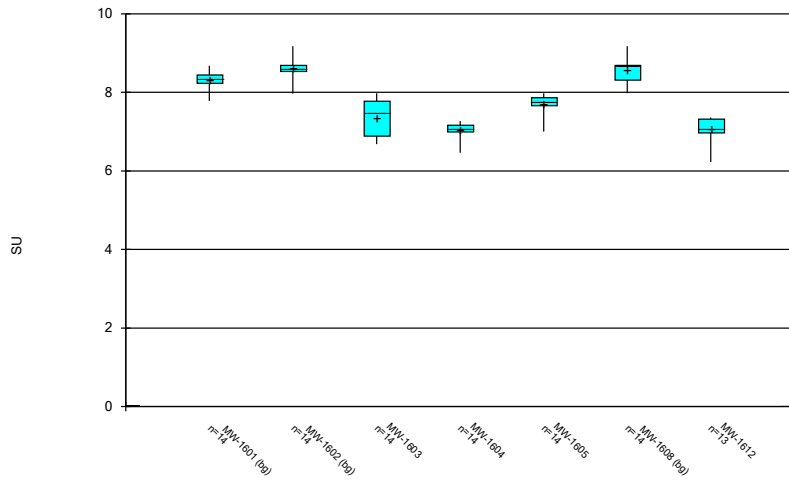
Constituent: Mercury Analysis Run 1/28/2021 2:32 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



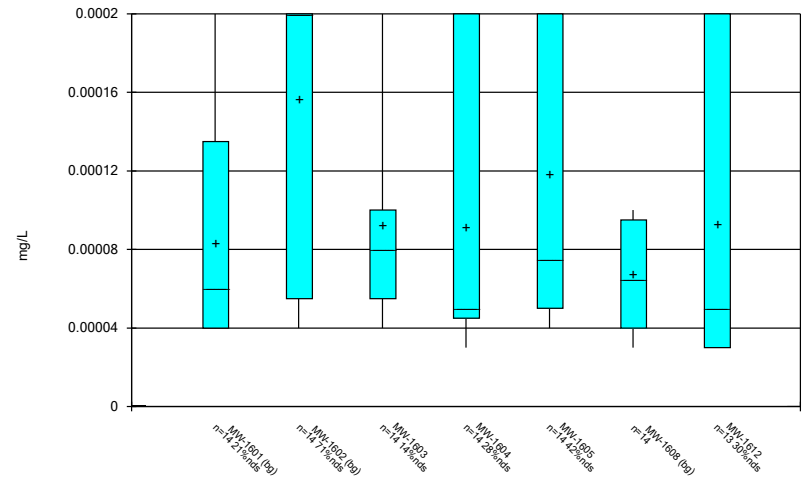
Constituent: Molybdenum Analysis Run 1/28/2021 2:33 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



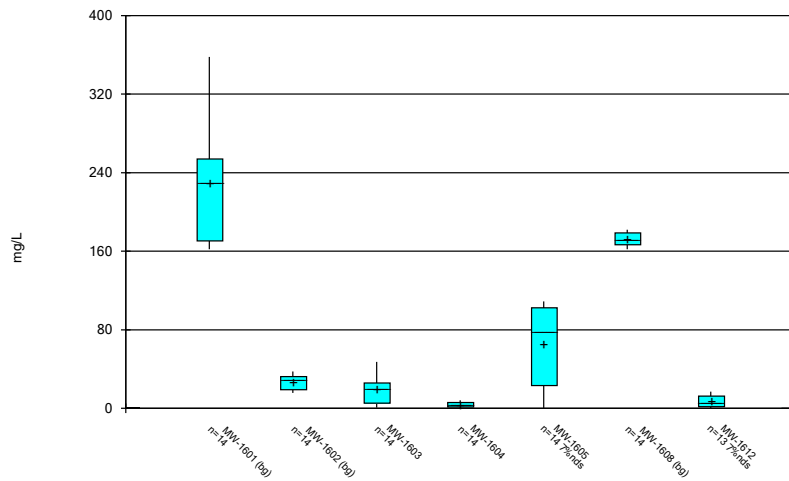
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



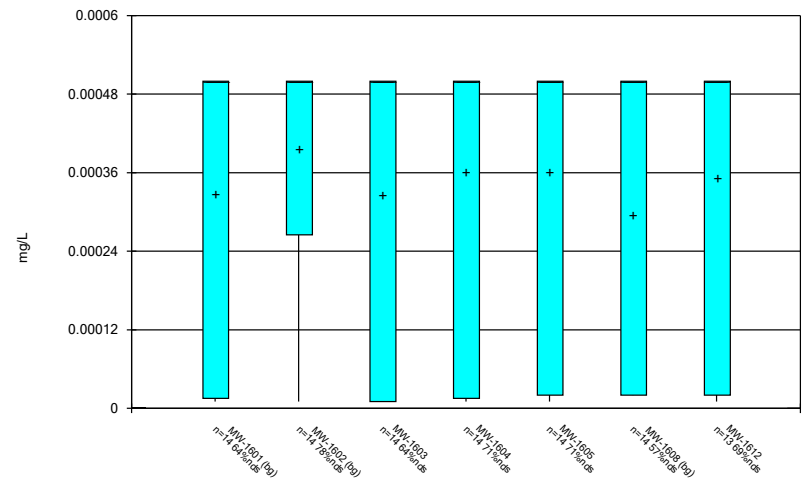
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



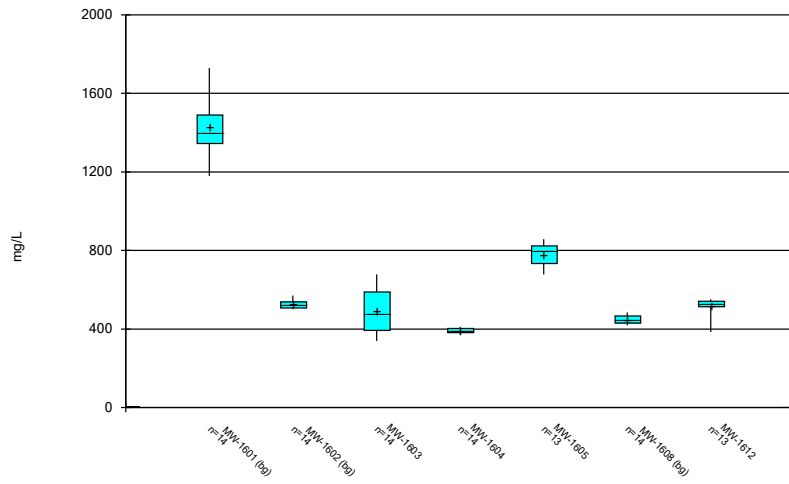
Constituent: Sulfate Analysis Run 1/28/2021 2:33 PM View: Chattanooga Shale - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



Constituent: Thallium Analysis Run 1/28/2021 2:33 PM View: Chattanooga Shale - Federal
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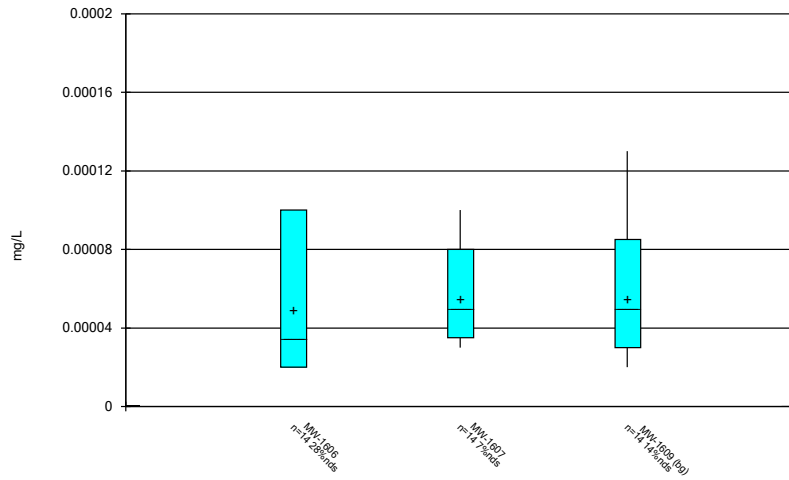
Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 1/28/2021 2:33 PM View: Chattanooga Shale - Federal
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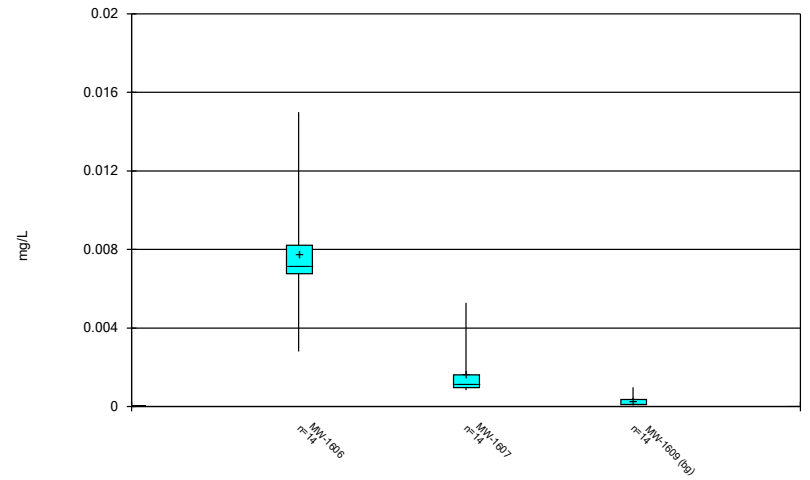
Box Plots - Rome Limestone

Box & Whiskers Plot



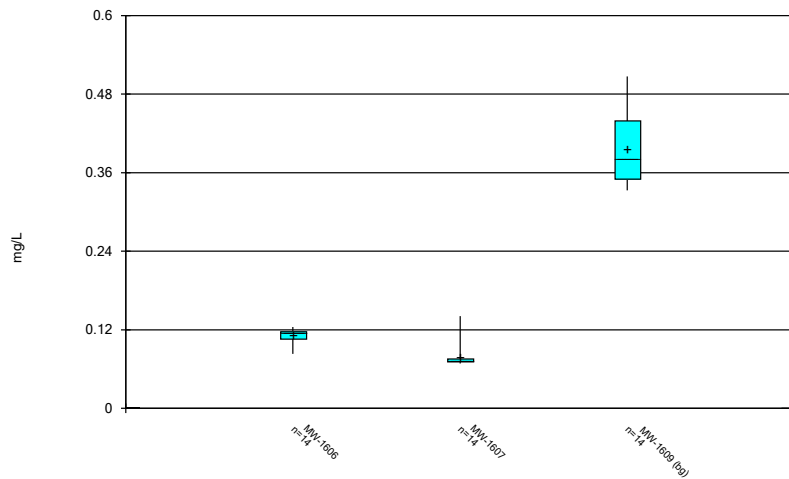
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Box & Whiskers Plot



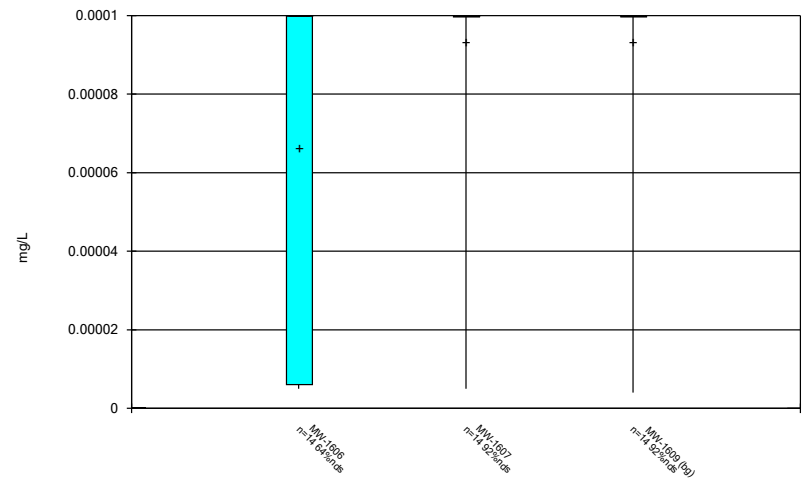
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Box & Whiskers Plot



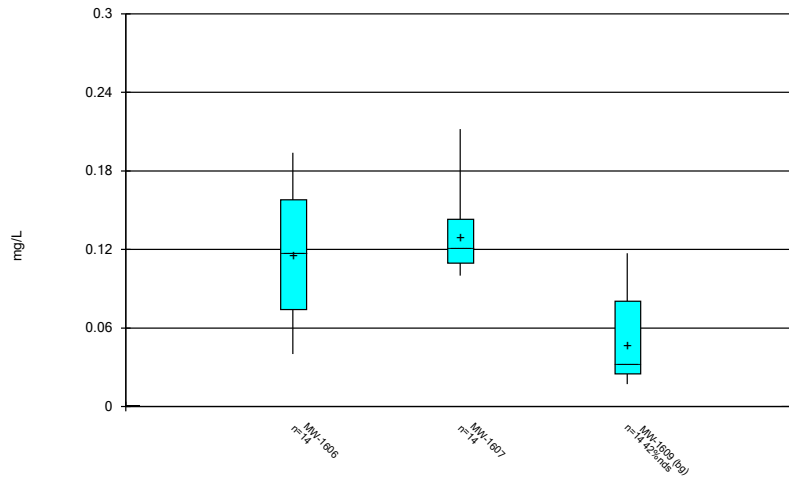
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Box & Whiskers Plot



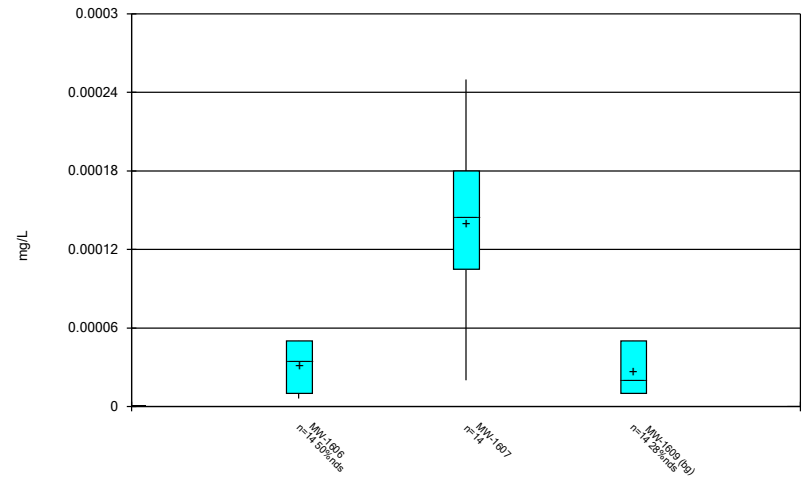
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Box & Whiskers Plot



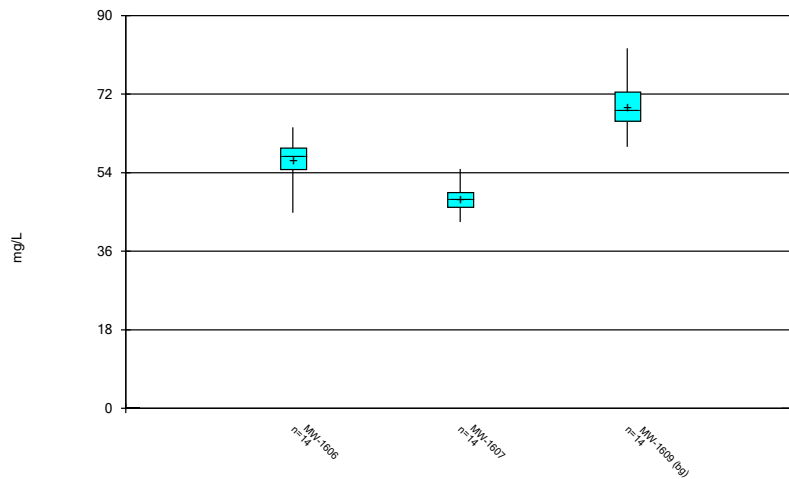
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Box & Whiskers Plot



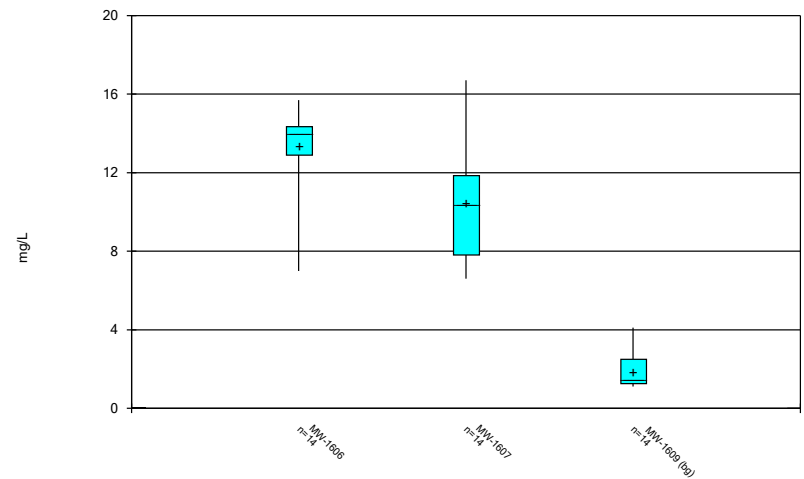
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Box & Whiskers Plot



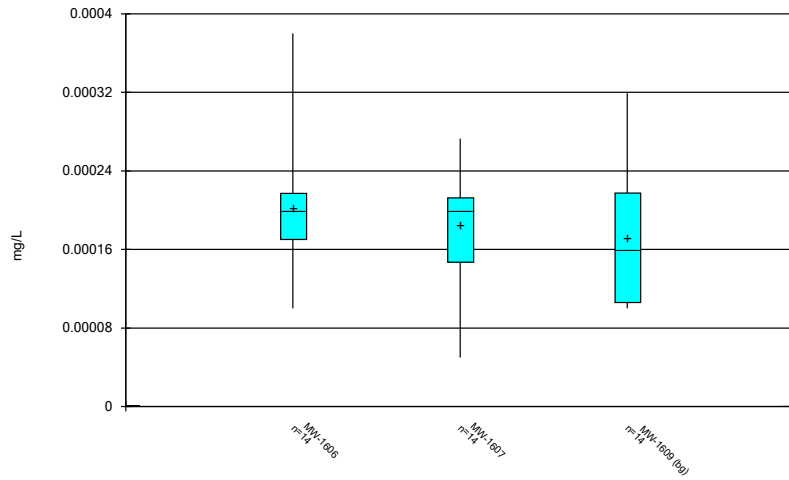
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Box & Whiskers Plot



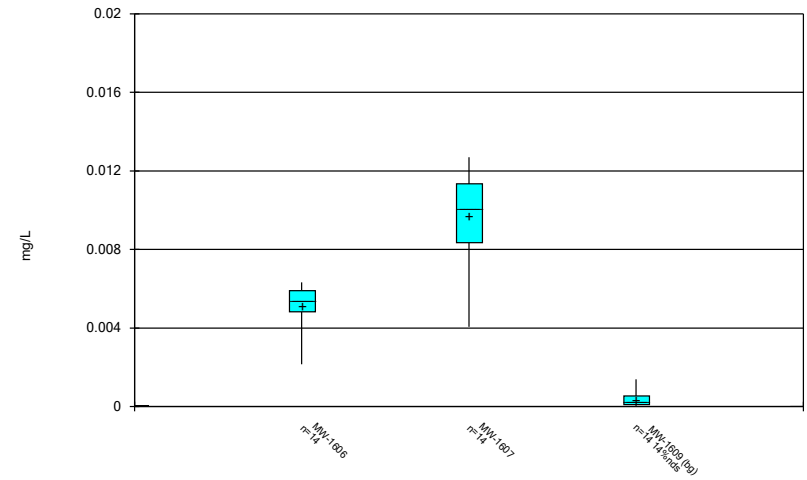
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Box & Whiskers Plot



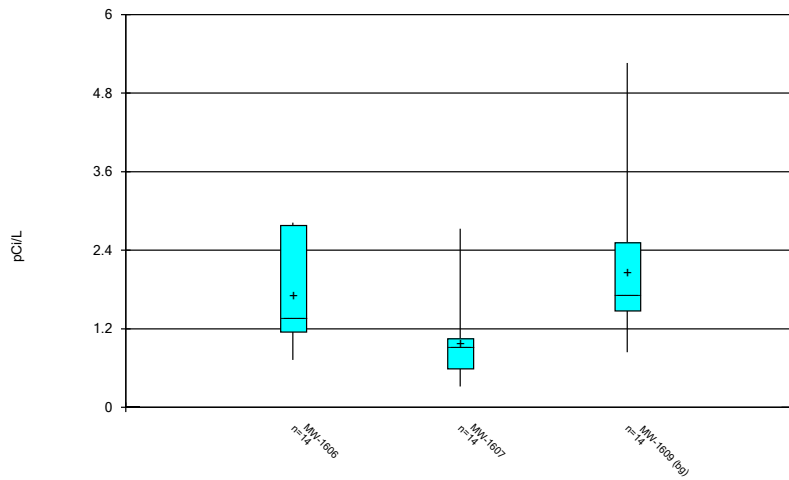
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Box & Whiskers Plot



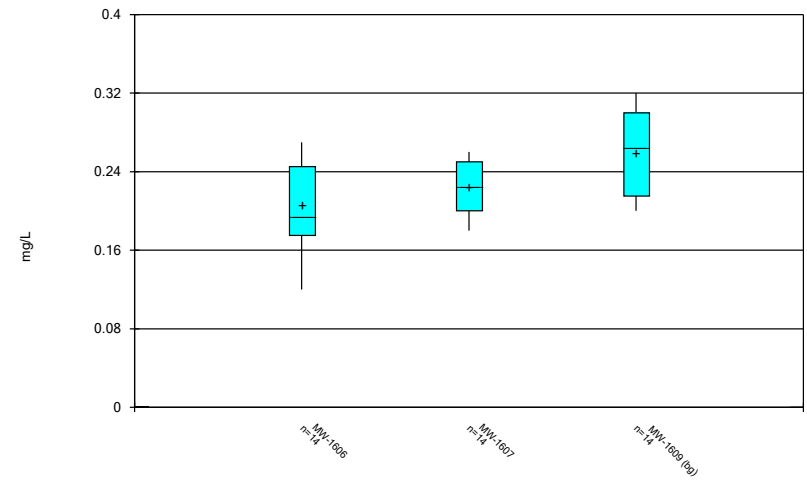
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Box & Whiskers Plot



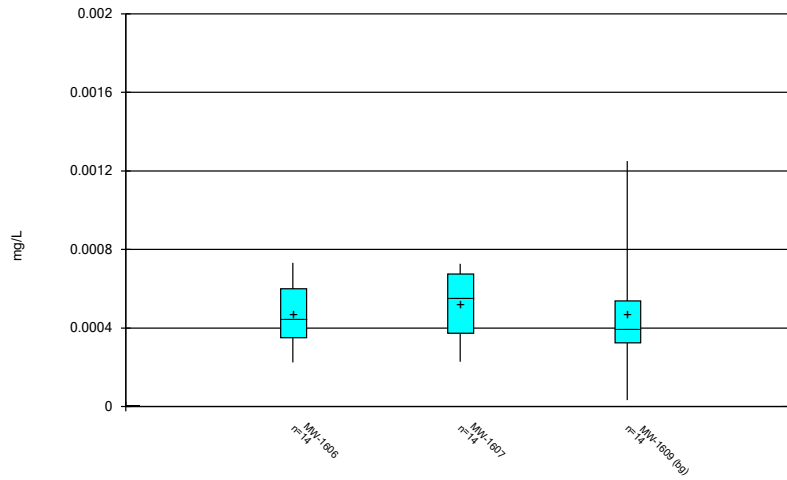
Constituent: Combined Radium 226 + 228 Analysis Run 1/29/2021 10:27 AM View: Rome Limestone - Fe
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



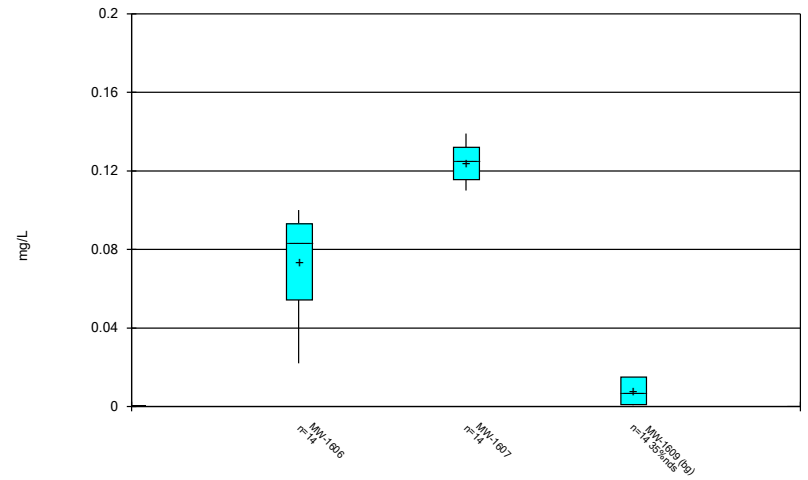
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Box & Whiskers Plot



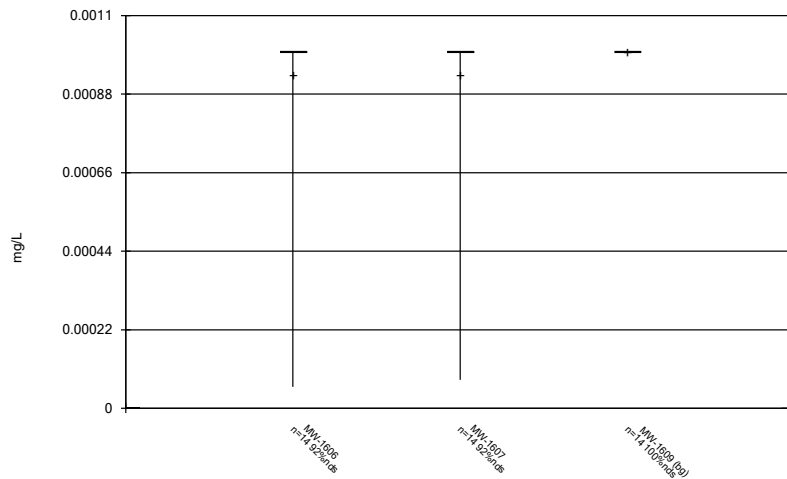
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Box & Whiskers Plot



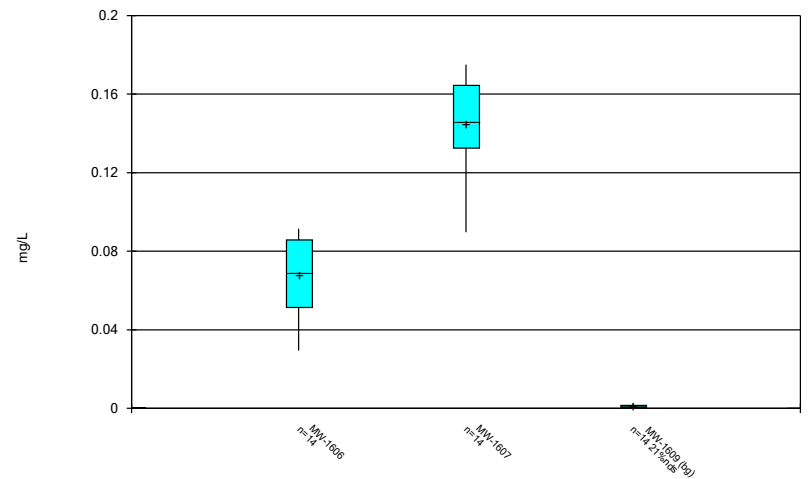
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Box & Whiskers Plot



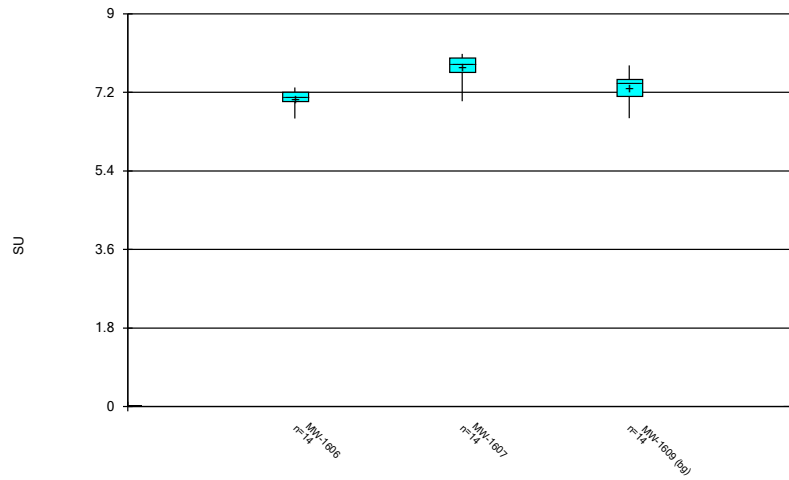
Constituent: Mercury Analysis Run 1/29/2021 10:27 AM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



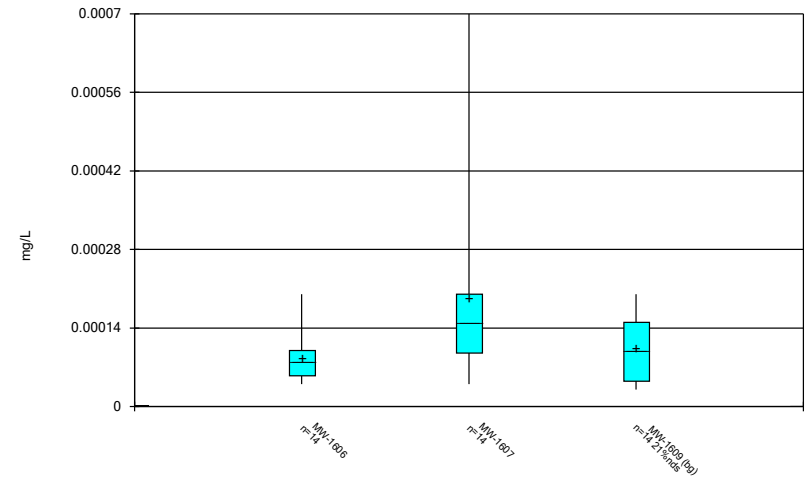
Constituent: Molybdenum Analysis Run 1/29/2021 10:27 AM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



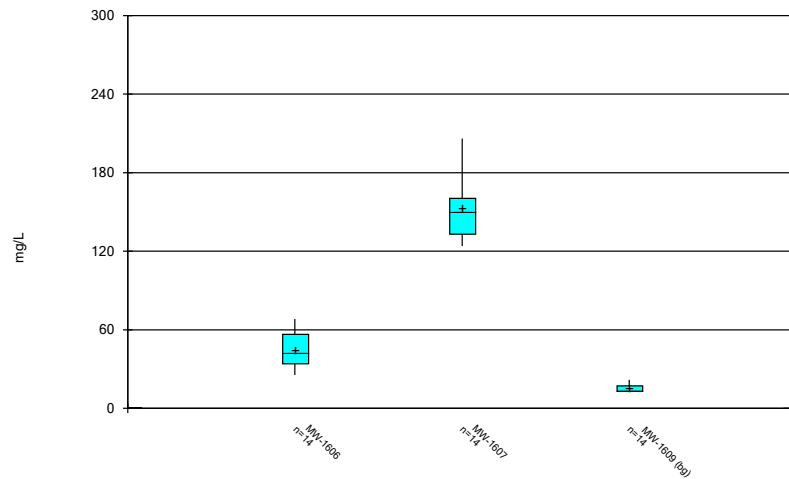
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Box & Whiskers Plot



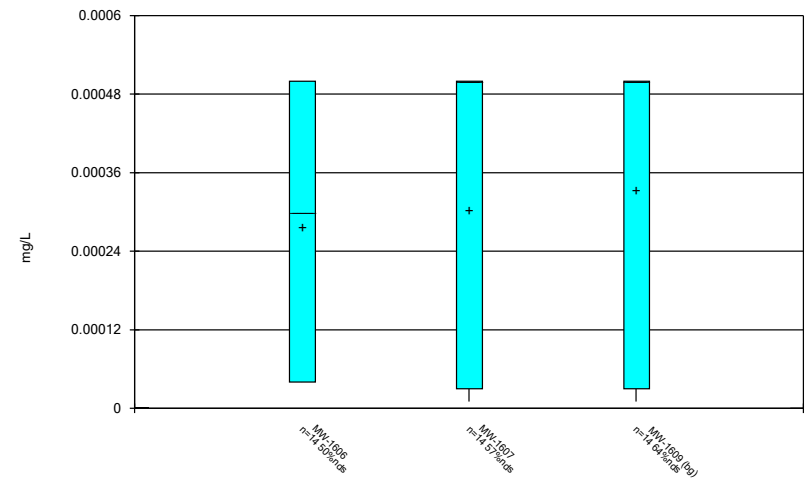
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



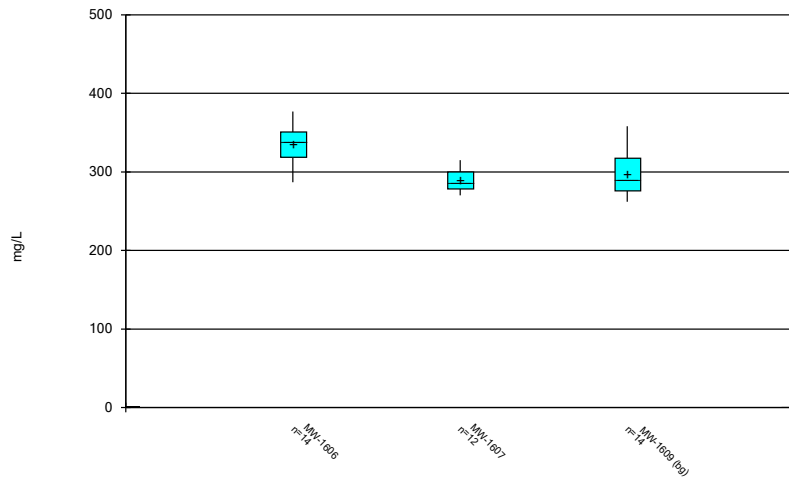
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



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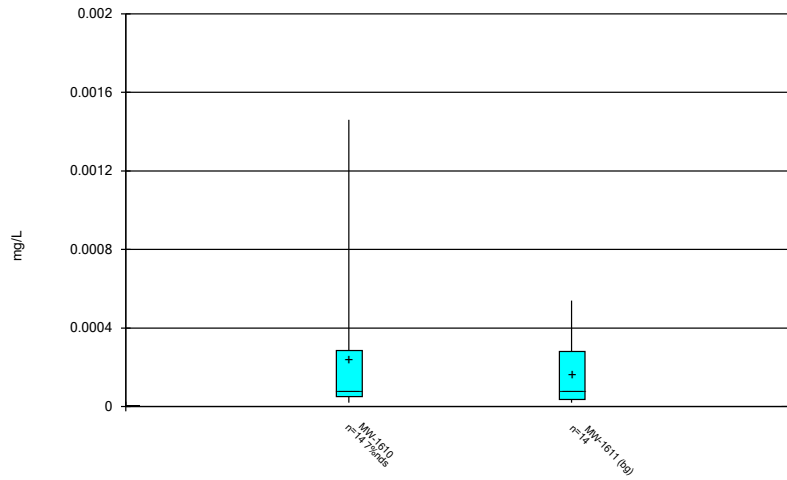
Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:28 AM View: Rome Limestone - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

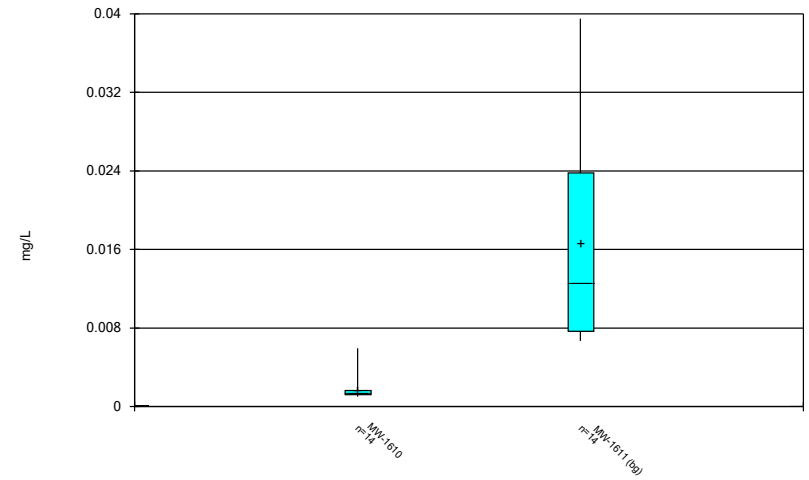
Box Plots - Dumps Fault

Box & Whiskers Plot



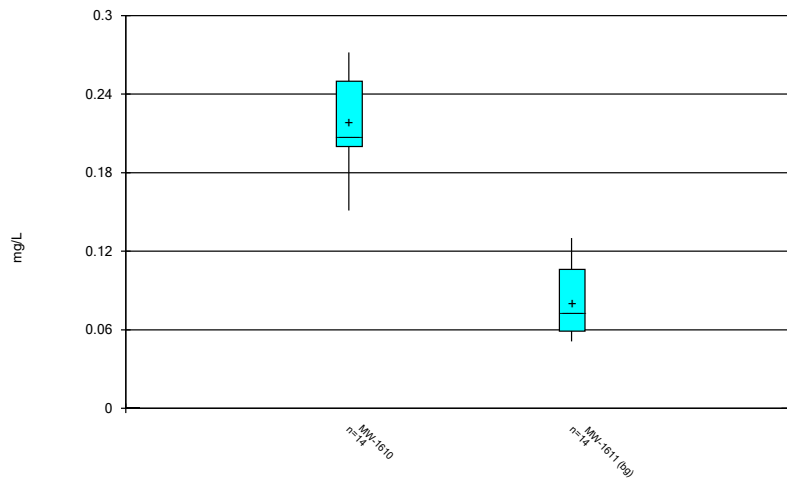
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Box & Whiskers Plot



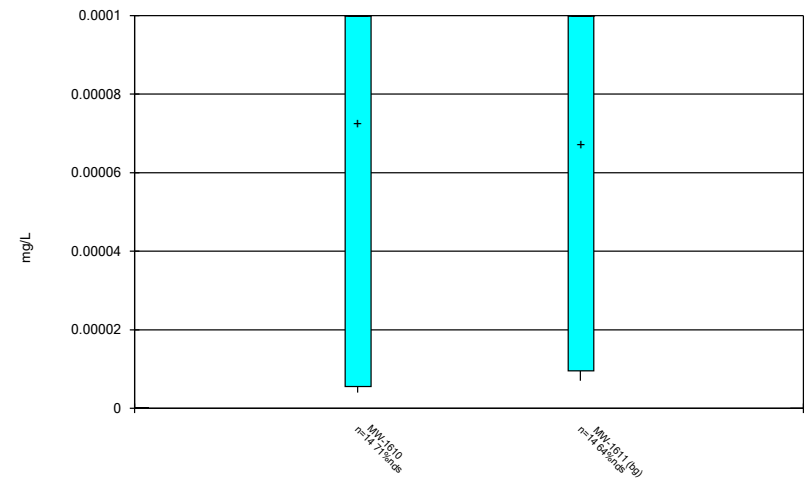
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Box & Whiskers Plot



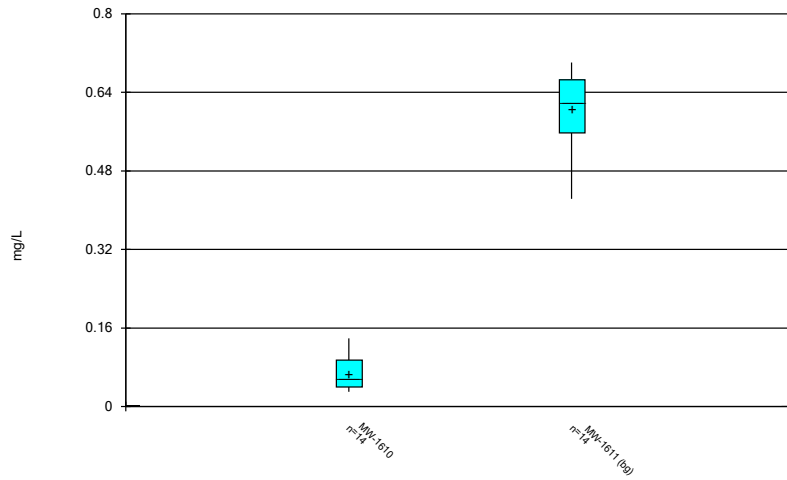
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Box & Whiskers Plot



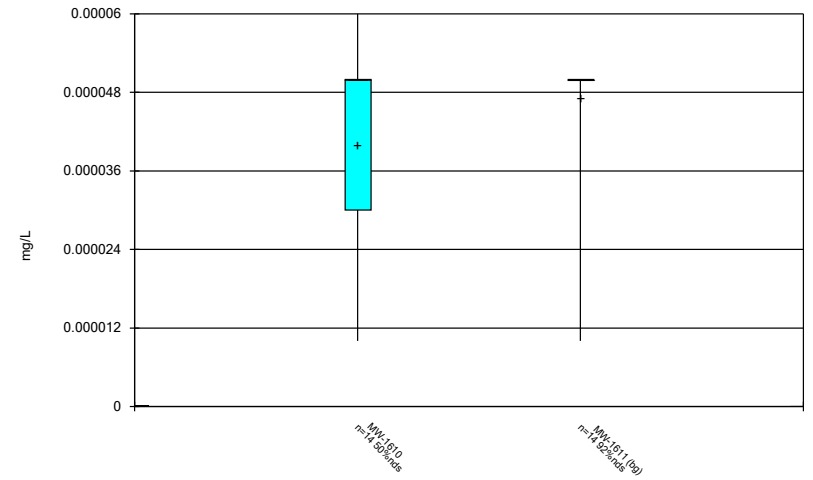
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



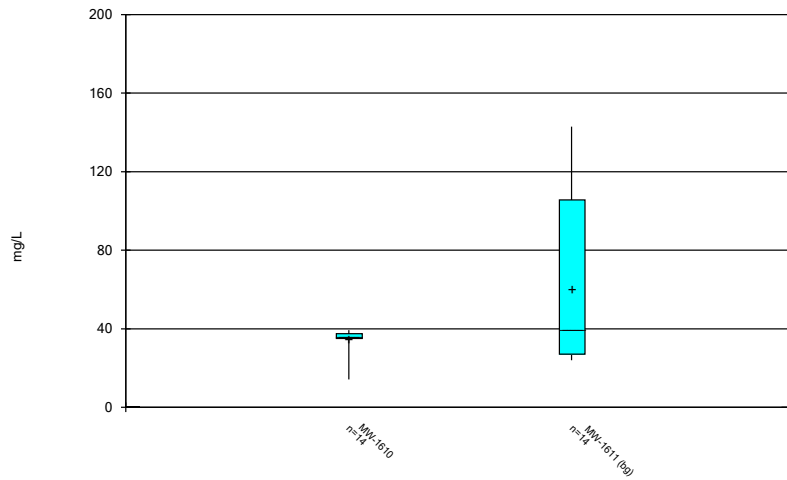
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Box & Whiskers Plot



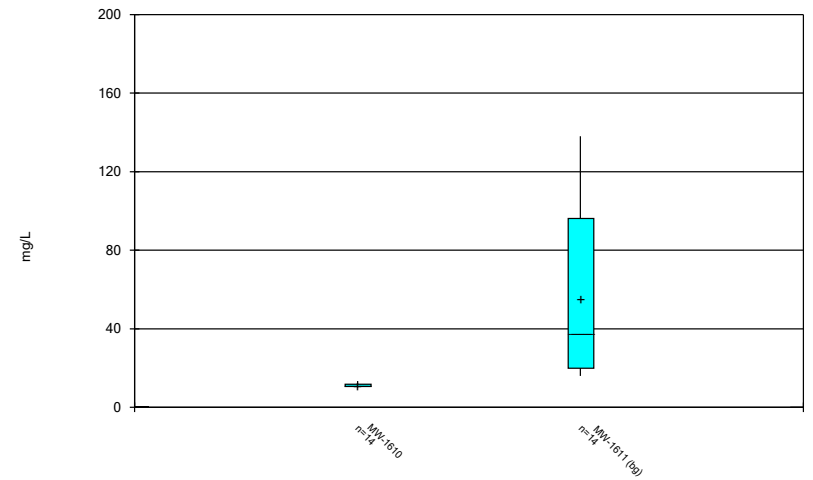
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Box & Whiskers Plot



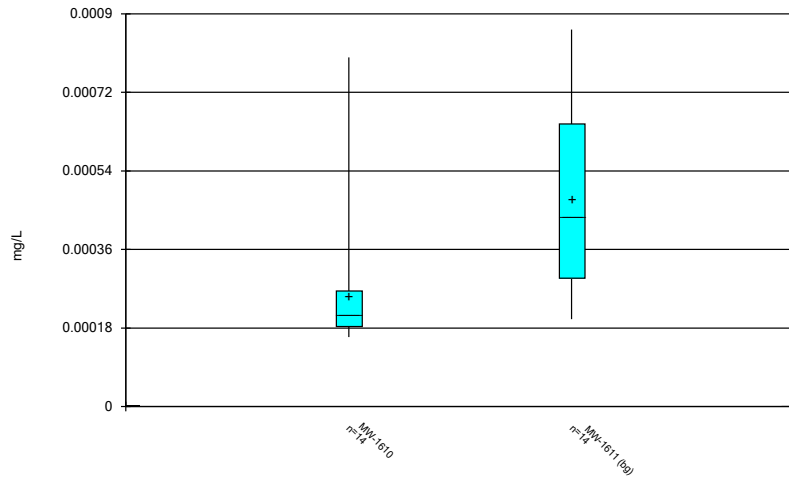
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Box & Whiskers Plot



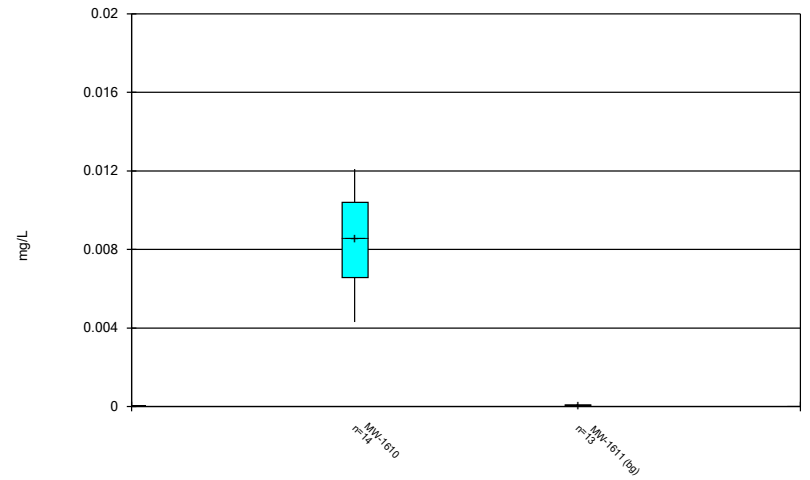
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



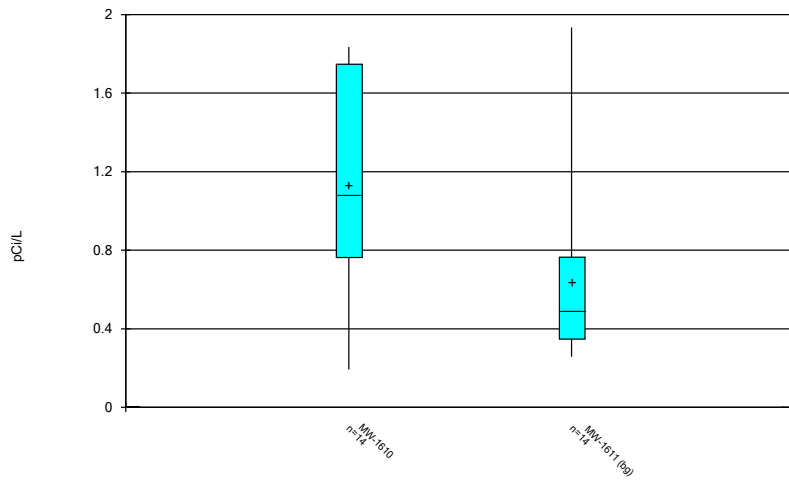
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



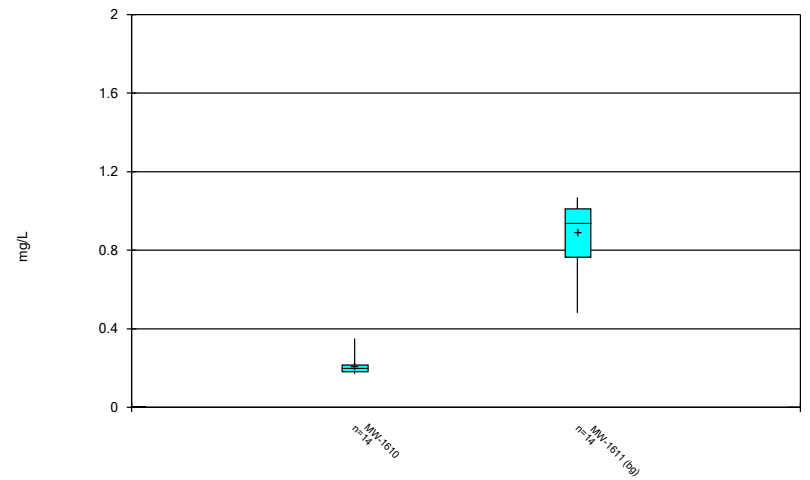
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



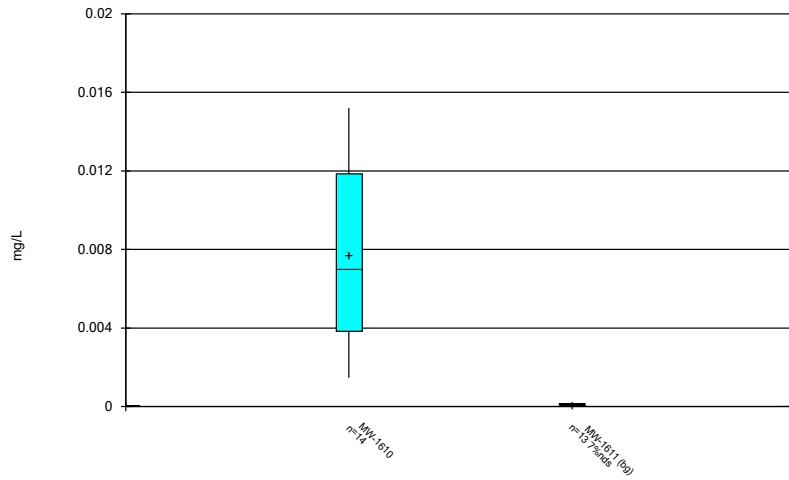
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



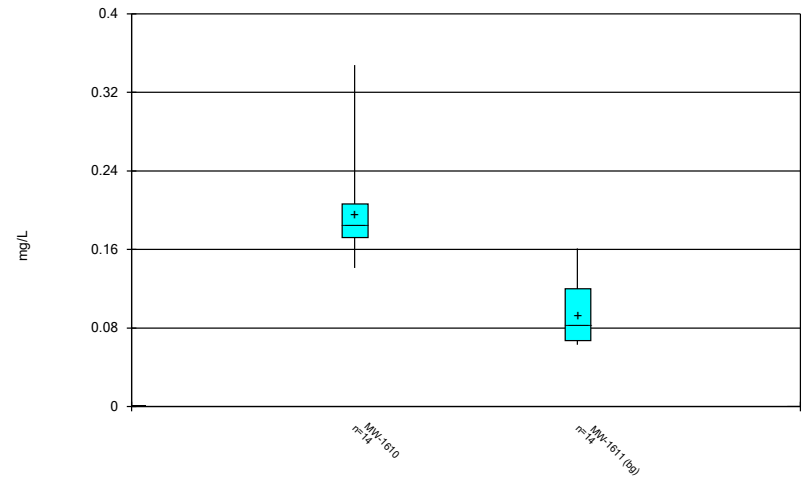
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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



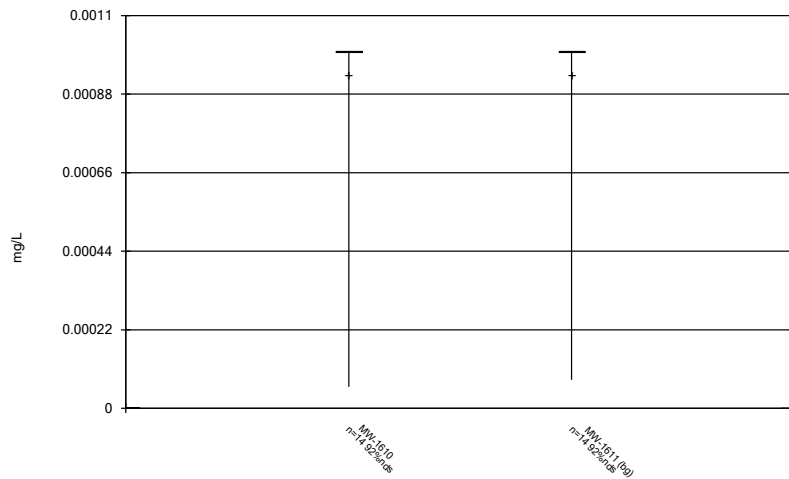
Constituent: Lead Analysis Run 1/29/2021 1:28 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



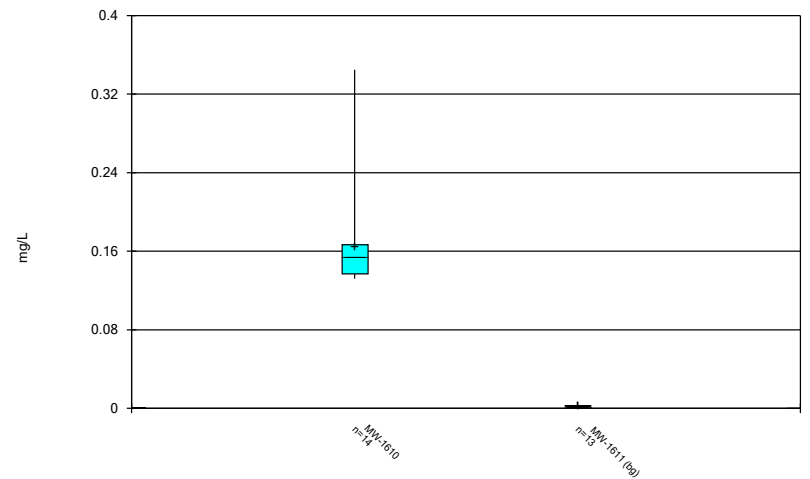
Constituent: Lithium Analysis Run 1/29/2021 1:28 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



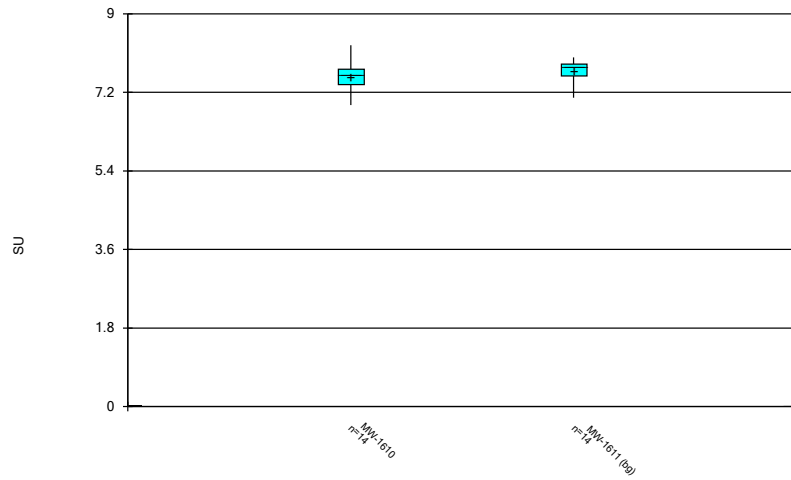
Constituent: Mercury Analysis Run 1/29/2021 1:28 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



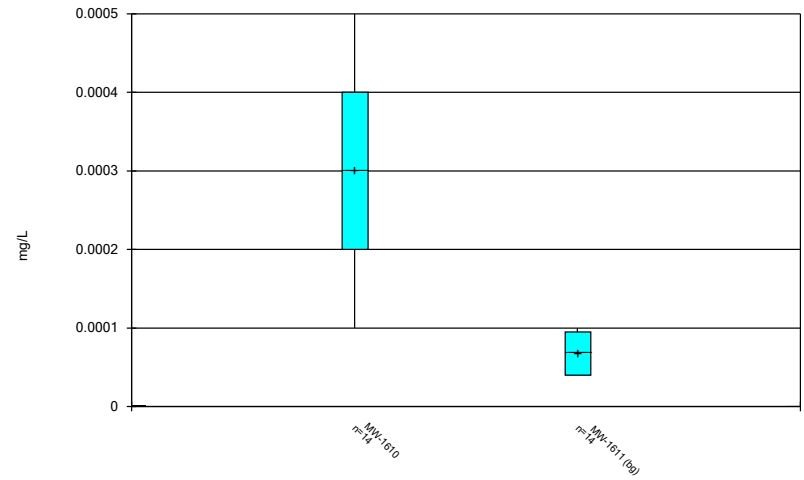
Constituent: Molybdenum Analysis Run 1/29/2021 1:28 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



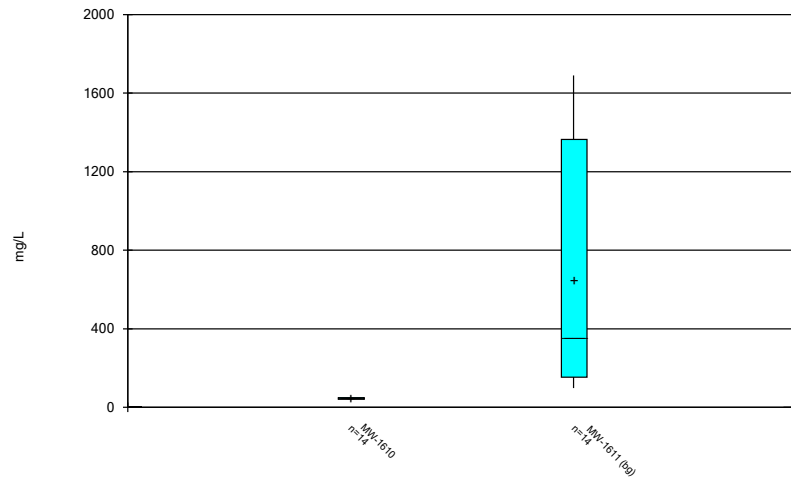
Constituent: pH Analysis Run 1/29/2021 1:28 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



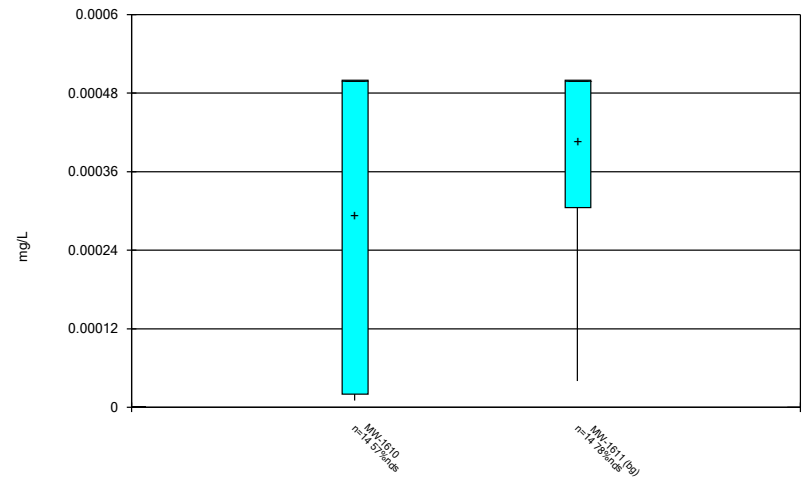
Constituent: Selenium Analysis Run 1/29/2021 1:28 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



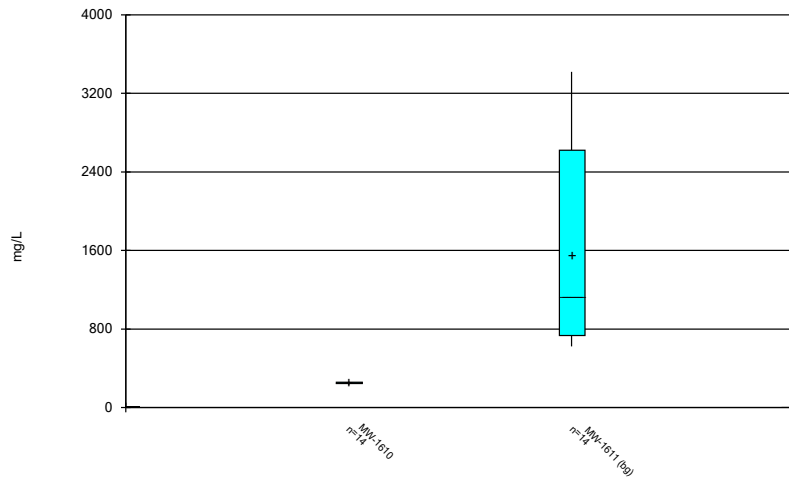
Constituent: Sulfate Analysis Run 1/29/2021 1:28 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



Constituent: Thallium Analysis Run 1/29/2021 1:28 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 1/29/2021 1:28 PM View: Dumps Fault - Federal
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

FIGURE C.

Outlier Summary - Chattanooga Shale

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 12:56 PM

MW-1605 Total Dissolved Solids (mg/L)

4/11/2018 1700 (o)

Outlier Summary - Rome Limestone

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/19/2021, 1:50 PM

MW-1607 Total Dissolved Solids (mg/L)

10/18/2017	468 (o)
12/12/2017	417 (o)

Outlier Summary - Dumps Fault

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/19/2021, 1:44 PM

	MW-1611 Cobalt (mg/L)	MW-1611 Lead (mg/L)	MW-1611 Molybdenum (mg/L)
10/19/2017	0.000311 (o)	0.00105 (o)	0.038 (o)

Tukey's Outlier Test - Downgradient Wells (Chattanooga) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:49 PM

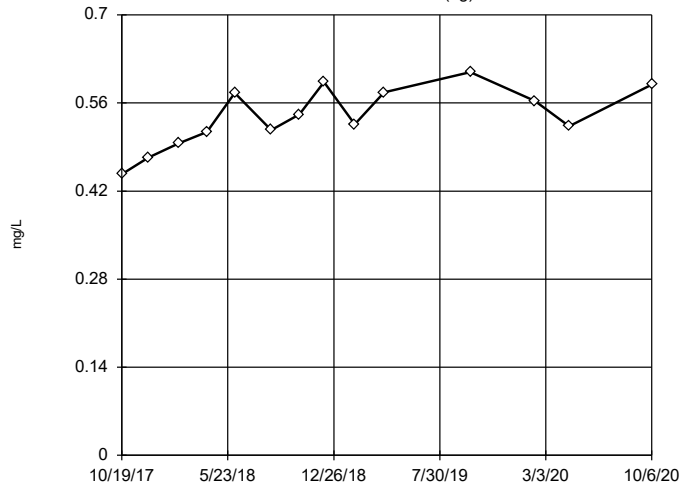
<u>Constituent</u>	<u>Well</u>	<u>Outlier</u> <u>Value(s)</u>	<u>Date(s)</u>	<u>Method</u> <u>Alpha</u> <u>N</u> <u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Total Dissolved Solids (mg/L)	MW-1605	Yes 1700	4/11/2018	NP NaN 14 846.8	252.2	In(x)	ShapiroWilk

Tukey's Outlier Test - Downgradient Wells (Chattanooga) - All Results

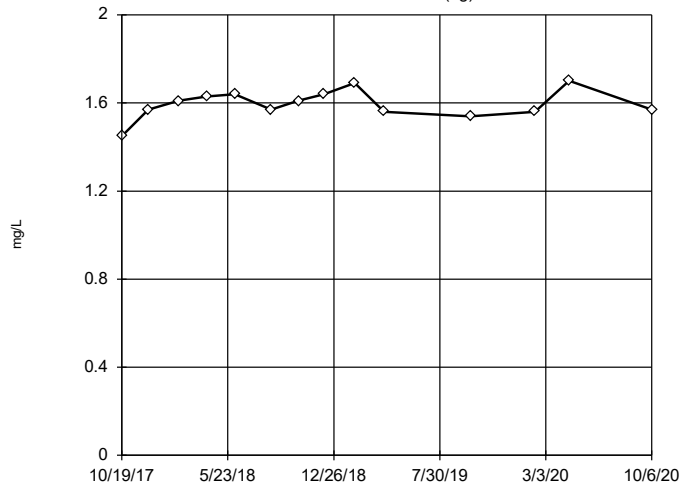
Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:49 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Boron (mg/L)	MW-1601 (bg)	No	n/a	n/a	NP	NaN	14	0.5389	0.04797	x^3	ShapiroWilk
Boron (mg/L)	MW-1602 (bg)	No	n/a	n/a	NP	NaN	14	0.6213	0.03331	x^5	ShapiroWilk
Boron (mg/L)	MW-1603	No	n/a	n/a	NP	NaN	14	0.2829	0.0966	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1604	No	n/a	n/a	NP	NaN	14	0.4165	0.03659	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1605	No	n/a	n/a	NP	NaN	14	0.5761	0.04389	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1608 (bg)	No	n/a	n/a	NP	NaN	14	0.3516	0.01842	sqrt(x)	ShapiroWilk
Boron (mg/L)	MW-1612	No	n/a	n/a	NP	NaN	13	0.4527	0.05968	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1601 (bg)	No	n/a	n/a	NP	NaN	14	2.103	0.1788	x^6	ShapiroWilk
Fluoride (mg/L)	MW-1602 (bg)	No	n/a	n/a	NP	NaN	14	1.596	0.06454	x^4	ShapiroWilk
Fluoride (mg/L)	MW-1603	No	n/a	n/a	NP	NaN	14	0.1264	0.02845	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1604	No	n/a	n/a	NP	NaN	14	0.2421	0.0362	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1605	No	n/a	n/a	NP	NaN	14	0.3586	0.03134	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1608 (bg)	No	n/a	n/a	NP	NaN	14	0.4236	0.0256	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1612	No	n/a	n/a	NP	NaN	13	0.1615	0.03716	x^3	ShapiroWilk
Sulfate (mg/L)	MW-1601 (bg)	No	n/a	n/a	NP	NaN	14	228.9	58.84	ln(x)	ShapiroWilk
Sulfate (mg/L)	MW-1602 (bg)	No	n/a	n/a	NP	NaN	14	26.54	6.765	x^2	ShapiroWilk
Sulfate (mg/L)	MW-1603	No	n/a	n/a	NP	NaN	14	18.76	14.77	sqrt(x)	ShapiroWilk
Sulfate (mg/L)	MW-1604	No	n/a	n/a	NP	NaN	14	3.529	2.416	x^(1/3)	ShapiroWilk
Sulfate (mg/L)	MW-1605	No	n/a	n/a	NP	NaN	14	65.96	39.69	x^2	ShapiroWilk
Sulfate (mg/L)	MW-1608 (bg)	No	n/a	n/a	NP	NaN	14	172.4	6.607	ln(x)	ShapiroWilk
Sulfate (mg/L)	MW-1612	No	n/a	n/a	NP	NaN	13	7.215	5.779	sqrt(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1601 (bg)	No	n/a	n/a	NP	NaN	14	1426	133.5	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1602 (bg)	No	n/a	n/a	NP	NaN	14	526.3	21.96	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1603	No	n/a	n/a	NP	NaN	14	489.6	102.2	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1604	No	n/a	n/a	NP	NaN	14	391.9	11.6	x^4	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1605	Yes	1700	4/11/2018	NP	NaN	14	846.8	252.2	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1608 (bg)	No	n/a	n/a	NP	NaN	14	447.5	19.47	x^(1/3)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1612	No	n/a	n/a	NP	NaN	13	517.1	43.13	x^6	ShapiroWilk

Tukey's Outlier Screening
MW-1601 (bg)



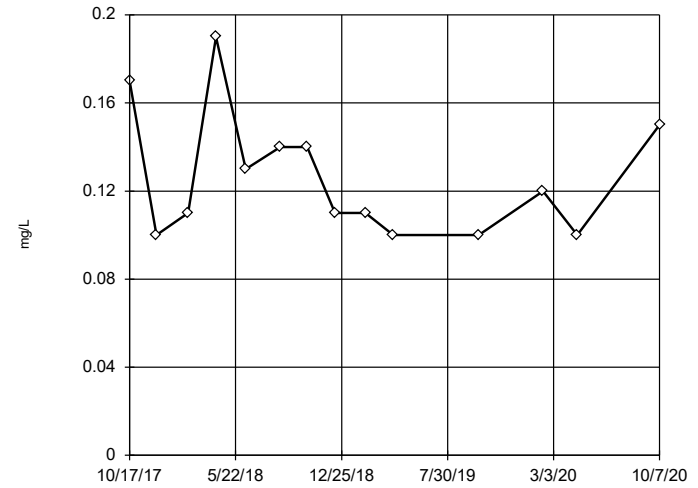
Tukey's Outlier Screening
MW-1602 (bg)



n = 14
No outliers found. Tukey's method selected by user.
Data were x⁴ transformed to achieve best W statistic (graph shown in original units).
High cutoff = 1.828, low cutoff = 1.187, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

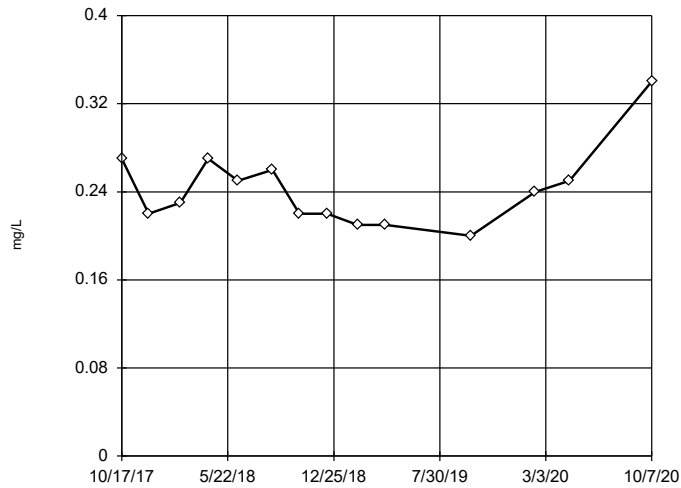
Tukey's Outlier Screening
MW-1603



n = 14
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 = 0.441, low cutoff = 0.03286, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

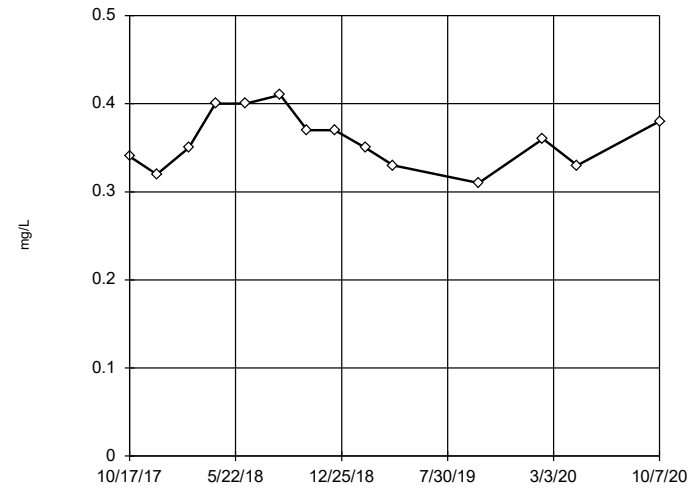
Tukey's Outlier Screening
MW-1604



n = 14
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 = 0.4963, low cutoff = 0.1148, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening
MW-1605

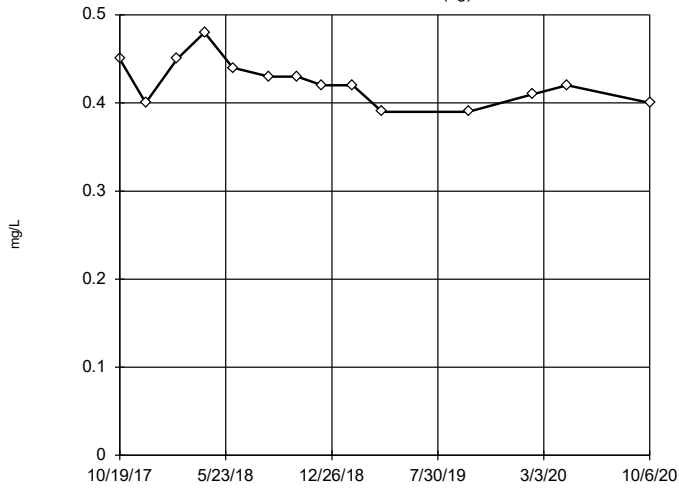


n = 14
No outliers found. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.6429, low cutoff = 0.2001, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1608 (bg)

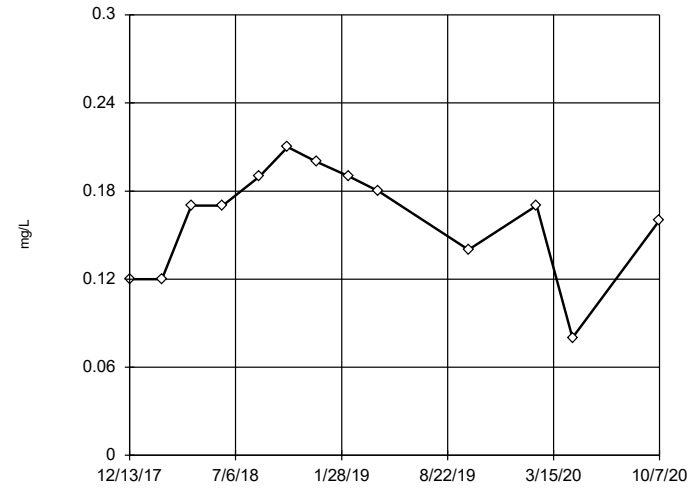


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.6126,
 low cutoff = 0.2906, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1612

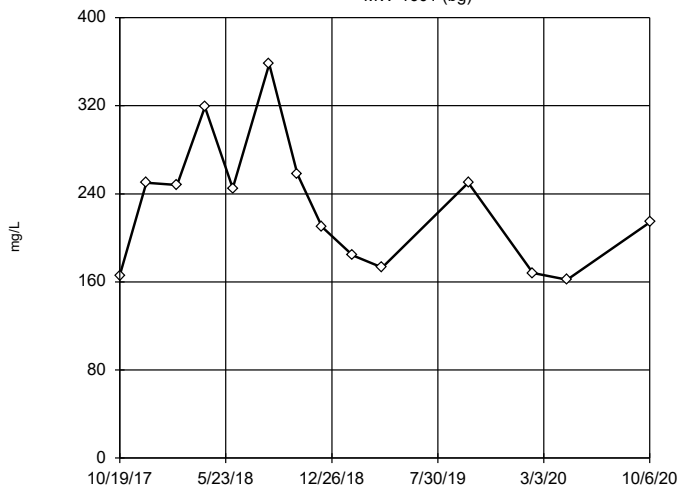


n = 13
 No outliers found.
 Tukey's method selected by user.
 Data were cube transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.2747,
 low cutoff = -0.2266, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1601 (bg)

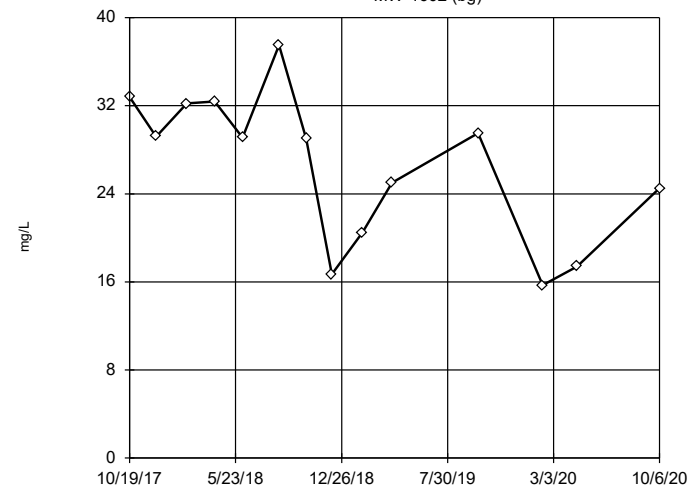


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 839.6, low cutoff = 51.57, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

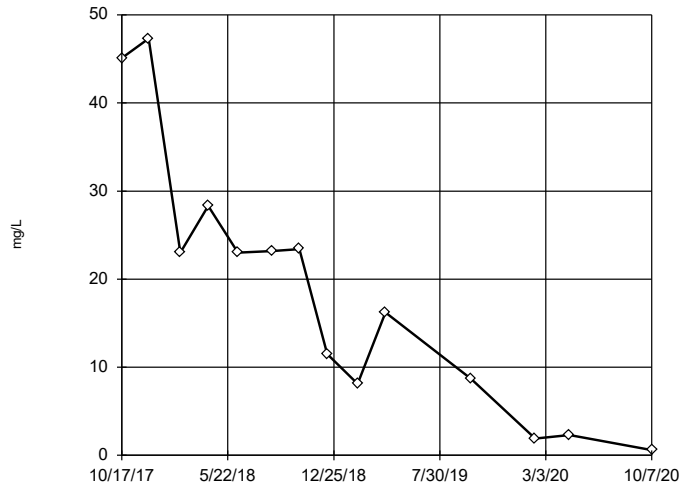
MW-1602 (bg)



n = 14
 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 = 55.58, low cutoff = -41.04, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

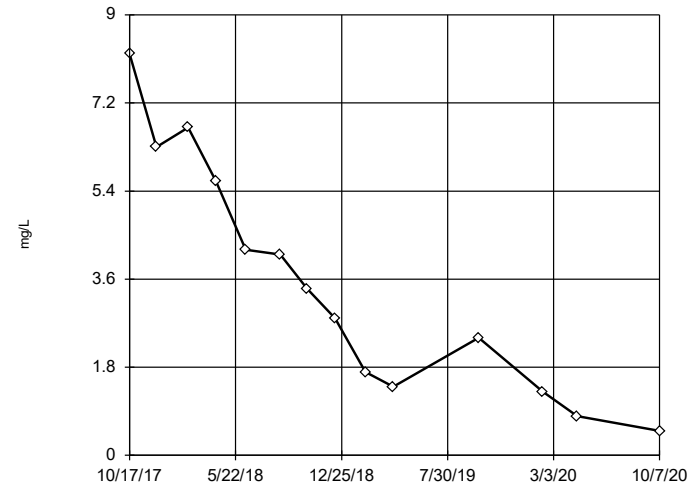
Tukey's Outlier Screening
MW-1603



n = 14
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 = 189.6, low cutoff = -42.39, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

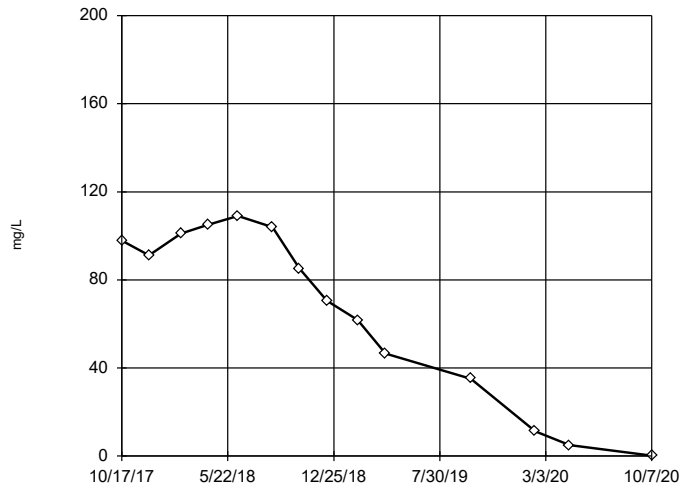
Tukey's Outlier Screening
MW-1604



n = 14
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 = 60.71, low cutoff = -1.042, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

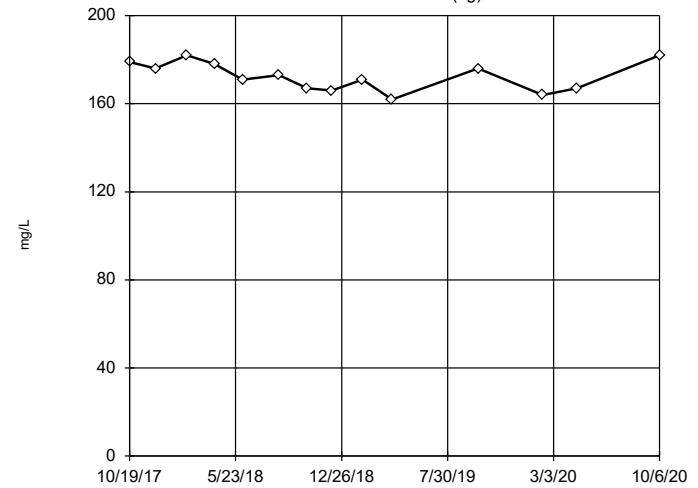
Tukey's Outlier Screening
MW-1605



n = 14
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 = 200, low cutoff = -169.7, based on IQR multiplier of 3.

Constituent: Sulfate Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

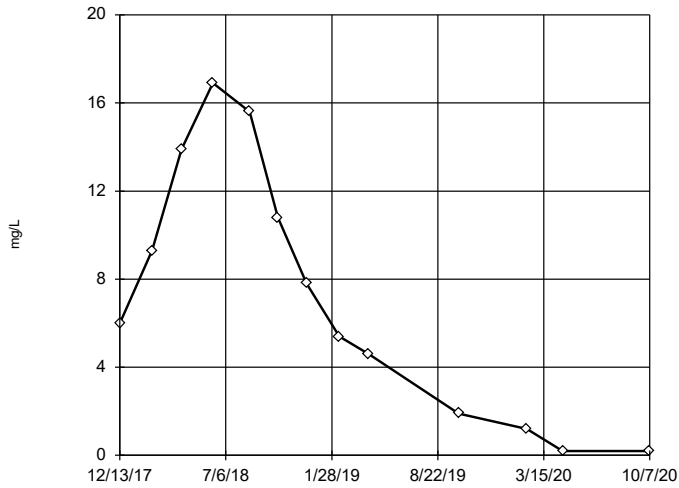
Tukey's Outlier Screening
MW-1608 (bg)



n = 14
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 = 219.9, low cutoff = 135.1, based on IQR multiplier of 3.

