Annual Groundwater Monitoring and Corrective Action Report

Appalachian Power Company
Mountaineer Plant
Bottom Ash Pond Surface Impoundment
Letart, WV

January 31, 2025

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APPALACHIAN POWER℠
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BOUNDLESS ENERGY℠

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Abbreviations:
ACM – Assessment of Corrective Measures
ASD – Alternate Source Demonstration
BAP –Bottom Ash Pond
CAMP- Corrective Action Monitoring Plan
CCR – Coal Combustion Residual
GWPS – Groundwater Protection Standard
LCL - Lower Confidence Limit
UCL - Upper Confidence level
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 the Bottom Ash Pond (BAP) CCR unit at Appalachian Power Company's, a wholly owned subsidiary of American Electric Power Company (AEP), Mountaineer Power Plant. The USEPA's CCR rules require that the Annual Groundwater Monitoring and Corrective Action Report be posted to the operating record for the preceding year no later than January 31.

In general, the following activities were completed:

- At the start of the current annual reporting period, BAP was operating under the assessment monitoring program in §257.95 as required under §257.98.
- At the end of the current annual reporting period, the BAP was operating under the assessment monitoring program in §257.95 as required under §257.98.
- An assessment monitoring program for BAP was established on April 13, 2018, based on statistically significant increases (SSI) over background were determined.
- Statistically significant level (SSL) of lithium concentrations above groundwater protection standards (GWPS) were then observed on January 8, 2019. An Assessment of Corrective Measures (ACM) was initiated on March 26, 2019. The ACM was completed on June 24, 2019, and the public meeting to discuss the proposed remedies was held on August 22, 2019. The ACM was revised on November 30, 2020 per federal EPA comments received via conference call discussions.
- The BAP selected a final design and remedy for the groundwater corrective action on December 22, 2021. The BAP established and implemented the Corrective Action Monitoring Plan (CAMP) within 90 days of selecting a remedy.
- Remedial activities were ongoing during the current annual reporting period. Groundwater samples were collected in March, May, and October.
- Statistical analysis not available for the previous reporting period, for data collected during the October 2023 sampling event, identified the following SSIs above background:
    - Boron at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
    - Calcium at: MW-1604S, MW-1605D, MW-1606D, and MW-1607D.
    - Chloride at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
    - Fluoride at: MW-1606S and MW-1607D.
    - Sulfate at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, and MW-1607D.

    - TDS at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, and MW-1607D.

- Statistical analysis not available for the previous reporting period, for data collected during the October 2023 sampling event, identified the following SSL above the GWPS:
    - Under Corrective Measures Monitoring: the upper confidence level (UCL) for Lithium was exceeded at: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, MW-1607S, and at NES wells MW-1922S, MW-1923, MW-1924, and MW-1925.
    - Under Assessment monitoring: the Lower Confidence Limit (LCL) for arsenic was exceeded at NES wells MW-1805 and MW-1922D.
- The statistical analysis for the May 2024 monitoring event identified the following SSIs above the background:
    - Boron at; MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
    - Calcium at: MW-1604S and MW-1607D.
    - Chloride at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
    - Fluoride at: MW-1606D, MW-1606S, and MW-1607D.
    - Sulfate at: MW-1604S, MW-1605D, MW-1605S, and MW-1607D.
    - TDS at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1607D, and MW-1607S.
- The statistical analysis for the May 2024 monitoring event identified the following SSLs above the GWPS:
    - Under Corrective Measures Monitoring: the UCL for Lithium was exceeded at: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, MW-1607S; and at NES wells MW-1922S, MW-1923, MW-1924, and MW-1925.
    - Under Assessment monitoring: the LCL for Arsenic was exceeded at: NES wells MW-1805 and MW-1922D.
    - Under Assessment monitoring: the LCL for Molybdenum was exceed at: NES well MW-1923.
- Alternate source demonstrations (ASDs) were completed for the potential SSLs not included in the corrective measures**.**
- The October 2024 sampling event data are still undergoing statistical analysis.

The major components of this annual report, to the extent applicable, 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.
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened.
- All the monitoring data collected, including the rate and direction of groundwater flow, plus a summary showing the number of samples collected per monitoring well, the dates the samples were collected and whether the sample was collected as part of detection monitoring or assessment monitoring programs (**Appendix 1**).
- Statistical comparison of monitoring data to determine if there have been SSIs or SSLs (**Appendix 2**).
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (**Appendix 3**).
- A summary of any transition between monitoring programs or an alternate monitoring frequency (**Appendix 4**).
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened (**Appendix 5**).
- Corrective Action evaluation and other information required to be included in the annual report, 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

Figure 1 depicts the PE-certified groundwater monitoring network. The monitoring well distribution adequately covers downgradient and background areas as detailed in the *Ground Water Monitoring Well Network Evaluation* report that was placed in the AEP CCR public internet site on March 9, 2017. Additional wells shown in the figure were installed as part of the Nature and Extent Characterization study.

III. Monitoring Wells Installed or Decommissioned

No monitoring wells were installed or decommissioned in 2024.

IV. Groundwater Quality Data and Static Water Elevation Data and Flow Rate

Appendix 1 contains tables showing the groundwater quality data collected during the establishment of background quality, detection monitoring, assessment and corrective action monitoring. **Appendix 1** also has the groundwater velocity calculations, groundwater flow direction on the potentiometric maps developed after each sampling event. It is important to note that MW-1928 although installed, was unable to be sampled due to very low groundwater yield the first attempt and the monitoring well being dry and not recovering on the following attempts. Additionally, MW-112 also has low recovery and was not sampled during this reporting period.

V. Groundwater Quality Data Statistical Analysis

- Statistical analysis of the October 2023, 257.95(d)(1) sampling event resulted in SSIs above background and SSLs above the GWPS. A notice of this SSL was placed in the facility electronic operating record and on the publicly available internet site. The full statistical analysis report for this event is included in **Appendix 2**. The statistical analysis identified the following:
  - SSIs above background:
    - Boron at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
    - Calcium at: MW-1604S, MW-1605D, MW-1606D, and MW-1607D.
    - Chloride at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
    - Fluoride at: MW-1606S and MW-1607D.
    - Sulfate at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, and MW-1607D.
    - TDS at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, and MW-1607D.
  - SSL above the GWPS:
    - Under Corrective Measures Monitoring: the UCL for Lithium was exceeded at: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, MW-1607S and at NES wells MW-1922S, MW-1923, MW-1924, and MW-1925.

        - Under Assessment monitoring: the LCL for arsenic was exceeded at NES wells MW-1805 and MW-1922D.

- Groundwater sampling to address the requirements of 40 CFR 257.95(b) were conducted March 12, 2024.
- Statistical analysis of the May 2024 corrective action (40 CFR 257.98(a)(1)) sampling event resulted in SSIs above background and SSLs above the GWPS. A notice of this SSL was placed in the facility electronic operating record and on the publicly available internet site. The full statistical analysis report for this event is included in **Appendix 2**. The statistical analysis identified the following:
    - SSIs above the background:
        - Boron at; MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
        - Calcium at: MW-1604S and MW-1607D.
        - Chloride at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
        - Fluoride at: MW-1606D, MW-1606S, and MW-1607D.
        - Sulfate at: MW-1604S, MW-1605D, MW-1605S, and MW-1607D.
        - TDS at: MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1607D, and MW-1607S.
    - SSLs above the GWPS:
        - Under Corrective Measures Monitoring: the UCL for Lithium was exceeded at: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, MW-1607S; at NES wells MW-1922S, MW-1923, MW-1924, and MW-1925.
        - Under Assessment monitoring: the LCL for Arsenic was exceeded at: NES wells MW-1805 and MW-1922D.
        - Under Assessment monitoring: the LCL for Molybdenum was exceed at: NES well MW-1923.

VI. Alternative Source Demonstrations

Successful ASDs was completed for arsenic GWPS exceedance from the October 2023 and the arsenic and molybdenum GWPS exceedances from the May 2024 sampling events and are included in **Appendix 3**.

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

The Mountaineer BAP CCR Unit transitioned from the Assessment Monitoring program to the Assessment of Corrective Measures program on March 26, 2019 due to the SSL above a GWPS for Lithium on January 8, 2019. The notice for initiating assessment of corrective measures was posted on the publicly available internet site (April 25, 2019). The selection of remedy report can also be found on the publicly available internet site.

Regarding defining an alternate monitoring frequency, the groundwater velocity and monitoring well production is high enough at this facility that no modification to the monitoring frequency is needed.

VIII. Corrective Action and Other Required Information

SSLs of lithium above the groundwater protection standard in some of the compliance monitoring wells were observed on January 8, 2019. 40 CFR §257.96(a) requires that an owner or operator initiate an ACM to prevent further release, to remediate any releases, and to restore impacted areas to original conditions.

The nature and extent of lithium contamination in groundwater relative to GWPS (40 ug/L) has been defined per the 40 CFR 257 requirements based on the site-specific hydrogeology. The presence of nearby surface water body as well as the unimpacted background monitoring wells provide the boundaries for the extent of the GWPS exceedance.

An ACM was initiated on March 26, 2019, was completed on June 24, 2019, and the public meeting to discuss the proposed remedies was held on August 22, 2019.

Two semi-annual reports describing the progress in selecting and designing the remedy were completed in March and September of 2020 and 2021. The ACM was revised on November 30, 2020, per federal EPA comments received via conference call discussions. The selection of remedy was completed on December 22, 2021. The remedy was initiated within 90 days of selection. The corrective action monitoring program was established and implemented within 90 days of selecting the remedy.

The selected final design and remedy for the groundwater corrective action was completed on December 22, 2021. The selected remedy was source removal (closure by removal) and utilization of a hydraulic containment system (HCS). The CAMP for the BAP was established and implemented the within 90 days of selecting a remedy.

Source Removal and Disposal:

Ash and impacted soil removal activities as outlined in the most recent closure plan were completed in 2023, eliminating future mass flux of lithium to groundwater.

Hydraulic Containment System:

The hydraulic control system (HCS) for the Site is designed to maintain hydraulic capture of impacted groundwater. The table below provides a summary of groundwater extracted during this reporting period.

Extraction Well	Gallons of GW Extracted in 2024
Well #4	17,810,201
Well #5	50,503,200
Well #6	11,440,740
East Well	147,939,115
West Well	204,777,834

The potentiometric maps depict the hydraulic capture of potential contaminated groundwater. Note: The plant groundwater extraction wells were not operational during the 2H24 gauging and sampling event.

Graphs and trend analysis of the lithium concentration over time are presented within the statistical analyses' reports located in the appendix. Based on a review of the time series graphs, compliance wells pairs MWs 1605S/D and 1606S/D show decreasing trends for lithium while monitoring well pairs MWs-1607S/D appear to be stable.

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 this annual groundwater report preparation.

X. A Projection of Key Activities for the Upcoming Year

Key activities for the upcoming year include:

- Continue the HCS remedy for groundwater corrective actions;
- Continue to implement the most recent CAMP;
- Respond to any new data received considering what the CCR rule requires; and
- Preparation of the next annual groundwater report.

Monitoring Well Network

- ✦ Compliance Sampling Location
- ✦ Background Sampling Location
- ✦ Nature and Extent Wells
- ▭ Bottom Ash Ponds

Notes

- Monitoring well coordinates provided by AEP.
- Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.

Site Layout
Former CCR Bottom Ash Ponds
AEP Mountaineer Generating Plant
Letart, West Virginia

Geosyntec consultants

Columbus, Ohio
2020/01/24

Figure
1

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\AEP-Mountaineer_BAP_Site_Layout.mxd. ARevezzo. 1/24/2020. CHA8423/07/08.

APPENDIX 1

Tables and figures that follow show the groundwater monitoring data collected, and the rate and direction of groundwater flow.

Table 1. Groundwater Data Summary: JTMN-1
Mountaineer - BAP
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
3/31/2021	Assessment	0.295	149	42.3	0.31	7.2	255	716
5/20/2021	Assessment	0.249	142	37.6	0.26	6.7	217	670
10/27/2021	Assessment	0.335	164	50.4	0.34	7.0	342	840
3/3/2022	Corrective Action	0.266	172	47.2	0.29	7.2	294	740
5/24/2022	Corrective Action	0.302	188	46.9	0.29	7.3	304	780 L1
11/3/2022	Corrective Action	0.332	219 M1, P3	62.3	0.26	6.9	453	1,010
2/14/2023	Corrective Action	0.292	179	52.2	0.25	7.0	354	840
5/24/2023	Corrective Action	0.257	150	48.0	0.21	7.0	325	820
10/31/2023	Corrective Action	0.332	219	58.3	0.26	7.0	442	1,000
5/20/2024	Corrective Action	0.252	147	38.3	0.22	7.0	260	740
10/23/2024	Corrective Action	0.348	180	59.3	0.28	7.0	460	1,050

Table 1. Groundwater Data Summary: JTMN-1
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
3/31/2021	Assessment	0.1 J1	2.16	89.1	0.07 J1	0.03 J1	2.82	2.07	0.686	0.31	2.13	0.00594	0.003 J1	6.59	0.7	< 0.04 U1
5/20/2021	Assessment	0.14	1.46	84.6	0.032 J1	0.114	1.36	1.31	0.65	0.26	1.28	0.00370	< 0.002 U1	3.2	1.19	< 0.04 U1
10/27/2021	Assessment	0.08 J1	2.52	85.9	0.063	0.029	1.72	2.77	0.84	0.34	2.36	0.0127	0.003 J1	17.1	0.50	0.04 J1
3/3/2022	Corrective Action	0.04 J1	0.88	67.1	0.015 J1	0.021	0.88	0.674	1.25	0.29	0.59	0.00948	< 0.002 U1	13.0	0.89	< 0.04 U1
5/24/2022	Corrective Action	0.07 J1	2.02	94.7	0.041 J1	0.028	1.48	1.95	0.68	0.29	1.78	0.0113	0.003 J1	15.0	1.33	< 0.04 U1
11/3/2022	Corrective Action	0.09 J1	2.38	102 P3	0.065	0.038	2.45	2.44	2.04	0.26	2.46	0.0118	0.005	11.7	0.54	< 0.04 U1
2/14/2023	Corrective Action	0.03 J1	0.59	66.6	0.011 J1	0.018 J1	0.67	0.449	0.35	0.25	0.48	0.00787	< 0.002 U1	8.0	0.54	< 0.04 U1
5/24/2023	Corrective Action	0.045 J1	0.58	57.5	0.01 J1	0.017 J1	0.61	0.367	0.31	0.21	0.41	0.00620	< 0.002 U1	5.9	0.65	< 0.02 U1
10/31/2023	Corrective Action	0.045 J1	0.97	67.6	0.026 J1	0.023	1.01	0.953	1.03	0.26	0.90	0.0108	< 0.002 U1	12.4	0.48 J1	0.04 J1
5/20/2024	Corrective Action	0.036 J1	0.82	55.2	0.019 J1	0.015 J1	1.09	0.719	1.40	0.22	0.75	0.00704	0.003 J1	5.5	0.97	0.02 J1
10/23/2024	Corrective Action	0.043 J1	0.91	63.9	0.022 J1	0.019 J1	0.93	0.893	0.73	0.28	1.03	0.016	0.002 J1	11.9	0.45 J1	0.02 J1

Table 1. Groundwater Data Summary: JTMN-2
Mountaineer - BAP
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
3/31/2021	Assessment	0.378	178	54.0	0.36	7.2	392	862
5/20/2021	Assessment	0.289	142	35.0	0.26	6.6	186	690
10/27/2021	Assessment	0.407	185	59.3	0.41	--	420	940
10/28/2021	Assessment	--	--	--	--	7.2	--	--
3/3/2022	Corrective Action	0.230	165	43.2	0.22	7.1	262	700
5/24/2022	Corrective Action	0.364	182	48.2	0.41	7.5	304	770 L1
11/3/2022	Corrective Action	0.372	214	61.4	0.31	6.9	456	1,060
2/14/2023	Corrective Action	0.262	153	45.7	0.25	6.8	294	750
5/25/2023	Corrective Action	0.372	195	63.6	0.38	7.3	484	1,000
11/1/2023	Corrective Action	0.319	190	55.6	0.27	6.9	410	930 S7
5/21/2024	Corrective Action	0.252	146	46.3	0.21	6.7	308	750
10/22/2024	Corrective Action	0.378	226	64.4	0.40	7.2	521	1,150

Table 1. Groundwater Data Summary: JTMN-2
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
3/31/2021	Assessment	0.06 J1	1.09	87.1	0.03 J1	0.04 J1	1.27	1.24	0.27	0.36	0.775	0.0151	< 0.002 U1	20.0	0.6	< 0.04 U1
5/20/2021	Assessment	0.14	0.83	90.6	0.019 J1	0.052	0.67	0.826	0.42	0.26	0.66	0.00934	< 0.002 U1	10.7	1.05	< 0.04 U1
10/27/2021	Assessment	0.05 J1	0.79	68.3	0.021 J1	0.036	0.86	0.928	3.42	0.41	0.58	0.0225	< 0.002 U1	30.8	0.36 J1	< 0.04 U1
3/3/2022	Corrective Action	0.05 J1	1.08	91.5	0.029 J1	0.031	1.52	0.938	1.12	0.22	0.79	0.00586	0.002 J1	5.5	0.96	< 0.04 U1
5/24/2022	Corrective Action	0.06 J1	0.94	71.3	0.019 J1	0.014 J1	0.89	0.688	0.37	0.41	0.58	0.0208	0.004 J1	33.2	0.81	< 0.04 U1
11/3/2022	Corrective Action	0.07 J1	1.33	85.7	0.045 J1	0.034	1.78	1.47	1.64	0.31	1.13	0.0198	0.008	22.7	0.54	< 0.04 U1
2/14/2023	Corrective Action	0.03 J1	0.51	89.4	0.011 J1	0.038	0.65	0.299	0.78	0.25	0.24	0.00748	< 0.002 U1	7.5	0.56	< 0.04 U1
5/25/2023	Corrective Action	0.043 J1	0.55	61.6	0.012 J1	0.022	0.64	0.578	1.14	0.38	0.33	0.0224	< 0.002 U1	29.4	0.24 J1	< 0.02 U1
11/1/2023	Corrective Action	0.042 J1	0.86	83.0	0.025 J1	0.038	1.26	0.737	1.29	0.27	0.63	0.0134	< 0.002 U1	14.3	0.39 J1	0.03 J1
5/21/2024	Corrective Action	0.042 J1	0.79	81.2	0.021 J1	0.024	1.14	0.709	0.87	0.21	0.61	0.00620	< 0.002 U1	7.6	1.05	< 0.02 U1
10/22/2024	Corrective Action	0.027 J1	0.49	48.8	0.011 J1	0.014 J1	0.61	0.488	0.73	0.40	0.33	0.031	< 0.002 U1	28.7	0.30 J1	0.03 J1

Table 1. Groundwater Data Summary: MW-016
Mountaineer - BAP
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
9/11/2019	Assessment	1.87	230	64.4	0.21	7.3	545	1,240
3/11/2020	Assessment	--	--	--	0.23	7.2	--	--
5/13/2020	Assessment	2.28	204	64.2	0.26	7.2	530	1,210
10/9/2020	Assessment	1.79	228	56.7	0.23	7.1	542	1,220
3/24/2021	Assessment	1.79	224	67.0	0.27	7.5	521	1,050
5/19/2021	Assessment	1.65	195	73	0.26	7.3	495	1,090
10/28/2021	Assessment	1.54	203	64.0	0.27	7.3	470	1,060
3/2/2022	Corrective Action	1.43 P3	221 M1	72.0	0.25	7.4	476	1,010
5/17/2022	Corrective Action	1.45	197	77.8	0.24	7.3	458	1,010 L1
11/7/2022	Corrective Action	1.32	213	70.8	0.25	7.3	454	1,060
2/16/2023	Corrective Action	1.25	205	73.9	0.23	7.3	481	1,040
5/25/2023	Corrective Action	1.09	189	80.0	0.24	7.3	485	1,040
10/30/2023	Corrective Action	1.13	200	73.8	0.25	7.3	472	920
5/20/2024	Corrective Action	0.895	193	68.1	0.23	7.3	464	980
10/21/2024	Corrective Action	0.890	181	69.0	0.28	7.3	442	1,020

Table 1. Groundwater Data Summary: MW-016
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/11/2019	Assessment	0.04 J1	4.55	48.7	0.04 J1	0.04 J1	1.47	1.90	2.17	0.21	1.28	0.0348	< 0.002 U1	36.8	0.2	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	8.51	39.1	< 0.02 U1	0.02 J1	0.728	1.64	2.23	0.23	0.459	0.0345	< 0.002 U1	40.5	0.1 J1	< 0.1 U1
5/13/2020	Assessment	0.04 J1	4.02	28.7	--	0.03 J1	0.423	1.42	0.577	0.26	0.260	0.0338	--	39.0	0.2 J1	< 0.1 U1
10/9/2020	Assessment	0.04 J1	4.10	22.6	--	< 0.01 U1	0.363	1.12	0.548	0.23	0.1 J1	0.0305	< 0.002 U1	37.3	0.09 J1	< 0.1 U1
3/24/2021	Assessment	0.02 J1	4.11	23.2	< 0.007 U1	0.02 J1	0.2 J1	1.07	0.951	0.27	< 0.05 U1	0.0289	< 0.002 U1	36.3	0.2 J1	< 0.04 U1
5/19/2021	Assessment	0.09 J1	3.07	23.9	< 0.007 U1	0.021	0.26	0.92	1.41	0.26	0.17 J1	0.0284	< 0.002 U1	32.1	0.14 J1	< 0.04 U1
10/28/2021	Assessment	< 0.02 U1	3.55	23.9	< 0.007 U1	0.018 J1	0.33	1.17	0.44	0.27	0.17 J1	0.0293	< 0.002 U1	40.2	< 0.09 U1	< 0.04 U1
3/2/2022	Corrective Action	< 0.02 U1	3.47	24.2	< 0.007 U1	0.019 J1	0.47	1.06	0.89	0.25	0.05 J1	0.0252	< 0.002 U1	35.5	0.19 J1	< 0.04 U1
5/17/2022	Corrective Action	0.04 J1	2.45	24.2	< 0.007 U1	0.022	0.27	1.05	1.42	0.24	0.06 J1	0.0304	< 0.002 U1	36.3	0.13 J1	< 0.04 U1
11/7/2022	Corrective Action	0.05 J1	4.31	24.6	< 0.007 U1	0.012 J1	0.45	1.88	1.35	0.25	0.07 J1	0.0291	< 0.002 U1	36.3	0.10 J1	< 0.04 U1
2/16/2023	Corrective Action	< 0.02 U1	2.89	25.1	< 0.007 U1	0.022	0.41	1.03	0.98	0.23	0.09 J1	0.0249	< 0.002 U1	36.0	0.12 J1	< 0.04 U1
5/25/2023	Corrective Action	0.028 J1	2.58	22.1	< 0.007 U1	0.011 J1	0.23 J1	1.02	2.00	0.24	0.06 J1	0.0262	< 0.002 U1	35.7	0.1 J1	< 0.02 U1
10/30/2023	Corrective Action	0.014 J1	2.60	25.2	< 0.007 U1	0.019 J1	0.41	1.04	1.01	0.25	0.12 J1	0.0244	< 0.002 U1	34.0	0.14 J1	< 0.02 U1
5/20/2024	Corrective Action	0.013 J1	1.62	22.8	< 0.007 U1	0.015 J1	0.32	0.903	1.35	0.23	< 0.05 U1	0.0232	< 0.002 U1	31.1	0.15 J1	< 0.02 U1
10/21/2024	Corrective Action	< 0.008 U1	2.37	20.3	< 0.007 U1	0.010 J1	0.21 J1	1.03	0.10	0.28	< 0.05 U1	0.028	< 0.002 U1	32.4	0.12 J1	< 0.02 U1