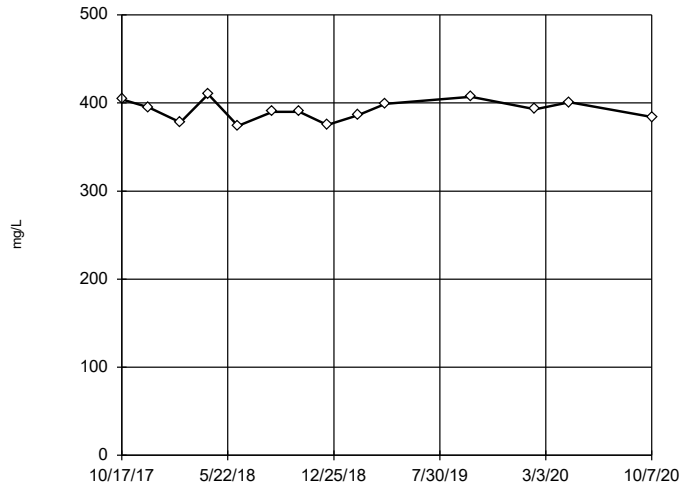
Constituent: Sulfate Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening
MW-1612



Tukey's Outlier Screening

MW-1604

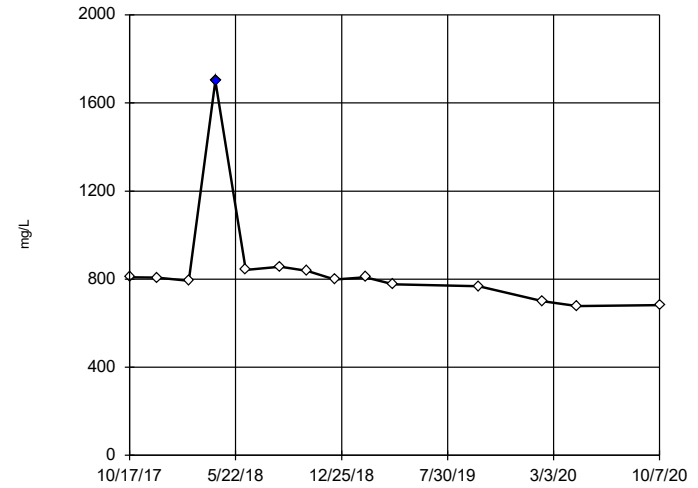


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were x⁴ transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 452, low cutoff = 273.2, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1605

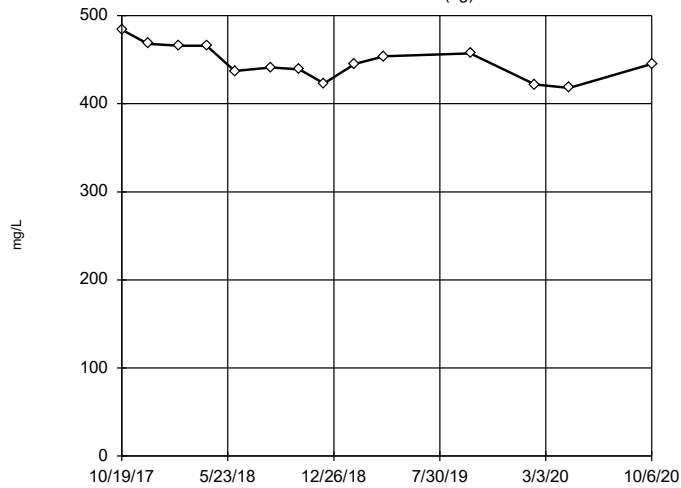


n = 14
 Outlier is drawn as solid.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1266, low cutoff = 486.2, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1608 (bg)

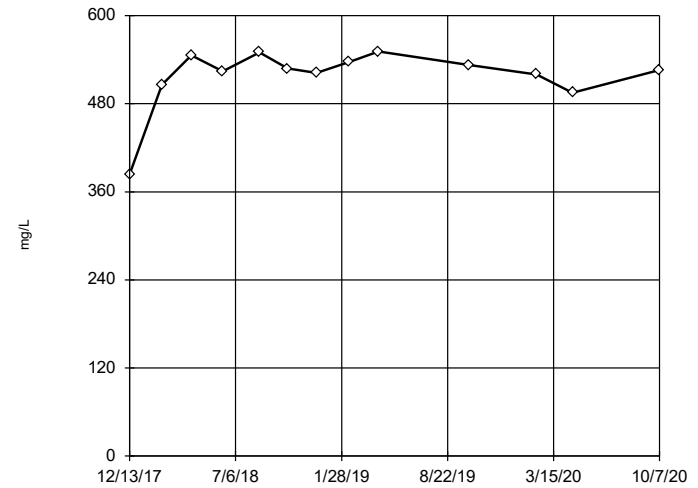


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 586.1, low cutoff = 333.1, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1612



n = 13
 No outliers found.
 Tukey's method selected by user.
 Data were x⁶ transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 598.8, low cutoff = -370.9, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/21/2021 1:48 PM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

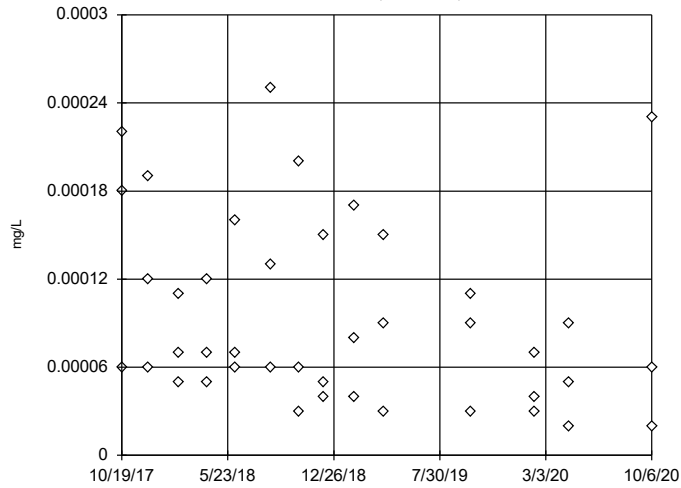
Tukey's Outlier Test - Upgradient Wells (Chattanooga) - All Results (No Significant)

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/28/2021, 2:38 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.00009429	0.00006236	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.006522	0.007395	ln(x)	ShapiroWilk
Barium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.1232	0.08507	x^(1/3)	ShapiroWilk
Beryllium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.00006548	0.00004085	sqrt(x)	ShapiroWilk
Cadmium (mg/L)	MW-1601,MW-1602,M...	n/a	n/a	n/a w/combined bg	NP	NaN	42	0.00004407	0.00001386	unknown	ShapiroWilk
Calcium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	3.525	2.171	sqrt(x)	ShapiroWilk
Chloride (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	13.8	12.19	ln(x)	ShapiroWilk
Chromium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.0004252	0.0002974	ln(x)	ShapiroWilk
Cobalt (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.0001415	0.000119	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.9599	0.8187	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	1.374	0.7199	x^3	ShapiroWilk
Lead (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.0001835	0.0001794	ln(x)	ShapiroWilk
Lithium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.05463	0.03426	ln(x)	ShapiroWilk
Mercury (mg/L)	MW-1601,MW-1602,M...	n/a	n/a	n/a w/combined bg	NP	NaN	42	0.0009107	0.0002786	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.004925	0.005015	ln(x)	ShapiroWilk
pH (SU)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	8.504	0.2824	normal	ShapiroWilk
Selenium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.0001024	0.00006828	ln(x)	ShapiroWilk
Thallium (mg/L)	MW-1601,MW-1602,M...	No	n/a	n/a w/combined bg	NP	NaN	42	0.00034	0.0002291	ln(x)	ShapiroWilk

Tukey's Outlier Screening, Pooled Background

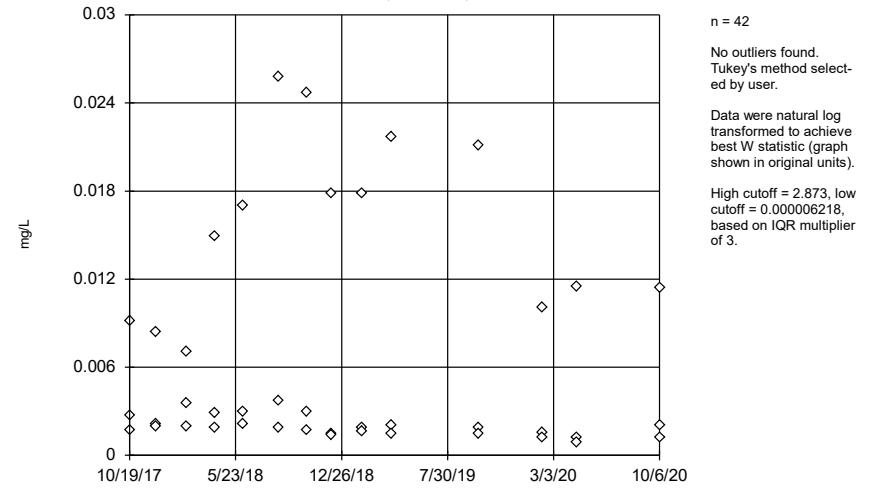
MW-1601,MW-1602,MW-1608



Constituent: Antimony Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

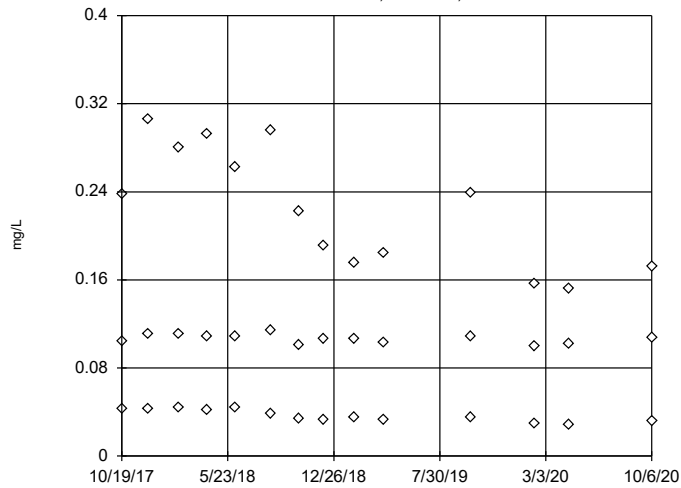
MW-1601,MW-1602,MW-1608



Constituent: Arsenic Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

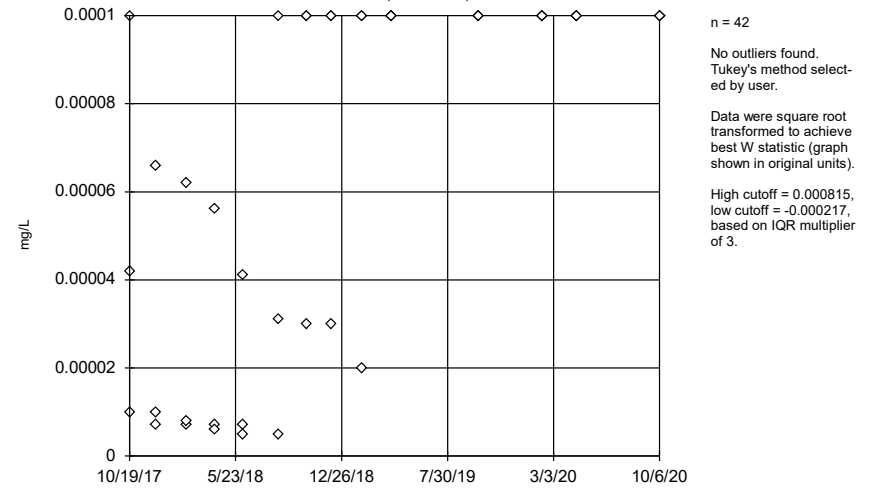
MW-1601,MW-1602,MW-1608



Constituent: Barium Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

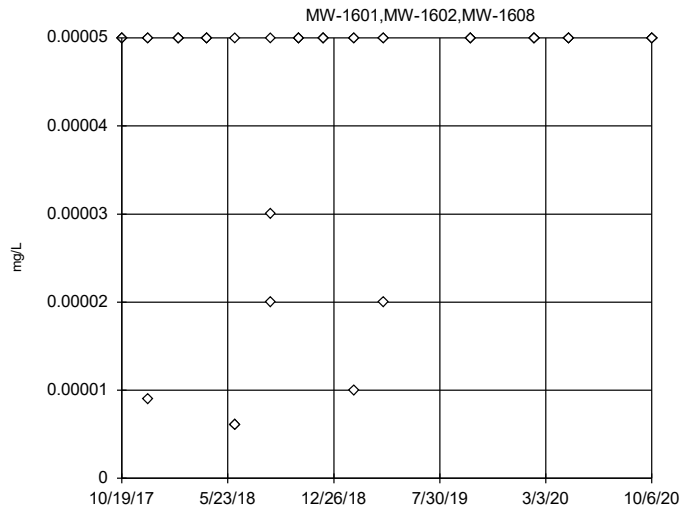
Tukey's Outlier Screening, Pooled Background

MW-1601,MW-1602,MW-1608



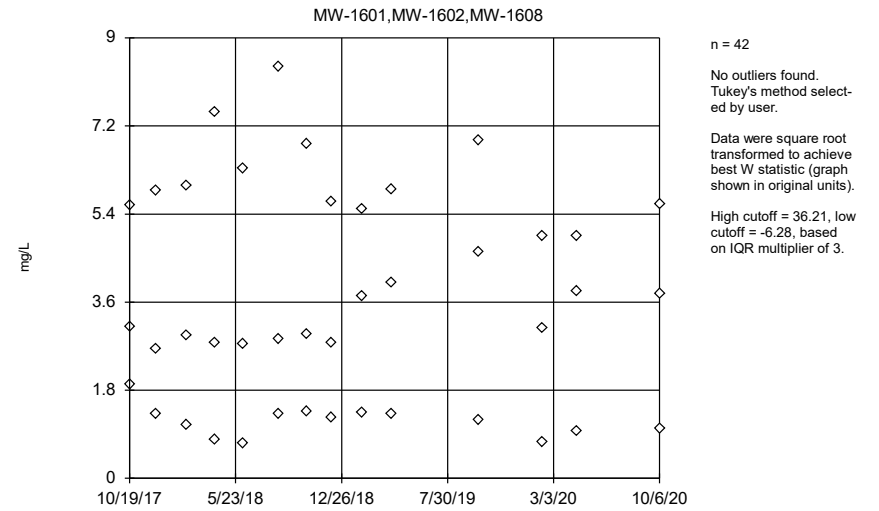
Constituent: Beryllium Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background



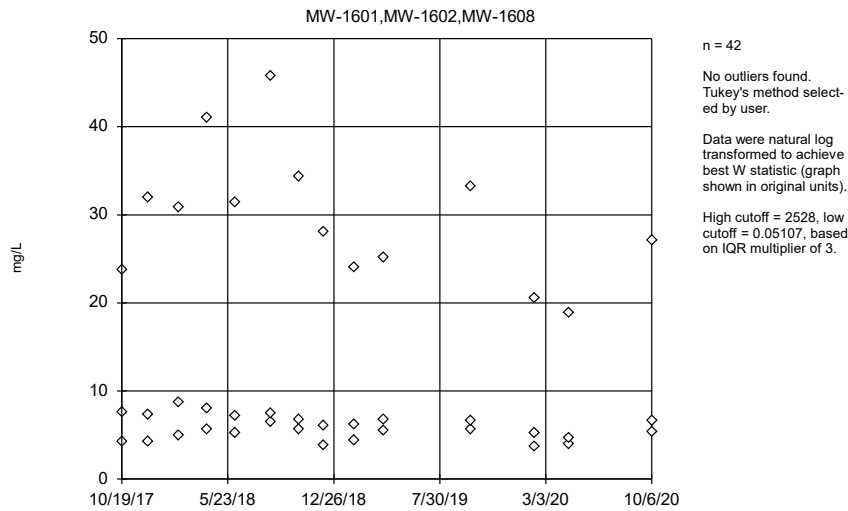
Constituent: Cadmium Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background



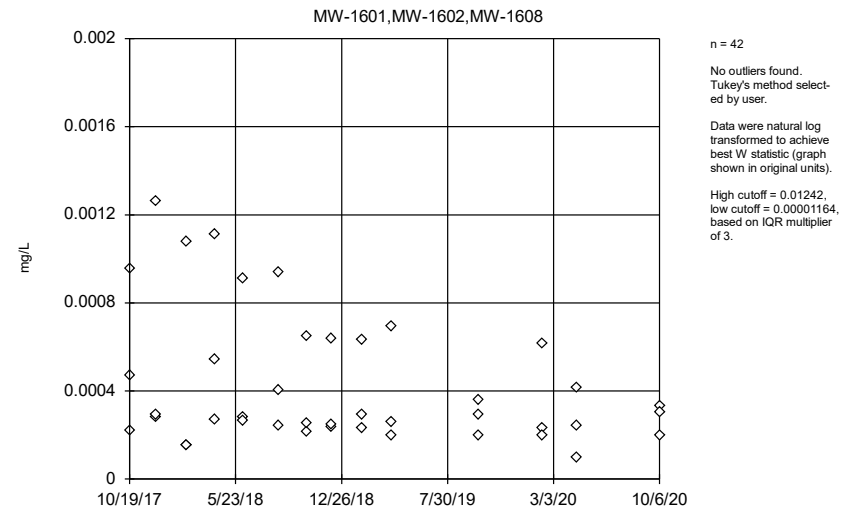
Constituent: Calcium Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background



Constituent: Chloride Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

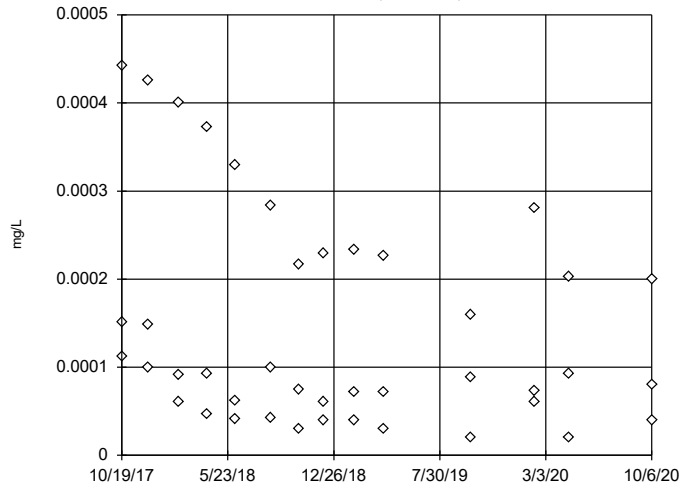
Tukey's Outlier Screening, Pooled Background



Constituent: Chromium Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

MW-1601,MW-1602,MW-1608

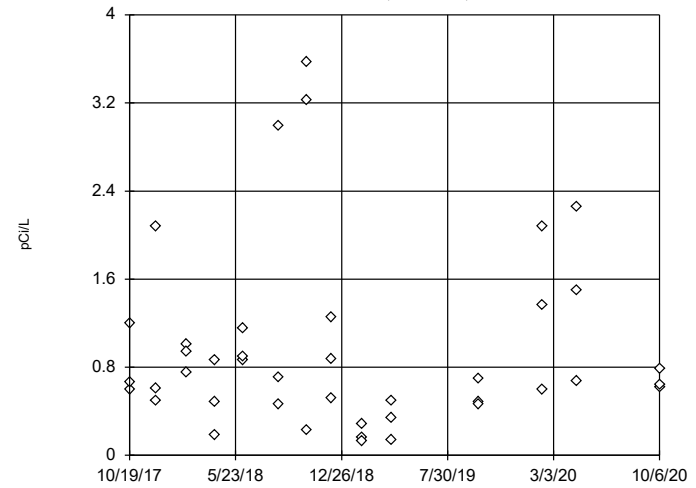


n = 42
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.0162, low cutoff = 7.3e-7, based on IQR multiplier of 3.

Constituent: Cobalt Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

MW-1601,MW-1602,MW-1608

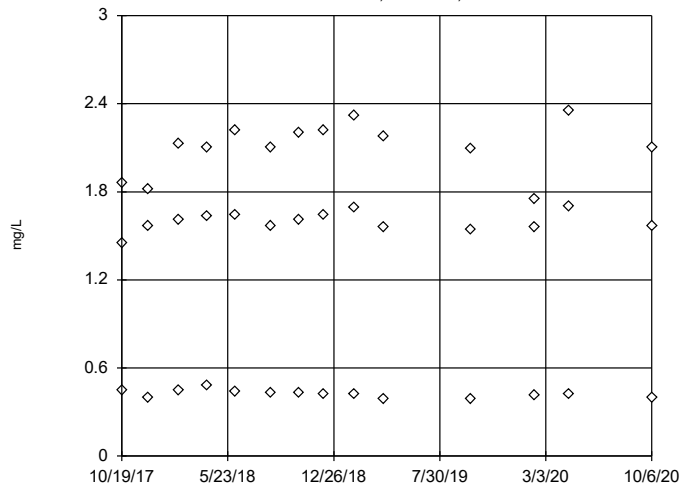


n = 42
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 16.95, low cutoff = 0.03343, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - F
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

MW-1601,MW-1602,MW-1608

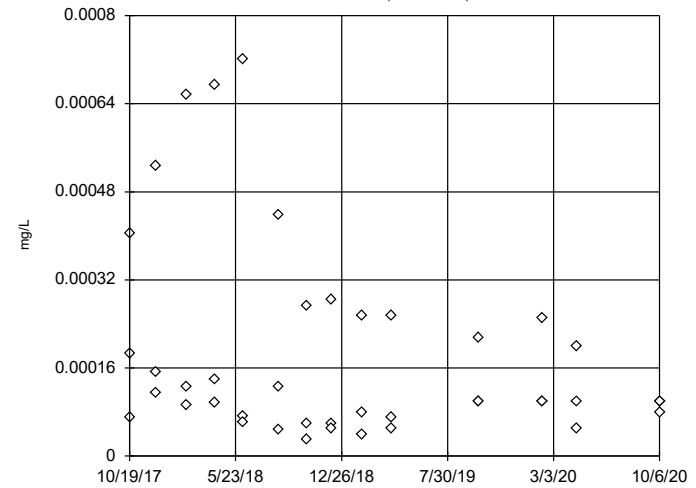


n = 42
 No outliers found.
 Tukey's method selected by user.
 Data were cube transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 3.318, low cutoff = -3.009, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

MW-1601,MW-1602,MW-1608

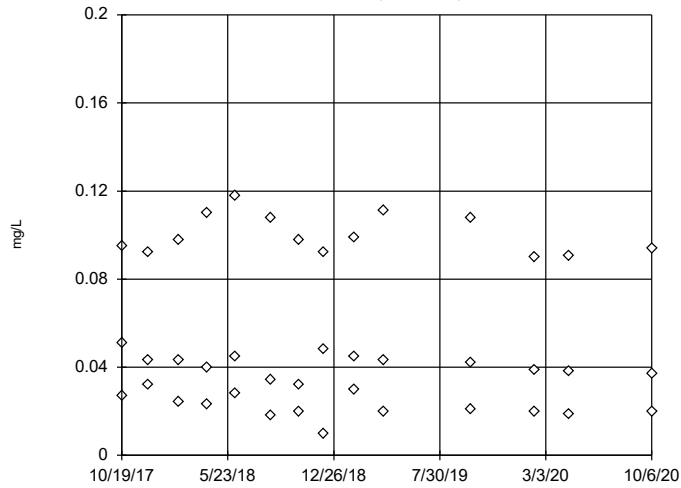


n = 42
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.01185, low cutoff = 0.000001492, based on IQR multiplier of 3.

Constituent: Lead Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

MW-1601,MW-1602,MW-1608

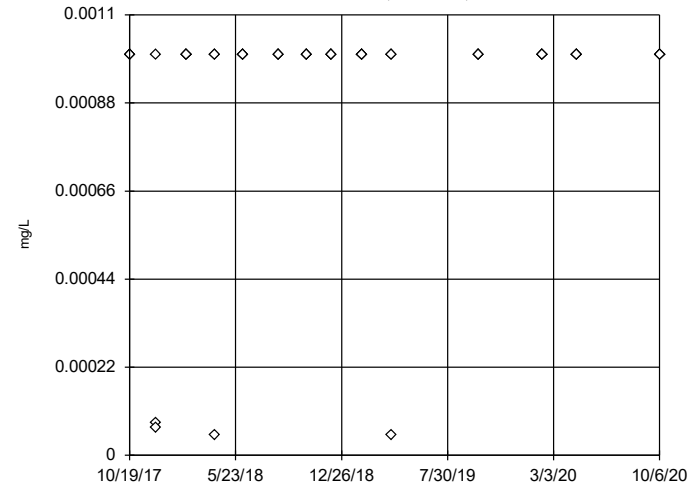


n = 42
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 4.524, low cutoff = 0.000523, based on IQR multiplier of 3.

Constituent: Lithium Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

MW-1601,MW-1602,MW-1608

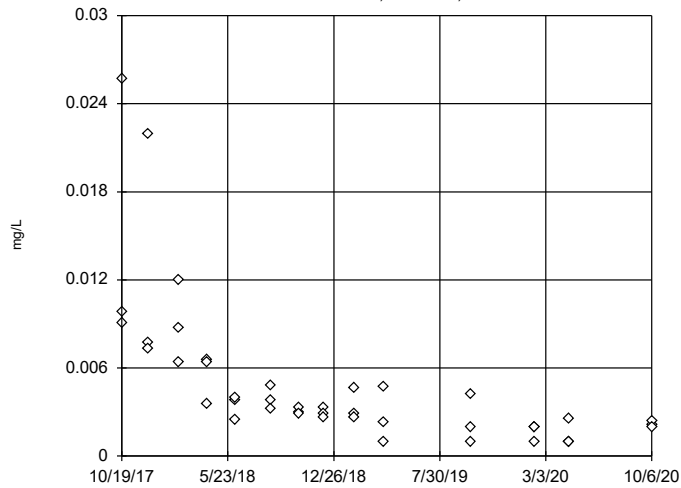


n = 42
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

MW-1601,MW-1602,MW-1608

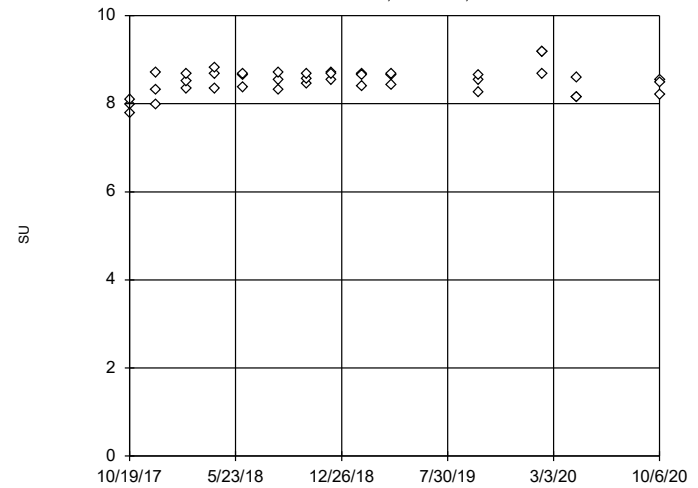


n = 42
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.158, low cutoff = 0.0000897, based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background

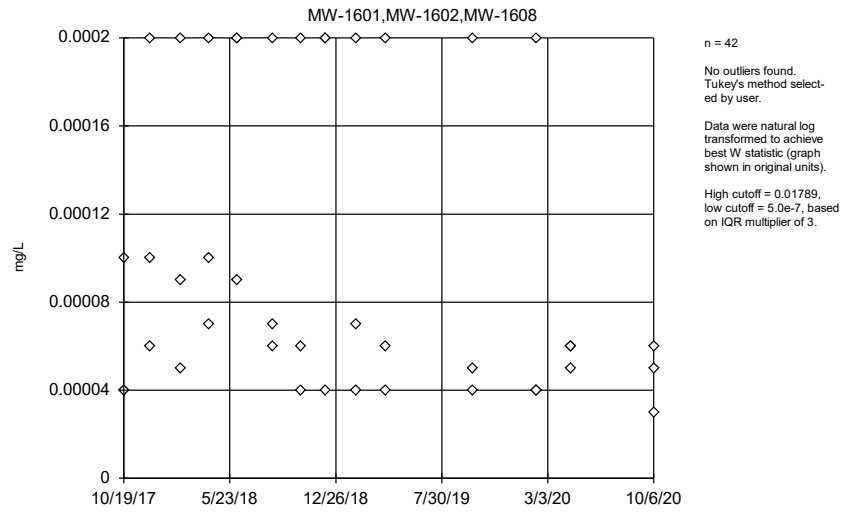
MW-1601,MW-1602,MW-1608



n = 42
 No outliers found. Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality; analysis run on raw data.
 High cutoff = 9.73, low cutoff = 7.28, based on IQR multiplier of 3.

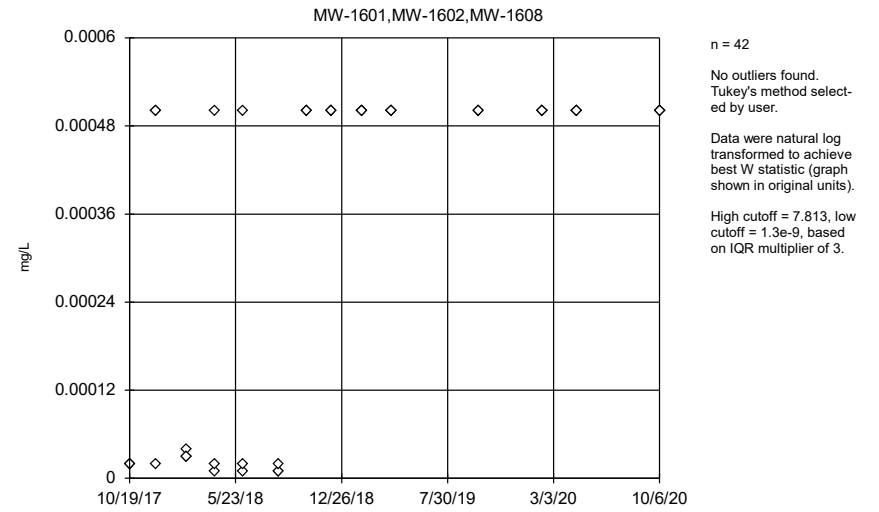
Constituent: pH Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background



Constituent: Selenium Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening, Pooled Background



Constituent: Thallium Analysis Run 1/28/2021 2:36 PM View: Chattanooga Shale - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Test - Downgradient Wells (Rome) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:35 AM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Date(s)</u>	<u>Method</u>	<u>Alpha</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Total Dissolved Solids (mg/L)	MW-1607	Yes	468	10/18/2017	NP	NaN	14	311.3	57.93	In(x)	ShapiroWilk

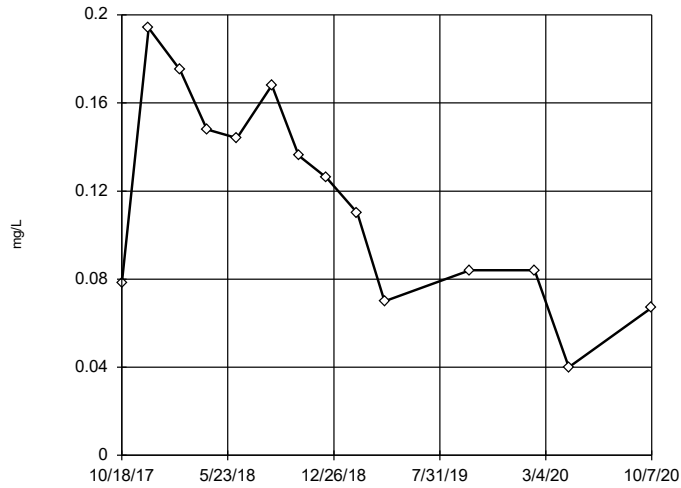
Tukey's Outlier Test - Downgradient Wells (Rome) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:35 AM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Boron (mg/L)	MW-1606	No	n/a	n/a	NP	NaN	14	0.116	0.04674	sqrt(x)	ShapiroWilk
Boron (mg/L)	MW-1607	No	n/a	n/a	NP	NaN	14	0.1295	0.02875	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.04714	0.03093	ln(x)	ShapiroWilk
Calcium (mg/L)	MW-1606	No	n/a	n/a	NP	NaN	14	56.91	4.854	x^5	ShapiroWilk
Calcium (mg/L)	MW-1607	No	n/a	n/a	NP	NaN	14	47.91	2.88	ln(x)	ShapiroWilk
Calcium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	68.91	5.805	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1606	No	n/a	n/a	NP	NaN	14	0.2057	0.04345	normal	ShapiroWilk
Fluoride (mg/L)	MW-1607	No	n/a	n/a	NP	NaN	14	0.2243	0.02593	normal	ShapiroWilk
Fluoride (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.26	0.04151	sqrt(x)	ShapiroWilk
pH (SU)	MW-1606	No	n/a	n/a	NP	NaN	14	7.059	0.191	x^6	ShapiroWilk
pH (SU)	MW-1607	No	n/a	n/a	NP	NaN	14	7.784	0.2921	x^6	ShapiroWilk
pH (SU)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	7.308	0.332	x^6	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1606	No	n/a	n/a	NP	NaN	14	335.6	25.21	normal	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1607	Yes	468	10/18/2017	NP	NaN	14	311.3	57.93	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	297.3	26.47	ln(x)	ShapiroWilk

Tukey's Outlier Screening

MW-1606

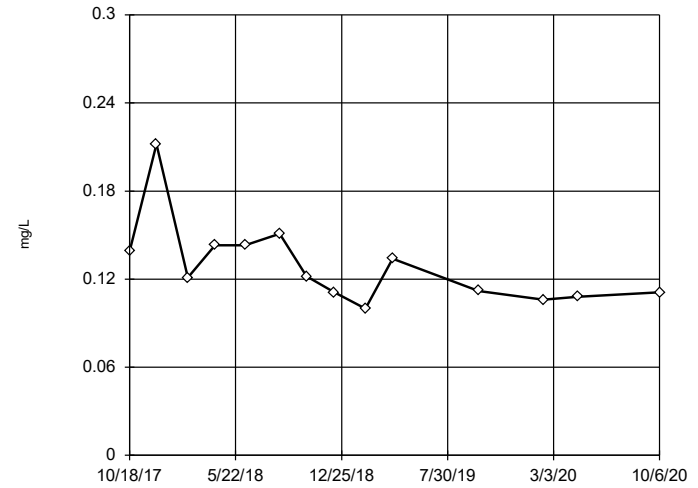


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.5981, low cutoff = -0.01085, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1607

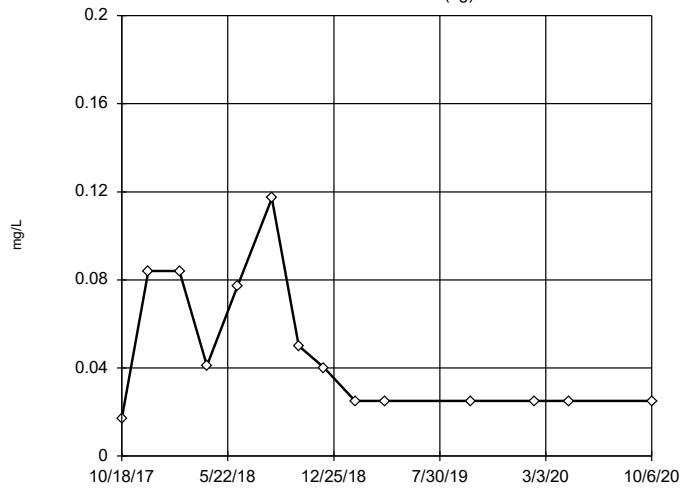


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.3186, low cutoff = 0.04915, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1609 (bg)

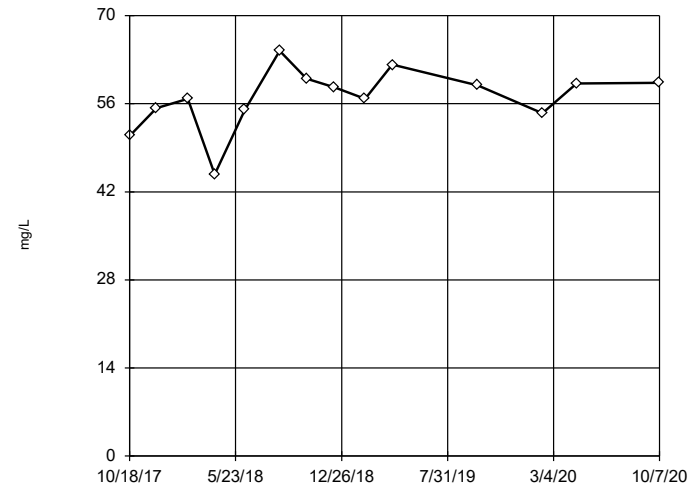


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 2.677, low cutoff = 0.0007509, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

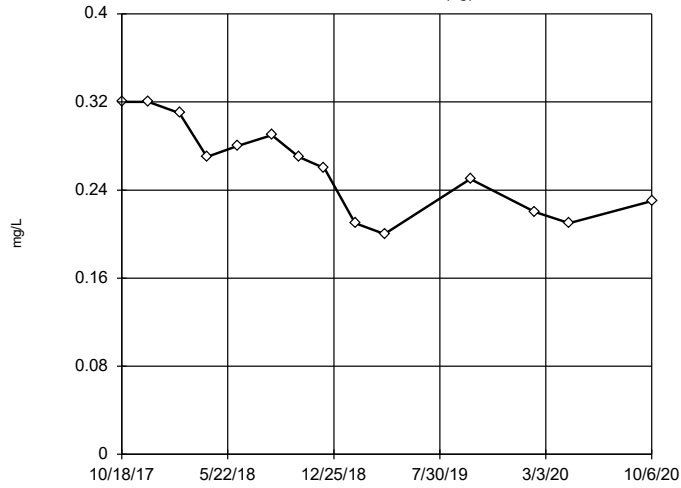
MW-1606



n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were x^5 transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 68.84, low cutoff = -49.53, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

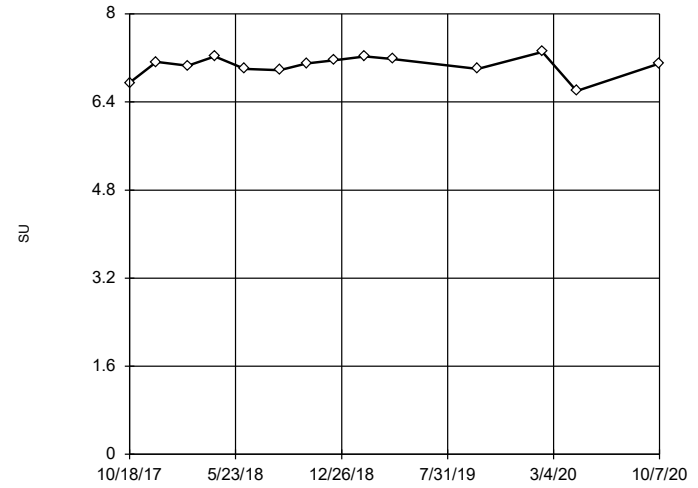
Tukey's Outlier Screening
MW-1609 (bg)



n = 14
No outliers found. Tukey's method selected by user.
Data were square root transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.6394, low cutoff = 0.0448, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

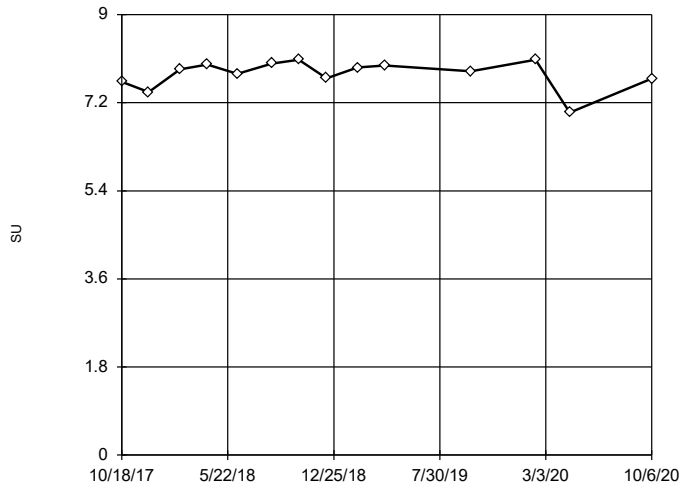
Tukey's Outlier Screening
MW-1606



n = 14
No outliers found. Tukey's method selected by user.
Data were x*6 transformed to achieve best W statistic (graph shown in original units).
High cutoff = 7.708, low cutoff = 6.004, based on IQR multiplier of 3.

Constituent: pH Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

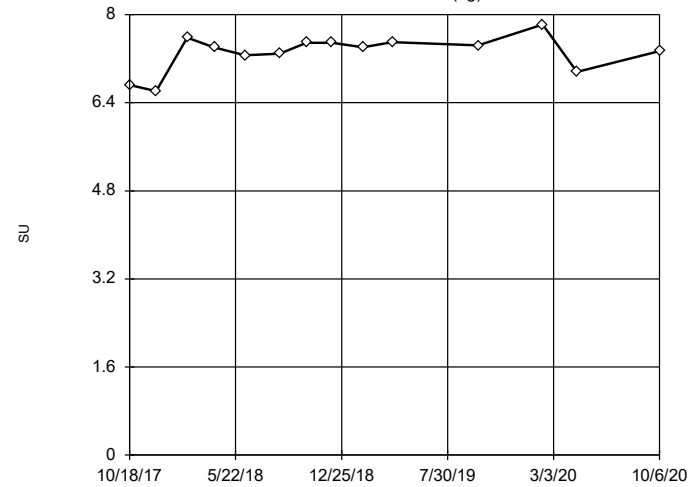
Tukey's Outlier Screening
MW-1607



n = 14
No outliers found. Tukey's method selected by user.
Data were x*6 transformed to achieve best W statistic (graph shown in original units).
High cutoff = 8.703, low cutoff = 5.499, based on IQR multiplier of 3.

Constituent: pH Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

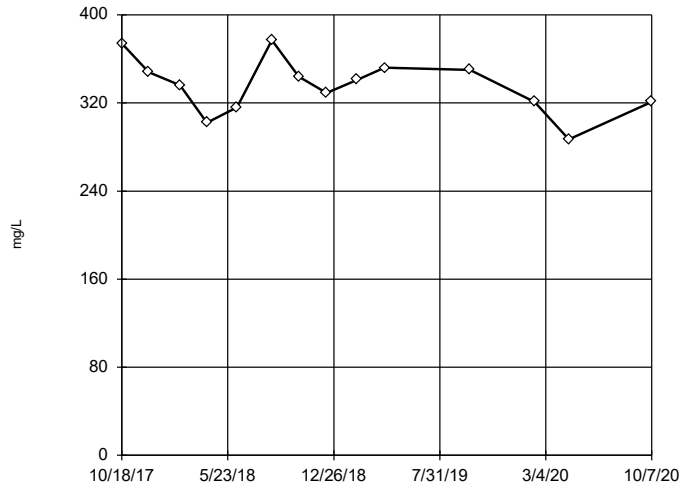
Tukey's Outlier Screening
MW-1609 (bg)



n = 14
No outliers found. Tukey's method selected by user.
Data were x*6 transformed to achieve best W statistic (graph shown in original units).
High cutoff = 8.266, low cutoff = -4.758, based on IQR multiplier of 3.

Constituent: pH Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

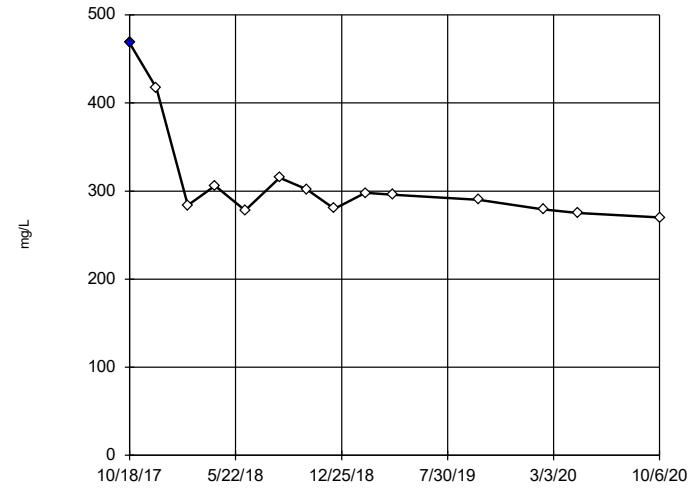
Tukey's Outlier Screening
MW-1606



n = 14
No outliers found. Tukey's method selected by user.
Ladder of Powers transformations did not improve normality; analysis run on raw data.
High cutoff = 448.5, low cutoff = 221, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

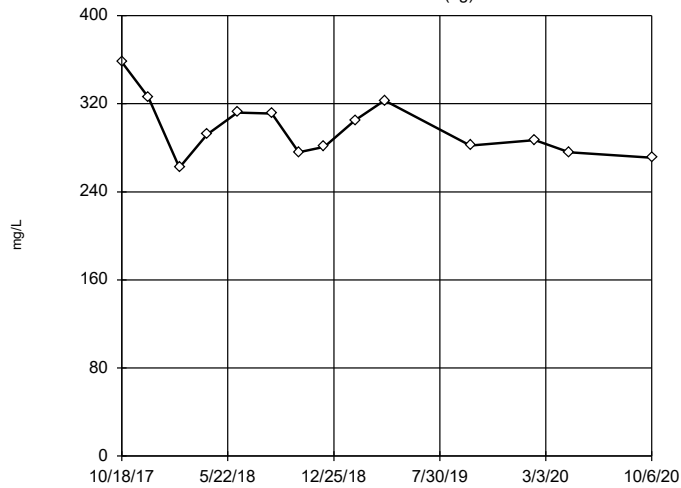
Tukey's Outlier Screening
MW-1607



n = 14
Outlier is drawn as solid. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 430.1, low cutoff = 201, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening
MW-1609 (bg)



n = 14
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 = 483, low cutoff = 181.4, based on IQR multiplier of 3.

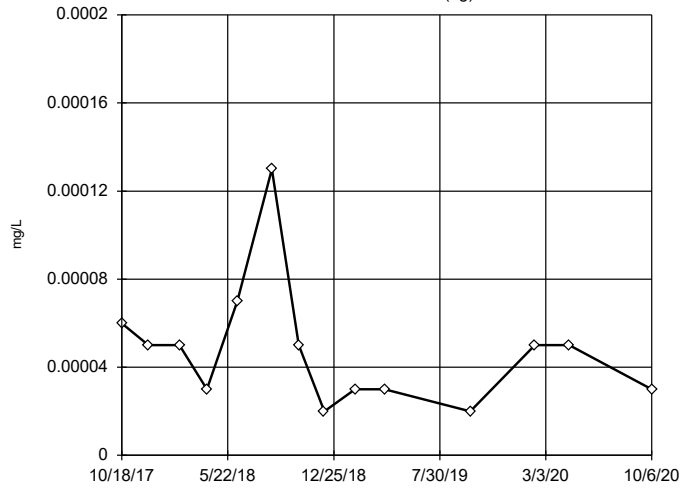
Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:31 AM View: Rome Limestone - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

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

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:35 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.00004786	0.00002806	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0002879	0.0002987	ln(x)	ShapiroWilk
Barium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.396	0.05488	ln(x)	ShapiroWilk
Beryllium (mg/L)	MW-1609 (bg)	n/a	n/a	n/a	NP	NaN	14	0.00009314	0.00002566	unknown	ShapiroWilk
Cadmium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.00002714	0.00001729	x^(1/3)	ShapiroWilk
Chloride (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	1.857	0.9255	ln(x)	ShapiroWilk
Chromium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0001714	0.00006464	ln(x)	ShapiroWilk
Cobalt (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0003391	0.0003561	x^(1/3)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	2.063	1.11	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.26	0.04151	sqrt(x)	ShapiroWilk
Lead (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0004698	0.0003074	sqrt(x)	ShapiroWilk
Lithium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.01309	0.01343	ln(x)	ShapiroWilk
Mercury (mg/L)	MW-1609 (bg)	n/a	n/a	n/a	NP	NaN	14	0.001	0	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.001239	0.0006733	ln(x)	ShapiroWilk
Selenium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.000125	0.00007208	sqrt(x)	ShapiroWilk
Sulfate (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	15.24	3.014	ln(x)	ShapiroWilk
Thallium (mg/L)	MW-1609 (bg)	No	n/a	n/a	NP	NaN	14	0.0003336	0.0002324	ln(x)	ShapiroWilk

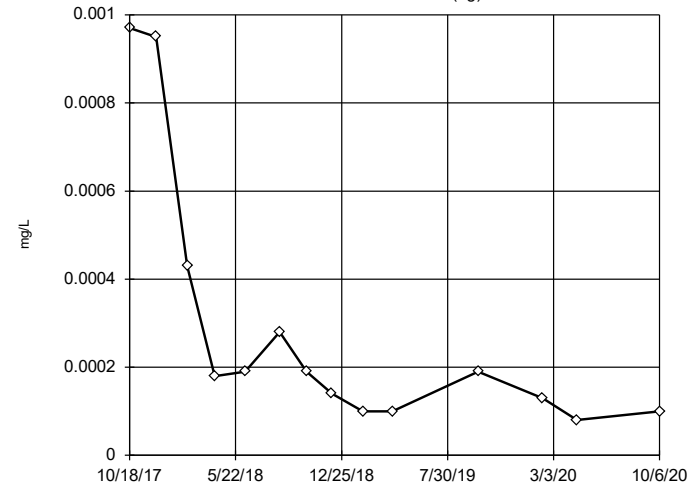
Tukey's Outlier Screening
MW-1609 (bg)



n = 14
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 = 0.0003333, low cutoff = 0.0000493, based on IQR multiplier of 3.

Constituent: Antimony Analysis Run 1/21/2021 1:34 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

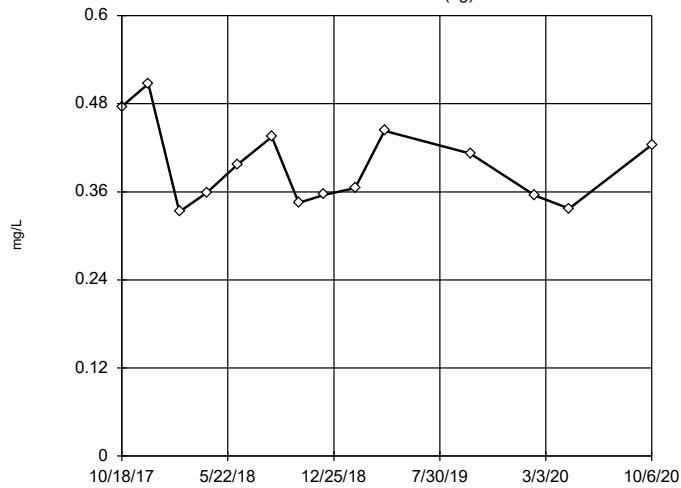
Tukey's Outlier Screening
MW-1609 (bg)



n = 14
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 = 0.0145, low cutoff = 0.00002394, based on IQR multiplier of 3.

Constituent: Arsenic Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

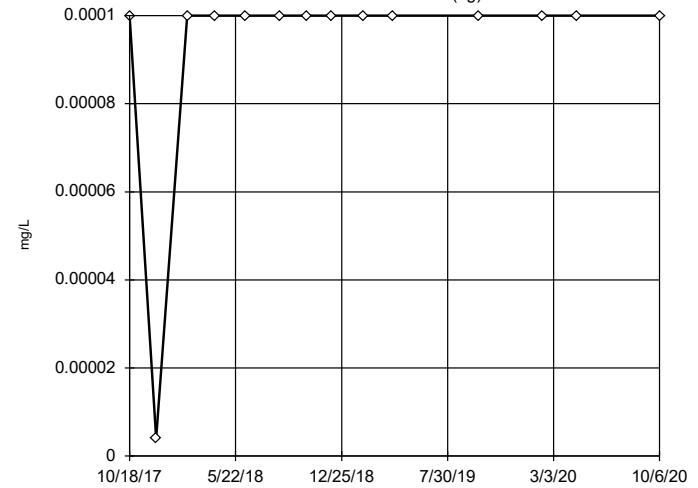
Tukey's Outlier Screening
MW-1609 (bg)



n = 14
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 = 0.8664, low cutoff = 0.1773, based on IQR multiplier of 3.

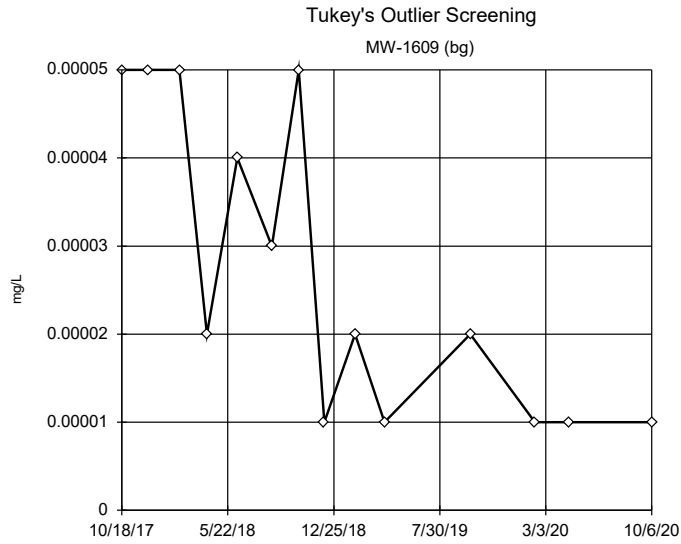
Constituent: Barium Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening
MW-1609 (bg)



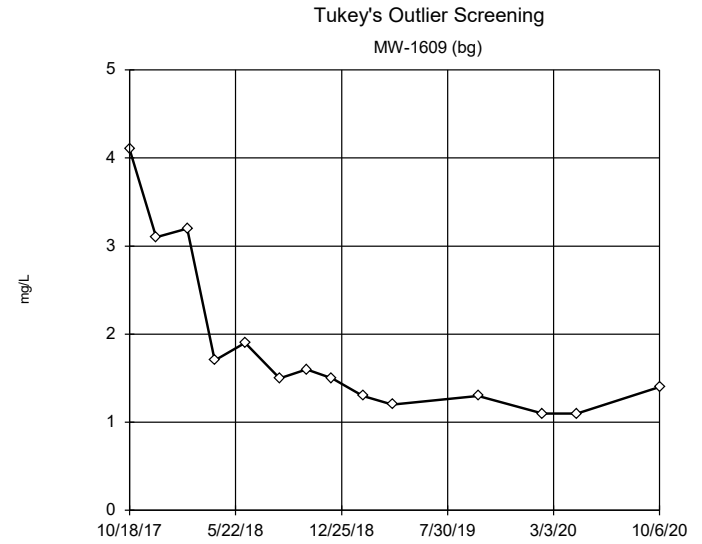
n = 14
No outliers found. Tukey's method selected by user.
Ladder of Powers transformations did not improve normality; analysis run on raw data.
The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Beryllium Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP



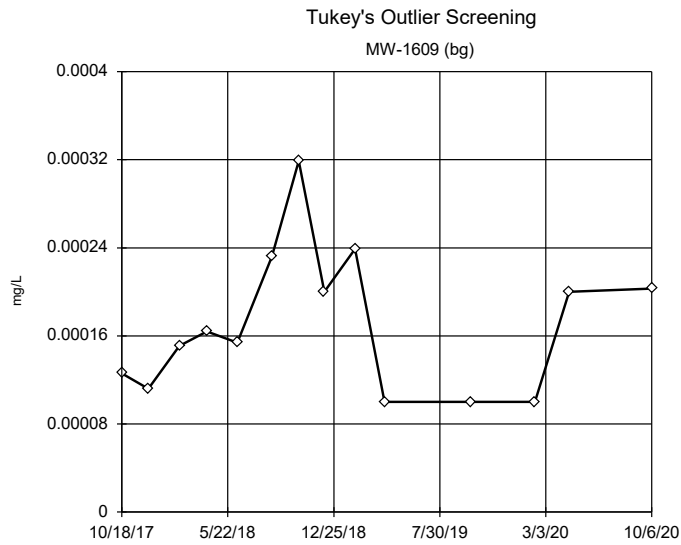
n = 14
No outliers found.
Tukey's method selected by user.
Data were cube root transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.0005662, low cutoff = -0.0001443, based on IQR multiplier of 3.

Constituent: Cadmium Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP



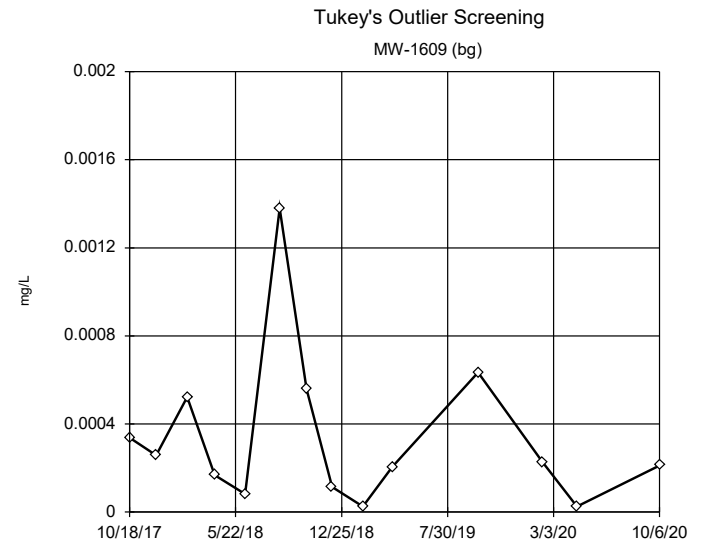
n = 14
No outliers found.
Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 17.81, low cutoff = 0.1702, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP



n = 14
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 = 0.001871, low cutoff = 0.00001227, based on IQR multiplier of 3.

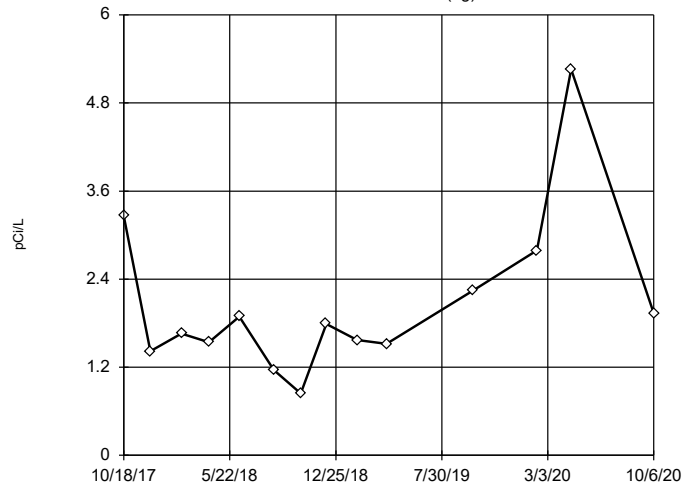
Constituent: Chromium Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP



n = 14
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 = 0.006622, low cutoff = -0.0002204, based on IQR multiplier of 3.

Constituent: Cobalt Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

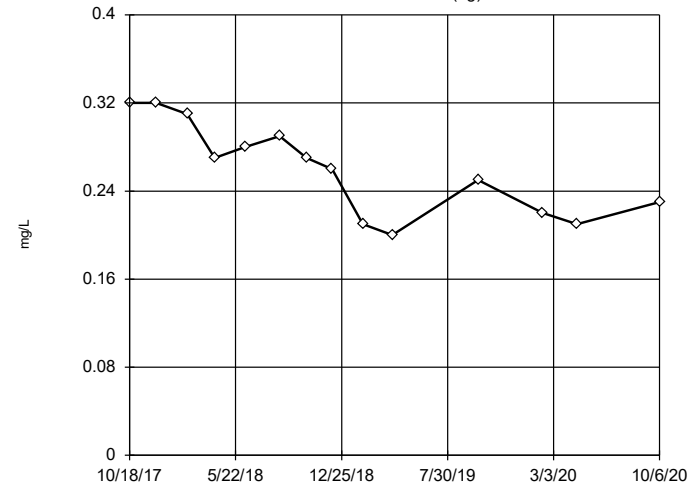
Tukey's Outlier Screening
MW-1609 (bg)



n = 14
No outliers found. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 12.32, low cutoff = 0.2982, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Fed
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

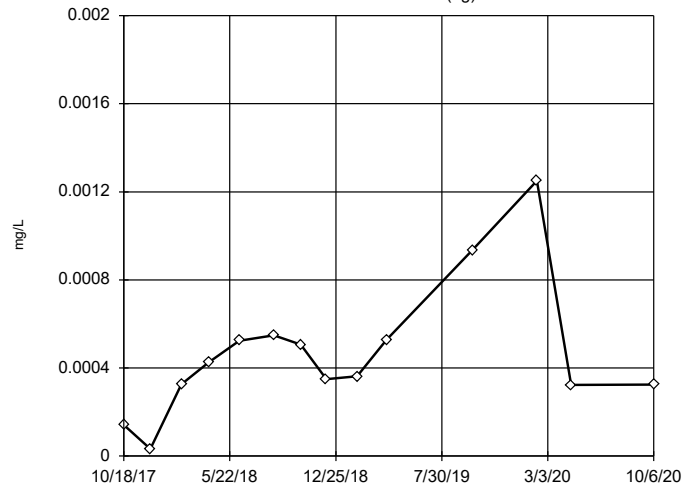
Tukey's Outlier Screening
MW-1609 (bg)



n = 14
No outliers found. Tukey's method selected by user.
Data were square root transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.6394, low cutoff = 0.0448, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

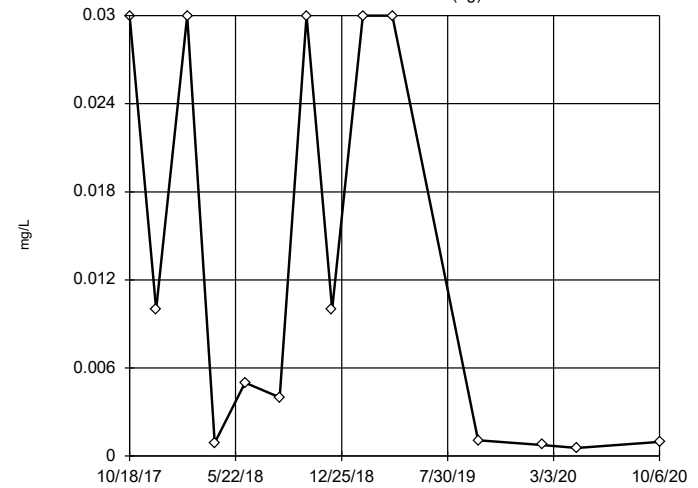
Tukey's Outlier Screening
MW-1609 (bg)



n = 14
No outliers found. Tukey's method selected by user.
Data were square root transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.001507, low cutoff = 0.000005583, based on IQR multiplier of 3.

Constituent: Lead Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

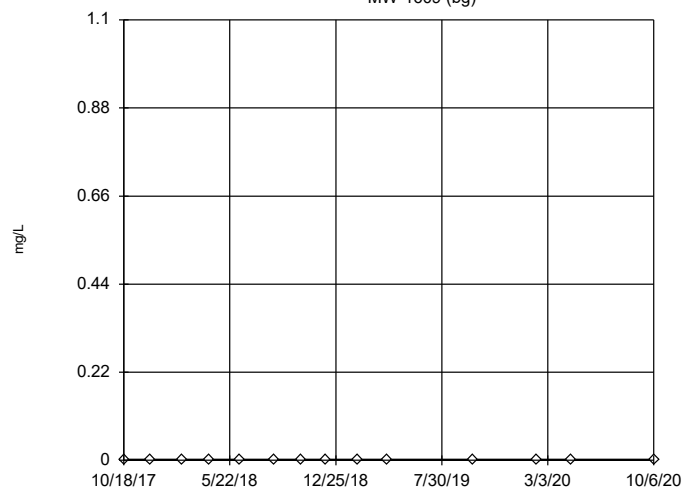
Tukey's Outlier Screening
MW-1609 (bg)



n = 14
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 = 985.4, low cutoff = 2.9e-8, based on IQR multiplier of 3.

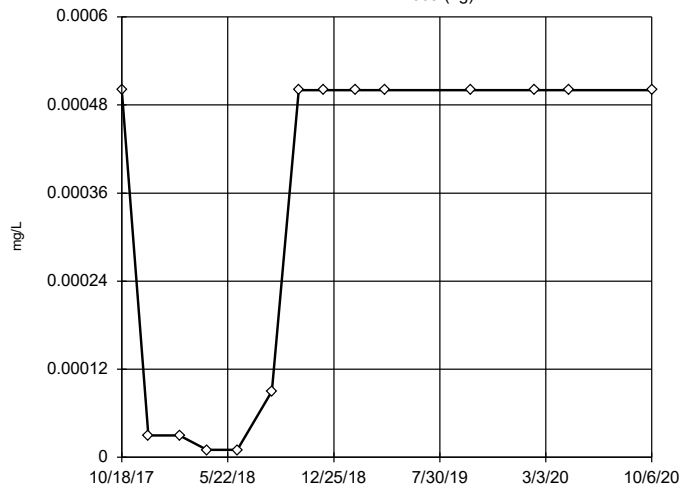
Constituent: Lithium Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening
MW-1609 (bg)



Tukey's Outlier Screening

MW-1609 (bg)



n = 14

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

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

High cutoff = 2.315, low cutoff = 6.5e-9, based on IQR multiplier of 3.

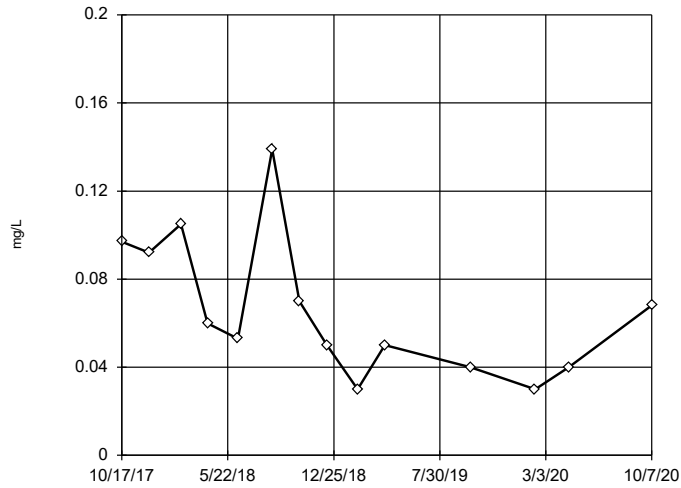
Constituent: Thallium Analysis Run 1/21/2021 1:35 PM View: Rome Limestone - Federal - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Test - Downgradient Wells (Dumps Fault) - All Results (No Significant)

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 1:10 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Boron (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	0.066	0.03183	ln(x)	ShapiroWilk
Boron (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.6058	0.0723	x^4	ShapiroWilk
Calcium (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	34.67	6.087	x^6	ShapiroWilk
Calcium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	60.07	41.7	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	11.15	0.8707	ln(x)	ShapiroWilk
Chloride (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	55.51	42.61	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	0.2086	0.04418	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.8914	0.171	x^5	ShapiroWilk
pH (SU)	MW-1610	No	n/a	n/a	NP	NaN	14	7.565	0.3266	sqrt(x)	ShapiroWilk
pH (SU)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	7.7	0.2366	x^6	ShapiroWilk
Sulfate (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	44.32	4.767	normal	ShapiroWilk
Sulfate (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	647.5	596.4	ln(x)	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1610	No	n/a	n/a	NP	NaN	14	250.1	10.42	x^6	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	1553	953.7	ln(x)	ShapiroWilk

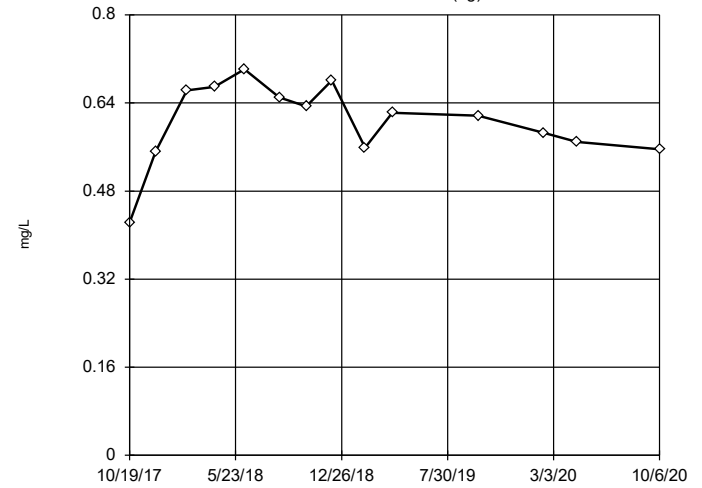
Tukey's Outlier Screening
MW-1610



n = 14
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 = 1.244, low cutoff = 0.003037, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

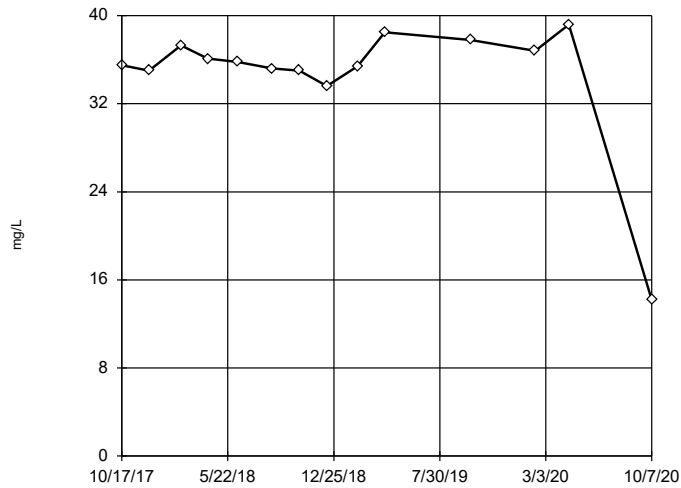
Tukey's Outlier Screening
MW-1611 (bg)



n = 14
No outliers found. Tukey's method selected by user.
Data were x⁴ transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.8397, low cutoff = -0.672, based on IQR multiplier of 3.

Constituent: Boron Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

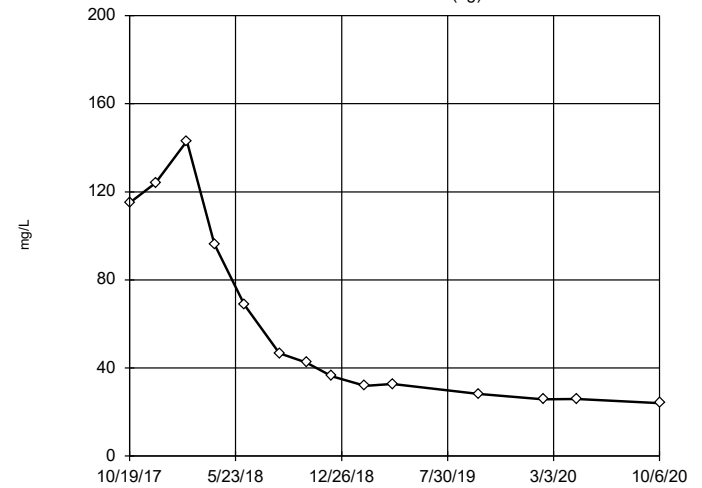
Tukey's Outlier Screening
MW-1610



n = 14
No outliers found. Tukey's method selected by user.
Data were x⁶ transformed to achieve best W statistic (graph shown in original units).
High cutoff = 42.27, low cutoff = -31.94, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening
MW-1611 (bg)

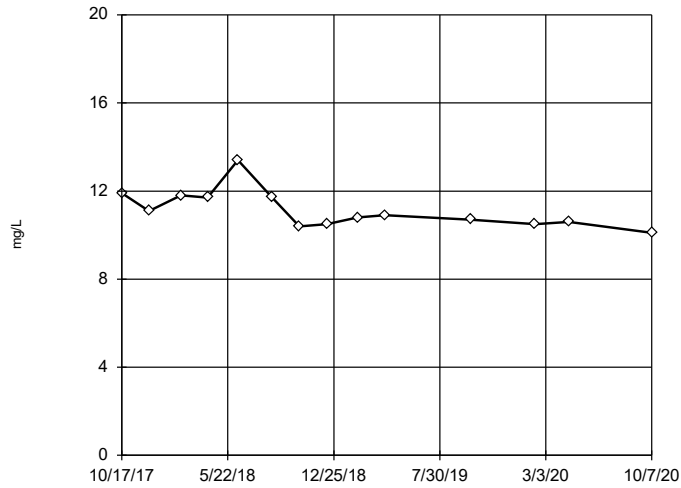


n = 14
No outliers found. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 6165, low cutoff = 0.462, based on IQR multiplier of 3.

Constituent: Calcium Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1610

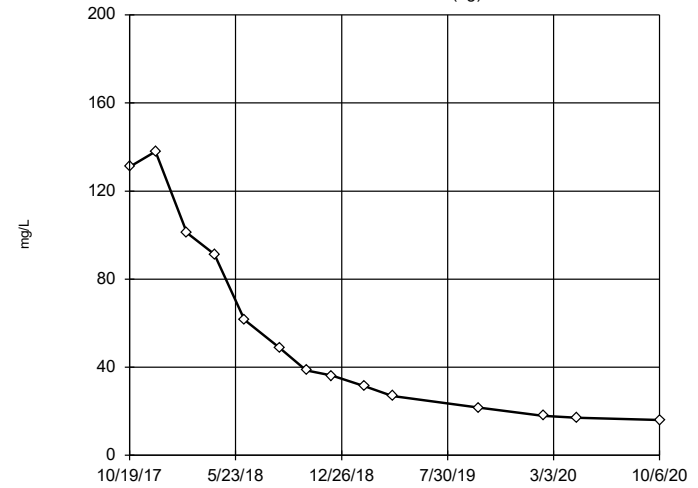


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 16.47, low cutoff = 7.493, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1611 (bg)

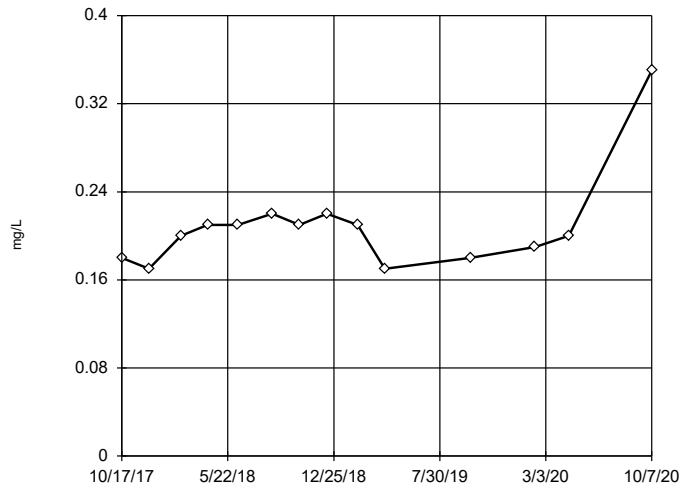


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 11107, low cutoff = 0.1704, based on IQR multiplier of 3.

Constituent: Chloride Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1610

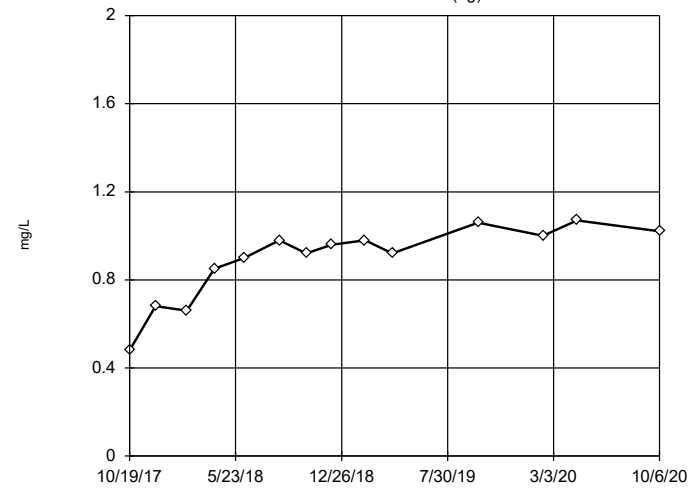


n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.366, low cutoff = 0.1057, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

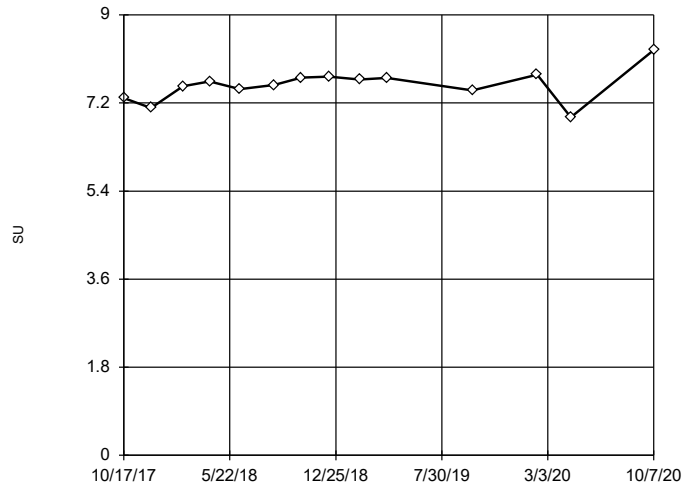
MW-1611 (bg)



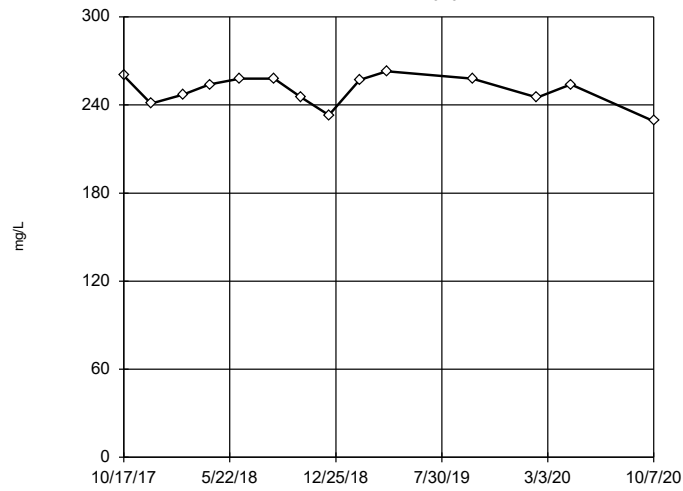
n = 14
 No outliers found.
 Tukey's method selected by user.
 Data were x⁵ transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1.272, low cutoff = -1.146, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening
MW-1610



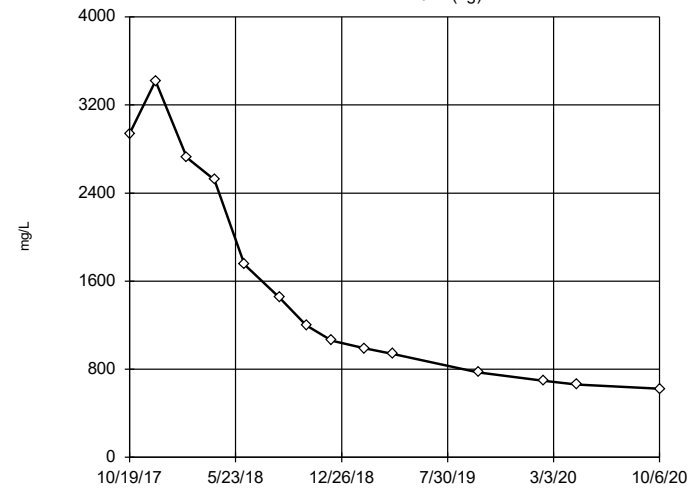
Tukey's Outlier Screening MW-1610



n = 14
No outliers found.
Tukey's method selected by user.
Data were x*6 transformed to achieve best W statistic (graph shown in original units).
High cutoff = 287.2, low cutoff = -198.1, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening MW-1611 (bg)



n = 14
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 = 119264, low cutoff = 16.09, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/29/2021 1:08 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Test - Upgradient Wells (Dumps Fault) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:26 PM

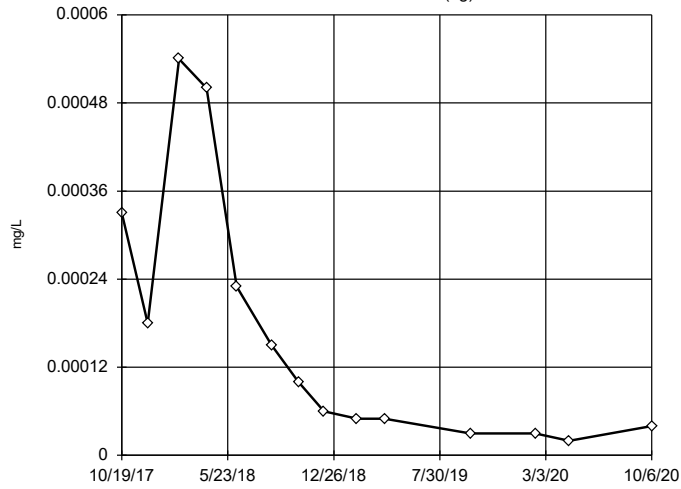
<u>Constituent</u>	<u>Well</u>	<u>Outlier</u> <u>Value(s)</u>	<u>Date(s)</u>	<u>Method</u> <u>Alpha</u> <u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Molybdenum (mg/L)	MW-1611 (bg)	Yes 0.038	10/19/2017	NP NaN 14	0.005268	0.009505	In(x)	ShapiroWilk

Tukey's Outlier Test - Upgradient Wells (Dumps Fault) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/21/2021, 1:26 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.000165	0.0001753	ln(x)	ShapiroWilk
Arsenic (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.01674	0.0108	ln(x)	ShapiroWilk
Barium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.08009	0.02525	ln(x)	ShapiroWilk
Beryllium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.00006743	0.00004535	ln(x)	ShapiroWilk
Cadmium (mg/L)	MW-1611 (bg)	n/a	n/a	n/a	NP	NaN	14	0.00004714	0.00001069	unknown	ShapiroWilk
Chromium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.0004773	0.0002155	ln(x)	ShapiroWilk
Cobalt (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.00008443	0.00007269	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.6419	0.4649	ln(x)	ShapiroWilk
Fluoride (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.8914	0.171	x^5	ShapiroWilk
Lead (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.0001752	0.0002545	ln(x)	ShapiroWilk
Lithium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.09339	0.03031	ln(x)	ShapiroWilk
Mercury (mg/L)	MW-1611 (bg)	n/a	n/a	n/a	NP	NaN	14	0.0009343	0.0002459	unknown	ShapiroWilk
Molybdenum (mg/L)	MW-1611 (bg)	Yes	0.038	10/19/2017	NP	NaN	14	0.005268	0.009505	ln(x)	ShapiroWilk
Selenium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.00006857	0.00002507	normal	ShapiroWilk
Thallium (mg/L)	MW-1611 (bg)	No	n/a	n/a	NP	NaN	14	0.0004064	0.0001866	x^(1/3)	ShapiroWilk

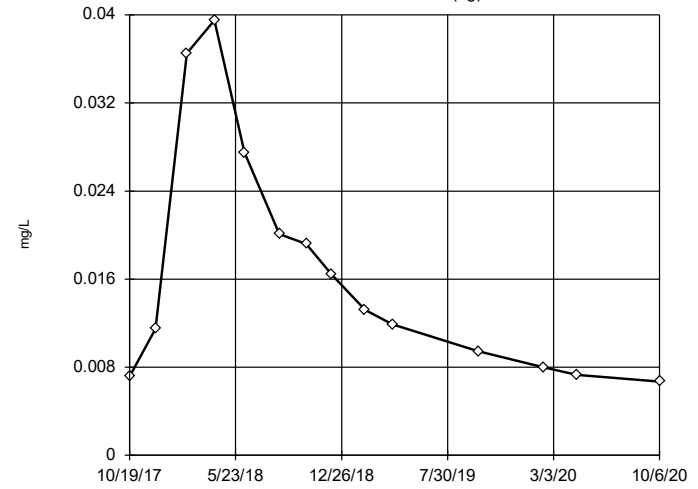
Tukey's Outlier Screening
MW-1611 (bg)



n = 14
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 = 0.1386, low cutoff = 6.9e-8, based on IQR multiplier of 3.

Constituent: Antimony Analysis Run 1/21/2021 1:24 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

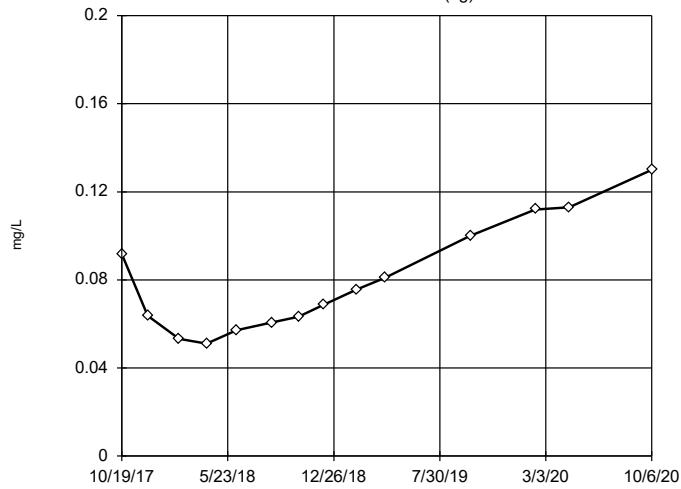
Tukey's Outlier Screening
MW-1611 (bg)



n = 14
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 = 0.6833, low cutoff = 0.0002631, based on IQR multiplier of 3.

Constituent: Arsenic Analysis Run 1/21/2021 1:24 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

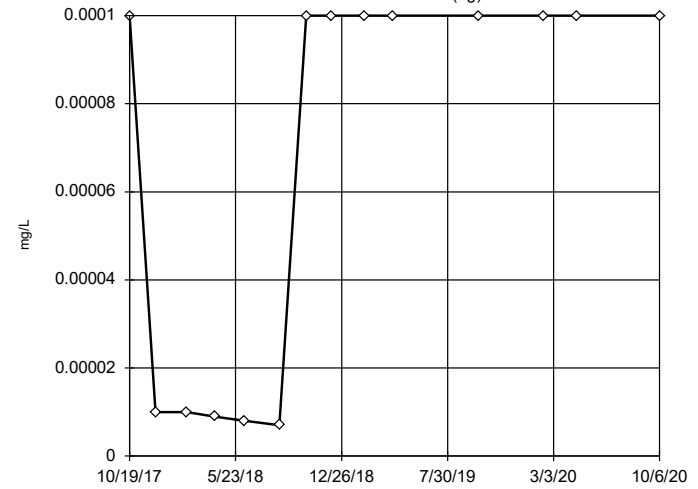
Tukey's Outlier Screening
MW-1611 (bg)



n = 14
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 = 0.6147, low cutoff = 0.01014, based on IQR multiplier of 3.

Constituent: Barium Analysis Run 1/21/2021 1:24 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening
MW-1611 (bg)

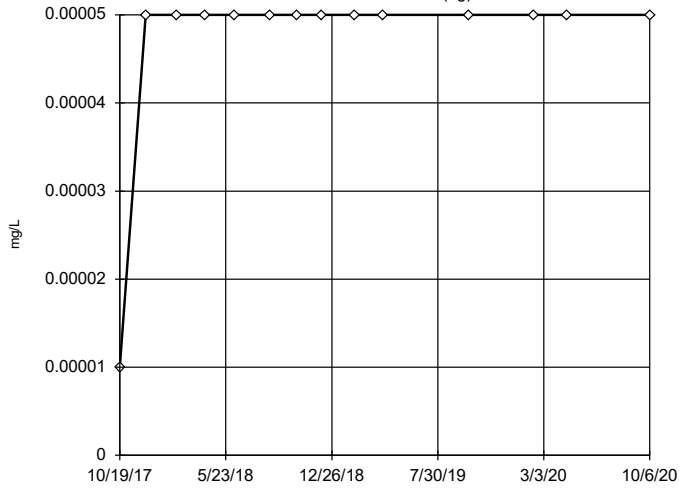


n = 14
No outliers found. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.1171, low cutoff = 8.1e-9, based on IQR multiplier of 3.

Constituent: Beryllium Analysis Run 1/21/2021 1:24 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1611 (bg)

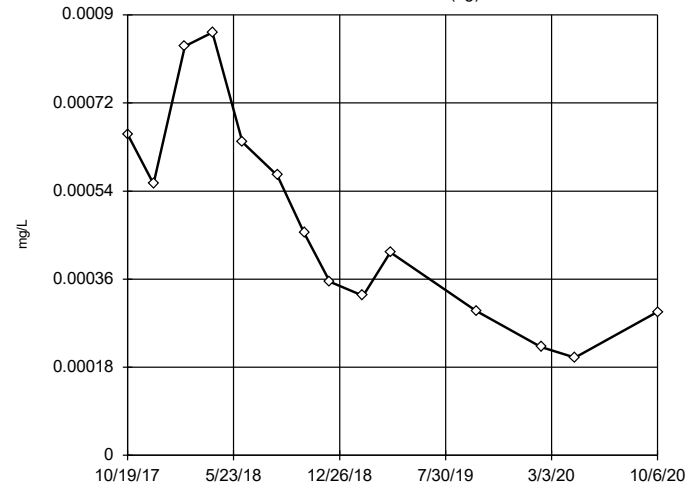


n = 14
 No outliers found. Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium Analysis Run 1/21/2021 1:24 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1611 (bg)

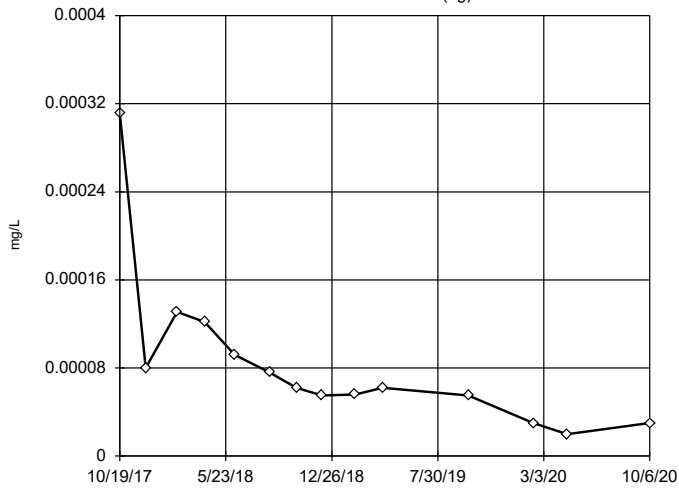


n = 14
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.006936, low cutoff = 0.00002746, based on IQR multiplier of 3.

Constituent: Chromium Analysis Run 1/21/2021 1:24 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

MW-1611 (bg)

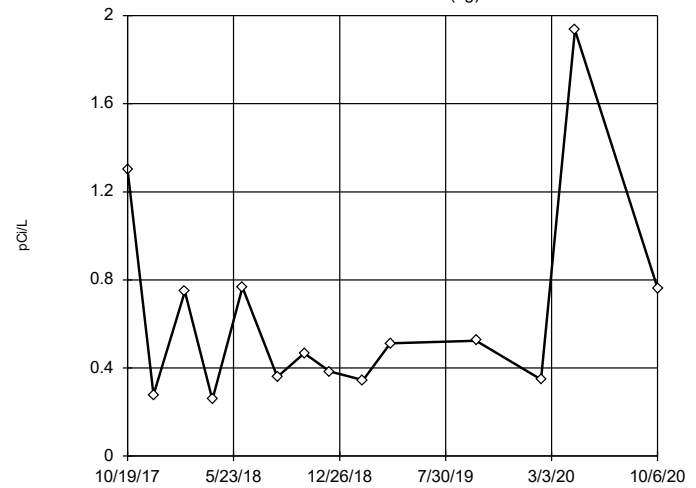


n = 14
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.00188, low cutoff = 0.00000229, based on IQR multiplier of 3.

Constituent: Cobalt Analysis Run 1/21/2021 1:24 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening

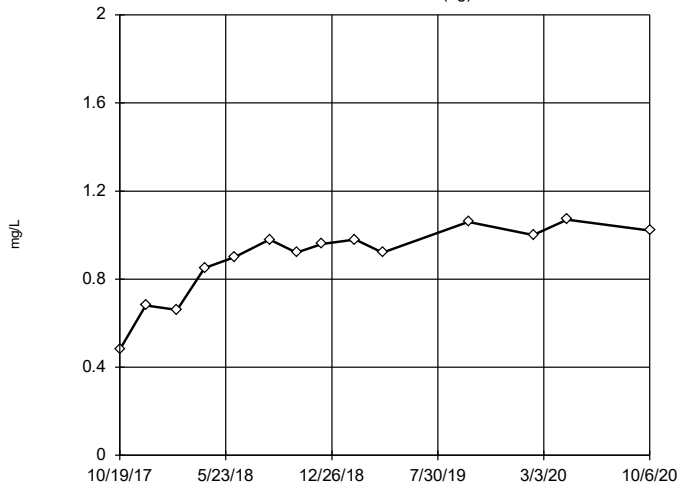
MW-1611 (bg)



n = 14
 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 = 8.222, low cutoff = 0.0322, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/21/2021 1:25 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

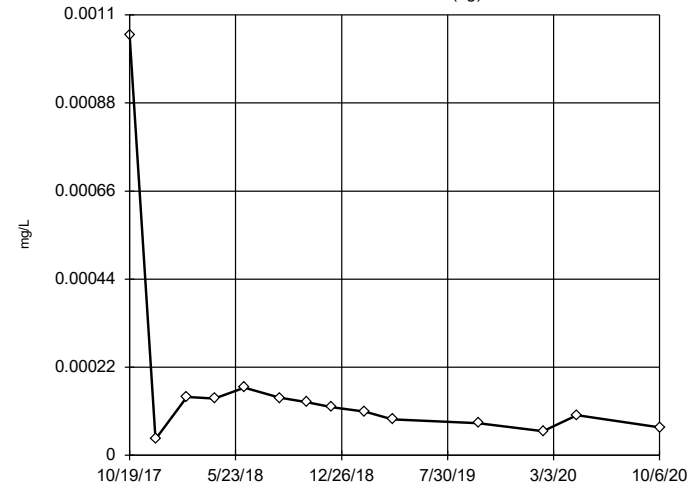
Tukey's Outlier Screening
MW-1611 (bg)



n = 14
No outliers found. Tukey's method selected by user.
Data were x⁵ transformed to achieve best W statistic (graph shown in original units).
High cutoff = 1.272, low cutoff = -1.146, based on IQR multiplier of 3.

Constituent: Fluoride Analysis Run 1/21/2021 1:25 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

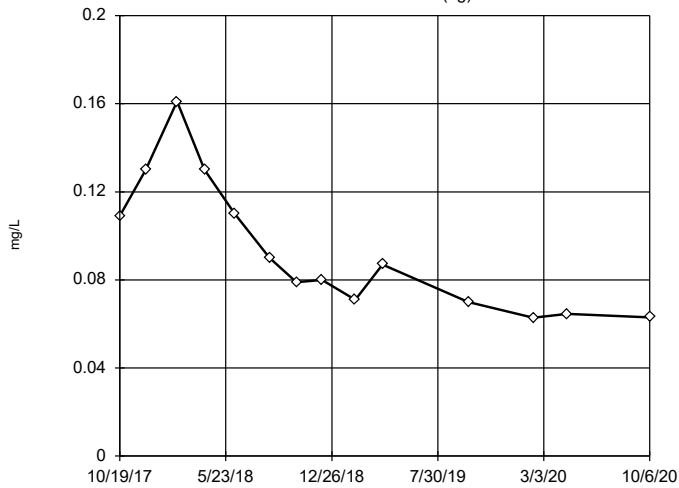
Tukey's Outlier Screening
MW-1611 (bg)



n = 14
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 = 0.001055, low cutoff = 0.00001029, based on IQR multiplier of 3.

Constituent: Lead Analysis Run 1/21/2021 1:25 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

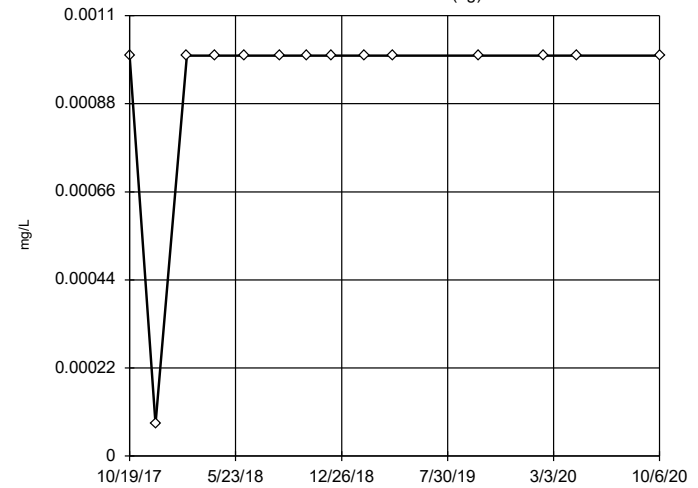
Tukey's Outlier Screening
MW-1611 (bg)



n = 14
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 = 0.6739, low cutoff = 0.01192, based on IQR multiplier of 3.

Constituent: Lithium Analysis Run 1/21/2021 1:25 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

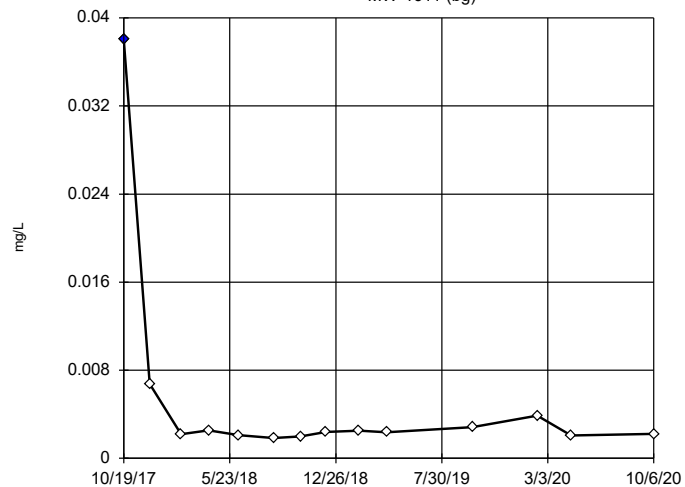
Tukey's Outlier Screening
MW-1611 (bg)



n = 14
No outliers found. Tukey's method selected by user.
Data were x⁴ transformed to achieve best W statistic (graph shown in original units).
The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury Analysis Run 1/21/2021 1:25 PM View: Dumps Fault - Outliers
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

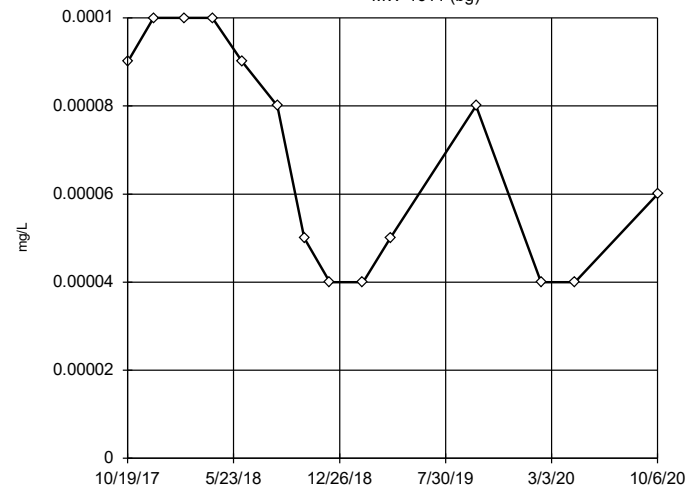
Tukey's Outlier Screening MW-1611 (bg)



n = 14
 Outlier is drawn as solid.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.01337,
 low cutoff = 0.0005196,
 based on IQR multiplier of 3.

Constituent: Molybdenum Analysis Run 1/21/2021 1:25 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

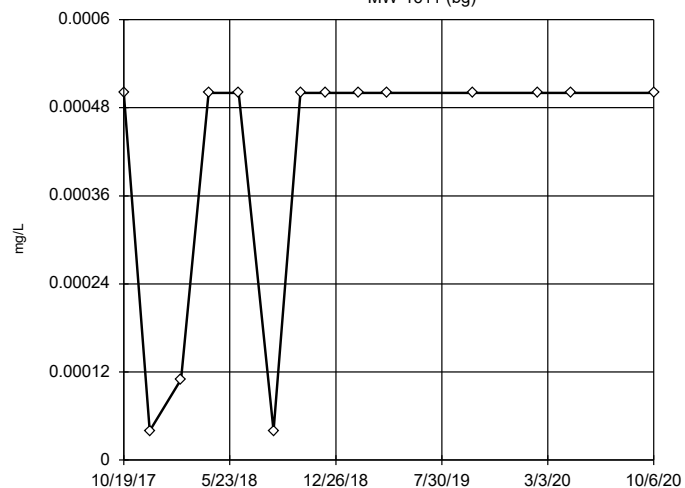
Tukey's Outlier Screening MW-1611 (bg)



n = 14
 No outliers found.
 Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality; analysis run on raw data.
 High cutoff = 0.00026,
 low cutoff = -0.000125,
 based on IQR multiplier of 3.

Constituent: Selenium Analysis Run 1/21/2021 1:25 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Tukey's Outlier Screening MW-1611 (bg)



n = 14
 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 = 0.002027,
 low cutoff = 0.000004458,
 based on IQR multiplier of 3.

Constituent: Thallium Analysis Run 1/21/2021 1:25 PM View: Dumps Fault - Outliers
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

FIGURE D.

Welch's t-test/Mann-Whitney (Chattanooga Shale) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/14/2021, 8:49 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Sulfate (mg/L)	MW-1603	-2.858	Yes	Mann-W
Sulfate (mg/L)	MW-1604	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1605	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1612	-2.923	Yes	Mann-W

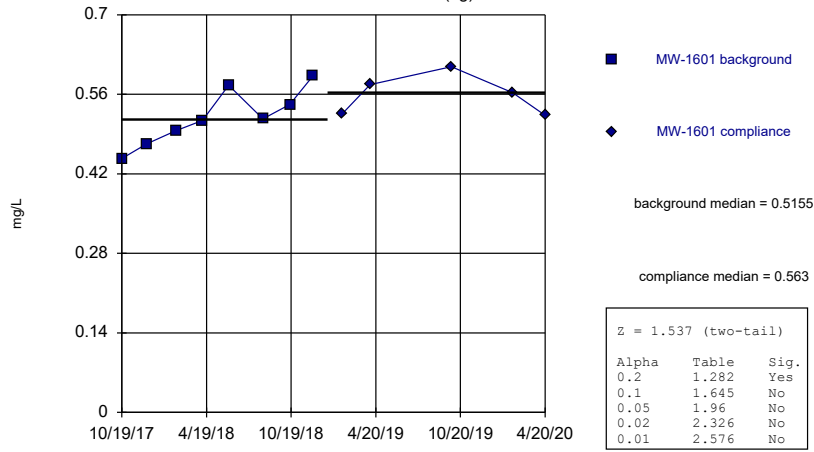
Welch's t-test/Mann-Whitney (Chattanooga Shale) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/14/2021, 8:49 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Boron (mg/L)	MW-1601 (bg)	1.537	No	Mann-W
Boron (mg/L)	MW-1602 (bg)	-0.8051	No	Mann-W
Boron (mg/L)	MW-1603	-0.366	No	Mann-W
Boron (mg/L)	MW-1604	-2.269	No	Mann-W
Boron (mg/L)	MW-1605	-0.07329	No	Mann-W
Boron (mg/L)	MW-1608 (bg)	-0.7329	No	Mann-W
Boron (mg/L)	MW-1612	-2.111	No	Mann-W
Fluoride (mg/L)	MW-1601 (bg)	0.367	No	Mann-W
Fluoride (mg/L)	MW-1602 (bg)	-0.2208	No	Mann-W
Fluoride (mg/L)	MW-1603	-2.093	No	Mann-W
Fluoride (mg/L)	MW-1604	-1.774	No	Mann-W
Fluoride (mg/L)	MW-1605	-1.914	No	Mann-W
Fluoride (mg/L)	MW-1608 (bg)	-2.439	No	Mann-W
Fluoride (mg/L)	MW-1612	-0.7386	No	Mann-W
Sulfate (mg/L)	MW-1601 (bg)	-1.906	No	Mann-W
Sulfate (mg/L)	MW-1602 (bg)	-1.976	No	Mann-W
Sulfate (mg/L)	MW-1603	-2.858	Yes	Mann-W
Sulfate (mg/L)	MW-1604	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1605	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1608 (bg)	-1.764	No	Mann-W
Sulfate (mg/L)	MW-1612	-2.923	Yes	Mann-W
Total Dissolved Solids (mg/L)	MW-1601 (bg)	-1.098	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1602 (bg)	0.07339	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1603	-0.2196	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1604	0.9528	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1605	-2.359	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1608 (bg)	-1.246	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1612	0.3248	No	Mann-W

Mann-Whitney (Wilcoxon Rank Sum)

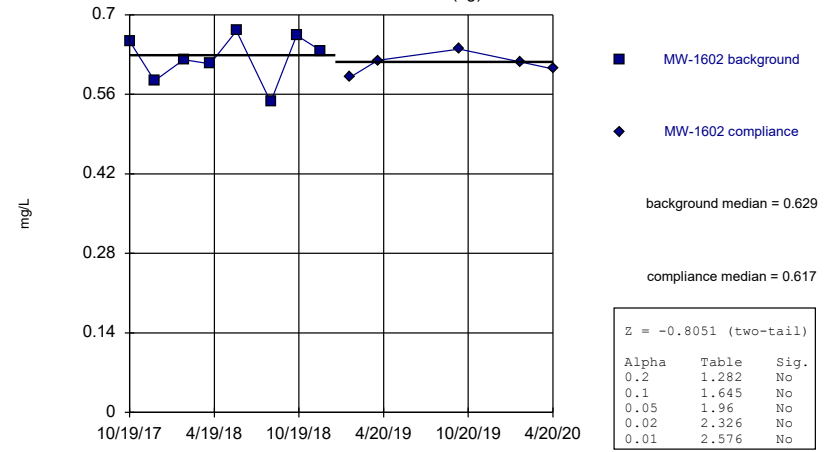
MW-1601 (bg)



Constituent: Boron Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

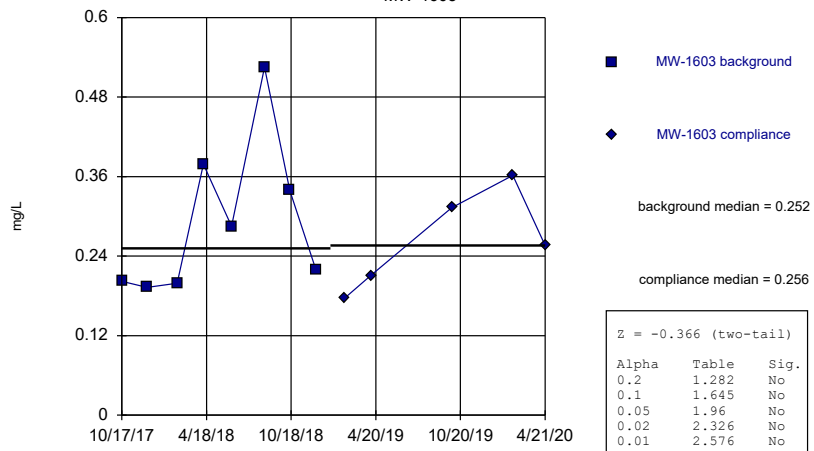
MW-1602 (bg)



Constituent: Boron Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

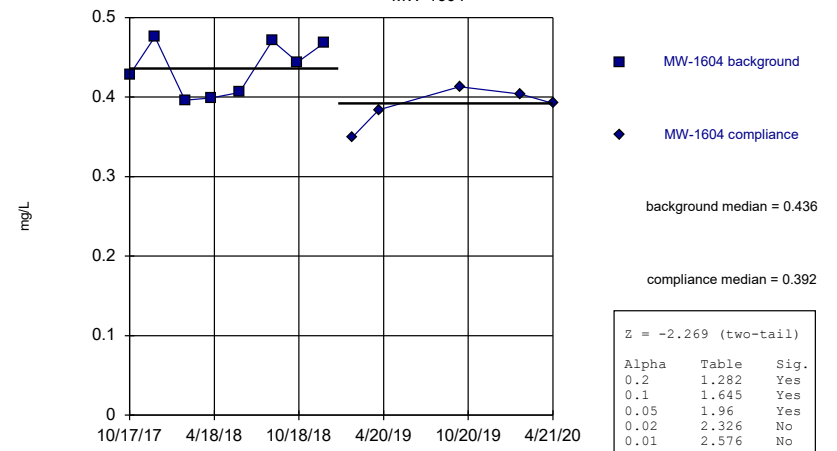
MW-1603



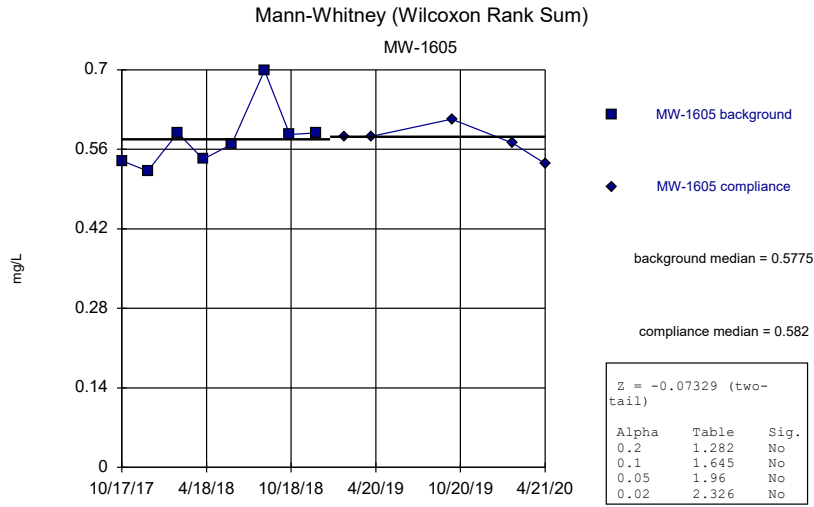
Constituent: Boron Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

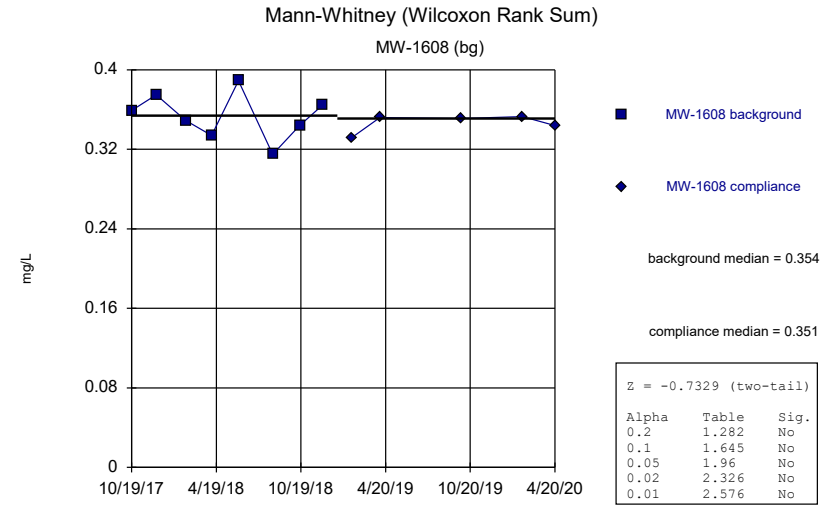
MW-1604



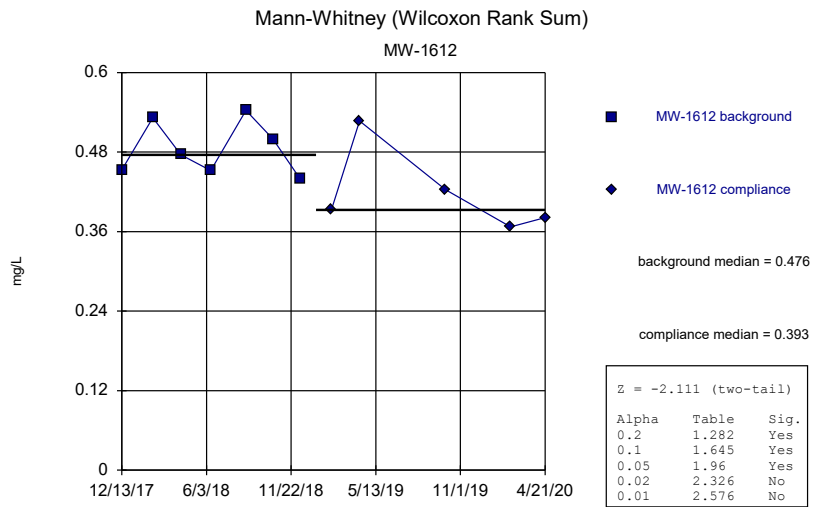
Constituent: Boron Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP



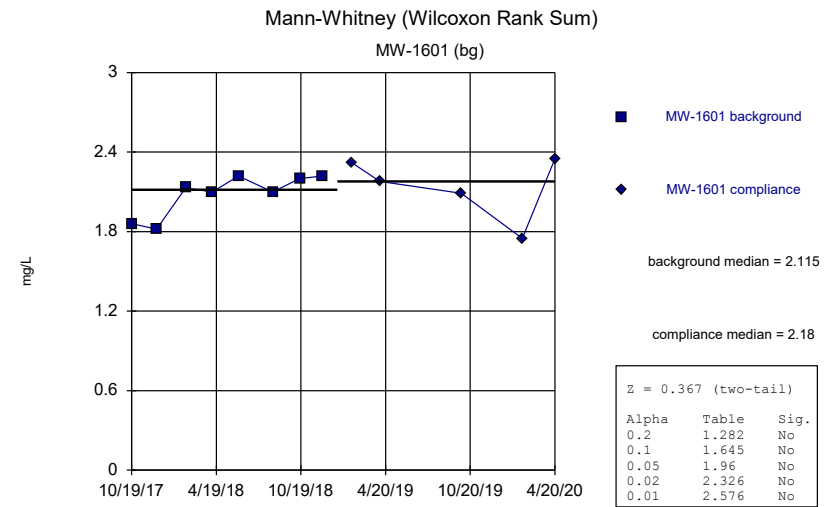
Constituent: Boron Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP



Constituent: Boron Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

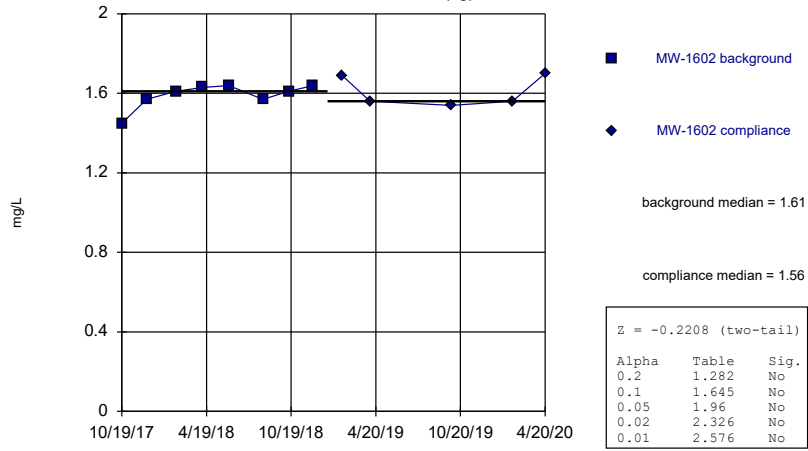


Constituent: Boron Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP



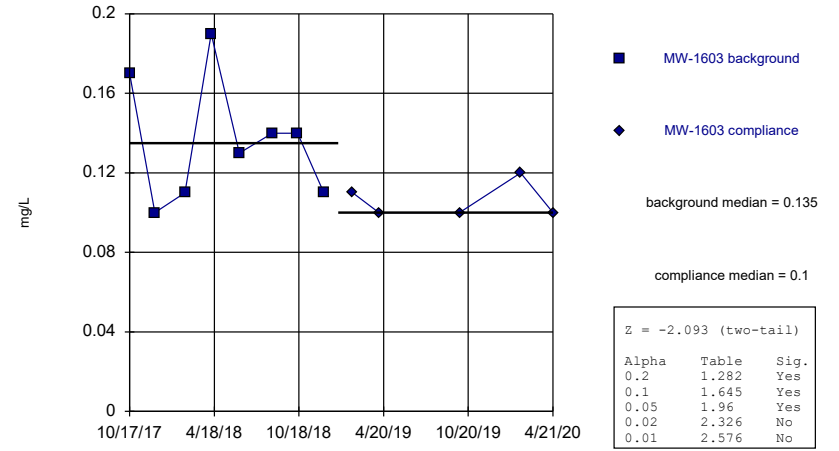
Constituent: Fluoride Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)
MW-1602 (bg)



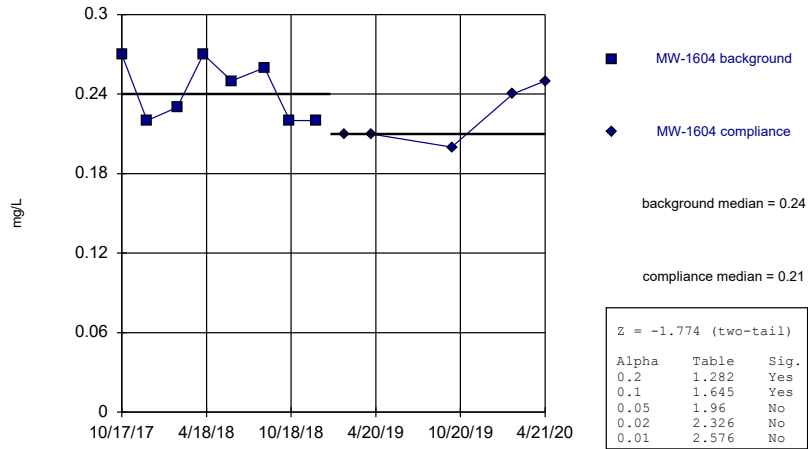
Constituent: Fluoride Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)
MW-1603



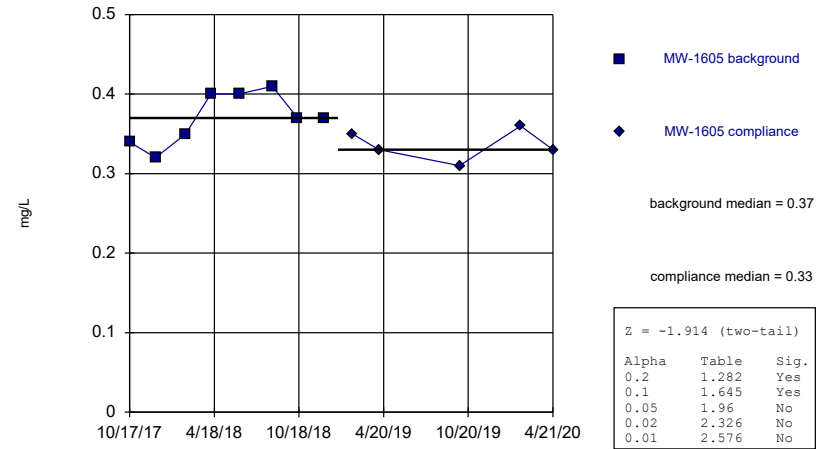
Constituent: Fluoride Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)
MW-1604



Constituent: Fluoride Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

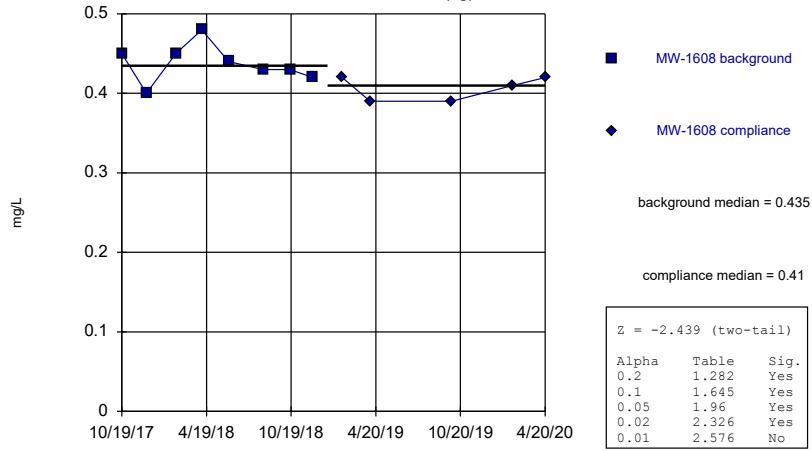
Mann-Whitney (Wilcoxon Rank Sum)
MW-1605



Constituent: Fluoride Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

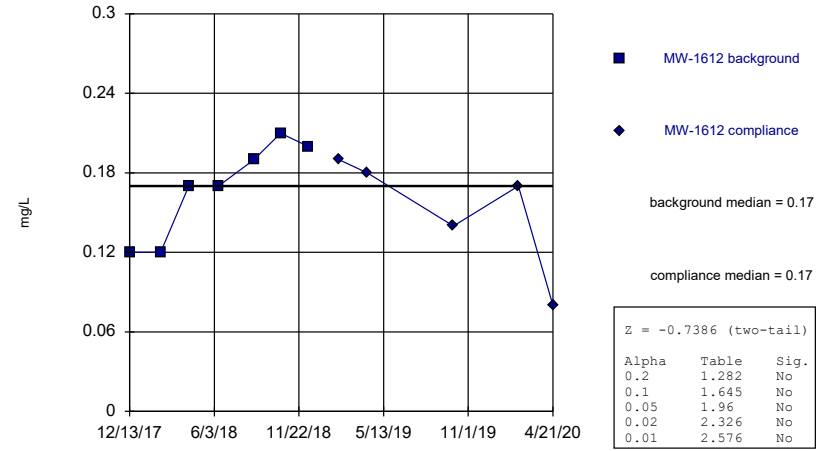
MW-1608 (bg)



Constituent: Fluoride Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

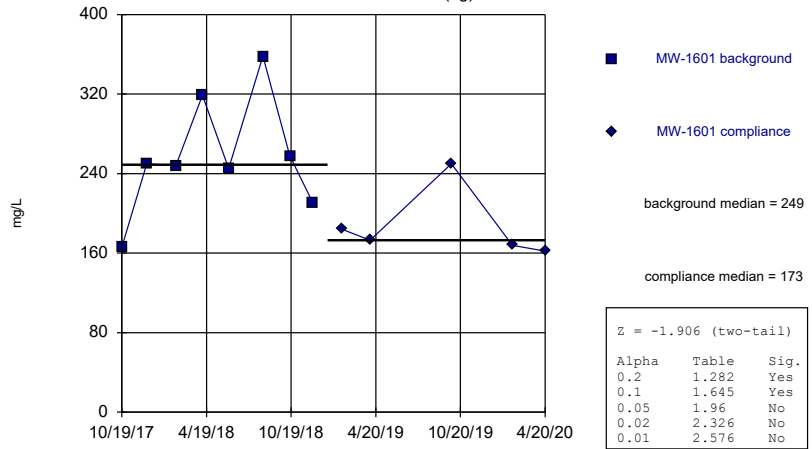
MW-1612



Constituent: Fluoride Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

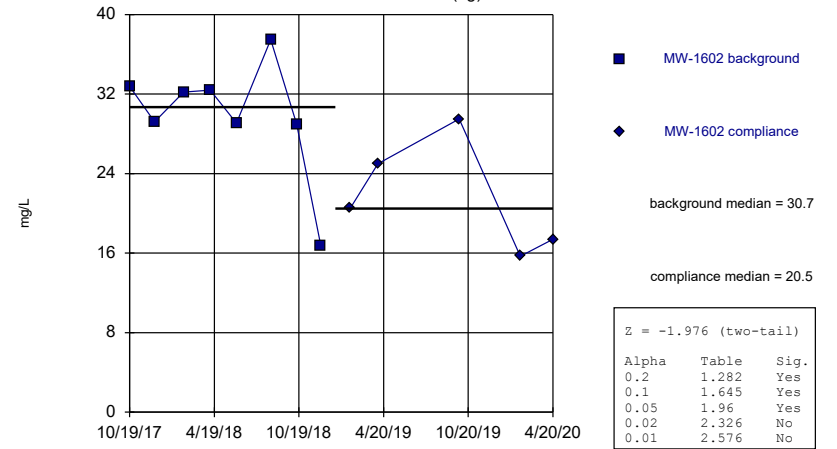
MW-1601 (bg)



Constituent: Sulfate Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

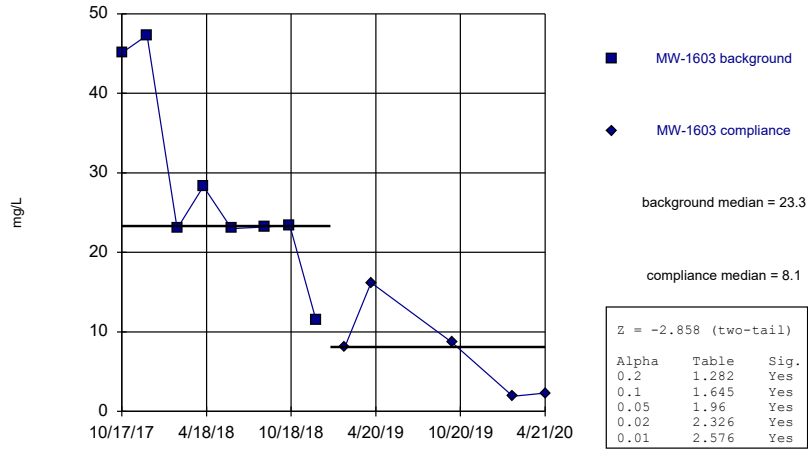
MW-1602 (bg)



Constituent: Sulfate Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

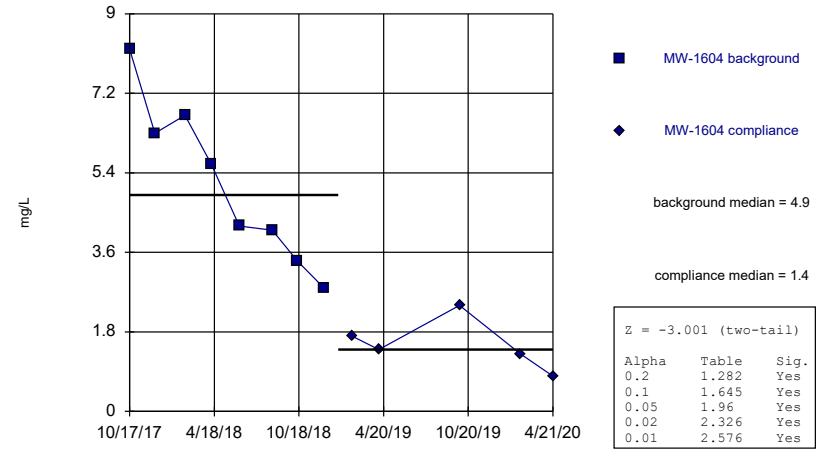
MW-1603



Constituent: Sulfate Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

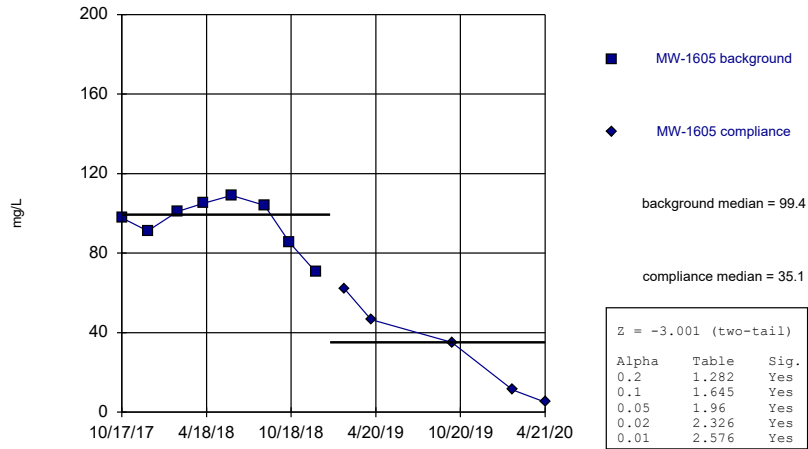
MW-1604



Constituent: Sulfate Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

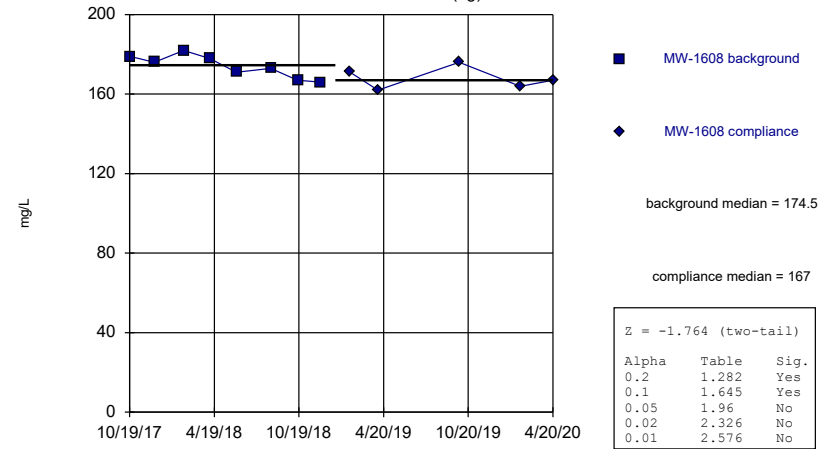
MW-1605



Constituent: Sulfate Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

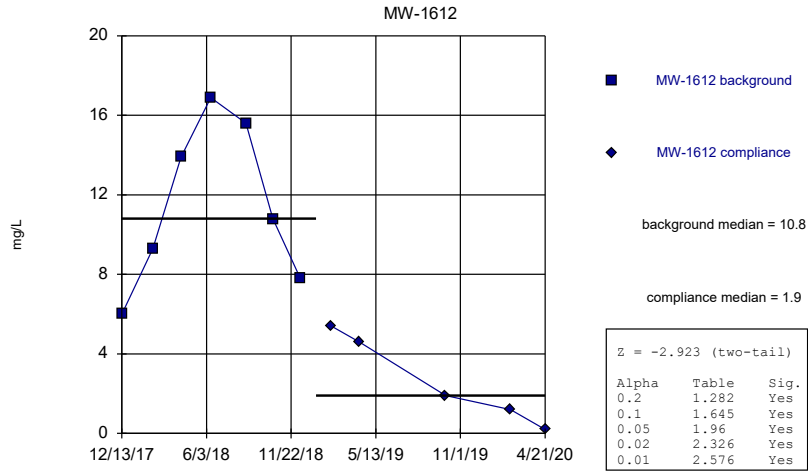
Mann-Whitney (Wilcoxon Rank Sum)

MW-1608 (bg)



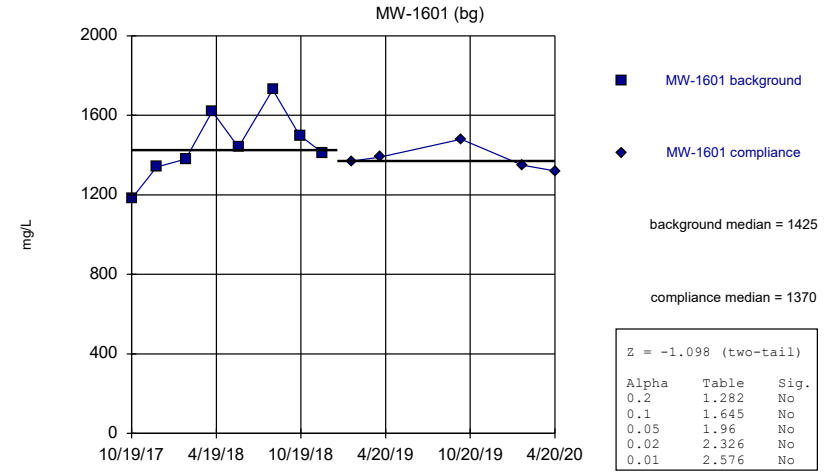
Constituent: Sulfate Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



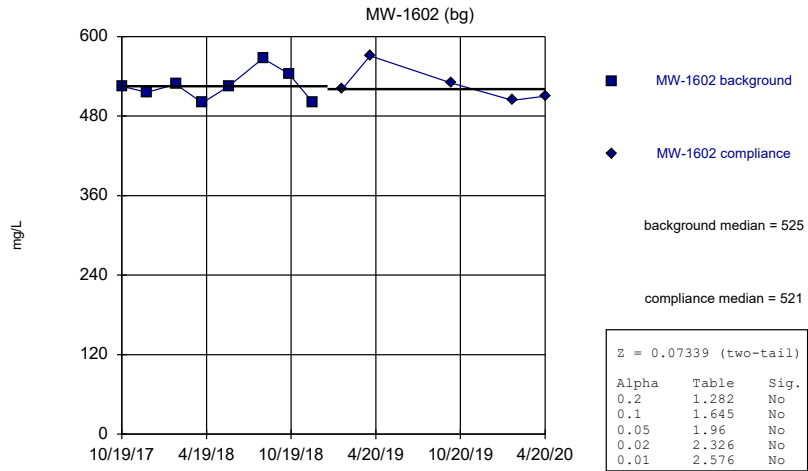
Constituent: Sulfate Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



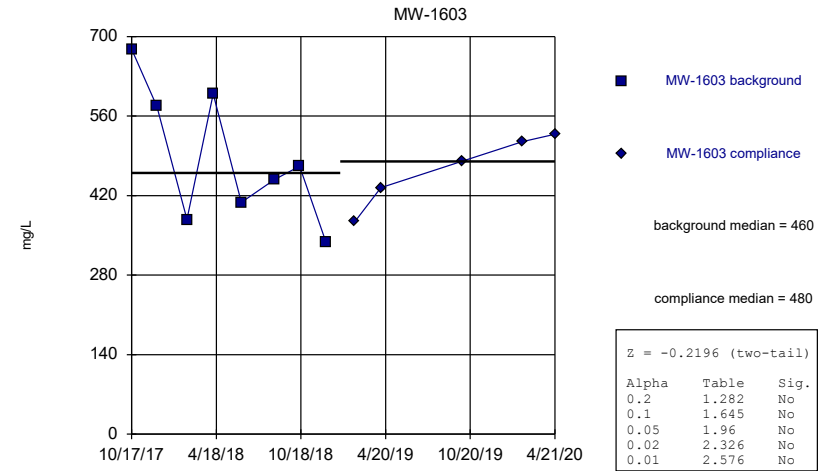
Constituent: Total Dissolved Solids Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal -
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Total Dissolved Solids Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal -
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

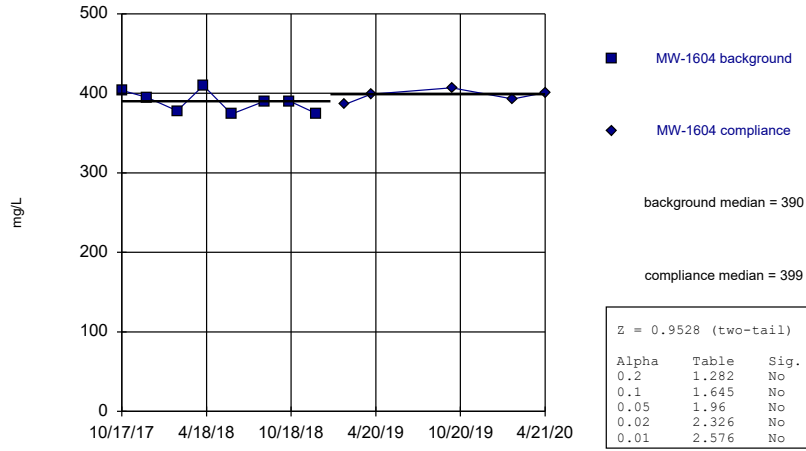
Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Total Dissolved Solids Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal -
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

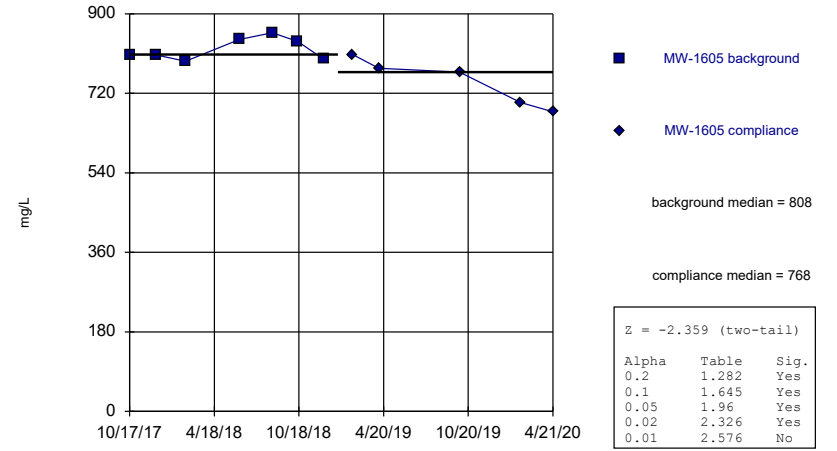
MW-1604



Constituent: Total Dissolved Solids Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

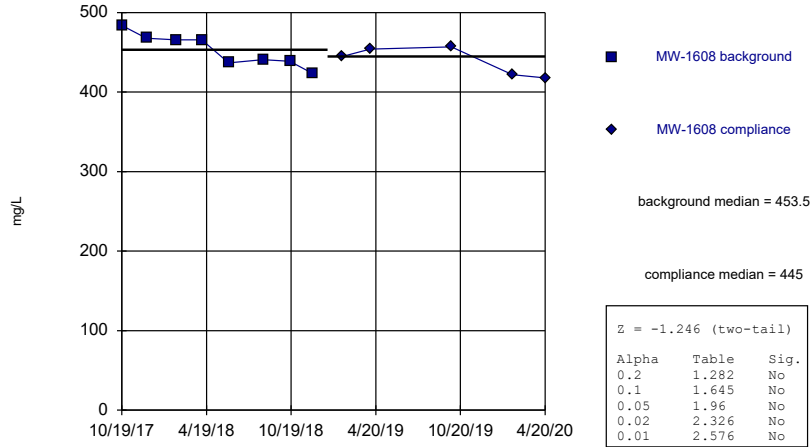
MW-1605



Constituent: Total Dissolved Solids Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

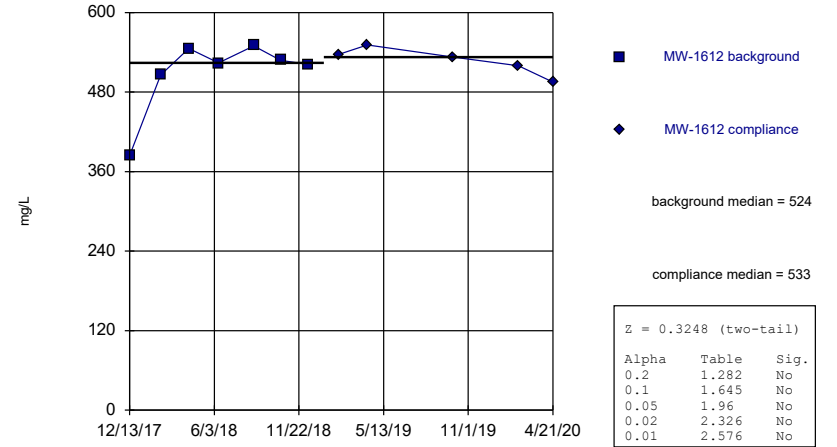
MW-1608 (bg)



Constituent: Total Dissolved Solids Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

MW-1612



Constituent: Total Dissolved Solids Analysis Run 1/14/2021 8:48 AM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Welch's t-test/Mann-Whitney (Rome Limestone) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:40 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Fluoride (mg/L)	MW-1609 (bg)	-3.013	Yes	Mann-W

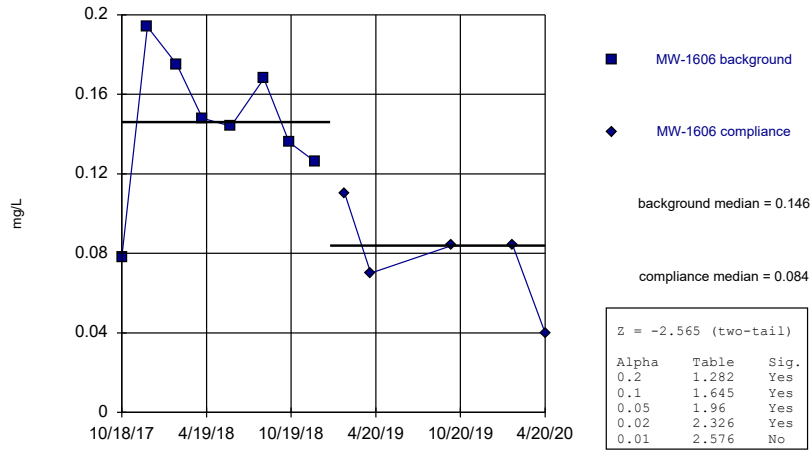
Welch's t-test/Mann-Whitney (Rome Limestone) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:40 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Boron (mg/L)	MW-1606	-2.565	No	Mann-W
Boron (mg/L)	MW-1607	-2.419	No	Mann-W
Boron (mg/L)	MW-1609 (bg)	-2.337	No	Mann-W
Calcium (mg/L)	MW-1606	0.7329	No	Mann-W
Calcium (mg/L)	MW-1607	-0.6587	No	Mann-W
Calcium (mg/L)	MW-1609 (bg)	0.366	No	Mann-W
Fluoride (mg/L)	MW-1606	-1.761	No	Mann-W
Fluoride (mg/L)	MW-1607	-2.285	No	Mann-W
Fluoride (mg/L)	MW-1609 (bg)	-3.013	Yes	Mann-W
pH (SU)	MW-1606	0.6605	No	Mann-W
pH (SU)	MW-1607	0.1466	No	Mann-W
pH (SU)	MW-1609 (bg)	0.9528	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1606	-0.366	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1607	-1.004	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1609 (bg)	-0.4398	No	Mann-W

Mann-Whitney (Wilcoxon Rank Sum)

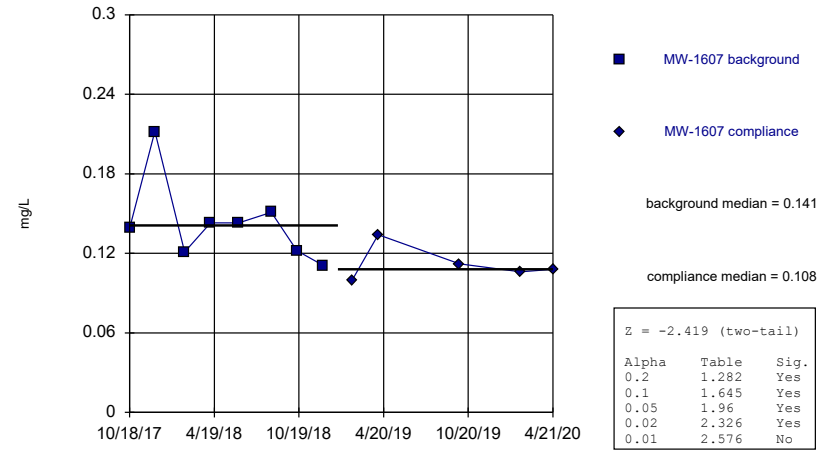
MW-1606



Constituent: Boron Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

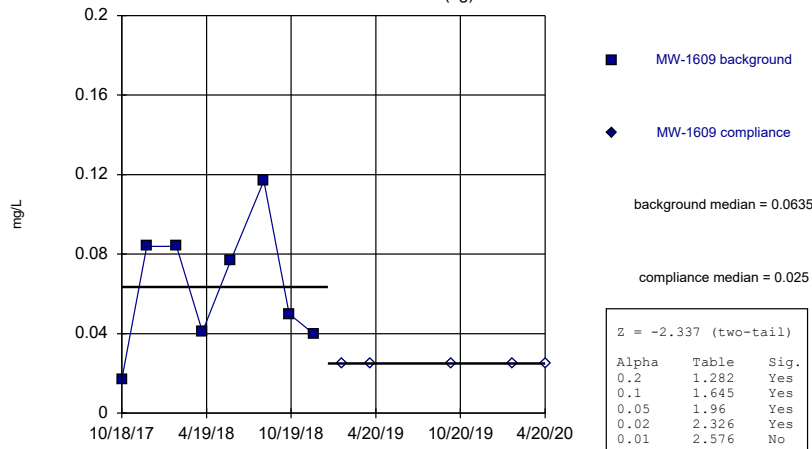
MW-1607



Constituent: Boron Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

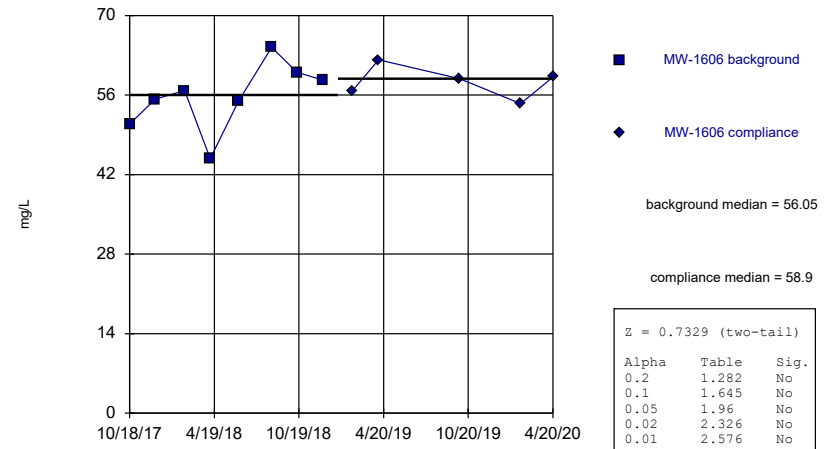
MW-1609 (bg)



Constituent: Boron Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

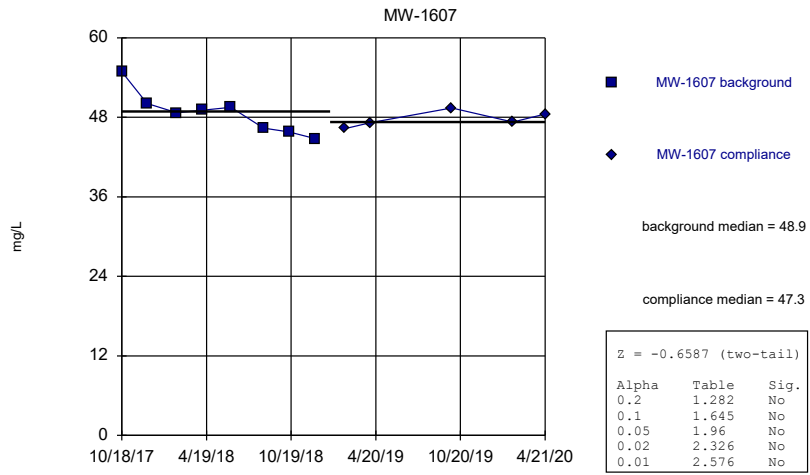
Mann-Whitney (Wilcoxon Rank Sum)

MW-1606



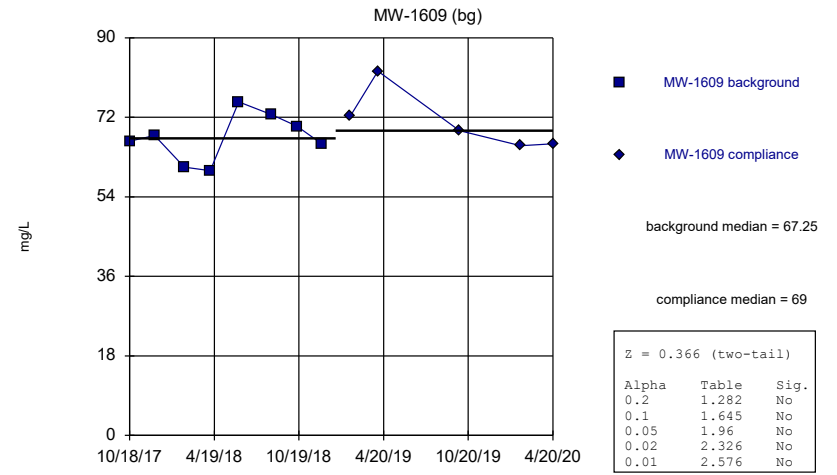
Constituent: Calcium Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



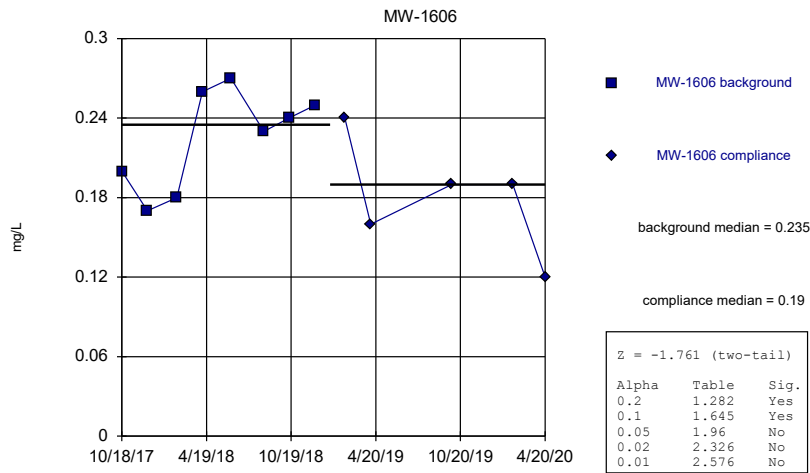
Constituent: Calcium Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



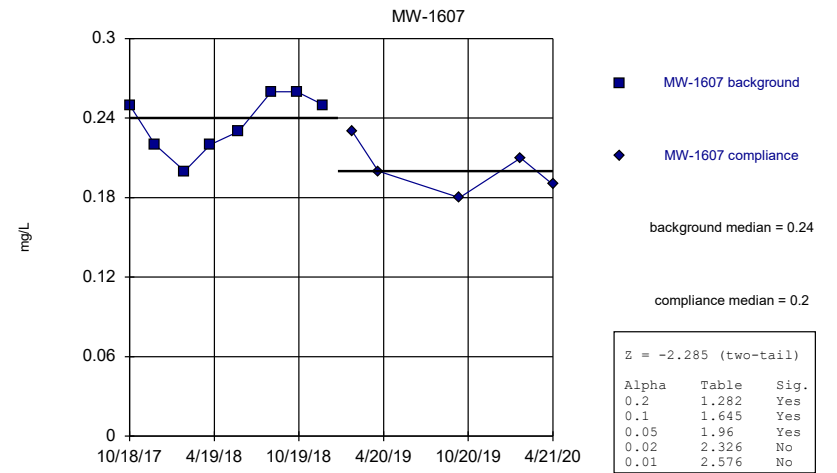
Constituent: Calcium Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Fluoride Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

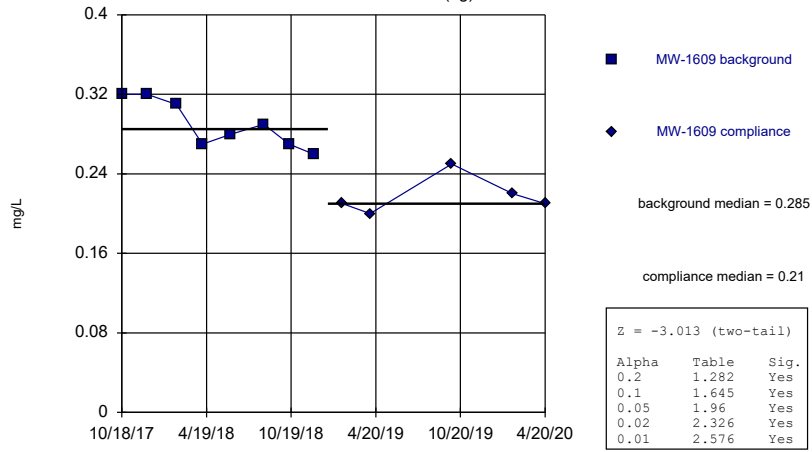
Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Fluoride Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

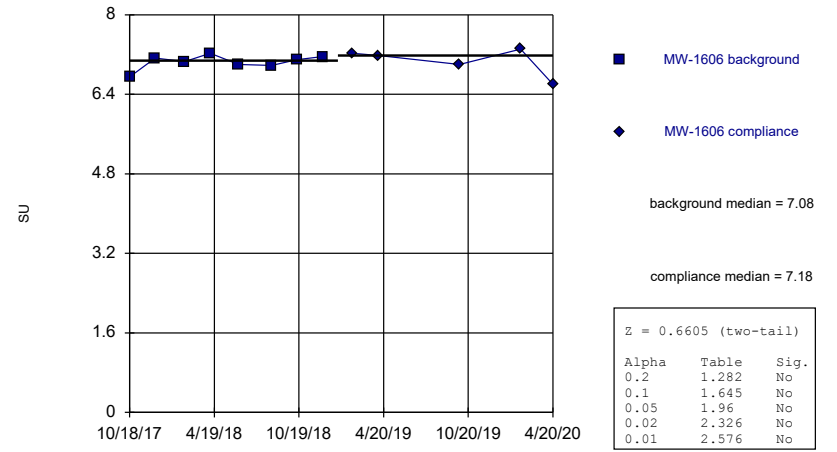
MW-1609 (bg)



Constituent: Fluoride Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

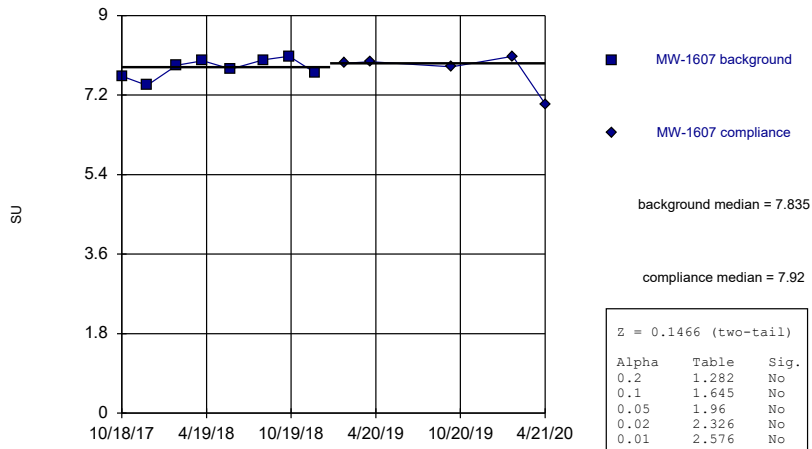
MW-1606



Constituent: pH Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

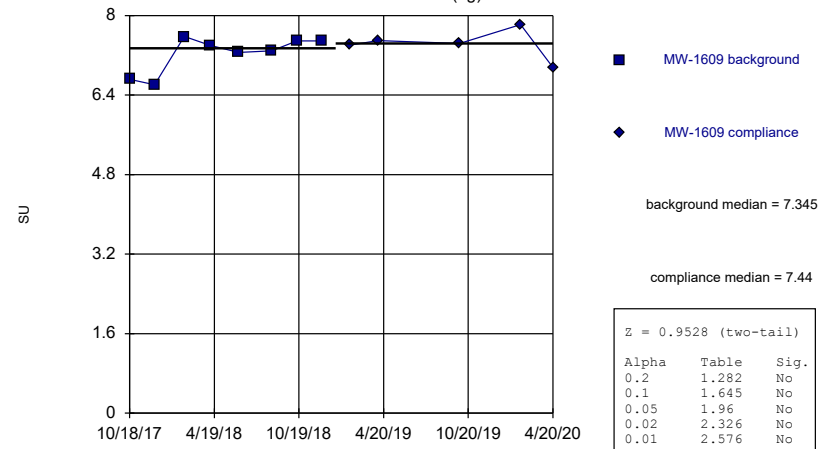
MW-1607



Constituent: pH Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

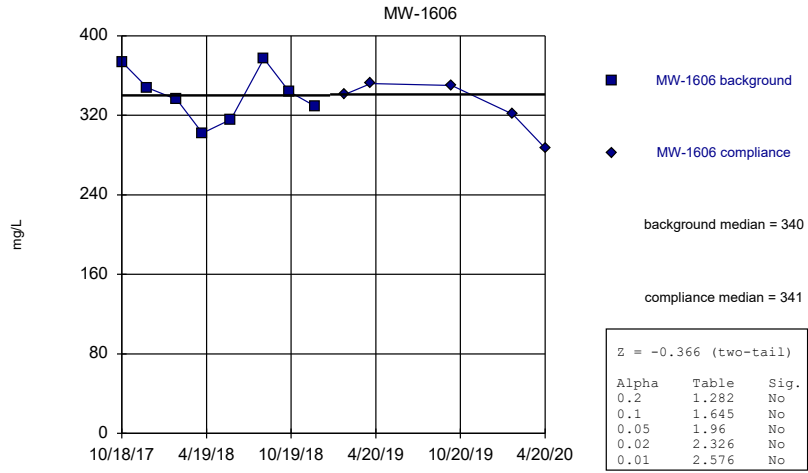
Mann-Whitney (Wilcoxon Rank Sum)

MW-1609 (bg)



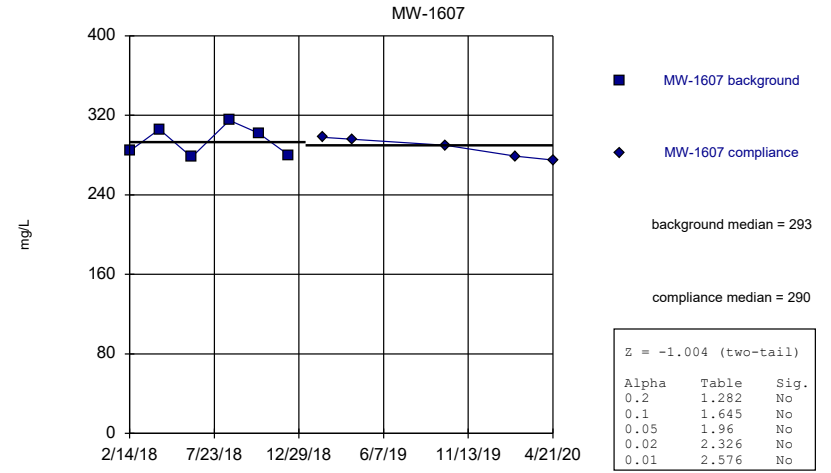
Constituent: pH Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



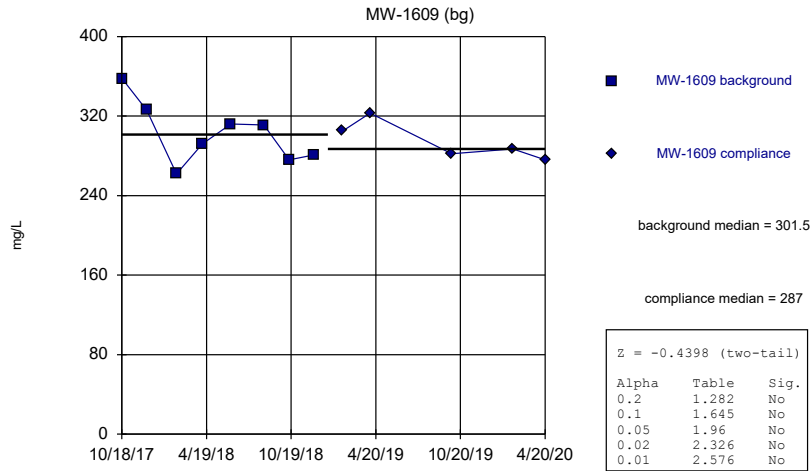
Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - I
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - I
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:38 AM View: Rome Limestone - Federal - I
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Welch's t-test/Mann-Whitney (Dumps Fault) - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 1:13 PM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Boron (mg/L)	MW-1610	-2.94	Yes	Mann-W
Calcium (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Chloride (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Sulfate (mg/L)	MW-1610	-2.708	Yes	Mann-W
Sulfate (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Total Dissolved Solids (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W

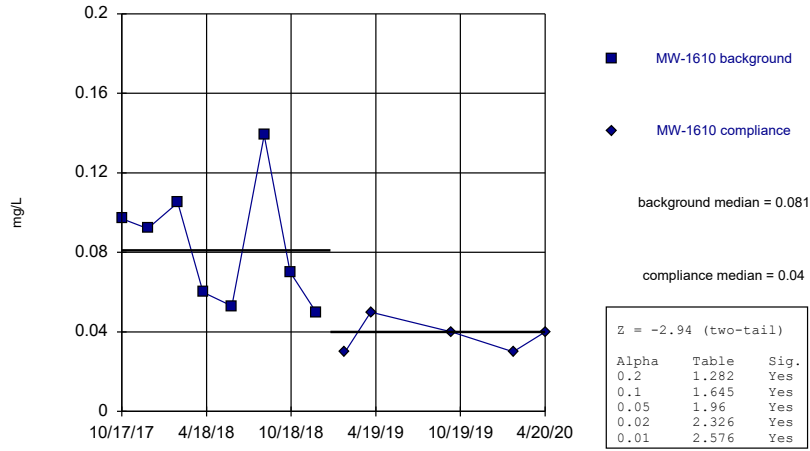
Welch's t-test/Mann-Whitney (Dumps Fault) - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 1:13 PM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Boron (mg/L)	MW-1610	-2.94	Yes	Mann-W
Boron (mg/L)	MW-1611 (bg)	-1.537	No	Mann-W
Calcium (mg/L)	MW-1610	2.126	No	Mann-W
Calcium (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Chloride (mg/L)	MW-1610	-1.615	No	Mann-W
Chloride (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Fluoride (mg/L)	MW-1610	-1.418	No	Mann-W
Fluoride (mg/L)	MW-1611 (bg)	2.422	No	Mann-W
pH (SU)	MW-1610	0.2196	No	Mann-W
pH (SU)	MW-1611 (bg)	1.026	No	Mann-W
Sulfate (mg/L)	MW-1610	-2.708	Yes	Mann-W
Sulfate (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W
Total Dissolved Solids (mg/L)	MW-1610	0.8118	No	Mann-W
Total Dissolved Solids (mg/L)	MW-1611 (bg)	-3.001	Yes	Mann-W

Mann-Whitney (Wilcoxon Rank Sum)

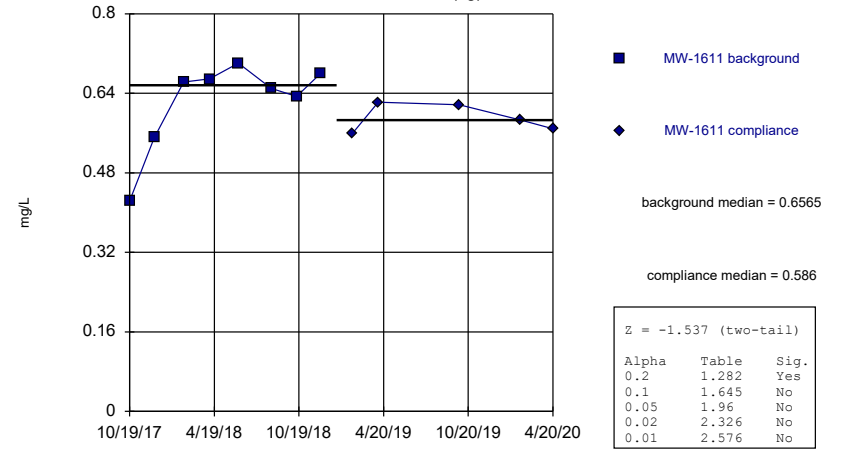
MW-1610



Constituent: Boron Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

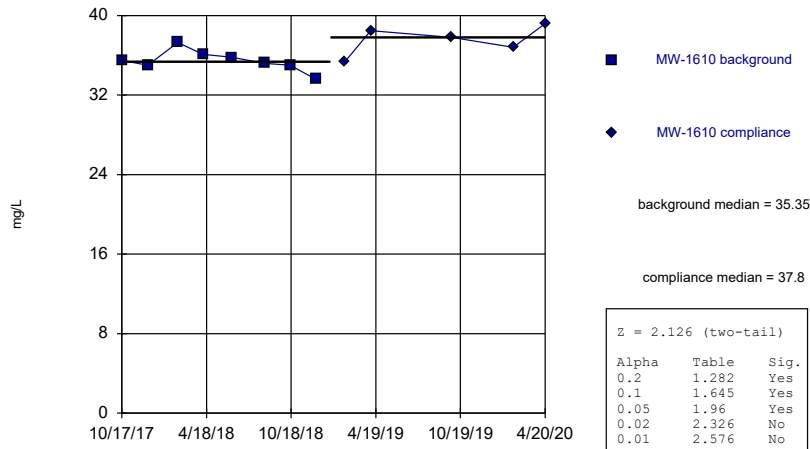
MW-1611 (bg)



Constituent: Boron Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

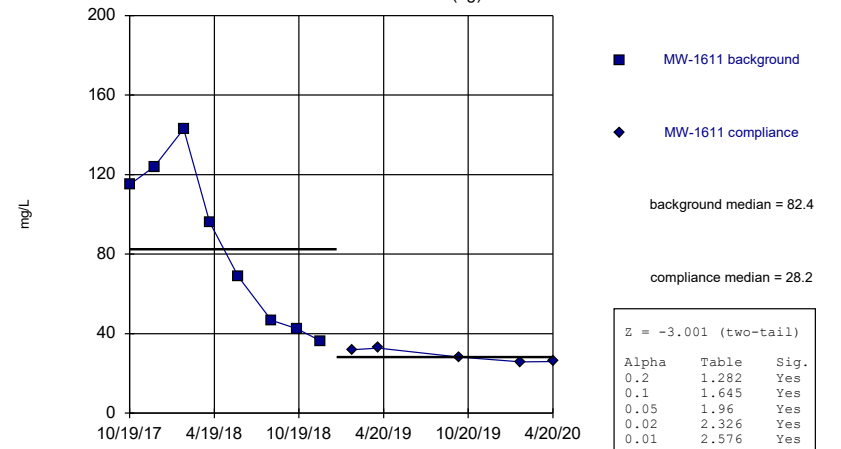
MW-1610



Constituent: Calcium Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

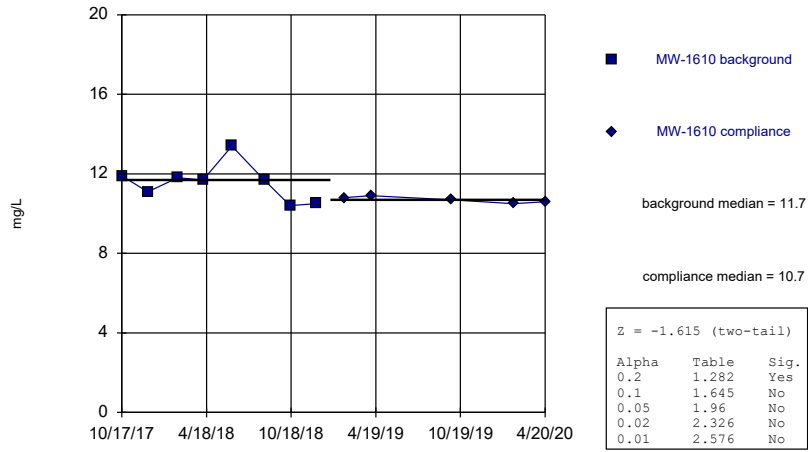
MW-1611 (bg)