Table 1. Groundwater Data Summary: MW-107
Mountaineer - BAP
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
6/18/2018	Assessment	--	--	--	--	6.8	--	--
4/10/2019	Assessment	0.614	270	71.4	0.21	6.8	518	1,270
6/18/2019	Assessment	0.592	245	71.7	0.22	--	545	1,250
9/10/2019	Assessment	0.696	316	79.7	0.19	7.1	631	1,410
3/10/2020	Assessment	--	--	--	0.25	--	--	--
5/13/2020	Assessment	0.579	239	66.5	0.26	6.7	555	1,240
10/6/2020	Assessment	0.560	179	46.1	0.25	6.6	301	845
3/23/2021	Assessment	0.757	225	48.5	0.25	7.1	454	1,060
5/18/2021	Assessment	0.684	204	51.8	0.25	6.8	418	1,020
10/27/2021	Assessment	0.491	185	48.6	0.21	6.8	273	850
3/1/2022	Corrective Action	0.872	300	76.4	0.22	7.0	683	1,440
5/17/2022	Corrective Action	0.952	338	74.3	0.22	6.9	666	1,460 L1
11/1/2022	Corrective Action	0.508	151	32.5	0.20	6.8	245	730
2/13/2023	Corrective Action	0.786	169	36.0	0.21	7.0	316	860
5/23/2023	Corrective Action	0.632	171	46.5	0.21	6.9	426	1,040
10/26/2023	Corrective Action	0.583	196	40.1	0.22	6.8	299	870
5/17/2024	Corrective Action	0.766	282	90.8	0.21	6.9	712	1,530
10/21/2024	Corrective Action	0.599	209	66.0	0.21	6.8	414	1,100

Table 1. Groundwater Data Summary: MW-107
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	< 0.1 U1	1.08	68.3	< 0.1 U1	0.05 J1	0.4 J1	1.03	1.854	0.21	0.4 J1	0.02 J1	< 0.002 U1	< 2 U1	0.7 J1	< 0.5 U1
6/18/2019	Assessment	0.03 J1	0.44	69.4	< 0.02 U1	0.05	0.08 J1	1.45	0.2284	0.22	0.04 J1	< 0.009 U1	< 0.002 U1	< 0.4 U1	0.6	< 0.1 U1
9/10/2019	Assessment	0.02 J1	0.44	67.8	< 0.02 U1	0.04 J1	0.07 J1	1.08	3.50	0.19	< 0.05 U1	0.00358	< 0.002 U1	< 0.4 U1	0.8	< 0.1 U1
3/10/2020	Assessment	< 0.02 U1	0.42	48.2	< 0.02 U1	0.03 J1	0.1 J1	0.741	0.161	0.25	< 0.05 U1	0.00410	< 0.002 U1	< 0.4 U1	0.7	< 0.1 U1
5/13/2020	Assessment	0.03 J1	0.59	48.1	--	0.07	0.2 J1	1.90	0.524	0.26	< 0.05 U1	0.00336	--	0.7 J1	0.5	< 0.1 U1
10/6/2020	Assessment	< 0.02 U1	0.34	35.4	--	0.02 J1	0.548	0.219	1.111	0.25	< 0.05 U1	0.00308	< 0.002 U1	< 0.4 U1	1.0	< 0.1 U1
3/23/2021	Assessment	0.03 J1	0.33	42.4	< 0.007 U1	0.03 J1	0.355	0.154	0.1427	0.25	< 0.05 U1	0.00370	< 0.002 U1	0.7 J1	0.4	< 0.04 U1
5/18/2021	Assessment	0.06 J1	0.25	39.0	< 0.007 U1	0.031	0.20	0.169	0.41	0.25	< 0.05 U1	0.00350	< 0.002 U1	0.2 J1	0.47 J1	< 0.04 U1
10/27/2021	Assessment	< 0.02 U1	0.30	37.1	< 0.007 U1	0.024	0.58	0.269	0.81	0.21	< 0.05 U1	0.00357	< 0.002 U1	0.6	0.97	< 0.04 U1
3/1/2022	Corrective Action	0.02 J1	0.42	52.1	< 0.007 U1	0.031	0.35	0.821	0.77	0.22	< 0.05 U1	0.00451	< 0.002 U1	0.2 J1	0.48 J1	< 0.04 U1
5/17/2022	Corrective Action	0.02 J1	0.37	50.9	< 0.007 U1	0.035	0.64	0.734	1.22	0.22	< 0.05 U1	0.00486	< 0.002 U1	1.7	0.48 J1	< 0.04 U1
11/1/2022	Corrective Action	0.02 J1	0.29	32.4	< 0.007 U1	0.015 J1	0.33	0.080	0.33	0.20	< 0.05 U1	0.00331	< 0.002 U1	0.1 J1	0.49 J1	< 0.04 U1
2/13/2023	Corrective Action	0.02 J1	0.29	33.6	< 0.007 U1	0.022	0.27	0.209	0.35	0.21	< 0.05 U1	0.00389	< 0.002 U1	0.2 J1	0.43 J1	< 0.04 U1
5/23/2023	Corrective Action	0.024 J1	0.27	33.5	< 0.007 U1	0.024	0.25 J1	0.331	0.78	0.21	< 0.05 U1	0.00340	< 0.002 U1	0.3 J1	0.24 J1	< 0.02 U1
10/26/2023	Corrective Action	0.019 J1	0.28	41.1	< 0.007 U1	0.028	0.22 J1	0.495	0.46	0.22	< 0.05 U1	0.00334	< 0.002 U1	0.3 J1	0.39 J1	< 0.02 U1
5/17/2024	Corrective Action	0.019 J1	0.28	45.9	< 0.007 U1	0.031	0.30	1.22	0.45	0.21	< 0.05 U1	0.00445	< 0.002 U1	0.2 J1	0.33 J1	< 0.02 U1
10/21/2024	Corrective Action	0.016 J1	0.29	36.7	< 0.007 U1	0.023	0.37	0.529	0.57	0.21	< 0.05 U1	0.00413	< 0.002 U1	0.1 J1	0.50	< 0.02 U1

Table 1. Groundwater Data Summary: MW-112
Mountaineer - BAP
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
6/19/2019	Assessment	0.283	142	37.2	0.24	7.2	255	668
5/13/2020	Assessment	0.246	108	33.3	0.29	6.8	205	533
3/24/2021	Assessment	0.315	170	45.6	0.32	7.1	333	753
5/19/2021	Assessment	0.324	159	45.6	0.3	7.0	347	800
3/1/2022	Corrective Action	0.229	117	34.9	0.22	6.8	199	520

Table 1. Groundwater Data Summary: MW-112
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
6/19/2019	Assessment	< 0.02 U1	0.40	76.9	< 0.02 U1	< 0.01 U1	0.2 J1	0.02 J1	0.0507	0.24	0.02 J1	< 0.009 U1	< 0.002 U1	11.2	1.5	< 0.1 U1
5/13/2020	Assessment	< 0.02 U1	0.33	59.7	--	< 0.01 U1	0.236	0.02 J1	0.08899	0.29	< 0.05 U1	0.00151	--	5.62	0.9	< 0.1 U1
3/24/2021	Assessment	0.03 J1	0.41	73.7	< 0.007 U1	0.007 J1	0.419	0.03 J1	0.13538	0.32	< 0.05 U1	0.00180	< 0.002 U1	9.18	0.7	< 0.04 U1
5/19/2021	Assessment	0.06 J1	0.38	72.7	< 0.007 U1	0.005 J1	0.34	0.023	0.78	0.3	< 0.05 U1	0.00186	< 0.002 U1	8.3	0.85	< 0.04 U1
3/1/2022	Corrective Action	0.03 J1	0.33	54.0	< 0.007 U1	0.007 J1	0.46	0.027	0.38	0.22	< 0.05 U1	0.00127	< 0.002 U1	5.2	0.69	< 0.04 U1

Table 1. Groundwater Data Summary: MW-203
Mountaineer - BAP
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
6/18/2019	Assessment	0.1 J1	115	31.4	0.22	7.2	86.8	472
9/11/2019	Assessment	0.104	106	10.1	0.22	7.1	65.5	435
3/11/2020	Assessment	--	--	--	0.25	7.0	--	--
5/13/2020	Assessment	0.094	103	12.6	0.28	7.0	77.1	434
10/6/2020	Assessment	0.085	92.3	12.5	0.32	6.8	60.0	423
3/23/2021	Assessment	0.090	98.1	15.6	0.32	7.3	56.2	353
5/18/2021	Assessment	0.077	101	60.8	0.29	7.1	54.8	470
10/27/2021	Assessment	0.085	95.0	27.2	0.28	7.2	64.1	380
3/2/2022	Corrective Action	0.089	114	42.0	0.28	7.3	70.9	420
5/17/2022	Corrective Action	0.093	114 M1, P3	28.8	0.28	7.1	65.9	390 L1
10/31/2022	Corrective Action	0.067	102	71.7	0.24	7.0	83.8	470
2/13/2023	Corrective Action	0.071	87.7	22.3	0.29	7.2	61.3	360
5/25/2023	Corrective Action	0.074	84.4	27.8	0.28	7.2	61.8	360
10/31/2023	Corrective Action	0.083	85.3	21.7	0.28	7.1	69.0	350
5/17/2024	Corrective Action	0.071	93.6	22.2	0.29	7.2	58.6	370
10/22/2024	Corrective Action	0.067	91.6	35.0	0.30	7.1	71.0	410

Table 1. Groundwater Data Summary: MW-203
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
6/18/2019	Assessment	< 0.02 U1	0.30	34.7	< 0.02 U1	< 0.01 U1	0.2 J1	0.054	0.1139	0.22	0.113	< 0.009 U1	< 0.002 U1	2 J1	1.4	< 0.1 U1
9/11/2019	Assessment	0.02 J1	0.33	31.6	< 0.02 U1	< 0.01 U1	0.2 J1	0.139	0.381	0.22	0.2 J1	0.00230	< 0.002 U1	1 J1	1.1	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	0.25	33.4	< 0.02 U1	< 0.01 U1	0.217	0.05 J1	0.824	0.25	0.1 J1	0.00237	< 0.002 U1	1 J1	1.4	< 0.1 U1
5/13/2020	Assessment	< 0.02 U1	0.29	31.0	--	< 0.01 U1	0.204	0.03 J1	0.4071	0.28	< 0.05 U1	0.00227	--	1 J1	1.1	< 0.1 U1
10/6/2020	Assessment	0.03 J1	0.28	24.6	--	< 0.01 U1	0.360	0.107	1.568	0.32	0.226	0.00205	< 0.002 U1	0.9 J1	0.8	< 0.1 U1
3/23/2021	Assessment	0.03 J1	0.29	26.7	< 0.007 U1	0.007 J1	0.211	0.04 J1	0.501	0.32	< 0.05 U1	0.00194	< 0.002 U1	1 J1	1.3	< 0.04 U1
5/18/2021	Assessment	0.06 J1	0.27	28.2	< 0.007 U1	0.005 J1	0.19 J1	0.027	3.67	0.29	< 0.05 U1	0.00199	< 0.002 U1	1	1.08	< 0.04 U1
10/27/2021	Assessment	< 0.02 U1	0.25	26.5	< 0.007 U1	0.005 J1	0.44	0.015 J1	0.46	0.28	< 0.05 U1	0.00224	< 0.002 U1	1.1	1.05	< 0.04 U1
3/2/2022	Corrective Action	< 0.02 U1	0.21	32.8	< 0.007 U1	0.006 J1	0.44	0.024	0.55	0.28	< 0.05 U1	0.00224	< 0.002 U1	1.1	0.85	< 0.04 U1
5/17/2022	Corrective Action	< 0.02 U1	0.26	29.3	< 0.007 U1	0.004 J1	0.39	0.030	0.28	0.28	< 0.05 U1	0.00199	< 0.002 U1	1.3	0.91	< 0.04 U1
10/31/2022	Corrective Action	< 0.02 U1	0.22	30.6	< 0.007 U1	0.005 J1	0.38	0.017 J1	0.68	0.24	< 0.05 U1	0.00238	< 0.002 U1	0.8	2.29	< 0.04 U1
2/13/2023	Corrective Action	< 0.02 U1	0.24	24.6	< 0.007 U1	0.004 J1	0.37	0.017 J1	0.08	0.29	< 0.05 U1	0.00203	< 0.002 U1	1.1	0.82	< 0.04 U1
5/25/2023	Corrective Action	0.018 J1	0.22	24.4	< 0.007 U1	0.006 J1	0.39	0.016 J1	1.46	0.28	< 0.05 U1	0.00201	< 0.002 U1	1.3	0.63	< 0.02 U1
10/31/2023	Corrective Action	0.024 J1	0.23	25.7	< 0.007 U1	0.005 J1	0.33	0.026	0.51	0.28	< 0.05 U1	0.00201	< 0.002 U1	1.2	0.78	< 0.02 U1
5/17/2024	Corrective Action	0.020 J1	0.29	24.7	< 0.007 U1	0.005 J1	0.32	0.021	0.60	0.29	< 0.05 U1	0.00182	< 0.002 U1	1.2	0.77	0.03 J1
10/22/2024	Corrective Action	0.013 J1	0.24	27.1	< 0.007 U1	0.005 J1	0.31	0.014 J1	0.31	0.30	< 0.05 U1	0.00217	< 0.002 U1	0.9	0.75	< 0.02 U1

Table 1. Groundwater Data Summary: MW-1601A
Mountaineer - BAP
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
9/28/2016	Background	0.211	141	21.8	0.17	7.6	130	538
11/1/2016	Background	0.170	122	17.3	0.19	7.2	136	534
12/19/2016	Background	0.196	130	20.4	0.18	7.2	141	544
2/20/2017	Background	0.253	117	31.0	0.20	7.2	135	568
3/27/2017	Background	0.515	119	42.1	0.19	7.1	148	530
4/18/2017	Background	0.259	130	55.3	0.19	7.1	169	580
5/15/2017	Background	0.224	159	74.4	0.18	7.7	197	676
6/12/2017	Background	0.285	138	57.7	0.18	6.9	170	586
10/31/2017	Detection	0.224	137	49.4	0.19	7.1	169	564
5/10/2018	Assessment	--	--	--	0.16	7.3	--	--
9/20/2018	Assessment	0.251	148	51.0	0.19	7.1	189	638
4/9/2019	Assessment	0.224	155	44.4	0.1 J1	7.1	176	692
6/20/2019	Assessment	0.160	165	48.6	0.16	7.3	207	730
9/11/2019	Assessment	0.153	164	45.8	0.14	7.0	221	749
3/11/2020	Assessment	--	--	--	0.14	6.7	--	--
5/15/2020	Assessment	0.136	185	22.7	0.16	6.7	274	814
10/8/2020	Assessment	0.114	178	18.4	0.13	6.8	252	748
3/22/2021	Assessment	0.128	179	16.0	0.15	7.0	241	738
5/20/2021	Assessment	0.122	173	16.1	0.13	6.6	241	750
10/28/2021	Assessment	0.121	173	13.0	0.12	6.9	222	700
3/7/2022	Corrective Action	0.144	164	13.8	0.11	7.0	242	700
5/20/2022	Corrective Action	0.146	178	13.9	0.12	6.7	239	720 L1
11/3/2022	Corrective Action	0.165	166	16.7	0.10	6.7	239	680
2/13/2023	Corrective Action	0.144	156	17.0	0.11	6.6	240	650
5/22/2023	Corrective Action	0.143	148	13.5	0.1	7.0	263	710
10/25/2023	Corrective Action	0.133	166	27.8	0.11	6.8	269	720
3/12/2024	Corrective Action	--	--	--	0.11	6.9	--	--
5/16/2024	Corrective Action	0.120	193	52.0	0.12	6.9	276	820
10/22/2024	Corrective Action	0.099	176	94.6	0.12	6.8	263	850

Table 1. Groundwater Data Summary: MW-1601A
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/28/2016	Background	0.05	0.62	46.6	< 0.005 U1	0.01 J1	0.3	0.116	0.43758	0.17	0.132	0.002	< 0.002 U1	2.61	1.3	0.053
11/1/2016	Background	0.05 J1	0.61	45.2	< 0.005 U1	0.02 J1	1.3	0.086	2.011	0.19	0.108	0.001	< 0.002 U1	2.36	1.1	0.058
12/19/2016	Background	0.05 J1	0.65	47.0	< 0.005 U1	0.02 J1	0.806	0.282	1.544	0.18	0.383	< 0.0002 U1	< 0.002 U1	0.93	1.1	0.04 J1
2/20/2017	Background	0.03 J1	0.55	41.4	< 0.005 U1	0.02 J1	0.198	0.132	0.313	0.20	0.139	0.005	< 0.002 U1	1.42	1.4	0.070
3/27/2017	Background	0.03 J1	0.49	40.2	< 0.005 U1	0.01 J1	0.225	0.097	0.495	0.19	0.069	0.006	< 0.002 U1	2.85	1.0	0.03 J1
4/18/2017	Background	0.03 J1	0.59	47.5	< 0.004 U1	0.01 J1	0.170	0.093	0.814	0.19	0.052	0.007	0.003 J1	1.53	1.5	0.04 J1
5/15/2017	Background	0.04 J1	0.79	56.9	< 0.004 U1	0.02 J1	0.166	0.154	1.279	0.18	0.141	< 0.0002 U1	< 0.002 U1	2.04	1.3	0.04 J1
6/12/2017	Background	0.04 J1	0.61	49.0	< 0.004 U1	0.02 J1	0.152	0.098	0.599	0.18	0.063	0.004	< 0.002 U1	1.13	1.5	0.04 J1
5/10/2018	Assessment	0.03 J1	0.55	63.9	< 0.004 U1	0.02 J1	0.153	0.083	0.767	0.16	0.034	0.004	< 0.002 U1	0.99	1.5	0.03 J1
9/20/2018	Assessment	0.03 J1	0.58	55.3	< 0.004 U1	0.02 J1	0.131	0.059	0.696	0.19	0.005 J1	0.004	< 0.002 U1	0.76	1.1	0.04 J1
4/9/2019	Assessment	< 0.1 U1	0.61	52.0	< 0.1 U1	< 0.05 U1	0.2 J1	0.2 J1	1.168	0.1 J1	< 0.1 U1	0.02 J1	< 0.002 U1	< 2 U1	1.1	< 0.5 U1
6/20/2019	Assessment	0.03 J1	0.63	63.1	< 0.02 U1	0.02 J1	0.314	0.03 J1	0.450	0.16	0.07 J1	< 0.009 U1	< 0.002 U1	0.9 J1	1.3	< 0.1 U1
9/11/2019	Assessment	0.03 J1	0.62	65.3	< 0.02 U1	0.02 J1	0.370	0.03 J1	1.168	0.14	< 0.05 U1	0.00184	< 0.002 U1	0.9 J1	1.1	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	0.58	64.9	< 0.02 U1	0.01 J1	0.205	0.02 J1	1.685	0.14	< 0.05 U1	0.00183	< 0.002 U1	1 J1	1.4	< 0.1 U1
5/15/2020	Assessment	0.03 J1	0.57	67.8	--	0.02 J1	0.1 J1	< 0.02 U1	0.553	0.16	< 0.05 U1	0.00190	--	0.7 J1	0.9	< 0.1 U1
10/8/2020	Assessment	0.03 J1	0.59	61.0	--	0.02 J1	0.328	0.04 J1	0.0868	0.13	< 0.05 U1	0.00168	< 0.002 U1	0.7 J1	0.9	< 0.1 U1
3/22/2021	Assessment	0.03 J1	0.55	65.4	< 0.007 U1	0.02 J1	0.456	0.02 J1	1.17	0.15	< 0.05 U1	0.00198	< 0.002 U1	3.96	0.9	< 0.04 U1
5/20/2021	Assessment	0.08 J1	0.54	67.7	< 0.007 U1	0.016 J1	0.23	0.012 J1	0.78	0.13	< 0.05 U1	0.00194	< 0.002 U1	0.5	0.94	< 0.04 U1
10/28/2021	Assessment	0.03 J1	0.55	64.4	< 0.007 U1	0.016 J1	0.28	0.012 J1	1.43	0.12	< 0.05 U1	0.00226	< 0.002 U1	0.5	0.85	< 0.04 U1
3/7/2022	Corrective Action	0.02 J1	0.50	62.5	< 0.007 U1	0.014 J1	0.33	0.013 J1	1.67	0.11	< 0.05 U1	0.00202	< 0.002 U1	1.7	0.89	< 0.04 U1
5/20/2022	Corrective Action	0.02 J1	0.47	64.3	< 0.007 U1	0.015 J1	0.25	0.024	1.36	0.12	< 0.05 U1	0.00201	< 0.002 U1	0.4 J1	1.09	< 0.04 U1
11/3/2022	Corrective Action	0.03 J1	0.49	66.5	< 0.007 U1	0.015 J1	0.30	0.014 J1	1.52	0.10	< 0.05 U1	0.00377	< 0.002 U1	0.5	0.58	< 0.04 U1
2/13/2023	Corrective Action	0.02 J1	0.45	60.6	< 0.007 U1	0.013 J1	0.26	0.013 J1	0.37	0.11	< 0.05 U1	0.00390	< 0.002 U1	0.5	0.57	< 0.04 U1
5/22/2023	Corrective Action	0.027 J1	0.44	58.5	< 0.007 U1	0.013 J1	0.21 J1	0.013 J1	1.02	0.1	< 0.05 U1	0.00291	< 0.002 U1	0.5	0.53	< 0.02 U1
10/25/2023	Corrective Action	0.028 J1	0.42	61.7	< 0.007 U1	0.018 J1	0.29 J1	0.014 J1	10.52	0.11	< 0.05 U1	0.00419	< 0.002 U1	0.4 J1	0.47 J1	< 0.02 U1
3/12/2024	Corrective Action	0.022 J1	0.40	64.4	< 0.007 U1	0.018 J1	0.27 J1	0.016 J1	0.68	0.11	< 0.05 U1	0.00256	< 0.002 U1	0.5	0.55	0.02 J1
5/16/2024	Corrective Action	0.020 J1	0.41	70.3	< 0.007 U1	0.021	0.22 J1	0.019 J1	0.73	0.12	< 0.05 U1	0.00256	< 0.002 U1	0.5	1.02	0.03 J1
10/22/2024	Corrective Action	0.023 J1	0.44	75.8	< 0.007 U1	0.019 J1	0.27 J1	0.017 J1	1.48	0.12	< 0.05 U1	0.00298	< 0.002 U1	0.5	0.76	0.02 J1

Table 1. Groundwater Data Summary: MW-1602
Mountaineer - BAP
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
9/28/2016	Background	0.141	74.9	7.95	0.17	7.3	167	412
11/1/2016	Background	0.115	71.1	8.70	0.18	6.6	178	424
12/19/2016	Background	0.120	74.7	9.91	0.18	6.9	188	470
2/20/2017	Background	0.093	69.6	9.76	0.19	6.5	193	494
3/27/2017	Background	0.240	86.6	12.0	0.19	6.3	231	504
4/17/2017	Background	0.107	91.1	12.1	0.20	6.7	248	520
5/15/2017	Background	0.115	105	12.6	0.19	7.0	273	598
6/12/2017	Background	0.153	94.0	11.8	0.20	6.8	269	588
10/31/2017	Detection	0.093	78.1	8.41	0.23	6.7	184	468
5/10/2018	Assessment	--	--	--	0.23	7.0	--	--
9/20/2018	Assessment	0.109	81.6	10.5	0.25	7.1	195	502
4/9/2019	Assessment	0.09 J1	99.8	11.4	0.20	6.6	221	595
6/20/2019	Assessment	0.1 J1	91.2	10.7	0.23	7.0	267	606
9/11/2019	Assessment	0.111	95.1	10.4	0.21	6.7	259	603
3/11/2020	Assessment	--	--	--	0.23	6.4	--	--
5/15/2020	Assessment	0.118	99.2	9.67	0.25	6.4	264	595
10/8/2020	Assessment	0.108	96.7	8.61	0.23	6.5	253	575
3/22/2021	Assessment	0.110	96.9	8.58	0.29	6.8	238	550
5/20/2021	Assessment	0.117	87.7	7.54	0.27	6.5	238	580
10/28/2021	Assessment	0.127	91.3 M1, P3	7.49	0.26	6.9	222	530
3/7/2022	Corrective Action	0.099	74.5	7.23	0.26	6.9	175	460
5/20/2022	Corrective Action	0.115	104	7.63	0.25	6.5	220	560 L1
11/2/2022	Corrective Action	0.098	77.0	7.89	0.26	6.6	178	480
2/13/2023	Corrective Action	0.100	86.3	8.75	0.24	6.4	226	540
5/22/2023	Corrective Action	0.107	78.7	8.29	0.23	6.7	227	530
10/25/2023	Corrective Action	0.104	79.0	8.69	0.19	6.4	236	520
3/12/2024	Corrective Action	--	--	--	0.17	6.4	--	--
5/16/2024	Corrective Action	0.109	103	13.6	0.17	6.4	330	690
10/22/2024	Corrective Action	0.147	118	10.8	0.19	6.4	381	790