Constituent: Calcium Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

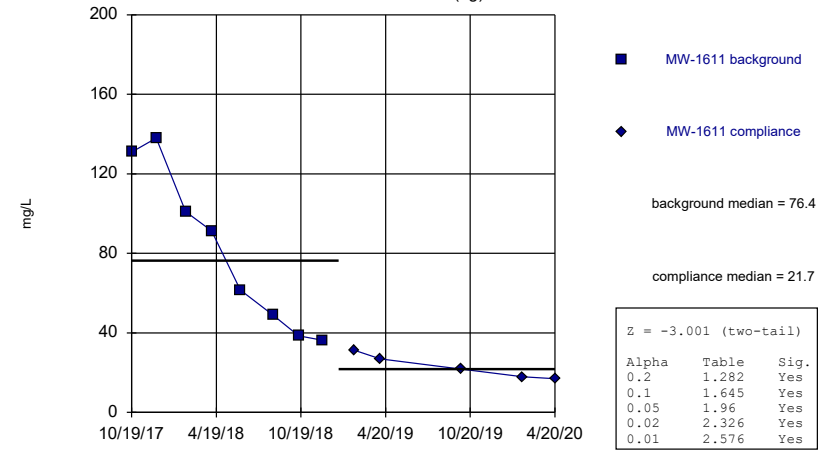
MW-1610



Constituent: Chloride Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

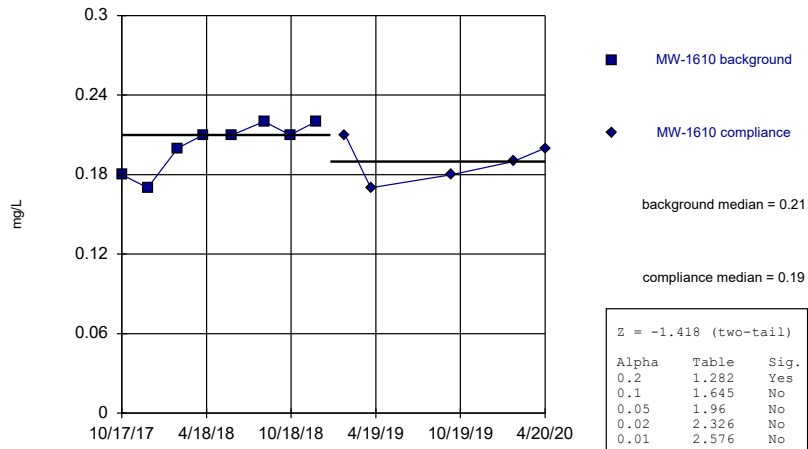
MW-1611 (bg)



Constituent: Chloride Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)

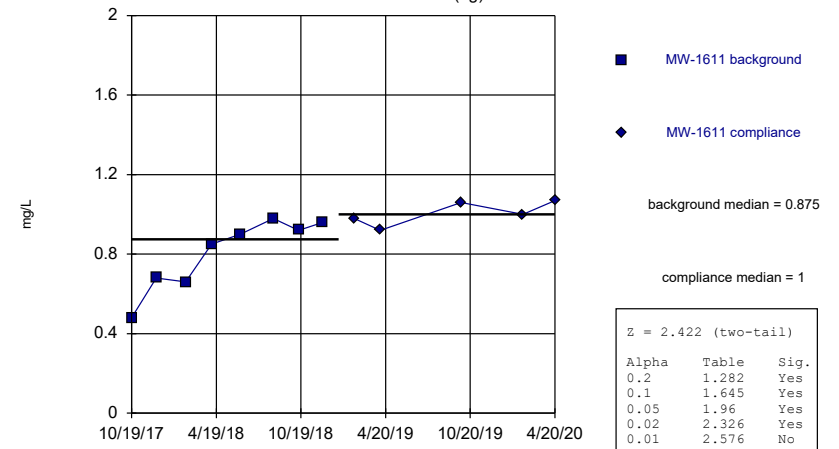
MW-1610



Constituent: Fluoride Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

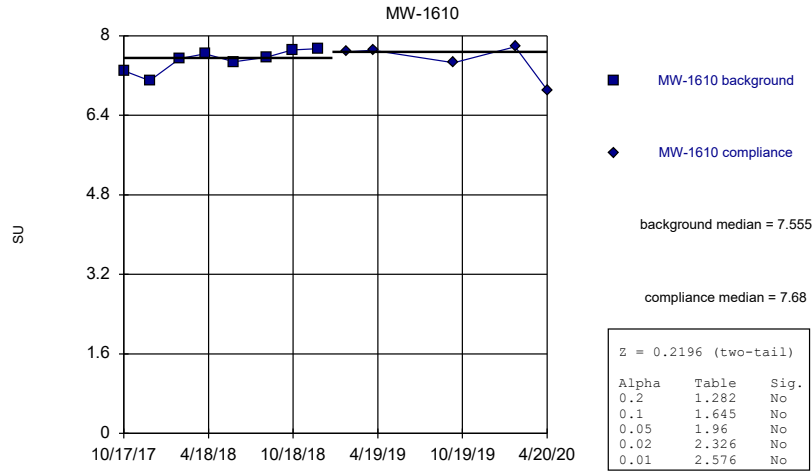
Mann-Whitney (Wilcoxon Rank Sum)

MW-1611 (bg)



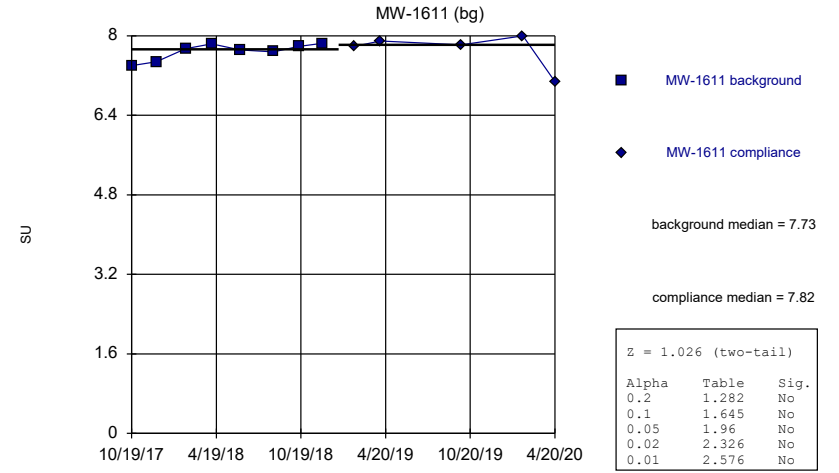
Constituent: Fluoride Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



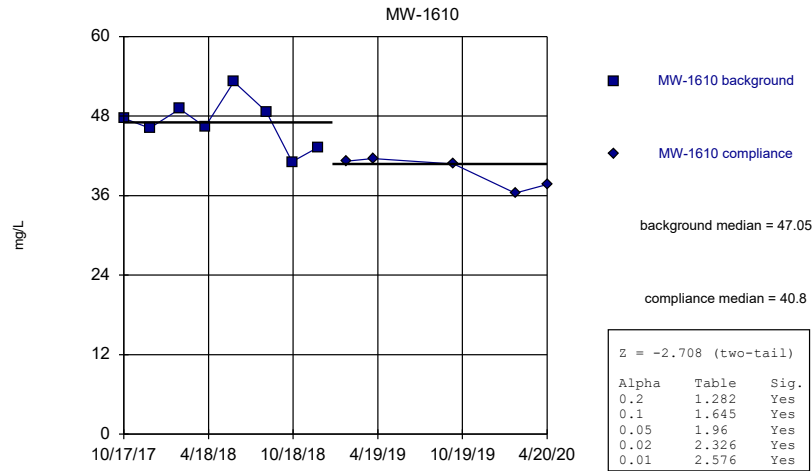
Constituent: pH Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



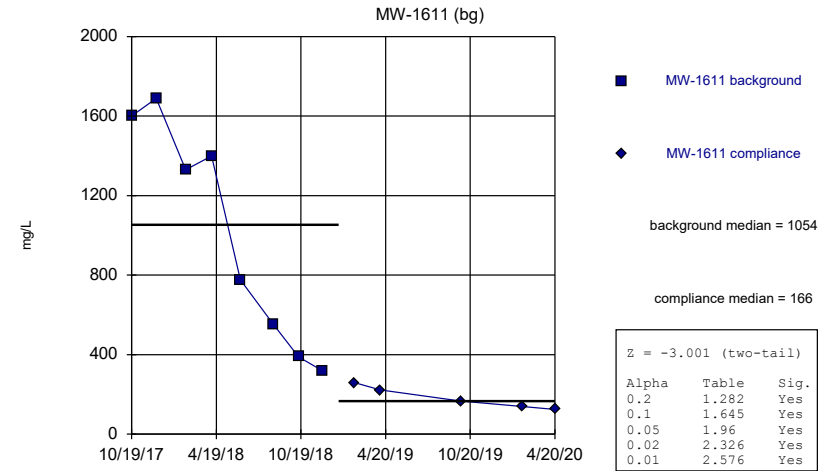
Constituent: pH Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Sulfate Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

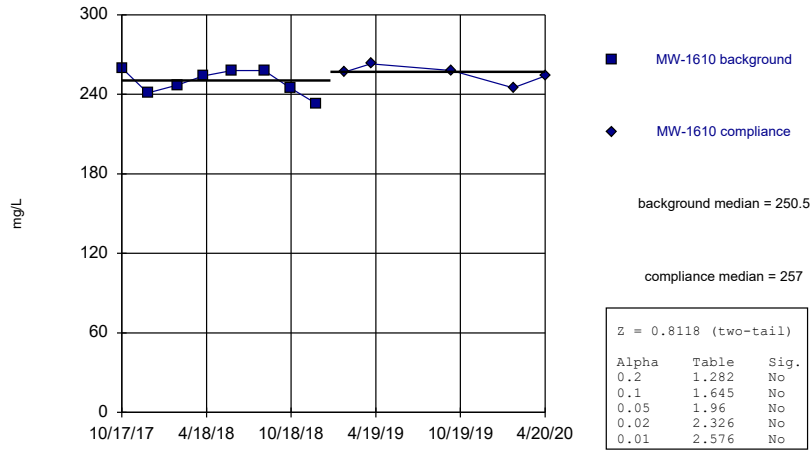
Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Sulfate Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

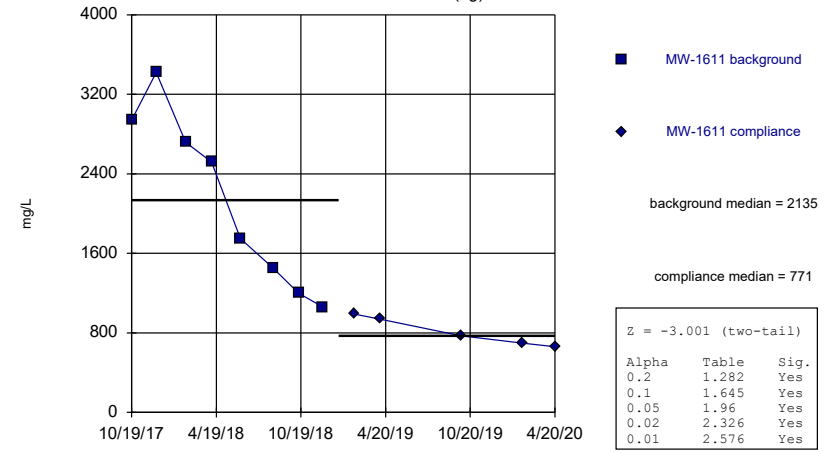
Mann-Whitney (Wilcoxon Rank Sum)

MW-1610



Mann-Whitney (Wilcoxon Rank Sum)

MW-1611 (bg)



Constituent: Total Dissolved Solids Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intraw
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Constituent: Total Dissolved Solids Analysis Run 1/29/2021 1:12 PM View: Dumps Fault - Federal - Intraw
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

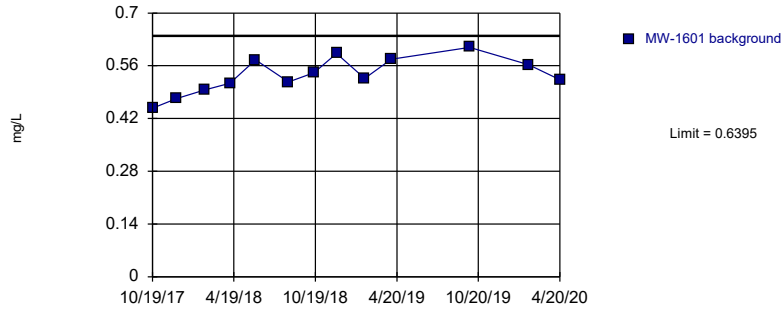
FIGURE E.

Intrawell Prediction Limits - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/18/2021, 4:49 PM

Constituent	Well	Upper Lim	Lower Lim	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-1601	0.6395	n/a	n/a	1 future	n/a	13	0.5351	0.04762	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1602	0.696	n/a	n/a	1 future	n/a	13	0.6204	0.0345	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1603	0.5017	n/a	n/a	1 future	n/a	13	0.2815	0.1004	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1604	0.5006	n/a	n/a	1 future	n/a	13	0.4178	0.03776	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1605	0.6766	n/a	n/a	1 future	n/a	13	0.5785	0.04472	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1608	0.3926	n/a	n/a	1 future	n/a	13	0.3509	0.019	0	None	No	0.00188	Param Intra 1 of 2
Boron (mg/L)	MW-1612	0.5911	n/a	n/a	1 future	n/a	12	0.4572	0.06002	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1601	2.511	n/a	n/a	1 future	n/a	13	2.103	0.1861	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1602	1.744	n/a	n/a	1 future	n/a	13	1.598	0.06673	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1603	0.1877	n/a	n/a	1 future	n/a	13	0.1246	0.02876	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1604	0.2865	n/a	n/a	1 future	n/a	13	0.2346	0.02367	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1605	0.4271	n/a	n/a	1 future	n/a	13	0.3569	0.03199	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1608	0.4817	n/a	n/a	1 future	n/a	13	0.4254	0.0257	0	None	No	0.00188	Param Intra 1 of 2
Fluoride (mg/L)	MW-1612	0.2483	n/a	n/a	1 future	n/a	12	0.1617	0.03881	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1601	364	n/a	n/a	1 future	n/a	13	230.1	61.08	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1602	42.08	n/a	n/a	1 future	n/a	13	26.69	7.015	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1603	33.92	n/a	n/a	1 future	n/a	8	11.91	8.413	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1604	5.22	n/a	n/a	1 future	n/a	8	2.238	1.14	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1605	143.2	n/a	n/a	1 future	n/a	8	52.41	34.71	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1608	185.4	n/a	n/a	1 future	n/a	13	171.7	6.25	0	None	No	0.00188	Param Intra 1 of 2
Sulfate (mg/L)	MW-1612	19.72	n/a	n/a	1 future	n/a	8	5.938	5.267	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1601	1728	n/a	n/a	1 future	n/a	13	1424	138.5	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1602	576.4	n/a	n/a	1 future	n/a	13	526.2	22.86	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1603	695	n/a	n/a	1 future	n/a	13	479.2	98.41	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1604	418.4	n/a	n/a	1 future	n/a	13	392.5	11.84	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1605	909.8	n/a	n/a	1 future	n/a	12	789.4	53.92	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1608	492.1	n/a	n/a	1 future	n/a	13	447.7	20.25	0	None	No	0.00188	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1612	583.9	n/a	n/a	1 future	n/a	12	7.4e10	1.9e10	0	None	x^4	0.00188	Param Intra 1 of 2

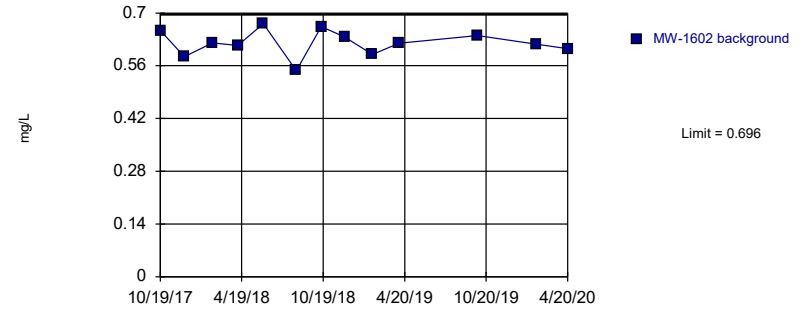
Prediction Limit
Intrawell Parametric, MW-1601 (bg)



Background Data Summary: Mean=0.5351, Std. Dev.=0.04762, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9752, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

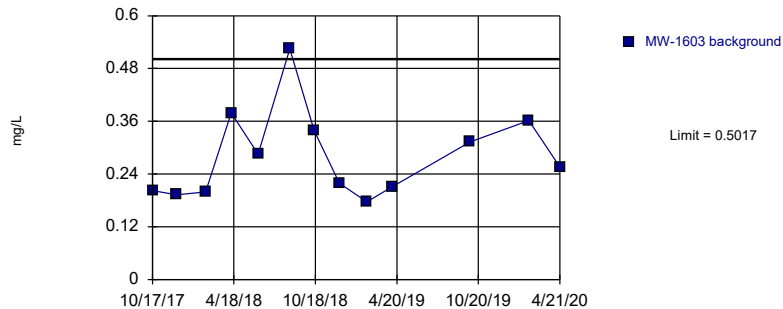
Prediction Limit
Intrawell Parametric, MW-1602 (bg)



Background Data Summary: Mean=0.6204, Std. Dev.=0.0345, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9709, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

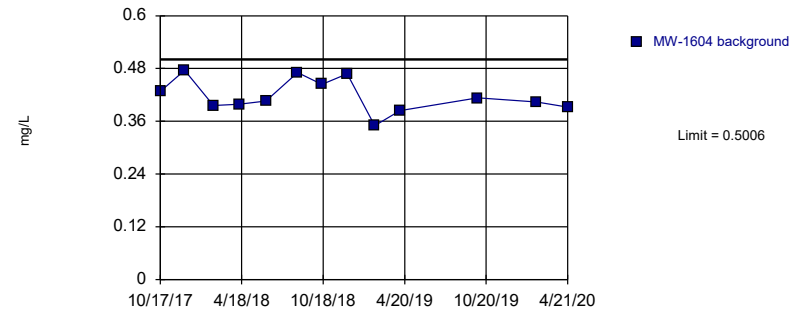
Prediction Limit
Intrawell Parametric, MW-1603



Background Data Summary: Mean=0.2815, Std. Dev.=0.1004, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8773, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

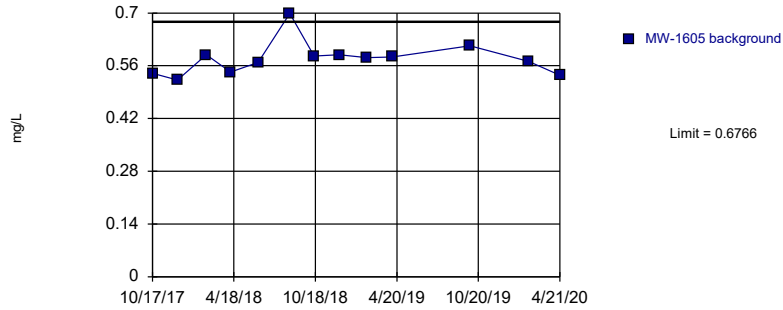
Prediction Limit
Intrawell Parametric, MW-1604



Background Data Summary: Mean=0.4178, Std. Dev.=0.03776, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9372, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

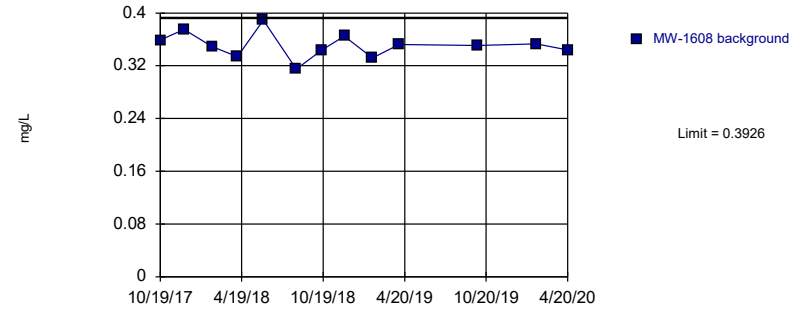
Prediction Limit
Intrawell Parametric, MW-1605



Background Data Summary: Mean=0.5785, Std. Dev.=0.04472, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.852, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

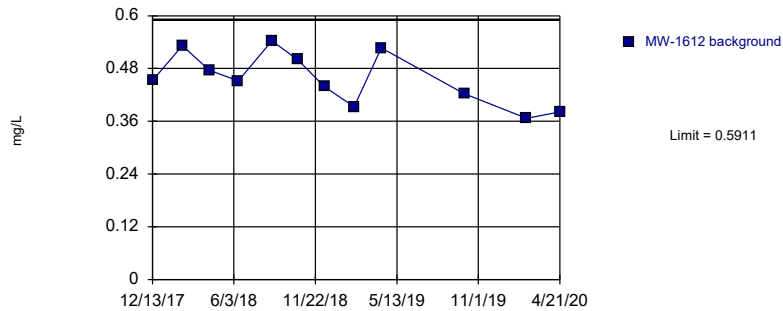
Prediction Limit
Intrawell Parametric, MW-1608 (bg)



Background Data Summary: Mean=0.3509, Std. Dev.=0.019, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9794, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

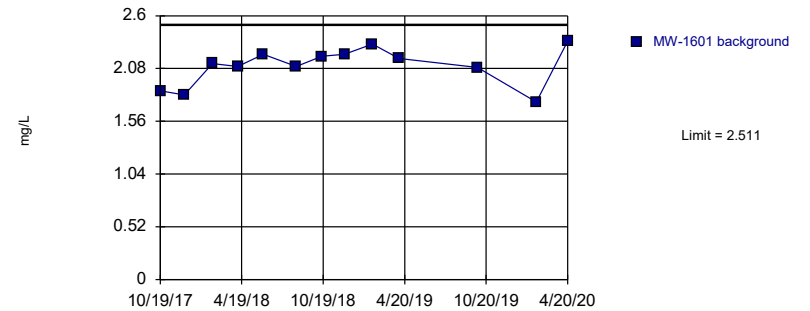
Prediction Limit
Intrawell Parametric, MW-1612



Background Data Summary: Mean=0.4572, Std. Dev.=0.06002, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9466, critical = 0.805. Kappa = 2.232 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Boron Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

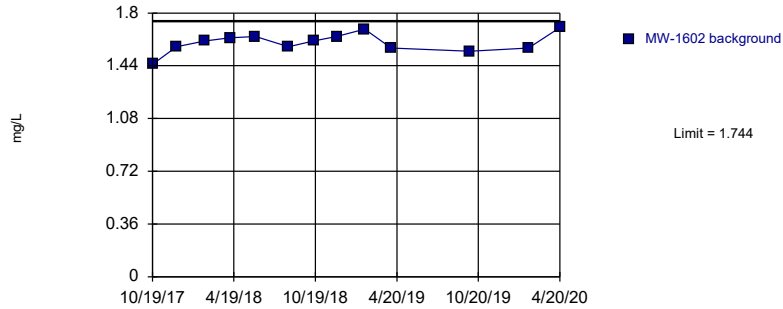
Prediction Limit
Intrawell Parametric, MW-1601 (bg)



Background Data Summary: Mean=2.103, Std. Dev.=0.1861, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9018, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

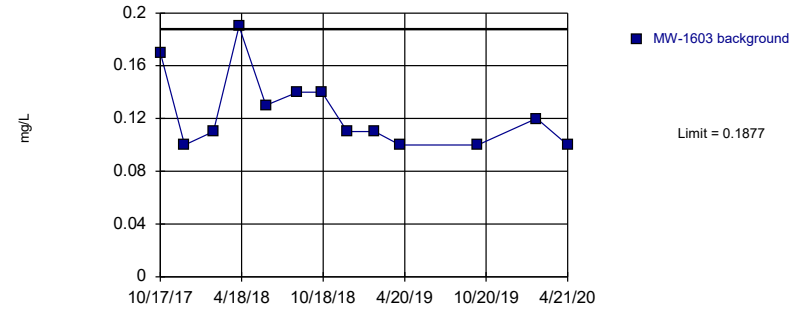
Prediction Limit
Intrawell Parametric, MW-1602 (bg)



Background Data Summary: Mean=1.598, Std. Dev.=0.06673, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9521, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

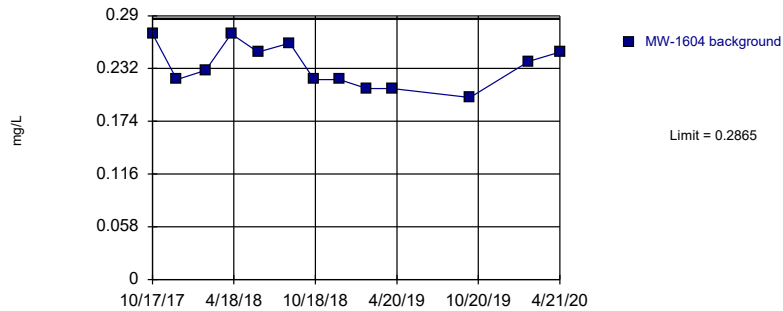
Prediction Limit
Intrawell Parametric, MW-1603



Background Data Summary: Mean=0.1246, Std. Dev.=0.02876, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8294, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

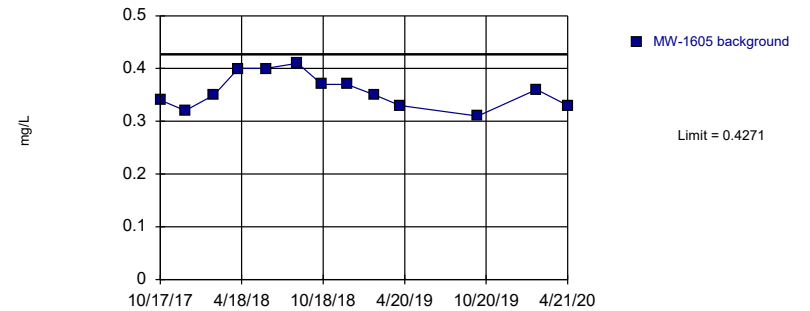
Prediction Limit
Intrawell Parametric, MW-1604



Background Data Summary: Mean=0.2346, Std. Dev.=0.02367, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9287, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

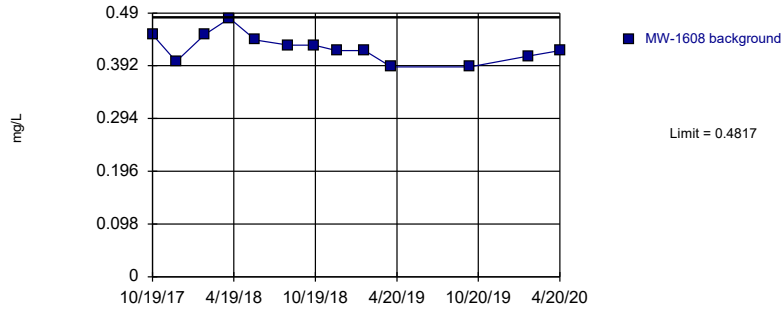
Prediction Limit
Intrawell Parametric, MW-1605



Background Data Summary: Mean=0.3569, Std. Dev.=0.03199, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9455, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

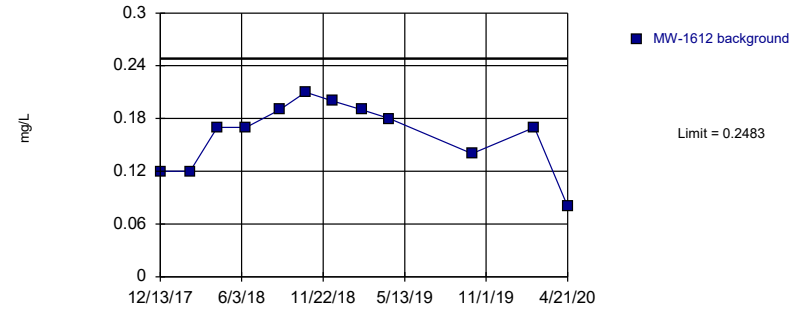
Prediction Limit
Intrawell Parametric, MW-1608 (bg)



Background Data Summary: Mean=0.4254, Std. Dev.=0.0257, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9553, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

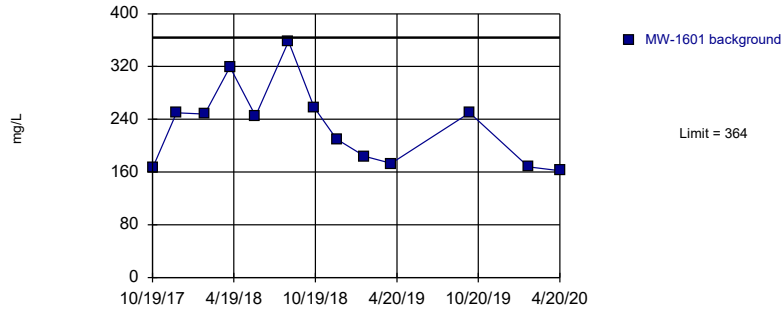
Prediction Limit
Intrawell Parametric, MW-1612



Background Data Summary: Mean=0.1617, Std. Dev.=0.03881, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9141, critical = 0.805. Kappa = 2.232 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

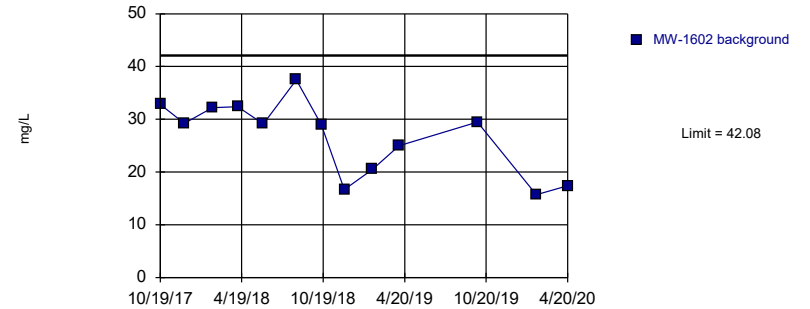
Prediction Limit
Intrawell Parametric, MW-1601 (bg)



Background Data Summary: Mean=230.1, Std. Dev.=61.08, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8941, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Sulfate Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

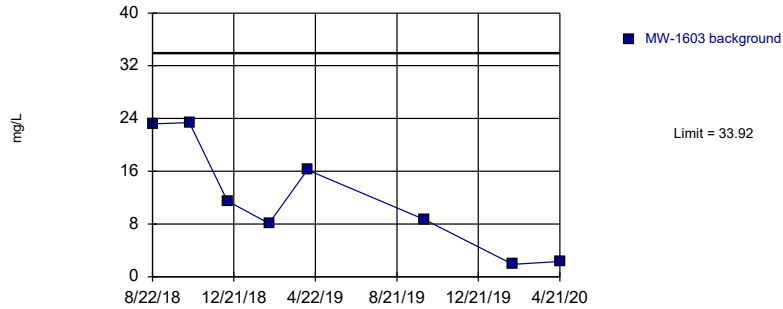
Prediction Limit
Intrawell Parametric, MW-1602 (bg)



Background Data Summary: Mean=26.69, Std. Dev.=7.015, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.908, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Sulfate Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

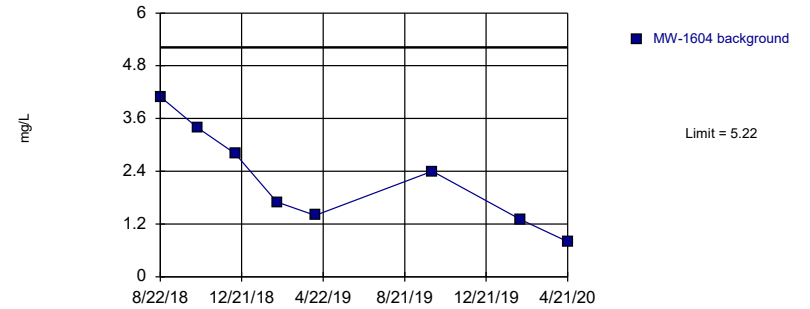
Prediction Limit
Intrawell Parametric, MW-1603



Background Data Summary: Mean=11.91, Std. Dev.=8.413, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9066, critical = 0.749. Kappa = 2.616 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Sulfate Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

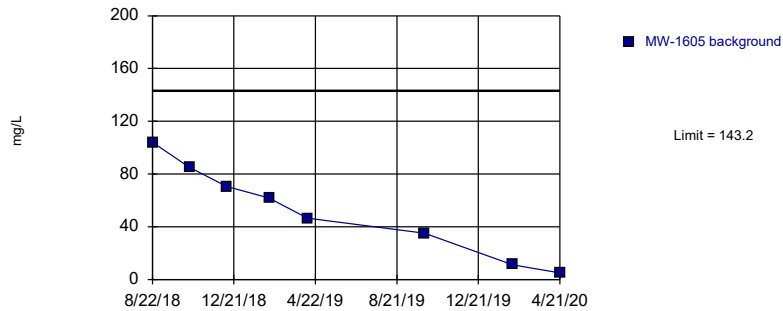
Prediction Limit
Intrawell Parametric, MW-1604



Background Data Summary: Mean=2.238, Std. Dev.=1.14, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9531, critical = 0.749. Kappa = 2.616 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Sulfate Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

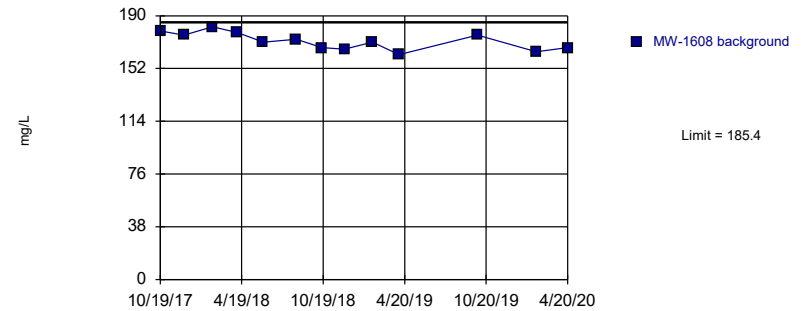
Prediction Limit
Intrawell Parametric, MW-1605



Background Data Summary: Mean=52.41, Std. Dev.=34.71, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9682, critical = 0.749. Kappa = 2.616 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Sulfate Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

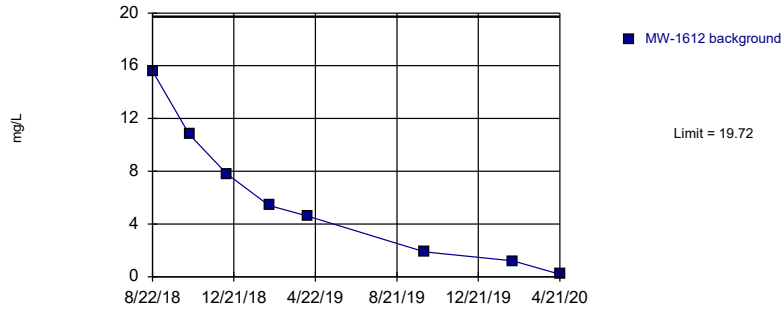
Prediction Limit
Intrawell Parametric, MW-1608 (bg)



Background Data Summary: Mean=171.7, Std. Dev.=6.25, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9618, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Sulfate Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

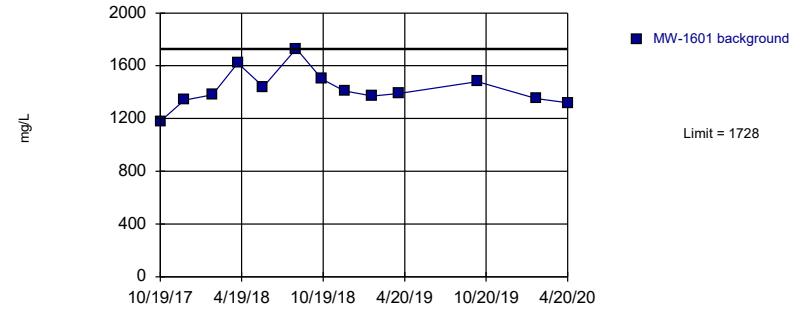
Prediction Limit
Intrawell Parametric, MW-1612



Background Data Summary: Mean=5.938, Std. Dev.=5.267, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9288, critical = 0.749. Kappa = 2.616 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Sulfate Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

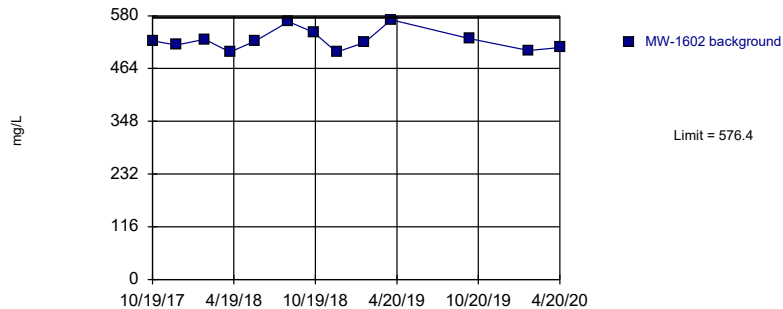
Prediction Limit
Intrawell Parametric, MW-1601 (bg)



Background Data Summary: Mean=1424, Std. Dev.=138.5, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9372, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal -
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

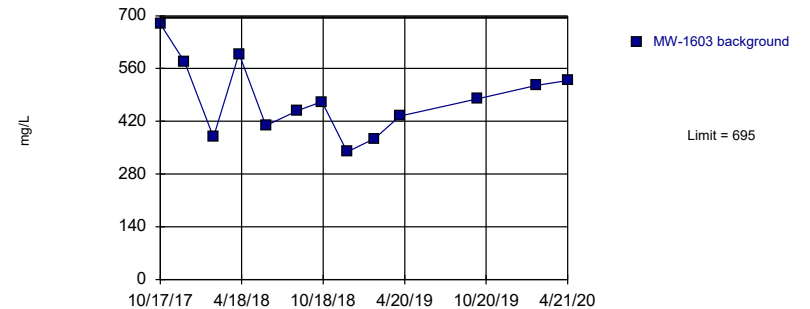
Prediction Limit
Intrawell Parametric, MW-1602 (bg)



Background Data Summary: Mean=526.2, Std. Dev.=22.86, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8955, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal -
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

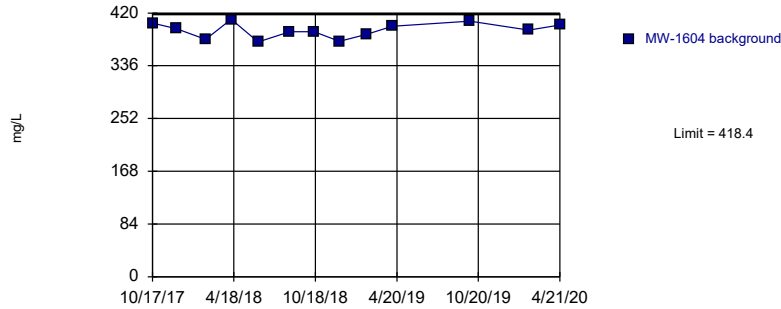
Prediction Limit
Intrawell Parametric, MW-1603



Background Data Summary: Mean=479.2, Std. Dev.=98.41, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9692, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/18/2021 4:48 PM View: Chattanooga Shale - Federal -
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

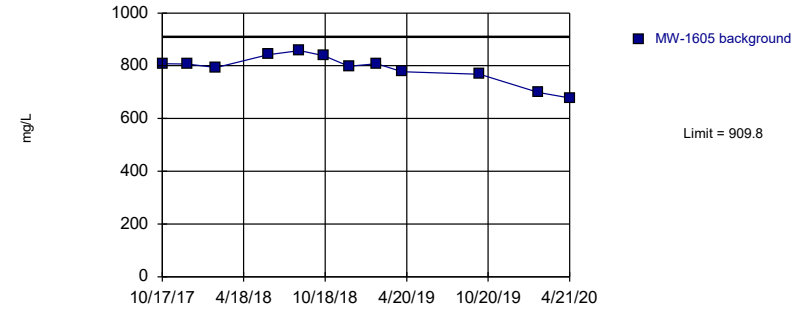
Prediction Limit
Intrawell Parametric, MW-1604



Background Data Summary: Mean=392.5, Std. Dev.=11.84, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9516, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/18/2021 4:49 PM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

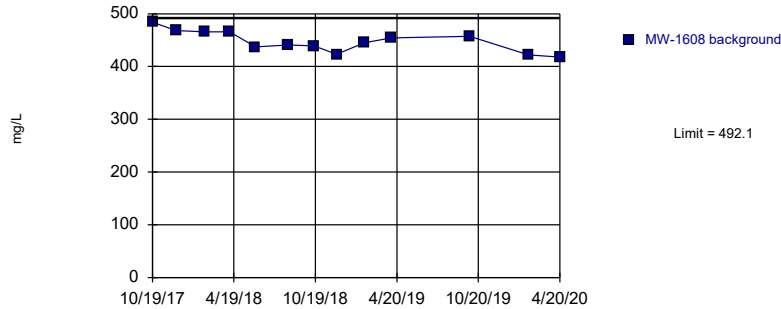
Prediction Limit
Intrawell Parametric, MW-1605



Background Data Summary: Mean=789.4, Std. Dev.=53.92, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8883, critical = 0.805. Kappa = 2.232 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/18/2021 4:49 PM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

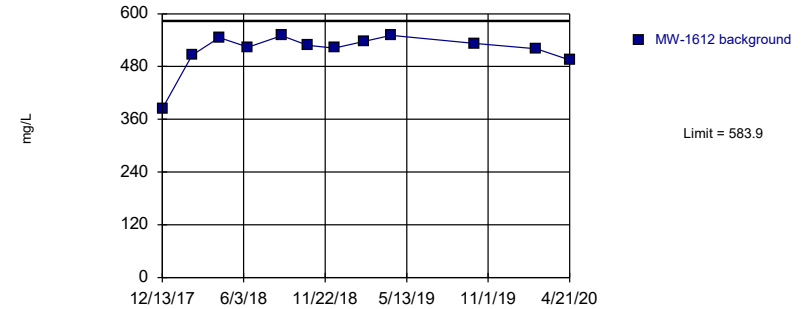
Prediction Limit
Intrawell Parametric, MW-1608 (bg)



Background Data Summary: Mean=447.7, Std. Dev.=20.25, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9582, critical = 0.814. Kappa = 2.193 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/18/2021 4:49 PM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Prediction Limit
Intrawell Parametric, MW-1612



Background Data Summary (based on x^4 transformation): Mean=7.4e10, Std. Dev.=1.9e10, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8054, critical = 0.805. Kappa = 2.232 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188. Assumes 1 future value.

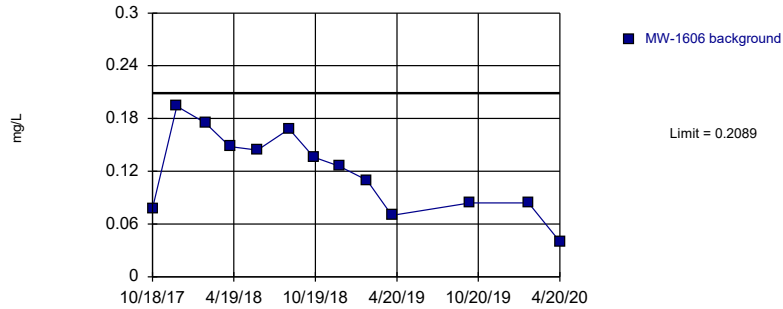
Constituent: Total Dissolved Solids Analysis Run 1/18/2021 4:49 PM View: Chattanooga Shale - Federal - Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Intrawell Prediction Limits - Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-1606	0.2089	n/a	n/a	1 future	n/a	13	0.1198	0.04638	0	None	No	0.003756	Param Intra 1 of 2
Boron (mg/L)	MW-1607	0.1874	n/a	n/a	1 future	n/a	13	0.1309	0.02941	0	None	No	0.003756	Param Intra 1 of 2
Boron (mg/L)	MW-1609	0.1023	n/a	n/a	1 future	n/a	13	0.05015	0.02716	38.46	Kaplan-Meier	No	0.003756	Param Intra 1 of 2
Calcium (mg/L)	MW-1606	66.33	n/a	n/a	1 future	n/a	13	56.72	5.001	0	None	No	0.003756	Param Intra 1 of 2
Calcium (mg/L)	MW-1607	53.23	n/a	n/a	1 future	n/a	13	48.31	2.559	0	None	No	0.003756	Param Intra 1 of 2
Calcium (mg/L)	MW-1609	80.41	n/a	n/a	1 future	n/a	13	68.82	6.032	0	None	No	0.003756	Param Intra 1 of 2
Fluoride (mg/L)	MW-1606	0.2933	n/a	n/a	1 future	n/a	13	0.2077	0.04456	0	None	No	0.003756	Param Intra 1 of 2
Fluoride (mg/L)	MW-1607	0.2741	n/a	n/a	1 future	n/a	13	0.2231	0.02658	0	None	No	0.003756	Param Intra 1 of 2
Fluoride (mg/L)	MW-1609	0.3435	n/a	n/a	1 future	n/a	13	0.2623	0.04226	0	None	No	0.003756	Param Intra 1 of 2
pH (SU)	MW-1606	7.437	6.675	n/a	1 future	n/a	13	7.056	0.1984	0	None	No	0.001878	Param Intra 1 of 2
pH (SU)	MW-1607	8.372	7.209	n/a	1 future	n/a	13	7.791	0.3027	0	None	No	0.001878	Param Intra 1 of 2
pH (SU)	MW-1609	7.969	6.642	n/a	1 future	n/a	13	7.305	0.3455	0	None	No	0.001878	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1606	386.4	n/a	n/a	1 future	n/a	13	336.7	25.88	0	None	No	0.003756	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1607	317.6	n/a	n/a	1 future	n/a	11	291.2	13.17	0	None	No	0.003756	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1609	350	n/a	n/a	1 future	n/a	13	299.3	26.41	0	None	No	0.003756	Param Intra 1 of 2

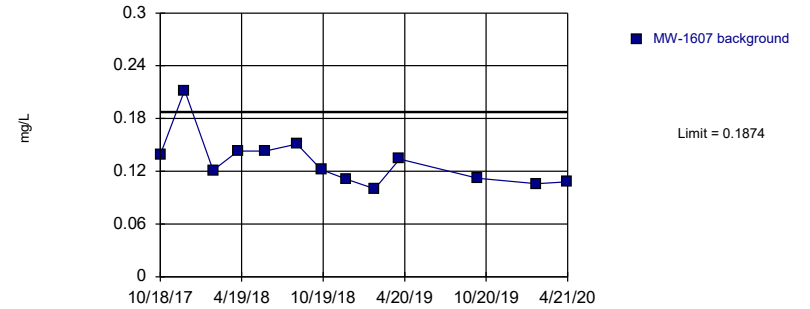
Prediction Limit
Intrawell Parametric, MW-1606



Background Data Summary: Mean=0.1198, Std. Dev.=0.04638, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.968, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Boron Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

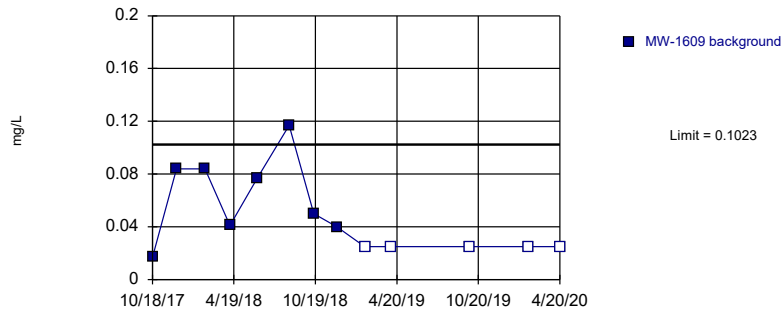
Prediction Limit
Intrawell Parametric, MW-1607



Background Data Summary: Mean=0.1309, Std. Dev.=0.02941, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8254, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Boron Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

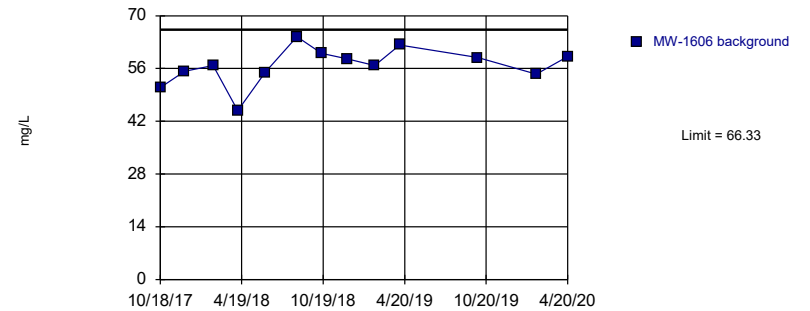
Prediction Limit
Intrawell Parametric, MW-1609 (bg)



Background Data Summary (after Kaplan-Meier Adjustment): Mean=0.05015, Std. Dev.=0.02716, n=13, 38.46% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8385, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Boron Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

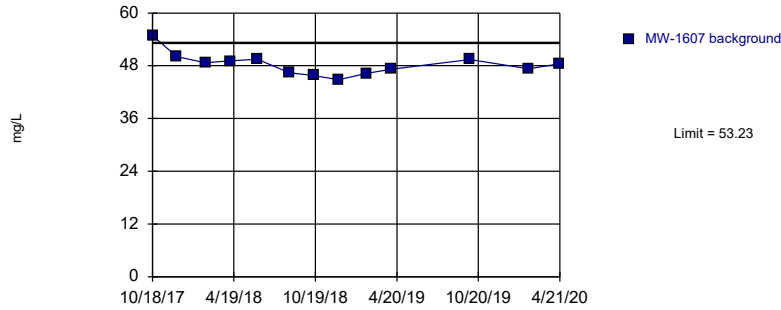
Prediction Limit
Intrawell Parametric, MW-1606



Background Data Summary: Mean=56.72, Std. Dev.=5.001, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9402, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Calcium Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

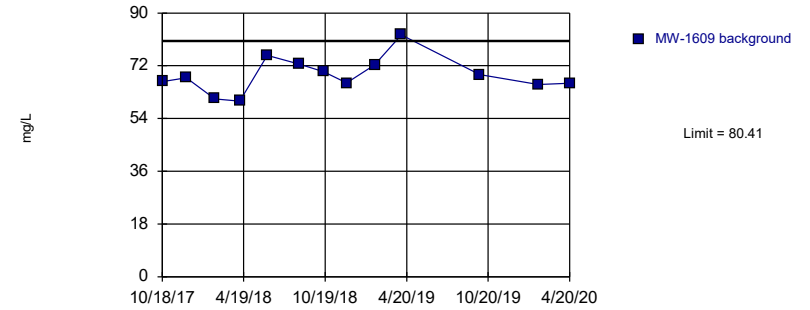
Prediction Limit
Intrawell Parametric, MW-1607



Background Data Summary: Mean=48.31, Std. Dev.=2.559, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8999, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Calcium Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

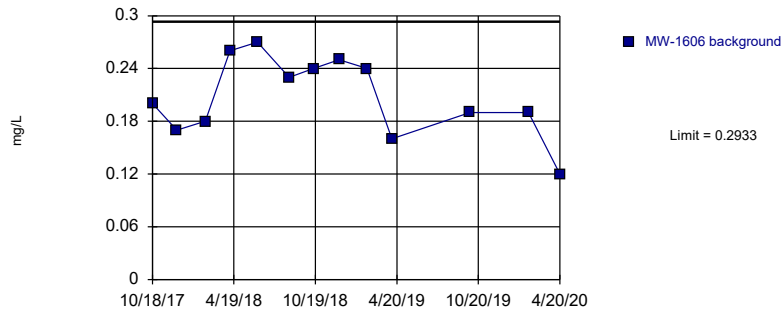
Prediction Limit
Intrawell Parametric, MW-1609 (bg)



Background Data Summary: Mean=68.82, Std. Dev.=6.032, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9489, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Calcium Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

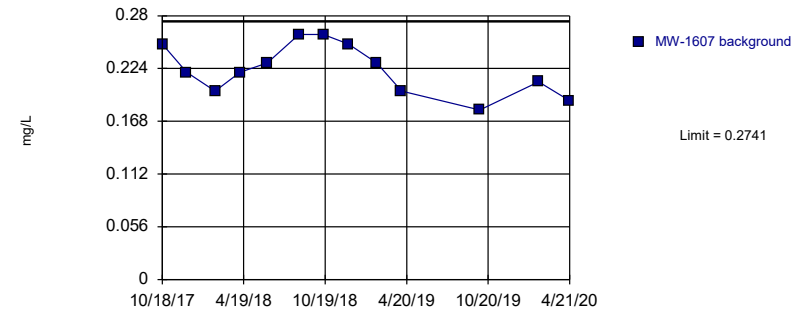
Prediction Limit
Intrawell Parametric, MW-1606



Background Data Summary: Mean=0.2077, Std. Dev.=0.04456, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9546, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

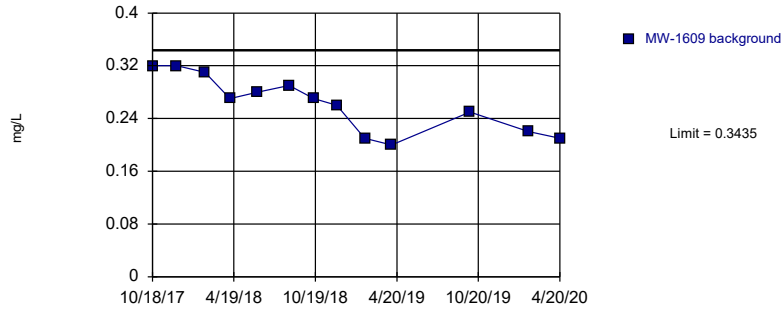
Prediction Limit
Intrawell Parametric, MW-1607



Background Data Summary: Mean=0.2231, Std. Dev.=0.02658, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9445, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

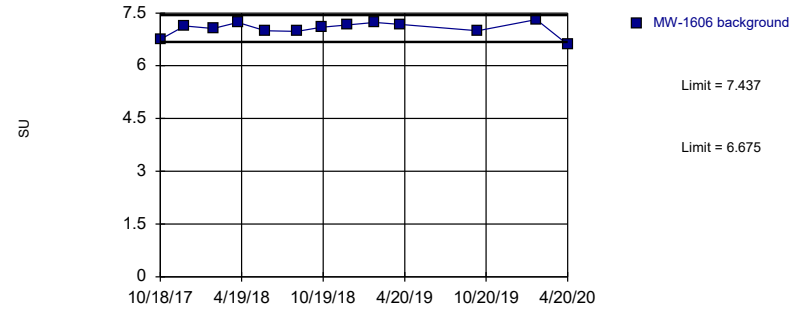
Prediction Limit
Intrawell Parametric, MW-1609 (bg)



Background Data Summary: Mean=0.2623, Std. Dev.=0.04226, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9249, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Fluoride Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

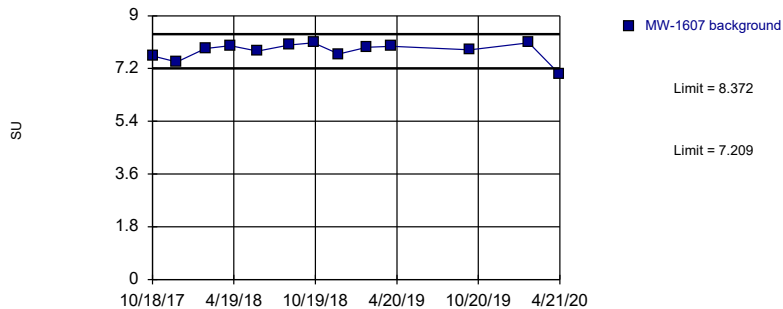
Prediction Limit
Intrawell Parametric, MW-1606



Background Data Summary: Mean=7.056, Std. Dev.=0.1984, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9014, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: pH Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

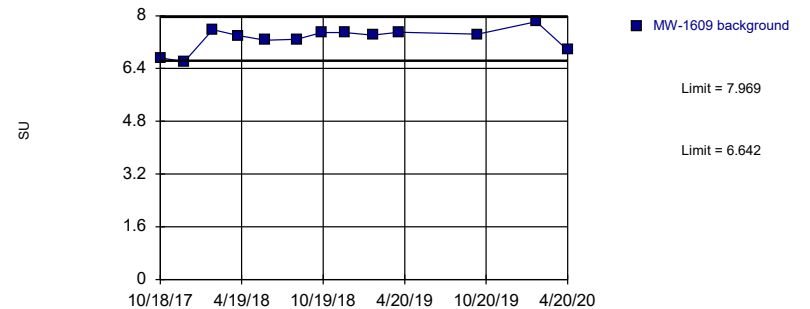
Prediction Limit
Intrawell Parametric, MW-1607



Background Data Summary: Mean=7.791, Std. Dev.=0.3027, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8352, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: pH Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

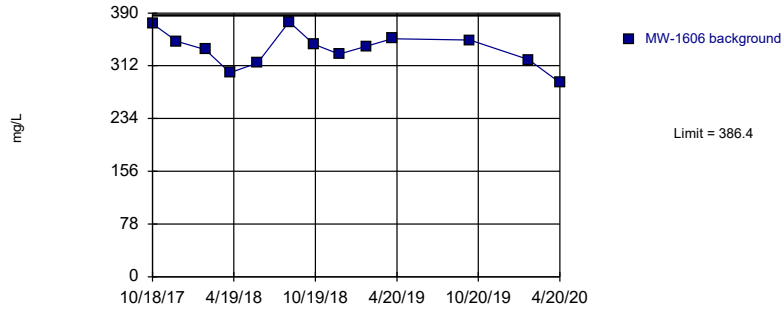
Prediction Limit
Intrawell Parametric, MW-1609 (bg)



Background Data Summary: Mean=7.305, Std. Dev.=0.3455, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8885, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: pH Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

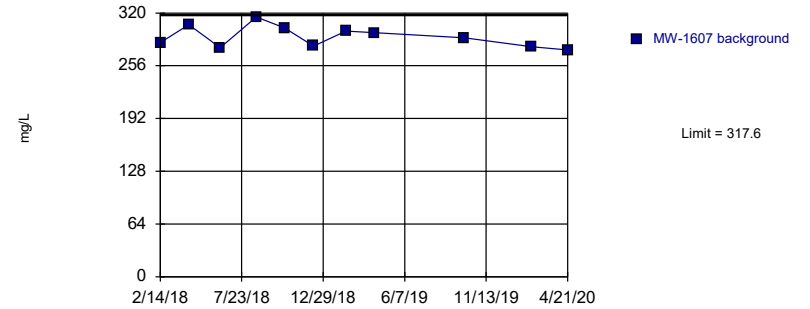
Prediction Limit
Intrawell Parametric, MW-1606



Background Data Summary: Mean=336.7, Std. Dev.=25.88, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9709, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - I
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

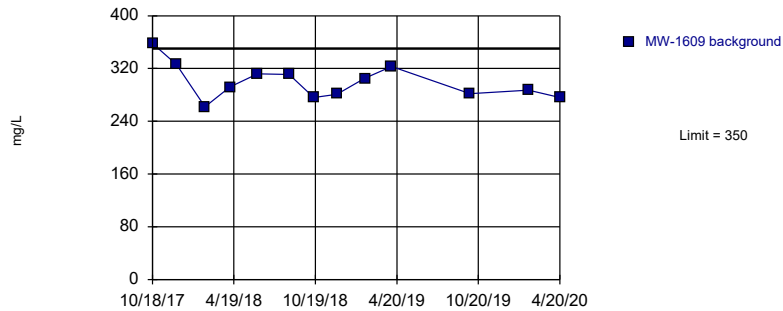
Prediction Limit
Intrawell Parametric, MW-1607



Background Data Summary: Mean=291.2, Std. Dev.=13.17, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9353, critical = 0.792. Kappa = 2.003 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - I
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Prediction Limit
Intrawell Parametric, MW-1609 (bg)



Background Data Summary: Mean=299.3, Std. Dev.=26.41, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9437, critical = 0.814. Kappa = 1.922 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.003756. Assumes 1 future value.

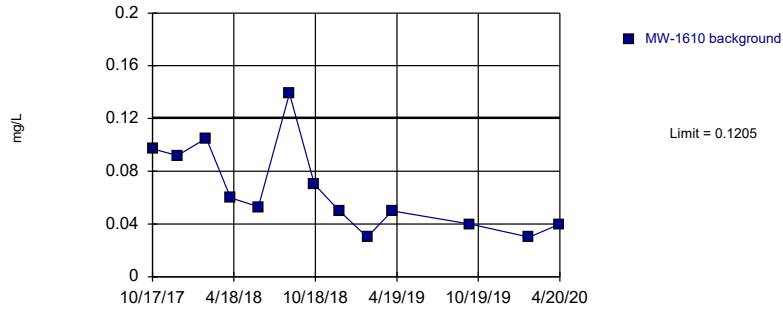
Constituent: Total Dissolved Solids Analysis Run 1/29/2021 10:48 AM View: Rome Limestone - Federal - I
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Intrawell Prediction Limits - Dumps Fault - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 1:17 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	TransformAlpha	Method
Boron (mg/L)	MW-1610	0.1205	n/a	n/a	1 future	n/a	13	0.06585	0.03312	0	None	No	0.007498 Param Intra 1 of 2
Boron (mg/L)	MW-1611	0.7312	n/a	n/a	1 future	n/a	13	0.6096	0.07376	0	None	No	0.007498 Param Intra 1 of 2
Calcium (mg/L)	MW-1610	38.87	n/a	n/a	1 future	n/a	13	36.25	1.59	0	None	No	0.007498 Param Intra 1 of 2
Calcium (mg/L)	MW-1611	48.15	n/a	n/a	1 future	n/a	8	33.78	7.645	0	None	No	0.007498 Param Intra 1 of 2
Chloride (mg/L)	MW-1610	12.63	n/a	n/a	1 future	n/a	13	11.23	0.8499	0	None	No	0.007498 Param Intra 1 of 2
Chloride (mg/L)	MW-1611	50.68	n/a	n/a	1 future	n/a	8	29.8	11.1	0	None	No	0.007498 Param Intra 1 of 2
Fluoride (mg/L)	MW-1610	0.2272	n/a	n/a	1 future	n/a	13	0.1977	0.01787	0	None	No	0.007498 Param Intra 1 of 2
Fluoride (mg/L)	MW-1611	1.168	n/a	n/a	1 future	n/a	13	0.8815	0.1737	0	None	No	0.007498 Param Intra 1 of 2
pH (SU)	MW-1610	7.945	7.075	n/a	1 future	n/a	13	7.51	0.2639	0	None	No	0.003749 Param Intra 1 of 2
pH (SU)	MW-1611	8.105	7.293	n/a	1 future	n/a	13	7.699	0.2463	0	None	No	0.003749 Param Intra 1 of 2
Sulfate (mg/L)	MW-1610	52.17	n/a	n/a	1 future	n/a	13	44.11	4.891	0	None	No	0.007498 Param Intra 1 of 2
Sulfate (mg/L)	MW-1611	544.1	n/a	n/a	1 future	n/a	8	271.3	145.1	0	None	No	0.007498 Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1610	266.3	n/a	n/a	1 future	n/a	13	251.8	8.805	0	None	No	0.007498 Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW-1611	1474	n/a	n/a	1 future	n/a	8	971	267.7	0	None	No	0.007498 Param Intra 1 of 2

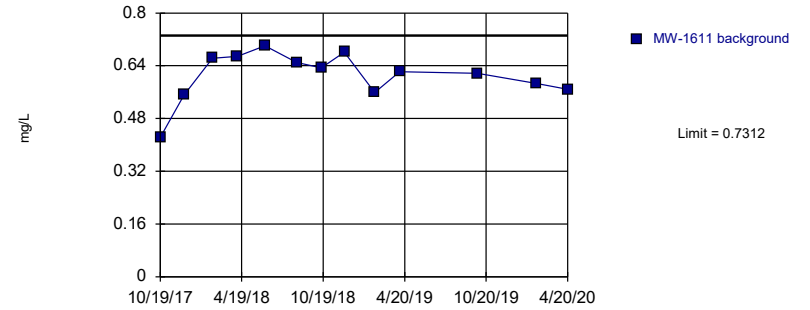
Prediction Limit
Intrawell Parametric, MW-1610



Background Data Summary: Mean=0.06585, Std. Dev.=0.03312, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8978, critical = 0.814. Kappa = 1.649 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: Boron Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

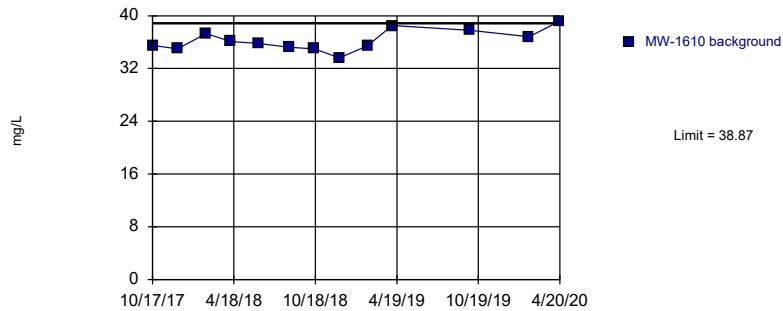
Prediction Limit
Intrawell Parametric, MW-1611 (bg)



Background Data Summary: Mean=0.6096, Std. Dev.=0.07376, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9025, critical = 0.814. Kappa = 1.649 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: Boron Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

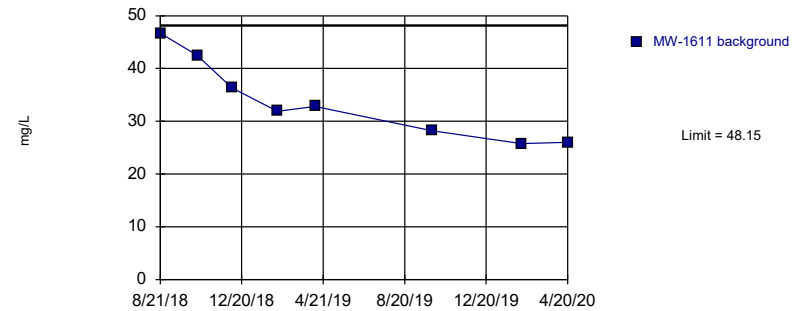
Prediction Limit
Intrawell Parametric, MW-1610



Background Data Summary: Mean=36.25, Std. Dev.=1.59, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.956, critical = 0.814. Kappa = 1.649 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: Calcium Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

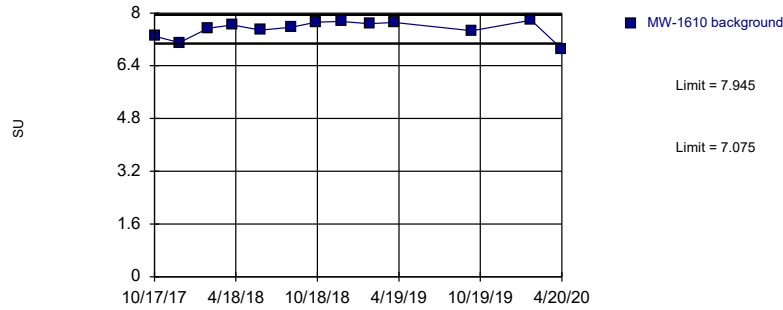
Prediction Limit
Intrawell Parametric, MW-1611 (bg)



Background Data Summary: Mean=33.78, Std. Dev.=7.645, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9134, critical = 0.749. Kappa = 1.88 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: Calcium Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

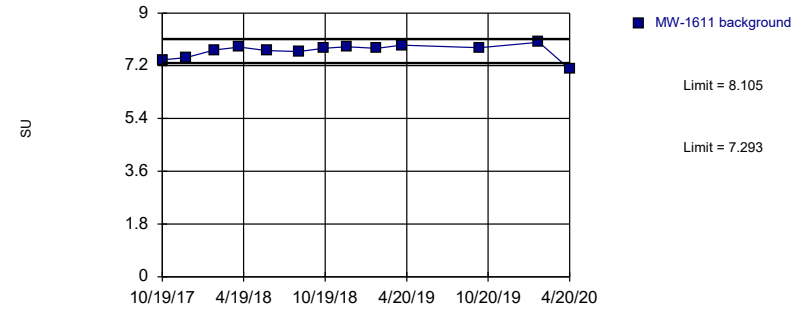
Prediction Limit
Intrawell Parametric, MW-1610



Background Data Summary: Mean=7.51, Std. Dev.=0.2639, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8652, critical = 0.814. Kappa = 1.649 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: pH Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

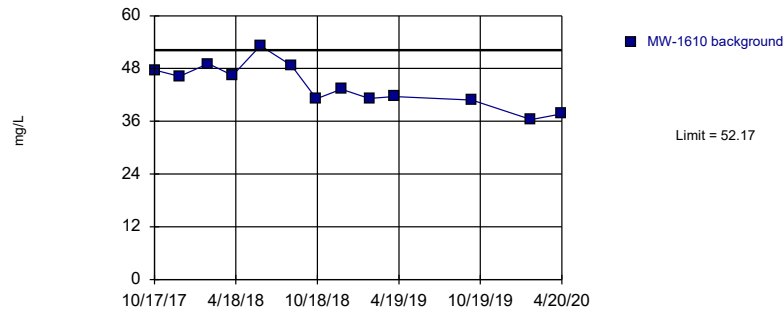
Prediction Limit
Intrawell Parametric, MW-1611 (bg)



Background Data Summary: Mean=7.699, Std. Dev.=0.2463, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8564, critical = 0.814. Kappa = 1.649 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: pH Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

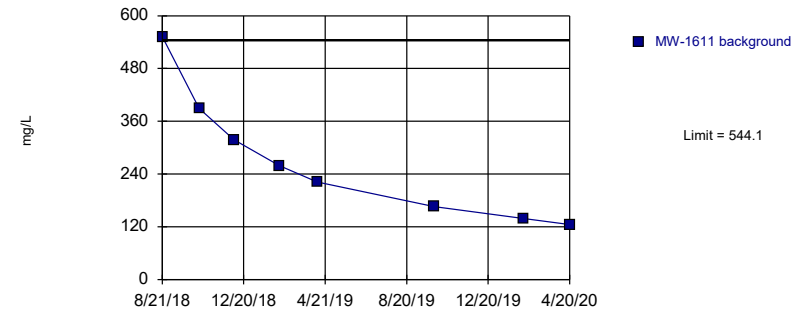
Prediction Limit
Intrawell Parametric, MW-1610



Background Data Summary: Mean=44.11, Std. Dev.=4.891, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9651, critical = 0.814. Kappa = 1.649 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: Sulfate Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

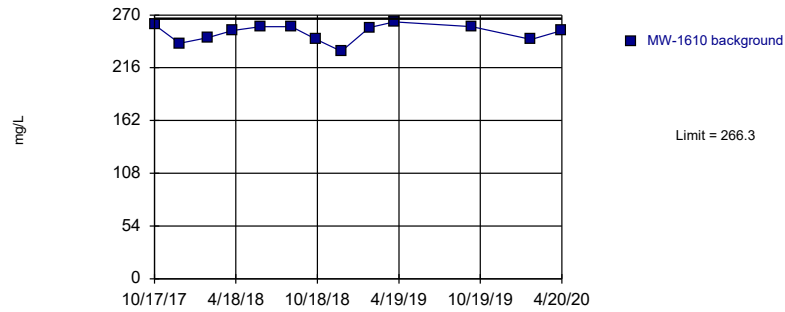
Prediction Limit
Intrawell Parametric, MW-1611 (bg)



Background Data Summary: Mean=271.3, Std. Dev.=145.1, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9092, critical = 0.749. Kappa = 1.88 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: Sulfate Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intrawell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

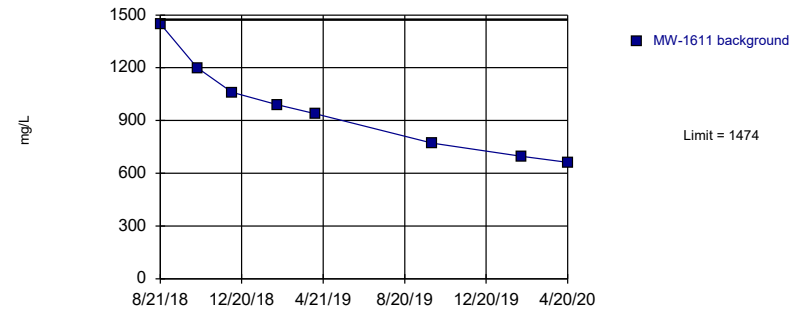
Prediction Limit Intrawell Parametric, MW-1610



Background Data Summary: Mean=251.8, Std. Dev.=8.805, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9115, critical = 0.814. Kappa = 1.649 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intraw
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Prediction Limit Intrawell Parametric, MW-1611 (bg)



Background Data Summary: Mean=971, Std. Dev.=267.7, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9468, critical = 0.749. Kappa = 1.88 (c=7, w=1, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Assumes 1 future value.

Constituent: Total Dissolved Solids Analysis Run 1/29/2021 1:13 PM View: Dumps Fault - Federal - Intraw
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

FIGURE F.

Upgradient Wells Trend Tests - Chattanooga Shale - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:08 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Chloride (mg/L)	MW-1608 (bg)	-1.074	-60	-48	Yes	14	0	n/a	n/a	0.01	NP

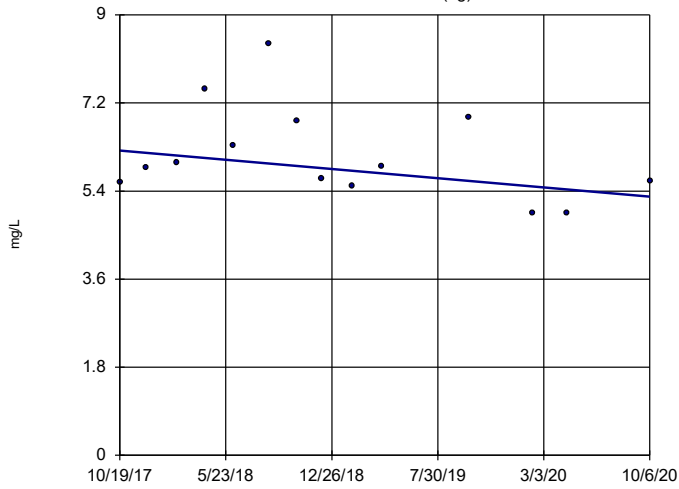
Upgradient Wells Trend Tests - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:08 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Calcium (mg/L)	MW-1601 (bg)	-0.317	-19	-48	No	14	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-1602 (bg)	0.4044	44	48	No	14	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-1608 (bg)	-0.1253	-22	-48	No	14	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-1601 (bg)	-4.878	-27	-48	No	14	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-1602 (bg)	0	1	48	No	14	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-1608 (bg)	-1.074	-60	-48	Yes	14	0	n/a	n/a	0.01	NP
pH (SU)	MW-1601 (bg)	0.0784	11	48	No	14	0	n/a	n/a	0.01	NP
pH (SU)	MW-1602 (bg)	0.01017	7	48	No	14	0	n/a	n/a	0.01	NP
pH (SU)	MW-1608 (bg)	0	-1	-48	No	14	0	n/a	n/a	0.01	NP

Sen's Slope Estimator

MW-1601 (bg)

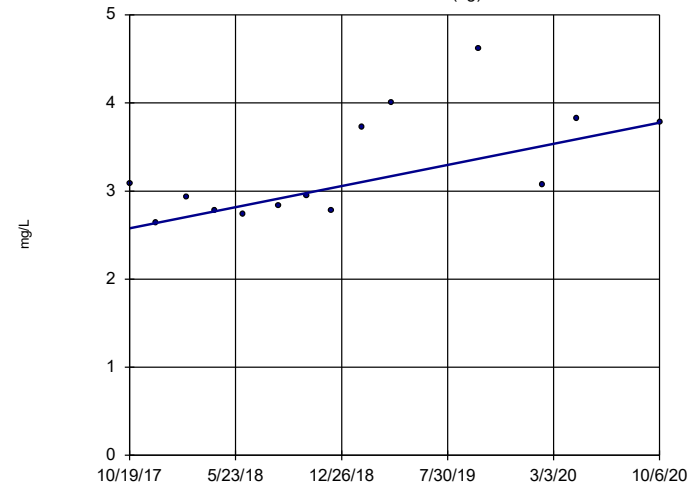


n = 14
 Slope = -0.317 units per year.
 Mann-Kendall statistic = -19
 critical = -48
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 1/29/2021 10:07 AM View: Chattanooga Shale - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Sen's Slope Estimator

MW-1602 (bg)

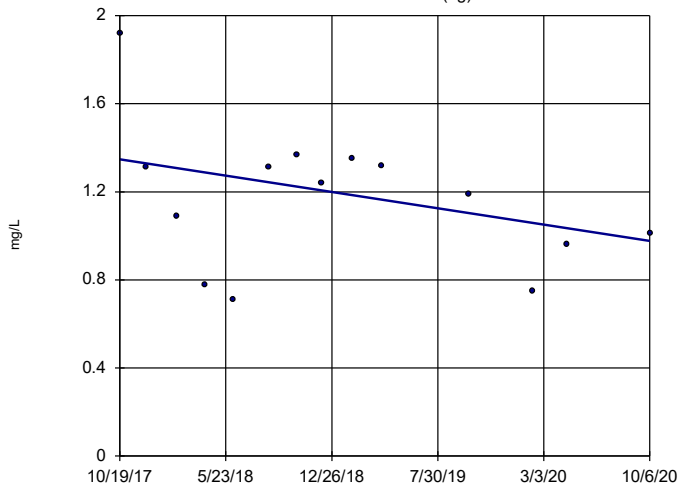


n = 14
 Slope = 0.4044 units per year.
 Mann-Kendall statistic = 44
 critical = 48
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 1/29/2021 10:07 AM View: Chattanooga Shale - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Sen's Slope Estimator

MW-1608 (bg)

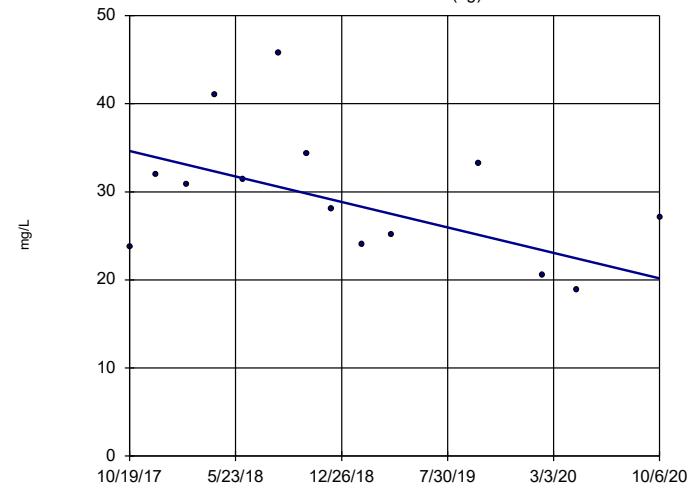


n = 14
 Slope = -0.1253 units per year.
 Mann-Kendall statistic = -22
 critical = -48
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 1/29/2021 10:07 AM View: Chattanooga Shale - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Sen's Slope Estimator

MW-1601 (bg)

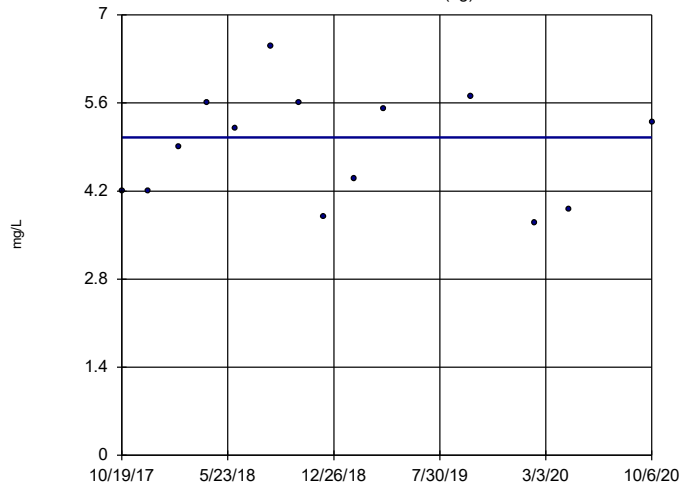


n = 14
 Slope = -4.878 units per year.
 Mann-Kendall statistic = -27
 critical = -48
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 1/29/2021 10:07 AM View: Chattanooga Shale - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Sen's Slope Estimator

MW-1602 (bg)

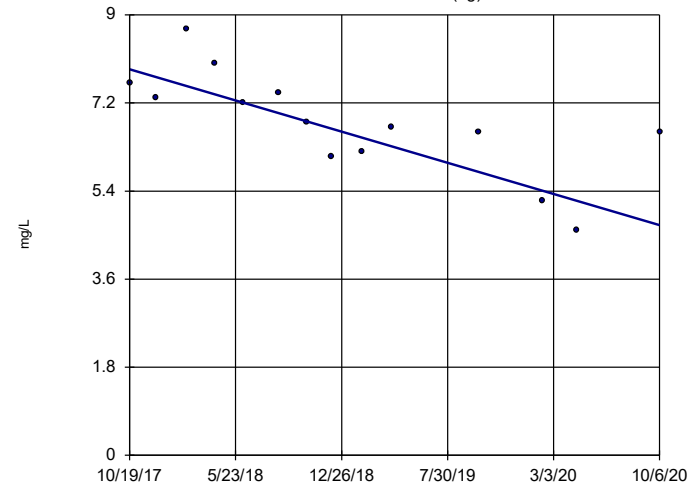


n = 14
 Slope = 0
 units per year.
 Mann-Kendall
 statistic = 1
 critical = 48
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Chloride Analysis Run 1/29/2021 10:07 AM View: Chattanooga Shale - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Sen's Slope Estimator

MW-1608 (bg)

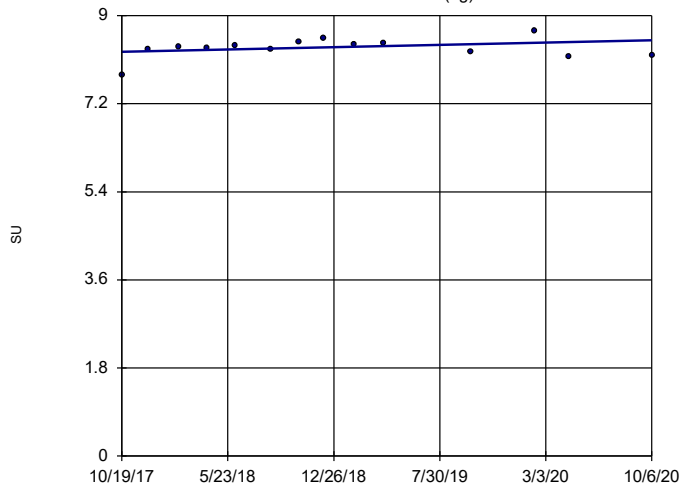


n = 14
 Slope = -1.074
 units per year.
 Mann-Kendall
 statistic = -60
 critical = -48
 Decreasing trend
 significant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Chloride Analysis Run 1/29/2021 10:07 AM View: Chattanooga Shale - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Sen's Slope Estimator

MW-1601 (bg)

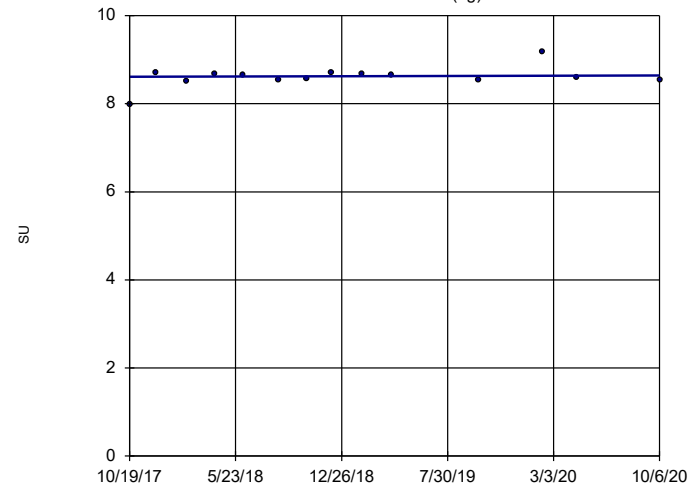


n = 14
 Slope = 0.0784
 units per year.
 Mann-Kendall
 statistic = 11
 critical = 48
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: pH Analysis Run 1/29/2021 10:07 AM View: Chattanooga Shale - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Sen's Slope Estimator

MW-1602 (bg)



n = 14
 Slope = 0.01017
 units per year.
 Mann-Kendall
 statistic = 7
 critical = 48
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: pH Analysis Run 1/29/2021 10:07 AM View: Chattanooga Shale - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Upgradient Wells Trend Tests - Rome Limestone - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:51 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Chloride (mg/L)	MW-1609 (bg)	-0.6024	-70	-48	Yes	14	0	n/a	n/a	0.01	NP

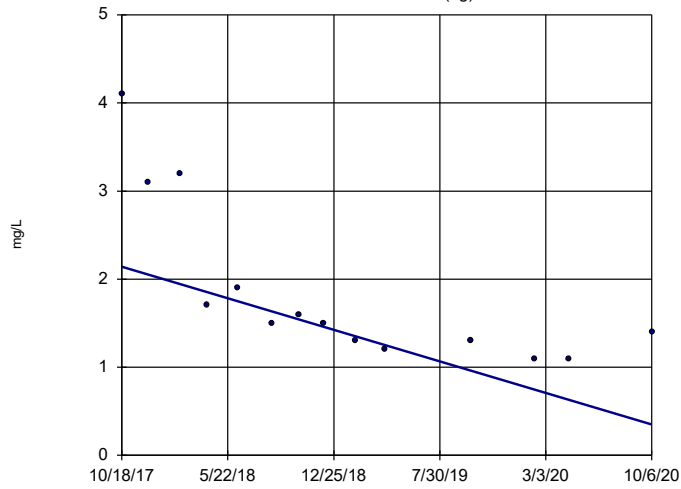
Upgradient Wells Trend Tests - Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:51 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Chloride (mg/L)	MW-1609 (bg)	-0.6024	-70	-48	Yes	14	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-1609 (bg)	-0.8295	-25	-48	No	14	0	n/a	n/a	0.01	NP

Sen's Slope Estimator

MW-1609 (bg)

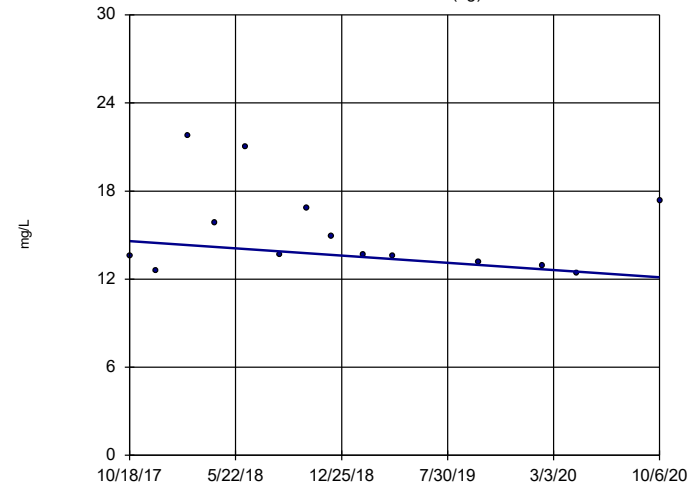


n = 14
 Slope = -0.6024
 units per year.
 Mann-Kendall
 statistic = -70
 critical = -48
 Decreasing trend
 significant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Chloride Analysis Run 1/29/2021 10:51 AM View: Rome Limestone - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Sen's Slope Estimator

MW-1609 (bg)

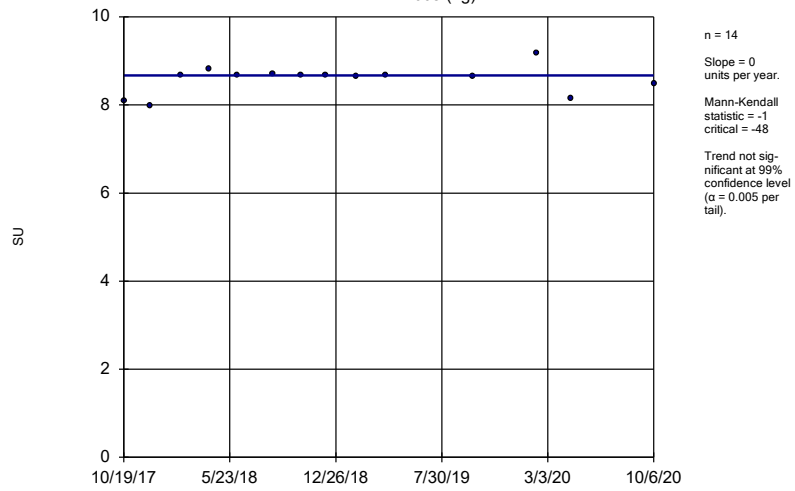


n = 14
 Slope = -0.8295
 units per year.
 Mann-Kendall
 statistic = -25
 critical = -48
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Sulfate Analysis Run 1/29/2021 10:51 AM View: Rome Limestone - Federal - Interwell
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Sen's Slope Estimator

MW-1608 (bg)



Constituent: pH Analysis Run 1/29/2021 10:07 AM View: Chattanooga Shale - Federal - Interwell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

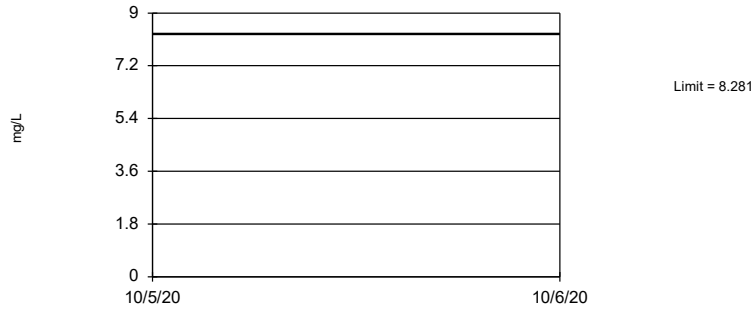
FIGURE G.

Interwell Prediction Limits - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:10 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>TransformAlpha</u>	<u>Method</u>
Calcium (mg/L)	n/a	8.281	n/a	n/a	4 future	n/a	42	1.781	0.602	0	None	sqrt(x)	0.00188 Param Inter 1 of 2
Chloride (mg/L)	n/a	45.8	n/a	n/a	4 future	n/a	42	n/a	n/a	0	n/a	n/a	0.001062 NP Inter (normality) 1 of 2
pH (SU)	n/a	9.019	7.99	n/a	4 future	n/a	42	8.504	0.2824	0	None	No	0.0009398 Param Inter 1 of 2

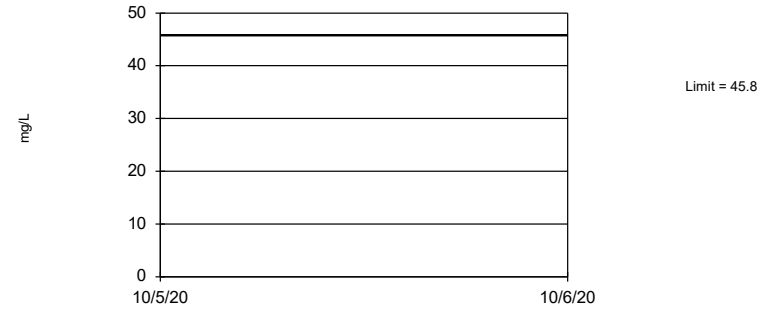
Prediction Limit
Interwell Parametric



Background Data Summary (based on square root transformation): Mean=1.781, Std. Dev.=0.602, n=42. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9297, critical = 0.922. Kappa = 1.822 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.00188. Assumes 4 future values.

Constituent: Calcium Analysis Run 1/29/2021 10:09 AM View: Chattanooga Shale - Federal - Interwell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

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 42 background values. Annual per-constituent alpha = 0.008462. Individual comparison alpha = 0.001062 (1 of 2). Assumes 4 future values.

Constituent: Chloride Analysis Run 1/29/2021 10:09 AM View: Chattanooga Shale - Federal - Interwell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Prediction Limit
Interwell Parametric



Background Data Summary: Mean=8.504, Std. Dev.=0.2824, n=42. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9414, critical = 0.922. Kappa = 1.822 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009398. Assumes 4 future values.

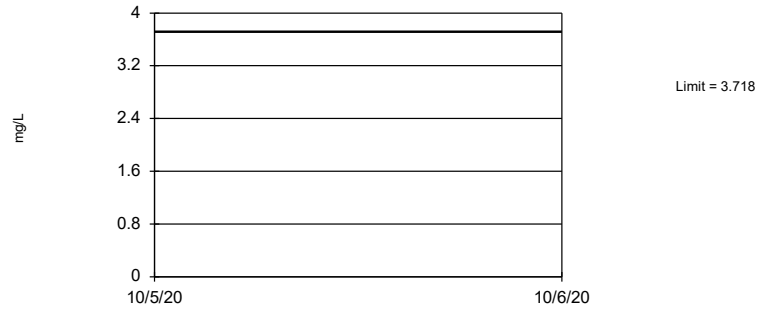
Constituent: pH Analysis Run 1/29/2021 10:09 AM View: Chattanooga Shale - Federal - Interwell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Interwell Prediction Limits - Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/29/2021, 10:53 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>TransformAlpha</u>	<u>Method</u>
Chloride (mg/L)	n/a	3.718	n/a	n/a	2 future	n/a	14	0.5281	0.4174	0	None	ln(x)	0.003756 Param Inter 1 of 2
Sulfate (mg/L)	n/a	20.99	n/a	n/a	2 future	n/a	14	3.887	0.369	0	None	sqrt(x)	0.003756 Param Inter 1 of 2

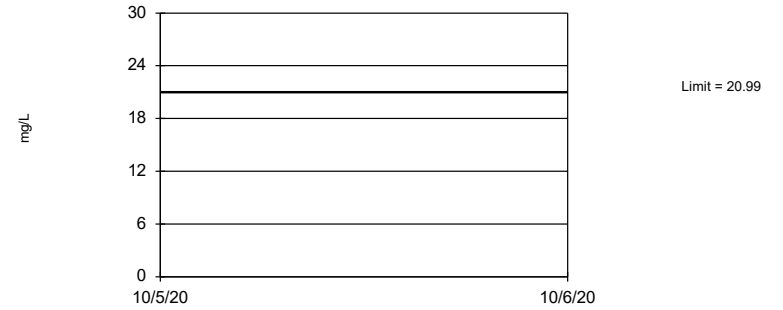
Prediction Limit
Interwell Parametric



Background Data Summary (based on natural log transformation): Mean=0.5281, Std. Dev.=0.4174, n=14. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8529, critical = 0.825. Kappa = 1.881 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.003756. Assumes 2 future values.

Constituent: Chloride Analysis Run 1/29/2021 10:53 AM View: Rome Limestone - Federal - Interwell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Prediction Limit
Interwell Parametric



Background Data Summary (based on square root transformation): Mean=3.887, Std. Dev.=0.369, n=14. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8367, critical = 0.825. Kappa = 1.881 (c=7, w=2, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.003756. Assumes 2 future values.

Constituent: Sulfate Analysis Run 1/29/2021 10:53 AM View: Rome Limestone - Federal - Interwell
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

FIGURE H.

Upper Tolerance Limit Summary Table - Chattanooga Shale

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/13/2021, 6:34 PM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	0.0002482	n/a	n/a	42	0.009216	0.003094	0	None	sqrt(x)	0.05	Inter
Arsenic (mg/L)	0.0258	n/a	n/a	42	n/a	n/a	0	n/a	n/a	0.116	NP Inter(normality)
Barium (mg/L)	0.306	n/a	n/a	42	n/a	n/a	0	n/a	n/a	0.116	NP Inter(normality)
Beryllium (mg/L)	0.0001	n/a	n/a	42	n/a	n/a	54.76	n/a	n/a	0.116	NP Inter(NDs)
Cadmium (mg/L)	0.00005	n/a	n/a	42	n/a	n/a	83.33	n/a	n/a	0.116	NP Inter(NDs)
Chromium (mg/L)	0.001276	n/a	n/a	42	-7.961	0.6138	0	None	ln(x)	0.05	Inter
Cobalt (mg/L)	0.0004673	n/a	n/a	42	0.04836	0.01384	0	None	x^(1/3)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	3.013	n/a	n/a	42	0.9229	0.2469	0	None	x^(1/3)	0.05	Inter
Fluoride (mg/L)	2.35	n/a	n/a	42	n/a	n/a	0	n/a	n/a	0.116	NP Inter(normality)
Lead (mg/L)	0.0007226	n/a	n/a	42	-8.96	0.8179	11.9	None	ln(x)	0.05	Inter
Lithium (mg/L)	0.118	n/a	n/a	42	n/a	n/a	0	n/a	n/a	0.116	NP Inter(normality)
Mercury (mg/L)	0.001	n/a	n/a	42	n/a	n/a	90.48	n/a	n/a	0.116	NP Inter(NDs)
Molybdenum (mg/L)	0.01824	n/a	n/a	42	-5.637	0.773	0	None	ln(x)	0.05	Inter
Selenium (mg/L)	0.0002	n/a	n/a	42	n/a	n/a	30.95	n/a	n/a	0.116	NP Inter(normality)
Thallium (mg/L)	0.0005	n/a	n/a	42	n/a	n/a	66.67	n/a	n/a	0.116	NP Inter(NDs)

Upper Tolerance Limit Summary Table - Rome Limestone

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/18/2021, 4:59 PM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	0.0001305	n/a	n/a	14	0.006694	0.00181	14.29	None	sqrt(x)	0.05	Inter
Arsenic (mg/L)	0.001623	n/a	n/a	14	-8.503	0.7957	0	None	ln(x)	0.05	Inter
Barium (mg/L)	0.5395	n/a	n/a	14	0.396	0.05488	0	None	No	0.05	Inter
Beryllium (mg/L)	0.0001	n/a	n/a	14	n/a	n/a	92.86	n/a	n/a	0.4877	NP Inter(NDs)
Cadmium (mg/L)	0.00005	n/a	n/a	14	n/a	n/a	28.57	n/a	n/a	0.4877	NP Inter(normality)
Chromium (mg/L)	0.0003404	n/a	n/a	14	0.0001714	0.00006464	0	None	No	0.05	Inter
Cobalt (mg/L)	0.001524	n/a	n/a	14	0.01642	0.008652	14.29	None	sqrt(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	5.249	n/a	n/a	14	1.398	0.3416	0	None	sqrt(x)	0.05	Inter
Fluoride (mg/L)	0.3685	n/a	n/a	14	0.26	0.04151	0	None	No	0.05	Inter
Lead (mg/L)	0.001273	n/a	n/a	14	0.0004698	0.0003074	0	None	No	0.05	Inter
Lithium (mg/L)	0.0165	n/a	n/a	14	-6.539	0.9315	35.71	Kaplan-Meier	ln(x)	0.05	Inter
Mercury (mg/L)	0.001	n/a	n/a	14	n/a	n/a	100	n/a	n/a	0.4877	NP Inter(NDs)
Molybdenum (mg/L)	0.0025	n/a	n/a	14	0.0009739	0.0005839	21.43	Kaplan-Meier	No	0.05	Inter
Selenium (mg/L)	0.0002	n/a	n/a	14	n/a	n/a	21.43	n/a	n/a	0.4877	NP Inter(normality)
Thallium (mg/L)	0.0005	n/a	n/a	14	n/a	n/a	64.29	n/a	n/a	0.4877	NP Inter(NDs)

Upper Tolerance Limit Summary Table - Dumps Fault

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/14/2021, 9:19 AM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	0.0007762	n/a	n/a	14	0.0113	0.006334	0	None	sqrt(x)	0.05	Inter
Arsenic (mg/L)	0.04497	n/a	n/a	14	0.01674	0.0108	0	None	No	0.05	Inter
Barium (mg/L)	0.1461	n/a	n/a	14	0.08009	0.02525	0	None	No	0.05	Inter
Beryllium (mg/L)	0.0001	n/a	n/a	14	n/a	n/a	64.29	n/a	n/a	0.4877	NP Inter(NDs)
Cadmium (mg/L)	0.00005	n/a	n/a	14	n/a	n/a	92.86	n/a	n/a	0.4877	NP Inter(NDs)
Chromium (mg/L)	0.001041	n/a	n/a	14	0.0004773	0.0002155	0	None	No	0.05	Inter
Cobalt (mg/L)	0.0001562	n/a	n/a	13	0.000067	0.00003342	0	None	No	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	2.008	n/a	n/a	14	0.7642	0.2498	0	None	sqrt(x)	0.05	Inter
Fluoride (mg/L)	1.338	n/a	n/a	14	0.8914	0.171	0	None	No	0.05	Inter
Lead (mg/L)	0.0002111	n/a	n/a	13	0.0001079	0.00003866	7.692	None	No	0.05	Inter
Lithium (mg/L)	0.1726	n/a	n/a	14	0.09339	0.03031	0	None	No	0.05	Inter
Mercury (mg/L)	0.001	n/a	n/a	14	n/a	n/a	92.86	n/a	n/a	0.4877	NP Inter(NDs)
Molybdenum (mg/L)	0.00676	n/a	n/a	13	n/a	n/a	0	n/a	n/a	0.5133	NP Inter(normality)
Selenium (mg/L)	0.0001341	n/a	n/a	14	0.00006857	0.00002507	0	None	No	0.05	Inter
Thallium (mg/L)	0.0005	n/a	n/a	14	n/a	n/a	78.57	n/a	n/a	0.4877	NP Inter(NDs)

FIGURE I.

CLINCH RIVER GWPS - CHATTANOOGA SHALE				
Constituent Name	MCL	CCR Rule Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00025	0.006
Arsenic, Total (mg/L)	0.01		0.026	0.026
Barium, Total (mg/L)	2		0.31	2
Beryllium, Total (mg/L)	0.004		0.0001	0.004
Cadmium, Total (mg/L)	0.005		0.00005	0.005
Chromium, Total (mg/L)	0.1		0.0013	0.1
Cobalt, Total (mg/L)		0.006	0.00047	0.006
Combined Radium, Total (pCi/L)	5		3	5
Fluoride, Total (mg/L)	4		2.4	4
Lead, Total (mg/L)		0.015	0.0007	0.015
Lithium, Total (mg/L)		0.04	0.12	0.12
Mercury, Total (mg/L)	0.002		0.001	0.002
Molybdenum, Total (mg/L)		0.1	0.02	0.1
Selenium, Total (mg/L)	0.05		0.0002	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**Grey cell indicates background is higher than MCL or CCR Rule*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

CLINCH RIVER GWPS - ROME LIMESTONE				
Constituent Name	MCL	CCR Rule Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00013	0.006
Arsenic, Total (mg/L)	0.01		0.0016	0.01
Barium, Total (mg/L)	2		0.54	2
Beryllium, Total (mg/L)	0.004		0.0001	0.004
Cadmium, Total (mg/L)	0.005		0.00005	0.005
Chromium, Total (mg/L)	0.1		0.00034	0.1
Cobalt, Total (mg/L)		0.006	0.0015	0.006
Combined Radium, Total (pCi/L)	5		5.25	5.25
Fluoride, Total (mg/L)	4		0.37	4
Lead, Total (mg/L)		0.015	0.0013	0.015
Lithium, Total (mg/L)		0.04	0.017	0.04
Mercury, Total (mg/L)	0.002		0.001	0.002
Molybdenum, Total (mg/L)		0.1	0.0025	0.1
Selenium, Total (mg/L)	0.05		0.0002	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**Grey cell indicates background is higher than MCL or CCR Rule*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

CLINCH RIVER GWPS - DUMPS FAULT				
Constituent Name	MCL	CCR Rule Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00078	0.006
Arsenic, Total (mg/L)	0.01		0.045	0.045
Barium, Total (mg/L)	2		0.15	2
Beryllium, Total (mg/L)	0.004		0.0001	0.004
Cadmium, Total (mg/L)	0.005		0.00005	0.005
Chromium, Total (mg/L)	0.1		0.001	0.1
Cobalt, Total (mg/L)		0.006	0.00016	0.006
Combined Radium, Total (pCi/L)	5		2	5
Fluoride, Total (mg/L)	4		1.3	4
Lead, Total (mg/L)		0.015	0.00021	0.015
Lithium, Total (mg/L)		0.04	0.173	0.173
Mercury, Total (mg/L)	0.002		0.001	0.002
Molybdenum, Total (mg/L)		0.1	0.0068	0.1
Selenium, Total (mg/L)	0.05		0.00013	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**Grey cell indicates background is higher than MCL or CCR Rule*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

FIGURE J.

Confidence Intervals - Chattanooga Shale - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/13/2021, 6:41 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig. N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Barium (mg/L)	MW-1604	3.302	3.067	2	Yes 14	3.184	0.1658	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1605	0.2055	0.187	0.12	Yes 14	0.1962	0.01305	0	None	No	0.01	Param.

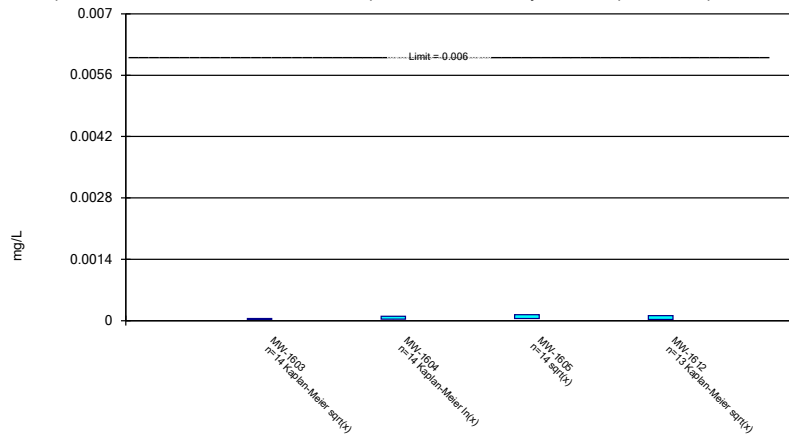
Confidence Intervals - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/13/2021, 6:41 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	MW-1603	0.00004727	0.00002404	0.006	No 14	0.00006	0.00002935	28.57	Kaplan-Meier	sqrt(x)	0.01	Param.
Antimony (mg/L)	MW-1604	0.0000954	0.0000314	0.006	No 14	0.00009571	0.0001017	21.43	Kaplan-Meier	ln(x)	0.01	Param.
Antimony (mg/L)	MW-1605	0.0001337	0.00004689	0.006	No 14	0.000095	0.0000723	0	None	sqrt(x)	0.01	Param.
Antimony (mg/L)	MW-1612	0.0001139	0.00002503	0.006	No 13	0.00008615	0.000075	15.38	Kaplan-Meier	sqrt(x)	0.01	Param.
Arsenic (mg/L)	MW-1603	0.002496	0.001816	0.026	No 14	0.002156	0.0004797	0	None	No	0.01	Param.
Arsenic (mg/L)	MW-1604	0.00243	0.001584	0.026	No 14	0.002026	0.000622	0	None	sqrt(x)	0.01	Param.
Arsenic (mg/L)	MW-1605	0.005053	0.002984	0.026	No 14	0.004019	0.001461	0	None	No	0.01	Param.
Arsenic (mg/L)	MW-1612	0.001976	0.0006394	0.026	No 13	0.001369	0.001028	0	None	sqrt(x)	0.01	Param.
Barium (mg/L)	MW-1603	2.447	1.986	2	No 14	2.216	0.3251	0	None	No	0.01	Param.
Barium (mg/L)	MW-1604	3.302	3.067	2	Yes 14	3.184	0.1658	0	None	No	0.01	Param.
Barium (mg/L)	MW-1605	1.565	1.199	2	No 14	1.382	0.2586	0	None	No	0.01	Param.
Barium (mg/L)	MW-1612	2.336	1.928	2	No 13	2.132	0.2741	0	None	No	0.01	Param.
Beryllium (mg/L)	MW-1603	0.0001	0.00001	0.004	No 14	0.00008057	0.00003861	78.57	None	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-1604	0.0001	0.000007	0.004	No 14	0.00008657	0.00003414	85.71	None	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-1605	0.0001	0.00001	0.004	No 14	0.00007993	0.0000399	78.57	None	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-1612	0.0001	0.000006	0.004	No 13	0.00007431	0.00004124	69.23	None	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-1605	0.00005	0.00002	0.005	No 14	0.000045	0.00001286	85.71	None	No	0.01	NP (NDs)
Cobalt (mg/L)	MW-1603	0.0006382	0.0003479	0.006	No 14	0.0004931	0.0002049	0	None	No	0.01	Param.
Cobalt (mg/L)	MW-1604	0.0007888	0.0004879	0.006	No 14	0.0006384	0.0002124	0	None	No	0.01	Param.
Cobalt (mg/L)	MW-1605	0.0003434	0.0001716	0.006	No 14	0.0002575	0.0001213	0	None	No	0.01	Param.
Cobalt (mg/L)	MW-1612	0.0002616	0.0001389	0.006	No 13	0.0002002	0.00008248	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1603	1.561	0.6305	5	No 14	1.14	0.76	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604	1.711	0.8835	5	No 14	1.297	0.5841	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605	2.246	0.7146	5	No 14	1.63	1.588	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1612	2.451	1.268	5	No 13	1.86	0.7952	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-1603	0.1451	0.1065	4	No 14	0.1264	0.02845	0	None	sqrt(x)	0.01	Param.
Fluoride (mg/L)	MW-1604	0.2662	0.217	4	No 14	0.2421	0.0362	0	None	sqrt(x)	0.01	Param.
Fluoride (mg/L)	MW-1605	0.3808	0.3364	4	No 14	0.3586	0.03134	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-1612	0.1892	0.1339	4	No 13	0.1615	0.03716	0	None	No	0.01	Param.
Lead (mg/L)	MW-1603	0.0002	0.00001	0.015	No 14	0.0001219	0.00009391	57.14	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-1604	0.0002	0.00002	0.015	No 14	0.0001168	0.00008792	50	None	No	0.01	NP (normality)
Lead (mg/L)	MW-1605	0.0002	0.000036	0.015	No 14	0.0001019	0.00007715	35.71	None	No	0.01	NP (normality)
Lead (mg/L)	MW-1612	0.000331	0.000025	0.015	No 13	0.000139	0.00009757	46.15	None	No	0.01	NP (normality)
Lithium (mg/L)	MW-1603	0.07823	0.05315	0.12	No 14	0.06569	0.0177	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1604	0.08458	0.07375	0.12	No 14	0.07916	0.007651	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1605	0.2055	0.187	0.12	Yes 14	0.1962	0.01305	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1612	0.1343	0.1134	0.12	No 13	0.1238	0.0141	7.692	None	No	0.01	Param.
Mercury (mg/L)	MW-1603	0.001	0.00006	0.002	No 14	0.0009329	0.0002512	92.86	None	No	0.01	NP (NDs)
Mercury (mg/L)	MW-1604	0.001	0.00006	0.002	No 14	0.0009329	0.0002512	92.86	None	No	0.01	NP (NDs)
Mercury (mg/L)	MW-1612	0.001	0.00006	0.002	No 13	0.0009277	0.0002607	92.31	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-1603	0.001977	0.0006411	0.1	No 14	0.001387	0.001159	7.143	None	sqrt(x)	0.01	Param.
Molybdenum (mg/L)	MW-1604	0.001428	0.000541	0.1	No 14	0.001159	0.001194	14.29	None	ln(x)	0.01	Param.
Molybdenum (mg/L)	MW-1605	0.005277	0.001788	0.1	No 14	0.003532	0.002463	0	None	No	0.01	Param.
Molybdenum (mg/L)	MW-1612	0.0036	0.0007	0.1	No 13	0.002756	0.005248	7.692	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-1603	0.0001194	0.00005814	0.05	No 14	0.00009214	0.0000501	14.29	None	x^(1/3)	0.01	Param.
Selenium (mg/L)	MW-1604	0.0002	0.00004	0.05	No 14	0.00009143	0.00007199	28.57	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-1605	0.0002	0.00005	0.05	No 14	0.0001186	0.00007389	42.86	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-1612	0.0002	0.00003	0.05	No 13	0.00009308	0.00007653	30.77	None	No	0.01	NP (normality)
Thallium (mg/L)	MW-1603	0.0005	0.00001	0.002	No 14	0.0003257	0.0002427	64.29	None	No	0.01	NP (NDs)
Thallium (mg/L)	MW-1604	0.0005	0.00001	0.002	No 14	0.0003607	0.0002286	71.43	None	No	0.01	NP (NDs)
Thallium (mg/L)	MW-1605	0.0005	0.00002	0.002	No 14	0.0003614	0.0002274	71.43	None	No	0.01	NP (NDs)
Thallium (mg/L)	MW-1612	0.0005	0.00001	0.002	No 13	0.0003508	0.000233	69.23	None	No	0.01	NP (NDs)

Parametric Confidence Interval

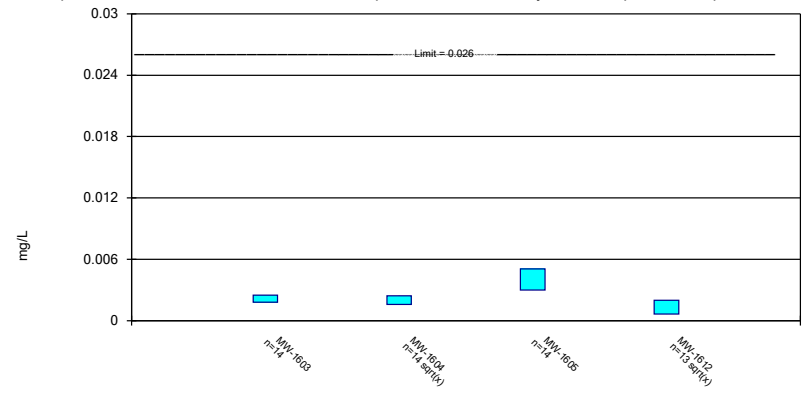
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Antimony Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

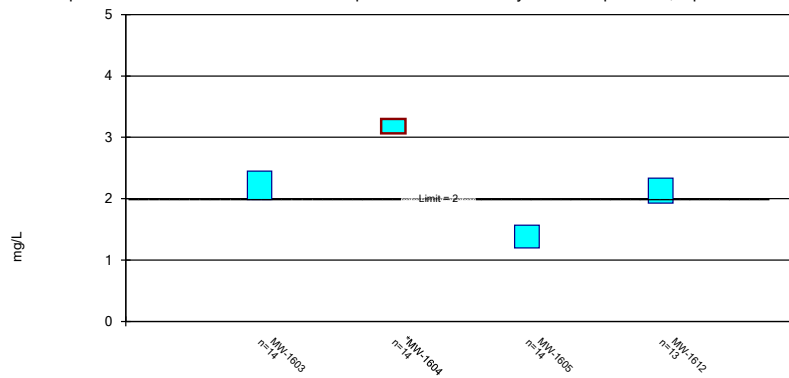
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

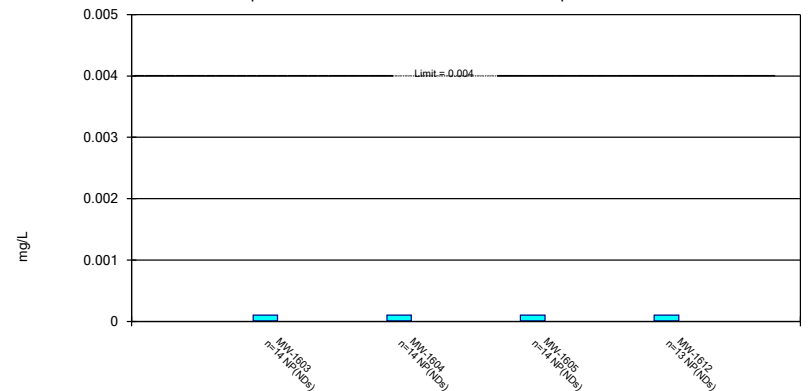
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

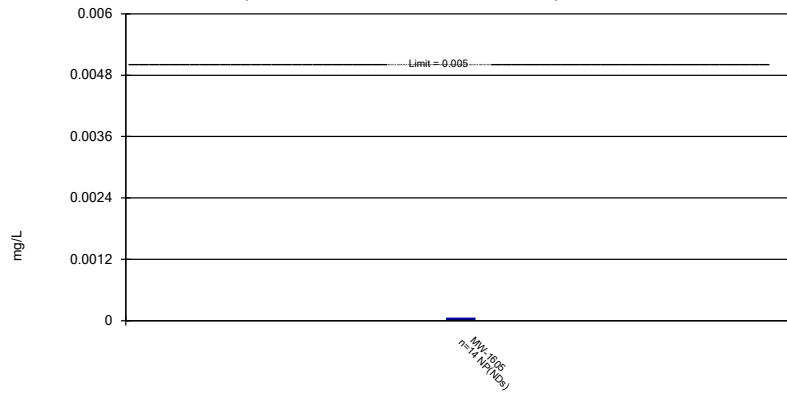
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Beryllium Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

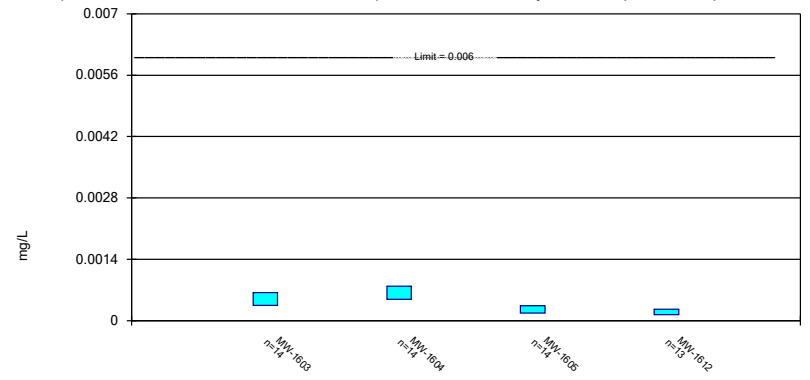
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cadmium Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

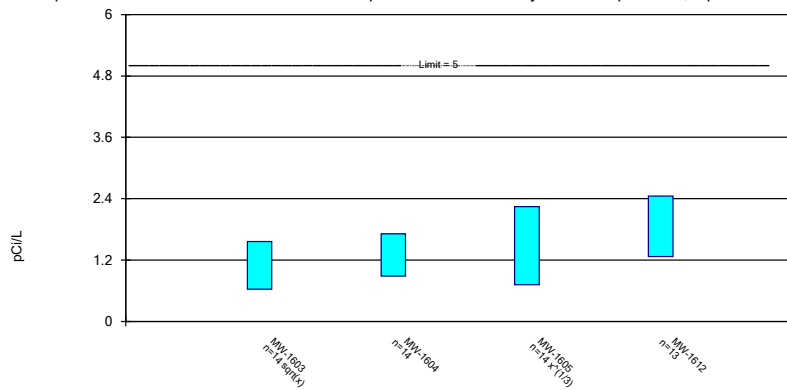
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

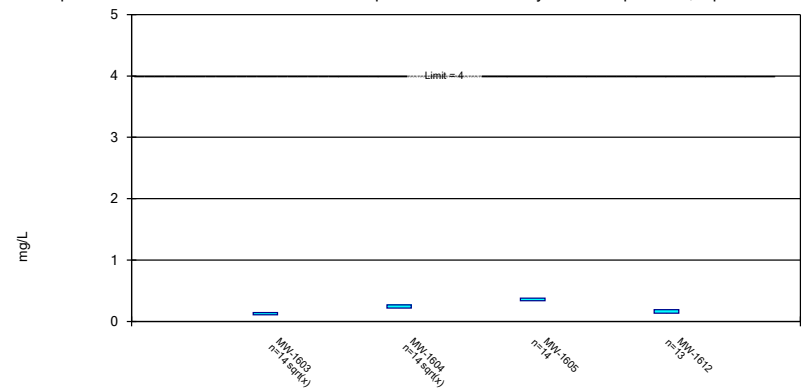
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - A
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

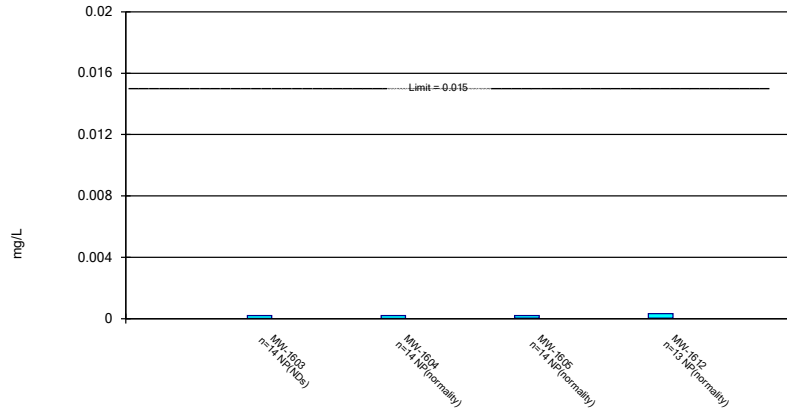
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

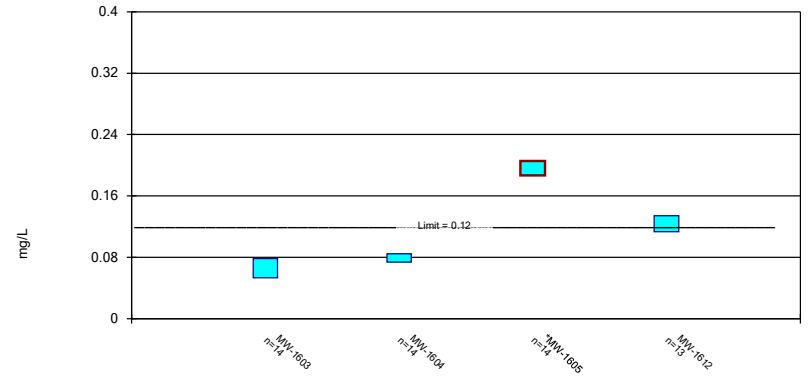
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

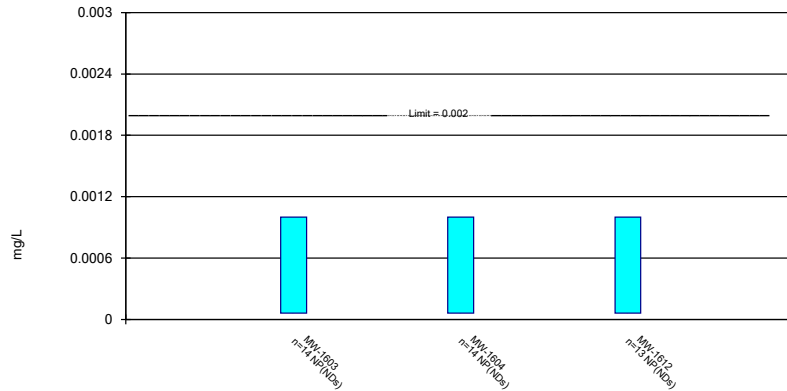
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

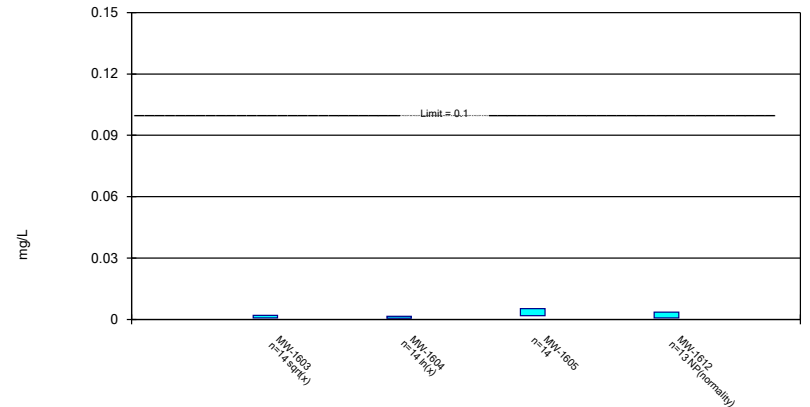
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric and Non-Parametric (NP) Confidence Interval

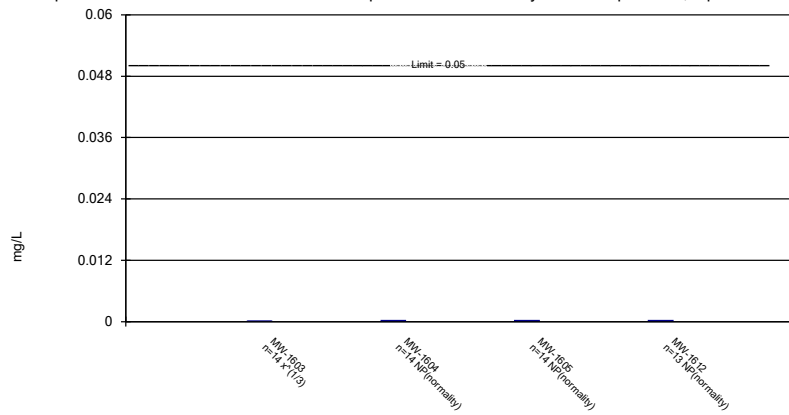
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric and Non-Parametric (NP) Confidence Interval

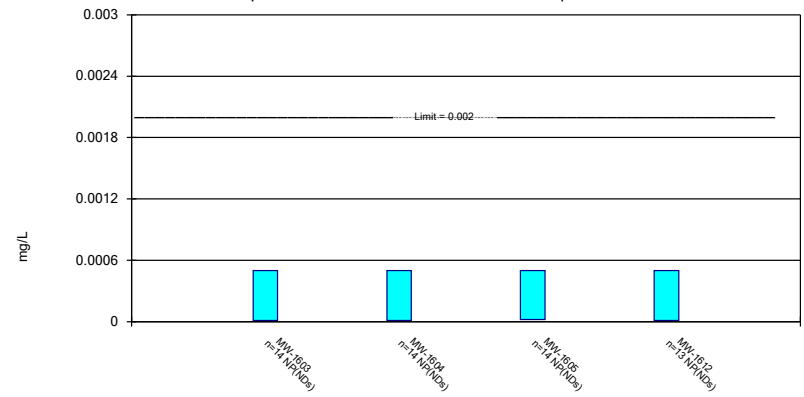
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

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



Constituent: Thallium Analysis Run 1/13/2021 6:40 PM View: Chattanooga Shale - Appendix IV
 Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Confidence Intervals- Rome Limestone - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/18/2021, 5:05 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Cobalt (mg/L)	MW-1607	0.01134	0.008064	0.006	Yes 14	0.009703	0.002314	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1606	0.09078	0.0607	0.04	Yes 14	0.07314	0.02571	0	None	x^2	0.01	Param.
Lithium (mg/L)	MW-1607	0.1306	0.1178	0.04	Yes 14	0.1242	0.008989	0	None	No	0.01	Param.
Molybdenum (mg/L)	MW-1607	0.1607	0.1293	0.1	Yes 14	0.145	0.02218	0	None	No	0.01	Param.

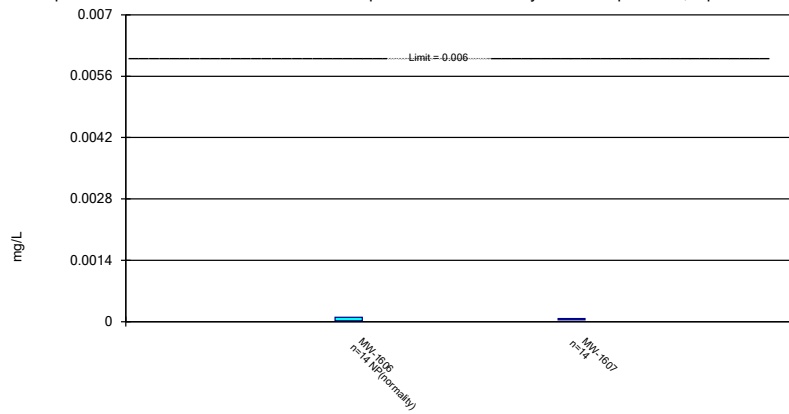
Confidence Intervals- Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 1/18/2021, 5:05 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	MW-1606	0.0001	0.00002	0.006	No 14	0.00004929	0.00003407	28.57	None	No	0.01	NP (normality)
Antimony (mg/L)	MW-1607	0.00007161	0.00003839	0.006	No 14	0.000055	0.00002345	7.143	None	No	0.01	Param.
Arsenic (mg/L)	MW-1606	0.00833	0.00676	0.01	No 14	0.007809	0.002675	0	None	No	0.01	NP (normality)
Arsenic (mg/L)	MW-1607	0.00164	0.00086	0.01	No 14	0.001683	0.00137	0	None	No	0.01	NP (normality)
Barium (mg/L)	MW-1606	0.1184	0.1058	2	No 14	0.1117	0.0102	0	None	x^3	0.01	Param.
Barium (mg/L)	MW-1607	0.0757	0.0704	2	No 14	0.07857	0.01888	0	None	No	0.01	NP (normality)
Beryllium (mg/L)	MW-1606	0.0001	0.000006	0.004	No 14	0.00006643	0.00004674	64.29	None	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-1607	0.0001	0.000005	0.004	No 14	0.00009321	0.00002539	92.86	None	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-1606	0.00005	0.00001	0.005	No 14	0.00003186	0.00001927	50	None	No	0.01	NP (normality)
Cadmium (mg/L)	MW-1607	0.0001799	0.0001001	0.005	No 14	0.00014	0.0000563	0	None	No	0.01	Param.
Chromium (mg/L)	MW-1606	0.000218	0.00014	0.1	No 14	0.0002024	0.00006263	0	None	No	0.01	NP (normality)
Chromium (mg/L)	MW-1607	0.000216	0.0001	0.1	No 14	0.0001843	0.00005911	0	None	No	0.01	NP (normality)
Cobalt (mg/L)	MW-1606	0.00585	0.00453	0.006	No 14	0.005121	0.001112	0	None	x^2	0.01	Param.
Cobalt (mg/L)	MW-1607	0.01134	0.008064	0.006	Yes 14	0.009703	0.002314	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606	2.159	1.126	5.25	No 14	1.72	0.7925	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607	1.312	0.5802	5.25	No 14	0.9771	0.6036	0	None	sqrt(x)	0.01	Param.
Fluoride (mg/L)	MW-1606	0.2365	0.1749	4	No 14	0.2057	0.04345	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-1607	0.2427	0.2059	4	No 14	0.2243	0.02593	0	None	No	0.01	Param.
Lead (mg/L)	MW-1606	0.00058	0.0003575	0.015	No 14	0.0004688	0.0001571	0	None	No	0.01	Param.
Lead (mg/L)	MW-1607	0.0006421	0.0004063	0.015	No 14	0.0005242	0.0001664	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1606	0.09078	0.0607	0.04	Yes 14	0.07314	0.02571	0	None	x^2	0.01	Param.
Lithium (mg/L)	MW-1607	0.1306	0.1178	0.04	Yes 14	0.1242	0.008989	0	None	No	0.01	Param.
Mercury (mg/L)	MW-1606	0.001	0.00006	0.002	No 14	0.0009329	0.0002512	92.86	None	No	0.01	NP (NDs)
Mercury (mg/L)	MW-1607	0.001	0.00008	0.002	No 14	0.0009343	0.0002459	92.86	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-1606	0.082	0.05326	0.1	No 14	0.06763	0.02029	0	None	No	0.01	Param.
Molybdenum (mg/L)	MW-1607	0.1607	0.1293	0.1	Yes 14	0.145	0.02218	0	None	No	0.01	Param.
Selenium (mg/L)	MW-1606	0.0001096	0.00006009	0.05	No 14	0.00008643	0.00003895	0	None	sqrt(x)	0.01	Param.
Selenium (mg/L)	MW-1607	0.0002491	0.00009026	0.05	No 14	0.0001943	0.0001708	0	None	ln(x)	0.01	Param.
Thallium (mg/L)	MW-1606	0.0005	0.00004	0.002	No 14	0.0002757	0.0002332	50	None	No	0.01	NP (normality)
Thallium (mg/L)	MW-1607	0.0005	0.00003	0.002	No 14	0.0003021	0.000238	57.14	None	No	0.01	NP (NDs)

Parametric and Non-Parametric (NP) Confidence Interval

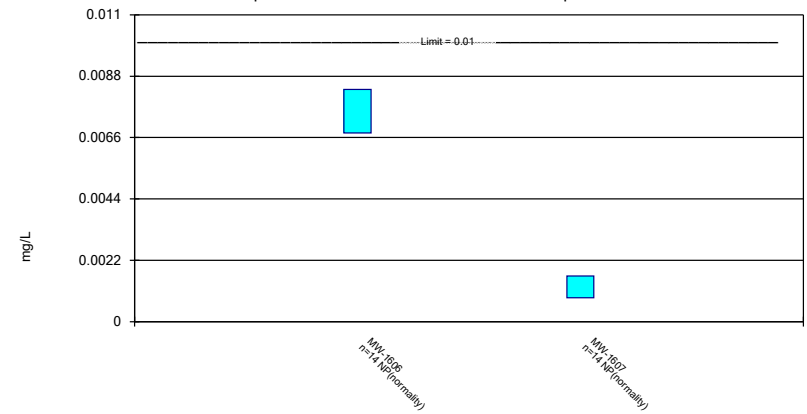
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Antimony Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

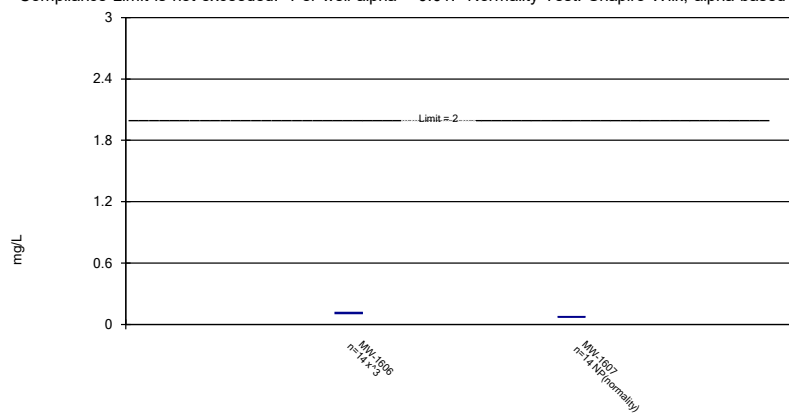
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Arsenic Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric and Non-Parametric (NP) Confidence Interval

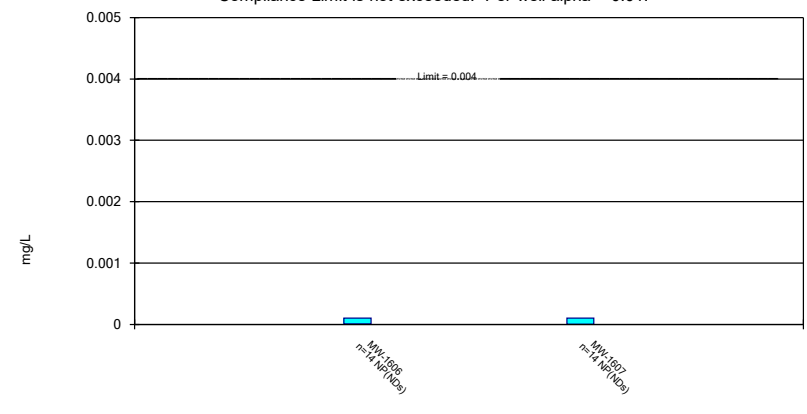
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

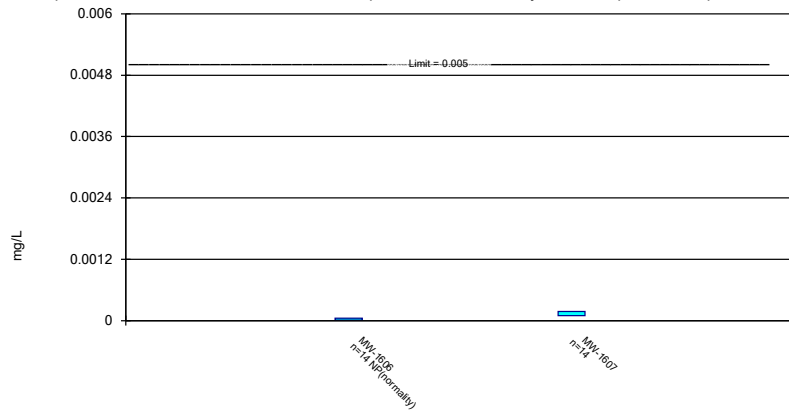
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Beryllium Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric and Non-Parametric (NP) Confidence Interval

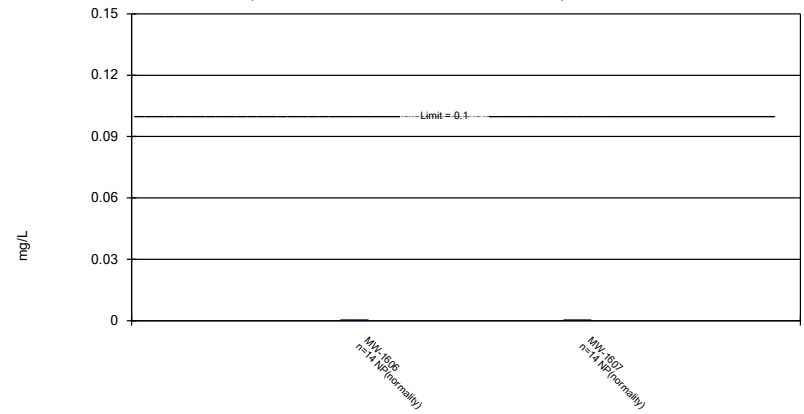
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

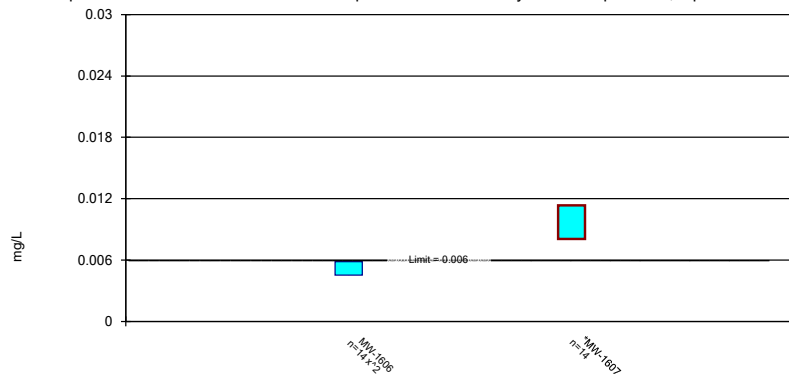
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Chromium Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

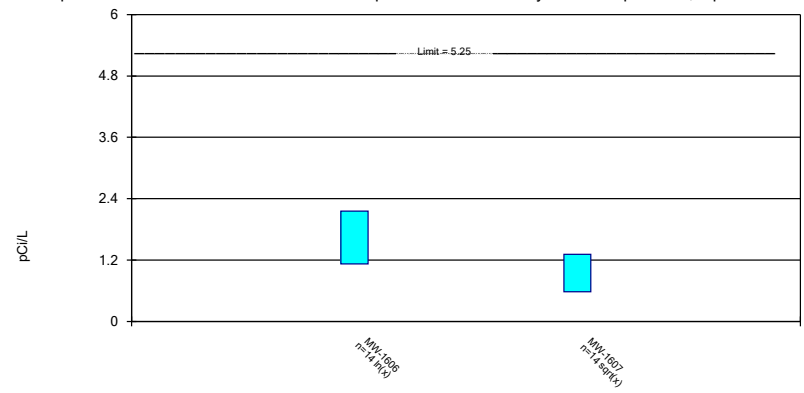
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

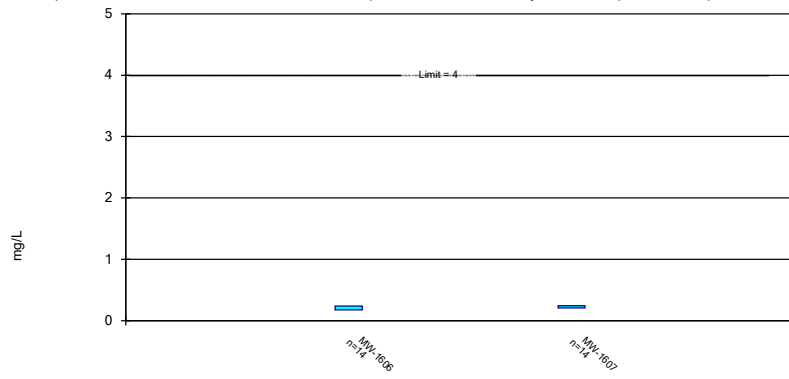
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - App
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

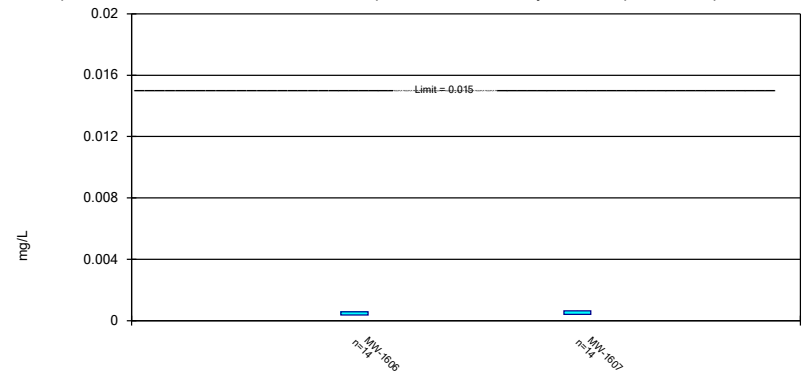
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

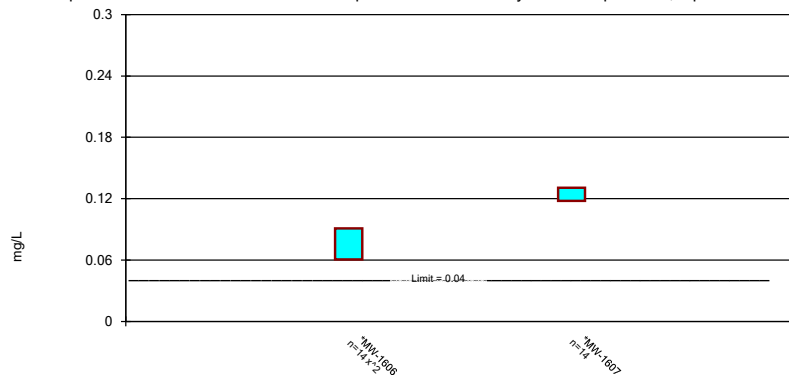
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

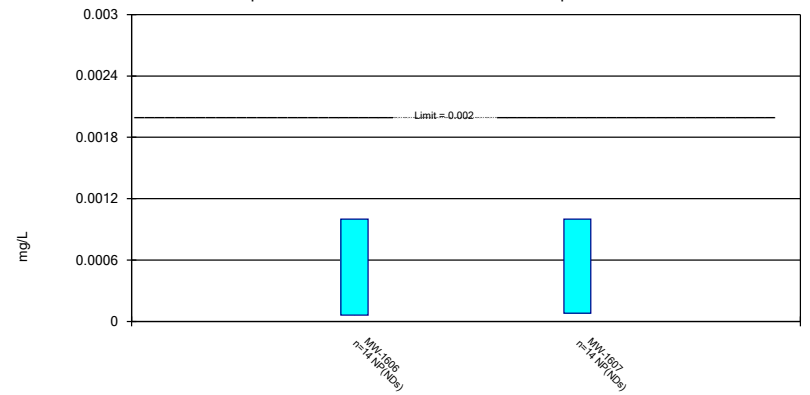
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Constituent: Lithium Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

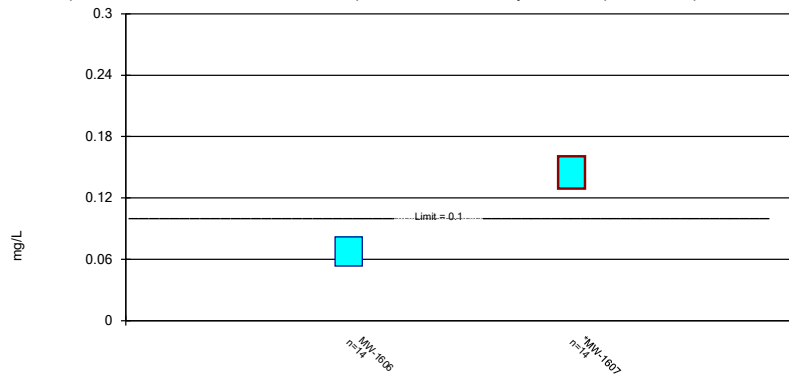
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

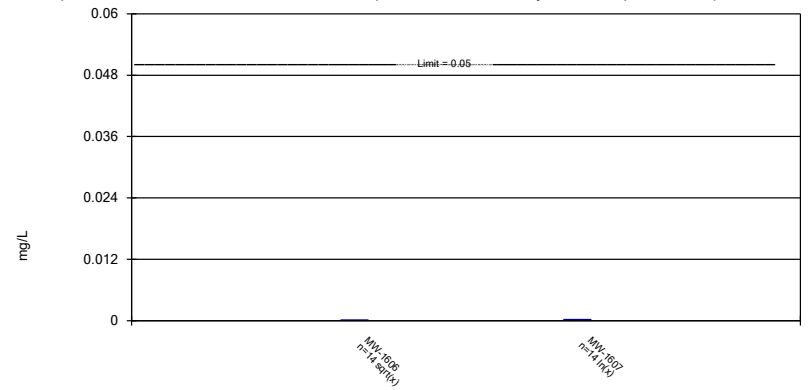
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

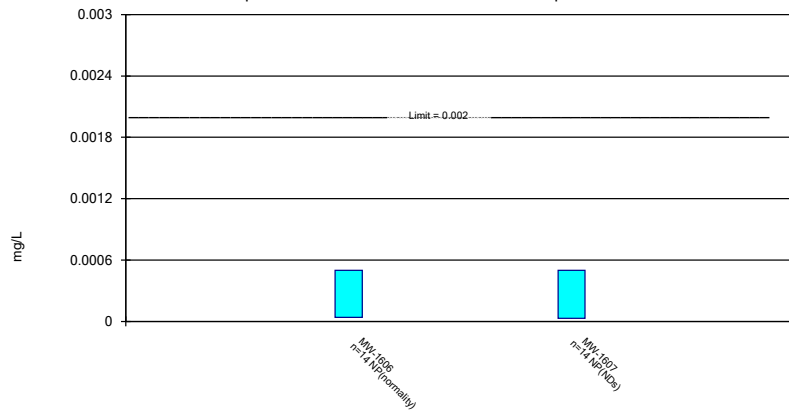
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

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



Constituent: Thallium Analysis Run 1/18/2021 5:04 PM View: Rome Limestone - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Confidence Intervals - Dumps Fault - Significant Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 2/1/2021, 1:50 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Cobalt (mg/L)	MW-1610	0.01021	0.006983	0.006	Yes 14	0.008599	0.002281	0	None	No	0.01	Param.
Molybdenum (mg/L)	MW-1610	0.172	0.135	0.1	Yes 14	0.1654	0.05375	0	None	No	0.01	NP (normality)

Confidence Intervals - Dumps Fault - All Results

Clinch River LF Client: AEP Data: Clinch River Landfill AEP Printed 2/1/2021, 1:50 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	MW-1610	0.0002542	0.00004682	0.006	No 14	0.0002407	0.0003939	7.143	None	In(x)	0.01	Param.
Arsenic (mg/L)	MW-1610	0.00167	0.00118	0.045	No 14	0.001704	0.001233	0	None	No	0.01	NP (normality)
Barium (mg/L)	MW-1610	0.2415	0.1955	2	No 14	0.2185	0.03246	0	None	No	0.01	Param.
Beryllium (mg/L)	MW-1610	0.0001	0.000004	0.004	No 14	0.00007279	0.00004466	71.43	None	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-1610	0.00006	0.00002	0.005	No 14	0.00004	0.00001468	50	None	No	0.01	NP (normality)
Chromium (mg/L)	MW-1610	0.000267	0.000174	0.1	No 14	0.0002553	0.0001612	0	None	No	0.01	NP (normality)
Cobalt (mg/L)	MW-1610	0.01021	0.006983	0.006	Yes 14	0.008599	0.002281	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1610	1.495	0.7721	5	No 14	1.133	0.5101	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-1610	0.22	0.18	4	No 14	0.2086	0.04418	0	None	No	0.01	NP (normality)
Lead (mg/L)	MW-1610	0.01085	0.004547	0.015	No 14	0.007699	0.004451	0	None	No	0.01	Param.
Lithium (mg/L)	MW-1610	0.207	0.171	0.173	No 14	0.1951	0.04905	0	None	No	0.01	NP (normality)
Mercury (mg/L)	MW-1610	0.001	0.00006	0.002	No 14	0.0009329	0.0002512	92.86	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-1610	0.172	0.135	0.1	Yes 14	0.1654	0.05375	0	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-1610	0.0003879	0.0002121	0.05	No 14	0.0003	0.000124	0	None	No	0.01	Param.
Thallium (mg/L)	MW-1610	0.0005	0.00002	0.002	No 14	0.0002943	0.0002465	57.14	None	No	0.01	NP (NDs)

Parametric Confidence Interval

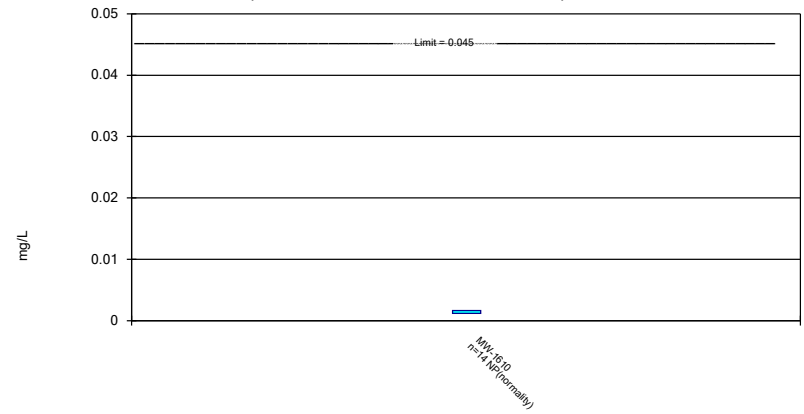
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Antimony Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

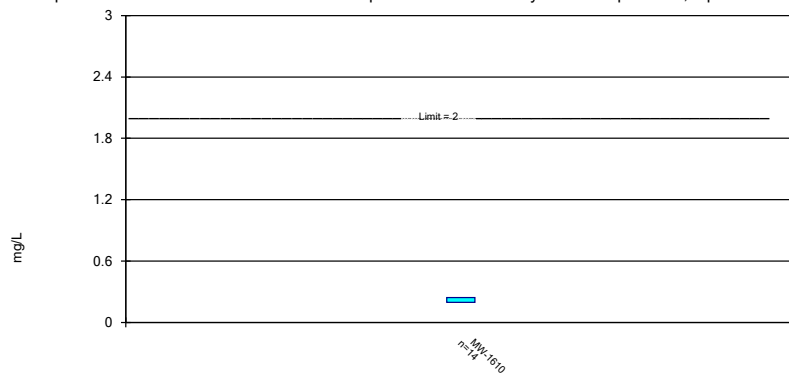
Compliance Limit is not exceeded. Per-well alpha = 0.01.



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Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

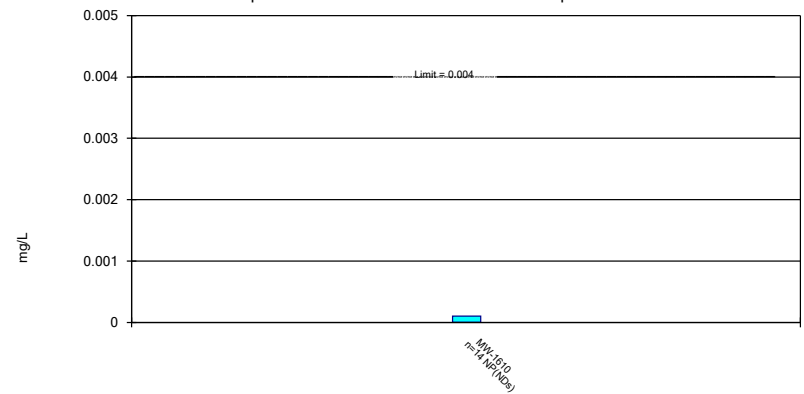
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

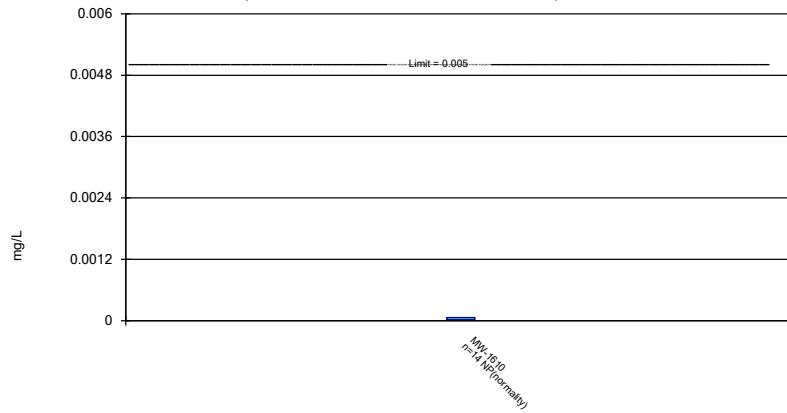
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Beryllium Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

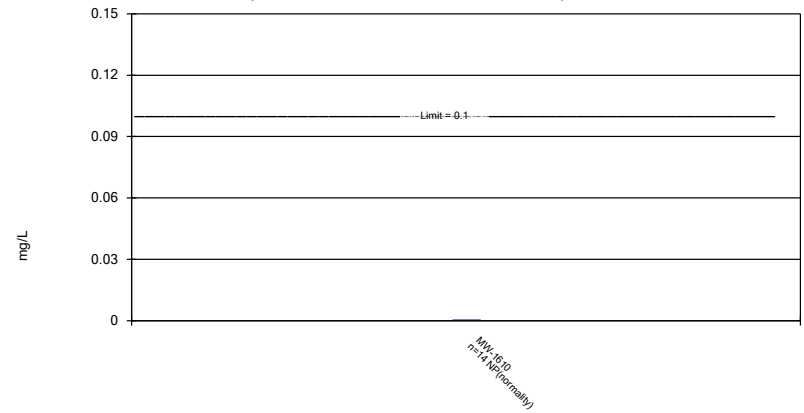
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cadmium Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

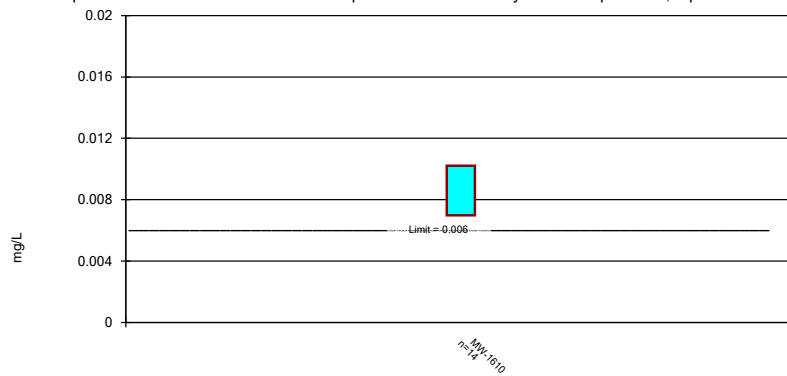
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Chromium Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

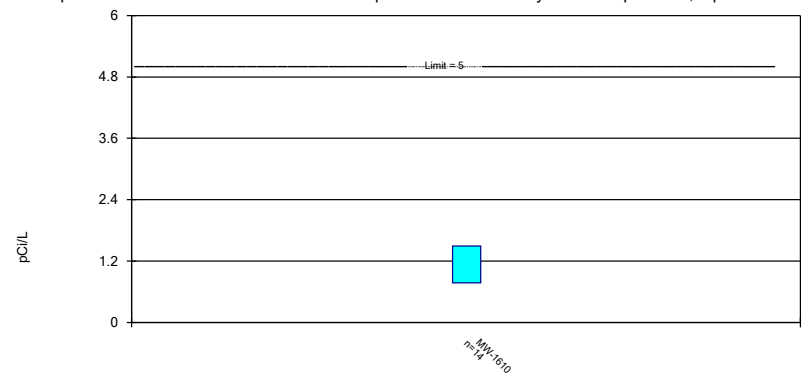
Compliance limit is exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

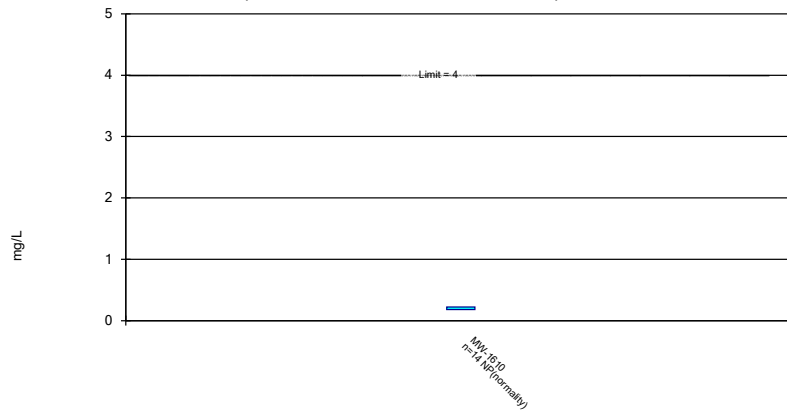
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Constituent: Combined Radium 226 + 228 Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

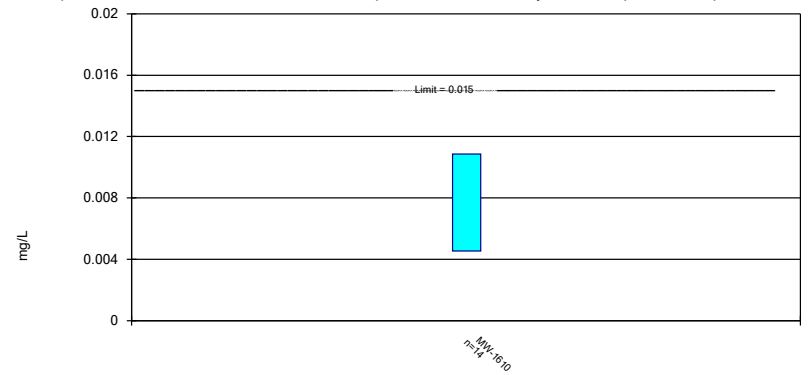
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Fluoride Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

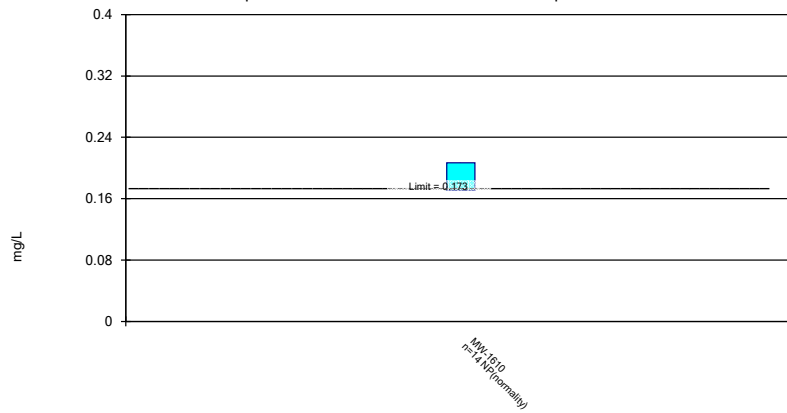
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

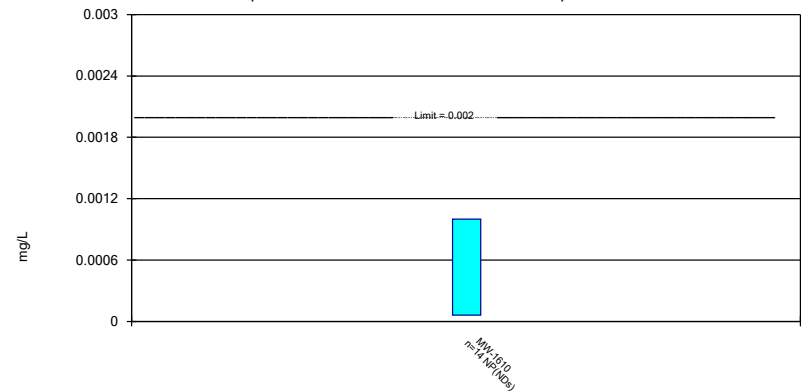
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lithium Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

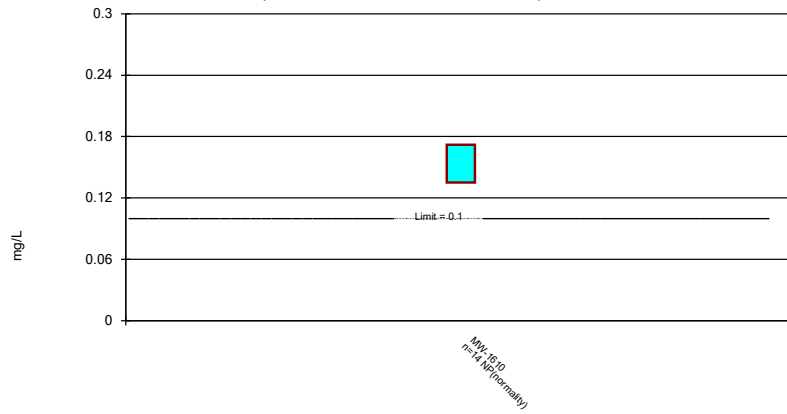
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

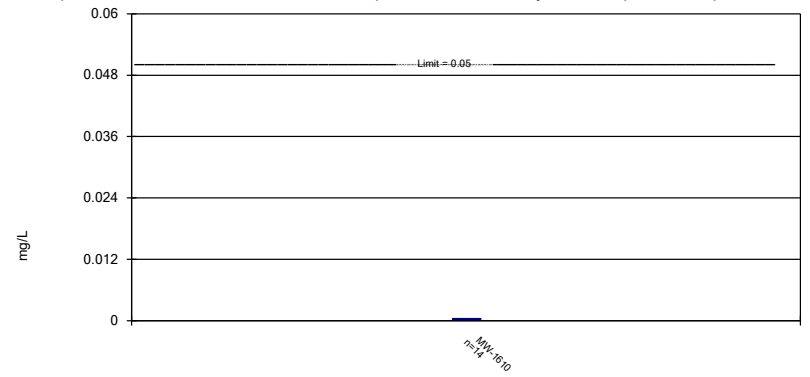
Compliance limit is exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Parametric Confidence Interval

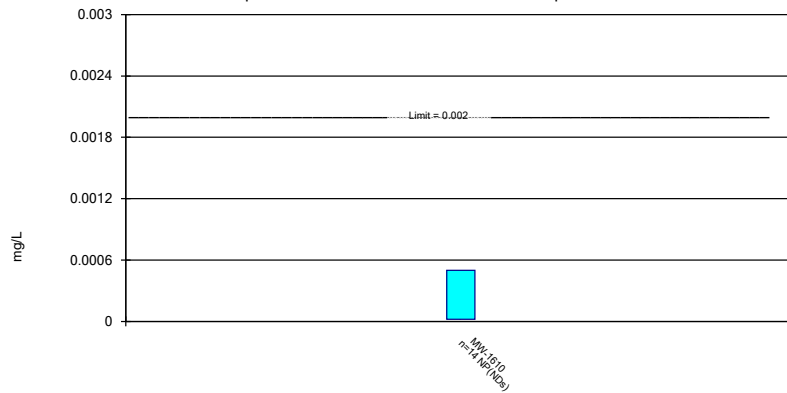
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

Non-Parametric Confidence Interval

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



Constituent: Thallium Analysis Run 2/1/2021 1:48 PM View: Dumps Fault - Appendix IV
Clinch River LF Client: AEP Data: Clinch River Landfill AEP

STATISTICAL ANALYSIS SUMMARY
ASH POND 1
Clinch River Plant
Carbo, Virginia

Submitted to



1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by



engineers | scientists | innovators

941 Chatham Lane
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October 18, 2021

CHA8500

TABLE OF CONTENTS

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

LIST OF TABLES

Table 1	Groundwater Data Summary
Table 2	Appendix IV Groundwater Protection Standards
Table 3	Appendix IV Identified Statistically Significant Levels
Table 4	Appendix III Data Summary

LIST OF ATTACHMENTS

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

LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
QA	Quality Assurance
QC	Quality Control
SSD	Statistically Significant Decrease
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
SU	Standard Units
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

SECTION 1

EXECUTIVE SUMMARY

In accordance with the United States Environmental Protection Agency's (USEPA's) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (40 CFR 257.90-257.98, "CCR rule"), groundwater monitoring has been conducted at Ash Pond 1, an existing CCR unit at the Clinch River Plant located in Carbo, Virginia.

Eight monitoring events were completed from December 2017 to December 2018 to establish background concentrations for Appendix III and Appendix IV parameters under the CCR rule. Data collected through April 2019 were compared to the background concentrations to evaluate whether statistically significant increases (SSIs) or statistically significant levels (SSLs) of Appendix III or Appendix IV constituents, respectively, were identified. SSIs for calcium, chloride, sulfate, and pH and SSLs for barium, cobalt, lithium, and molybdenum were identified, and an alternative source for these exceedances were not identified. Therefore, Ash Pond 1 initiated an assessment of corrective measures in accordance with 40 CFR 257.96 and has been completing assessment monitoring since.

During 2021, an annual sampling event for Appendix IV parameters required by 257.95(b) was completed in February, and semi-annual sampling events for Appendix III and the detected Appendix IV parameters required by 257.95(d)(1) were completed in April. The results of the semi-annual assessment monitoring events are documented in this report.

Monitoring data from the February 2021 and April 2021 event 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.