Table 1. Groundwater Data Summary: MW-1602
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/28/2016	Background	0.02 J1	0.40	27.1	< 0.005 U1	0.02 J1	0.2	0.217	0.275	0.17	0.255	0.013	< 0.002 U1	0.90	0.08 J1	0.092
11/1/2016	Background	0.02 J1	0.35	28.7	< 0.005 U1	0.02 J1	0.6	0.108	2.086	0.18	0.070	0.014	< 0.002 U1	1.48	0.1	0.116
12/19/2016	Background	0.02 J1	0.43	28.9	< 0.005 U1	0.01 J1	1.65	0.225	0.7053	0.18	0.272	0.008	< 0.002 U1	0.56	0.08 J1	0.02 J1
2/20/2017	Background	< 0.01 U1	0.35	26.9	< 0.005 U1	0.01 J1	0.194	0.052	0.75	0.19	0.052	0.013	< 0.002 U1	0.63	0.1	0.02 J1
3/27/2017	Background	0.01 J1	0.34	29.9	< 0.005 U1	0.02 J1	0.456	0.059	0.679	0.19	0.063	0.019	< 0.002 U1	1.49	0.2	0.01 J1
4/17/2017	Background	0.02 J1	0.36	32.1	< 0.004 U1	0.01 J1	0.240	0.049	0.337	0.20	0.087	0.017	0.002 J1	0.66	0.1	0.01 J1
5/15/2017	Background	0.02 J1	0.42	33.2	< 0.004 U1	0.02 J1	0.136	0.072	1.9116	0.19	0.078	0.009	< 0.002 U1	1.28	0.1	0.04 J1
6/12/2017	Background	0.03 J1	0.36	33.1	< 0.004 U1	0.01 J1	0.408	0.066	0.2898	0.20	0.061	0.018	< 0.002 U1	0.53	0.1	0.02 J1
5/10/2018	Assessment	0.02 J1	0.34	31.2	0.005 J1	0.01 J1	0.121	0.036	0.342	0.23	0.038	0.015	< 0.002 U1	0.71	0.1	0.03 J1
9/20/2018	Assessment	0.01 J1	0.32	26.7	< 0.004 U1	0.01 J1	0.210	0.02 J1	0.683	0.25	0.01 J1	0.012	< 0.002 U1	0.84	0.07 J1	0.02 J1
4/9/2019	Assessment	< 0.1 U1	0.4 J1	29.0	< 0.1 U1	< 0.05 U1	< 0.2 U1	< 0.1 U1	1.0509	0.20	< 0.1 U1	0.02 J1	< 0.002 U1	3 J1	0.2 J1	< 0.5 U1
6/20/2019	Assessment	0.02 J1	0.33	29.5	< 0.02 U1	0.01 J1	0.2 J1	0.03 J1	0.1531	0.23	0.07 J1	0.01 J1	< 0.002 U1	0.9 J1	0.1 J1	< 0.1 U1
9/11/2019	Assessment	< 0.02 U1	0.31	27.3	< 0.02 U1	0.01 J1	0.2 J1	< 0.02 U1	0.451	0.21	< 0.05 U1	0.00979	< 0.002 U1	1 J1	0.1 J1	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	0.31	28.9	< 0.02 U1	< 0.01 U1	0.261	< 0.02 U1	0.4389	0.23	0.05 J1	0.0117	< 0.002 U1	1 J1	0.2 J1	< 0.1 U1
5/15/2020	Assessment	0.02 J1	0.31	30.0	--	0.01 J1	0.2 J1	0.04 J1	0.5819	0.25	< 0.05 U1	0.0126	--	0.9 J1	0.09 J1	< 0.1 U1
10/8/2020	Assessment	0.04 J1	0.33	25.7	--	0.01 J1	0.311	0.04 J1	0.194	0.23	< 0.05 U1	0.0104	< 0.002 U1	0.9 J1	0.08 J1	< 0.1 U1
3/22/2021	Assessment	0.02 J1	0.31	26.2	< 0.007 U1	0.02 J1	0.531	0.03 J1	0.8182	0.29	0.06 J1	0.0109	< 0.002 U1	1 J1	0.1 J1	< 0.04 U1
5/20/2021	Assessment	0.07 J1	0.30	25.9	< 0.007 U1	0.012 J1	0.65	0.018 J1	0.58	0.27	< 0.05 U1	0.0118	< 0.002 U1	1.1	0.10 J1	< 0.04 U1
10/28/2021	Assessment	< 0.02 U1	0.31	24.5	< 0.007 U1	0.011 J1	0.47	0.013 J1	0.86	0.26	< 0.05 U1	0.0129	< 0.002 U1	1.1	0.11 J1	< 0.04 U1
3/7/2022	Corrective Action	0.52	0.32	21.8	< 0.007 U1	0.038	0.62	0.044	0.72	0.26	0.20	0.0114	< 0.002 U1	1.2	0.12 J1	< 0.04 U1
5/20/2022	Corrective Action	0.02 J1	0.36	28.2	< 0.007 U1	0.017 J1	0.32	0.027	0.57	0.25	0.20	0.0125	< 0.002 U1	1.0	< 0.09 U1	< 0.04 U1
11/2/2022	Corrective Action	< 0.02 U1	0.29	23.6	< 0.007 U1	0.011 J1	0.42	0.015 J1	0.96	0.26	< 0.05 U1	0.0137	< 0.002 U1	1.1	< 0.09 U1	< 0.04 U1
2/13/2023	Corrective Action	< 0.02 U1	0.27	25.1	< 0.007 U1	0.012 J1	0.66	0.012 J1	0.78	0.24	< 0.05 U1	0.0133	< 0.002 U1	1.0	0.11 J1	< 0.04 U1
5/22/2023	Corrective Action	0.022 J1	0.26	24.0	< 0.007 U1	0.01 J1	0.35	0.016 J1	0.24	0.23	< 0.05 U1	0.0131	< 0.002 U1	1.1	0.40 J1	< 0.02 U1
10/25/2023	Corrective Action	0.020 J1	0.25	26.7	< 0.007 U1	0.013 J1	0.44	0.019 J1	1.58	0.19	< 0.05 U1	0.0152	< 0.002 U1	0.6	0.52	< 0.02 U1
3/12/2024	Corrective Action	0.020 J1	0.25	32.1	< 0.007 U1	0.017 J1	0.28 J1	0.029	0.62	0.17	< 0.05 U1	0.0169	< 0.002 U1	0.6	1.11	0.02 J1
5/16/2024	Corrective Action	0.017 J1	0.25	35.5	< 0.007 U1	0.022	0.36	0.016 J1	0.51	0.17	0.05 J1	0.0187	< 0.002 U1	0.6	0.41 J1	0.04 J1
10/22/2024	Corrective Action	< 0.008 U1	0.25	33.4	< 0.007 U1	0.021	0.35	0.007 J1	0.78	0.19	0.08 J1	0.025	< 0.002 U1	0.4 J1	0.26 J1	< 0.02 U1

Table 1. Groundwater Data Summary: MW-1603
Mountaineer - BAP
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
9/28/2016	Background	0.327	124	15.7	0.07 J1	7.3	388	618
11/2/2016	Background	0.334	146	22.8	0.08 J1	6.6	483	814
12/19/2016	Background	0.495	164	30.1	0.1 J1	7.4	504	908
2/20/2017	Background	0.543	169	27.4	0.1 J1	6.8	485	962
3/28/2017	Background	0.781	181	25.2	0.1 J1	6.6	476	918
4/17/2017	Background	0.519	170	22.9	0.1 J1	6.9	474	910
5/15/2017	Background	0.546	187	24.7	0.1 J1	7.4	470	910
6/12/2017	Background	0.535	176	20.5	0.1 J1	7.0	482	878
10/31/2017	Detection	0.360	171	13.1	0.1 J1	6.6	553	872
5/10/2018	Assessment	--	--	--	0.09 J1	6.6	--	--
9/20/2018	Assessment	0.324	167	14.0	0.09	6.6	524	920
4/9/2019	Assessment	0.408	182	15.8	0.11	6.8	429	918
6/20/2019	Assessment	0.299	162	10.9	0.09	7.0	434	878
9/11/2019	Assessment	0.308	156	10.0	0.09	6.7	421	853
3/11/2020	Assessment	--	--	--	0.06	6.4	--	--
5/15/2020	Assessment	0.275	161	10.7	0.09	6.5	387	809
10/8/2020	Assessment	0.221	139	8.86	0.07	6.3	332	692
3/22/2021	Assessment	0.218	177	9.93	0.09	6.7	364	840
5/20/2021	Assessment	0.232	162	10.3	0.08	6.3	390	820
10/28/2021	Assessment	0.328	176	18.7	0.09	6.9	372	860
3/8/2022	Corrective Action	0.300	187	16.2	0.08	6.9	395	910
5/19/2022	Corrective Action	0.344	202	17.3	0.09	6.6	379	880 L1
11/7/2022	Corrective Action	0.239	166	14.1	0.07	6.7	424	880
2/13/2023	Corrective Action	0.190	150	12.7	0.06	6.4	450	830
5/22/2023	Corrective Action	0.203	128	11.3	0.05 J1	6.5	433	800
10/25/2023	Corrective Action	0.206	114	10.9	0.06	6.2	392	720
3/12/2024	Corrective Action	--	--	--	0.06	6.3	--	--
5/16/2024	Corrective Action	0.194	117 M1	11.7	0.07	6.3	384	750
10/22/2024	Corrective Action	0.207	126	11.4	0.06	6.2	436	820

Table 1. Groundwater Data Summary: MW-1603
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/28/2016	Background	0.02 J1	0.36	29.5	< 0.005 U1	0.02 J1	0.3	0.317	0.0927	0.07 J1	0.253	0.021	< 0.002 U1	1.21	0.1	0.02 J1
11/2/2016	Background	0.02 J1	0.36	34.1	< 0.005 U1	0.01 J1	0.4	0.166	2.593	0.08 J1	0.131	0.022	< 0.002 U1	2.47	0.4	0.04 J1
12/19/2016	Background	0.03 J1	0.40	33.1	< 0.005 U1	0.01 J1	2.37	0.134	0.966	0.1 J1	0.084	0.010	< 0.002 U1	0.36	0.3	0.063
2/20/2017	Background	0.01 J1	0.37	31.7	< 0.005 U1	0.01 J1	0.229	0.105	0.384	0.1 J1	0.077	0.012	< 0.002 U1	0.37	0.4	0.02 J1
3/28/2017	Background	0.02 J1	0.36	32.9	< 0.005 U1	0.01 J1	0.545	0.093	0.2071	0.1 J1	0.080	0.020	< 0.002 U1	0.72	0.2	< 0.01 U1
4/17/2017	Background	0.03 J1	0.52	33.7	0.005 J1	0.01 J1	0.304	0.377	0.6154	0.1 J1	0.308	0.018	0.003 J1	0.27	0.2	0.01 J1
5/15/2017	Background	0.03 J1	0.43	33.0	< 0.004 U1	0.01 J1	0.415	0.101	1.6052	0.1 J1	0.079	0.012	< 0.002 U1	0.71	0.1	0.02 J1
6/12/2017	Background	0.03 J1	0.35	32.0	< 0.004 U1	0.01 J1	0.963	0.085	0.776	0.1 J1	0.059	0.021	< 0.002 U1	0.29	0.1	0.01 J1
5/10/2018	Assessment	0.02 J1	0.31	41.3	0.007 J1	0.01 J1	0.099	0.054	0.363	0.09 J1	0.042	0.021	< 0.002 U1	0.14	0.2	0.02 J1
9/20/2018	Assessment	0.02 J1	0.26	35.9	< 0.004 U1	0.01 J1	0.102	0.032	0.881	0.09	0.02 J1	0.022	< 0.002 U1	0.07 J1	0.4	0.01 J1
4/9/2019	Assessment	< 0.1 U1	0.56	32.4	< 0.1 U1	< 0.05 U1	0.4 J1	0.622	2.389	0.11	0.5 J1	0.030	< 0.002 U1	< 2 U1	0.4 J1	< 0.5 U1
6/20/2019	Assessment	0.03 J1	0.41	30.7	< 0.02 U1	0.01 J1	0.249	0.204	0.2974	0.09	0.176	< 0.009 U1	< 0.002 U1	0.9 J1	0.3	< 0.1 U1
9/11/2019	Assessment	0.03 J1	0.35	30.9	< 0.02 U1	0.01 J1	0.205	0.112	1.07	0.09	0.1 J1	0.0150	< 0.002 U1	0.5 J1	0.2	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	0.29	30.4	< 0.02 U1	0.01 J1	0.224	0.061	2.036	0.06	0.08 J1	0.0175	< 0.002 U1	< 0.4 U1	0.2 J1	< 0.1 U1
5/15/2020	Assessment	< 0.02 U1	0.27	30.0	--	0.01 J1	0.210	0.094	0.701	0.09	0.07 J1	0.0182	--	< 0.4 U1	0.2 J1	< 0.1 U1
10/8/2020	Assessment	0.15	0.41	26.8	--	0.01 J1	0.552	0.392	0.0948	0.07	0.310	0.0142	< 0.002 U1	< 0.4 U1	0.2	< 0.1 U1
3/22/2021	Assessment	0.03 J1	0.32	31.2	< 0.007 U1	0.01 J1	0.341	0.110	1.916	0.09	0.1 J1	0.0153	< 0.002 U1	0.1 J1	0.1 J1	< 0.04 U1
5/20/2021	Assessment	0.08 J1	0.29	30.9	< 0.007 U1	0.012 J1	0.74	0.152	0.49	0.08	0.16 J1	0.0154	< 0.002 U1	0.1 J1	0.13 J1	< 0.04 U1
10/28/2021	Assessment	0.02 J1	0.23	29.5	< 0.007 U1	0.010 J1	0.45	0.033	1.59	0.09	< 0.05 U1	0.0158	< 0.002 U1	0.1 J1	0.14 J1	< 0.04 U1
3/8/2022	Corrective Action	0.02 J1	0.27	29.3	< 0.007 U1	0.012 J1	0.40	0.037	0.65	0.08	< 0.05 U1	0.0145	< 0.002 U1	0.2 J1	0.19 J1	< 0.04 U1
5/19/2022	Corrective Action	0.02 J1	0.28	31.6	< 0.007 U1	0.011 J1	0.32	0.039	0.40	0.09	< 0.05 U1	0.0158	< 0.002 U1	0.2 J1	0.1 J1	< 0.04 U1
11/7/2022	Corrective Action	< 0.02 U1	0.22	29.3	< 0.007 U1	0.010 J1	0.57	0.031	4.44	0.07	< 0.05 U1	0.0174	< 0.002 U1	0.3 J1	0.16 J1	< 0.04 U1
2/13/2023	Corrective Action	0.02 J1	0.18	28.1	< 0.007 U1	0.012 J1	0.35	0.034	0.49	0.06	< 0.05 U1	0.0167	< 0.002 U1	0.1 J1	0.38 J1	< 0.04 U1
5/22/2023	Corrective Action	0.069 J1	0.27	29.5	< 0.007 U1	0.020	0.42	0.226	0.77	0.05 J1	0.21	0.0165	< 0.002 U1	< 0.1 U1	0.24 J1	< 0.02 U1
10/25/2023	Corrective Action	0.027 J1	0.21	28.5	< 0.007 U1	0.011 J1	0.37	0.112	1.34	0.06	0.11 J1	0.0141	< 0.002 U1	0.1 J1	0.14 J1	< 0.02 U1
3/12/2024	Corrective Action	0.022 J1	0.18	28.8	< 0.007 U1	0.010 J1	0.47	0.063	0.41	0.06	0.06 J1	0.0136	< 0.002 U1	< 0.1 U1	0.10 J1	< 0.02 U1
5/16/2024	Corrective Action	0.017 J1	0.14	28.4	< 0.007 U1	0.010 J1	0.28 J1	0.026	0.64	0.07	< 0.05 U1	0.0132	< 0.002 U1	< 0.1 U1	0.07 J1	< 0.02 U1
10/22/2024	Corrective Action	< 0.008 U1	0.14	30.1	< 0.007 U1	0.014 J1	0.27 J1	0.022	0.63	0.06	< 0.05 U1	0.017	< 0.002 U1	< 0.1 U1	0.20 J1	< 0.02 U1

Table 1. Groundwater Data Summary: MW-1604D
Mountaineer - BAP
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
9/26/2016	Background	3.54	306	111	0.18	7.3	865	1,650
11/1/2016	Background	2.98	277	116	0.19	7.3	866	1,580
12/20/2016	Background	3.07	289	118	0.17	7.4	863	1,630
2/21/2017	Background	3.01	260	111	0.21	7.2	823	1,640
3/28/2017	Background	4.18	293	112	0.19	7.2	814	1,660
4/19/2017	Background	2.97	269	109	0.20	7.2	797	1,570
5/16/2017	Background	2.95	300	112	0.18	7.9	828	1,610
6/13/2017	Background	2.98	283	118	0.18	7.5	856	1,620
10/30/2017	Detection	2.60	295	116	0.20	7.2	833	1,570
1/22/2018	Detection	3.07	291	118	--	7.2	862	1,620
5/9/2018	Assessment	--	--	--	0.21	7.1	--	--
9/19/2018	Assessment	1.33	144	41.3	0.19	7.2	313	838
4/9/2019	Assessment	2.82	236	100	0.15	6.9	539	1,300
6/19/2019	Assessment	1.66	196	93.0	0.14	7.2	461	1,110
9/9/2019	Assessment	2.18	217	82.2	0.17	7.0	551	1,210
3/10/2020	Assessment	--	--	--	0.22	6.4	--	--
5/14/2020	Assessment	4.65	205	113	0.25	6.7	667	1,390
10/9/2020	Assessment	3.58	188	57.9	0.20	6.7	483	1,080
3/24/2021	Assessment	3.68	175	70.4	0.24	7.2	489	1,080
5/20/2021	Assessment	4.02	174	80.5	0.24	7.0	508	1,160
10/27/2021	Assessment	3.32	186	48.7	0.15	6.9	314	250
3/2/2022	Corrective Action	3.17	185	64.0	0.22	7.1	496	1,110
5/23/2022	Corrective Action	2.73	192	31.9	0.07	6.8	5.20	260 L1
11/3/2022	Corrective Action	3.59	160	60.9	0.21	6.9	440	1,060
2/15/2023	Corrective Action	3.20	163 M1	78.1	0.21	6.8	462	1,070
5/24/2023	Corrective Action	0.566	105	3.75	0.24	7.1	249	650
10/25/2023	Corrective Action	0.130	105	20.7	0.25	7.1	203	600
3/13/2024	Corrective Action	--	--	--	0.21	7.0	--	--
5/17/2024	Corrective Action	0.132	124	25.0	0.23	7.1	270	670
10/22/2024	Corrective Action	0.563	123	79.7	0.20	7.0	333	870

Table 1. Groundwater Data Summary: MW-1604D
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/26/2016	Background	0.14	0.48	29.1	< 0.005 U1	0.14	0.4	1.76	1.38	0.18	0.106	0.059	< 0.002 U1	19.8	0.9	0.235
11/1/2016	Background	0.15	0.59	28.4	< 0.005 U1	0.17	0.5	1.78	1.056	0.19	0.039	0.057	0.036	20.0	1.0	0.261
12/20/2016	Background	0.14	0.57	30.3	< 0.005 U1	0.17	0.798	1.92	1.450	0.17	0.02 J1	0.045	< 0.002 U1	20.8	1.0	0.283
2/21/2017	Background	0.11	0.45	26.2	< 0.005 U1	0.13	0.297	1.85	0.824	0.21	0.02 J1	0.050	< 0.002 U1	17.4	0.7	0.264
3/28/2017	Background	0.13	0.41	28.9	< 0.005 U1	0.13	0.416	1.74	0.806	0.19	0.022	0.064	< 0.002 U1	18.2	0.7	0.336
4/19/2017	Background	0.12	0.49	27.9	< 0.004 U1	0.09	0.323	1.60	1.537	0.20	0.584	0.051	0.003 J1	17.4	0.7	0.217
5/16/2017	Background	0.13	0.54	27.5	< 0.004 U1	0.10	0.079	1.60	3.489	0.18	0.027	0.052	< 0.002 U1	18.1	0.5	0.231
6/13/2017	Background	0.15	0.46	27.9	< 0.008 U1	0.15	0.180	1.95	1.058	0.18	0.03 J1	0.058	< 0.002 U1	18.3	0.8	0.256
5/9/2018	Assessment	0.04 J1	0.34	32.0	< 0.004 U1	0.04	0.195	0.314	0.687	0.21	0.035	0.024	< 0.002 U1	2.05	1.4	0.02 J1
9/19/2018	Assessment	0.04 J1	0.29	37.0	< 0.004 U1	0.03	0.169	0.203	0.316	0.19	0.303	0.016	< 0.002 U1	1.57	3.8	0.02 J1
4/9/2019	Assessment	< 0.1 U1	0.4 J1	42.5	< 0.1 U1	0.05 J1	0.2 J1	0.345	0.957	0.15	< 0.1 U1	0.038	< 0.002 U1	< 2 U1	2.0	< 0.5 U1
6/19/2019	Assessment	0.04 J1	0.28	52.9	< 0.02 U1	0.04 J1	0.212	0.242	0.1922	0.14	0.07 J1	< 0.009 U1	< 0.002 U1	1 J1	3.1	< 0.1 U1
9/9/2019	Assessment	0.03 J1	0.30	55.6	< 0.02 U1	0.03 J1	0.345	0.181	0.464	0.17	< 0.05 U1	0.0188	< 0.002 U1	2 J1	3.4	< 0.1 U1
3/10/2020	Assessment	0.02 J1	0.31	34.2	< 0.02 U1	0.03 J1	0.311	0.138	0.834	0.22	< 0.05 U1	0.0235	< 0.002 U1	1 J1	0.8	< 0.1 U1
5/14/2020	Assessment	0.03 J1	0.28	34.1	--	0.03 J1	0.729	0.117	0.1393	0.25	< 0.05 U1	0.0218	--	1 J1	0.7	< 0.1 U1
10/9/2020	Assessment	0.03 J1	0.29	27.3	--	0.02 J1	1.02	0.140	0.123	0.20	0.06 J1	0.0190	< 0.002 U1	1 J1	3.0	< 0.1 U1
3/24/2021	Assessment	0.04 J1	0.28	26.5	< 0.007 U1	0.02 J1	0.219	0.105	0.677	0.24	< 0.05 U1	0.0217	< 0.002 U1	2 J1	1.2	< 0.04 U1
5/20/2021	Assessment	0.08 J1	0.25	24.4	< 0.007 U1	0.022	0.26	0.091	0.32	0.24	< 0.05 U1	0.0213	< 0.002 U1	1.4	1.39	< 0.04 U1
10/27/2021	Assessment	0.03 J1	0.29	24.1	< 0.007 U1	0.027	0.28	0.134	0.61	0.15	< 0.05 U1	0.0213	< 0.002 U1	1.5	1.49	< 0.04 U1
3/2/2022	Corrective Action	0.03 J1	0.26	23.2	< 0.007 U1	0.022	0.49	0.092	0.79	0.22	< 0.05 U1	0.0197	< 0.002 U1	1.5	0.51	< 0.04 U1
5/23/2022	Corrective Action	0.04 J1	0.40	35.3	< 0.007 U1	0.022	0.24	0.126	0.85	0.07	< 0.05 U1	0.0199	< 0.002 U1	1.9	0.74	< 0.04 U1
11/3/2022	Corrective Action	0.06 J1	0.24	26.8	< 0.007 U1	0.017 J1	0.26	0.112	2.13	0.21	0.08 J1	0.0190	< 0.002 U1	1.6	2.11	< 0.04 U1
2/15/2023	Corrective Action	0.03 J1	0.23	24.1	< 0.007 U1	0.018 J1	0.27	0.116	0.70	0.21	< 0.05 U1	0.0186	< 0.002 U1	1.6	1.19	< 0.04 U1
5/24/2023	Corrective Action	0.041 J1	0.24	25.6	< 0.007 U1	0.014 J1	0.30	0.079	0.54	0.24	< 0.05 U1	0.0140	< 0.002 U1	1.8	3.46	< 0.02 U1
10/25/2023	Corrective Action	0.040 J1	0.26	34.5	< 0.007 U1	0.022	0.44	0.607	2.25	0.25	0.32	0.0128	< 0.002 U1	1.3	1.52	< 0.02 U1
3/13/2024	Corrective Action	0.026 J1	0.18	46.0	< 0.007 U1	0.014 J1	0.25 J1	0.088	0.72	0.21	< 0.05 U1	0.0138	< 0.002 U1	1.4	2.46	< 0.02 U1
5/17/2024	Corrective Action	0.077 J1	0.30	43.3	< 0.007 U1	0.012 J1	0.44	0.090	0.88	0.23	0.05 J1	0.0124	< 0.002 U1	1.6	2.04	< 0.02 U1
10/22/2024	Corrective Action	0.038 J1	0.21	51.4	< 0.007 U1	0.018 J1	0.49	0.232	0.78	0.20	0.15 J1	0.016	< 0.002 U1	1.2	1.38	< 0.02 U1