Groundwater data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. The statistics were completed in three separate groups which correspond to differences in the underlying geology at the monitoring locations. Groundwater protection standards (GWPSs) were re-established for the Appendix IV parameters to assess whether Appendix IV parameters were present at an SSL above the GWPS. SSLs were identified for barium, cobalt, lithium, and molybdenum. Thus, the unit will continue the assessment of corrective measures process and will monitor the groundwater monitoring network in accordance with the assessment monitoring program as required by 40 CFR 275.96(b). Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

SECTION 2

ASH POND 1 EVALUATION

2.1 Data Validation & QA/QC

During the assessment monitoring program, two set of samples were collected for analysis from each upgradient and downgradient well throughout the three geologically distinct monitoring well networks to meet the requirements of 40 CFR 257.95b (February 2021) and 257.95(d)(1) (April 2021). The geological units consist of the Chattanooga Shale, the Rome Limestone, and the Dumps Fault water-bearing unit. A summary of data collected during these assessment monitoring events may be found 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 information and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.30 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

2.2 Statistical Analysis

Statistical analyses for Ash Pond 1 were conducted in accordance with the October 2020 *Statistical Analysis Plan* (Geosyntec, 2020). Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained in February and April 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 40 CFR 257.95(h) and the *Statistical Analysis Plan* (Geosyntec 2020) to incorporate data from May 2019 that was previously excluded from the GWPS calculations because it was collected for a detection monitoring verification event. The established GWPSs were determined to be the greater value of (1) the background concentration and (2) the maximum contaminant level (MCL) or the level specified in 40 CFR 257.95(h)(2) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the

background wells collected during the background monitoring and assessment monitoring events. Generally, tolerance limits were calculated parametrically with 95% coverage and 95% confidence. Non-parametric tolerance limits were calculated in instances where data have either non-normal distributions or a high non-detect frequency. Non-parametric tolerance limits for Chattanooga Shale wells were calculated for arsenic, barium, fluoride, lithium, and selenium due to apparent non-normal distributions, and for beryllium, cadmium, mercury, and thallium due to a high non-detect frequency. Non-parametric tolerance limits for Rome Limestone wells were calculated for cadmium and lithium due to apparent non-normal distributions, and for beryllium, mercury, and thallium due to a high non-detect frequency. Non-parametric tolerance limits for Dumps Fault wells were calculated for combined radium and molybdenum due to apparent non-normal distributions, and for beryllium, cadmium, mercury, and thallium due to a high non-detect frequency. Tolerance limits and the final GWPSs are summarized in Tables 2A-2C.

2.2.2 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ($\alpha = 0.01$); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high). An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B and summarized in Table 3.

The following SSLs were identified at Clinch River Ash Pond 1:

- The LCL for barium at MW-1604 (3.08 mg/L) exceeded the GWPS of 2.00 mg/L, and the LCL for lithium at MW-1605 (0.186 mg/L) exceeded the GWPS of 0.118 mg/L in the Chattanooga Shale formation.
- The LCL for cobalt at MW-1607 (0.00828 mg/L) exceeded the GWPS of 0.00600 mg/L, the LCLs for lithium at MW-1606 (0.0533 mg/L) and MW-1607 (0.118 mg/L) exceeded the GWPS of 0.0400 mg/L, and the LCL for molybdenum at MW-1607 (0.131 mg/L) exceeded the GWPS of 0.100 mg/L in the Rome Limestone formation.
- The LCL for cobalt at MW-1610 (0.00671 mg/L) exceeded the GWPS of 0.00600 mg/L, the LCL for lithium at MW-1610 (0.173 mg/L) exceeded the GWPS of 0.168 mg/L, and the LCL for molybdenum at MW-1610 (0.139 mg/L) exceeded the GWPS of 0.100 mg/L in the Dumps Fault water-bearing unit.

As a result, Clinch River Ash Pond 1 will continue the assessment of corrective measures and continue to monitor the groundwater monitoring network in accordance with the assessment monitoring program per 40 CFR 257.96(b).

2.2.3 Evaluation of Potential Appendix III SSIs

While SSLs were identified, a review of the Appendix III results was also completed to assess whether concentrations of Appendix III parameters at the compliance wells exceeded background concentrations. Data collected during the April 2021 assessment monitoring event from downgradient compliance wells were compared to previously calculated prediction limits to evaluate results above background values. The results from this event and the prediction limits are summarized in Tables 4A-4C. The following SSIs above the upper prediction limits (UPLs) were noted:

- Calcium concentrations exceeded the Chattanooga Shale interwell UPL of 8.28 mg/L at MW-1603 (33.1 mg/L), MW-1604 (25.8 mg/L), MW-1605 (43.0 mg/L), and MW-1612 (41.6 mg/L).
- Chloride concentrations exceeded the Chattanooga Shale interwell UPL of 45.8 mg/L at MW-1603 (263 mg/L) and MW-1605 (161 mg/L). Chloride concentrations exceeded the Rome Limestone interwell UPL of 3.72 mg/L at MW-1606 (13.4 mg/L) and MW-1607 (6.3 mg/L).
- Fluoride concentrations exceeded the Chattanooga Shale intrawell UPL of 0.287 mg/L at MW-1604 (0.30 mg/L). Fluoride concentrations exceeded the Dumps Fault intrawell UPL of 0.227 mg/L at MW-1610 (0.26 mg/L).
- Sulfate concentrations exceeded the Rome Limestone interwell UPL of 21.0 mg/L at MW-1606 (26.8 mg/L) and MW-1607 (120 mg/L).
- Total dissolved solids (TDS) exceeded the Chattanooga Shale intrawell UPL of 695 mg/L at MW-1603 (848 mg/L).

Additionally, the following statistically significant decreases (SSDs) below the lower prediction limits (LPLs) for pH were noted:

- pH values were below the Chattanooga Shale interwell LPL of 8.0 SU for MW-1603 (7.3 SU), MW-1604 (7.3 SU), MW-1605 (7.9 SU), and MW-1612 (7.3 SU).

While the prediction limits were calculated for a one-of-two or one-of-three retesting procedure, SSIs were conservatively assumed if the initial (April 2021) sample was above the UPL or below the LPL.

2.3 Conclusions

A semi-annual assessment monitoring event was conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified no potential outliers in the February 2021 or April 2021 data. GWPSs were re-established for the Appendix IV parameters to

incorporate May 2019 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 barium, cobalt, lithium, and molybdenum.

Appendix III parameters were compared to previously calculated prediction limits. Calcium, chloride, fluoride, pH, TDS, and sulfate results exceeded background levels, and pH results were lower than background levels.

Based on this evaluation, the Clinch River Ash Pond 1 CCR unit will continue with the assessment of corrective measures and continue to monitor the groundwater monitoring network in accordance with the assessment monitoring program per 40 CFR 257.96b.

SECTION 3

REFERENCES

Geosyntec Consultants (Geosyntec). 2020. Statistical Analysis Plan. October 2020.

Geosyntec. 2021. Statistical Analysis Summary – Ash Pond 1, Clinch River Plant, Carbo, Virginia. February 2, 2021.

TABLES

**Table 1 - Groundwater Data Summary
Clinch River Plant - Pond 1**

Parameter	Unit	MW-1601		MW-1602		MW-1603		MW-1604		MW-1605		MW-1606	
		2/8/2021	4/12/2021	2/8/2021	4/12/2021	2/9/2021	4/13/2021	2/9/2021	4/13/2021	2/9/2021	4/13/2021	2/9/2021	4/12/2021
Antimony	µg/L	0.06 J	0.05 J	0.53	0.54	0.08 J	0.08 J	0.12	0.05 J	0.03 J	0.04 J	0.03 J	0.1 U
Arsenic	µg/L	7.91	8.77	1.39	1.69	3.36	3.94	1.88	1.28	1.54	1.78	10.5	8.32
Barium	µg/L	152	176	103	98.7	3,810	3,540	3,170	3,000	2,160	2,150	124	113
Beryllium	µg/L	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 J
Boron	mg/L	0.549	0.527	0.610	0.600	0.345	0.374	0.462	0.403	0.549	0.529	0.079	0.083
Cadmium	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 J	0.02 J
Calcium	mg/L	4.83	5.68	3.70	3.73	30.9	33.1	22.4	25.8	42.7	43.0	57.8	57.2
Chloride	mg/L	23.1	22.5	3.9	4.6	184	263	15.7	16.9	159	161	13.0	13.4
Chromium	µg/L	0.263	0.1 J	0.2 J	0.06 J	0.1 J	0.2 J	0.05 J	0.2 J	0.06 J	0.256	0.572	0.234
Cobalt	µg/L	0.078	0.057	0.03 J	0.02 J	0.153	0.118	0.329	0.299	0.04 J	0.04 J	4.68	4.13
Combined Radium	pCi/L	0.645	0.727	0.419	0.892	1.392	1.565	1.288	1.096	1.713	1.163	1.63	1.507
Fluoride	mg/L	2.40	2.42	1.76	1.77	0.12	0.17	0.37	0.30	0.38	0.30	0.22	0.22
Lead	µg/L	0.2 U	0.08 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.03	0.538
Lithium	mg/L	0.0938	0.0975	0.0378	0.0476	0.0977	0.103	0.0710	0.0713	0.190	0.182	0.0561	0.0558
Mercury	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Molybdenum	µg/L	1 J	0.9 J	2 J	2 J	0.4 J	0.5 J	2 U	0.2 J	0.6 J	0.6 J	56.7	53.5
Selenium	µg/L	0.09 J	0.5 U	0.04 J	0.5 U	0.08 J	0.5 U	0.07 J	0.5 U	0.05 J	0.5 U	0.1 J	0.5 U
Sulfate	mg/L	185	188	16.1	20.3	1.9	1.6	0.9	0.9	0.4 U	0.4 U	26.5	26.8
Thallium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Dissolved Solids	mg/L	1,360	1,480	539	522	734	848	441	396	705	653	368	333
pH	SU	8.2	8.5	8.4	8.6	7.1	7.3	7.3	7.3	7.8	7.9	7.1	7.1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

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

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

-: Not sampled

**Table 1 - Groundwater Data Summary
Clinch River Plant - Pond 1**

Parameter	Unit	MW-1607		MW-1608		MW-1609		MW-1610		MW-1611		MW-1612	
		2/9/2021	4/13/2021	2/8/2021	4/12/2021	2/8/2021	4/12/2021	2/9/2021	4/12/2021	2/8/2021	4/12/2021	2/9/2021	4/13/2021
Antimony	µg/L	0.04 J	0.04 J	0.1 U	0.02 J	0.03 J	0.02 J	0.06 J	1.44	0.02 J	0.02 J	0.03 J	0.04 J
Arsenic	µg/L	1.13	1.00	1.15	1.06	0.1 J	0.08 J	1.67	2.26	6.62	6.19	0.50	0.37
Barium	µg/L	68.5	62.0	30.3	28.1	399	340	311	251	151	157	2,400	2,120
Beryllium	µg/L	0.1 U	0.1 U	0.1 U	0.008 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Boron	mg/L	0.113	0.099	0.347	0.343	0.05 U	0.05 U	0.04 J	0.04 J	0.558	0.546	0.369	0.339
Cadmium	µg/L	0.07	0.15	0.05 U	0.05 U	0.01 J	0.01 J	0.02 J	0.01 J	0.05 U	0.05 U	0.05 U	0.05 U
Calcium	mg/L	41.5	43.9	0.968	0.744	66.4	66.2	31.2	29.5	22.6	22.7	41.4	41.6
Chloride	mg/L	7.0	6.3	5.8	5.8	1.5	1.0	10.0	10.3	14.7	14.8	26.8	29.6
Chromium	µg/L	0.842	0.2 J	0.408	0.207	0.233	0.08 J	0.248	0.204	0.261	0.2 J	0.1 J	0.2 J
Cobalt	µg/L	8.45	8.87	0.175	0.120	0.207	0.005 J	5.31	5.26	0.02 J	0.02 J	0.097	0.125
Combined Radium	pCi/L	1.624	0.807	0.715	0.646	1.224	4.39	0.944	0.725	0.915	0.753	2.053	1.572
Fluoride	mg/L	0.26	0.23	0.46	0.45	0.26	0.24	0.26	0.26	1.15	1.18	0.19	0.19
Lead	µg/L	0.394	0.626	0.1 J	0.1 J	0.298	0.242	0.551	3.09	0.2 U	0.2 U	0.2 U	0.2 U
Lithium	mg/L	0.126	0.112	0.0194	0.0183	0.00101	0.000654	0.215	0.219	0.0620	0.0613	0.113	0.113
Mercury	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Molybdenum	µg/L	141	128	1 J	1 J	2 U	0.3 J	183	185	2 J	1 J	0.6 J	0.7 J
Selenium	µg/L	0.1 J	0.3 J	0.07 J	0.5 U	0.1 J	0.2 J	0.07 J	0.5 J	0.03 J	0.5 U	0.2 U	0.5 U
Sulfate	mg/L	128	120	167	166	19.6	11.7	38.7	34.2	82.9	71.8	0.3 J	0.4
Thallium	µg/L	0.5 U	0.05 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Dissolved Solids	mg/L	303	275	442	434	284	282	251	235	619	580	555	524
pH	SU	7.5	7.9	8.3	8.6	7.4	7.5	7.7	7.6	7.7	7.9	7.2	7.3

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

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

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

-: Not sampled

**Table 2A: Appendix IV Groundwater Protection Standards
Clinch River Plant - Ash Pond 1**

Geosyntec Consultants, Inc.

Chattanooga Shale Monitoring Well Network				
Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.0060		0.00024	0.0060
Arsenic, Total (mg/L)	0.0100		0.0258	0.0258
Barium, Total (mg/L)	2.00		0.306	2.00
Beryllium, Total (mg/L)	0.004		0.00007	0.004
Cadmium, Total (mg/L)	0.005		0.00003	0.005
Chromium, Total (mg/L)	0.0500		0.00126	0.0500
Cobalt, Total (mg/L)	n/a	0.00600	0.000462	0.00600
Combined Radium, Total (pCi/L)	5.00		2.86	5.00
Fluoride, Total (mg/L)	4.0		2.35	4.0
Lead, Total (mg/L)	n/a	0.015	0.00088	0.015
Lithium, Total (mg/L)	n/a	0.0400	0.118	0.118
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)	n/a	0.100	0.0173	0.100
Selenium, Total (mg/L)	0.05		0.0001	0.05
Thallium, Total (mg/L)	0.002		0.0001	0.002

Notes:

Grey cell indicates calculated UTL is higher than MCL or CCR Rule-specified value

MCL = Maximum Contaminant Level

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

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

**Table 2B: Appendix IV Groundwater Protection Standards
Clinch River Plant - Ash Pond 1**

Geosyntec Consultants, Inc.

Rome Limestone Monitoring Well Network				
Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.006		0.00013	0.006
Arsenic, Total (mg/L)	0.010		0.0015	0.010
Barium, Total (mg/L)	2.00		0.544	2.00
Beryllium, Total (mg/L)	0.004		0.00002	0.004
Cadmium, Total (mg/L)	0.005		0.00004	0.005
Chromium, Total (mg/L)	0.0500		0.000341	0.0500
Cobalt, Total (mg/L)	n/a	0.00600	0.00143	0.00600
Combined Radium, Total (pCi/L)	5.00		5.02	5.02
Fluoride, Total (mg/L)	4.0		0.362	4.0
Lead, Total (mg/L)	n/a	0.015	0.00123	0.015
Lithium, Total (mg/L)	n/a	0.0400	0.010	0.0400
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)	n/a	0.100	0.0028	0.100
Selenium, Total (mg/L)	0.05		0.0005	0.05
Thallium, Total (mg/L)	0.002		0.0001	0.002

Notes:

Grey cell indicates calculated UTL is higher than MCL or CCR Rule-specified value

MCL = Maximum Contaminant Level

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

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

**Table 2C: Appendix IV Groundwater Protection Standards
Clinch River Plant - Ash Pond 1**

Geosyntec Consultants, Inc.

Dumps Fault Monitoring Well Network				
Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.0060		0.00725	0.00725
Arsenic, Total (mg/L)	0.0100		0.0484	0.0484
Barium, Total (mg/L)	2.00		0.143	2.00
Beryllium, Total (mg/L)	0.004		0.00002	0.004
Cadmium, Total (mg/L)	0.005		0.00001	0.005
Chromium, Total (mg/L)	0.0500		0.00101	0.0500
Cobalt, Total (mg/L)	n/a	0.00600	0.000152	0.00600
Combined Radium, Total (pCi/L)	5.00		1.94	5.00
Fluoride, Total (mg/L)	4.0		1.23	4.0
Lead, Total (mg/L)	n/a	0.015	0.00022	0.015
Lithium, Total (mg/L)	n/a	0.0400	0.168	0.168
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)	n/a	0.100	0.00676	0.100
Selenium, Total (mg/L)	0.05		0.00013	0.05
Thallium, Total (mg/L)	0.002		0.00011	0.002

Notes:

Grey cell indicates calculated UTL is higher than MCL or CCR Rule-specified value

MCL = Maximum Contaminant Level

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

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

**Table 3 - Appendix IV Identified Statistically Significant Levels
Clinch River Plant - Ash Pond 1**

Formation	Well ID	Constituent	GWPS	LCL
Chattanooga Shale	MW-1604	Barium	2.00	3.08
	MW-1605	Lithium	0.118	0.186
Rome Limestone	MW-1606	Lithium	0.0400	0.0533
	MW-1607	Cobalt	0.00600	0.00600
		Lithium	0.0400	0.118
		Molybdenum	0.100	0.131
Dumps Fault	MW-1610	Cobalt	0.00600	0.00671
		Lithium	0.168	0.173
		Molybdenum	0.100	0.139

Notes:

All values are in mg/L

GWPS - Groundwater protection standard

LCL - lower confidence limit

**Table 4A: Appendix III Data Summary
Clinch River Plant - Pond 1**

Analyte	Unit	Description	Chattanooga Shale			
			MW-1603 4/13/2021	MW-1604 4/13/2021	MW-1605 4/13/2021	MW-1612 4/13/2021
Boron	mg/L	Intrawell Background Value (UPL)	0.502	0.501	0.677	0.591
		Analytical Result	0.374	0.403	0.529	0.339
Calcium	mg/L	Interwell Background Value (UPL)	8.28			
		Analytical Result	33.1	25.8	43.0	41.6
Chloride	mg/L	Interwell Background Value (UPL)	45.8			
		Analytical Result	263	16.9	161	29.6
Fluoride	mg/L	Intrawell Background Value (UPL)	0.188	0.287	0.427	0.248
		Analytical Result	0.17	0.30	0.30	0.19
pH	SU	Interwell Background Value (UPL)	9.0			
		Interwell Background Value (LPL)	8.0			
		Analytical Result	7.3	7.3	7.9	7.3
Sulfate	mg/L	Intrawell Background Value (UPL)	33.9	5.22	143	19.7
		Analytical Result	1.6	0.9	0.06	0.4
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	695	418	910	584
		Analytical Result	848	396	653	524

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

Bold values exceed the background value.

Background values are shaded gray.

**Table 4B: Appendix III Data Summary
Clinch River Plant - Pond 1**

Analyte	Unit	Description	Rome Limestone	
			MW-1606	MW-1607
			4/12/2021	4/13/2021
Boron	mg/L	Intrawell Background Value (UPL)	0.209	0.187
		Analytical Result	0.083	0.099
Calcium	mg/L	Intrawell Background Value (UPL)	66.3	53.2
		Analytical Result	57.2	43.9
Chloride	mg/L	Interwell Background Value (UPL)	3.72	
		Analytical Result	13.4	6.3
Fluoride	mg/L	Intrawell Background Value (UPL)	0.293	0.274
		Analytical Result	0.22	0.23
pH	SU	Intrawell Background Value (UPL)	7.4	8.4
		Intrawell Background Value (LPL)	6.7	7.2
		Analytical Result	7.1	7.9
Sulfate	mg/L	Interwell Background Value (UPL)	21.0	
		Analytical Result	26.8	120
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	386	318
		Analytical Result	333	275

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

Bold values exceed the background value.

Background values are shaded gray.

**Table 4C: Appendix III Data Summary
Clinch River Plant - Pond 1**

Analyte	Unit	Description	Dumps Fault
			MW-1610
			4/12/2021
Boron	mg/L	Intrawell Background Value (UPL)	0.121
		Analytical Result	0.04
Calcium	mg/L	Intrawell Background Value (UPL)	38.9
		Analytical Result	29.5
Chloride	mg/L	Intrawell Background Value (UPL)	12.6
		Analytical Result	10.3
Fluoride	mg/L	Intrawell Background Value (UPL)	0.227
		Analytical Result	0.26
pH	SU	Intrawell Background Value (UPL)	7.9
		Intrawell Background Value (LPL)	7.1
		Analytical Result	7.6
Sulfate	mg/L	Intrawell Background Value (UPL)	52.2
		Analytical Result	34.2
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	266
		Analytical Result	235

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

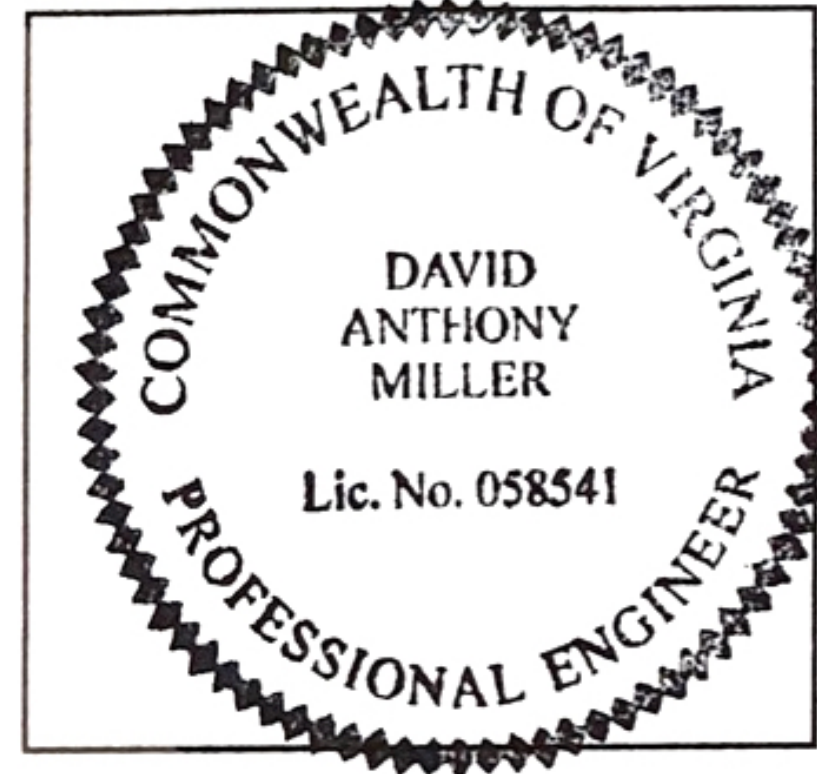
I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Clinch River Ash Pond 1 CCR management area and that the requirements of 40 CFR 257.93(f) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



058541

License Number

VIRGINIA

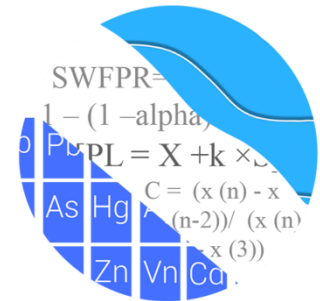
Licensing State

10.20.21

Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING



August 17, 2021

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

RE: Clinch River Pond 1 – Assessment Monitoring Report – 2021

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical evaluation of 2021 groundwater data for American Electric Power Company's Clinch River Pond 1. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009).

Sampling began at the Clinch River Pond 1 for the CCR program in 2017 at each of the groundwater monitoring wells. The monitoring well network, as provided by Geosyntec Consultants, consists of the following three formations:

Chattanooga Shale:

Upgradient Wells: MW-1601, MW-1602, MW-1608

Downgradient Wells: MW-1603, MW-1604, MW-1605, MW-1612

Rome Limestone:

Cross-gradient (background) Well: MW-1609

Downgradient Wells: MW-1606, MW-1607

Dumps Fault:

Upgradient Well: MW-1611

Downgradient Well: MW-1610

Data were sent electronically to Groundwater Stats Consulting, and the statistical 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 listed below. The terms “constituent” and “parameter” are interchangeable.

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

For all constituents, a substitution of the most recent reporting limit is used for non-detect data. In the time series plots, a single reporting limit substitution is used across all wells for a given parameter since the wells are plotted as a group. For calculating intrawell prediction limits, the substitution is performed for individual wells and may differ across wells. This generally gives the most conservative limit in each case. Note that when there are no detections present in downgradient wells for a given constituent, statistical analyses are not required. A summary of well/constituent pairs with 100% non-detects for the Chattanooga Shale formation follows this letter. Both the Dumps Fault and Rome Limestone formations did not have any well/constituent pairs with 100% non-detects.

A separate section is provided for each formation and includes time series plots for Appendix IV parameters at all wells within the same formation, for the purpose of screening data (Figure A for each formation). Additionally, box plots are included for all constituents at upgradient and downgradient wells (Figure B for each formation). The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells.

Summary of Statistical Methods:

Parametric tolerance 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 (USEPA, 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 most recent 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 tolerance limits are used on data containing greater than 50% non-detects.

Evaluation of Appendix IV Parameters – April 2021 Sampling Event

Prior to constructing statistical limits, data at all wells are screened through April 2021 using time series plots to identify outliers and extreme trending patterns that would lead to artificially elevated statistical limits. 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. No new suspected outliers were identified during this analysis. Any previously flagged values, as discussed below, may be seen on the Outlier Summary table for each formation following this letter.

Tukey's outlier test on pooled upgradient well data for Chattanooga Shale and Rome Limestone did not identify any potential outliers, and none were flagged. For Dumps Fault Tukey's test identified a high value of molybdenum for well MW-1611, and this value was flagged. In addition, high values for cobalt and lead in well MW-1611 were identified visually and flagged. Values identified as outliers are flagged with "o" and displayed in a lighter font and disconnected symbol on the time series graphs. Summaries of all flagged outliers are included in Figure C for each of the three formations.

For each Appendix IV parameter and each of the three formations, interwell upper tolerance limits were calculated to create background limits from all available pooled upgradient well data through October 2020. Since the previous background update conducted in February 2021, additional samples were provided by Geosyntec from the May 2019 sample event, and these samples were included in the construction of the tolerance limits during this analysis. Parametric limits use a target of 95% confidence and 95% coverage (Figure D). The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. Interwell upper tolerance

using limits were compared to the Maximum Contaminant Levels (MCLs) and CCR-Rule specified levels, as shown in the Groundwater Protection Standards (GWPS) table following this letter (Figure E for each formation), to determine the highest limit for use as the GWPS in the Confidence Interval comparisons.

Confidence intervals were then constructed for each Appendix IV constituent and each downgradient well using data through April 2021 (Figure F for each formation). The confidence intervals were then compared against the GWPS for each constituent to assess compliance. Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. Complete results of the confidence interval analysis follow this letter. The following confidence interval exceedances were identified:

Chattanooga Shale

- Barium: MW-1604
- Lithium: MW-1605

Rome Limestone

- Cobalt: MW-1607
- Lithium: MW-1606 and MW-1607
- Molybdenum: MW-1607

Dumps Fault

- Cobalt: MW-1610
- Lithium: MW-1610
- Molybdenum: MW-1610

Note that for lithium in MW-1610 at the Dumps Fault formation, the lower confidence limit, when rounded to 2 significant figures, is equal to the GWPS. Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for the Clinch River Pond 1. 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

100% Non-Detects: Chattanooga Shale

Analysis Run 8/5/2021 9:21 AM View: Chattanooga Shale - Pond 1 Confidence Intervals
Clinch River LF Client: AEP Data: Clinch River

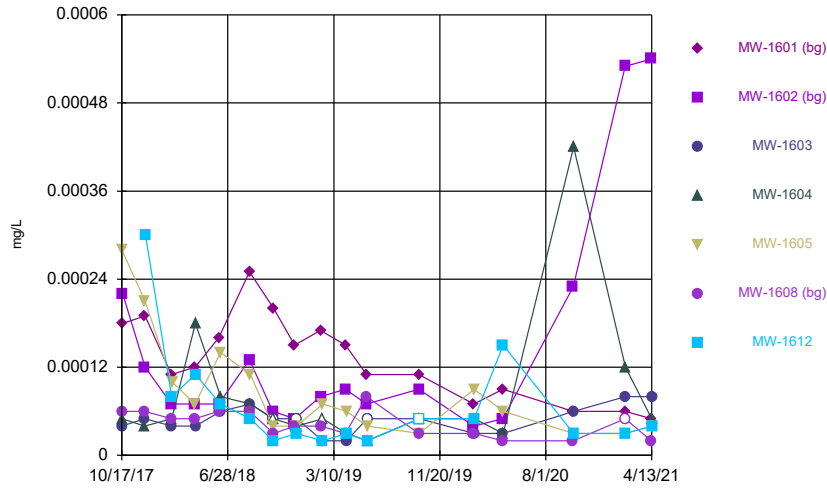
Cadmium total (mg/L)
MW-1603, MW-1604, MW-1612

Mercury total (mg/L)
MW-1605

FIGURE A.

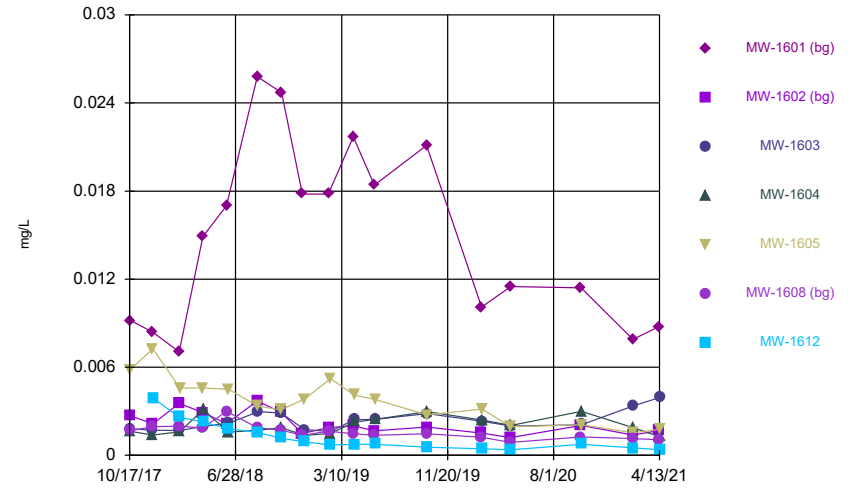
Time Series - Chattanooga Shale

Time Series



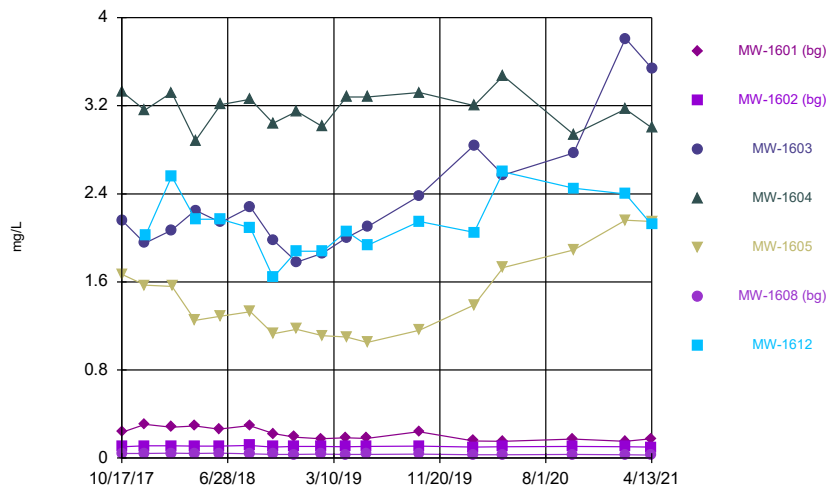
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Clinch River LF Client: AEP Data: Clinch River

Time Series



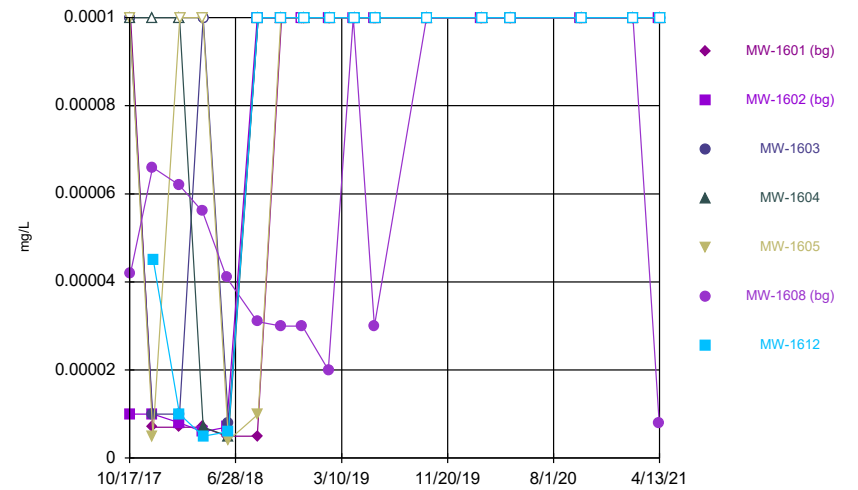
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Clinch River LF Client: AEP Data: Clinch River

Time Series



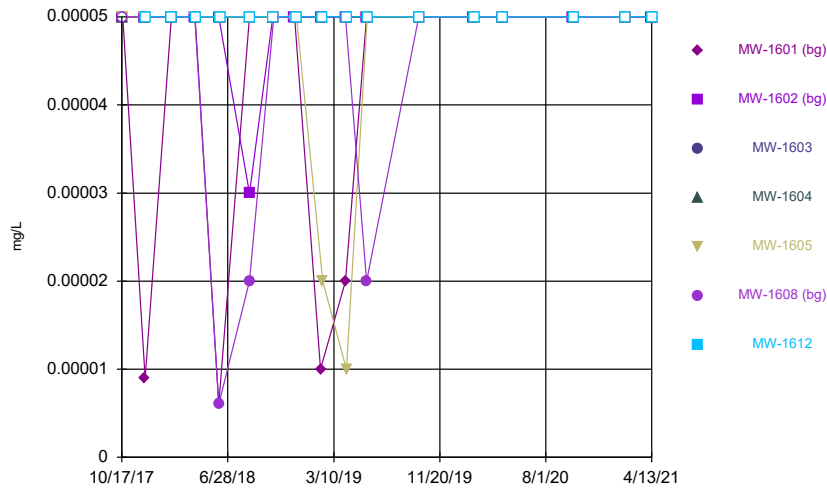
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Time Series



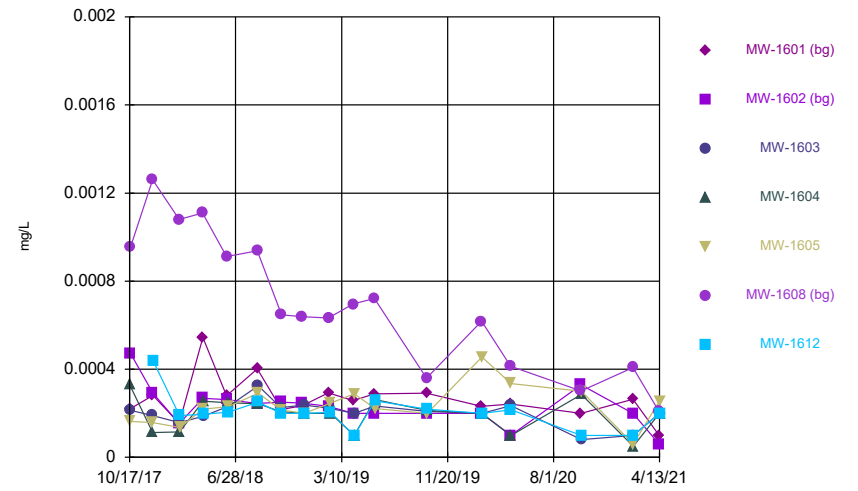
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Clinch River LF Client: AEP Data: Clinch River

Time Series



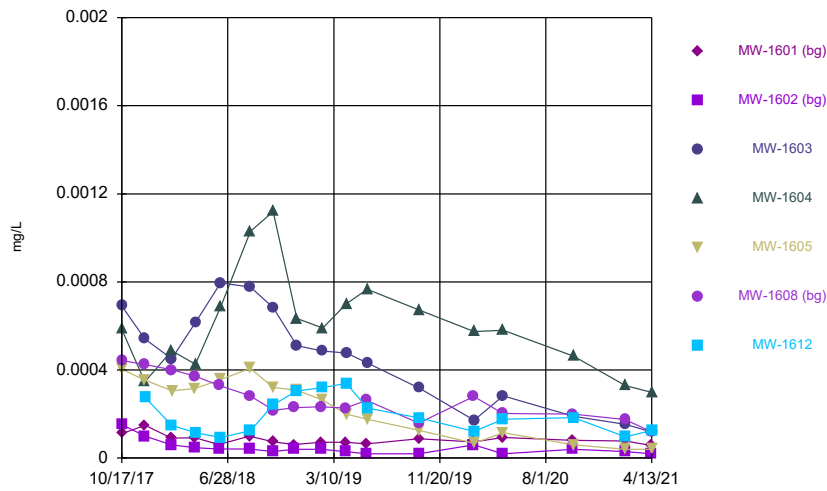
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Clinch River LF Client: AEP Data: Clinch River

Time Series



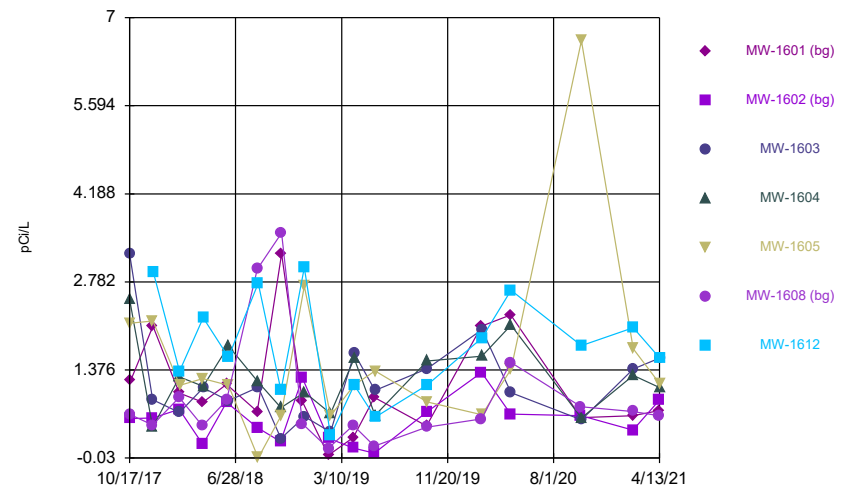
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Clinch River LF Client: AEP Data: Clinch River

Time Series



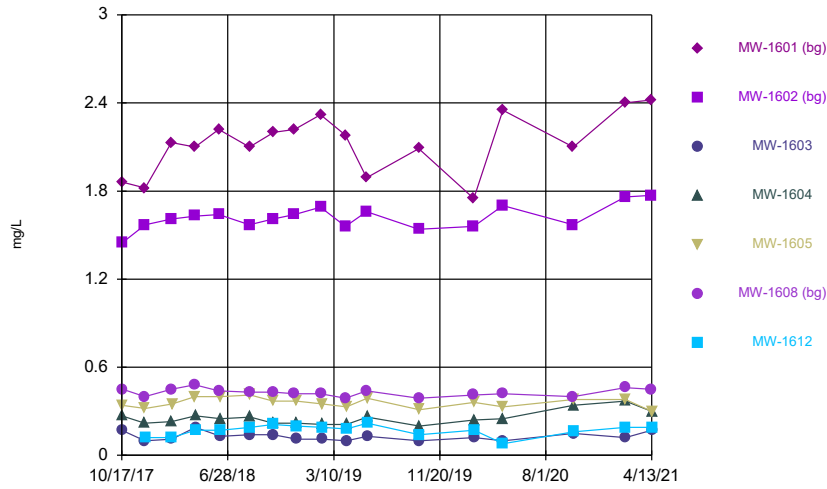
Constituent: Cobalt total Analysis Run 8/5/2021 9:19 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Time Series



Constituent: Combined Radium 226 and 228 Analysis Run 8/5/2021 9:19 AM View: Chattanooga Shale -
Clinch River LF Client: AEP Data: Clinch River

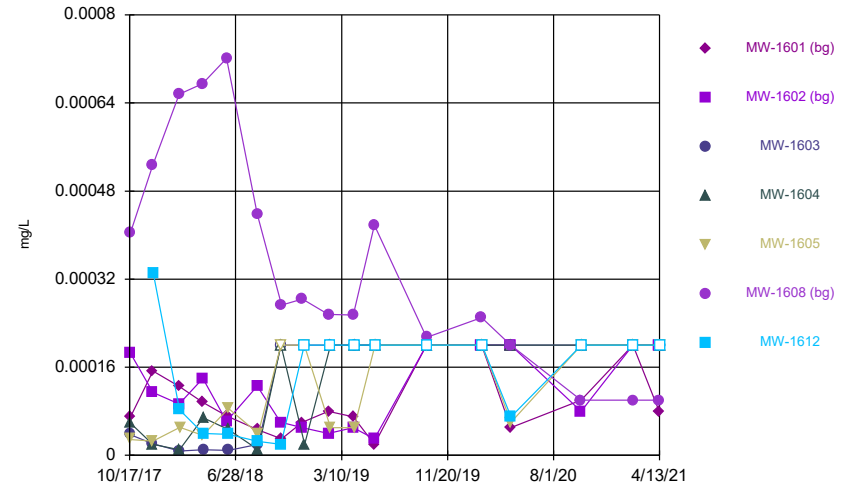
Time Series



Constituent: Fluoride total Analysis Run 8/5/2021 9:19 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Hollow symbols indicate censored values.

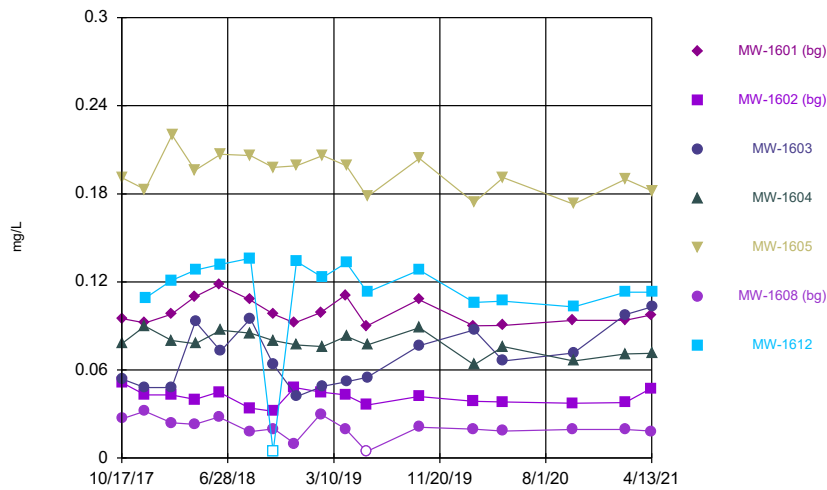
Time Series



Constituent: Lead total Analysis Run 8/5/2021 9:19 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

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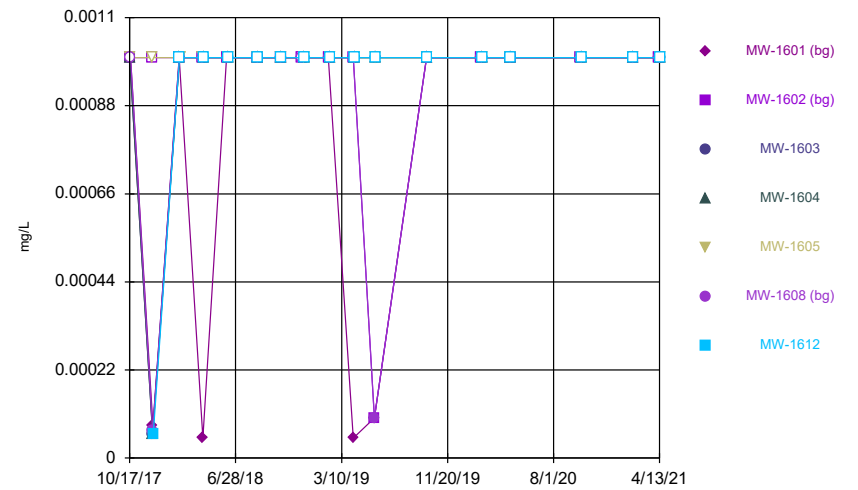
Time Series



Constituent: Lithium total Analysis Run 8/5/2021 9:19 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

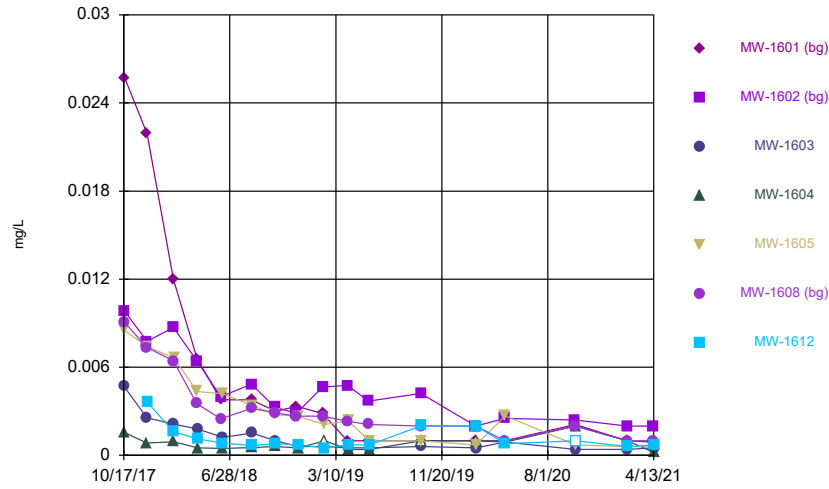
Hollow symbols indicate censored values.

Time Series



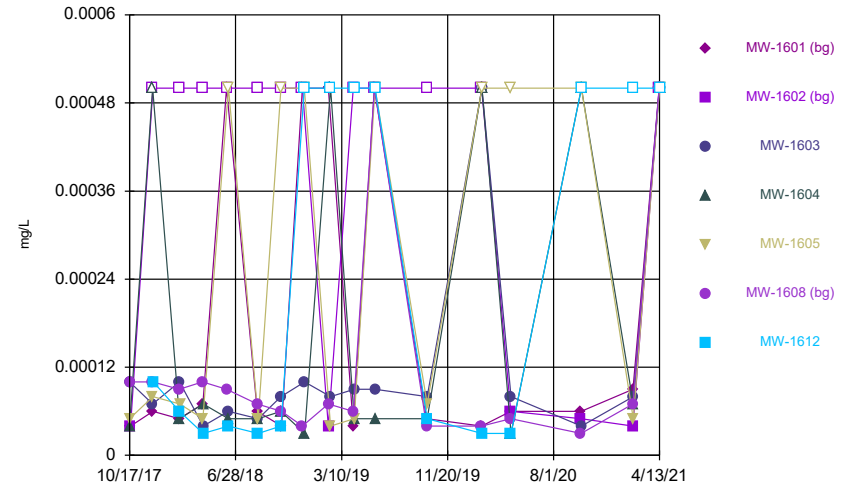
Constituent: Mercury total Analysis Run 8/5/2021 9:19 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Time Series



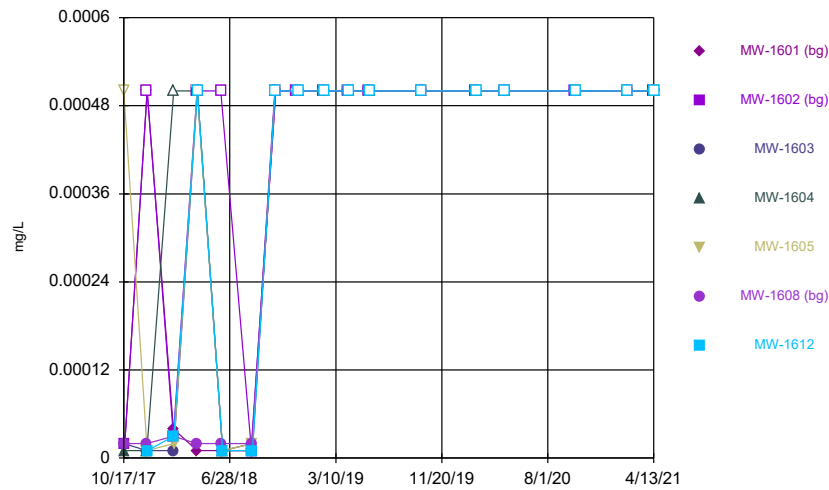
Constituent: Molybdenum total Analysis Run 8/5/2021 9:19 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Time Series



Constituent: Selenium total Analysis Run 8/5/2021 9:19 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

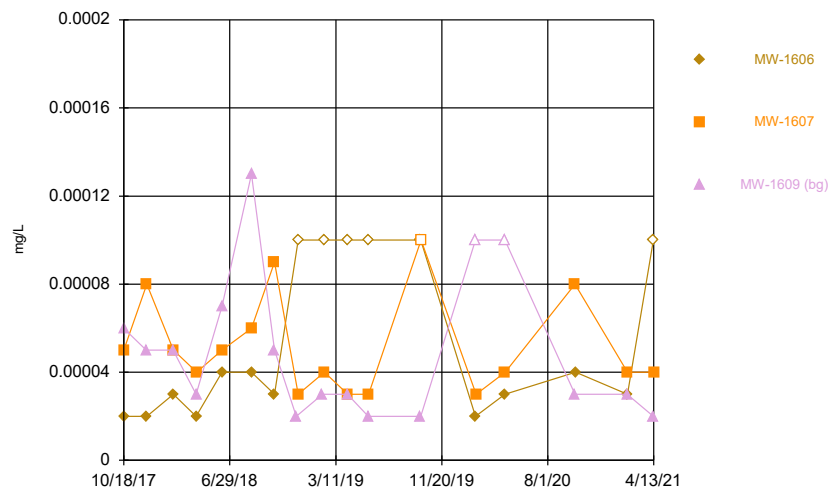
Time Series



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Clinch River LF Client: AEP Data: Clinch River

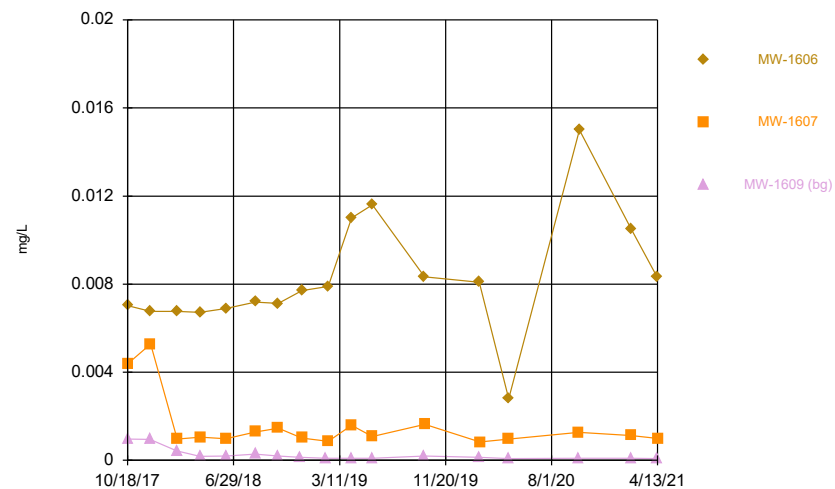
Time Series - Rome Limestone

Time Series



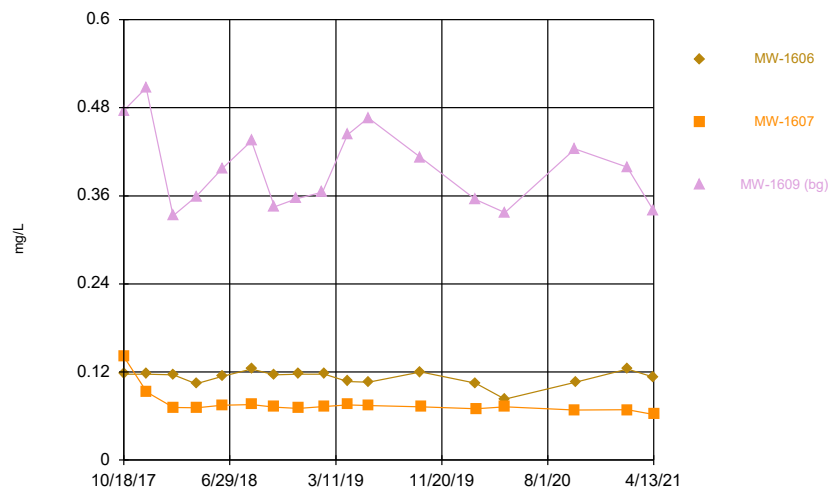
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 Clinch River LF Client: AEP Data: Clinch River

Time Series



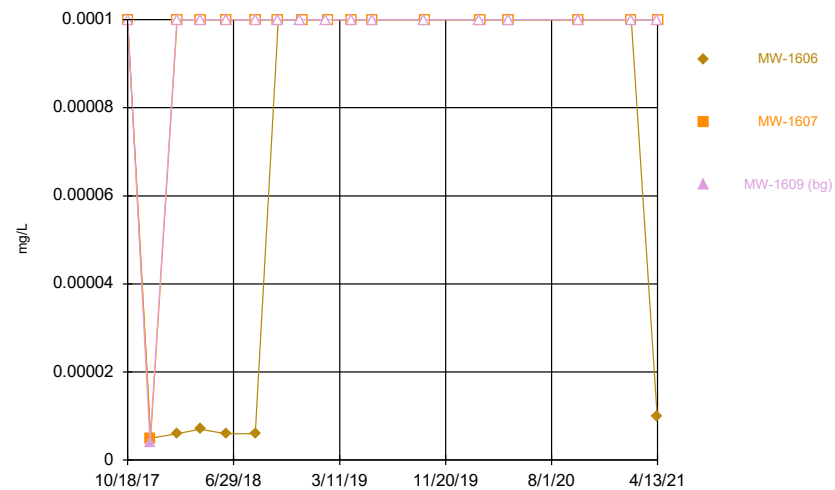
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 Clinch River LF Client: AEP Data: Clinch River

Time Series



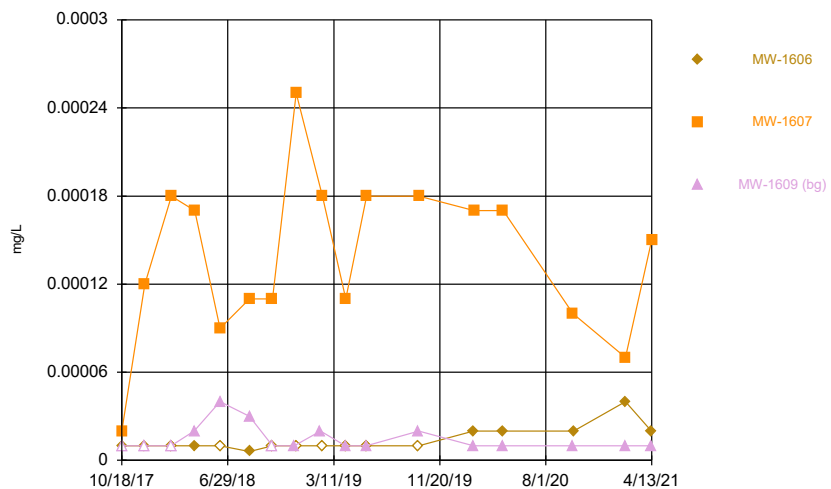
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Time Series



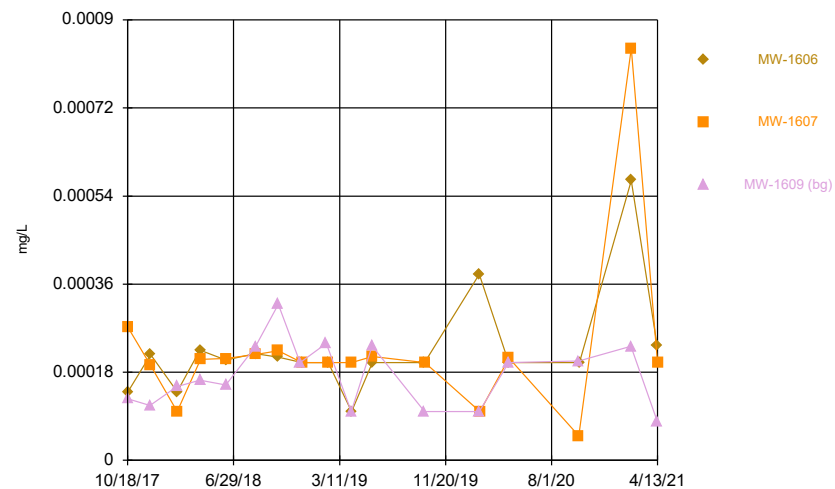
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Time Series



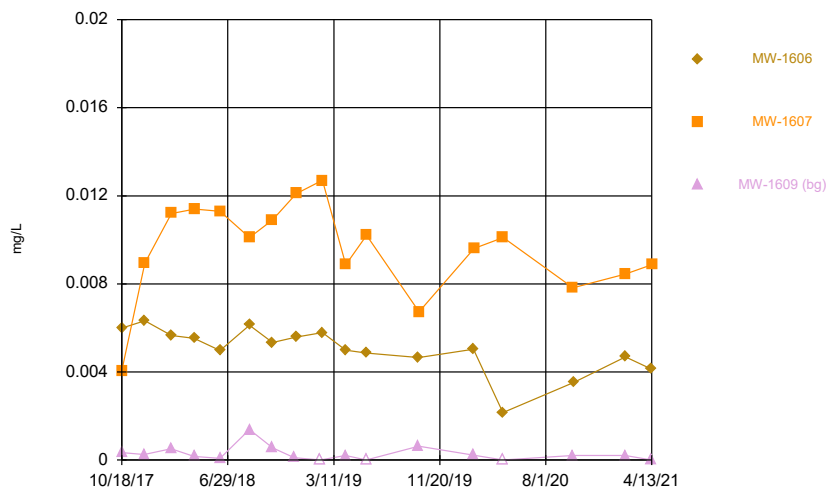
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Time Series



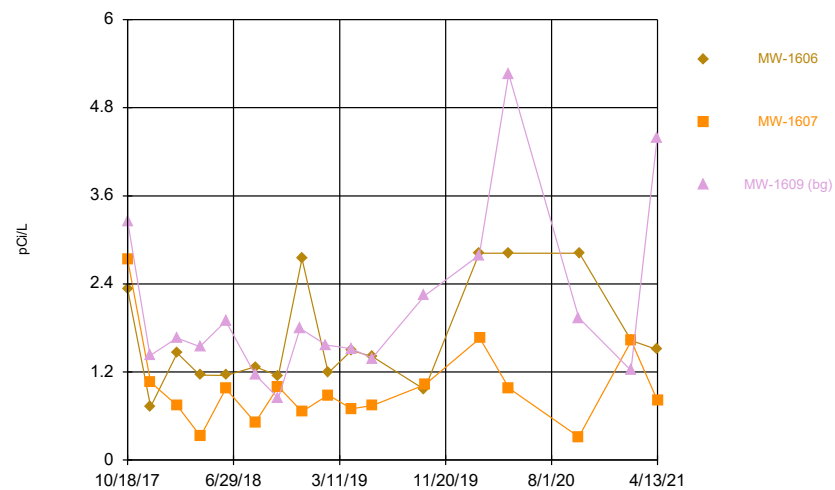
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Time Series



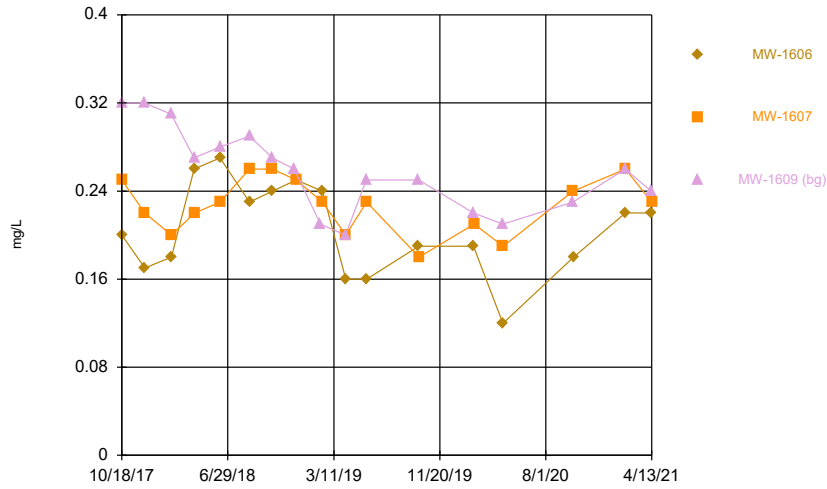
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Clinch River LF Client: AEP Data: Clinch River

Time Series



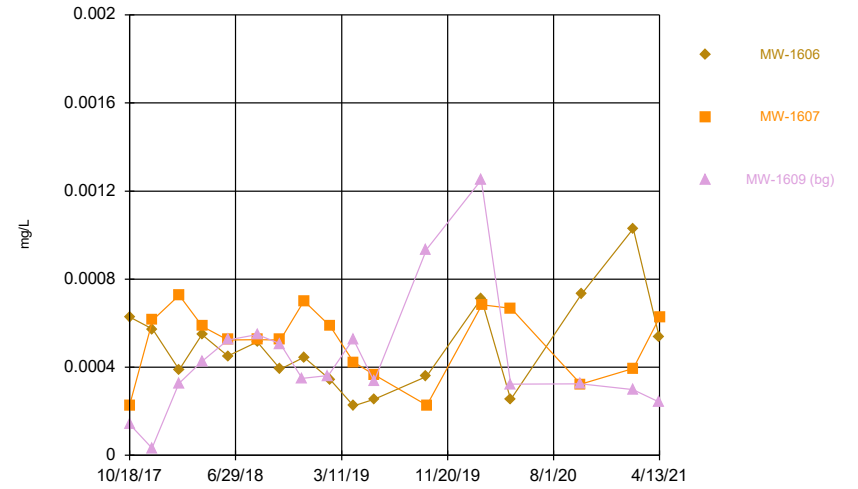
Constituent: Combined Radium 226 and 228 Analysis Run 8/5/2021 9:27 AM View: Rome Limestone - Po
Clinch River LF Client: AEP Data: Clinch River

Time Series



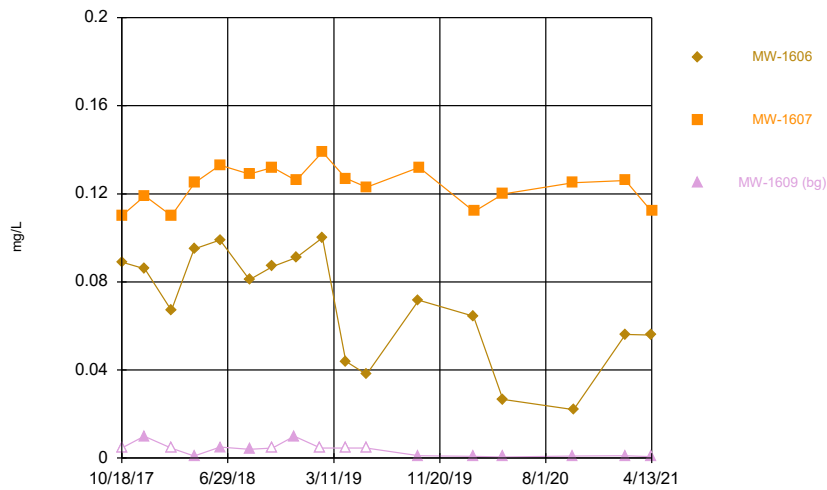
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Time Series



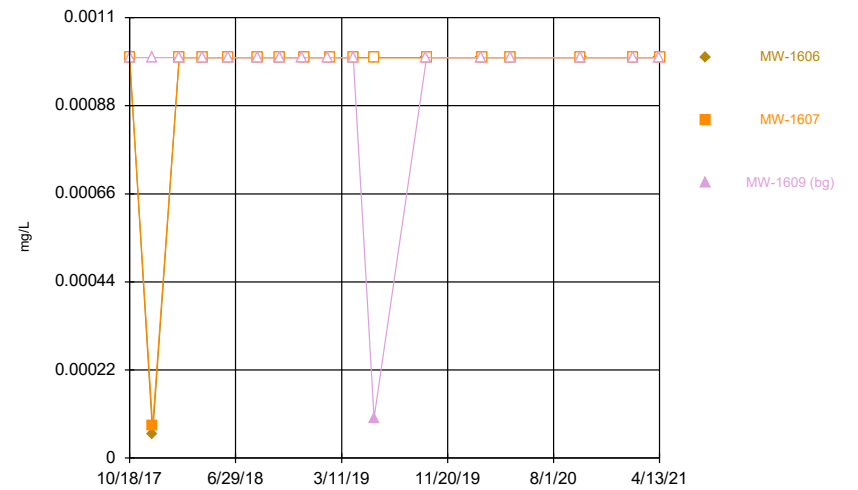
Constituent: Lead total Analysis Run 8/5/2021 9:27 AM View: Rome Limestone - Pond 1
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Time Series



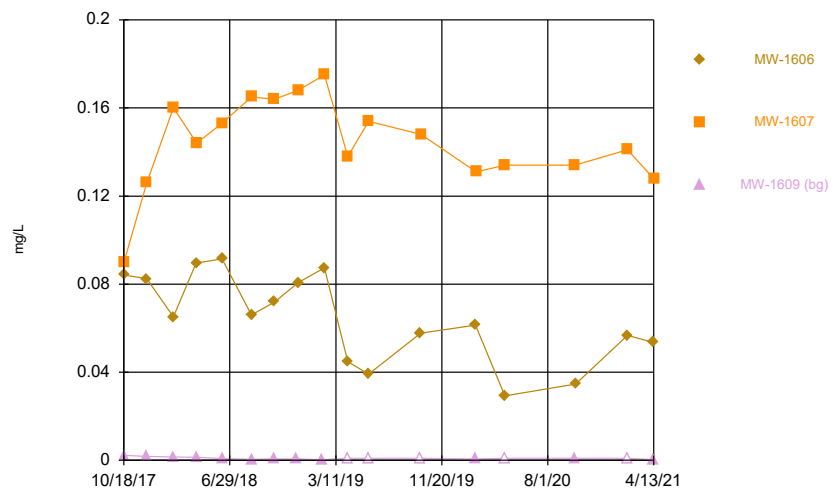
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Clinch River LF Client: AEP Data: Clinch River

Time Series



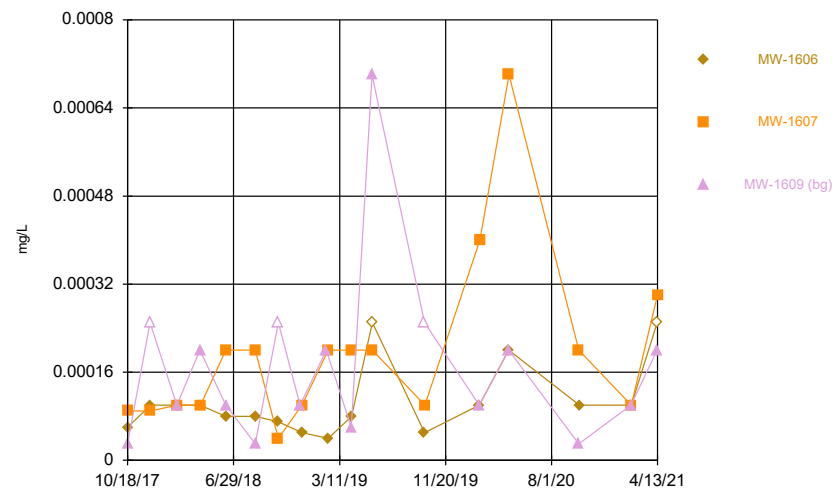
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Clinch River LF Client: AEP Data: Clinch River

Time Series



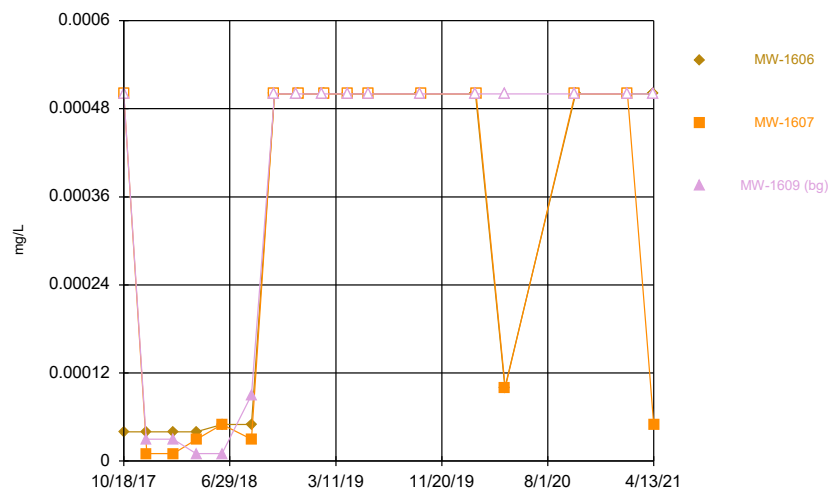
Constituent: Molybdenum total Analysis Run 8/5/2021 9:27 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Time Series



Constituent: Selenium total Analysis Run 8/5/2021 9:27 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

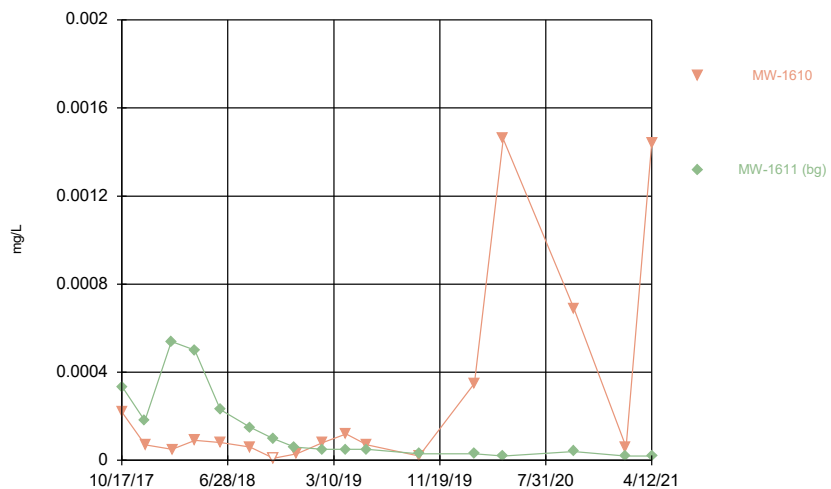
Time Series



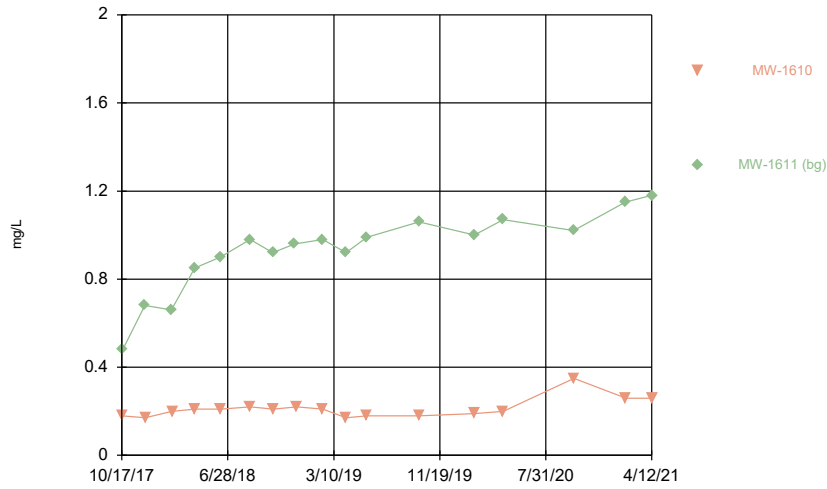
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Clinch River LF Client: AEP Data: Clinch River

Time Series - Dumps Fault

Time Series

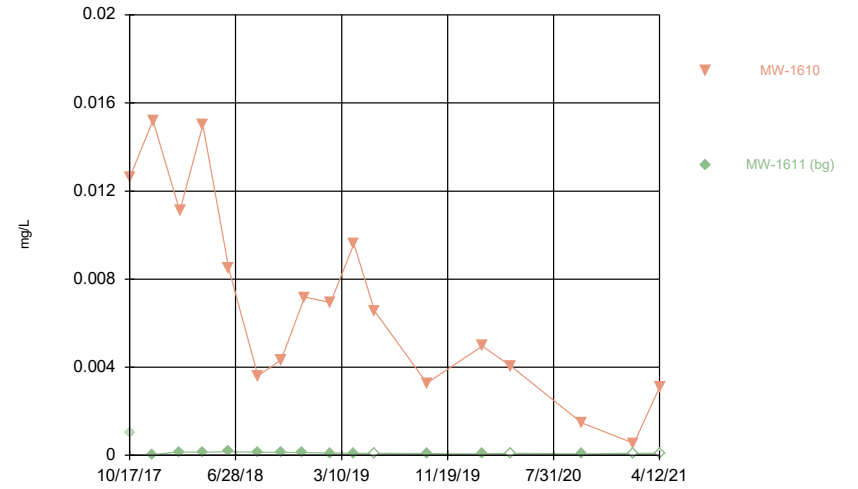


Time Series



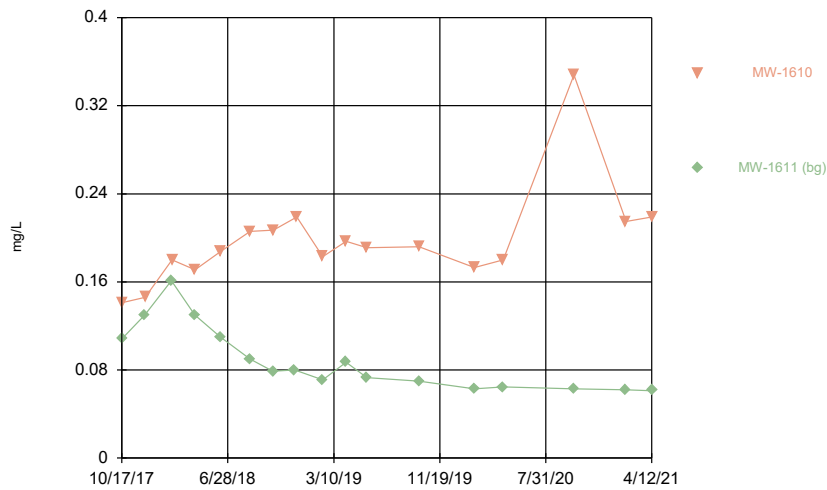
Constituent: Fluoride total Analysis Run 8/5/2021 9:11 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Time Series



Constituent: Lead total Analysis Run 8/5/2021 9:11 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Time Series



Time Series

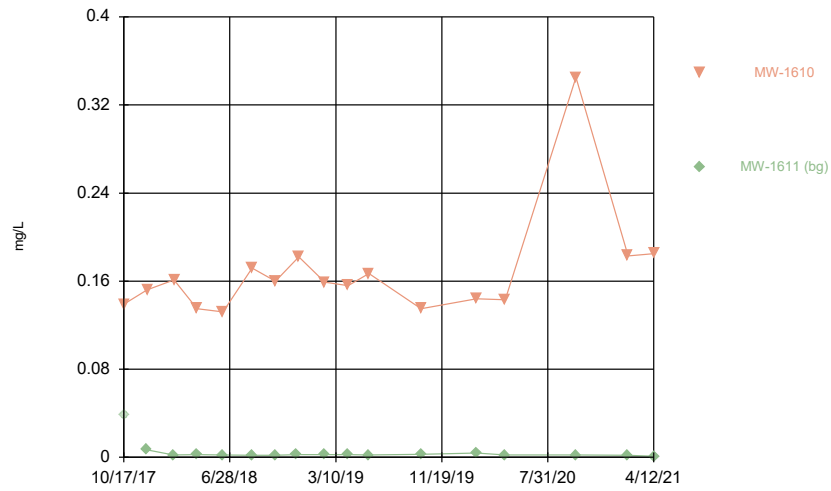
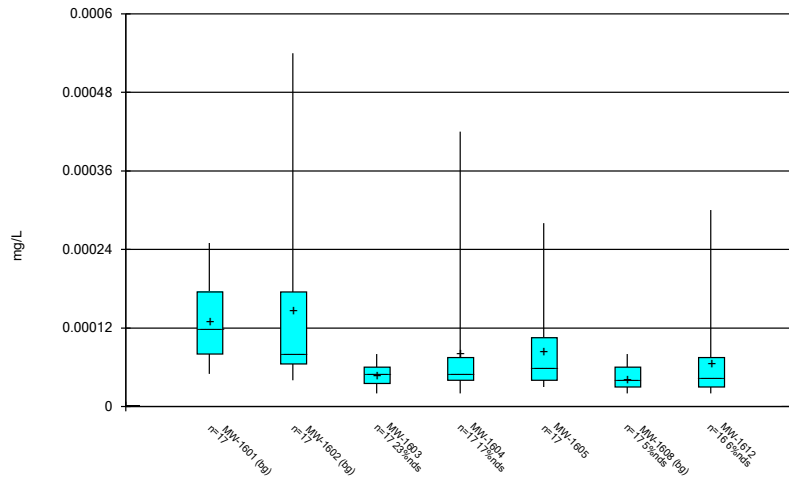


FIGURE B.

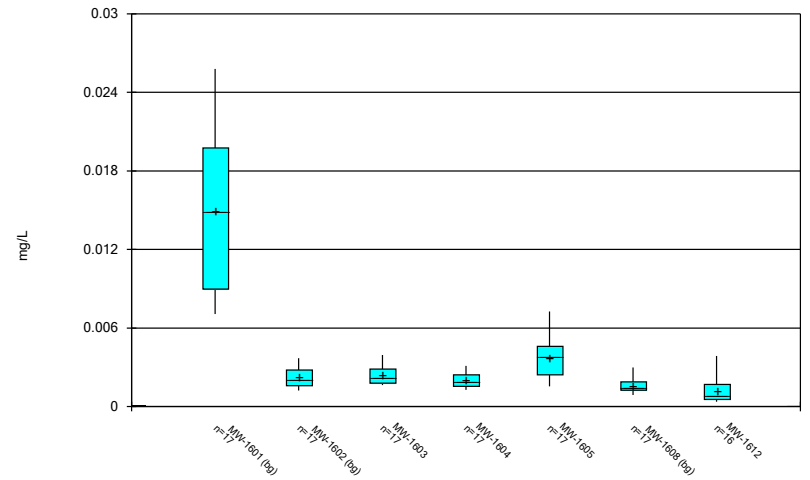
Box Plots - Chattanooga Shale

Box & Whiskers Plot



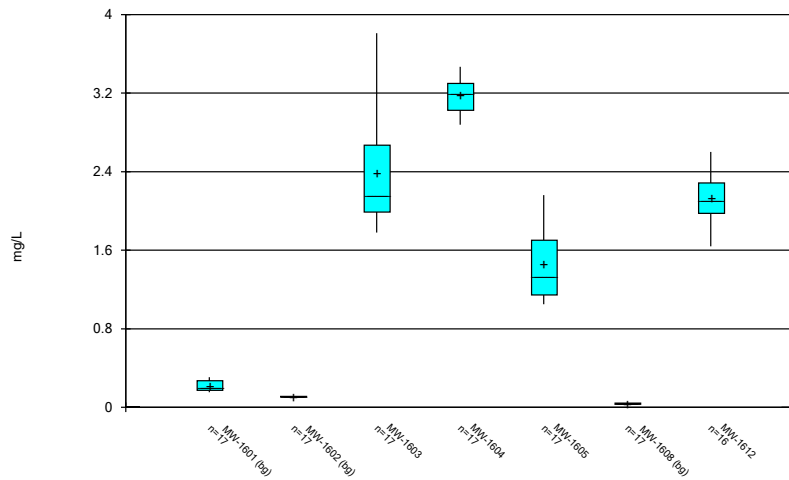
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



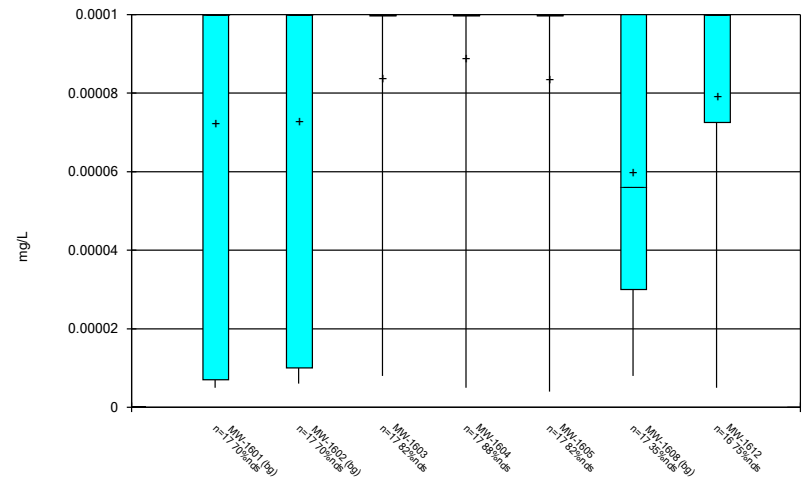
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



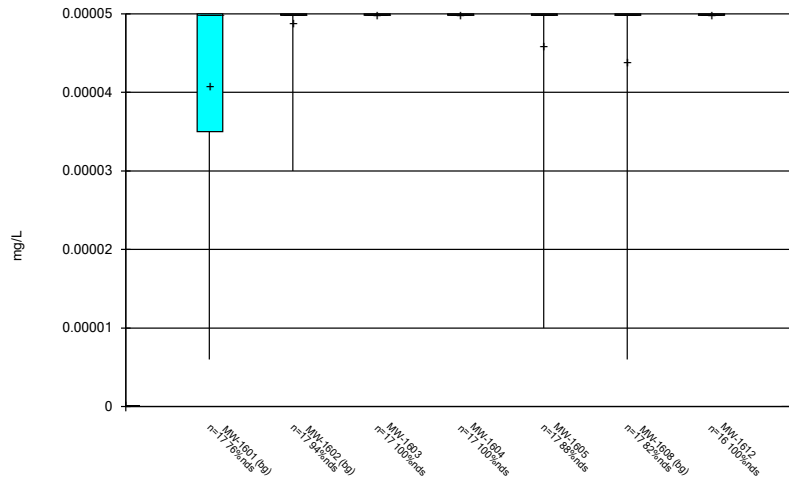
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



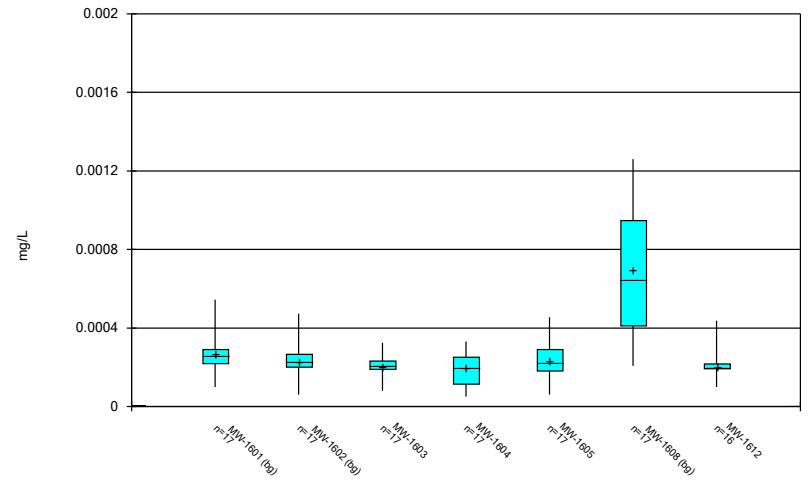
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



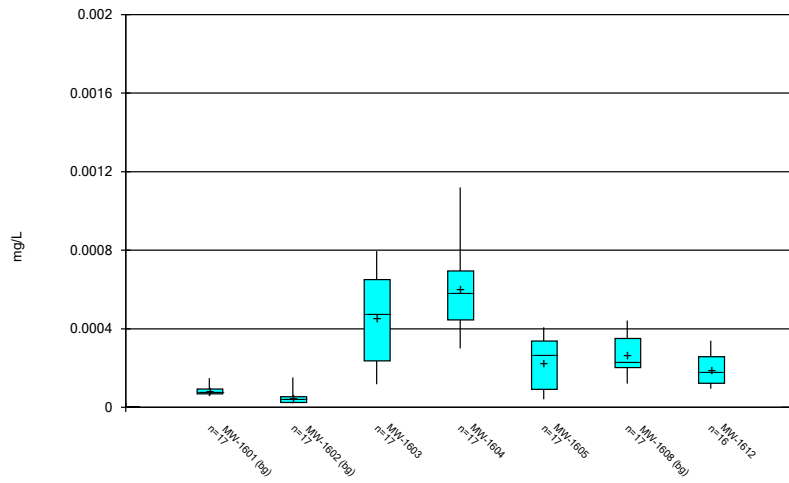
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



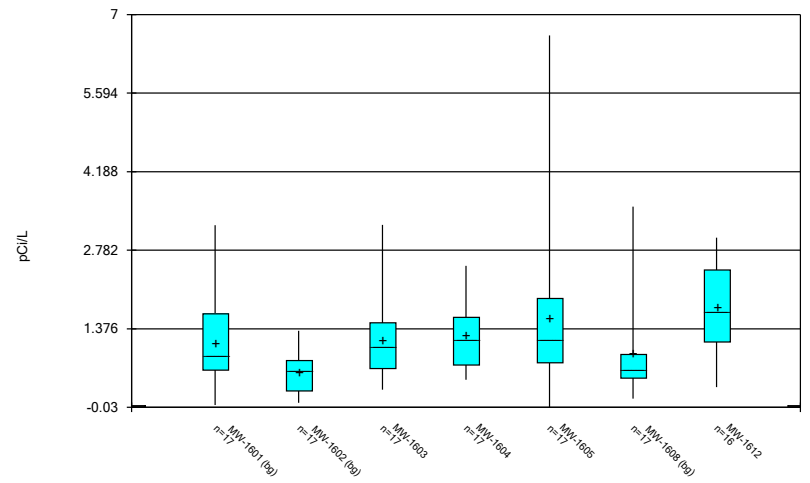
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



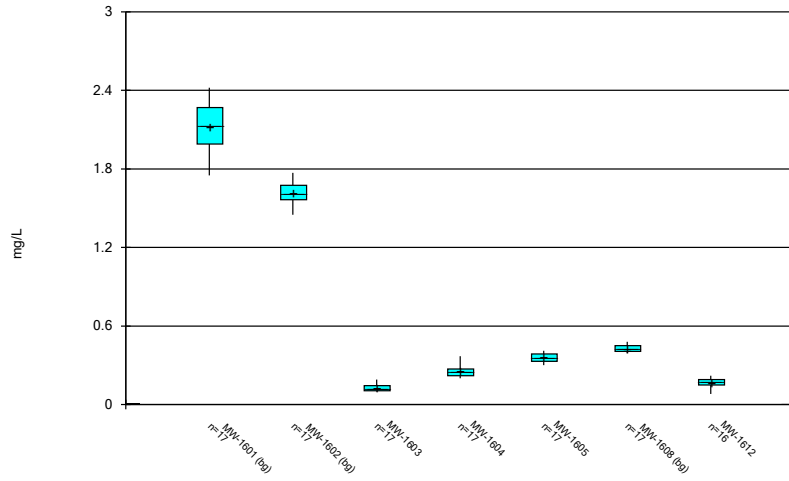
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



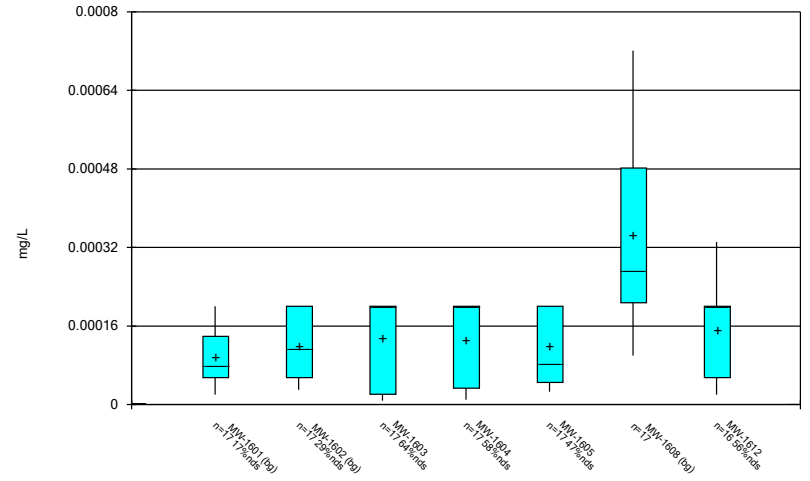
Constituent: Combined Radium 226 and 228 Analysis Run 8/5/2021 9:20 AM View: Chattanooga Shale -
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



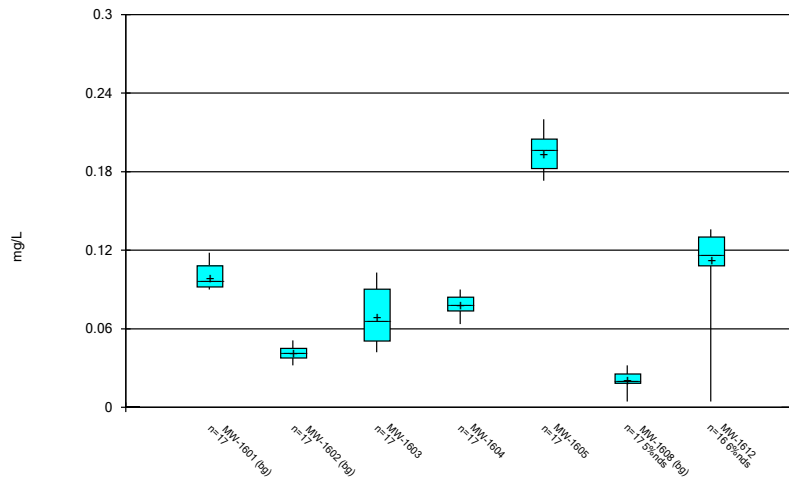
Constituent: Fluoride total Analysis Run 8/5/2021 9:20 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



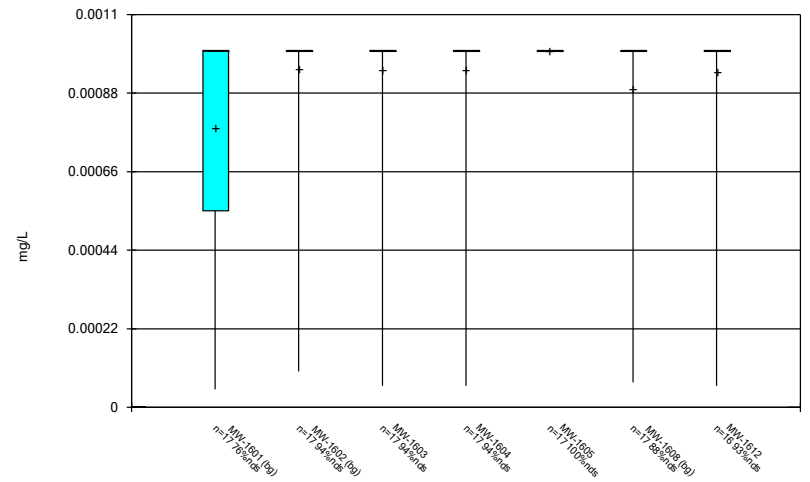
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



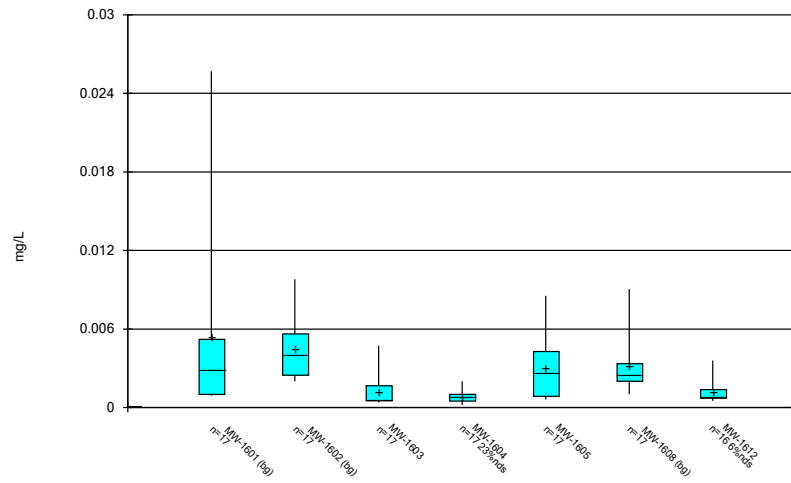
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



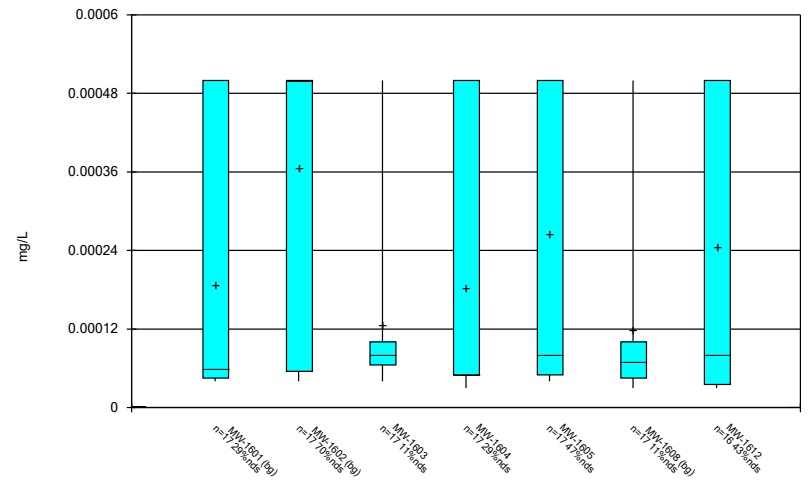
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



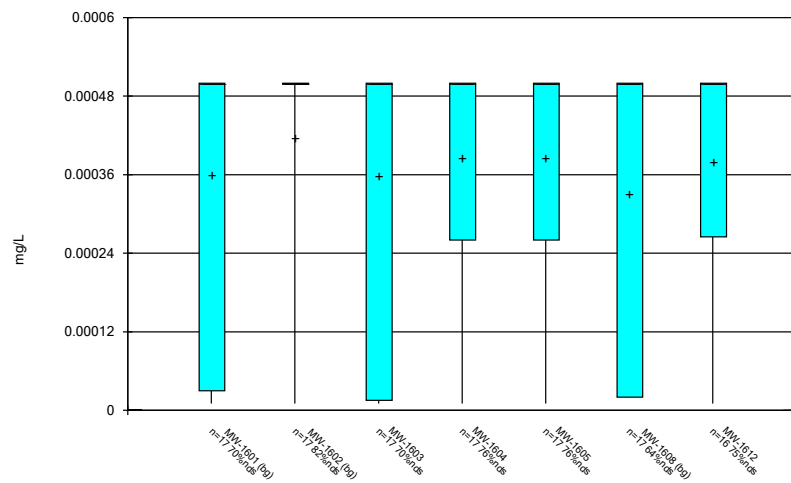
Constituent: Molybdenum total Analysis Run 8/5/2021 9:20 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



Constituent: Selenium total Analysis Run 8/5/2021 9:20 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

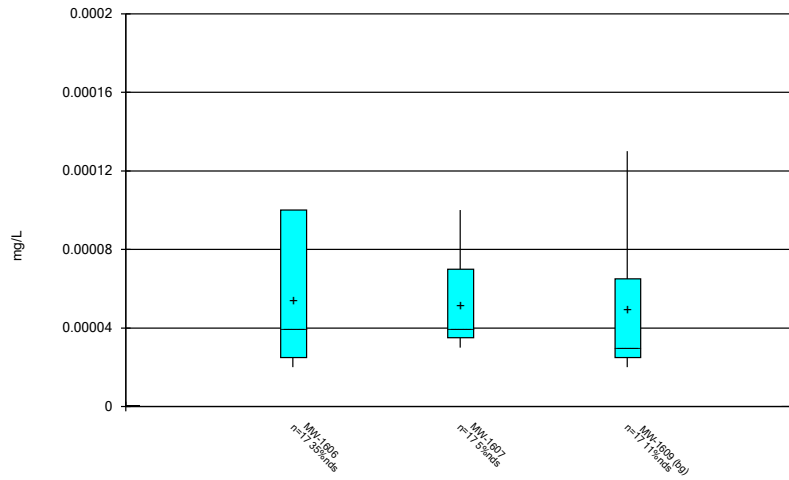
Box & Whiskers Plot



Constituent: Thallium total Analysis Run 8/5/2021 9:20 AM View: Chattanooga Shale - Pond 1
Clinch River LF Client: AEP Data: Clinch River

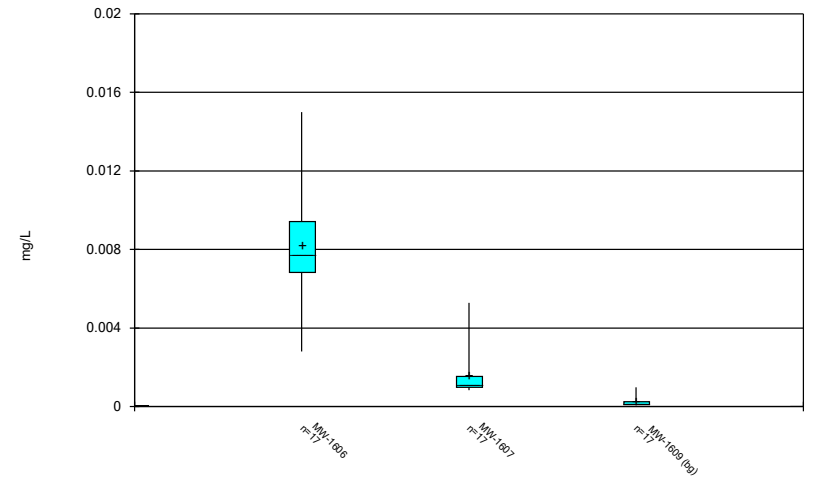
Box Plots - Rome Limestone

Box & Whiskers Plot



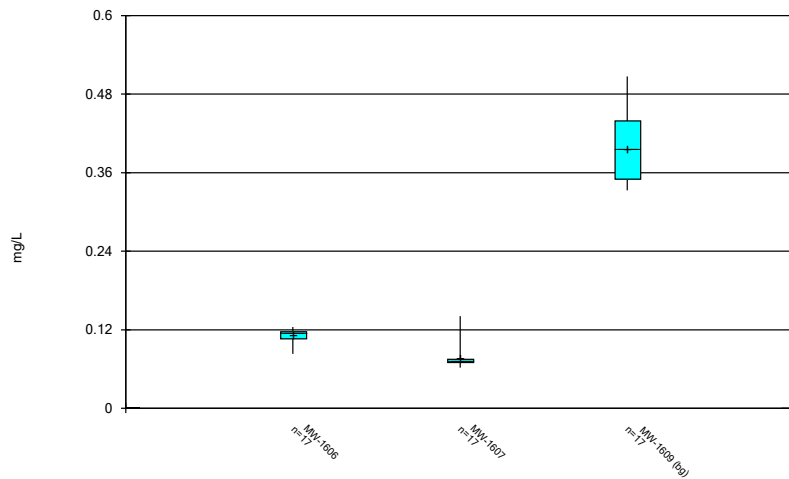
Constituent: Antimony total Analysis Run 8/5/2021 9:28 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



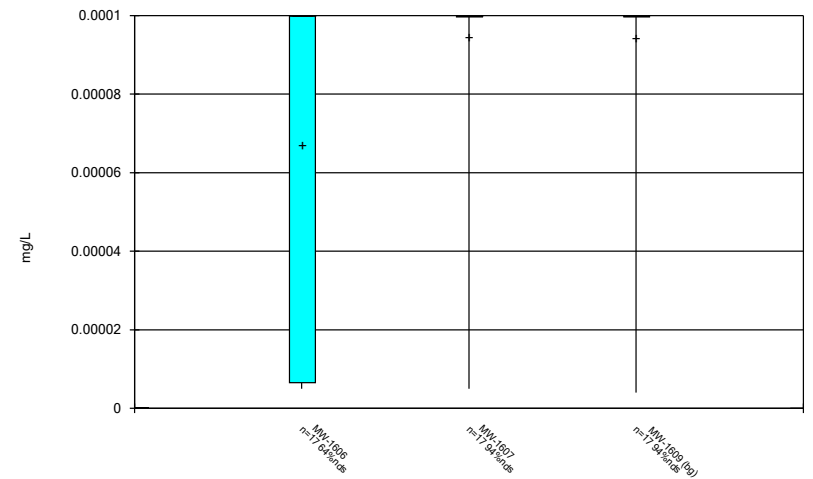
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



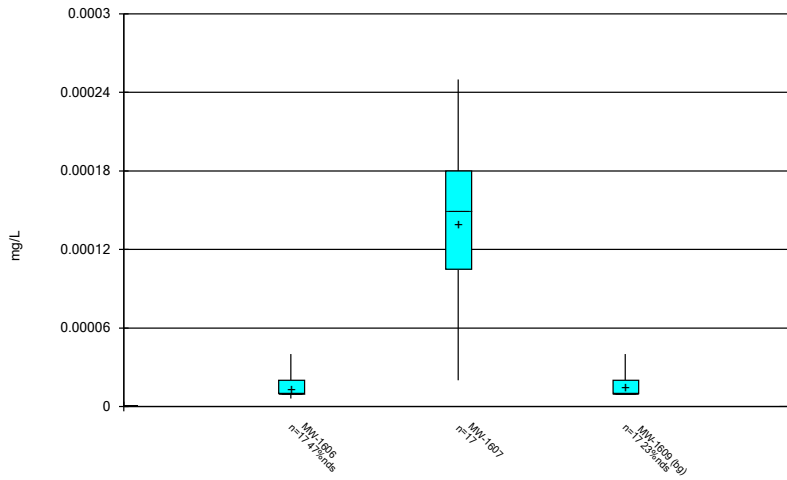
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



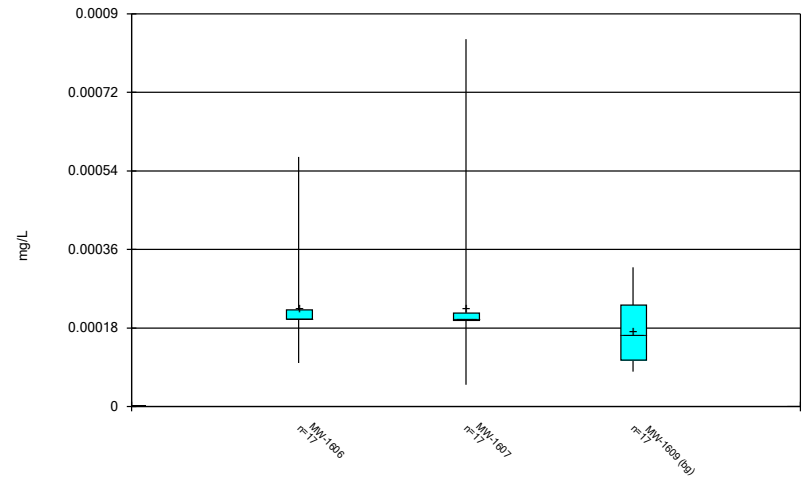
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



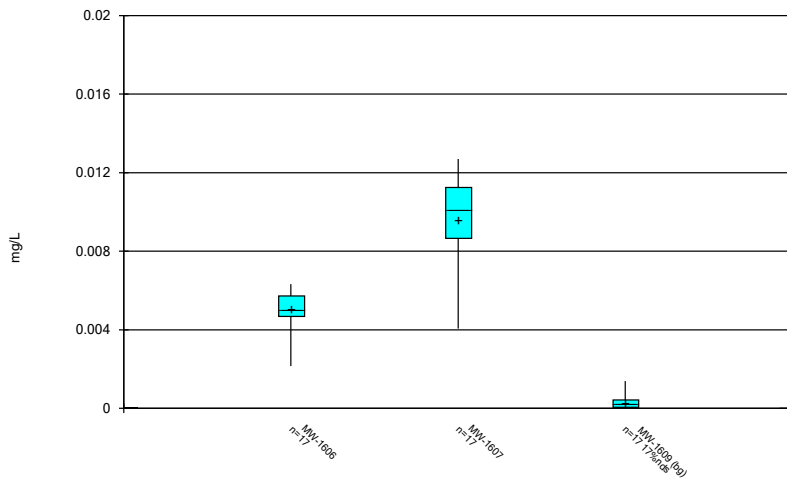
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



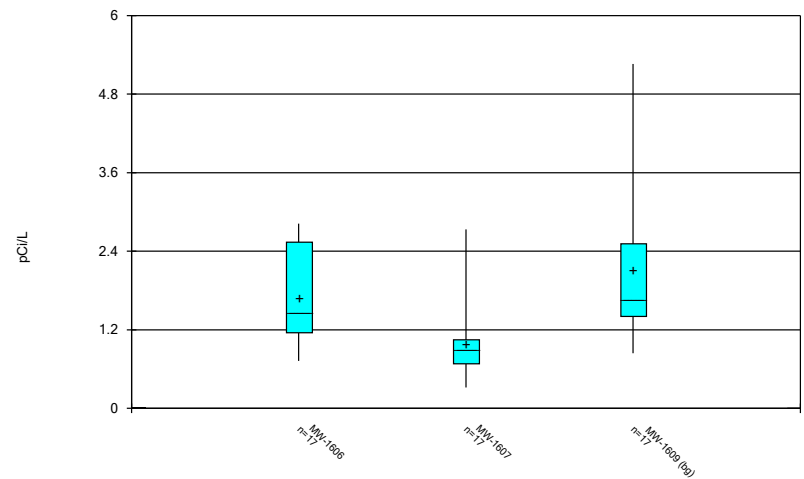
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



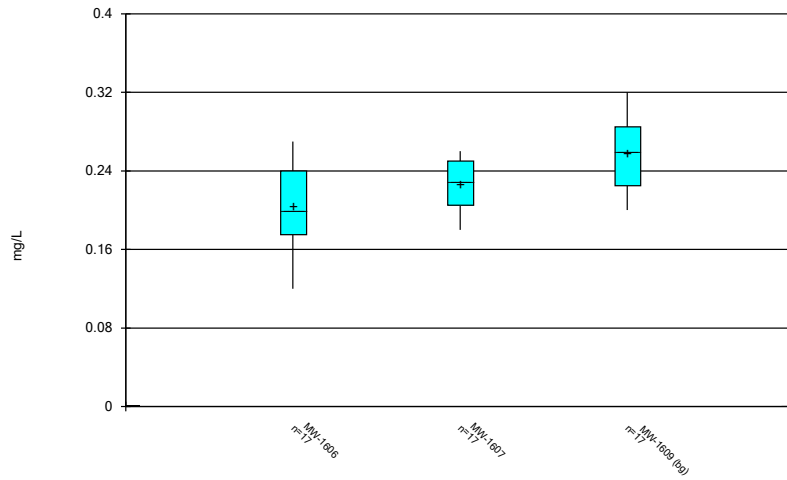
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Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



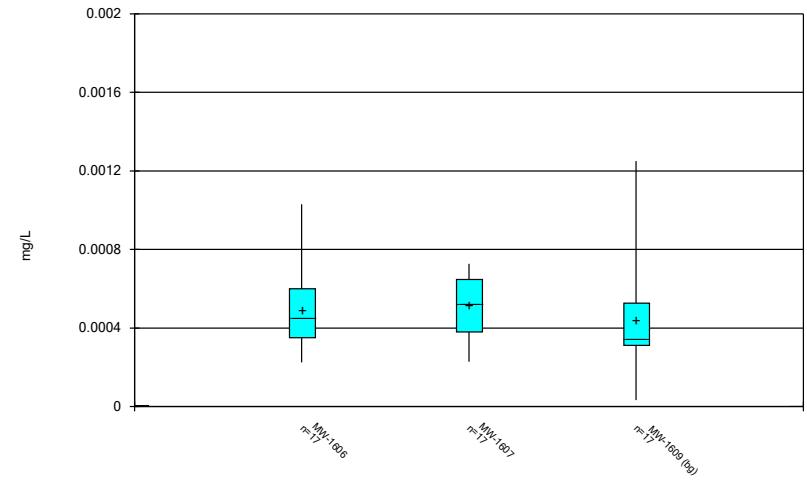
Constituent: Combined Radium 226 and 228 Analysis Run 8/5/2021 9:28 AM View: Rome Limestone - Po
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



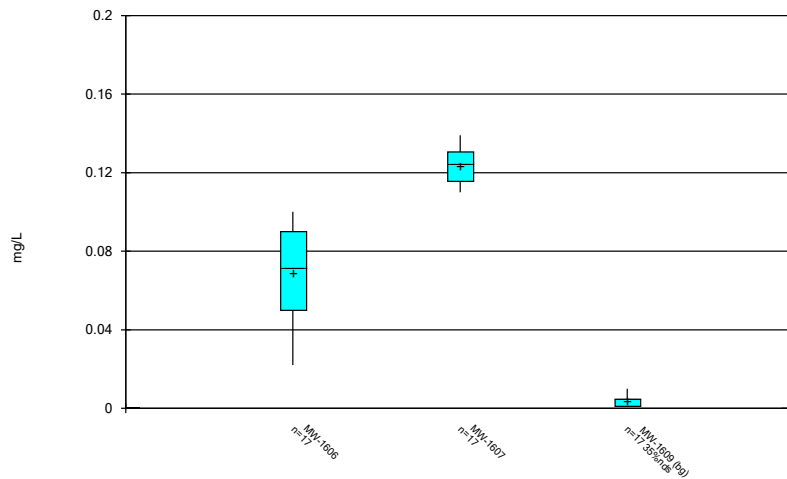
Constituent: Fluoride total Analysis Run 8/5/2021 9:28 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



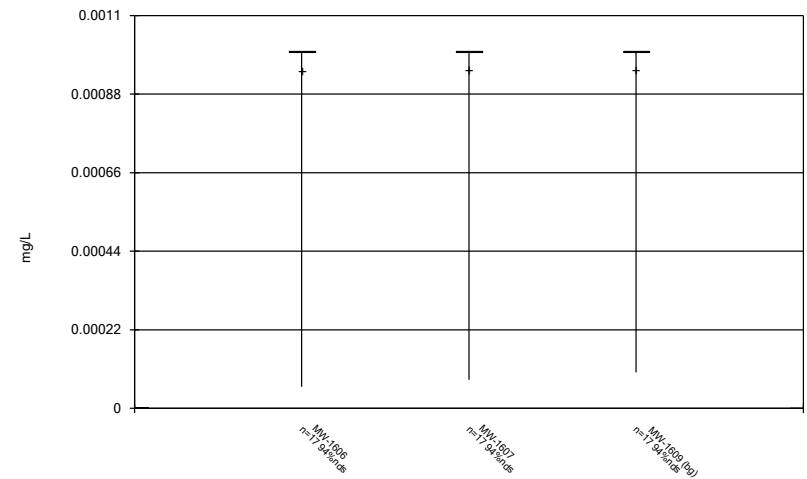
Constituent: Lead total Analysis Run 8/5/2021 9:28 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



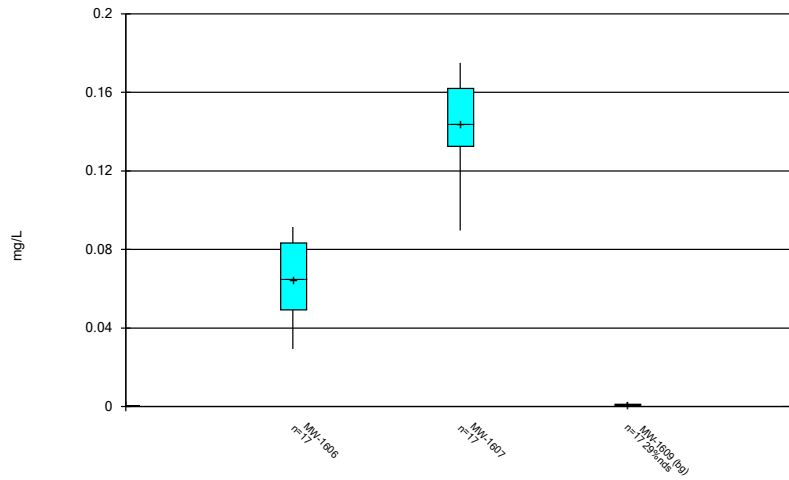
Constituent: Lithium total Analysis Run 8/5/2021 9:28 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



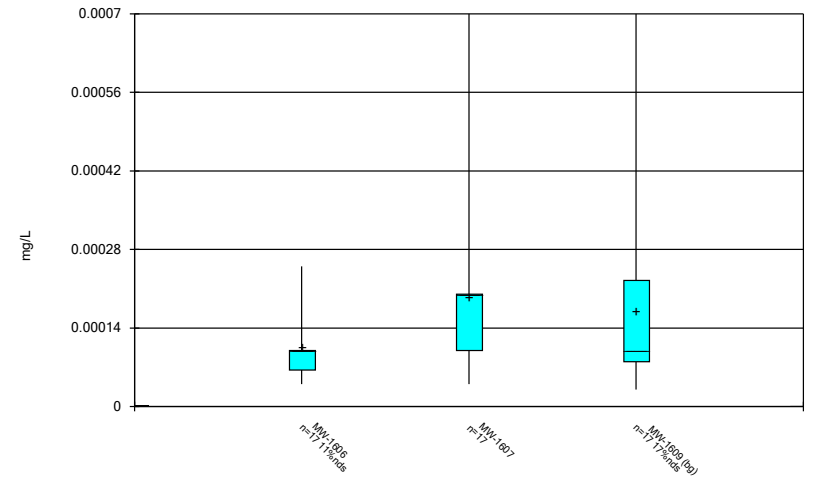
Constituent: Mercury total Analysis Run 8/5/2021 9:28 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



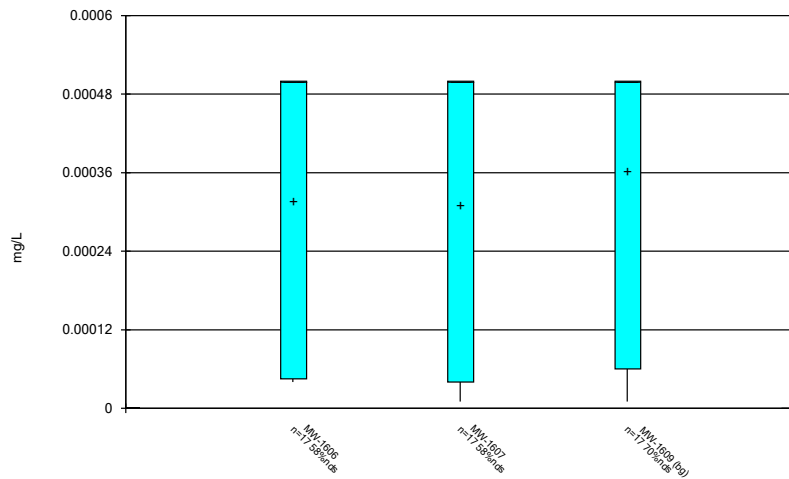
Constituent: Molybdenum total Analysis Run 8/5/2021 9:28 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



Constituent: Selenium total Analysis Run 8/5/2021 9:28 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

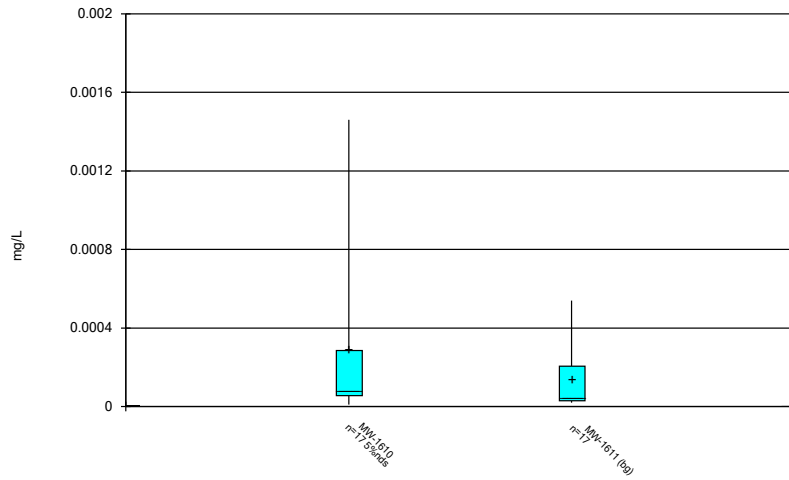
Box & Whiskers Plot



Constituent: Thallium total Analysis Run 8/5/2021 9:28 AM View: Rome Limestone - Pond 1
Clinch River LF Client: AEP Data: Clinch River

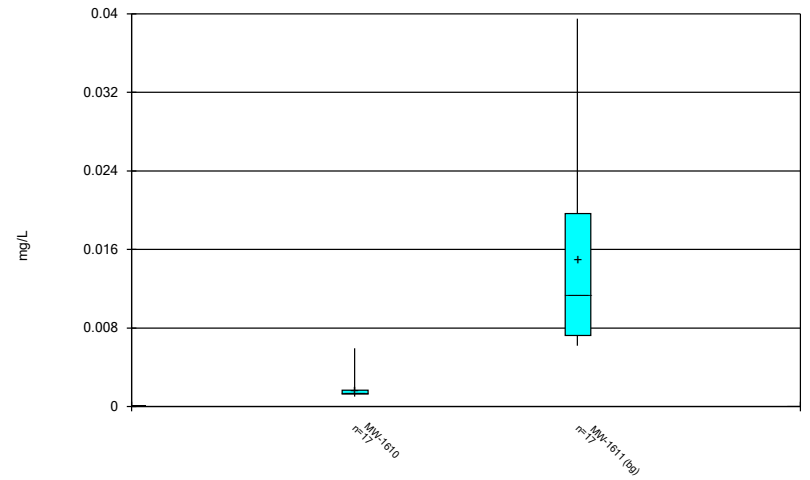
Box Plots - Dumps Fault

Box & Whiskers Plot



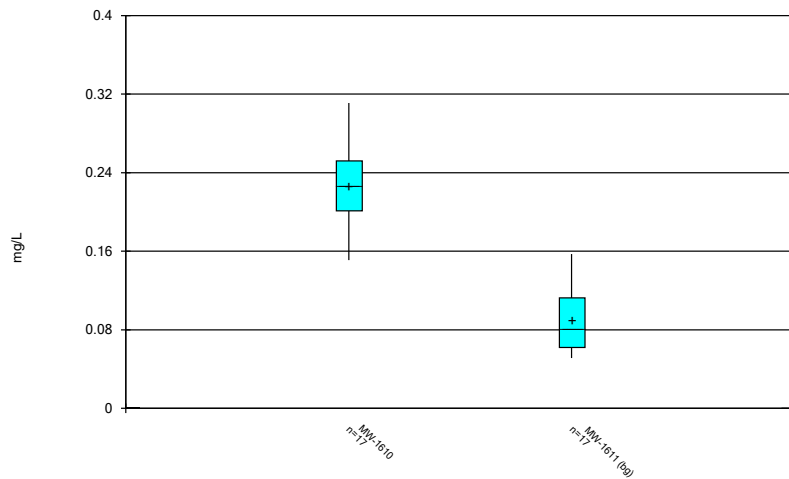
Constituent: Antimony total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



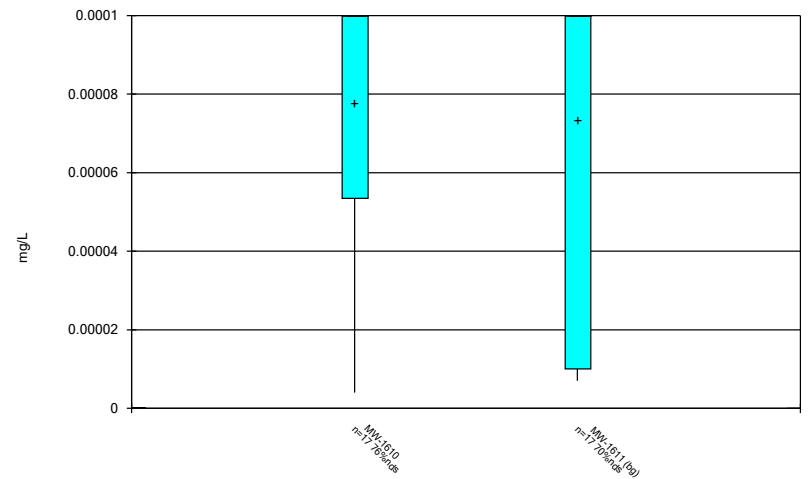
Constituent: Arsenic total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



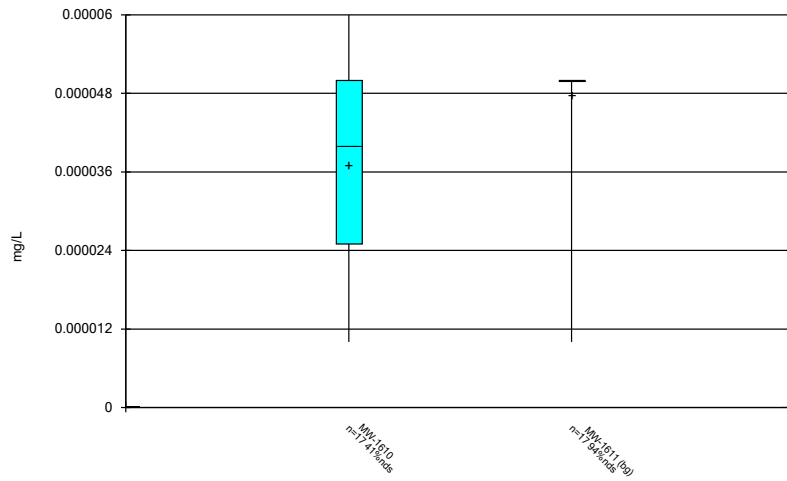
Constituent: Barium total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



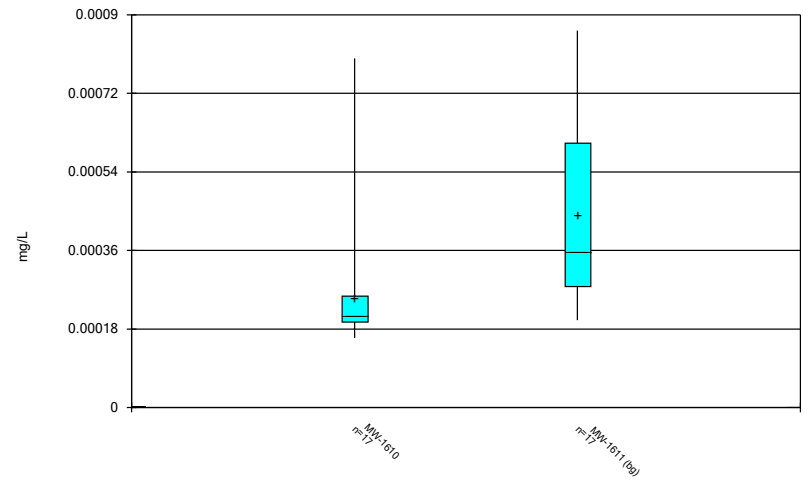
Constituent: Beryllium total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



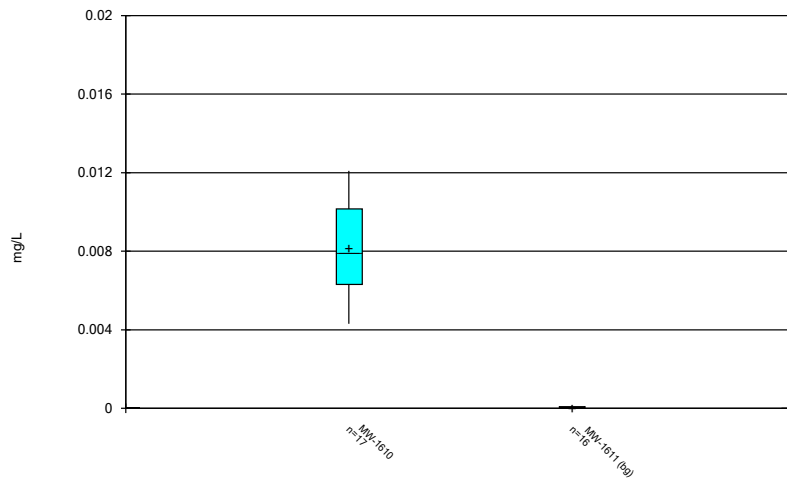
Constituent: Cadmium total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



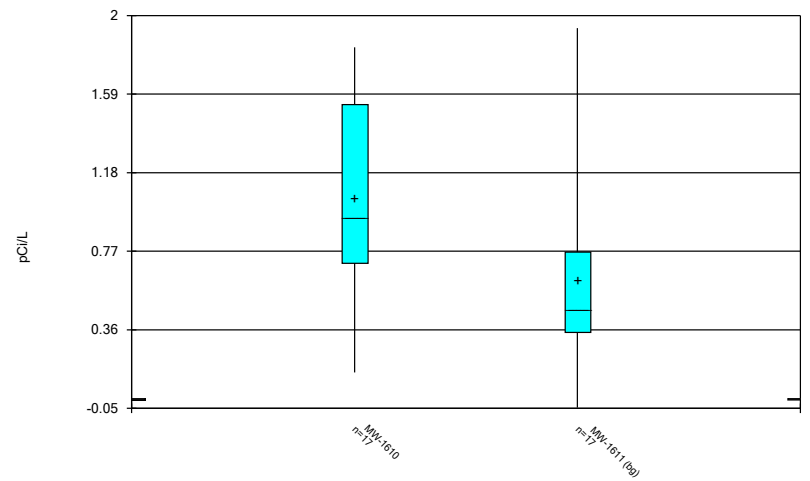
Constituent: Chromium total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



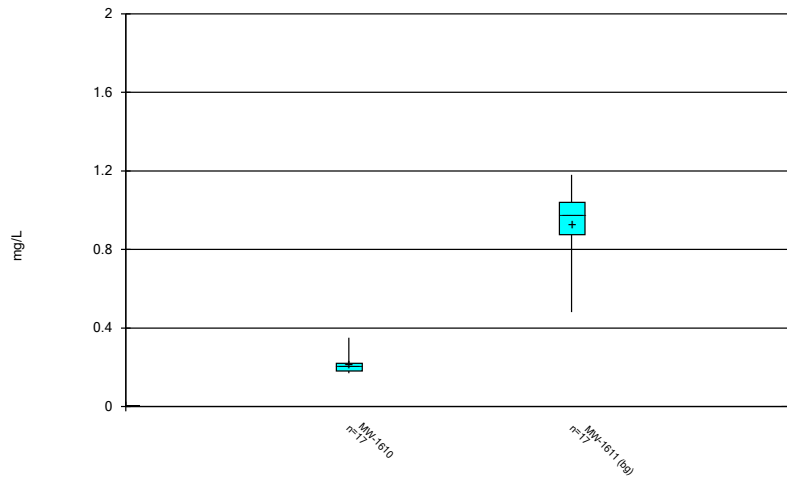
Constituent: Cobalt total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



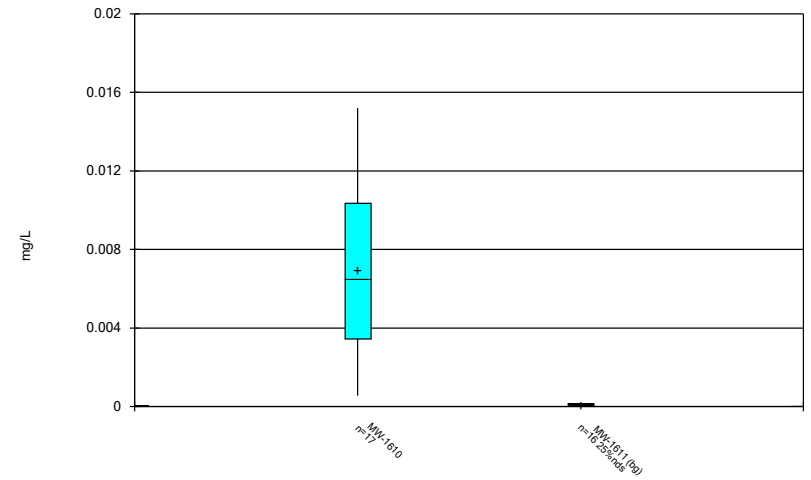
Constituent: Combined Radium 226 and 228 Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



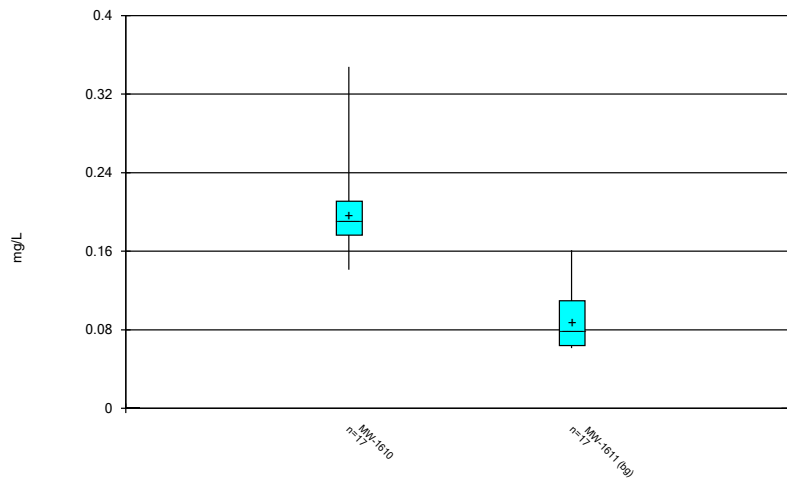
Constituent: Fluoride total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



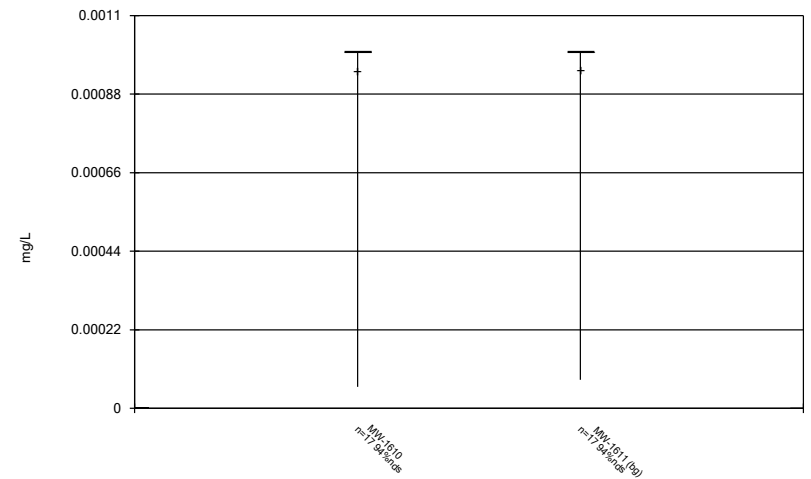
Constituent: Lead total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



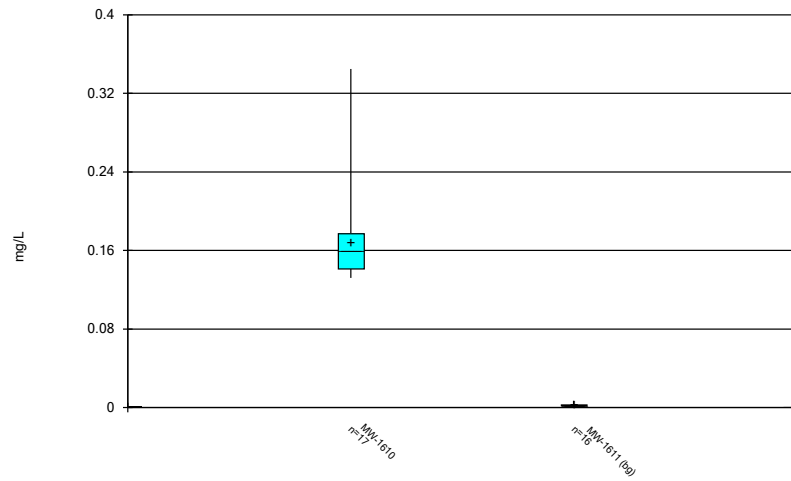
Constituent: Lithium total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



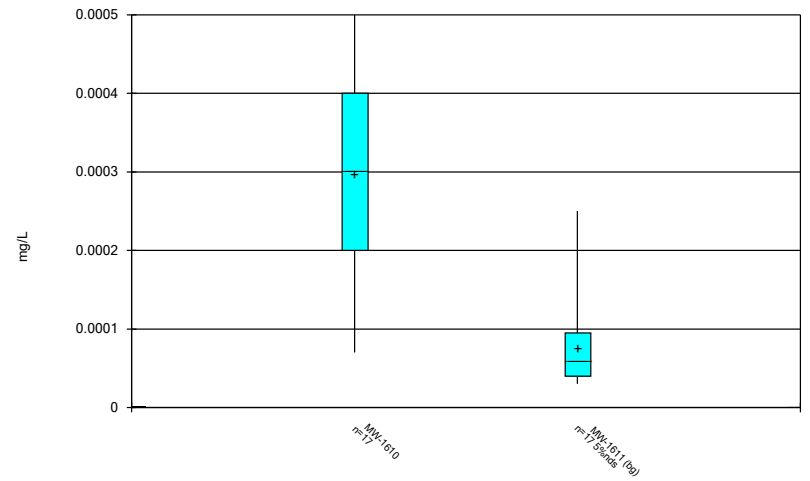
Constituent: Mercury total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



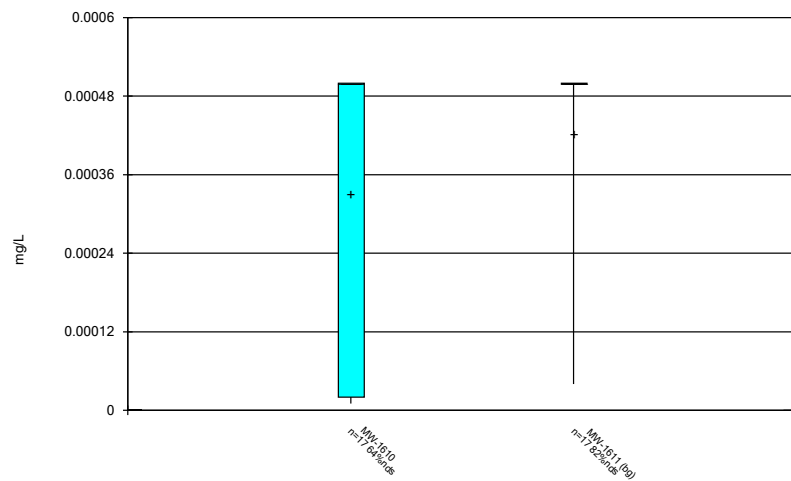
Constituent: Molybdenum total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



Constituent: Selenium total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

Box & Whiskers Plot



Constituent: Thallium total Analysis Run 8/5/2021 9:12 AM View: Dumps Fault - Pond 1
Clinch River LF Client: AEP Data: Clinch River

FIGURE C.

Outlier Summary - Chattanooga Shale

Clinch River LF Client: AEP Data: Clinch River Printed 8/4/2021, 4:12 PM

Outlier Summary - Rome Limestone

Clinch River LF Client: AEP Data: Clinch River Printed 8/4/2021, 4:29 PM

Outlier Summary - Dumps Fault

Clinch River LF Client: AEP Data: Clinch River Printed 8/5/2021, 9:04 AM

	MW-1611 Cobalt total (mg/L)	MW-1611 Lead total (mg/L)	MW-1611 Molybdenum total (mg/L)
10/19/2017	0.000311 (o)	0.00105 (o)	0.038 (o)

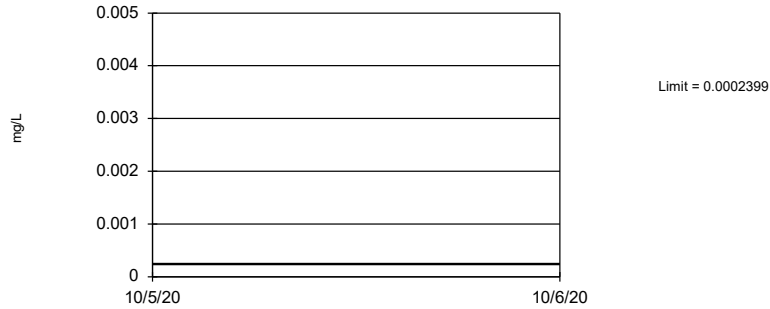
FIGURE D.

Tolerance Limits Summary Table - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Printed 8/12/2021, 10:40 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony total (mg/L)	n/a	0.0002399	n/a	n/a	n/a	45	0.00922	0.002996	0	None	sqrt(x)	0.05	Inter
Arsenic total (mg/L)	n/a	0.0258	n/a	n/a	n/a	45	n/a	n/a	0	n/a	n/a	0.09944	NP Inter(normality)
Barium total (mg/L)	n/a	0.306	n/a	n/a	n/a	45	n/a	n/a	0	n/a	n/a	0.09944	NP Inter(normality)
Beryllium total (mg/L)	n/a	0.000066	n/a	n/a	n/a	45	n/a	n/a	55.56	n/a	n/a	0.09944	NP Inter(NDs)
Cadmium total (mg/L)	n/a	0.00003	n/a	n/a	n/a	45	n/a	n/a	82.22	n/a	n/a	0.09944	NP Inter(NDs)
Chromium total (mg/L)	n/a	0.00126	n/a	n/a	n/a	45	n/a	n/a	0	n/a	n/a	0.09944	NP Inter(normality)
Cobalt total (mg/L)	n/a	0.0004623	n/a	n/a	n/a	45	0.04805	0.01399	0	None	x^(1/3)	0.05	Inter
Combined Radium 226 and 228 (pCi/L)	n/a	2.856	n/a	n/a	n/a	45	0.8766	0.3888	0	None	sqrt(x)	0.05	Inter
Fluoride total (mg/L)	n/a	2.35	n/a	n/a	n/a	45	n/a	n/a	0	n/a	n/a	0.09944	NP Inter(normality)
Lead total (mg/L)	n/a	0.0008839	n/a	n/a	n/a	45	-9.162	1.018	11.11	None	ln(x)	0.05	Inter
Lithium total (mg/L)	n/a	0.118	n/a	n/a	n/a	45	n/a	n/a	2.222	n/a	n/a	0.09944	NP Inter(normality)
Mercury total (mg/L)	n/a	0.0002	n/a	n/a	n/a	45	n/a	n/a	84.44	n/a	n/a	0.09944	NP Inter(NDs)
Molybdenum total (mg/L)	n/a	0.01729	n/a	n/a	n/a	45	-5.676	0.7735	0	None	ln(x)	0.05	Inter
Selenium total (mg/L)	n/a	0.0001	n/a	n/a	n/a	45	n/a	n/a	35.56	n/a	n/a	0.09944	NP Inter(normality)
Thallium total (mg/L)	n/a	0.0001	n/a	n/a	n/a	45	n/a	n/a	68.89	n/a	n/a	0.09944	NP Inter(NDs)

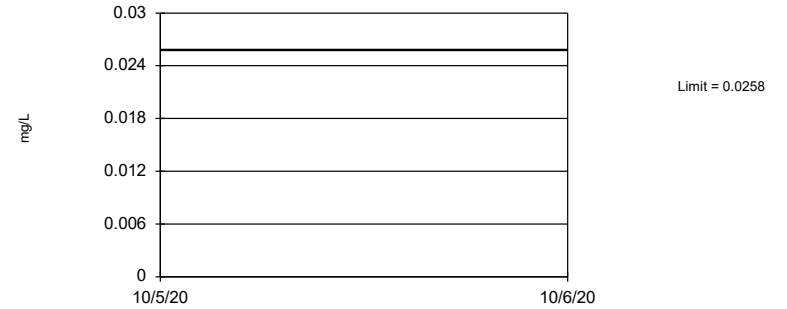
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.00922, Std. Dev.=0.002996, n=45. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9434, critical = 0.926. Report alpha = 0.05.

Constituent: Antimony total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

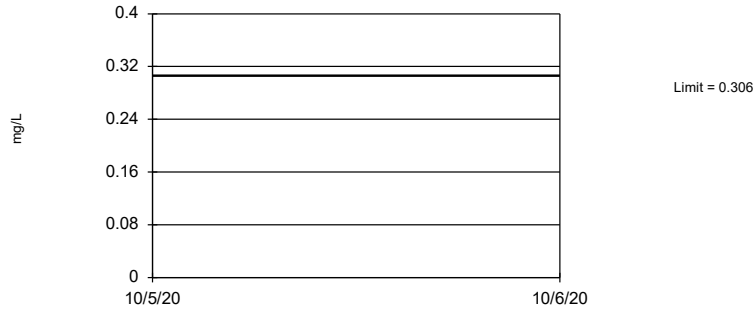
Tolerance Limit
Interwell Non-parametric



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 45 background values. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

Constituent: Arsenic total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

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 45 background values. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

Constituent: Barium total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

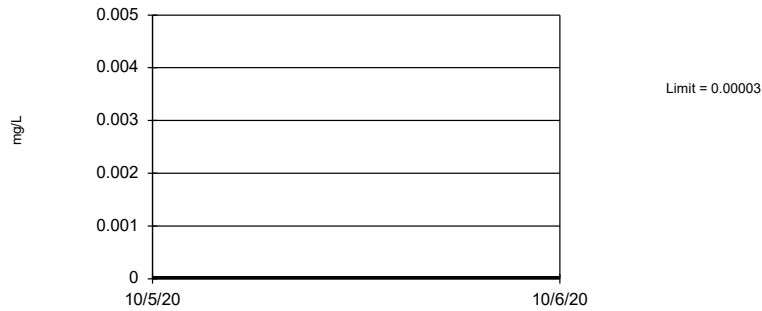
Tolerance Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 45 background values. 55.56% NDs. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

Constituent: Beryllium total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

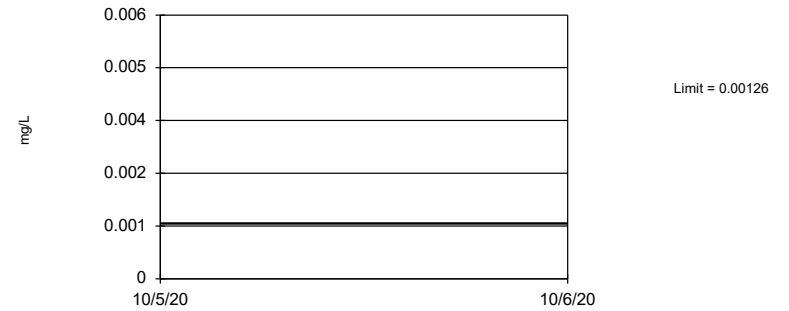
Tolerance Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 45 background values. 82.22% NDs. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

Constituent: Cadmium total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

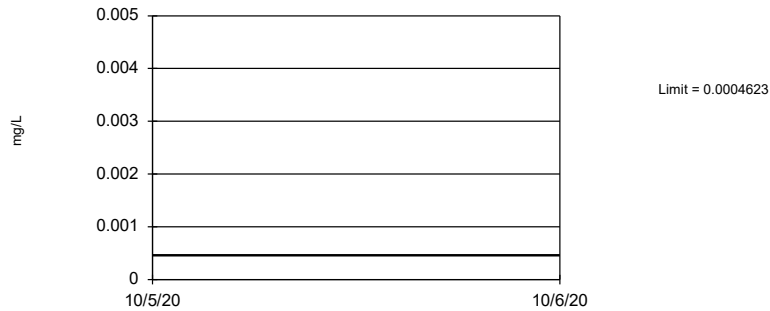
Tolerance Limit
Interwell Non-parametric



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 45 background values. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

Constituent: Chromium total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

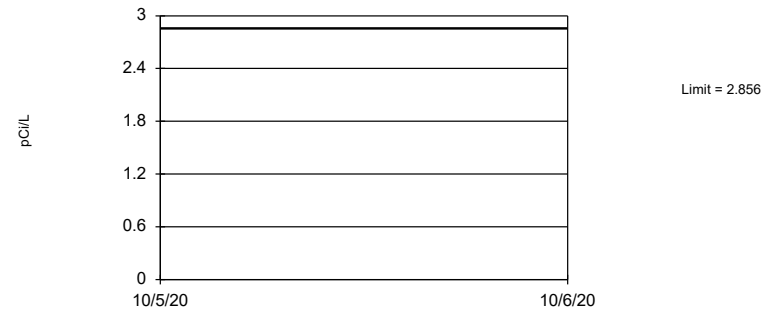
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary (based on cube root transformation): Mean=0.04805, Std. Dev.=0.01399, n=45. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.931, critical = 0.926. Report alpha = 0.05.

Constituent: Cobalt total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.8766, Std. Dev.=0.3888, n=45. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.946, critical = 0.926. Report alpha = 0.05.

Constituent: Combined Radium 226 and 228 Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale
Clinch River LF Client: AEP Data: Clinch River

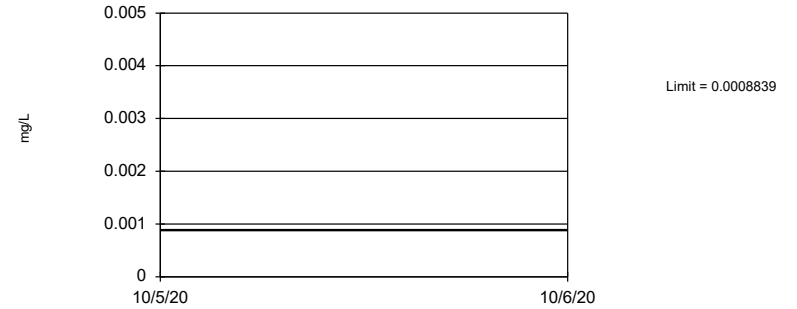
Tolerance Limit
Interwell Non-parametric



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 45 background values. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

Constituent: Fluoride total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary (based on natural log transformation): Mean=-9.162, Std. Dev.=1.018, n=45, 11.11% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9479, critical = 0.926. Report alpha = 0.05.

Constituent: Lead total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

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 45 background values. 2.222% NDs. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

Constituent: Lithium total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

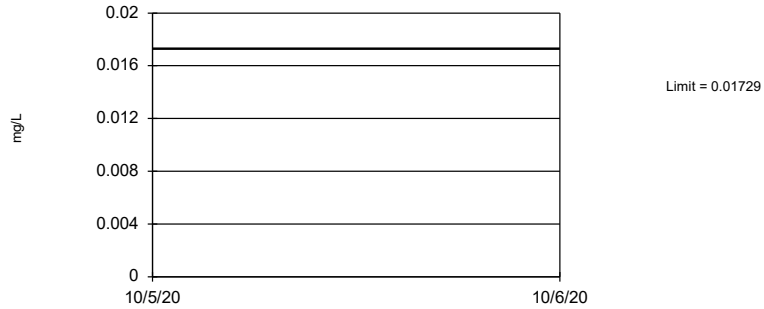
Tolerance Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 45 background values. 84.44% NDs. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

Constituent: Mercury total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

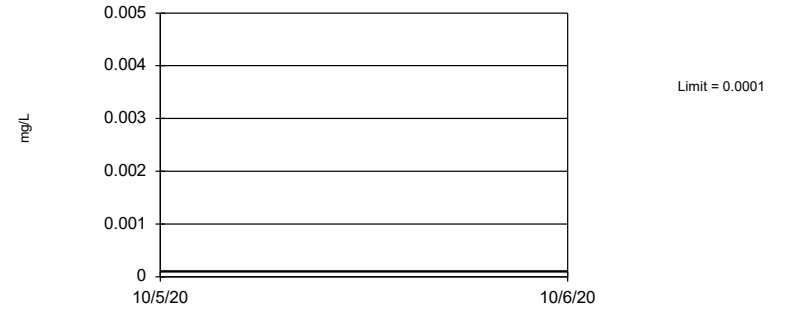
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary (based on natural log transformation): Mean=-5.676, Std. Dev.=0.7735, n=45. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9482, critical = 0.926. Report alpha = 0.05.

Constituent: Molybdenum total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTL
Clinch River LF Client: AEP Data: Clinch River

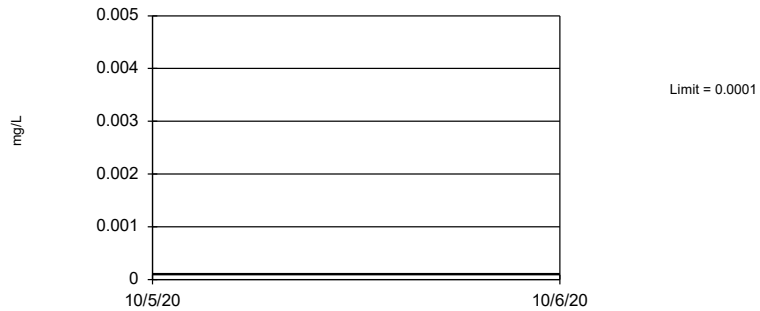
Tolerance Limit
Interwell Non-parametric



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 45 background values. 35.56% NDs. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

Constituent: Selenium total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 45 background values. 68.89% NDs. 90.43% coverage at alpha=0.01; 93.55% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.09944.

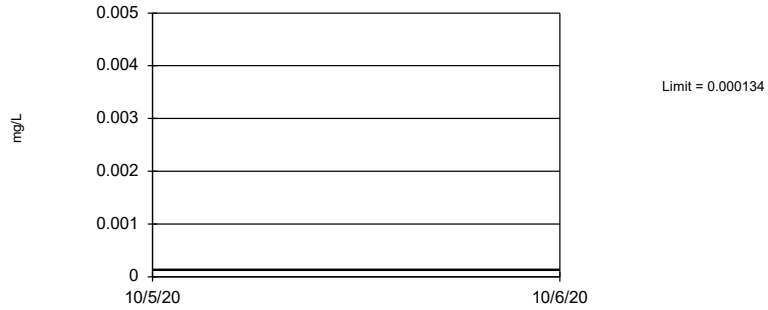
Constituent: Thallium total Analysis Run 8/12/2021 10:40 AM View: Chattanooga Shale - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limits Summary Table - Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Printed 8/12/2021, 10:14 AM

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	0.000134	n/a	n/a	n/a	15	0.006025	0.002162	13.33	None	sqrt(x)	0.05	Inter
Arsenic total (mg/L)	n/a	0.001462	n/a	n/a	n/a	15	-8.55	0.7882	0	None	ln(x)	0.05	Inter
Barium total (mg/L)	n/a	0.5441	n/a	n/a	n/a	15	0.4007	0.05589	0	None	No	0.05	Inter
Beryllium total (mg/L)	n/a	0.00002	n/a	n/a	n/a	15	n/a	n/a	93.33	n/a	n/a	0.4633	NP Inter(NDs)
Cadmium total (mg/L)	n/a	0.00004	n/a	n/a	n/a	15	n/a	n/a	26.67	n/a	n/a	0.4633	NP Inter(normality)
Chromium total (mg/L)	n/a	0.0003407	n/a	n/a	n/a	15	0.0001756	0.00006435	0	None	No	0.05	Inter
Cobalt total (mg/L)	n/a	0.00143	n/a	n/a	n/a	15	0.01555	0.008677	20	Kaplan-Meier	sqrt(x)	0.05	Inter
Combined Radium 226 and 228 (pCi/L)	n/a	5.02	n/a	n/a	n/a	15	1.384	0.3339	0	None	sqrt(x)	0.05	Inter
Fluoride total (mg/L)	n/a	0.3622	n/a	n/a	n/a	15	0.2593	0.04008	0	None	No	0.05	Inter
Lead total (mg/L)	n/a	0.001226	n/a	n/a	n/a	15	0.0004609	0.0002982	0	None	No	0.05	Inter
Lithium total (mg/L)	n/a	0.01	n/a	n/a	n/a	15	n/a	n/a	40	n/a	n/a	0.4633	NP Inter(normality)
Mercury total (mg/L)	n/a	0.0002	n/a	n/a	n/a	15	n/a	n/a	93.33	n/a	n/a	0.4633	NP Inter(NDs)
Molybdenum total (mg/L)	n/a	0.002769	n/a	n/a	n/a	15	0.0899	0.01969	26.67	Kaplan-Meier	x^(1/3)	0.05	Inter
Selenium total (mg/L)	n/a	0.0005028	n/a	n/a	n/a	15	-9.905	0.9001	20	Kaplan-Meier	ln(x)	0.05	Inter
Thallium total (mg/L)	n/a	0.0001	n/a	n/a	n/a	15	n/a	n/a	66.67	n/a	n/a	0.4633	NP Inter(NDs)

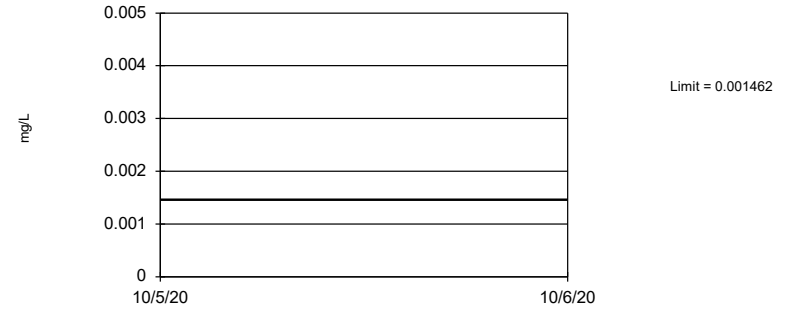
Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.006025, Std. Dev.=0.002162, n=15, 13.33% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.92, critical = 0.835. Report alpha = 0.05.

Constituent: Antimony total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

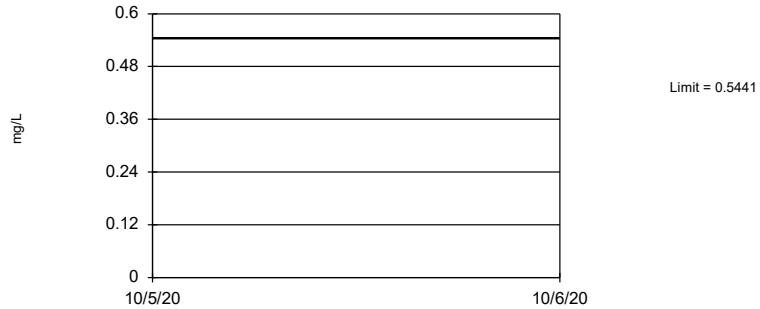
Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary (based on natural log transformation): Mean=-8.55, Std. Dev.=0.7882, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8508, critical = 0.835. Report alpha = 0.05.

Constituent: Arsenic total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary: Mean=0.4007, Std. Dev.=0.05589, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9214, critical = 0.835. Report alpha = 0.05.

Constituent: Barium total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

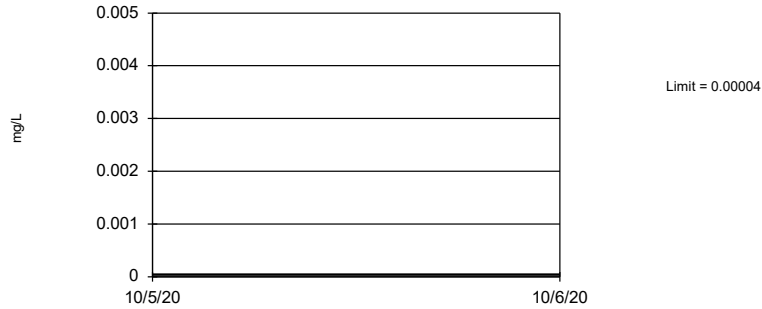
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 15 background values. 93.33% NDs. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

Constituent: Beryllium total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

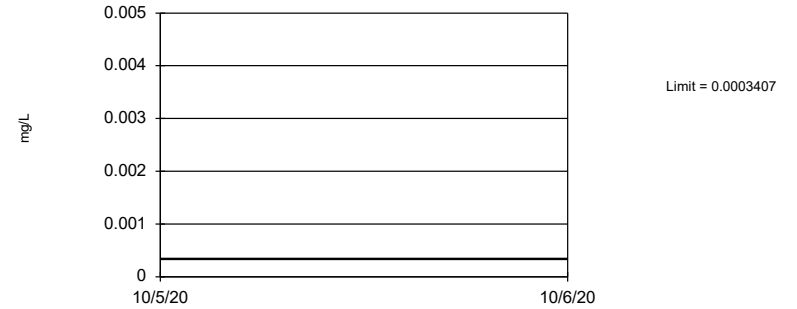
Tolerance Limit Interwell Non-parametric



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 15 background values. 26.67% NDs. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

Constituent: Cadmium total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

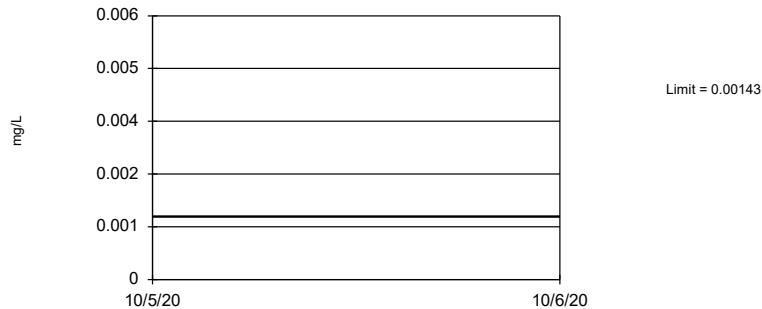
Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary: Mean=0.0001756, Std. Dev.=0.00006435, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9239, critical = 0.835. Report alpha = 0.05.

Constituent: Chromium total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

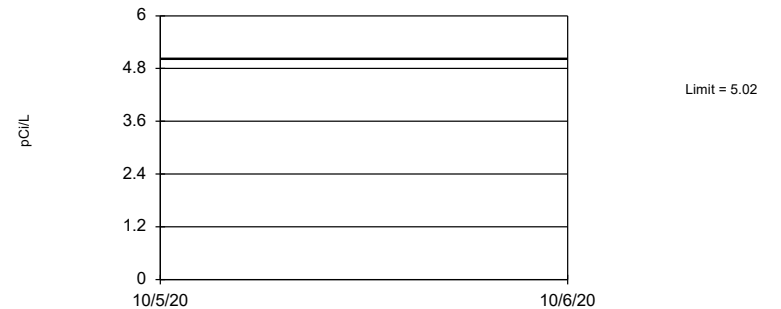
Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation) (after Kaplan-Meier Adjustment): Mean=0.01555, Std. Dev.=0.008677, n=15, 20% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9288, critical = 0.835. Report alpha = 0.05.

Constituent: Cobalt total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLS
Clinch River LF Client: AEP Data: Clinch River

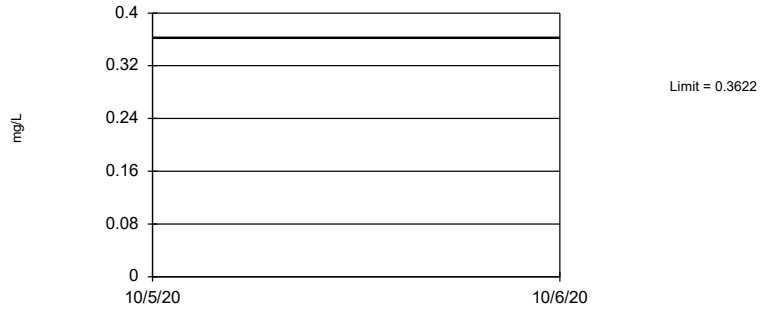
Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=1.384, Std. Dev.=0.3339, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8711, critical = 0.835. Report alpha = 0.05.

Constituent: Combined Radium 226 and 228 Analysis Run 8/12/2021 10:13 AM View: Rome Limestone -
Clinch River LF Client: AEP Data: Clinch River

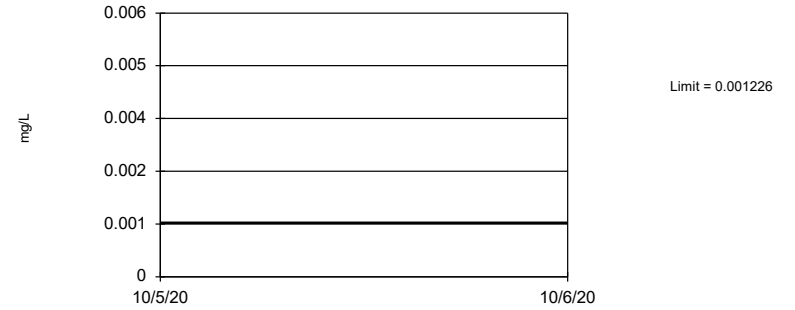
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary: Mean=0.2593, Std. Dev.=0.04008, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9432, critical = 0.835. Report alpha = 0.05.

Constituent: Fluoride total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary: Mean=0.0004609, Std. Dev.=0.0002982, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8494, critical = 0.835. Report alpha = 0.05.

Constituent: Lead total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

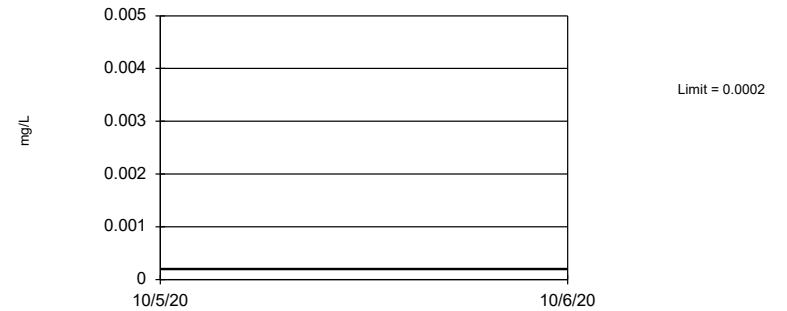
Tolerance Limit
Interwell Non-parametric



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 15 background values. 40% NDs. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

Constituent: Lithium total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

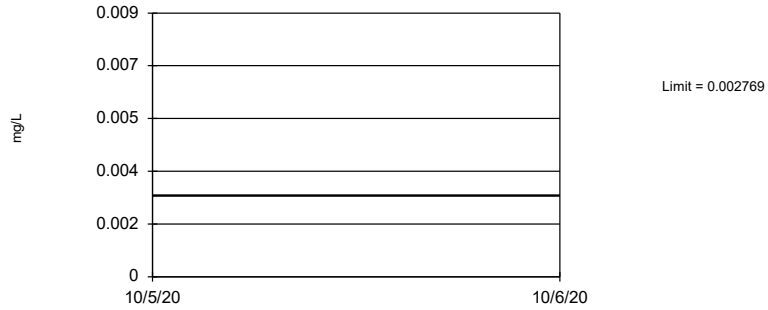
Tolerance Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 15 background values. 93.33% NDs. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

Constituent: Mercury total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

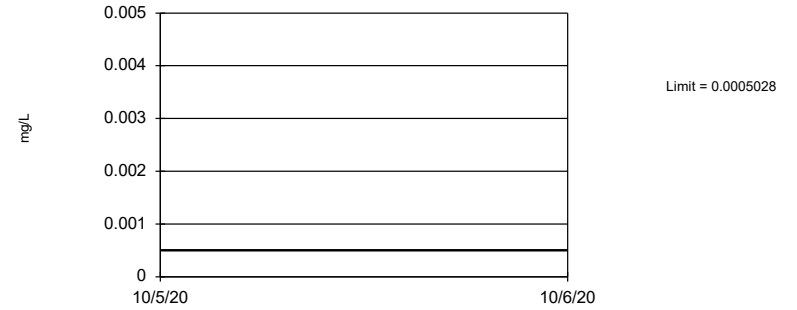
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary (based on cube root transformation) (after Kaplan-Meier Adjustment): Mean=0.0899, Std. Dev.=0.01969, n=15, 26.67% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8434, critical = 0.835. Report alpha = 0.05.

Constituent: Molybdenum total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

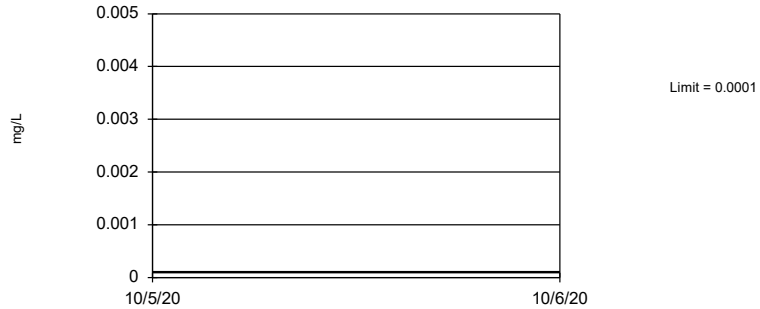
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=9.905, Std. Dev.=0.9001, n=15, 20% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8559, critical = 0.835. Report alpha = 0.05.