Table 1. Groundwater Data Summary: MW-1604S
Mountaineer - BAP
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
9/26/2016	Background	2.12	178	83.9	0.20	7.0	602	1,280
11/1/2016	Background	1.90	167	99.4	0.21	7.1	626	1,310
12/20/2016	Background	2.35	165	99.9	0.19	7.2	618	1,300
2/21/2017	Background	3.08	168	112	0.21	7.0	634	1,430
3/28/2017	Background	4.04	180	116	0.20	6.9	663	1,420
4/19/2017	Background	3.68	191	130	0.21	7.0	716	1,500
5/16/2017	Background	3.63	202	122	0.19	7.7	708	1,510
6/13/2017	Background	3.48	182	112	0.20	7.5	685	1,400
10/30/2017	Detection	2.17	167	85.3	0.21	7.1	544	1,150
1/22/2018	Detection	2.36	--	105	--	6.9	602	1,312
5/9/2018	Assessment	--	--	--	0.22	7.4	--	--
9/19/2018	Assessment	2.49	262	109	0.22	7.3	742	1,500
4/9/2019	Assessment	3.50	301	132	0.19	7.1	703	1,650
6/19/2019	Assessment	3.15	278	127	0.16	7.3	741	1,580
9/9/2019	Assessment	3.23	267	128	0.20	7.3	770	1,520
3/10/2020	Assessment	--	--	--	0.24	6.7	--	--
5/14/2020	Assessment	3.68	250	116	0.25	6.9	715	1,520
10/9/2020	Assessment	2.59	265	107	0.21	7.0	635	1,360
3/25/2021	Assessment	2.48	220	95.3	0.29	7.3	577	1,210
5/20/2021	Assessment	2.72	223	100	0.27	7.1	602	1,300
10/27/2021	Assessment	2.94	221	93.5	0.26	7.1	532	1,210
3/2/2022	Corrective Action	2.25	237 M1, P3	100	0.25	7.4	609	1,250
5/23/2022	Corrective Action	2.59	270	98.0	0.26	6.9	634	1,300 L1
11/3/2022	Corrective Action	2.37	246	96.1	0.24	7.0	622	1,340
2/15/2023	Corrective Action	2.11	240	112	0.23	6.9	702	1,360
5/24/2023	Corrective Action	1.90	204	112	0.22	7.1	692	1,350
10/25/2023	Corrective Action	2.01	227	105	0.25	7.1	588	1,280
3/13/2024	Corrective Action	--	--	--	0.23	7.1	--	--
5/17/2024	Corrective Action	1.93	232	105	0.25	7.1	685	1,330
10/22/2024	Corrective Action	1.90	247	107	0.26	7.1	690	1,400

Table 1. Groundwater Data Summary: MW-1604S
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/26/2016	Background	0.04 J1	0.39	29.4	< 0.005 U1	0.03	0.2	0.358	0.136	0.20	0.114	0.034	< 0.002 U1	3.20	3.1	0.03 J1
11/1/2016	Background	0.04 J1	0.46	27.2	< 0.005 U1	0.04	0.3	0.307	0.769	0.21	0.065	0.035	< 0.002 U1	2.47	2.5	0.02 J1
12/20/2016	Background	0.04 J1	0.42	26.6	< 0.005 U1	0.04	1.97	0.390	0.5256	0.19	0.093	0.023	< 0.002 U1	2.71	2.7	0.03 J1
2/21/2017	Background	0.03 J1	0.42	26.7	< 0.005 U1	0.04	0.379	0.501	0.920	0.21	0.140	0.033	< 0.002 U1	2.52	2.2	0.03 J1
3/28/2017	Background	0.03 J1	0.37	31.6	< 0.005 U1	0.03	0.692	0.308	0.585	0.20	0.055	0.042	< 0.002 U1	2.53	2.2	0.119
4/19/2017	Background	0.03 J1	0.44	28.9	< 0.004 U1	0.04	0.158	0.317	0.722	0.21	0.051	0.041	0.003 J1	2.53	1.7	0.02 J1
5/16/2017	Background	0.04 J1	0.51	32.2	< 0.004 U1	0.04	0.098	0.317	2.577	0.19	0.100	0.033	< 0.002 U1	2.54	2.0	0.04 J1
6/13/2017	Background	0.03 J1	0.41	28.7	< 0.004 U1	0.04	0.149	0.308	0.598	0.20	0.033	0.038	< 0.002 U1	2.41	2.5	0.02 J1
5/9/2018	Assessment	0.13	0.33	28.7	0.024	0.15	0.107	1.83	1.173	0.22	0.034	0.051	< 0.002 U1	16.2	1.0	0.220
9/19/2018	Assessment	0.13	0.32	26.6	< 0.004 U1	0.15	0.093	1.88	1.159	0.22	0.02 J1	0.052	< 0.002 U1	15.6	0.8	0.251
4/9/2019	Assessment	0.2 J1	0.54	29.1	< 0.1 U1	0.27	0.3 J1	2.41	1.472	0.19	< 0.1 U1	0.061	< 0.002 U1	17.8	1.2	< 0.5 U1
6/19/2019	Assessment	0.15	0.33	29.0	< 0.02 U1	0.21	0.09 J1	2.16	1.256	0.16	< 0.02 U1	0.032	< 0.002 U1	16.6	1.0	0.3 J1
9/9/2019	Assessment	0.14	0.34	29.0	< 0.02 U1	0.21	0.1 J1	2.14	1.15	0.20	< 0.05 U1	0.0476	< 0.002 U1	16.3	1.0	0.3 J1
3/10/2020	Assessment	0.14	0.29	28.9	< 0.02 U1	0.12	0.323	1.72	1.662	0.24	< 0.05 U1	0.0390	< 0.002 U1	13.7	1.2	0.2 J1
5/14/2020	Assessment	0.15	0.30	29.1	--	0.19	0.1 J1	1.93	1.038	0.25	< 0.05 U1	0.0419	--	14.9	1.1	0.2 J1
10/9/2020	Assessment	0.16	0.32	28.2	--	0.21	0.798	2.08	9.989	0.21	< 0.05 U1	0.0384	< 0.002 U1	15.0	0.9	0.3 J1
3/25/2021	Assessment	0.25	0.35	28.2	< 0.007 U1	0.20	0.506	4.70	2.14	0.29	0.245	0.0368	< 0.002 U1	13.7	1.1	0.2 J1
5/20/2021	Assessment	0.16	0.25	25.3	< 0.007 U1	0.174	0.21	1.77	1.38	0.27	< 0.05 U1	0.0374	< 0.002 U1	14.5	0.96	0.24
10/27/2021	Assessment	0.15	0.35	24.9	< 0.007 U1	0.171	0.41	2.36	1.48	0.26	< 0.05 U1	0.0380	< 0.002 U1	13.9	0.76	0.23
3/2/2022	Corrective Action	0.15	0.24	27.8	< 0.007 U1	0.172	0.45	1.99	1.99	0.25	< 0.05 U1	0.0340	< 0.002 U1	13.4	0.77	0.21
5/23/2022	Corrective Action	0.16	0.26	34.0	< 0.007 U1	0.128	0.23	1.79	1.29	0.26	< 0.05 U1	0.0351	< 0.002 U1	14.4	0.73	0.21
11/3/2022	Corrective Action	0.16	0.22	29.4	< 0.007 U1	0.167	0.50	1.89	2.63	0.24	0.07 J1	0.0358	< 0.002 U1	13.5	0.60	0.22
2/15/2023	Corrective Action	0.15	0.22	29.9	< 0.007 U1	0.181	0.34	2.20	1.83	0.23	< 0.05 U1	0.0356	< 0.002 U1	12.1	0.53	0.21
5/24/2023	Corrective Action	0.117	0.20	25.5	< 0.007 U1	0.169	0.20 J1	1.49	0.99	0.22	0.08 J1	0.0306	< 0.002 U1	11.4	0.55	0.19 J1
10/25/2023	Corrective Action	0.186	0.23	29.1	< 0.007 U1	0.302	0.43	4.11	1.43	0.25	< 0.05 U1	0.0309	< 0.002 U1	13.1	0.70	0.22
3/13/2024	Corrective Action	0.129	0.18	30.0	< 0.007 U1	0.211	0.33	1.83	1.35	0.23	< 0.05 U1	0.0323	< 0.002 U1	11.9	0.53	0.15 J1
5/17/2024	Corrective Action	0.173	0.28	30.7	< 0.01 U1	0.313	0.51	5.05	2.22	0.25	< 0.05 U1	0.0324	< 0.002 U1	15.2	0.71	0.17 J1
10/22/2024	Corrective Action	0.146	0.17	30.0	< 0.007 U1	0.212	0.49	3.00	0.88	0.26	< 0.05 U1	0.038	< 0.002 U1	10.4	0.47 J1	0.17 J1

Table 1. Groundwater Data Summary: MW-1605D
Mountaineer - BAP
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
9/27/2016	Background	12.2	462	195	0.18	7.6	1,480	2,650
11/2/2016	Background	9.96	381	195	0.19	7.4	1,500	2,510
12/20/2016	Background	9.35	341	168	0.18	7.4	1,290	2,300
2/21/2017	Background	9.16	318	163	0.20	7.3	1,190	2,290
3/28/2017	Background	11.6	344	169	0.20	7.2	1,200	2,350
4/18/2017	Background	9.06	360	172	0.20	7.5	1,180	2,280
5/16/2017	Background	8.77	374	187	0.20	7.9	1,130	2,240
6/13/2017	Background	9.09	351	196	0.17	--	1,190	2,260
10/31/2017	Detection	7.83	324	198	0.21	7.3	1,170	2,170
1/22/2018	Detection	9.33	321	197	--	7.2	1,070	2,060
5/9/2018	Assessment	--	--	--	0.23	7.5	--	--
9/19/2018	Assessment	9.11	278	188	0.22	7.6	972	1,960
4/9/2019	Assessment	6.90	247	169	0.22	7.3	791	1,710
6/19/2019	Assessment	6.57	265	165	0.19	7.5	877	1,890
9/10/2019	Assessment	8.57	283	168	0.17	7.2	974	2,050
3/10/2020	Assessment	--	--	--	0.19	6.9	--	--
5/19/2020	Assessment	6.92	265	169	0.17	7.0	848	1,670
10/9/2020	Assessment	4.81	247	109	0.20	7.2	682	1,490
3/25/2021	Assessment	4.32	233	121	0.22	7.5	772	1,540
5/19/2021	Assessment	4.90	224	128	0.21	7.2	785	1,590
10/26/2021	Assessment	3.70	183	103	0.21	7.2	526	1,230
3/9/2022	Corrective Action	3.35	189	102	0.20	7.4	532	1,220
5/24/2022	Corrective Action	3.98	220	104	0.20	7.0	615	2,610 L1
11/4/2022	Corrective Action	2.69	212 M1, P3	99.3	0.20	7.3	566	1,270
2/15/2023	Corrective Action	2.96	214	110	0.20	7.1	584	1,250
5/24/2023	Corrective Action	3.15 M1	202 M1	111	0.19	7.2	697	1,410
10/26/2023	Corrective Action	2.58	222 M1	105	0.22	7.2	577	1,250
3/12/2024	Corrective Action	--	--	--	0.21	7.1	--	--
5/16/2024	Corrective Action	2.66	181 M1	132	0.21	7.2	554	1,300
10/23/2024	Corrective Action	2.44	189 M1	113	0.24	7.2	508	1,230

Table 1. Groundwater Data Summary: MW-1605D
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.03 J1	2.29	31.5	< 0.01 U1	0.04	0.1	1.91	1.06	0.18	0.080	0.085	< 0.002 U1	54.6	0.2	0.06 J1
11/2/2016	Background	0.03 J1	2.48	30.6	< 0.01 U1	0.04	0.2	1.79	1.925	0.19	0.044	0.078	< 0.002 U1	52.4	0.2	0.05 J1
12/20/2016	Background	0.03 J1	2.26	28.2	< 0.01 U1	0.04 J1	2.29	1.75	2.662	0.18	0.03 J1	0.063	< 0.002 U1	54.7	0.3	0.05 J1
2/21/2017	Background	0.04 J1	2.23	25.9	< 0.005 U1	0.03	0.282	1.84	1.033	0.20	0.021	0.071	< 0.002 U1	46.8	0.2	0.138
3/28/2017	Background	0.04 J1	2.01	27.9	< 0.005 U1	0.03	0.556	1.69	0.578	0.20	0.02 J1	0.086	< 0.002 U1	44.6	0.2	0.090
4/18/2017	Background	0.03 J1	2.25	25.8	< 0.008 U1	0.02 J1	0.127	1.69	0.821	0.20	0.02 J1	0.077	0.002 J1	43.2	0.2 J1	0.04 J1
5/16/2017	Background	0.03 J1	2.45	26.3	< 0.004 U1	0.02 J1	0.099	1.63	3.433	0.20	0.01 J1	0.075	< 0.002 U1	48.1	0.2	0.04 J1
6/13/2017	Background	0.04 J1	1.99	27.2	< 0.008 U1	0.04	0.120	1.86	0.668	0.17	0.02 J1	0.081	< 0.002 U1	45.5	0.4	0.05 J1
5/9/2018	Assessment	0.03 J1	2.22	21.6	< 0.004 U1	0.01 J1	0.067	1.51	0.523	0.23	0.02 J1	0.062	< 0.002 U1	46.4	0.2	0.04 J1
9/19/2018	Assessment	0.04 J1	2.51	25.9	< 0.004 U1	0.02 J1	0.229	1.80	0.759	0.22	0.01 J1	0.060	< 0.002 U1	47.9	0.3	0.05 J1
4/9/2019	Assessment	0.04 J1	2.81	26.4	< 0.02 U1	0.01 J1	0.06 J1	1.56	0.543	0.22	0.03 J1	0.075	< 0.002 U1	40.6	0.2	< 0.1 U1
6/19/2019	Assessment	< 0.04 U1	2.67	28.6	< 0.04 U1	0.02 J1	0.2 J1	1.65	0.831	0.19	< 0.04 U1	0.02 J1	< 0.002 U1	40.0	0.2 J1	< 0.2 U1
9/10/2019	Assessment	0.03 J1	2.78	33.1	< 0.02 U1	0.03 J1	0.04 J1	1.69	1.641	0.17	< 0.05 U1	0.0561	< 0.002 U1	39.7	0.3	< 0.1 U1
3/10/2020	Assessment	0.03 J1	3.01	29.6	< 0.02 U1	0.02 J1	0.08 J1	1.67	0.3851	0.19	< 0.05 U1	0.0502	< 0.002 U1	32.7	0.2 J1	< 0.1 U1
5/19/2020	Assessment	0.04 J1	2.73	25.7	--	0.01 J1	0.1 J1	1.45	0.425	0.17	< 0.05 U1	0.0495	--	32.8	0.2 J1	< 0.1 U1
10/9/2020	Assessment	< 0.02 U1	3.09	23.0	--	< 0.01 U1	0.208	1.43	0.8083	0.20	0.05 J1	0.0439	< 0.002 U1	35.7	0.09 J1	< 0.1 U1
3/25/2021	Assessment	0.03 J1	2.98	27.3	< 0.007 U1	0.01 J1	0.1 J1	1.55	3.315	0.22	< 0.05 U1	0.0447	< 0.002 U1	30.1	0.2 J1	< 0.04 U1
5/19/2021	Assessment	0.06 J1	2.83	26.6	< 0.007 U1	0.014 J1	0.17 J1	1.54	1.28	0.21	< 0.05 U1	0.0455	< 0.002 U1	29.3	0.14 J1	< 0.04 U1
10/26/2021	Assessment	0.04 J1	2.90	24.3	< 0.007 U1	0.011 J1	0.19 J1	1.23	0.62	0.21	< 0.05 U1	0.0413	< 0.002 U1	33.0	0.11 J1	0.05 J1
3/9/2022	Corrective Action	0.02 J1	3.33	26.6	< 0.007 U1	0.015 J1	0.50	1.41	2.11	0.20	< 0.05 U1	0.0352	< 0.002 U1	33.7	< 0.09 U1	< 0.04 U1
5/24/2022	Corrective Action	0.04 J1	3.27	33.5	< 0.007 U1	0.016 J1	0.18 J1	1.49	1.33	0.20	< 0.05 U1	0.0416	< 0.002 U1	35.5	0.13 J1	< 0.04 U1
11/4/2022	Corrective Action	0.03 J1	3.42	29.5	< 0.007 U1	0.008 J1	0.25	1.24	2.06	0.20	< 0.05 U1	0.0430	< 0.002 U1	32.0	< 0.09 U1	< 0.04 U1
2/15/2023	Corrective Action	0.03 J1	2.97	30.0	< 0.007 U1	0.008 J1	0.23	1.24	0.59	0.20	< 0.05 U1	0.0417	< 0.002 U1	30.2	0.11 J1	< 0.04 U1
5/24/2023	Corrective Action	0.031 J1	2.72	28.4	< 0.007 M1, U1	0.008 J1	0.32	1.25	1.33	0.19	< 0.05 U1	0.0365 M1	< 0.002 U1	27.5	0.11 J1	0.02 J1
10/26/2023	Corrective Action	0.024 J1	2.85	28.8	< 0.007 U1	0.008 J1	0.22 J1	1.14	1.21	0.22	< 0.05 U1	0.0400	< 0.002 U1	27.4	0.09 J1	0.03 J1
3/12/2024	Corrective Action	0.021 J1	3.32	29.0	< 0.007 U1	0.008 J1	0.20 J1	1.30	0.80	0.21	0.06 J1	0.0394	< 0.002 U1	28.0	0.05 J1	0.03 J1
5/16/2024	Corrective Action	0.024 J1	3.04	28.5	< 0.01 U1	0.011 J1	0.27 J1	1.17	1.27	0.21	< 0.05 U1	0.0402	< 0.002 U1	27.7	0.09 J1	0.03 J1
10/23/2024	Corrective Action	0.013 J1	3.24	27.0	< 0.007 U1	0.008 J1	0.19 J1	1.12	0.48	0.24	< 0.05 U1	0.046	< 0.002 U1	30.1	0.08 J1	0.03 J1

Table 1. Groundwater Data Summary: MW-1605S
Mountaineer - BAP
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
9/27/2016	Background	8.30	224	150	0.24	7.5	965	1,910
11/1/2016	Background	6.55	220	159	0.25	7.3	1,010	1,930
12/20/2016	Background	7.30	279	173	0.22	7.4	1,180	2,160
2/21/2017	Background	9.04	249	179	0.25	7.2	1,110	2,220
3/28/2017	Background	10.8	261	212	0.25	7.1	1,110	2,250
4/18/2017	Background	8.69	244	180	0.23	7.4	1,100	2,120
5/16/2017	Background	8.75	251	217	0.26	7.7	1,060	2,160
6/13/2017	Background	8.80	218	191	0.24	7.8	1,000	1,980
10/31/2017	Detection	5.88	212	222	0.25	7.2	1,040	2,000
1/22/2018	Detection	10.1	231	220	--	7.1	976	1,970
5/9/2018	Assessment	--	--	--	0.30	7.2	--	--
9/19/2018	Assessment	7.75	182	171	0.32	7.4	793	1,650
4/9/2019	Assessment	9.39	164	140	0.33	7.2	599	1,450
6/19/2019	Assessment	7.02	156	140	0.23	7.4	649	1,510
9/10/2019	Assessment	8.05	174	149	0.26	7.2	694	1,470
3/10/2020	Assessment	--	--	--	0.30	6.9	--	--
5/19/2020	Assessment	4.83	154	93.5	0.28	6.9	543	1,160
10/9/2020	Assessment	3.99	163	85.4	0.28	7.0	492	1,150
3/24/2021	Assessment	4.63	160	85.8	0.33	7.4	512	1,120
5/19/2021	Assessment	4.74	154	93.2	0.30	7.1	528	1,180
10/26/2021	Assessment	3.95	167	81.9	0.29	7.3	568	1,220
3/9/2022	Corrective Action	4.16	180	80.2	0.24	7.3	607	1,250
5/24/2022	Corrective Action	4.17	178	66.0	0.27	6.9	547	1,130 L1
11/4/2022	Corrective Action	3.63	156	81.4	0.26	7.2	513	1,180
2/15/2023	Corrective Action	3.49	162	78.3	0.25	6.9	574	1,170
5/22/2023	Corrective Action	3.28	153	85.5	0.23	7.2	623	1,240
10/26/2023	Corrective Action	3.16	160	94.9	0.27	7.2	562	1,220
3/12/2024	Corrective Action	--	--	--	0.24	7.0	--	--
5/16/2024	Corrective Action	3.57	172	113	0.25	7.1	563	1,270
10/23/2024	Corrective Action	3.33	154	130	0.26	7.1	564	1,270

Table 1. Groundwater Data Summary: MW-1605S
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.16	1.38	49.6	0.02 J1	0.13	0.6	3.16	0.777	0.24	2.18	0.086	< 0.002 U1	25.8	1.1	0.174
11/1/2016	Background	0.07	0.93	38.2	0.009 J1	0.08	0.7	1.26	2.692	0.25	0.793	0.084	< 0.002 U1	23.9	0.9	0.055
12/20/2016	Background	0.07 J1	0.88	37.0	< 0.01 U1	0.08	2.85	0.861	0.337	0.22	0.410	0.076	< 0.002 U1	22.9	0.7	0.05 J1
2/21/2017	Background	0.04 J1	0.86	36.0	0.007 J1	0.08	0.390	1.10	0.785	0.25	0.636	0.068	< 0.002 U1	17.5	1.1	0.055
3/28/2017	Background	0.03 J1	0.63	32.5	< 0.005 U1	0.06	0.349	0.448	0.466	0.25	0.181	0.076	< 0.002 U1	15.4	1.0	0.102
4/18/2017	Background	0.06 J1	0.74	31.9	< 0.008 U1	0.08	0.245	0.715	0.827	0.23	0.285	0.067	0.003 J1	20.8	3.0	0.04 J1
5/16/2017	Background	0.06 J1	0.88	33.3	< 0.008 U1	0.08	0.585	0.647	2.733	0.26	0.382	0.076	< 0.002 U1	18.6	1.7	0.06 J1
6/13/2017	Background	0.05 J1	0.75	30.8	< 0.008 U1	0.08	0.387	0.708	0.611	0.24	0.541	0.071	< 0.002 U1	17.8	1.7	0.05 J1
5/9/2018	Assessment	0.04 J1	0.50	23.5	< 0.004 U1	0.06	0.083	0.518	0.3045	0.30	0.056	0.051	< 0.002 U1	15.6	2.0	0.04 J1
9/19/2018	Assessment	0.04 J1	0.49	23.1	< 0.004 U1	0.05	0.644	0.360	0.347	0.32	0.093	0.049	< 0.002 U1	15.1	1.0	0.04 J1
4/9/2019	Assessment	0.05 J1	0.64	25.2	< 0.02 U1	0.05	0.293	0.631	0.369	0.33	0.331	0.079	< 0.002 U1	15.9	0.7	< 0.1 U1
6/19/2019	Assessment	0.04 J1	0.47	23.6	< 0.02 U1	0.05 J1	0.1 J1	0.279	0.424	0.23	0.08 J1	0.040	< 0.002 U1	13.6	0.6	< 0.1 U1
9/10/2019	Assessment	0.04 J1	0.59	29.6	< 0.02 U1	0.05 J1	0.237	0.379	0.542	0.26	0.202	0.0524	< 0.002 U1	14.2	0.4	< 0.1 U1
3/10/2020	Assessment	0.08 J1	0.62	26.5	< 0.02 U1	0.04 J1	0.305	0.723	0.842	0.30	0.497	0.0558	< 0.002 U1	12.8	0.8	< 0.1 U1
5/19/2020	Assessment	0.04 J1	0.47	21.1	--	0.03 J1	0.1 J1	0.208	0.639	0.28	< 0.05 U1	0.0523	--	12.3	0.7	< 0.1 U1
10/9/2020	Assessment	0.04 J1	0.47	24.6	--	0.03 J1	0.266	0.195	1.4891	0.28	0.05 J1	0.0470	< 0.002 U1	11.2	0.5	< 0.1 U1
3/24/2021	Assessment	0.04 J1	0.42	25.7	< 0.007 U1	0.05 J1	0.2 J1	0.208	0.919	0.33	0.06 J1	0.0509	< 0.002 U1	13.4	0.4 J1	< 0.04 U1
5/19/2021	Assessment	0.09 J1	0.43	26.9	< 0.007 U1	0.047	0.34	0.603	0.77	0.30	0.14 J1	0.0516	< 0.002 U1	12.4	0.39 J1	< 0.04 U1
10/26/2021	Assessment	0.04 J1	0.39	28.2	< 0.007 U1	0.050	0.07 J1	0.324	0.69	0.29	< 0.05 U1	0.0542 M1	< 0.002 U1	11.9	0.96	< 0.04 U1
3/9/2022	Corrective Action	0.05 J1	0.43	28.3	< 0.007 U1	0.057	0.46	0.547	2.40	0.24	0.08 J1	0.0522	< 0.002 U1	14.3	0.88	< 0.04 U1
5/24/2022	Corrective Action	0.09 J1	0.43	29.0	< 0.007 U1	0.040	0.25	0.377	0.34	0.27	0.08 J1	0.0481	< 0.002 U1	13.4	0.92	< 0.04 U1
11/4/2022	Corrective Action	0.06 J1	0.45	27.3	< 0.007 U1	0.045	0.44	0.547	1.04	0.26	0.17 J1	0.0444	< 0.002 U1	13.0	0.59	< 0.04 U1
2/15/2023	Corrective Action	0.04 J1	0.39	27.5	< 0.007 U1	0.046	0.26	0.306	0.63	0.25	0.05 J1	0.0456	< 0.002 U1	12.8	0.45 J1	< 0.04 U1
5/22/2023	Corrective Action	0.043 J1	0.34	25.3	< 0.007 U1	0.049	0.18 J1	0.344	0.67	0.23	0.06 J1	0.0415	< 0.002 U1	13.6	1.38	0.03 J1
10/26/2023	Corrective Action	0.037 J1	0.41	27.6	< 0.007 U1	0.044	0.44	0.439	0.52	0.27	0.18 J1	0.0384	< 0.002 U1	12.5	1.53	0.03 J1
3/12/2024	Corrective Action	0.049 J1	0.44	30.3	< 0.007 U1	0.052	0.32	0.443	0.31	0.24	0.23	0.0417	< 0.002 U1	14.8	0.99	0.03 J1
5/16/2024	Corrective Action	0.033 J1	0.39	29.7	< 0.007 U1	0.052	0.42	0.451	0.51	0.25	0.10 J1	0.0380	< 0.002 U1	14.8	1.55	0.02 J1
10/23/2024	Corrective Action	0.035 J1	0.37	28.5	< 0.007 U1	0.054	0.40	0.514	0.38	0.26	0.28	0.050	< 0.002 U1	15.2	1.03	0.02 J1

Table 1. Groundwater Data Summary: MW-1606D
Mountaineer - BAP
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
9/27/2016	Background	4.29	278	190	0.25	7.2	813	1,710
11/2/2016	Background	3.97	252	201	0.28	7.4	796	1,720
12/20/2016	Background	4.96	260	206	0.24	7.5	796	1,690
2/21/2017	Background	5.48	242	190	0.26	7.3	759	1,670
3/28/2017	Background	6.90	247	187	0.26	7.2	739	1,700
4/18/2017	Background	5.46	274	104	0.26	7.4	385	1,690
5/16/2017	Background	5.26	278	218	0.26	8.0	764	1,730
6/13/2017	Background	5.90	262	219	0.24	7.5	752	1,680
10/31/2017	Detection	7.03	287	213	0.24	7.3	770	1,590
1/23/2018	Detection	9.59	322	237	--	7.4	760	1,730
5/9/2018	Assessment	--	--	--	0.26	7.4	--	--
9/19/2018	Assessment	7.27	260	201	0.26	7.2	722	1,610
4/8/2019	Assessment	7.32	265	214	0.26	7.2	682	1,600
6/19/2019	Assessment	7.79	281	231	0.1 J1	7.4	693	1,690
9/10/2019	Assessment	6.38	281	244	0.49	7.4	588	1,700
3/10/2020	Assessment	--	--	--	0.27	7.0	--	--
5/19/2020	Assessment	5.92	270	178	0.24	7.0	756	1,600
10/8/2020	Assessment	6.85	273	208	0.23	7.1	694	1,650
3/25/2021	Assessment	7.50	239	170	0.27	7.4	703	1,580
5/18/2021	Assessment	7.99	230	180	0.26	7.1	682	1,620
10/26/2021	Assessment	7.25	216	226	0.26	7.0	652	1,650
3/9/2022	Corrective Action	7.44	235	229	0.22	7.3	657	1,530
5/24/2022	Corrective Action	4.90	207	131	0.26	6.9	581	1,280 L1
11/7/2022	Corrective Action	6.37	199	191	0.24	7.2	585	1,380
2/15/2023	Corrective Action	5.52 M1	189 M1	164	0.24	7.2	601	1,320
5/24/2023	Corrective Action	4.07	194	172	0.23	7.2	585	1,330
10/27/2023	Corrective Action	4.23	212	159	0.26	7.2	563	1,320
3/12/2024	Corrective Action	--	--	--	0.28	7.1	--	--
5/15/2024	Corrective Action	1.93	150	106	0.31	7.3	490	1,080
10/23/2024	Corrective Action	2.08	164	116	0.30	7.2	517	1,120

Table 1. Groundwater Data Summary: MW-1606D
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.19	0.71	64.0	0.005 J1	0.07	0.3	2.20	8.459	0.25	0.522	0.129	< 0.002 U1	81.4	1.8	0.123
11/2/2016	Background	0.19	0.84	62.6	< 0.005 U1	0.07	0.9	1.92	3.659	0.28	0.491	0.120	< 0.002 U1	81.2	4.7	0.092
12/20/2016	Background	0.16	0.63	58.4	< 0.005 U1	0.06	0.736	1.52	1.179	0.24	0.164	0.110	< 0.002 U1	83.2	3.6	0.094
2/21/2017	Background	0.16	0.51	52.6	< 0.005 U1	0.07	0.300	1.33	1.71	0.26	0.082	0.109	< 0.002 U1	76.6	4.1	0.119
3/28/2017	Background	0.15	0.44	53.6	< 0.005 U1	0.05	0.541	1.17	1.459	0.26	0.087	0.130	< 0.002 U1	73.3	3.6	0.113
4/18/2017	Background	0.25	1.38	64.2	0.01 J1	0.08	0.853	4.26	1.212	0.26	2.04	0.119	0.004 J1	71.5	4.1	0.097
5/16/2017	Background	0.19	0.63	56.7	0.031	0.07	0.163	1.39	3.18	0.26	0.162	0.124	< 0.002 U1	79.1	5.9	0.095
6/13/2017	Background	0.16	0.52	52.0	< 0.008 U1	0.08	0.153	1.46	1.026	0.24	0.084	0.132	< 0.002 U1	77.8	8.1	0.09 J1
5/9/2018	Assessment	0.16	0.44	53.0	< 0.004 U1	0.07	0.198	1.40	0.972	0.26	0.115	0.112	< 0.002 U1	70.3	2.6	0.086
9/19/2018	Assessment	0.15	0.38	48.9	0.004 J1	0.07	0.151	1.17	0.4378	0.26	0.01 J1	0.107	< 0.002 U1	65.3	3.3	0.108
4/8/2019	Assessment	0.15	0.35	47.3	< 0.02 U1	0.07	0.1 J1	1.25	0.940	0.26	0.03 J1	0.124	< 0.002 U1	71.8	8.1	< 0.1 U1
6/19/2019	Assessment	0.14	0.37	49.4	< 0.02 U1	0.09	0.07 J1	1.36	0.933	0.1 J1	< 0.02 U1	0.058	< 0.002 U1	68.3	9.6	0.1 J1
9/10/2019	Assessment	0.15	0.40	51.4	< 0.02 U1	0.08	0.1 J1	1.09	2.2714	0.49	< 0.05 U1	0.0835	< 0.002 U1	68.5	1.0	< 0.1 U1
3/10/2020	Assessment	0.14	0.35	45.3	< 0.02 U1	0.05	0.2 J1	1.11	0.946	0.27	< 0.05 U1	0.0700	< 0.002 U1	62.5	0.5	< 0.1 U1
5/19/2020	Assessment	0.15	0.32	45.6	--	0.06	0.1 J1	1.10	0.975	0.24	< 0.05 U1	0.0681	--	67.0	0.5	< 0.1 U1
10/8/2020	Assessment	0.14	0.36	45.6	--	0.08	0.247	1.54	0.908	0.23	< 0.05 U1	0.0633	< 0.002 U1	63.6	4.2	< 0.1 U1
3/25/2021	Assessment	0.15	0.35	47.3	< 0.007 U1	0.08	0.202	1.56	0.444	0.27	< 0.05 U1	0.0658	< 0.002 U1	66.9	3.2	0.07 J1
5/18/2021	Assessment	0.20	0.33	46.1	< 0.007 U1	0.082	0.46	1.60	1.24	0.26	< 0.05 U1	0.0666	< 0.002 U1	66.9	3.62	0.07 J1
10/26/2021	Assessment	0.14	0.28	46.1	< 0.007 U1	0.075	0.30	1.60	0.89	0.26	< 0.05 U1	0.0594	< 0.002 U1	61.2	1.92	0.07 J1
3/9/2022	Corrective Action	0.17	0.30	48.1	< 0.007 U1	0.083	0.64	1.77	2.43	0.22	0.07 J1	0.0603	< 0.002 U1	66.5	1.64	0.07 J1
5/24/2022	Corrective Action	0.21	0.27	39.4	< 0.007 U1	0.052	0.43	1.01	1.89	0.26	< 0.05 U1	0.0540	< 0.002 U1	62.0	0.85	0.06 J1
11/7/2022	Corrective Action	0.14	0.30	41.9	< 0.007 U1	0.064	0.28	1.41	2.35	0.24	< 0.05 U1	0.0591	< 0.002 U1	62.5	2.18	0.06 J1
2/15/2023	Corrective Action	0.15	0.27	39.6	< 0.007 U1	0.061	0.52	1.31	1.85	0.24	< 0.05 M1, P3, U1	0.0545 M1	< 0.002 U1	65.3	1.41	0.07 J1
5/24/2023	Corrective Action	0.140	0.26	37.3	< 0.007 U1	0.057	0.48	1.23	0.78	0.23	< 0.05 U1	0.0519	< 0.002 U1	59.3	2.29	0.06 J1
10/27/2023	Corrective Action	0.143	0.28	40.7	< 0.007 U1	0.060	0.45	1.18	1.38	0.26	< 0.05 U1	0.0520	< 0.002 U1	56.3	2.35	0.09 J1
3/12/2024	Corrective Action	0.142	0.22	34.3	< 0.007 U1	0.054	0.85	0.889	0.80	0.28	< 0.05 U1	0.0514	< 0.002 U1	55.1	2.68	0.06 J1
5/15/2024	Corrective Action	0.133	0.22	31.4	< 0.007 U1	0.054	0.46	0.844	0.55	0.31	0.11 J1	0.0500	< 0.002 U1	53.8	0.58	0.06 J1
10/23/2024	Corrective Action	0.130	0.24	34.1	< 0.007 U1	0.042	0.45	1.03	0.55	0.30	0.05 J1	0.061	< 0.002 U1	56.5	2.21	0.06 J1

Table 1. Groundwater Data Summary: MW-1606S
Mountaineer - BAP
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
9/27/2016	Background	5.25	219	182	0.50	6.0	621	1,470
11/2/2016	Background	4.57	183	183	0.57	7.2	638	1,470
12/20/2016	Background	5.35	200	170	0.46	7.3	621	1,420
2/21/2017	Background	5.03	211	231	0.46	7.1	578	1,500
3/28/2017	Background	6.67	217	226	0.45	7.0	589	1,500
4/18/2017	Background	5.80	228	217	0.43	7.2	615	1,540
5/16/2017	Background	5.72	228	227	0.45	7.7	635	3,230
6/13/2017	Background	6.12	230	230	0.45	7.4	643	1,540
10/31/2017	Detection	9.54	226	187	0.46	7.1	644	1,410
1/23/2018	Detection	6.62	218	184	0.43	7.2	660	1,450
5/9/2018	Assessment	--	--	--	0.44	6.9	--	--
9/19/2018	Assessment	5.87	199	219	0.46	7.1	571	1,370
4/8/2019	Assessment	7.68	229	223	0.54	6.8	592	1,480
6/19/2019	Assessment	6.08	223	232	0.25	7.2	581	1,490
9/10/2019	Assessment	6.19	229	221	0.28	7.3	705	1,460
3/10/2020	Assessment	--	--	--	0.40	6.8	--	--
5/19/2020	Assessment	5.94	207	181	0.38	6.7	646	1,400
10/8/2020	Assessment	6.35	206	172	0.38	6.9	572	1,460
3/25/2021	Assessment	6.09	172	137	0.45	7.2	516	1,280
5/18/2021	Assessment	4.92	158	141	0.45	7.0	505	1,290
10/26/2021	Assessment	5.49	181	152	0.38	6.9	497	1,300
3/9/2022	Corrective Action	5.01	200	145	0.38	7.1	495	1,280
5/24/2022	Corrective Action	3.61	156 M1, P3	124	0.39	6.9	485	1,150 L1
11/8/2022	Corrective Action	4.94	201	169	0.36	7.1	529	1,300
2/15/2023	Corrective Action	5.06	196	166	0.34	7.0	553	1,280
5/23/2023	Corrective Action	3.33	127	106	0.34	7.1	477	1,100
10/27/2023	Corrective Action	3.03	160	98.3	0.37	7.0	458	1,100
3/12/2024	Corrective Action	--	--	--	0.37	7.0	--	--
5/15/2024	Corrective Action	2.10	121	78.8	0.41	7.3	366	900
10/23/2024	Corrective Action	2.06	127	79.6	0.42	7.0	333	910

Table 1. Groundwater Data Summary: MW-1606S
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.16	0.88	76.7	< 0.005 U1	0.08	0.2	0.466	0.592	0.50	0.234	0.116	< 0.002 U1	112	1.2	0.074
11/2/2016	Background	0.17	0.94	69.7	< 0.005 U1	0.07	0.4	0.432	1.55	0.57	0.207	0.103	< 0.002 U1	112	1.0	0.060
12/20/2016	Background	0.16	0.83	71.6	< 0.005 U1	0.07	1.26	0.280	1.656	0.46	0.084	0.102	< 0.002 U1	101	0.9	0.063
2/21/2017	Background	0.15	0.88	77.2	< 0.005 U1	0.08	0.384	0.372	0.993	0.46	0.158	0.108	< 0.002 U1	93.1	0.7	0.086
3/28/2017	Background	0.14	0.78	75.7	< 0.005 U1	0.06	0.742	0.258	0.945	0.45	0.096	0.126	< 0.002 U1	90.1	0.7	0.100
4/18/2017	Background	0.16	0.86	74.2	< 0.004 U1	0.07	0.134	0.234	1.303	0.43	0.070	0.117	0.002 J1	92.4	0.8	0.062
5/16/2017	Background	0.16	0.90	74.1	< 0.004 U1	0.07	0.093	0.241	2.167	0.45	0.062	0.110	< 0.002 U1	90.2	0.9	0.069
6/13/2017	Background	0.16	0.81	77.1	< 0.008 U1	0.09	0.178	0.281	1.280	0.45	0.090	0.118	< 0.002 U1	95.7	0.9	0.07 J1
5/9/2018	Assessment	0.14	0.72	73.2	< 0.004 U1	0.08	0.056	0.318	0.3443	0.44	0.040	0.107	< 0.002 U1	70.2	2.0	0.076
9/19/2018	Assessment	0.13	0.69	64.8	0.005 J1	0.06	0.297	0.260	0.439	0.46	0.02 J1	0.096	< 0.002 U1	70.6	2.8	0.112
4/8/2019	Assessment	0.15	0.70	63.1	< 0.02 U1	0.07	0.08 J1	0.320	0.595	0.54	0.107	0.117	< 0.002 U1	67.7	1.4	< 0.1 U1
6/19/2019	Assessment	0.15	0.63	67.2	< 0.02 U1	0.08	0.08 J1	0.171	1.0123	0.25	0.111	0.056	< 0.002 U1	58.9	1.3	0.1 J1
9/10/2019	Assessment	0.13	0.67	70.4	< 0.02 U1	0.07	0.08 J1	0.312	2.682	0.28	< 0.05 U1	0.0877	< 0.002 U1	54.9	2.7	< 0.1 U1
3/10/2020	Assessment	0.13	0.62	60.9	< 0.02 U1	0.07	0.1 J1	0.322	0.434	0.40	0.05 J1	0.0721	< 0.002 U1	51.7	4.4	< 0.1 U1
5/19/2020	Assessment	0.14	0.65	59.8	--	0.06	0.1 J1	0.435	0.3814	0.38	< 0.05 U1	0.0730	--	56.0	5.3	< 0.1 U1
10/8/2020	Assessment	0.14	0.68	57.4	--	0.07	0.492	0.148	0.682	0.38	< 0.05 U1	0.0701	< 0.002 U1	56.4	1.9	< 0.1 U1
3/25/2021	Assessment	0.16	0.70	54.1	< 0.007 U1	0.05	0.232	0.153	0.745	0.45	< 0.05 U1	0.0604	< 0.002 U1	62.5	3.0	0.06 J1
5/18/2021	Assessment	0.17	0.63	52.1	< 0.007 U1	0.067	0.19 J1	0.192	0.79	0.45	< 0.05 U1	0.0652	< 0.002 M1, P3, U1	52.8	3.49	0.06 J1
10/26/2021	Assessment	0.15	0.61	55.6	< 0.007 U1	0.061	0.21	0.142	0.67	0.38	0.08 J1	0.0644	< 0.002 U1	50.6	1.87	0.06 J1
3/9/2022	Corrective Action	0.15	0.70	54.6	< 0.007 U1	0.068	0.70	0.139	1.21	0.38	< 0.05 U1	0.0543	< 0.002 U1	58.3	2.04	0.06 J1
5/24/2022	Corrective Action	0.14	0.61	44.8	< 0.007 U1	0.055	0.30	0.280	3.53	0.39	< 0.05 U1	0.0582	< 0.002 U1	56.6	5.90	0.06 J1
11/8/2022	Corrective Action	0.14	0.62	56.0	< 0.007 U1	0.059	0.25	0.145	0.52	0.36	< 0.05 U1	0.0571	< 0.002 U1	51.8	1.43	0.06 J1
2/15/2023	Corrective Action	0.14	0.64	54.1	< 0.007 U1	0.061	0.26	0.195	0.93	0.34	< 0.05 U1	0.0545	< 0.002 U1	52.8	1.55	0.06 J1
5/23/2023	Corrective Action	0.130	0.51	36.3	< 0.007 U1	0.043	0.22 J1	0.136	0.47	0.34	0.06 J1	0.0391	< 0.002 U1	44.4	3.28	0.04 J1
10/27/2023	Corrective Action	0.147	0.58	44.7	< 0.007 U1	0.048	0.29 J1	0.154	0.92	0.37	0.05 J1	0.0473	< 0.002 U1	48.7	2.26	0.06 J1
3/12/2024	Corrective Action	0.144	0.57	42.9	< 0.007 U1	0.054	0.27 J1	0.152	0.59	0.37	< 0.05 U1	0.0467	< 0.002 U1	56.0	3.23	0.06 J1
5/15/2024	Corrective Action	0.129	0.59	35.8	< 0.007 U1	0.049	0.23 J1	0.155	1.54	0.41	0.17 J1	0.0444	< 0.002 U1	56.7	3.84	0.06 J1
10/23/2024	Corrective Action	0.132	0.60	38.1	< 0.007 U1	0.043	0.28 J1	0.110	0.37	0.42	< 0.05 U1	0.050	< 0.002 U1	55.9	3.96	0.05 J1

Table 1. Groundwater Data Summary: MW-1607D
Mountaineer - BAP
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
9/27/2016	Background	1.64	141	88.3	0.54	6.9	285	744
11/2/2016	Background	1.42	155	103	0.61	7.8	376	856
12/20/2016	Background	1.46	187	118	0.50	7.7	474	1,050
1/23/2017	Background	--	--	--	--	7.5	--	--
2/21/2017	Background	1.54	165	107	0.51	7.6	415	1,010
3/29/2017	Background	1.89	162	106	0.52	7.6	393	938
4/18/2017	Background	1.58	168	104	0.52	7.6	383	904
5/16/2017	Background	1.54	156	102	0.52	8.4	347	876
6/14/2017	Background	1.50	159	104	0.49	7.6	365	872
10/31/2017	Detection	1.76	214	138	0.47	7.6	626	1,290
1/23/2018	Detection	2.34	244	150	0.44	7.5	668	1,380
5/10/2018	Assessment	--	--	--	0.54	7.5	--	--
9/20/2018	Assessment	2.44	222	163	0.52	7.7	662	1,450
4/8/2019	Assessment	3.10	232	162	0.52	7.4	656	1,480
6/19/2019	Assessment	3.14	234	167	0.40	7.8	710	1,600
9/10/2019	Assessment	3.65	233	174	0.56	7.7	699	1,610
3/11/2020	Assessment	--	--	--	0.41	7.1	--	--
5/20/2020	Assessment	3.89	228	181	0.51	7.2	722	1,620
10/8/2020	Assessment	4.16	232	170	0.49	7.3	703	1,650
3/25/2021	Assessment	4.43	212	170	0.57	7.6	668	1,550
5/18/2021	Assessment	4.46	197	170	0.53	7.3	652	1,590
10/26/2021	Assessment	4.46	201	164	0.52	7.3	612	1,530
3/8/2022	Corrective Action	4.51	225	166	0.50	7.5	622	1,530
5/25/2022	Corrective Action	5.04	201	158	0.49	7.6	604	1,480 L1
11/8/2022	Corrective Action	4.56	222 M1	165	0.47	7.4	641	1,560
2/15/2023	Corrective Action	4.40	218	177	0.46	7.4	719	1,600
5/23/2023	Corrective Action	4.16	175	159	0.46	7.4	629	1,530
10/31/2023	Corrective Action	4.65	211	157	0.48	7.3	624	1,510
3/13/2024	Corrective Action	--	--	--	0.47	7.3	--	--
5/15/2024	Corrective Action	4.29	206	176	0.49	7.4	623	1,500
10/21/2024	Corrective Action	4.15	184 M1	156	0.53	7.3	569	1,460