Constituent: Selenium total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 15 background values. 66.67% NDs. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

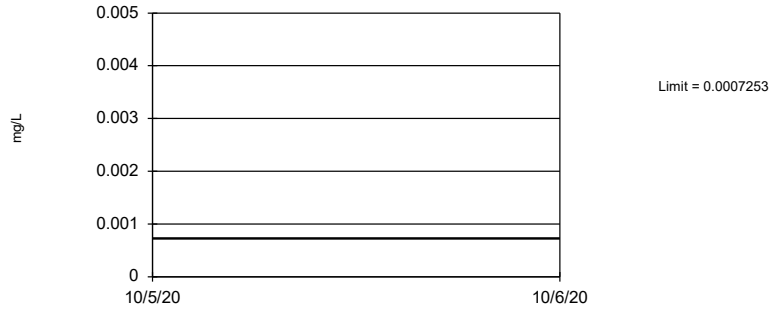
Constituent: Thallium total Analysis Run 8/12/2021 10:13 AM View: Rome Limestone - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limits Summary Table - Dumps Fault - All Results

Clinch River LF Client: AEP Data: Clinch River Printed 8/12/2021, 10:26 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony total (mg/L)	n/a	0.0007253	n/a	n/a	n/a	15	0.01102	0.006201	0	None	sqrt(x)	0.05	Inter
Arsenic total (mg/L)	n/a	0.04839	n/a	n/a	n/a	15	0.122	0.03819	0	None	sqrt(x)	0.05	Inter
Barium total (mg/L)	n/a	0.143	n/a	n/a	n/a	15	0.08043	0.02437	0	None	No	0.05	Inter
Beryllium total (mg/L)	n/a	0.00002	n/a	n/a	n/a	15	n/a	n/a	66.67	n/a	n/a	0.4633	NP Inter(NDs)
Cadmium total (mg/L)	n/a	0.00001	n/a	n/a	n/a	15	n/a	n/a	93.33	n/a	n/a	0.4633	NP Inter(NDs)
Chromium total (mg/L)	n/a	0.001009	n/a	n/a	n/a	15	0.0004683	0.0002105	0	None	No	0.05	Inter
Cobalt total (mg/L)	n/a	0.0001522	n/a	n/a	n/a	14	0.00006436	0.0000336	0	None	No	0.05	Inter
Combined Radium 226 and 228 (pCi/L)	n/a	1.935	n/a	n/a	n/a	15	n/a	n/a	0	n/a	n/a	0.4633	NP Inter(normality)
Fluoride total (mg/L)	n/a	1.23	n/a	n/a	n/a	15	0.8323	0.2654	0	None	x^2	0.05	Inter
Lead total (mg/L)	n/a	0.0002219	n/a	n/a	n/a	14	0.00009664	0.00004791	14.29	None	No	0.05	Inter
Lithium total (mg/L)	n/a	0.1682	n/a	n/a	n/a	15	0.09203	0.02968	0	None	No	0.05	Inter
Mercury total (mg/L)	n/a	0.0002	n/a	n/a	n/a	15	n/a	n/a	93.33	n/a	n/a	0.4633	NP Inter(NDs)
Molybdenum total (mg/L)	n/a	0.00676	n/a	n/a	n/a	14	n/a	n/a	0	n/a	n/a	0.4877	NP Inter(normality)
Selenium total (mg/L)	n/a	0.0001305	n/a	n/a	n/a	15	0.00006733	0.00002463	0	None	No	0.05	Inter
Thallium total (mg/L)	n/a	0.00011	n/a	n/a	n/a	15	n/a	n/a	80	n/a	n/a	0.4633	NP Inter(NDs)

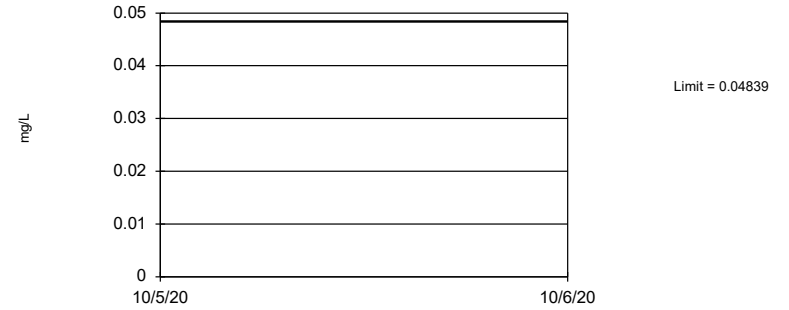
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.01102, Std. Dev.=0.006201, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8598, critical = 0.835. Report alpha = 0.05.

Constituent: Antimony total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

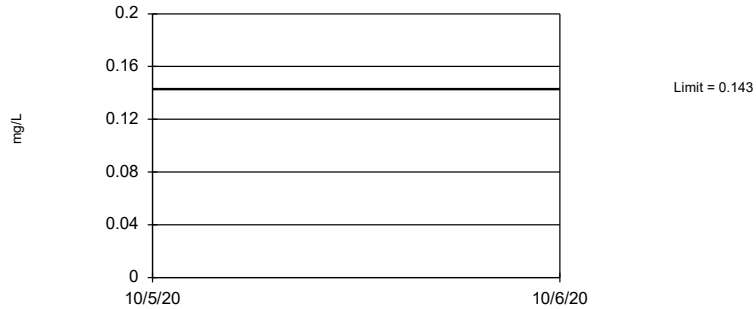
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.122, Std. Dev.=0.03819, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8809, critical = 0.835. Report alpha = 0.05.

Constituent: Arsenic total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary: Mean=0.08043, Std. Dev.=0.02437, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9263, critical = 0.835. Report alpha = 0.05.

Constituent: Barium total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

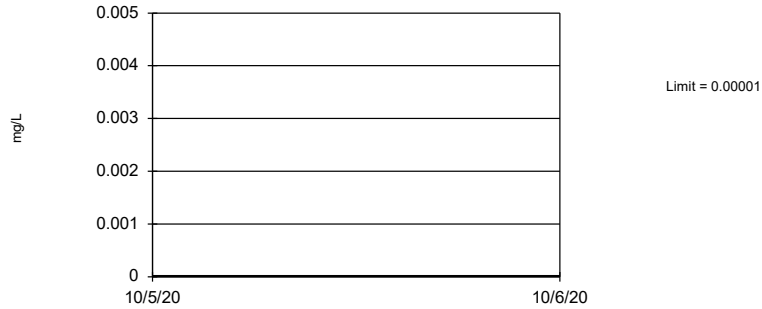
Tolerance Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 15 background values. 66.67% NDs. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

Constituent: Beryllium total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limit
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 15 background values. 93.33% NDs. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

Constituent: Cadmium total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

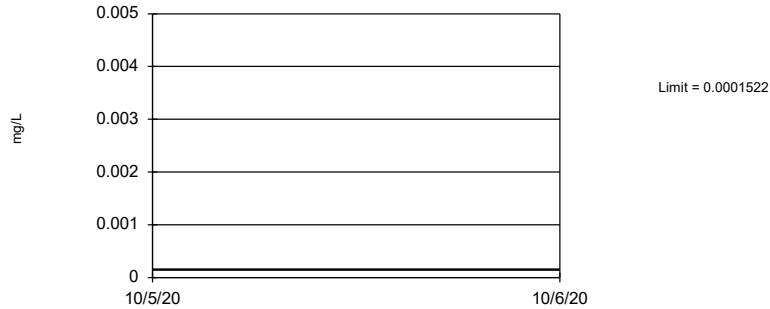
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary: Mean=0.0004683, Std. Dev.=0.0002105, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9232, critical = 0.835. Report alpha = 0.05.

Constituent: Chromium total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

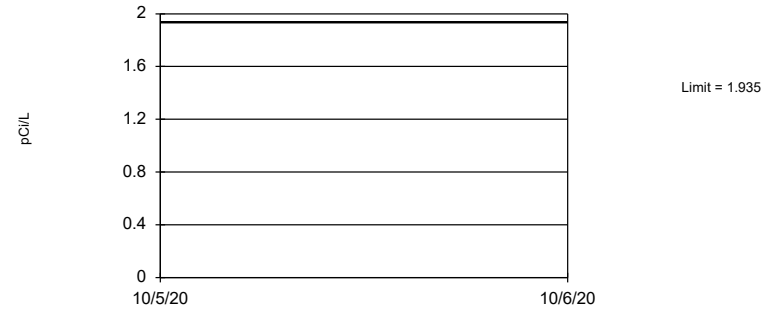
Tolerance Limit
Interwell Parametric



95% coverage. Background Data Summary: Mean=0.00006436, Std. Dev.=0.0000336, n=14. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9223, critical = 0.825. Report alpha = 0.05.

Constituent: Cobalt total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

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 15 background values. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

Constituent: Combined Radium 226 and 228 Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond
Clinch River LF Client: AEP Data: Clinch River

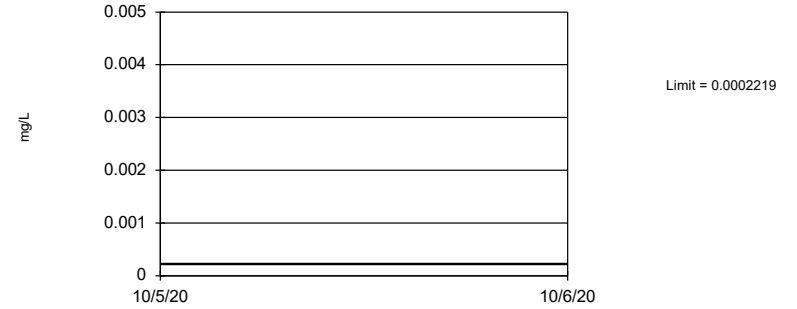
Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary (based on square transformation): Mean=0.8323, Std. Dev.=0.2654, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8823, critical = 0.835. Report alpha = 0.05.

Constituent: Fluoride total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

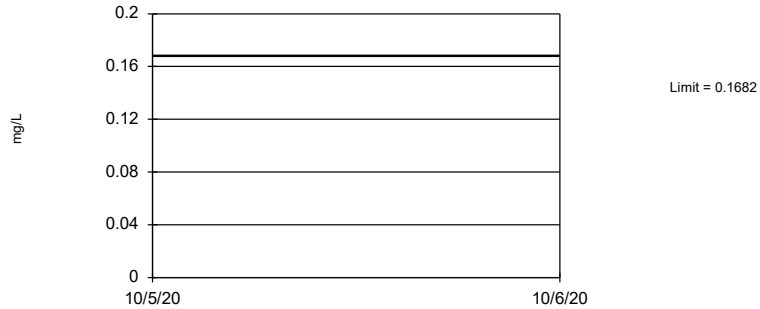
Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary: Mean=0.00009664, Std. Dev.=0.00004791, n=14, 14.29% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.938, critical = 0.825. Report alpha = 0.05.

Constituent: Lead total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

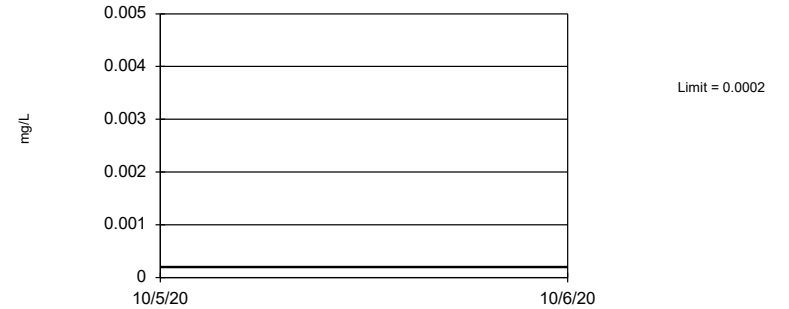
Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary: Mean=0.09203, Std. Dev.=0.02968, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8686, critical = 0.835. Report alpha = 0.05.

Constituent: Lithium total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

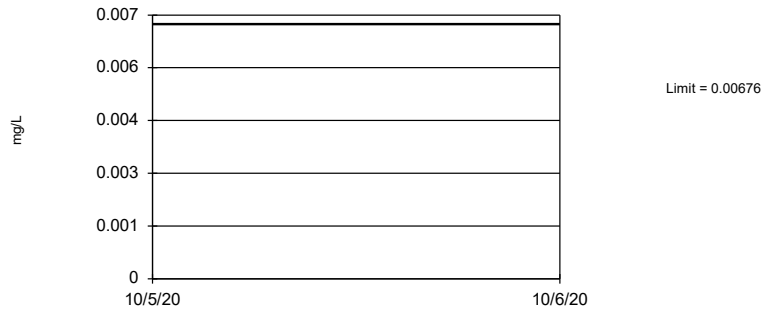
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 15 background values. 93.33% NDs. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

Constituent: Mercury total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

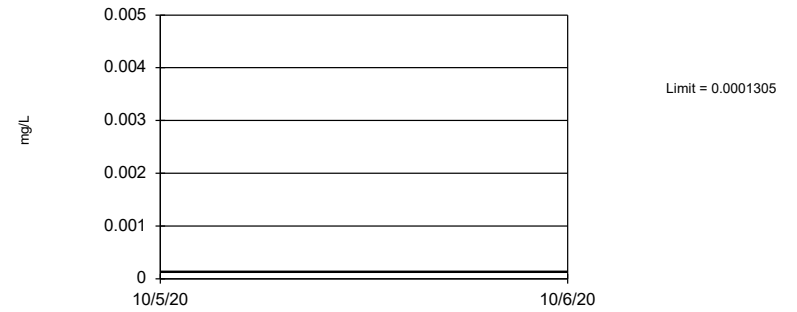
Tolerance Limit Interwell Non-parametric



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 14 background values. 72.07% coverage at alpha=0.01; 80.66% coverage at alpha=0.05; 95.12% coverage at alpha=0.5. Report alpha = 0.4877.

Constituent: Molybdenum total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

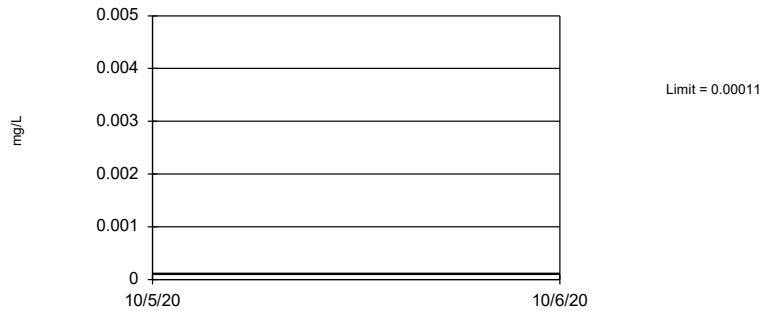
Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary: Mean=0.00006733, Std. Dev.=0.00002463, n=15. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8396, critical = 0.835. Report alpha = 0.05.

Constituent: Selenium total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 15 background values. 80% NDs. 73.63% coverage at alpha=0.01; 81.84% coverage at alpha=0.05; 95.51% coverage at alpha=0.5. Report alpha = 0.4633.

Constituent: Thallium total Analysis Run 8/12/2021 10:26 AM View: Dumps Fault - Pond 1 UTLs
Clinch River LF Client: AEP Data: Clinch River

FIGURE E.

CLINCH RIVER GWPS - CHATTANOOGA SHALE				
Constituent Name	MCL	CCR Rule Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00024	0.006
Arsenic, Total (mg/L)	0.01		0.026	0.026
Barium, Total (mg/L)	2		0.31	2
Beryllium, Total (mg/L)	0.004		0.000066	0.004
Cadmium, Total (mg/L)	0.005		0.00003	0.005
Chromium, Total (mg/L)	0.1		0.0013	0.1
Cobalt, Total (mg/L)		0.006	0.00046	0.006
Combined Radium, Total (pCi/L)	5		2.86	5
Fluoride, Total (mg/L)	4		2.35	4
Lead, Total (mg/L)		0.015	0.00088	0.015
Lithium, Total (mg/L)		0.04	0.12	0.12
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)		0.1	0.017	0.1
Selenium, Total (mg/L)	0.05		0.0001	0.05
Thallium, Total (mg/L)	0.002		0.0001	0.002

**Grey cell indicates background is higher than MCL or CCR Rule*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

CLINCH RIVER GWPS - ROME LIMESTONE				
Constituent Name	MCL	CCR Rule Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00013	0.006
Arsenic, Total (mg/L)	0.01		0.0015	0.01
Barium, Total (mg/L)	2		0.54	2
Beryllium, Total (mg/L)	0.004		0.00002	0.004
Cadmium, Total (mg/L)	0.005		0.00004	0.005
Chromium, Total (mg/L)	0.1		0.00034	0.1
Cobalt, Total (mg/L)		0.006	0.0014	0.006
Combined Radium, Total (pCi/L)	5		5.02	5.02
Fluoride, Total (mg/L)	4		0.36	4
Lead, Total (mg/L)		0.015	0.0012	0.015
Lithium, Total (mg/L)		0.04	0.01	0.04
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)		0.1	0.0028	0.1
Selenium, Total (mg/L)	0.05		0.0005	0.05
Thallium, Total (mg/L)	0.002		0.0001	0.002

**Grey cell indicates background is higher than MCL or CCR Rule*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

CLINCH RIVER GWPS - DUMPS FAULT				
Constituent Name	MCL	CCR Rule Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00073	0.006
Arsenic, Total (mg/L)	0.01		0.048	0.048
Barium, Total (mg/L)	2		0.14	2
Beryllium, Total (mg/L)	0.004		0.00002	0.004
Cadmium, Total (mg/L)	0.005		0.00001	0.005
Chromium, Total (mg/L)	0.1		0.001	0.1
Cobalt, Total (mg/L)		0.006	0.00015	0.006
Combined Radium, Total (pCi/L)	5		1.94	5
Fluoride, Total (mg/L)	4		1.23	4
Lead, Total (mg/L)		0.015	0.00022	0.015
Lithium, Total (mg/L)		0.04	0.17	0.17
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)		0.1	0.0068	0.1
Selenium, Total (mg/L)	0.05		0.00013	0.05
Thallium, Total (mg/L)	0.002		0.00011	0.002

**Grey cell indicates background is higher than MCL or CCR Rule*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

FIGURE F.

Confidence Intervals - Chattanooga Shale - Significant Results

Clinch River LF Client: AEP Data: Clinch River Printed 8/12/2021, 10:51 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Barium total (mg/L)	MW-1604	3.277	3.078	2	Yes	17	3.178	0.1588	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1605	0.2021	0.1858	0.12	Yes	17	0.1939	0.01299	0	None	No	0.01	Param.

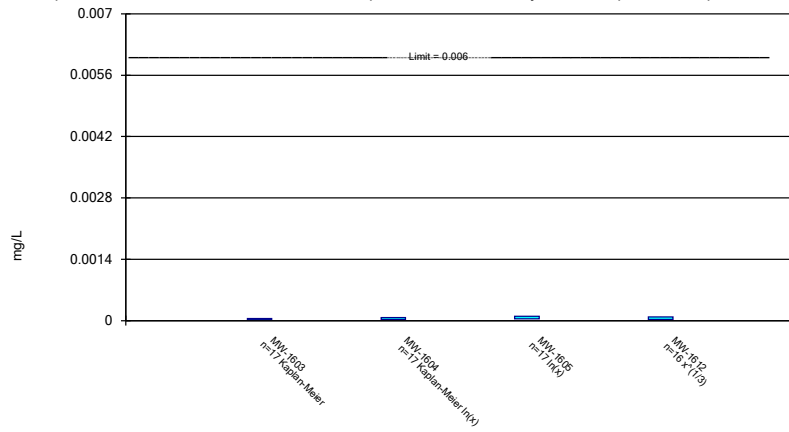
Confidence Intervals - Chattanooga Shale - All Results

Clinch River LF Client: AEP Data: Clinch River Printed 8/12/2021, 10:51 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony total (mg/L)	MW-1603	0.00004573	0.00002112	0.006	No	17	0.00003882	0.00002446	23.53	Kaplan-Meier	No	0.01	Param.
Antimony total (mg/L)	MW-1604	0.00007208	0.00002329	0.006	No	17	0.00007412	0.000099	17.65	Kaplan-Meier	ln(x)	0.01	Param.
Antimony total (mg/L)	MW-1605	0.000102	0.00004346	0.006	No	17	0.00008471	0.00006911	0	None	ln(x)	0.01	Param.
Antimony total (mg/L)	MW-1612	0.0000866	0.00002486	0.006	No	16	0.000065	0.00007294	6.25	None	x^(1/3)	0.01	Param.
Arsenic total (mg/L)	MW-1603	0.002767	0.001945	0.026	No	17	0.002356	0.0006554	0	None	No	0.01	Param.
Arsenic total (mg/L)	MW-1604	0.002376	0.001629	0.026	No	17	0.002002	0.0005964	0	None	No	0.01	Param.
Arsenic total (mg/L)	MW-1605	0.004688	0.002769	0.026	No	17	0.003729	0.001531	0	None	No	0.01	Param.
Arsenic total (mg/L)	MW-1612	0.001609	0.0005995	0.026	No	16	0.001215	0.0009806	0	None	x^(1/3)	0.01	Param.
Barium total (mg/L)	MW-1603	2.77	1.98	2	No	17	2.381	0.571	0	None	No	0.01	NP (normality)
Barium total (mg/L)	MW-1604	3.277	3.078	2	Yes	17	3.178	0.1588	0	None	No	0.01	Param.
Barium total (mg/L)	MW-1605	1.66	1.224	2	No	17	1.454	0.3612	0	None	sqrt(x)	0.01	Param.
Barium total (mg/L)	MW-1612	2.305	1.966	2	No	16	2.136	0.2601	0	None	No	0.01	Param.
Beryllium total (mg/L)	MW-1603	0.0001	0.00001	0.004	No	17	0.000084	0.00003563	82.35	None	No	0.01	NP (NDs)
Beryllium total (mg/L)	MW-1604	0.0001	0.000007	0.004	No	17	0.00008894	0.00003122	88.24	None	No	0.01	NP (NDs)
Beryllium total (mg/L)	MW-1605	0.0001	0.00001	0.004	No	17	0.00008347	0.00003682	82.35	None	No	0.01	NP (NDs)
Beryllium total (mg/L)	MW-1612	0.0001	0.00001	0.004	No	16	0.00007912	0.00003831	75	None	No	0.01	NP (NDs)
Cadmium total (mg/L)	MW-1605	0.00005	0.00002	0.005	No	17	0.00004588	0.00001176	88.24	None	No	0.01	NP (NDs)
Chromium total (mg/L)	MW-1603	0.000233	0.000187	0.1	No	17	0.0002025	0.00005465	0	None	No	0.01	NP (normality)
Chromium total (mg/L)	MW-1604	0.0002433	0.0001479	0.1	No	17	0.0001956	0.00007611	0	None	No	0.01	Param.
Chromium total (mg/L)	MW-1605	0.0002889	0.0001786	0.1	No	17	0.0002337	0.00008802	0	None	No	0.01	Param.
Chromium total (mg/L)	MW-1612	0.000251	0.00019	0.1	No	16	0.0002047	0.00007849	0	None	No	0.01	NP (normality)
Cobalt total (mg/L)	MW-1603	0.0005899	0.0003151	0.006	No	17	0.0004525	0.0002193	0	None	No	0.01	Param.
Cobalt total (mg/L)	MW-1604	0.0007452	0.0004655	0.006	No	17	0.0006054	0.0002232	0	None	No	0.01	Param.
Cobalt total (mg/L)	MW-1605	0.0003095	0.0001447	0.006	No	17	0.0002271	0.0001315	0	None	No	0.01	Param.
Cobalt total (mg/L)	MW-1612	0.0002457	0.0001384	0.006	No	16	0.0001921	0.00008248	0	None	No	0.01	Param.
Combined Radium 226 and 228 (pCi/L)	MW-1603	1.516	0.7197	5	No	17	1.169	0.7037	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 and 228 (pCi/L)	MW-1604	1.592	0.9012	5	No	17	1.246	0.5511	0	None	No	0.01	Param.
Combined Radium 226 and 228 (pCi/L)	MW-1605	2.122	0.6629	5	No	17	1.57	1.46	0	None	No	0.01	NP (normality)
Combined Radium 226 and 228 (pCi/L)	MW-1612	2.283	1.225	5	No	16	1.754	0.8125	0	None	No	0.01	Param.
Fluoride total (mg/L)	MW-1603	0.1449	0.1112	4	No	17	0.1288	0.02781	0	None	sqrt(x)	0.01	Param.
Fluoride total (mg/L)	MW-1604	0.2809	0.2251	4	No	17	0.2541	0.04651	0	None	sqrt(x)	0.01	Param.
Fluoride total (mg/L)	MW-1605	0.379	0.3374	4	No	17	0.3582	0.03321	0	None	No	0.01	Param.
Fluoride total (mg/L)	MW-1612	0.193	0.1445	4	No	16	0.1688	0.03722	0	None	No	0.01	Param.
Lead total (mg/L)	MW-1603	0.0002	0.00002	0.015	No	17	0.0001356	0.00009004	64.71	None	No	0.01	NP (NDs)
Lead total (mg/L)	MW-1604	0.0002	0.00002	0.015	No	17	0.0001315	0.00008573	58.82	None	No	0.01	NP (NDs)
Lead total (mg/L)	MW-1605	0.0002	0.00004	0.015	No	17	0.0001192	0.00007951	47.06	None	No	0.01	NP (normality)
Lead total (mg/L)	MW-1612	0.000331	0.000038	0.015	No	16	0.0001504	0.00009067	56.25	None	No	0.01	NP (NDs)
Lithium total (mg/L)	MW-1603	0.08168	0.05661	0.12	No	17	0.06914	0.02	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1604	0.08273	0.07346	0.12	No	17	0.07809	0.007393	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1605	0.2021	0.1858	0.12	Yes	17	0.1939	0.01299	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1612	0.1276	0.1077	0.12	No	16	0.1153	0.02174	6.25	None	x^3	0.01	Param.
Mercury total (mg/L)	MW-1603	0.001	0.00006	0.002	No	17	0.0009447	0.000228	94.12	None	No	0.01	NP (NDs)
Mercury total (mg/L)	MW-1604	0.001	0.00006	0.002	No	17	0.0009447	0.000228	94.12	None	No	0.01	NP (NDs)
Mercury total (mg/L)	MW-1612	0.001	0.00006	0.002	No	16	0.0009413	0.000235	93.75	None	No	0.01	NP (NDs)
Molybdenum total (mg/L)	MW-1603	0.001424	0.0005683	0.1	No	17	0.001201	0.001115	0	None	ln(x)	0.01	Param.
Molybdenum total (mg/L)	MW-1604	0.000841	0.0003063	0.1	No	17	0.0008135	0.0004536	23.53	Kaplan-Meier	sqrt(x)	0.01	Param.
Molybdenum total (mg/L)	MW-1605	0.004173	0.001373	0.1	No	17	0.003038	0.002479	0	None	sqrt(x)	0.01	Param.
Molybdenum total (mg/L)	MW-1612	0.002	0.00067	0.1	No	16	0.001146	0.000808	6.25	None	No	0.01	NP (normality)
Selenium total (mg/L)	MW-1603	0.0001	0.00006	0.05	No	17	0.0001259	0.0001421	11.76	None	No	0.01	NP (normality)
Selenium total (mg/L)	MW-1604	0.0005	0.00004	0.05	No	17	0.0001824	0.0002116	29.41	None	No	0.01	NP (normality)
Selenium total (mg/L)	MW-1605	0.0005	0.00005	0.05	No	17	0.0002653	0.0002283	47.06	None	No	0.01	NP (normality)
Selenium total (mg/L)	MW-1612	0.0005	0.00003	0.05	No	16	0.0002444	0.0002334	43.75	None	No	0.01	NP (normality)
Thallium total (mg/L)	MW-1603	0.0005	0.00001	0.002	No	17	0.0003565	0.0002292	70.59	None	No	0.01	NP (NDs)
Thallium total (mg/L)	MW-1604	0.0005	0.00002	0.002	No	17	0.0003853	0.0002132	76.47	None	No	0.01	NP (NDs)
Thallium total (mg/L)	MW-1605	0.0005	0.00002	0.002	No	17	0.0003859	0.0002121	76.47	None	No	0.01	NP (NDs)
Thallium total (mg/L)	MW-1612	0.0005	0.00003	0.002	No	16	0.0003788	0.0002169	75	None	No	0.01	NP (NDs)

Parametric Confidence Interval

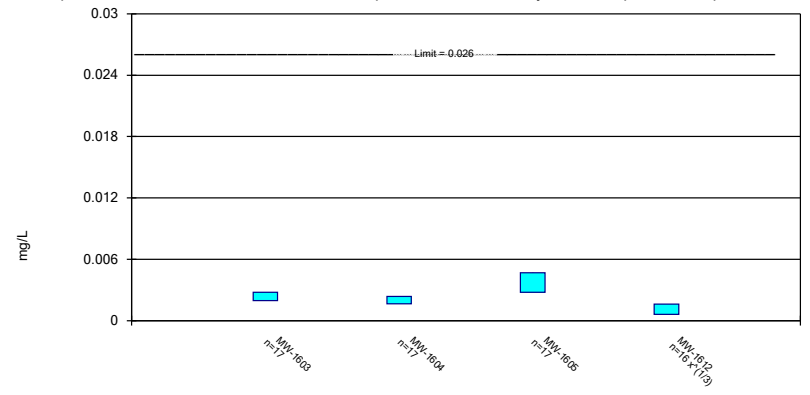
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Antimony total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

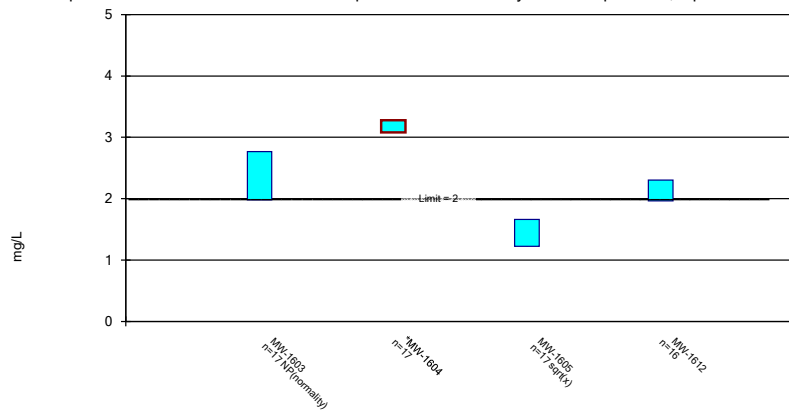
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Parametric and Non-Parametric (NP) Confidence Interval

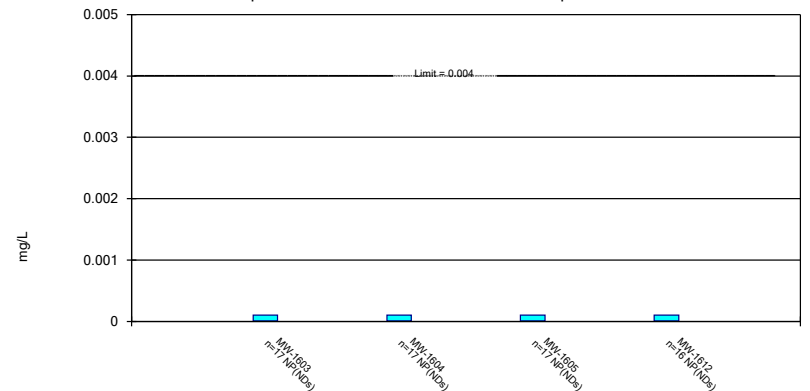
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

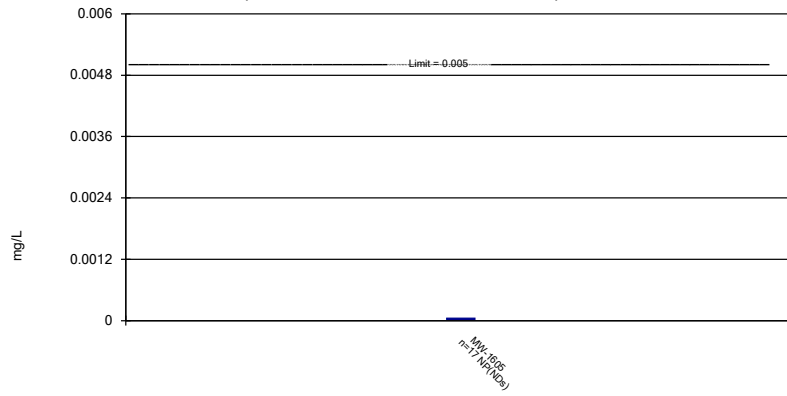
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Beryllium total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

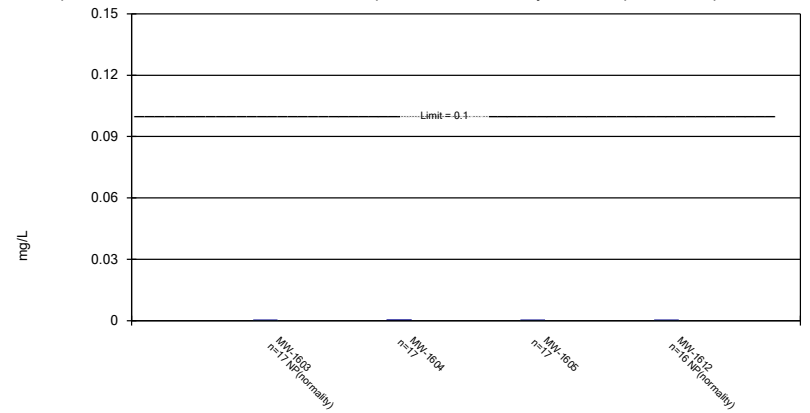
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cadmium total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Parametric and Non-Parametric (NP) Confidence Interval

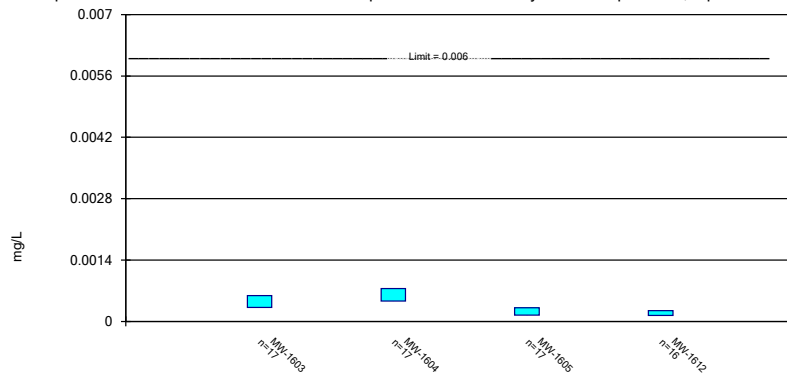
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

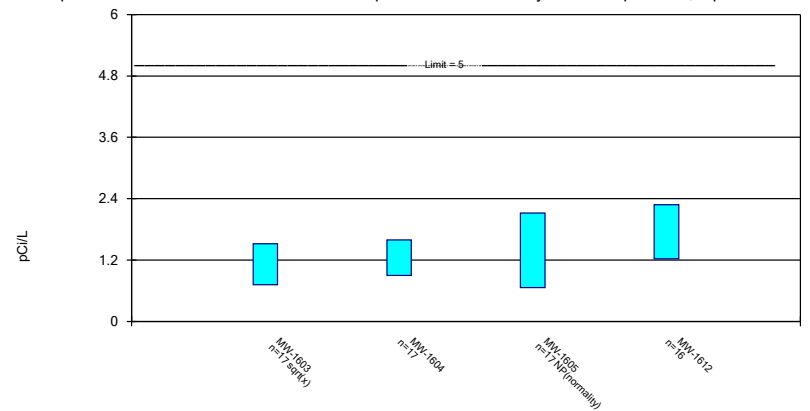
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Parametric and Non-Parametric (NP) Confidence Interval

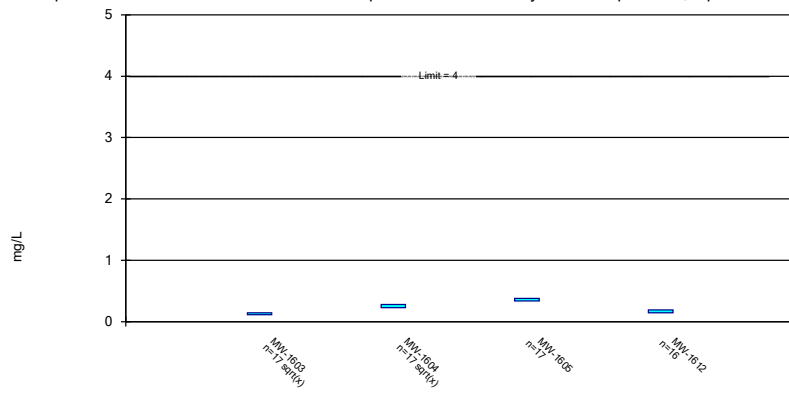
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 and 228 Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

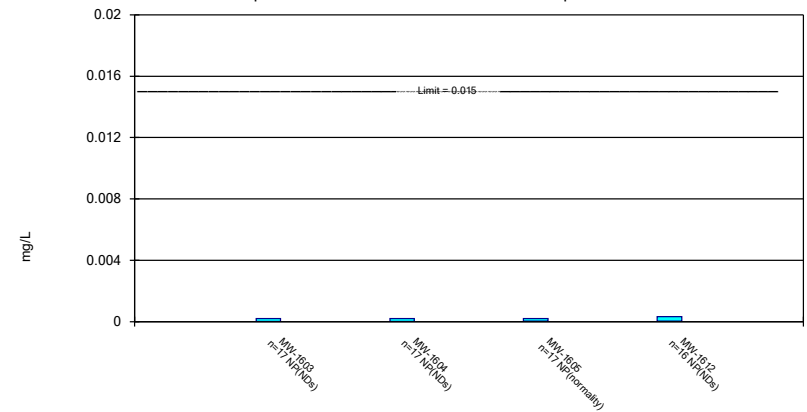
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

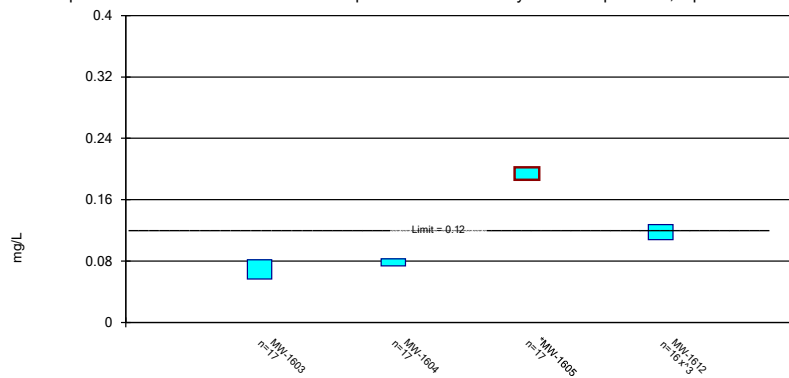
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

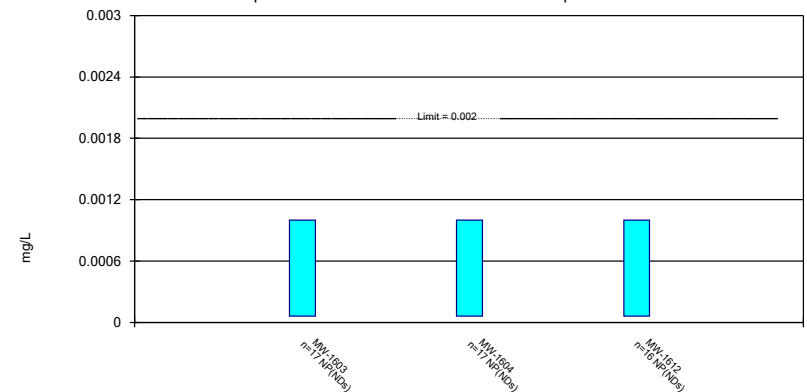
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

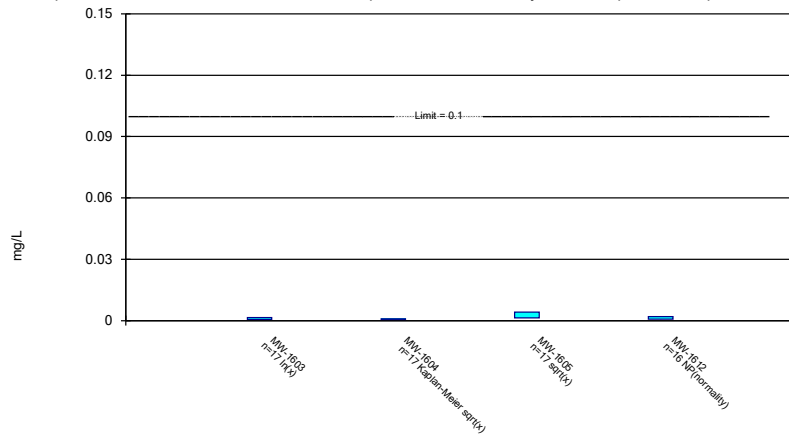
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Parametric and Non-Parametric (NP) Confidence Interval

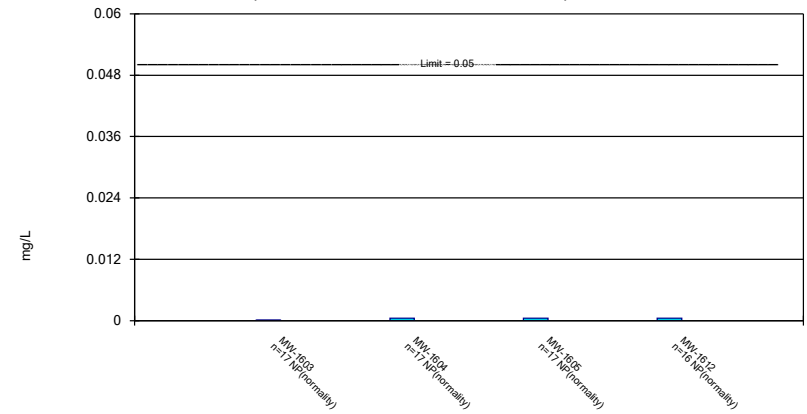
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Conf
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

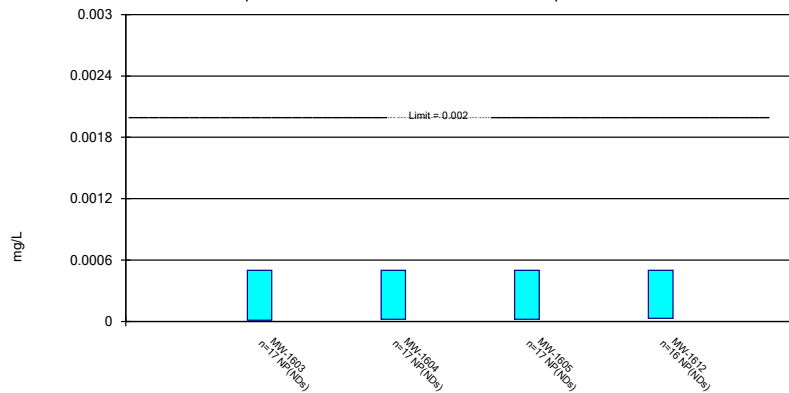
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Selenium total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confide
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

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



Constituent: Thallium total Analysis Run 8/12/2021 10:49 AM View: Chattanooga Shale - Pond 1 Confiden
Clinch River LF Client: AEP Data: Clinch River

Confidence Intervals - Rome Limestone - Significant Results

Clinch River LF Client: AEP Data: Clinch River Printed 8/12/2021, 10:24 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Cobalt total (mg/L)	MW-1607	0.01094	0.008281	0.006	Yes	17	0.009609	0.002121	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1606	0.08482	0.05328	0.04	Yes	17	0.06905	0.02517	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1607	0.1289	0.1181	0.04	Yes	17	0.1235	0.008647	0	None	No	0.01	Param.
Molybdenum total (mg/L)	MW-1607	0.1572	0.1314	0.1	Yes	17	0.1443	0.02057	0	None	No	0.01	Param.

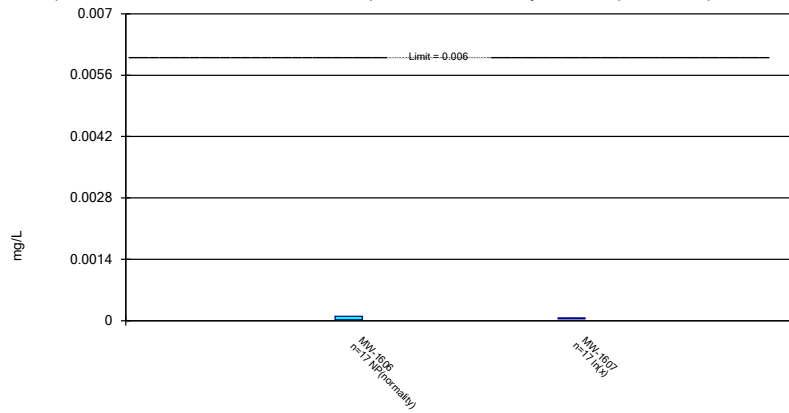
Confidence Intervals - Rome Limestone - All Results

Clinch River LF Client: AEP Data: Clinch River Printed 8/12/2021, 10:24 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony total (mg/L)	MW-1606	0.0001	0.00002	0.006	No	17	0.00005412	0.00003554	35.29	None	No	0.01	NP (normality)
Antimony total (mg/L)	MW-1607	0.00006145	0.00003722	0.006	No	17	0.00005176	0.00002243	5.882	None	ln(x)	0.01	Param.
Arsenic total (mg/L)	MW-1606	0.0105	0.00677	0.01	No	17	0.00822	0.002646	0	None	No	0.01	NP (normality)
Arsenic total (mg/L)	MW-1607	0.00159	0.00096	0.01	No	17	0.001575	0.001258	0	None	No	0.01	NP (normality)
Barium total (mg/L)	MW-1606	0.1181	0.1072	2	No	17	0.1121	0.009791	0	None	x^3	0.01	Param.
Barium total (mg/L)	MW-1607	0.0753	0.0698	2	No	17	0.07675	0.01763	0	None	No	0.01	NP (normality)
Beryllium total (mg/L)	MW-1606	0.0001	0.000006	0.004	No	17	0.00006706	0.00004599	64.71	None	No	0.01	NP (NDs)
Beryllium total (mg/L)	MW-1607	0.0001	0.000005	0.004	No	17	0.00009441	0.00002304	94.12	None	No	0.01	NP (NDs)
Cadmium total (mg/L)	MW-1606	0.00002	0.00001	0.005	No	17	0.00001388	0.000008139	47.06	None	No	0.01	NP (normality)
Cadmium total (mg/L)	MW-1607	0.0001731	0.0001046	0.005	No	17	0.0001388	0.00005464	0	None	No	0.01	Param.
Chromium total (mg/L)	MW-1606	0.000225	0.00014	0.1	No	17	0.0002259	0.0001058	0	None	No	0.01	NP (normality)
Chromium total (mg/L)	MW-1607	0.000216	0.000194	0.1	No	17	0.0002255	0.0001677	0	None	No	0.01	NP (normality)
Cobalt total (mg/L)	MW-1606	0.00567	0.004373	0.006	No	17	0.005021	0.001035	0	None	No	0.01	Param.
Cobalt total (mg/L)	MW-1607	0.01094	0.008281	0.006	Yes	17	0.009609	0.002121	0	None	No	0.01	Param.
Combined Radium 226 and 228 (pCi/L)	MW-1606	2.012	1.196	5.02	No	17	1.684	0.7204	0	None	ln(x)	0.01	Param.
Combined Radium 226 and 228 (pCi/L)	MW-1607	1.266	0.6276	5.02	No	17	0.9853	0.5798	0	None	sqrt(x)	0.01	Param.
Fluoride total (mg/L)	MW-1606	0.2305	0.179	4	No	17	0.2047	0.0411	0	None	No	0.01	Param.
Fluoride total (mg/L)	MW-1607	0.2427	0.2114	4	No	17	0.2271	0.02494	0	None	No	0.01	Param.
Lead total (mg/L)	MW-1606	0.0006221	0.0003645	0.015	No	17	0.0004933	0.0002055	0	None	No	0.01	Param.
Lead total (mg/L)	MW-1607	0.0006136	0.0004129	0.015	No	17	0.0005132	0.0001602	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1606	0.08482	0.05328	0.04	Yes	17	0.06905	0.02517	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1607	0.1289	0.1181	0.04	Yes	17	0.1235	0.008647	0	None	No	0.01	Param.
Mercury total (mg/L)	MW-1606	0.001	0.00006	0.002	No	17	0.0009447	0.000228	94.12	None	No	0.01	NP (NDs)
Mercury total (mg/L)	MW-1607	0.001	0.00008	0.002	No	17	0.0009459	0.0002231	94.12	None	No	0.01	NP (NDs)
Molybdenum total (mg/L)	MW-1606	0.07692	0.05203	0.1	No	17	0.06448	0.01987	0	None	No	0.01	Param.
Molybdenum total (mg/L)	MW-1607	0.1572	0.1314	0.1	Yes	17	0.1443	0.02057	0	None	No	0.01	Param.
Selenium total (mg/L)	MW-1606	0.0001286	0.00006665	0.05	No	17	0.0001065	0.00006451	11.76	None	ln(x)	0.01	Param.
Selenium total (mg/L)	MW-1607	0.0002374	0.0001013	0.05	No	17	0.0001953	0.000158	0	None	ln(x)	0.01	Param.
Thallium total (mg/L)	MW-1606	0.0005	0.00004	0.002	No	17	0.0003153	0.000228	58.82	None	No	0.01	NP (NDs)
Thallium total (mg/L)	MW-1607	0.0005	0.00003	0.002	No	17	0.0003106	0.0002341	58.82	None	No	0.01	NP (NDs)

Parametric and Non-Parametric (NP) Confidence Interval

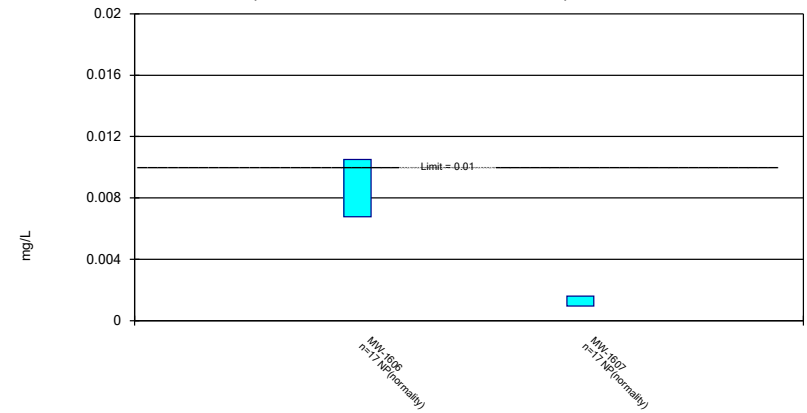
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Constituent: Antimony total Analysis Run 8/12/2021 10:22 AM View: Rome Limestone - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

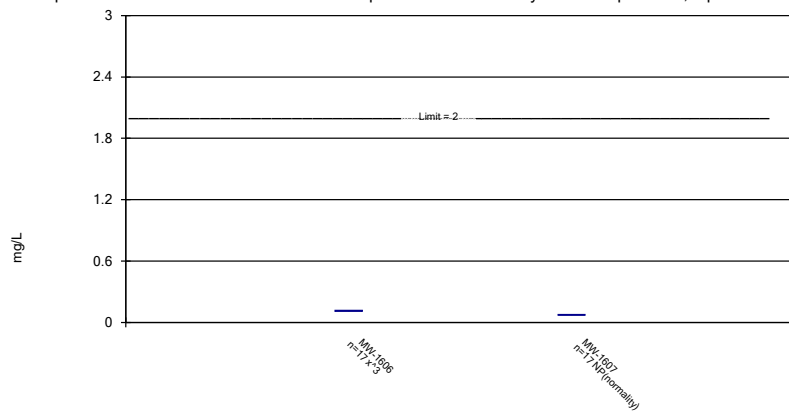
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Arsenic total Analysis Run 8/12/2021 10:22 AM View: Rome Limestone - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Parametric and Non-Parametric (NP) Confidence Interval

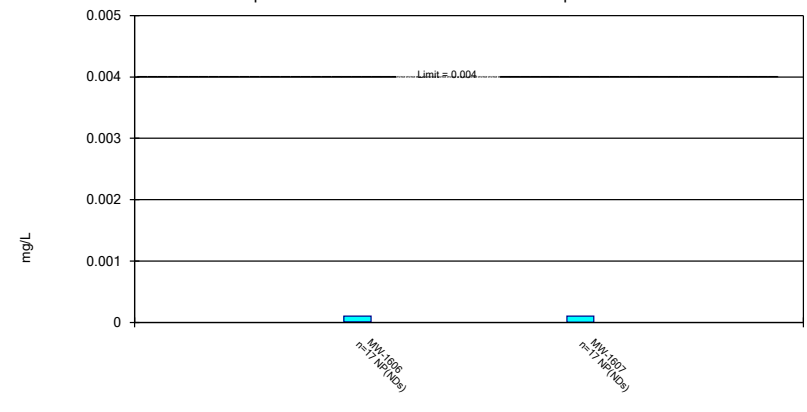
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Constituent: Barium total Analysis Run 8/12/2021 10:22 AM View: Rome Limestone - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

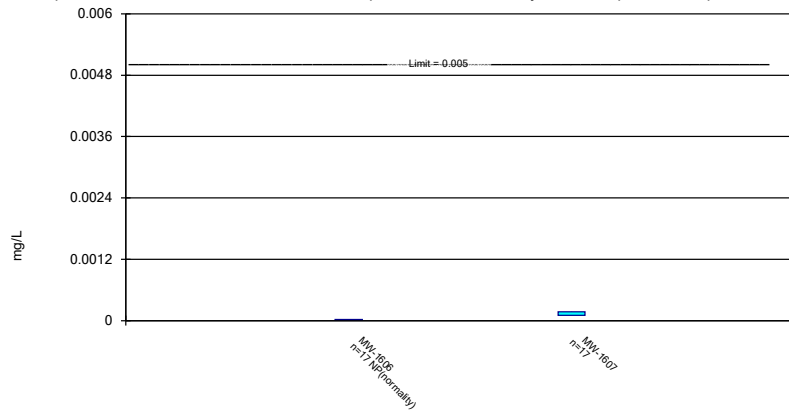
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Beryllium total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidence Clinch River LF Client: AEP Data: Clinch River

Parametric and Non-Parametric (NP) Confidence Interval

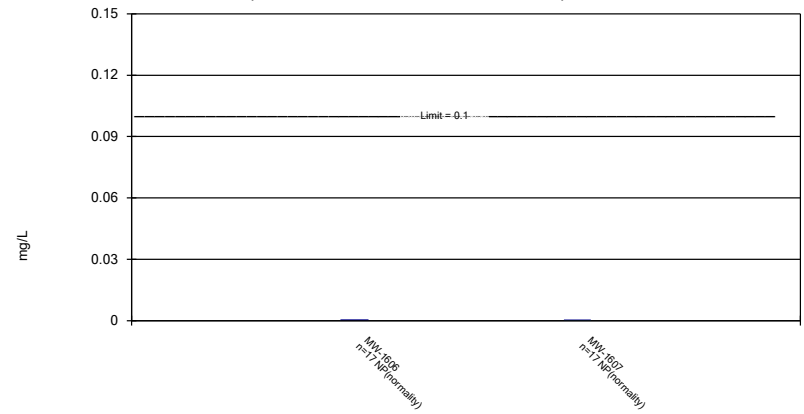
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

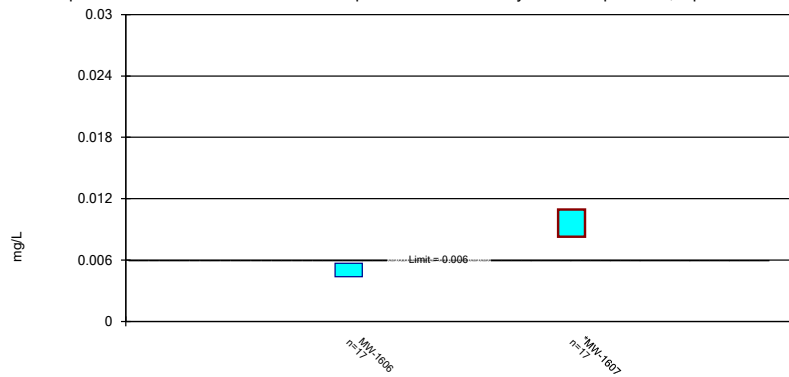
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Chromium total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

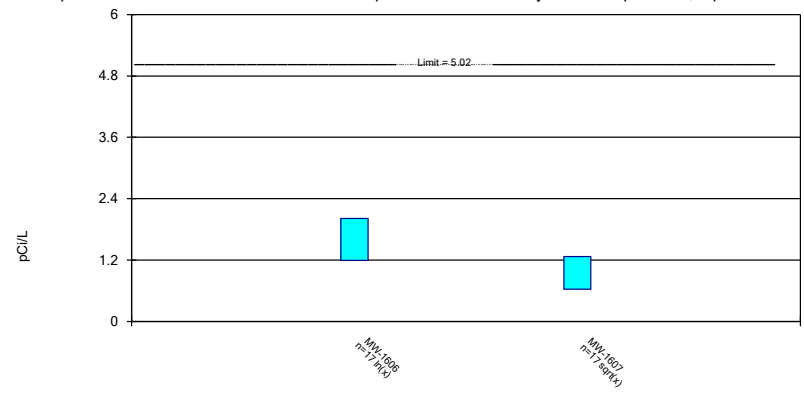
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

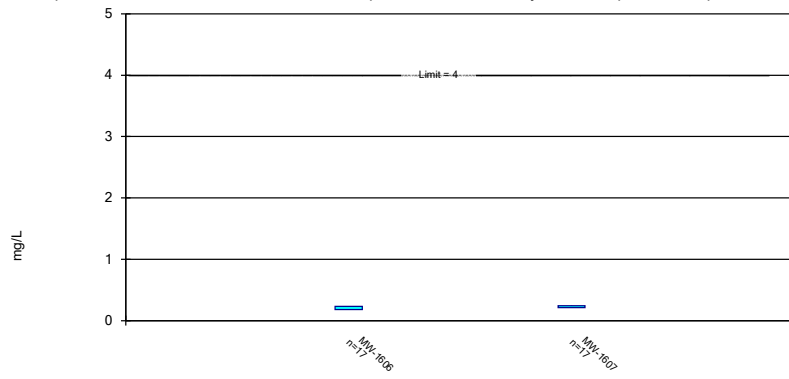
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 and 228 Analysis Run 8/12/2021 10:23 AM View: Rome Limestone -
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

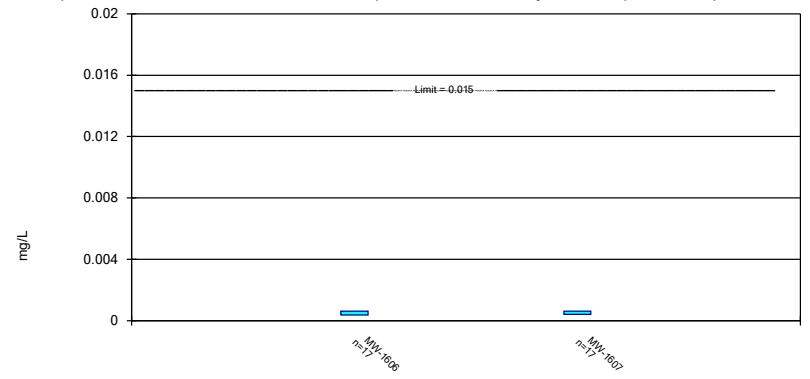
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

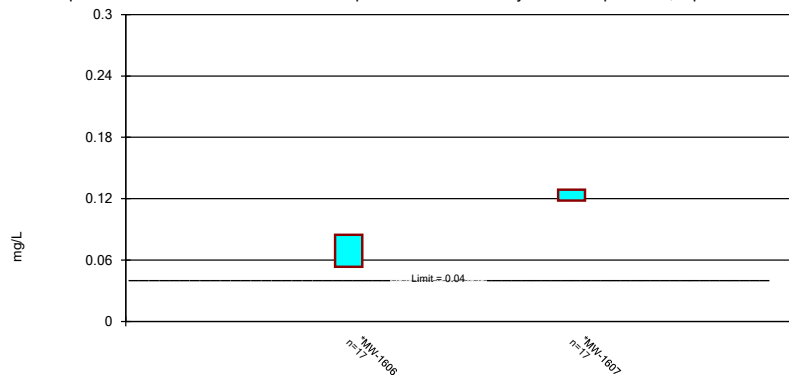
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidence Int
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

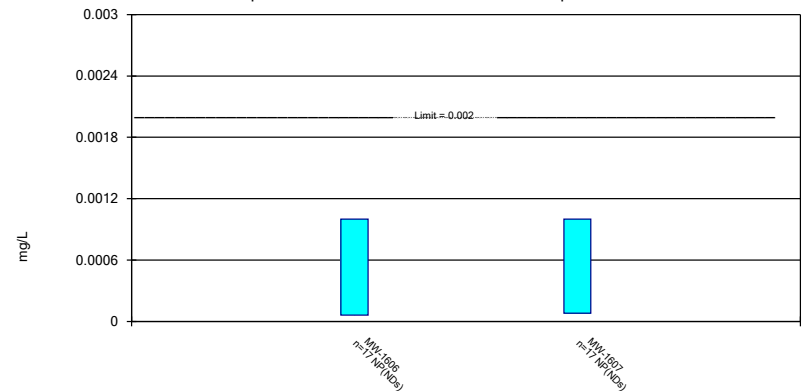
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidence I
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

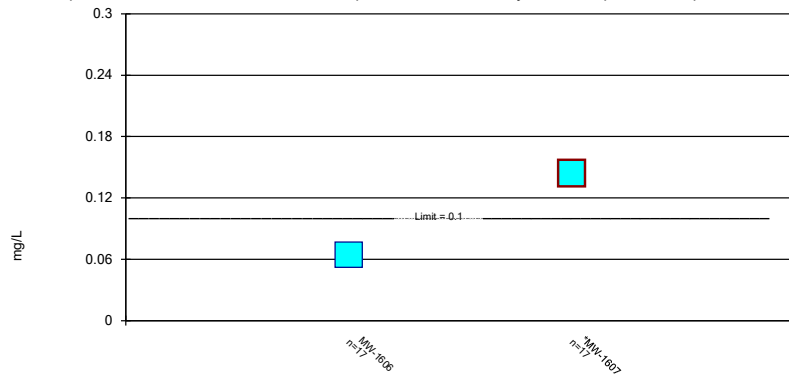
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

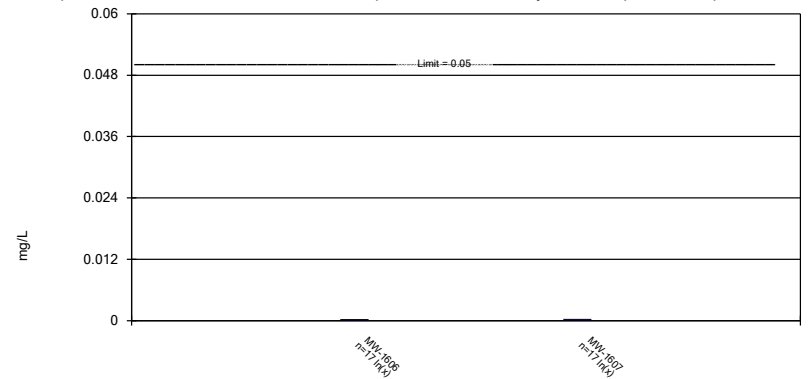
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confid
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

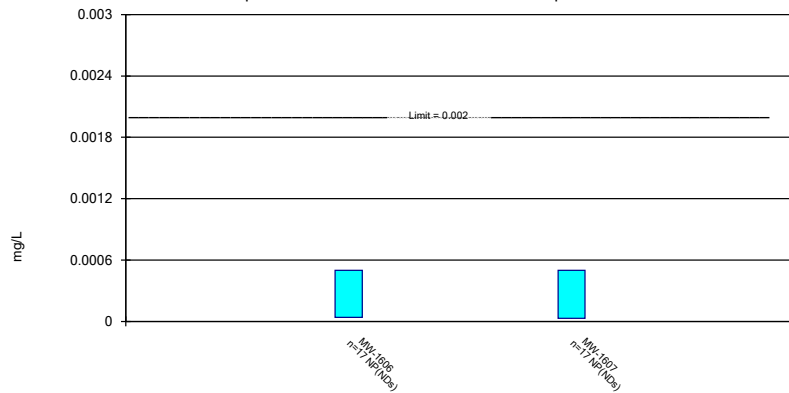
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidenc
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

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



Constituent: Thallium total Analysis Run 8/12/2021 10:23 AM View: Rome Limestone - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Confidence Intervals - Dumps Fault - Significant Results

Clinch River LF Client: AEP Data: Clinch River Printed 8/12/2021, 10:37 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig. N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt total (mg/L)	MW-1610	0.009629	0.006708	0.006	Yes 17	0.008169	0.002331	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1610	0.215	0.173	0.17	Yes 17	0.1974	0.04484	0	None	No	0.01	NP (normality)
Molybdenum total (mg/L)	MW-1610	0.182	0.139	0.1	Yes 17	0.1676	0.04884	0	None	No	0.01	NP (normality)

Confidence Intervals - Dumps Fault - All Results

Clinch River LF Client: AEP Data: Clinch River Printed 8/12/2021, 10:37 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony total (mg/L)	MW-1610	0.0002593	0.00004551	0.006	No	17	0.0002882	0.0004674	5.882	None	ln(x)	0.01	Param.
Arsenic total (mg/L)	MW-1610	0.00169	0.00124	0.048	No	17	0.001711	0.001125	0	None	No	0.01	NP (normality)
Barium total (mg/L)	MW-1610	0.2507	0.2037	2	No	17	0.2272	0.03753	0	None	No	0.01	Param.
Beryllium total (mg/L)	MW-1610	0.0001	0.000007	0.004	No	17	0.00007759	0.00004165	76.47	None	No	0.01	NP (NDs)
Cadmium total (mg/L)	MW-1610	0.00003	0.00001	0.005	No	17	0.00002059	0.00001435	41.18	None	No	0.01	NP (normality)
Chromium total (mg/L)	MW-1610	0.000262	0.000192	0.1	No	17	0.0002511	0.0001458	0	None	No	0.01	NP (normality)
Cobalt total (mg/L)	MW-1610	0.009629	0.006708	0.006	Yes	17	0.008169	0.002331	0	None	No	0.01	Param.
Combined Radium 226 and 228 (pCi/L)	MW-1610	1.369	0.7264	5	No	17	1.048	0.5126	0	None	No	0.01	Param.
Fluoride total (mg/L)	MW-1610	0.22	0.18	4	No	17	0.2129	0.04413	0	None	No	0.01	NP (normality)
Lead total (mg/L)	MW-1610	0.009748	0.004131	0.015	No	17	0.006939	0.004482	0	None	No	0.01	Param.
Lithium total (mg/L)	MW-1610	0.215	0.173	0.17	Yes	17	0.1974	0.04484	0	None	No	0.01	NP (normality)
Mercury total (mg/L)	MW-1610	0.001	0.00006	0.002	No	17	0.0009447	0.000228	94.12	None	No	0.01	NP (NDs)
Molybdenum total (mg/L)	MW-1610	0.182	0.139	0.1	Yes	17	0.1676	0.04884	0	None	No	0.01	NP (normality)
Selenium total (mg/L)	MW-1610	0.000383	0.0002135	0.05	No	17	0.0002982	0.0001353	0	None	No	0.01	Param.
Thallium total (mg/L)	MW-1610	0.0005	0.00002	0.002	No	17	0.0003306	0.0002365	64.71	None	No	0.01	NP (NDs)

Parametric Confidence Interval

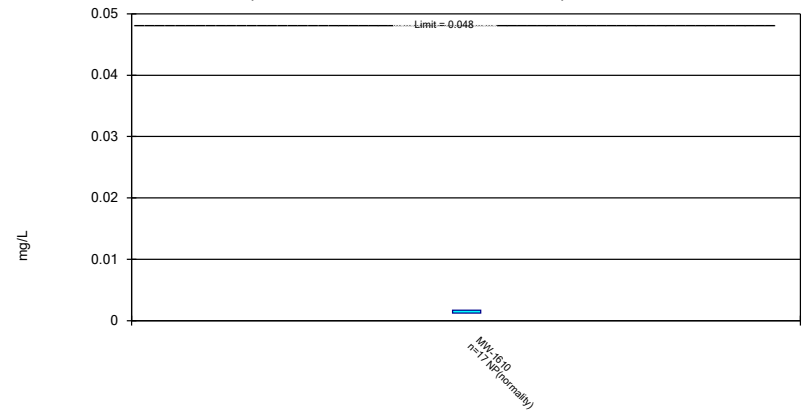
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Antimony total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Int Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

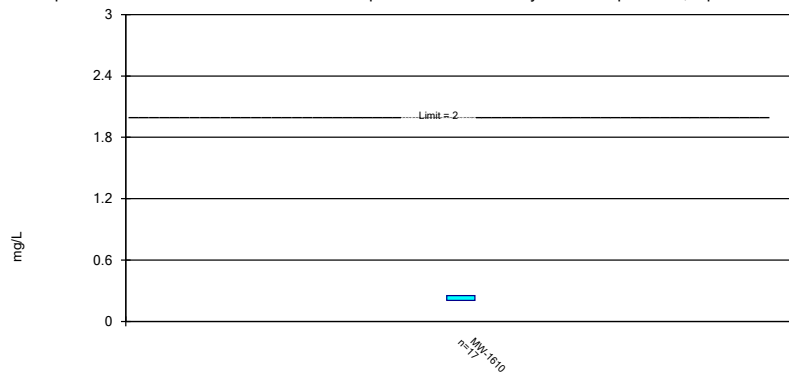
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Arsenic total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Inter Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

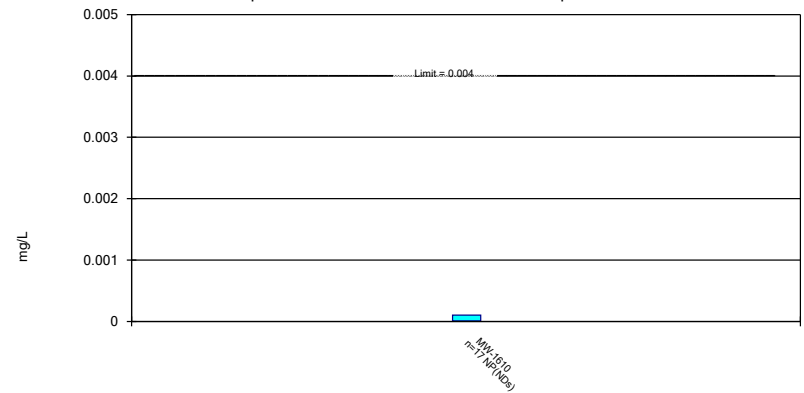
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Inter Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

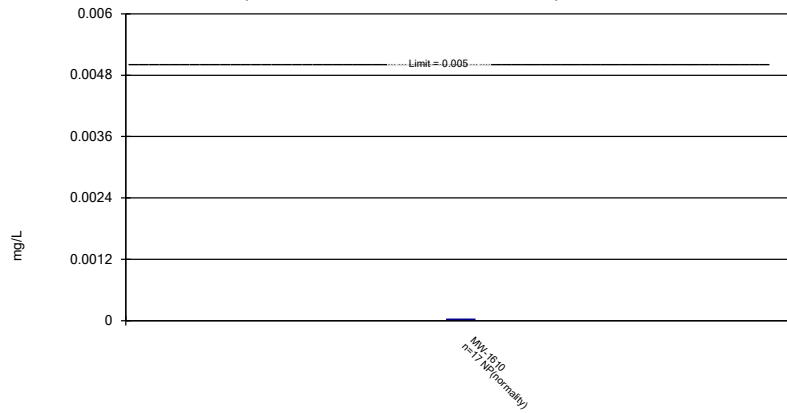
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Beryllium total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Inter Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

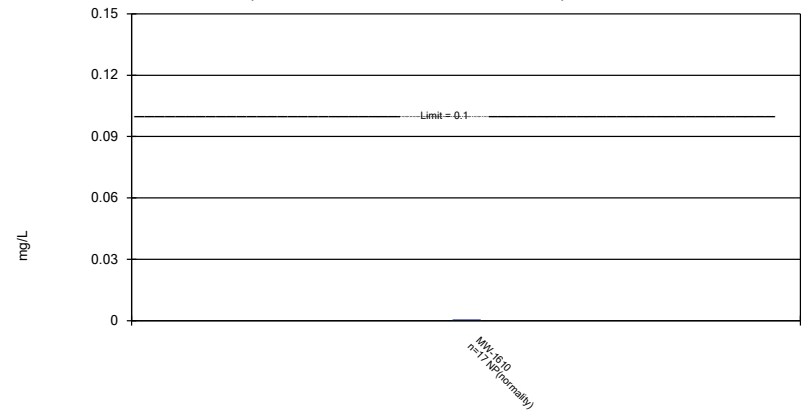
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cadmium total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Int Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

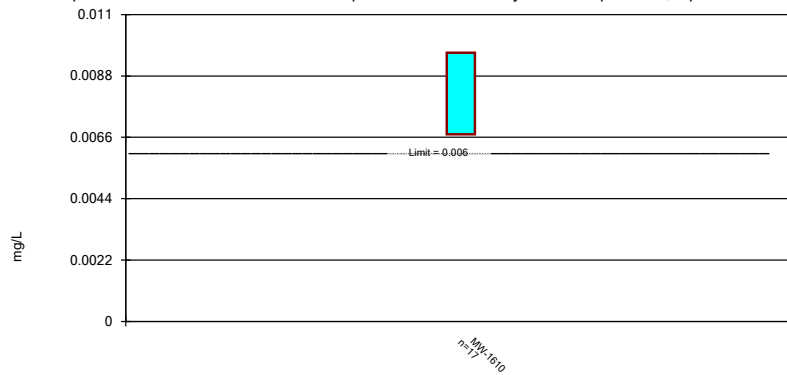
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Chromium total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Int Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

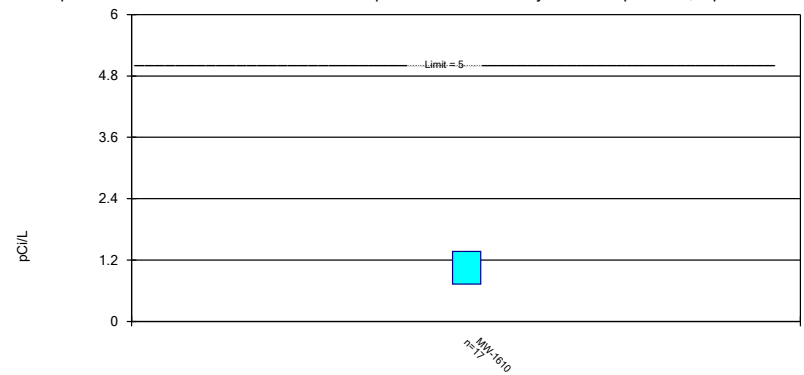
Compliance limit is exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Interv Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

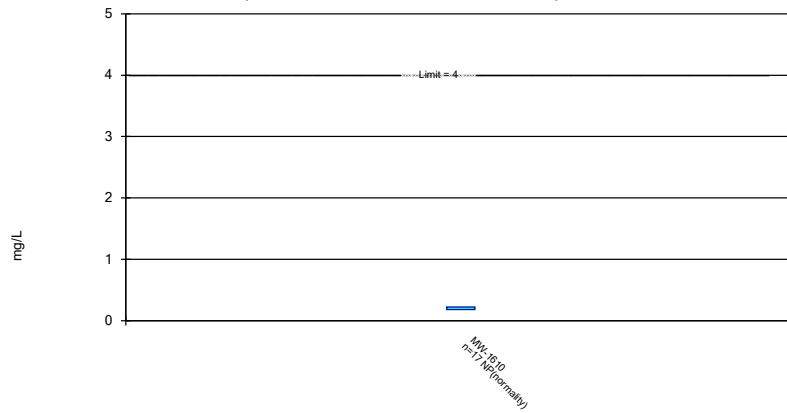
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 and 228 Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

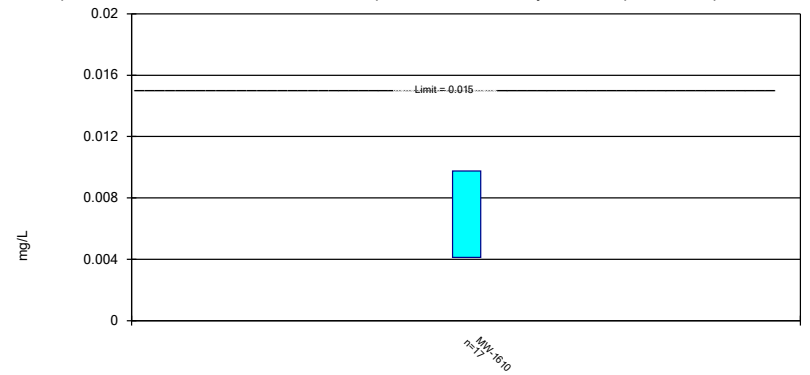
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Fluoride total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Inte
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

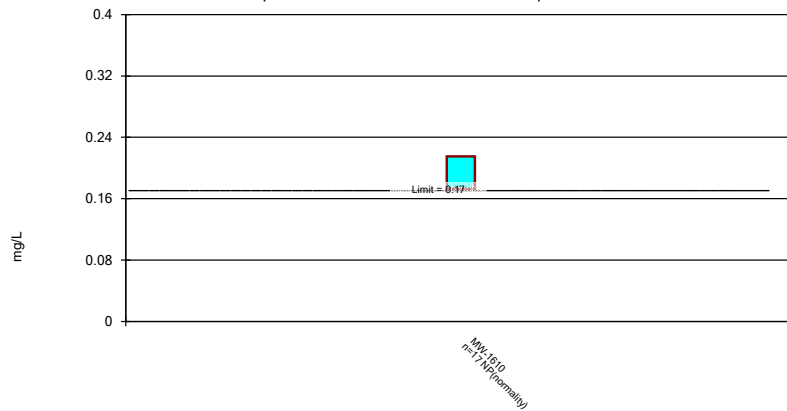
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Interval
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

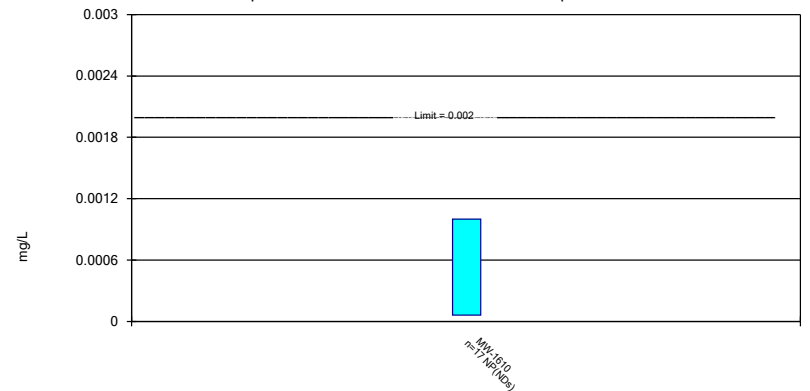
Compliance limit is exceeded. Per-well alpha = 0.01.



Constituent: Lithium total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Inter
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

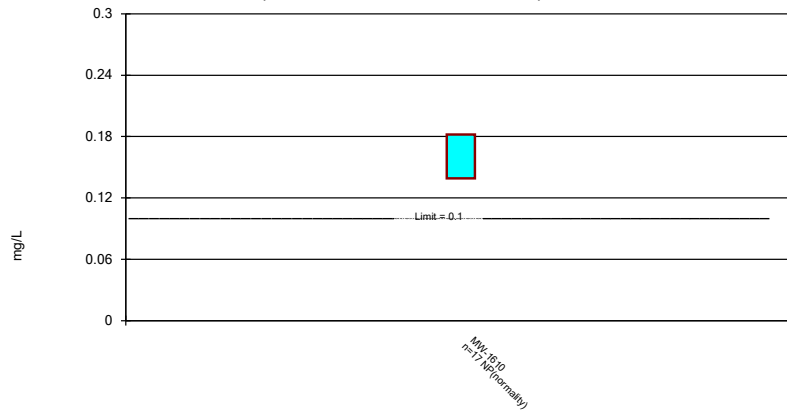
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Inte
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

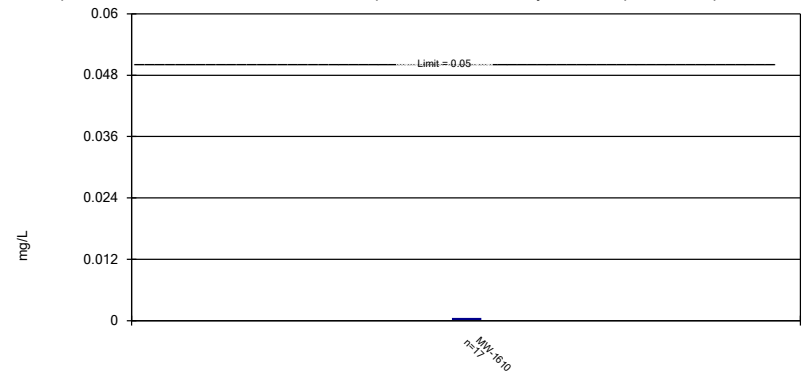
Compliance limit is exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence
Clinch River LF Client: AEP Data: Clinch River

Parametric Confidence Interval

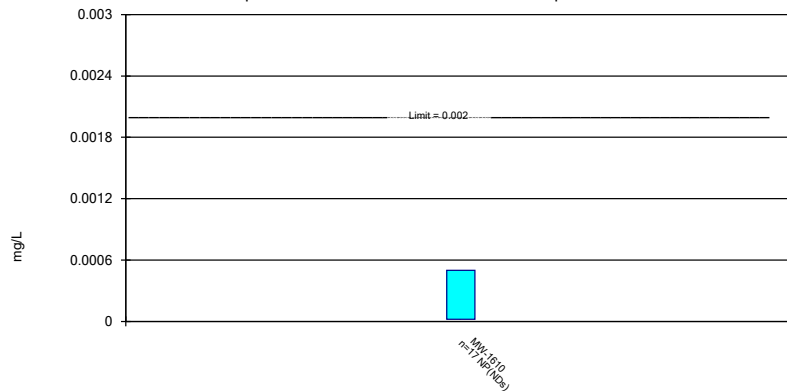
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Int
Clinch River LF Client: AEP Data: Clinch River

Non-Parametric Confidence Interval

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



Constituent: Thallium total Analysis Run 8/12/2021 10:34 AM View: Dumps Fault - Pond 1 Confidence Inte
Clinch River LF Client: AEP Data: Clinch River

APPENDIX 3 – Alternate Source Demonstrations

No new alternate source demonstrations have been completed as of January 31, 2022.

APPENDIX 4 – Notices for Monitoring Program Transitions

The notification that an assessment monitoring program and assessment of corrective measure was initiated follows.

Clinch River Plant
Notice of Assessment Monitoring Program Establishment
Pond 1 CCR Management Unit

On July 15, 2019, it was determined that Clinch River Plant's Pond 1 had statistically significant increases over background for calcium, chloride and sulfate and a statistically significant decrease for pH.

Clinch River Pond 1 was officially closed on August 6, 2018 under a Solid Waste Permit issued by Virginia Department of Environmental Quality. The State solid waste permit included a groundwater monitoring program that required the groundwater to be sampled and analyzed for Appendix III, Appendix IV and additional State parameters immediately following the collection of background. Under the State statistical methods, the statistical analysis of the first compliance sampling event indicated statistical significant increases above groundwater protection standards for cobalt, lithium, molybdenum, nickel, lead and barium. Nickel and lead are State-only parameters.

Based on the results of the State statistical analysis, Appalachian Power Company made the decision to statistically evaluate Appendix IV parameters during the first Federal CCR detection monitoring event. This evaluation following Federal statistical analysis methods, indicated statistical significant increases above groundwater protection standards for barium, cobalt, lithium and molybdenum. This evaluation can be found as Appendix 2 of the Annual Groundwater Report dated August 1, 2019.

At this point, no alternate source demonstration (ASD) for Appendix III parameters will be completed in accordance with §257.94(e)(2), prompting the initiation of an assessment monitoring program, which was established on July 15, 2019. Therefore this notice is being placed in the operating record in accordance with the requirement of 257.94(e)(3). If a successful ASD is completed for the Appendix IV exceedances then an ASD will be completed for the Appendix III parameters.

Clinch River Plant

Notice for Initiating an Assessment of Corrective Measures

CCR Unit – Pond 1

This notice is being provided, as required by 40 CFR 257.95(g)(5), that an Assessment of Corrective Measures was initiated on October 13, 2019 for Clinch River Plant's Pond 1 due to the statistically significant concentrations detected above the established groundwater protection standards for cobalt, lithium, molybdenum and barium.

APPENDIX 5 – Well Installation/Decommissioning Logs

No new wells were installed or decommissioned during the reporting period.