Table 1. Groundwater Data Summary: MW-1607D
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.04 J1	0.91	117	< 0.005 U1	0.02 J1	0.3	0.439	0.86	0.54	0.179	0.068	< 0.002 U1	96.2	0.1	0.05 J1
11/2/2016	Background	0.03 J1	1.02	155	< 0.005 U1	0.02 J1	0.7	0.396	3.997	0.61	0.058	0.069	< 0.002 U1	91.1	0.07 J1	0.04 J1
12/20/2016	Background	0.03 J1	1.02	168	< 0.005 U1	0.005 J1	2.07	0.526	1.689	0.50	0.038	0.075	< 0.002 U1	89.6	0.03 J1	0.04 J1
2/21/2017	Background	0.03 J1	1.14	133	< 0.005 U1	< 0.004 U1	0.090	0.481	0.883	0.51	0.041	0.072	< 0.002 U1	87.7	0.03 J1	0.04 J1
3/29/2017	Background	0.05	1.24	140	0.008 J1	0.03	0.602	0.805	1.872	0.52	0.628	0.087	0.002 J1	85.9	0.5	0.062
4/18/2017	Background	0.03 J1	1.00	126	< 0.004 U1	< 0.005 U1	0.133	0.414	1.535	0.52	0.070	0.079	0.002 J1	81.8	0.05 J1	0.02 J1
5/16/2017	Background	0.03 J1	1.11	129	< 0.004 U1	< 0.005 U1	0.078	0.399	1.265	0.52	0.041	0.087	< 0.002 U1	91.2	0.04 J1	0.02 J1
6/14/2017	Background	0.03 J1	0.98	131	< 0.004 U1	< 0.005 U1	0.141	0.439	1.764	0.49	0.124	0.088	< 0.002 U1	90.8	0.03 J1	0.04 J1
5/10/2018	Assessment	0.03 J1	1.15	73.5	< 0.004 U1	< 0.005 U1	0.051	0.521	1.254	0.54	0.043	0.089	< 0.002 U1	80.9	< 0.03 U1	0.02 J1
9/20/2018	Assessment	0.03 J1	1.34	92.3	< 0.004 U1	< 0.005 U1	0.158	0.769	0.926	0.52	0.044	0.104	< 0.002 U1	83.4	< 0.03 U1	0.04 J1
4/8/2019	Assessment	0.03 J1	1.31	75.7	< 0.02 U1	< 0.01 U1	0.07 J1	0.778	1.3269	0.52	0.05 J1	0.127	< 0.002 U1	79.8	0.05 J1	< 0.1 U1
6/19/2019	Assessment	0.03 J1	1.61	82.3	< 0.02 U1	< 0.01 U1	0.1 J1	0.799	1.310	0.40	0.07 J1	0.072	< 0.002 U1	81.8	0.06 J1	< 0.1 U1
9/10/2019	Assessment	0.03 J1	1.53	79.3	< 0.02 U1	0.01 J1	0.05 J1	0.848	1.855	0.56	< 0.05 U1	0.110	< 0.002 U1	82.1	0.09 J1	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	1.56	68.3	< 0.02 U1	< 0.01 U1	0.08 J1	0.846	2.552	0.41	< 0.05 U1	0.108	< 0.002 U1	79.6	0.04 J1	< 0.1 U1
5/20/2020	Assessment	0.03 J1	1.42	65.6	--	< 0.01 U1	0.2 J1	0.913	0.815	0.51	0.05 J1	0.104	--	83.5	0.08 J1	< 0.1 U1
10/8/2020	Assessment	0.03 J1	1.80	75.8	--	< 0.01 U1	0.244	1.01	1.304	0.49	< 0.05 U1	0.0966	< 0.002 U1	83.8	0.06 J1	< 0.1 U1
3/25/2021	Assessment	0.03 J1	1.86	75.3	< 0.007 U1	0.004 J1	0.1 J1	0.874	1.002	0.57	< 0.05 U1	0.0770	< 0.002 U1	75.9	< 0.09 U1	< 0.04 U1
5/18/2021	Assessment	0.07 J1	1.86	71.7	< 0.007 U1	0.01 J1	0.26	0.843	1.34	0.53	< 0.05 U1	0.103	< 0.002 U1	75.0	< 0.09 U1	< 0.04 U1
10/26/2021	Assessment	0.03 J1	1.87	70.3	< 0.007 U1	0.008 J1	0.44	0.853	1.55	0.52	< 0.05 U1	0.0968	< 0.002 U1	72.3	< 0.09 U1	< 0.04 U1
3/8/2022	Corrective Action	0.03 J1	2.07	70.5	< 0.007 U1	0.011 J1	0.34	0.902	4.44	0.50	< 0.05 U1	0.0919	< 0.002 U1	71.9	< 0.09 U1	< 0.04 U1
5/25/2022	Corrective Action	0.03 J1	1.93	67.0	< 0.007 U1	0.01 J1	0.32	0.923	3.21	0.49	< 0.05 U1	0.0998	< 0.002 U1	75.0	< 0.09 U1	< 0.04 U1
11/8/2022	Corrective Action	0.03 J1	1.95	74.0	< 0.007 U1	< 0.004 U1	0.29	0.897	1.54	0.47	< 0.05 U1	0.0988	< 0.002 U1	64.3	< 0.09 U1	< 0.04 U1
2/15/2023	Corrective Action	0.04 J1	2.51	68.7	< 0.007 U1	< 0.004 U1	0.51	0.989	1.68	0.46	0.06 J1	0.0997	< 0.002 U1	63.2	< 0.09 U1	< 0.04 U1
5/23/2023	Corrective Action	0.030 J1	1.97	58.1	< 0.007 U1	< 0.004 U1	0.21 J1	0.839	1.81	0.46	< 0.05 U1	0.0811	< 0.002 U1	60.0	< 0.04 U1	< 0.02 U1
10/31/2023	Corrective Action	0.033 J1	1.97	63.5	< 0.007 U1	0.004 J1	0.47	0.859	1.70	0.48	< 0.05 U1	0.0892	< 0.002 U1	58.5	0.07 J1	0.02 J1
3/13/2024	Corrective Action	0.024 J1	2.18	64.2	< 0.007 U1	0.009 J1	0.43	0.854	1.20	0.47	< 0.05 U1	0.0906	< 0.002 U1	58.9	0.04 J1	0.03 J1
5/15/2024	Corrective Action	0.028 J1	1.99	60.3	< 0.04 U1	0.010 J1	1.03	0.808	1.37	0.49	< 0.05 U1	0.0895	< 0.002 U1	56.9	0.04 J1	0.02 J1
10/21/2024	Corrective Action	0.016 J1	1.97	54.7	< 0.007 U1	< 0.004 U1	0.82	0.748	0.80	0.53	< 0.05 U1	0.101	< 0.002 U1	54.8	0.05 J1	0.02 J1

Table 1. Groundwater Data Summary: MW-1607S
Mountaineer - BAP
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
10/31/2016	Background	1.38	126	90.8	0.31	7.6	213	670
11/2/2016	Background	1.35	126	90.6	0.32	7.6	214	698
12/21/2016	Background	1.02	129	92.7	0.33	7.7	246	716
2/21/2017	Background	1.27	131	91.9	0.29	7.5	244	746
3/28/2017	Background	1.70	131	93.1	0.28	7.4	233	706
4/18/2017	Background	1.65	135	92.6	0.30	7.6	225	678
5/16/2017	Background	1.64	133	97.5	0.29	8.2	221	746
6/14/2017	Background	1.74	136	96.3	0.27	7.5	229	708
10/31/2017	Detection	1.32	165	100	0.28	7.5	343	860
1/23/2018	Detection	1.49	--	111	--	7.4	--	--
5/10/2018	Assessment	--	--	--	0.29	7.4	--	--
9/20/2018	Assessment	1.71	220	151	0.28	7.6	478	1,160
4/8/2019	Assessment	2.35	226	153	0.26	7.2	504	1,310
6/19/2019	Assessment	2.46	233	154	0.19	7.5	524	1,370
9/10/2019	Assessment	3.21	198	167	0.27	7.7	465	1,350
3/10/2020	Assessment	--	--	--	0.24	6.9	--	--
5/20/2020	Assessment	3.55	190	172	0.23	7.0	407	1,230
10/8/2020	Assessment	3.26	187	148	0.24	7.0	371	1,180
3/25/2021	Assessment	3.37	187	166	0.26	7.4	373	1,160
5/18/2021	Assessment	3.40 P3	177	163	0.25	7.1	375	1,230
10/26/2021	Assessment	3.07	156	141	0.24	7.1	312	1,120
3/8/2022	Corrective Action	3.09	185	156	0.23	7.3	341	1,170
5/25/2022	Corrective Action	3.37	169	143	0.21	7.1	339	1,130 L1
11/8/2022	Corrective Action	2.76	170	126	0.21	7.2	290	1,060
2/15/2023	Corrective Action	2.58	181	161	0.21	7.2	349	1,160
5/23/2023	Corrective Action	3.18 M1	146 M1	138	0.22	7.1	311	1,140
10/31/2023	Corrective Action	2.87	134	116	0.24	7.1	244	940
3/13/2024	Corrective Action	--	--	--	0.24	7.1	--	--
5/15/2024	Corrective Action	3.06	153	149	0.24	7.1	262	1,000
10/21/2024	Corrective Action	3.48	134	147	0.23	7.1	276	1,090

Table 1. Groundwater Data Summary: MW-1607S
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
10/31/2016	Background	0.46	1.86	56.7	0.01 J1	0.06	0.8	2.59	2.504	0.31	1.40	0.098	0.003 J1	48.4	7.1	0.060
11/2/2016	Background	0.45	1.30	55.5	< 0.005 U1	0.04	0.4	0.752	1.338	0.32	0.264	0.092	< 0.002 U1	50.4	7.0	0.05 J1
12/21/2016	Background	0.84	11.2	114	0.123	0.22	3.10	20.1	2.81	0.33	11.0	0.088	0.012	45.7	9.4	0.150
2/21/2017	Background	0.42	1.19	63.9	0.007 J1	0.03	0.325	1.21	1.974	0.29	0.267	0.091	< 0.002 U1	41.3	9.0	0.069
3/28/2017	Background	0.43	1.17	66.8	< 0.005 U1	0.02	0.390	0.942	1.153	0.28	0.134	0.110	< 0.002 U1	39.2	9.2	0.052
4/18/2017	Background	0.55	1.62	67.6	0.01 J1	0.06	0.514	2.60	1.632	0.30	1.25	0.102	0.003 J1	45.1	8.9	0.058
5/16/2017	Background	0.50	1.17	63.7	< 0.004 U1	0.03	0.226	0.851	2.408	0.29	0.159	0.094	< 0.002 U1	48.1	9.1	0.05 J1
6/14/2017	Background	0.48	1.10	62.9	< 0.004 U1	0.03	0.200	0.936	1.017	0.27	0.138	0.106	< 0.002 U1	46.1	9.4	0.05 J1
5/10/2018	Assessment	0.44	0.93	71.1	< 0.004 U1	0.04	0.121	1.18	1.290	0.29	0.128	0.103	< 0.002 U1	43.2	11.4	0.064
9/20/2018	Assessment	0.42	0.90	80.6	< 0.004 U1	0.04	0.086	0.840	0.584	0.28	0.094	0.118	< 0.002 U1	41.5	8.8	0.089
4/8/2019	Assessment	0.40	0.94	72.7	< 0.02 U1	0.04 J1	0.376	1.21	0.723	0.26	0.09 J1	0.141	< 0.002 U1	37.9	7.0	< 0.1 U1
6/19/2019	Assessment	0.44	0.96	81.0	< 0.02 U1	0.04 J1	0.428	0.990	1.121	0.19	0.108	0.075	< 0.002 U1	34.6	5.6	< 0.1 U1
9/10/2019	Assessment	0.41	0.87	67.7	< 0.02 U1	0.05 J1	0.357	0.971	2.765	0.27	0.09 J1	0.0990	< 0.002 U1	35.0	4.3	< 0.1 U1
3/10/2020	Assessment	0.41	0.92	69.2	< 0.02 U1	0.04 J1	0.321	1.23	1.171	0.24	0.06 J1	0.110	< 0.002 U1	35.5	4.5	< 0.1 U1
5/20/2020	Assessment	0.45	0.93	66.8	--	0.04 J1	0.249	1.42	0.3123	0.23	0.06 J1	0.105	--	35.8	5.7	< 0.1 U1
10/8/2020	Assessment	0.48	0.89	64.0	--	0.03 J1	0.509	1.27	1.553	0.24	0.2 J1	0.0937	< 0.002 U1	35.9	3.3	< 0.1 U1
3/25/2021	Assessment	0.43	0.93	70.7	< 0.007 U1	0.04 J1	0.329	1.28	0.963	0.26	0.08 J1	0.0796	< 0.002 U1	30.4	4.1	0.07 J1
5/18/2021	Assessment	0.49	0.91	68.0 P3	< 0.007 U1	0.108	0.23	1.45	0.39	0.25	0.19 J1	0.103	< 0.002 U1	30.5	4.05	0.07 J1
10/26/2021	Assessment	0.40	0.92	65.0	< 0.007 U1	0.036	0.31	1.27	0.52	0.24	0.08 J1	0.0974	< 0.002 U1	30.1	2.71	0.07 J1
3/8/2022	Corrective Action	0.43	0.85	68.6	< 0.007 U1	0.042	0.43	1.53	1.42	0.23	0.05 J1	0.0967	< 0.002 U1	29.4	3.38	0.06 J1
5/25/2022	Corrective Action	0.41	0.84	60.8	< 0.007 U1	0.043	0.26	1.78	1.01	0.21	0.09 J1	0.104	< 0.002 U1	30.5	4.53	0.06 J1
11/8/2022	Corrective Action	0.44	0.91	64.0	< 0.04 U1	0.034	0.31	1.37	1.42	0.21	0.07 J1	0.105	< 0.002 U1	31.8	2.25	0.06 J1
2/15/2023	Corrective Action	0.40	0.84	67.4	< 0.007 U1	0.038	0.27	1.57	1.39	0.21	0.06 J1	0.102	< 0.002 U1	28.4	3.06	0.06 J1
5/23/2023	Corrective Action	0.399	0.80	57.2 M1	< 0.007 M1, U1	0.032	0.26 J1	1.39	1.12	0.22	0.07 J1	0.0890 M1	< 0.002 U1	30.5	3.27	0.05 J1
10/31/2023	Corrective Action	0.405	0.83	52.6	< 0.007 U1	0.024	0.34	1.26	1.13	0.24	< 0.05 U1	0.0827	< 0.002 U1	29.9	3.16	0.04 J1
3/13/2024	Corrective Action	0.431	0.83	57.7	< 0.007 U1	0.026	0.28 J1	1.36	0.56	0.24	0.07 J1	0.0954	< 0.002 U1	29.7	3.41	0.08 J1
5/15/2024	Corrective Action	0.453	0.75	58.4	< 0.007 U1	0.022	0.44	1.33	1.47	0.24	0.25	0.0832	< 0.002 U1	28.3	4.06	0.05 J1
10/21/2024	Corrective Action	0.385	0.77	59.7	< 0.007 U1	0.024	0.25 J1	1.19	1.25	0.23	0.07 J1	0.097	< 0.002 U1	25.9	3.22	0.05 J1

Table 1. Groundwater Data Summary: MW-1608
Mountaineer - BAP
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
9/27/2016	Background	0.150	93.8	6.55	0.27	7.4	70.6	368
11/1/2016	Background	0.113	86.2	6.43	0.30	7.3	64.3	352
12/19/2016	Background	0.118	83.0	4.25	0.26	7.3	58.3	338
2/22/2017	Background	0.156	83.3	4.37	0.25	7.1	94.4	398
3/27/2017	Background	0.238	80.3	5.27	0.24	6.8	112	350
4/17/2017	Background	0.233	101	7.08	0.23	7.0	168	424
5/15/2017	Background	0.200	102	8.62	0.23	7.8	208	475
6/12/2017	Background	0.169	110	8.23	0.21	6.7	204	486
10/31/2017	Detection	0.140	94.7	5.13	0.22	7.1	131	430
5/10/2018	Assessment	--	--	--	0.18	6.8	--	--
9/20/2018	Assessment	0.169	128	6.59	0.21	7.2	256	572
4/9/2019	Assessment	0.156	102	6.82	0.20	6.9	179	451
6/18/2019	Assessment	0.116	86.5	5.06	0.16	6.2	144	416
9/10/2019	Assessment	0.124	92.0	4.01	0.20	7.1	109	369
3/10/2020	Assessment	--	--	--	0.21	6.7	--	--
5/13/2020	Assessment	0.108	92.7	5.22	0.22	6.8	158	440
10/6/2020	Assessment	0.074	83.9	1.57	0.27	6.7	56.4	440
3/23/2021	Assessment	0.059	81.8	2.82	0.29	6.9	76.5	325
5/18/2021	Assessment	0.085	80.3	2.58	0.27	6.9	78.3	360
10/27/2021	Assessment	0.069	78.2	1.45	0.29	7.0	50.3	300
3/1/2022	Corrective Action	0.075	94.7 M1, P3	2.30	0.25	7.0	85.1	370
5/17/2022	Corrective Action	0.099	90.5 M1, P3	2.10	0.26	7.1	78.9	340 L1
11/1/2022	Corrective Action	0.065	84.5	2.07	0.25	7.0	83.3	370
2/14/2023	Corrective Action	0.058	78.5 M1	1.57	0.26	6.9	64.7	320 S7
5/23/2023	Corrective Action	0.089	91.5	4.78	0.23	6.9	140	440
10/26/2023	Corrective Action	0.075	75.9	1.28	0.27	6.9	60.8	320
3/13/2024	Corrective Action	--	--	--	0.23	6.8	--	--
5/16/2024	Corrective Action	0.084	101	6.18	0.22	6.8	155	430
10/23/2024	Corrective Action	0.082	80.4	4.25	0.26	7.0	108	410

Table 1. Groundwater Data Summary: MW-1608
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.10	0.82	42.0	0.02 J1	0.03	0.9	1.21	0.454	0.27	0.881	0.003	< 0.002 U1	2.35	1.2	0.03 J1
11/1/2016	Background	0.04 J1	0.53	33.4	< 0.005 U1	0.02 J1	0.6	0.254	2.282	0.30	0.232	0.004	< 0.002 U1	2.16	1.3	0.081
12/19/2016	Background	0.04 J1	0.68	32.2	0.009 J1	0.02	2.78	0.588	0.379	0.26	0.405	< 0.0002 U1	< 0.002 U1	1.94	1.1	0.03 J1
2/22/2017	Background	0.03 J1	0.52	32.4	< 0.005 U1	0.01 J1	0.364	0.240	1.235	0.25	0.205	0.003	< 0.002 U1	1.40	1.5	0.053
3/27/2017	Background	0.03 J1	0.56	31.4	< 0.005 U1	0.01 J1	0.335	0.330	0.417	0.24	0.274	0.006	< 0.002 U1	2.49	1.3	0.04 J1
4/17/2017	Background	0.04 J1	0.50	35.3	< 0.004 U1	0.01 J1	0.223	0.196	0.1298	0.23	0.173	0.006	0.002 J1	1.89	1.3	0.01 J1
5/15/2017	Background	0.04 J1	0.49	35.1	< 0.004 U1	0.008 J1	0.151	0.098	0.857	0.23	0.073	0.006	< 0.002 U1	2.08	1.0	0.01 J1
6/12/2017	Background	0.03 J1	0.49	36.4	< 0.004 U1	0.006 J1	0.277	0.040	0.146	0.21	0.024	0.016	< 0.002 U1	1.57	1.1	0.02 J1
5/10/2018	Assessment	0.02 J1	0.37	46.6	0.009 J1	0.01 J1	0.126	0.095	0.565	0.18	0.079	0.0003 J1	< 0.002 U1	0.53	0.9	0.02 J1
9/20/2018	Assessment	0.03 J1	0.42	42.6	< 0.004 U1	0.008 J1	0.264	0.052	0.550	0.21	0.037	0.004	< 0.002 U1	1.18	1.2	0.02 J1
4/9/2019	Assessment	0.04 J1	0.56	41.2	< 0.02 U1	0.02 J1	0.372	0.597	0.2435	0.20	0.454	0.01 J1	< 0.002 U1	1 J1	1.2	< 0.1 U1
6/18/2019	Assessment	0.03 J1	0.40	32.0	< 0.02 U1	0.01 J1	0.306	0.05 J1	0.104	0.16	0.06 J1	< 0.009 U1	< 0.002 U1	0.8 J1	0.8	< 0.1 U1
9/10/2019	Assessment	0.03 J1	0.52	26.8	0.05 J1	< 0.01 U1	0.327	0.056	1.348	0.20	0.06 J1	0.00286	< 0.002 U1	1 J1	1.0	< 0.1 U1
3/10/2020	Assessment	< 0.02 U1	0.37	30.5	< 0.02 U1	< 0.01 U1	0.264	0.070	0.670	0.21	0.06 J1	0.00229	< 0.002 U1	0.6 J1	4.3	< 0.1 U1
5/13/2020	Assessment	0.04 J1	0.36	31.3	--	0.02 J1	0.2 J1	0.092	0.569	0.22	0.275	0.00241	--	0.7 J1	2.1	< 0.1 U1
10/6/2020	Assessment	0.09 J1	0.66	30.5	--	0.05	0.707	0.659	0.0286	0.27	0.476	0.00241	< 0.002 U1	2 J1	1.7	< 0.1 U1
3/23/2021	Assessment	0.04 J1	0.55	31.9	< 0.007 U1	0.02 J1	0.429	0.399	0.9785	0.29	0.334	0.00187	< 0.002 U1	0.6 J1	1.4	< 0.04 U1
5/18/2021	Assessment	0.09 J1	0.45	25.0	< 0.007 U1	0.009 J1	0.25	0.125	0.56	0.27	0.10 J1	0.00209	< 0.002 U1	1	2.06	< 0.04 U1
10/27/2021	Assessment	0.04 J1	0.49	23.0	< 0.007 U1	0.01 J1	0.43	0.113	1.09	0.29	0.10 J1	0.00226	< 0.002 U1	1.9	1.32	< 0.04 U1
3/1/2022	Corrective Action	0.04 J1	0.45	25.2	< 0.007 U1	0.006 J1	0.48	0.070	0.80	0.25	0.05 J1	0.00206	< 0.002 U1	0.8	1.58	< 0.04 U1
5/17/2022	Corrective Action	0.03 J1	0.40	24.0	< 0.007 U1	0.008 J1	0.60	0.092	0.53	0.26	0.06 J1	0.00223	< 0.002 U1	0.9	2.38	< 0.04 U1
11/1/2022	Corrective Action	0.03 J1	0.43	25.1	< 0.007 U1	0.005 J1	0.44	0.024	1.19	0.25	0.22	0.00231	< 0.002 U1	0.9	2.07	< 0.04 U1
2/14/2023	Corrective Action	0.03 J1	0.38	23.4	< 0.007 U1	0.006 J1	0.28	0.052	0.29	0.26	< 0.05 U1	0.00226	< 0.002 U1	0.7	1.58	< 0.04 U1
5/23/2023	Corrective Action	0.033 J1	0.33	26.8	< 0.007 U1	0.007 J1	0.31	0.049	0.54	0.23	< 0.05 U1	0.00228	< 0.002 U1	0.8	3.27	< 0.02 U1
10/26/2023	Corrective Action	0.032 J1	0.41	22.7	< 0.007 U1	0.006 J1	0.41	0.080	1.43	0.27	0.06 J1	0.00216	< 0.002 U1	0.9	1.03	< 0.02 U1
3/13/2024	Corrective Action	0.029 J1	0.32	27.3	< 0.007 U1	0.006 J1	0.32	0.039	0.50	0.23	< 0.05 U1	0.00226	< 0.002 U1	0.6	2.96	0.05 J1
5/16/2024	Corrective Action	0.023 J1	0.30	31.8	< 0.007 U1	0.007 J1	0.50	0.051	0.93	0.22	< 0.05 U1	0.00212	< 0.002 U1	0.6	1.74	< 0.02 U1
10/23/2024	Corrective Action	0.033 J1	0.37	26.5	< 0.007 U1	0.006 J1	0.53	0.033	0.78	0.26	< 0.05 U1	0.00240	< 0.002 U1	0.8	1.27	0.02 J1

Table 1. Groundwater Data Summary: MW-1805
Mountaineer - BAP
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
4/10/2019	Assessment	4.24	147	146	0.36	7.8	639	1,500
6/19/2019	Assessment	6.38	280	156	0.1 J1	7.5	894	1,860
9/10/2019	Assessment	6.00	273	--	--	7.4	--	--
9/11/2019	Assessment	--	--	167	0.24	--	908	1,880
3/10/2020	Assessment	--	--	--	0.27	7.2	--	--
5/14/2020	Assessment	5.74	254	169	0.24	7.2	923	1,800
10/9/2020	Assessment	5.11	265	131	0.19	7.2	789	1,660
3/25/2021	Assessment	4.67	225	127	0.24	7.6	762	1,530
5/19/2021	Assessment	4.46	204	124	0.29	7.2	735	1,480
10/26/2021	Assessment	3.43	111	140	0.29	7.3	473	1,250
3/2/2022	Corrective Action	2.96	86.9	151	0.38	7.8	368	1,100
5/20/2022	Corrective Action	3.13	65.6	152	0.41	7.7	288	1,050 L1
11/4/2022	Corrective Action	2.84	147	119	0.31	7.5	408	1,140
2/14/2023	Corrective Action	2.03	39.5 M1	156	0.63	8.0	128	840
5/22/2023	Corrective Action	1.98	36.3	149	0.60	8.0	143	840
10/25/2023	Corrective Action	1.75	63.4	133	0.64	8.0	180	800
5/21/2024	Corrective Action	1.45	19.9	137	0.87	8.3	87.9	710
10/23/2024	Corrective Action	1.43	33.6	134	0.89	8.0	136	770

Table 1. Groundwater Data Summary: MW-1805
Mountaineer - BAP
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**	**pCi/L**	**mg/L**	**µg/L**	**mg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
4/10/2019	Assessment	2.14	20.3	54.3	< 0.1 U1	< 0.05 U1	1.00	3.31	3.12	0.36	1.21	0.043	< 0.002 U1	80.1	< 0.3 U1	< 0.5 U1
6/19/2019	Assessment	< 0.04 U1	66.3	42.4	< 0.04 U1	< 0.02 U1	0.2 J1	4.91	1.412	0.1 J1	< 0.04 U1	0.032	< 0.002 U1	96.2	0.1 J1	< 0.2 U1
9/10/2019	Assessment	0.07 J1	70.4	41.9	< 0.02 U1	< 0.01 U1	0.415	3.39	2.7353	--	0.1 J1	0.0426	< 0.002 U1	78.0	0.1 J1	< 0.1 U1
9/11/2019	Assessment	--	--	--	--	--	--	--	--	0.24	--	--	--	--	--	--
3/10/2020	Assessment	0.02 J1	11.4	24.3	< 0.02 U1	< 0.01 U1	0.2 J1	0.091	1.409	0.27	< 0.05 U1	0.0316	< 0.002 U1	10.7	< 0.03 U1	< 0.1 U1
5/14/2020	Assessment	0.03 J1	56.0	41.3	--	< 0.01 U1	0.1 J1	0.384	0.641	0.24	< 0.05 U1	0.0422	--	42.7	0.1 J1	< 0.1 U1
10/9/2020	Assessment	< 0.02 U1	80.9	32.2	--	< 0.01 U1	0.326	1.01	1.50	0.19	< 0.05 U1	0.0432	< 0.002 U1	50.0	0.05 J1	< 0.1 U1
3/25/2021	Assessment	0.03 J1	74.2	28.8	< 0.007 U1	< 0.004 U1	0.2 J1	0.417	0.755	0.24	< 0.05 U1	0.0426	< 0.002 U1	43.9	< 0.09 U1	< 0.04 U1
5/19/2021	Assessment	0.05 J1	69.5	27.7	< 0.007 U1	< 0.004 U1	0.32	0.358	0.98	0.29	< 0.05 U1	0.0409	< 0.002 U1	41.0	< 0.09 U1	< 0.04 U1
10/26/2021	Assessment	0.04 J1	37.3	25.2	< 0.007 U1	< 0.004 U1	0.24	0.066	0.58	0.29	< 0.05 U1	0.0347	< 0.002 U1	10.6	< 0.09 M1, U1	< 0.04 U1
3/2/2022	Corrective Action	0.09 J1	19.4	32.3	< 0.007 U1	< 0.004 U1	0.40	0.037	1.70	0.38	< 0.05 U1	0.0248	< 0.002 U1	5.3	< 0.09 U1	< 0.04 U1
5/20/2022	Corrective Action	0.09 J1	10.9	44.5	< 0.007 U1	< 0.004 U1	0.26	0.098	2.07	0.41	< 0.05 U1	0.0260	< 0.002 U1	3.8	< 0.09 U1	< 0.04 U1
11/4/2022	Corrective Action	< 0.02 U1	40.2	40.3	< 0.007 U1	< 0.004 U1	0.31	0.130	3.14	0.31	< 0.05 U1	0.0306	< 0.002 U1	21.2	< 0.09 U1	< 0.04 U1
2/14/2023	Corrective Action	0.03 J1	15.2	56.7	< 0.007 U1	< 0.004 U1	0.24	0.039	0.56	0.63	< 0.05 U1	0.0178	< 0.002 U1	7.7	< 0.09 M1, U1	< 0.04 U1
5/22/2023	Corrective Action	0.037 J1	8.77	77.9	< 0.007 U1	< 0.004 U1	0.24 J1	0.033	2.00	0.60	< 0.05 U1	0.0180	< 0.002 U1	2.2	< 0.04 U1	< 0.02 U1
10/25/2023	Corrective Action	0.022 J1	27.4	96.3	< 0.007 U1	< 0.004 U1	0.32	0.037	1.03	0.64	< 0.05 U1	0.0187	< 0.002 U1	8.7	< 0.04 U1	< 0.02 U1
5/21/2024	Corrective Action	0.037 J1	9.30	54.1	< 0.007 U1	< 0.004 U1	0.27 J1	0.060	1.35	0.87	< 0.05 U1	0.0127	< 0.002 U1	7.2	< 0.04 U1	< 0.02 U1
10/23/2024	Corrective Action	0.028 J1	15.3	75.7	< 0.007 U1	< 0.004 U1	0.44	0.094	0.71	0.89	0.10 J1	0.019	< 0.002 U1	2.9	< 0.04 U1	< 0.02 U1

Table 1. Groundwater Data Summary: MW-1921
Mountaineer - BAP
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
4/10/2019	Assessment	0.571	55.9	34.7	0.77	7.6	106	452
6/19/2019	Assessment	0.644	77.7	33.3	0.87	8.2	128	435
9/11/2019	Assessment	0.647	79.6	--	--	7.6	--	--
9/13/2019	Assessment	--	--	33.2	0.79	--	131	438
3/12/2020	Assessment	--	--	--	0.94	7.4	--	--
5/18/2020	Assessment	0.751	88.3	35.8	0.98	7.4	153	469
10/6/2020	Assessment	0.577	77.2	38.7	0.98	7.2	127	603
3/22/2021	Assessment	0.654	86.8	51.3	1.05	7.8	130	448
5/20/2021	Assessment	0.585	83.8	53.6	1.0	7.7	137	470
10/29/2021	Assessment	0.563	85.3	56.9	0.96	7.6	152	500
3/2/2022	Corrective Action	0.647	95.2	57.0	1.15	7.8	163	510
5/18/2022	Corrective Action	0.727	109	53.2	1.13	7.8	148	470 L1
11/1/2022	Corrective Action	0.603	93.7	60.7	1.01	7.5	163	520
2/14/2023	Corrective Action	0.692	99.9	62.4	1.09	7.5	166	520
5/25/2023	Corrective Action	0.655	93.2	57.3	1.09	7.7	167	520
10/27/2023	Corrective Action	0.478	95.4	71.6	1.11	7.6	162	510
5/20/2024	Corrective Action	0.531	91.6	55.5	1.20	7.7	140	490
10/23/2024	Corrective Action	0.448	79.2	61.9	1.22	7.6	147	510

Table 1. Groundwater Data Summary: MW-1921
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.1 J1	3.36	68.0	< 0.1 U1	< 0.05 U1	1.13	2.64	1.678	0.77	0.944	0.075	0.002 J1	478	0.4 J1	< 0.5 U1
6/19/2019	Assessment	0.10	1.19	51.2	< 0.02 U1	< 0.01 U1	0.07 J1	0.860	0.276	0.87	0.06 J1	0.074	< 0.002 U1	502	0.2 J1	< 0.1 U1
9/11/2019	Assessment	0.1 J1	1.25	50.8	< 0.02 U1	0.03 J1	0.1 J1	0.692	1.228	--	0.08 J1	0.0926	< 0.002 U1	500	0.1 J1	< 0.1 U1
9/13/2019	Assessment	--	--	--	--	--	--	--	--	0.79	--	--	--	--	--	--
3/12/2020	Assessment	0.08 J1	1.21	58.5	< 0.02 U1	< 0.01 U1	0.230	0.879	3.441	0.94	0.217	0.0995	< 0.002 U1	461	0.1 J1	< 0.1 U1
5/18/2020	Assessment	0.11	1.12	54.1	--	< 0.01 U1	0.2 J1	0.795	1.053	0.98	0.385	0.0990	--	472	0.1 J1	< 0.1 U1
10/6/2020	Assessment	0.11	1.18	47.4	--	< 0.01 U1	0.524	0.604	0.451	0.98	0.2 J1	0.0870	< 0.002 U1	472	0.1 J1	< 0.1 U1
3/22/2021	Assessment	0.14	1.61	54.7	0.02 J1	0.06	0.748	0.951	0.925	1.05	0.572	0.0672	< 0.002 U1	364	0.2	0.06 J1
5/20/2021	Assessment	0.16	1.59	55.5	0.009 J1	0.043	0.46	0.707	0.62	1.0	0.30	0.0942	< 0.002 U1	489	0.19 J1	0.07 J1
10/29/2021	Assessment	0.09 J1	1.22	56.9	< 0.007 U1	0.023	0.48	0.574	1.04	0.96	0.1 J1	0.0862	< 0.002 U1	417	0.13 J1	0.05 J1
3/2/2022	Corrective Action	0.10	1.14	60.3	< 0.007 U1	0.040	0.52	0.630	0.82	1.15	< 0.05 U1	0.0892	< 0.002 U1	445	0.19 J1	0.06 J1
5/18/2022	Corrective Action	0.11	1.25	60.6	< 0.04 U1	0.047	0.26	0.657	1.37	1.13	0.07 J1	0.0998	< 0.002 U1	468	0.26 J1	0.07 J1
11/1/2022	Corrective Action	0.10	1.14	63.0	< 0.007 U1	0.01 J1	0.28	0.588	1.27	1.01	0.06 J1	0.0981	< 0.002 U1	386	< 0.09 U1	0.05 J1
2/14/2023	Corrective Action	0.10	1.14	62.2	< 0.007 U1	< 0.004 U1	0.31	0.655	0.30	1.09	< 0.05 U1	0.0992	< 0.002 U1	408	0.18 J1	0.06 J1
5/25/2023	Corrective Action	0.095 J1	1.11	58.1	< 0.007 U1	0.007 J1	0.15 J1	0.675	1.53	1.09	< 0.05 U1	0.0903	< 0.002 U1	415	0.32 J1	0.07 J1
10/27/2023	Corrective Action	0.094 J1	1.18	63.3	< 0.007 U1	0.012 J1	0.39	0.562	0.51	1.11	0.1 J1	0.0913	< 0.002 U1	350	0.34 J1	0.06 J1
5/20/2024	Corrective Action	0.083 J1	1.14	58.2	< 0.007 U1	0.017 J1	0.30	0.656	1.23	1.20	0.07 J1	0.0868	< 0.002 U1	358	0.08 J1	0.05 J1
10/23/2024	Corrective Action	0.060 J1	1.01	54.7	< 0.007 U1	0.024	0.24 J1	0.459	0.73	1.22	< 0.05 U1	0.098	< 0.002 U1	276	0.08 J1	0.05 J1

Table 1. Groundwater Data Summary: MW-1922D
Mountaineer - BAP
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
4/9/2019	Assessment	1.00	145	53.5	0.29	7.5	333	908
6/19/2019	Assessment	0.725	121	44.1	0.31	7.6	269	724
9/10/2019	Assessment	0.440	96.5	--	--	7.6	--	--
9/11/2019	Assessment	--	--	32.7	0.33	--	167	566
3/11/2020	Assessment	--	--	--	0.29	6.9	--	--
5/19/2020	Assessment	0.310	80.0	28.3	0.32	7.0	118	484
10/8/2020	Assessment	0.131	64.5	19.5	0.30	7.1	47.3	389
3/25/2021	Assessment	0.098	59.8	18.8	0.34	7.6	34.6	362
5/20/2021	Assessment	0.085	58.7	18.1	0.32	7.4	25.2	370
10/27/2021	Assessment	0.071	59.5	17.6	0.31	7.4	22.1	340
3/3/2022	Corrective Action	0.082	62.4	17.9	0.30	7.5	22.3	340
5/23/2022	Corrective Action	0.131	65.0	20.3	0.31	7.2	40.7	10,300 L1
11/4/2022	Corrective Action	0.063	58.3 M1, P3	17.2	0.28	7.2	16.0	330
2/15/2023	Corrective Action	0.073	58.8	17.4	0.29	7.2	16.1	340
5/22/2023	Corrective Action	0.079	51.9	18.2	0.29	7.3	21.5	340
10/25/2023	Corrective Action	0.054	52.5	16.0	0.29	7.4	8.6	320
5/16/2024	Corrective Action	0.128	60.6	21.6	0.30	7.4	36.8	370
10/23/2024	Corrective Action	0.081	54.7	18.4	0.33	7.3	16.9	330

Table 1. Groundwater Data Summary: MW-1922D
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/9/2019	Assessment	0.88	323	69.3	< 0.1 U1	< 0.05 U1	0.4 J1	1.02	2.64	0.29	0.1 J1	0.02 J1	< 0.002 U1	488	< 0.2 U1	< 0.5 U1
6/19/2019	Assessment	0.29	716	54.7	< 0.02 U1	< 0.01 U1	< 0.04 U1	0.530	3.332	0.31	< 0.02 U1	< 0.009 U1	< 0.002 U1	515	0.04 J1	< 0.1 U1
9/10/2019	Assessment	1.04	839	51.0	< 0.02 U1	0.01 J1	0.08 J1	0.492	3.089	--	< 0.05 U1	0.0126	< 0.002 U1	478	0.06 J1	< 0.1 U1
9/11/2019	Assessment	--	--	--	--	--	--	--	--	0.33	--	--	--	--	--	--
3/11/2020	Assessment	0.63	1,240	72.3	< 0.02 U1	< 0.01 U1	0.335	0.267	3.28	0.29	0.07 J1	0.0117	< 0.002 U1	314	0.05 J1	< 0.1 U1
5/19/2020	Assessment	0.31	522	66.3	--	< 0.01 U1	0.2 J1	0.218	1.816	0.32	< 0.05 U1	0.0110	--	289	< 0.03 U1	< 0.1 U1
10/8/2020	Assessment	4.91	1,040	144	--	< 0.01 U1	0.351	0.326	2.815	0.30	0.07 J1	0.00747	< 0.002 U1	109	< 0.03 U1	< 0.1 U1
3/25/2021	Assessment	1.61	546	227	< 0.007 U1	< 0.004 U1	0.248	0.215	3.232	0.34	< 0.05 U1	0.00796	< 0.002 U1	77.6	< 0.09 U1	< 0.04 U1
5/20/2021	Assessment	0.65	494	262	< 0.007 U1	< 0.004 U1	0.18 J1	0.104	4.45	0.32	< 0.05 U1	0.00755	< 0.002 U1	40.5	< 0.09 U1	< 0.04 U1
10/27/2021	Assessment	0.60	456	331	< 0.007 U1	< 0.004 U1	< 0.04 U1	0.124	5.33	0.31	< 0.05 U1	0.00779	< 0.002 U1	47.7	< 0.09 U1	< 0.04 U1
3/3/2022	Corrective Action	0.90	478	353	< 0.007 U1	0.005 J1	0.39	0.138	6.28	0.30	< 0.05 U1	0.00712	< 0.002 U1	57.4	< 0.09 U1	< 0.04 U1
5/23/2022	Corrective Action	0.94	562	300	< 0.007 U1	0.009 J1	0.25	0.161	5.55	0.31	< 0.05 U1	0.00848	< 0.002 U1	105	< 0.09 U1	< 0.04 U1
11/4/2022	Corrective Action	0.80	384 M1, P3	406 M1, P3	< 0.007 U1	< 0.004 U1	0.24	0.134	8.17	0.28	< 0.05 U1	0.00738	< 0.002 U1	36.6	< 0.09 U1	< 0.04 U1
2/15/2023	Corrective Action	0.85	443	402	< 0.007 U1	< 0.004 U1	0.28	0.178	5.54	0.29	0.10 J1	0.00770	< 0.002 U1	41.6	< 0.09 U1	< 0.04 U1
5/22/2023	Corrective Action	0.530	408	327	< 0.007 U1	< 0.004 U1	0.18 J1	0.129	5.72	0.29	< 0.05 U1	0.00682	< 0.002 U1	56.4	< 0.04 U1	< 0.02 U1
10/25/2023	Corrective Action	0.474	323	405	< 0.007 U1	< 0.004 U1	0.37	0.089	6.33	0.29	< 0.05 U1	0.00675	0.002 J1	23.8	< 0.04 U1	< 0.02 U1
5/16/2024	Corrective Action	0.411	861	334	< 0.007 U1	< 0.004 U1	0.20 J1	0.074	1.92	0.30	< 0.05 U1	0.00788	< 0.002 U1	102	< 0.04 U1	< 0.02 U1
10/23/2024	Corrective Action	0.287	595	358	< 0.007 U1	< 0.004 U1	0.19 J1	0.088	5.49	0.33	< 0.05 U1	0.00692	< 0.002 U1	50.0	< 0.04 U1	< 0.02 U1

Table 1. Groundwater Data Summary: MW-1922S
Mountaineer - BAP
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
4/9/2019	Assessment	7.66	359	171	0.16	7.2	978	2,090
6/20/2019	Assessment	6.95	335	169	0.17	7.4	1,020	2,090
9/10/2019	Assessment	6.34	342	--	--	7.3	--	--
9/11/2019	Assessment	--	--	179	0.19	--	1,070	2,060
3/11/2020	Assessment	--	--	--	0.1 J1	6.9	--	--
5/18/2020	Assessment	6.92	345	160	0.19	6.9	1,060	1,920
10/8/2020	Assessment	4.09	293	126	0.16	7.1	842	1,750
3/25/2021	Assessment	4.22	284	120	0.20	7.4	832	1,630
5/20/2021	Assessment	3.60	265	117	0.19	7.2	828	1,660
10/26/2021	Assessment	2.99	250	102	0.17	7.2	721	1,460
3/2/2022	Corrective Action	2.99	283	103	0.17	7.3	752	1,430
5/23/2022	Corrective Action	3.49	282	97.2	0.16	7.0	723	1,450 L1
11/4/2022	Corrective Action	3.01	276	103	0.15	7.0	735	1,460
2/15/2023	Corrective Action	2.87	264	113	0.15	7.2	704	1,420
5/22/2023	Corrective Action	2.21	244	110	0.14 J1	7.2	813	1,550
10/26/2023	Corrective Action	2.32	303	113	0.15	7.1	955	1,730
5/16/2024	Corrective Action	2.45	289	111	0.18	7.2	865	1,520
10/23/2024	Corrective Action	2.49	269	106	0.15	7.1	815	1,590

Table 1. Groundwater Data Summary: MW-1922S
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/9/2019	Assessment	< 0.1 U1	1.95	30.7	< 0.1 U1	< 0.05 U1	0.3 J1	1.83	2.124	0.16	0.3 J1	0.082	< 0.002 U1	43.5	< 0.2 U1	< 0.5 U1
6/20/2019	Assessment	< 0.04 U1	1.89	26.9	< 0.04 U1	< 0.02 U1	0.2 J1	1.37	1.156	0.17	0.08 J1	0.03 J1	< 0.002 U1	36.4	0.07 J1	< 0.2 U1
9/10/2019	Assessment	0.02 J1	1.75	26.5	< 0.02 U1	< 0.01 U1	0.2 J1	1.23	2.945	--	0.1 J1	0.0556	< 0.002 U1	33.9	0.08 J1	< 0.1 U1
9/11/2019	Assessment	--	--	--	--	--	--	--	--	0.19	--	--	--	--	--	--
3/11/2020	Assessment	< 0.02 U1	2.92	28.0	< 0.04 U1	< 0.01 U1	0.220	1.31	2.028	0.1 J1	0.2 J1	0.0615	< 0.002 U1	32.4	0.09 J1	< 0.1 U1
5/18/2020	Assessment	< 0.02 U1	1.79	27.4	--	< 0.01 U1	0.2 J1	1.52	0.821	0.19	0.06 J1	0.0611	--	34.3	0.1 J1	< 0.1 U1
10/8/2020	Assessment	0.09 J1	3.25	37.7	--	0.11	1.48	2.88	1.844	0.16	1.57	0.0551	0.002 J1	30.7	0.3	< 0.1 U1
3/25/2021	Assessment	0.02 J1	2.12	24.3	< 0.007 U1	0.006 J1	0.222	1.12	0.372	0.20	0.06 J1	0.0484	< 0.002 U1	29.4	< 0.09 U1	< 0.04 U1
5/20/2021	Assessment	0.05 J1	2.04	25.8	< 0.007 U1	0.012 J1	0.25	1.14	0.45	0.19	0.22	0.0520	< 0.002 U1	31.1	0.11 J1	0.05 J1
10/26/2021	Assessment	< 0.02 U1	2.07	25.4	< 0.007 U1	0.010 J1	0.22	1.02	1.30	0.17	0.14 J1	0.0477	< 0.002 U1	27.4	< 0.09 U1	< 0.04 U1
3/2/2022	Corrective Action	0.06 J1	4.08	30.7	0.018 J1	0.076	0.88	1.63	1.46	0.17	0.88	0.0409	< 0.002 U1	31.8	0.14 J1	0.04 J1
5/23/2022	Corrective Action	0.02 J1	1.99	29.2	< 0.007 U1	0.013 J1	0.26	1.00	1.74	0.16	0.09 J1	0.0455	< 0.002 U1	31.0	0.1 J1	< 0.04 U1
11/4/2022	Corrective Action	0.04 J1	1.89	27.6	< 0.007 U1	0.005 J1	0.22	0.840	1.72	0.15	< 0.05 U1	0.0467	< 0.002 U1	26.6	< 0.09 U1	< 0.04 U1
2/15/2023	Corrective Action	0.03 J1	3.64	28.1	< 0.007 U1	0.007 J1	0.22	0.934	0.62	0.15	0.08 J1	0.0426	< 0.002 U1	29.0	< 0.09 U1	< 0.04 U1
5/22/2023	Corrective Action	0.023 J1	1.56	26.1	< 0.007 U1	0.007 J1	0.16 J1	0.933	1.31	0.14 J1	0.06 J1	0.0370	< 0.002 U1	24.2	< 0.04 U1	0.03 J1
10/26/2023	Corrective Action	0.018 J1	1.89	34.0	< 0.007 U1	0.005 J1	0.54	1.15	0.95	0.15	0.17 J1	0.0432	< 0.002 U1	25.2	0.06 J1	0.04 J1
5/16/2024	Corrective Action	0.018 J1	1.79	29.5	< 0.007 U1	0.005 J1	0.25 J1	0.907	1.01	0.18	0.08 J1	0.0397	< 0.002 U1	24.9	0.06 J1	0.03 J1
10/23/2024	Corrective Action	0.012 J1	1.52	28.8	< 0.007 U1	< 0.004 U1	0.24 J1	0.925	1.07	0.15	0.07 J1	0.051	< 0.002 U1	24.8	0.07 J1	0.03 J1

Table 1. Groundwater Data Summary: MW-1923
Mountaineer - BAP
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
4/10/2019	Assessment	1.09	113	38.0	0.16	7.6	181	584
6/18/2019	Assessment	0.804	91.4	35.9	0.16	7.3	147	526
9/11/2019	Assessment	0.756	105	38.3	0.13	6.8	159	545
3/12/2020	Assessment	--	--	--	0.18	--	--	--
5/14/2020	Assessment	0.770	103	33.1	0.21	7.3	150	525
10/6/2020	Assessment	1.19	117	34.2	0.27	7.2	253	329
3/24/2021	Assessment	1.17	123	33.1	0.23	7.6	260	610
5/20/2021	Assessment	1.27	119	32.8	0.23	7.4	220	630
10/28/2021	Assessment	1.30	117	32.4	0.26	7.4	224	610
3/3/2022	Corrective Action	1.23	131	34.3	0.25	7.5	251	600
5/19/2022	Corrective Action	1.34	128 M1, P3	31.4	0.24	7.2	239	600 L1
11/1/2022	Corrective Action	1.17	120 M1, P3	34.2	0.22	7.3	263	630
2/16/2023	Corrective Action	1.15	115	30.2	0.26	7.2	256	620
5/25/2023	Corrective Action	1.21	113	29.6	0.28	7.5	254	620
10/30/2023	Corrective Action	1.31	109	32.3	0.29	7.5	222	580
5/21/2024	Corrective Action	1.27	111	24.6	0.29	7.4	223	600
10/23/2024	Corrective Action	1.32	101	30.8	0.37	7.4	204	590

Table 1. Groundwater Data Summary: MW-1923
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.2 J1	0.55	77.6	< 0.1 U1	< 0.05 U1	0.3 J1	0.317	0.706	0.16	0.1 J1	0.223	< 0.002 U1	160	23.8	< 0.5 U1
6/18/2019	Assessment	0.21	0.56	72.9	< 0.02 U1	0.01 J1	0.353	0.657	0.836	0.16	0.255	0.135	< 0.002 U1	101	14.4	< 0.1 U1
9/11/2019	Assessment	0.24	0.75	86.6	< 0.02 U1	0.03 J1	0.541	1.01	2.099	0.13	0.543	0.137	< 0.002 U1	84.2	14.0	< 0.1 U1
3/12/2020	Assessment	0.15	0.58	73.3	< 0.02 U1	0.02 J1	0.903	0.622	0.935	0.18	0.302	0.115	< 0.002 U1	70.1	5.2	< 0.1 U1
5/14/2020	Assessment	0.23	0.69	79.8	--	0.02 J1	0.484	0.814	0.480	0.21	0.354	0.109	--	70.9	4.1	< 0.1 U1
10/6/2020	Assessment	0.18	0.62	86.4	--	0.01 J1	2.13	0.747	1.241	0.27	0.434	0.177	< 0.002 U1	98.0	17.8	< 0.1 U1
3/24/2021	Assessment	0.21	0.52	95.1	< 0.007 U1	0.01 J1	0.715	0.370	0.778	0.23	0.09 J1	0.135	< 0.002 U1	308	38.7	< 0.04 U1
5/20/2021	Assessment	0.23	1.14	98.1	0.041 J1	0.033	1.12	1.84	1.36	0.23	1.16	0.207	< 0.002 U1	344	14.1	< 0.04 U1
10/28/2021	Assessment	0.23	1.66	103 M1, P3	0.064	0.053	2.26	2.65	0.90	0.26	1.98	0.182	0.002 J1	319 M1, P3	7.59	< 0.04 U1
3/3/2022	Corrective Action	0.16	0.78	99.9	0.017 J1	0.036	0.68	0.780	0.76	0.25	0.50	0.197	< 0.002 U1	353	9.47	< 0.04 U1
5/19/2022	Corrective Action	0.21	0.85	95.5	0.015 J1	0.049	0.64	0.865	0.91	0.24	0.58	0.187 M1	< 0.002 U1	334 P3	28.0	< 0.04 U1
11/1/2022	Corrective Action	0.18	0.79	101	0.022 J1	0.012 J1	0.83	0.799	1.49	0.22	0.66	0.194	< 0.002 U1	315 M1, P3	47.6	< 0.04 U1
2/16/2023	Corrective Action	0.36	0.80	93.4	0.021 J1	0.012 J1	0.99	0.726	1.44	0.26	0.70	0.215	< 0.002 U1	293	17.8	< 0.04 U1
5/25/2023	Corrective Action	0.192	1.25	96.5	0.051	0.019 J1	1.19	1.99	1.40	0.28	1.49	0.202	< 0.002 U1	284	4.39	0.03 J1
10/30/2023	Corrective Action	0.156	0.90	89.9	0.030 J1	0.024	0.99	1.11	1.49	0.29	0.83	0.184	< 0.002 U1	303	12.6	< 0.02 U1
5/21/2024	Corrective Action	0.171	1.05	93.3	0.038 J1	0.025	1.13	1.35	0.89	0.29	1.15	0.198	< 0.002 U1	297	7.29	< 0.02 U1
10/23/2024	Corrective Action	0.232	1.02	94.8	0.034 J1	0.057	1.86	1.46	1.51	0.37	1.28	0.234	< 0.002 U1	242	8.34	0.04 J1

Table 1. Groundwater Data Summary: MW-1924
Mountaineer - BAP
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
4/10/2019	Assessment	7.49	286	136	0.42	6.9	766	1,700
6/18/2019	Assessment	6.22	243	122	0.38	7.3	721	1,570
9/11/2019	Assessment	4.89	238	109	0.44	7.1	662	1,500
3/12/2020	Assessment	--	--	--	0.44	7.1	--	--
5/14/2020	Assessment	5.28	314	145	0.47	7.0	817	1,730
10/5/2020	Assessment	5.27	301	159	0.40	7.1	851	1,840
3/24/2021	Assessment	5.07	288	131	0.53	7.6	800	1,660
5/20/2021	Assessment	6.17	264	146	0.51	7.3	830	1,720
10/28/2021	Assessment	5.78 M1	214	144	0.52	7.3	663	1,490
3/7/2022	Corrective Action	2.29	173	74.8	0.57	7.5	483	1,120
5/19/2022	Corrective Action	1.39	158	39.1	0.55	7.2	291	790 L1
11/2/2022	Corrective Action	5.20	191	133	0.49	7.2	626	1,380
2/16/2023	Corrective Action	2.49	180 M1	79.8	0.51	6.9	453	1,070
5/25/2023	Corrective Action	3.28	166	88.4	0.53	7.3	501	1,120
10/30/2023	Corrective Action	3.11	168 M1	84.5	0.51	7.2	424	1,040
5/21/2024	Corrective Action	0.812	163 M1	103	0.44	7.1	213	790
10/22/2024	Corrective Action	3.16	155	97.3	0.56	7.3	531	1,220

Table 1. Groundwater Data Summary: MW-1924
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.2 J1	0.91	59.8	< 0.1 U1	0.2 J1	0.3 J1	2.29	0.921	0.42	0.3 J1	0.133	< 0.002 U1	89.5	1.3	< 0.5 U1
6/18/2019	Assessment	0.06 J1	0.55	69.5	< 0.02 U1	0.05	0.1 J1	2.74	1.417	0.38	0.07 J1	0.087	< 0.002 U1	69.0	3.6	< 0.1 U1
9/11/2019	Assessment	0.07 J1	0.61	54.5	< 0.02 U1	0.06	0.2 J1	4.10	1.719	0.44	0.218	0.102	< 0.002 U1	76.7	3.5	< 0.1 U1
3/12/2020	Assessment	0.09 J1	0.72	46.7	< 0.1 U1	0.06	0.324	6.80	0.974	0.44	0.394	0.130	< 0.002 U1	92.0	1.1	< 0.1 U1
5/14/2020	Assessment	0.06 J1	0.66	54.5	--	0.06	0.784	3.10	1.785	0.47	0.229	0.104	--	77.6	1.1	< 0.1 U1
10/5/2020	Assessment	0.09 J1	1.30	55.3	--	0.09	1.64	10.3	1.013	0.40	1.14	0.113	0.003 J1	82.7	0.9	< 0.1 U1
3/24/2021	Assessment	0.07 J1	1.18	44.7	0.03 J1	0.07	1.04	3.26	0.956	0.53	0.905	0.0668	< 0.002 U1	87.1	2.5	< 0.04 U1
5/20/2021	Assessment	0.06 J1	0.56	42.9	0.009 J1	0.068	0.59	2.15	1.30	0.51	0.13 J1	0.0964	< 0.002 U1	112	0.74	< 0.04 U1
10/28/2021	Assessment	0.07 J1	0.57	37.7	< 0.007 U1	0.065	0.37	2.93	1.23	0.52	0.1 J1	0.0877 M1	< 0.002 U1	134	0.50	< 0.04 U1
3/7/2022	Corrective Action	0.05 J1	0.64	37.6	0.008 J1	0.056	0.32	2.86	1.22	0.57	0.22	0.0645	< 0.002 U1	113	0.48 J1	< 0.04 U1
5/19/2022	Corrective Action	0.11	0.54	34.3	< 0.01 U1	0.051	0.39	1.74	0.71	0.55	0.05 J1	0.0594	< 0.002 U1	100	1.26	< 0.04 U1
11/2/2022	Corrective Action	0.06 J1	0.43	48.1	< 0.007 U1	0.054	0.38	2.32	1.15	0.49	0.06 J1	0.0850	< 0.002 U1	113	0.76	< 0.04 U1
2/16/2023	Corrective Action	0.07 J1	0.37	46.3	< 0.007 U1	0.035	0.37	1.99	0.58	0.51	0.05 J1	0.0734	< 0.002 U1	72.9	1.35	< 0.04 U1
5/25/2023	Corrective Action	0.067 J1	0.43	41.3	< 0.007 U1	0.035	0.31	3.31	1.18	0.53	0.11 J1	0.0640	< 0.002 U1	119	0.41 J1	< 0.02 U1
10/30/2023	Corrective Action	0.055 J1	0.40	48.6	< 0.007 U1	0.040	0.40	2.39	1.65	0.51	0.08 J1	0.0603	< 0.002 U1	105	0.37 J1	< 0.02 U1
5/21/2024	Corrective Action	0.041 J1	0.31	60.9	< 0.007 U1	0.038	0.37	1.40	1.08	0.44	< 0.05 U1	0.0490 M1	< 0.002 U1	56.9	0.28 J1	< 0.02 U1
10/22/2024	Corrective Action	0.046 J1	0.43	52.1	< 0.007 U1	0.043	0.21 J1	2.67	0.69	0.56	< 0.05 U1	0.073	< 0.002 U1	112	0.23 J1	0.02 J1

Table 1. Groundwater Data Summary: MW-1925
Mountaineer - BAP
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
4/10/2019	Assessment	4.17	172	128	0.33	7.2	624	1,460
6/19/2019	Assessment	5.21	242	147	0.25	7.6	686	1,520
9/10/2019	Assessment	5.86	249	147	0.26	7.2	683	1,500
3/11/2020	Assessment	--	--	--	0.24	7.0	--	--
5/14/2020	Assessment	4.91	205	119	0.34	7.0	565	1,250
10/6/2020	Assessment	4.31	211	122	0.29	6.8	548	372
3/23/2021	Assessment	3.13	223	106	0.33	7.3	521	1,180
5/19/2021	Assessment	4.26	183	90.2	0.31	7.1	495	1,130
10/28/2021	Assessment	4.28	166 M1	88.3	0.31	7.1	421	1,040
3/2/2022	Corrective Action	3.33	177	80.0	0.29	7.2	453	1,040
5/18/2022	Corrective Action	2.90	188	125	0.26	7.2	446	1,090 L1
11/1/2022	Corrective Action	3.35	174	109	0.27	6.9	474	1,130
2/14/2023	Corrective Action	3.35	190 M1	98.1	0.26	6.9	466	1,090
5/24/2023	Corrective Action	3.02 M1	172 M1	116	0.25	7.1	534	1,190
10/26/2023	Corrective Action	3.42	165	64.7	0.29	7.0	462	1,030
5/20/2024	Corrective Action	3.23	149	75.0	0.28	7.2	434	1,040
10/23/2024	Corrective Action	2.85	129	81.2	0.32	7.1	468	1,080

Table 1. Groundwater Data Summary: MW-1925
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.2 J1	0.88	46.6	< 0.1 U1	0.06 J1	0.4 J1	1.65	2.726	0.33	0.4 J1	0.094	< 0.002 U1	76.0	6.2	< 0.5 U1
6/19/2019	Assessment	0.18	0.35	48.0	< 0.02 U1	0.04 J1	0.1 J1	1.28	1.245	0.25	0.04 J1	0.095	< 0.002 U1	63.5	6.3	< 0.1 U1
9/10/2019	Assessment	0.20	0.41	45.0	< 0.02 U1	0.06	0.1 J1	1.27	1.041	0.26	0.2 J1	0.0947	< 0.002 U1	54.6	4.1	< 0.1 U1
3/11/2020	Assessment	0.16	0.37	40.4	< 0.02 U1	0.05 J1	0.1 J1	1.21	1.59	0.24	< 0.05 U1	0.0926	< 0.002 U1	56.2	2.9	< 0.1 U1
5/14/2020	Assessment	0.19	0.32	36.8	--	0.04 J1	0.08 J1	1.07	0.910	0.34	< 0.05 U1	0.0853	--	57.9	4.8	< 0.1 U1
10/6/2020	Assessment	0.20	0.56	39.5	--	0.04 J1	0.428	1.07	0.2096	0.29	0.09 J1	0.0776	< 0.002 U1	45.8	5.4	< 0.1 U1
3/23/2021	Assessment	0.21	0.53	39.7	< 0.007 U1	0.05 J1	0.311	1.03	2.076	0.33	0.06 J1	0.0517	< 0.002 U1	47.8	4.4	< 0.04 U1
5/19/2021	Assessment	0.27	0.52	38.3	0.008 J1	0.067	0.47	1.18	1.07	0.31	0.17 J1	0.0714	< 0.002 U1	46.1	4.41	< 0.04 U1
10/28/2021	Assessment	0.20	0.28	33.9	< 0.007 U1	0.037	0.40	0.996	1.96	0.31	< 0.05 U1	0.0621	< 0.002 U1	52.3	2.96	< 0.04 U1
3/2/2022	Corrective Action	0.20	0.28	38.5	< 0.007 U1	0.047	0.37	1.06	0.77	0.29	< 0.05 U1	0.0662	< 0.002 U1	48.2	3.26	< 0.04 U1
5/18/2022	Corrective Action	0.21	0.39	42.1	< 0.007 U1	0.057	0.29	1.48	1.28	0.26	0.08 J1	0.0761	< 0.002 U1	43.4	2.51	< 0.04 U1
11/1/2022	Corrective Action	0.20	0.24	39.7	< 0.007 U1	0.040	0.28	0.920	0.95	0.27	< 0.05 U1	0.0680	< 0.002 U1	41.2	5.10	< 0.04 U1
2/14/2023	Corrective Action	0.20	0.24	39.6	< 0.007 U1	0.045	0.29	1.03	1.19	0.26	< 0.05 U1	0.0629	< 0.002 U1	43.3	6.44	< 0.04 U1
5/24/2023	Corrective Action	0.195	0.23	37.4	< 0.007 M1, U1	0.041	0.23 J1	1.03	1.72	0.25	< 0.05 U1	0.0601 M1	< 0.002 U1	39.5	2.56	< 0.02 U1
10/26/2023	Corrective Action	0.184	0.27	34.1	< 0.007 U1	0.036	0.43	0.954	1.80	0.29	0.09 J1	0.0529	< 0.002 U1	43.1	2.64	< 0.02 U1
5/20/2024	Corrective Action	0.185	0.23	31.5	< 0.007 U1	0.036	0.29 J1	1.13	1.16	0.28	< 0.05 U1	0.0528	< 0.002 U1	49.2	3.32	< 0.02 U1
10/23/2024	Corrective Action	0.195	0.41	33.1	0.009 J1	0.043	1.51	1.19	1.78	0.32	0.35	0.065	< 0.002 U1	48.2	1.94	< 0.02 U1

Table 1. Groundwater Data Summary: MW-1926
Mountaineer - BAP
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
4/10/2019	Assessment	0.263	95.4	57.8	0.25	7.2	67.4	506
6/20/2019	Assessment	0.165	82.1	23.2	0.28	7.3	47.8	416
9/11/2019	Assessment	0.145	87.6	--	--	7.3	--	--
9/13/2019	Assessment	--	--	8.57	0.24	--	26.4	396
3/11/2020	Assessment	--	--	--	0.28	7.0	--	--
5/18/2020	Assessment	0.146	95.3	7.86	0.29	7.0	28.5	354
10/8/2020	Assessment	0.121	87.2	3.49	0.26	7.0	30.0	351
3/22/2021	Assessment	0.121	89.1	4.15	0.30	7.4	32.2	357
5/20/2021	Assessment	0.132	78.0	3.86	0.28	7.0	29.6	360
10/28/2021	Assessment	0.110	103	3.17	0.25	7.0	35.1	410
3/8/2022	Corrective Action	0.116	90.9	3.11	0.24	7.4	40.4	380
5/19/2022	Corrective Action	0.127	91.7	3.58	0.24	7.2	29.5	340 L1
11/2/2022	Corrective Action	0.108	82.7	3.00	0.26	7.2	28.2	350
2/13/2023	Corrective Action	0.106	88.3 M1	2.61	0.24	7.1	29.1	360
5/22/2023	Corrective Action	0.099	82.4	3.49	0.22	7.3	29.5	380
10/25/2023	Corrective Action	0.114	83.5	4.53	0.24	7.1	21.1	340
5/15/2024	Corrective Action	0.096	77.8	6.02	0.22	7.1	17.3	310
10/22/2024	Corrective Action	0.094	79.9	3.65	0.25	7.0	19.5	340

Table 1. Groundwater Data Summary: MW-1926
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.1 J1	0.95	28.8	< 0.1 U1	0.06 J1	0.4 J1	5.05	1.327	0.25	0.981	0.01 J1	< 0.002 U1	9 J1	0.3 J1	< 0.5 U1
6/20/2019	Assessment	0.08 J1	0.38	22.9	< 0.02 U1	0.05	0.06 J1	1.81	0.524	0.28	0.05 J1	< 0.009 U1	< 0.002 U1	7.05	0.3	< 0.1 U1
9/11/2019	Assessment	0.07 J1	0.37	23.9	< 0.02 U1	0.06	0.09 J1	1.17	0.4608	--	0.07 J1	0.00624	< 0.002 U1	5.38	0.4	< 0.1 U1
9/13/2019	Assessment	--	--	--	--	--	--	--	--	0.24	--	--	--	--	--	--
3/11/2020	Assessment	0.03 J1	0.33	20.3	< 0.02 U1	0.04 J1	0.206	1.08	1.316	0.28	< 0.05 U1	0.00675	< 0.002 U1	6.16	0.2	< 0.1 U1
5/18/2020	Assessment	0.08 J1	0.36	23.7	--	0.05	0.2 J1	1.42	0.3552	0.29	< 0.05 U1	0.00744	--	5.72	0.3	< 0.1 U1
10/8/2020	Assessment	0.05 J1	0.32	20.0	--	0.05 J1	0.323	1.03	0.379	0.26	< 0.05 U1	0.00575	< 0.002 U1	5.04	1.0	< 0.1 U1
3/22/2021	Assessment	0.06 J1	0.33	20.8	< 0.007 U1	0.04 J1	0.294	0.953	0.9312	0.30	< 0.05 U1	0.00585	< 0.002 U1	4.52	0.7	< 0.04 U1
5/20/2021	Assessment	0.1	0.31	19.1	< 0.007 U1	0.035	0.62	0.925	0.35	0.28	< 0.05 U1	0.00586	< 0.002 U1	4.7	0.59	0.09 J1
10/28/2021	Assessment	0.05 J1	0.31	22.0	< 0.007 U1	0.039	0.37	0.475	0.46	0.25	0.06 J1	0.00673	< 0.002 U1	4.1	0.73	< 0.04 U1
3/8/2022	Corrective Action	0.05 J1	0.30	20.2	< 0.007 U1	0.035	0.38	0.889	0.82	0.24	< 0.05 U1	0.00667	< 0.002 U1	4.4	0.60	< 0.04 U1
5/19/2022	Corrective Action	0.07 J1	0.34	20.0	< 0.007 U1	0.033	0.55	1.14	0.57	0.24	< 0.05 U1	0.00658	< 0.002 U1	4.9	0.46 J1	< 0.04 U1
11/2/2022	Corrective Action	0.06 J1	0.28	18.9	< 0.007 U1	0.032	0.50	0.875	0.53	0.26	< 0.05 U1	0.00661	< 0.002 U1	4.3	2.22	< 0.04 U1
2/13/2023	Corrective Action	0.06 J1	0.31	19.4	< 0.007 U1	0.036	0.47	0.788	0.78	0.24	0.10 J1	0.00683	< 0.002 U1	4.4	0.99	< 0.04 U1
5/22/2023	Corrective Action	0.063 J1	0.37	18.1	< 0.007 U1	0.032	0.48	0.728	0.71	0.22	0.24	0.00602	< 0.002 U1	4.1	0.60	0.02 J1
10/25/2023	Corrective Action	0.053 J1	0.34	18.4	< 0.007 U1	0.033	0.54	0.729	0.55	0.24	0.18 J1	0.00629	< 0.002 U1	4.1	0.90	0.03 J1
5/15/2024	Corrective Action	0.055 J1	0.26	15.8	< 0.007 U1	0.031	0.52	0.643	0.91	0.22	0.09 J1	0.00570	< 0.002 U1	3.9	0.87	0.02 J1
10/22/2024	Corrective Action	0.041 J1	0.26	16.4	< 0.007 U1	0.025	0.97	0.546	0.08	0.25	0.09 J1	0.00617	< 0.002 U1	3.7	0.89	< 0.02 U1

Table 1. Groundwater Data Summary: MW-1927
Mountaineer - BAP
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
4/10/2019	Assessment	0.654	151	20.3	0.18	7.3	327	898
6/20/2019	Assessment	0.513	159	15.6	0.13	7.8	335	849
9/11/2019	Assessment	0.498	143	--	--	7.0	--	--
9/13/2019	Assessment	--	--	15.2	0.14	--	306	839
3/11/2020	Assessment	--	--	--	0.14	6.9	--	--
5/14/2020	Assessment	0.501	143	12.9	0.17	6.8	290	807
10/9/2020	Assessment	0.429	155	11.8	0.14	6.9	277	741
3/24/2021	Assessment	0.431	154	12.2	0.18	7.3	294	762
5/20/2021	Assessment	0.420	155	11.6	0.17	7.0	284	770
10/27/2021	Assessment	0.416	151	11.4	0.16	7.0	264	770
3/2/2022	Corrective Action	0.390	170	13.2	0.15	7.2	322	830
5/20/2022	Corrective Action	0.443	171	13.0	0.15	6.9	293	800 L1
11/3/2022	Corrective Action	0.421	157	11.8	0.14	6.9	287	790
2/14/2023	Corrective Action	0.416	157	11.2	0.14	6.9	267	750
5/24/2023	Corrective Action	0.341	138	13.5	0.13	7.1	281	750
10/31/2023	Corrective Action	0.358	152	12.1	0.14	7.0	279	660
5/20/2024	Corrective Action	0.329	135	8.52	0.14	7.1	214	660
10/22/2024	Corrective Action	0.305	112	8.66	0.15	7.0	233	680

Table 1. Groundwater Data Summary: MW-1927
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.3 J1	0.4 J1	63.4	< 0.1 U1	< 0.05 U1	< 0.2 U1	0.319	1.533	0.18	0.1 J1	0.03 J1	< 0.002 U1	7 J1	0.8 J1	< 0.5 U1
6/20/2019	Assessment	0.15	0.28	61.5	< 0.02 U1	0.05 J1	0.1 J1	0.251	0.866	0.13	0.03 J1	< 0.009 U1	< 0.002 U1	2.82	0.3	< 0.1 U1
9/11/2019	Assessment	0.12	0.27	58.7	< 0.02 U1	0.05	0.08 J1	0.225	1.415	--	< 0.05 U1	0.00638	< 0.002 U1	2 J1	0.4	< 0.1 U1
9/13/2019	Assessment	--	--	--	--	--	--	--	--	0.14	--	--	--	--	--	--
3/11/2020	Assessment	0.09 J1	0.29	56.2	< 0.02 U1	0.06	0.1 J1	0.319	0.765	0.14	< 0.05 U1	0.00723	< 0.002 U1	2 J1	0.2 J1	< 0.1 U1
5/14/2020	Assessment	0.14	0.29	54.4	--	0.06	0.1 J1	0.434	1.190	0.17	0.08 J1	0.00725	--	2 J1	0.1 J1	< 0.1 U1
10/9/2020	Assessment	0.12	0.44	51.3	--	0.07	0.763	0.602	1.371	0.14	0.441	0.00598	< 0.002 U1	2 J1	0.3	< 0.1 U1
3/24/2021	Assessment	0.09 J1	0.25	57.1	< 0.007 U1	0.07	0.256	0.255	0.918	0.18	< 0.05 U1	0.00612	< 0.002 U1	1 J1	0.9	< 0.04 U1
5/20/2021	Assessment	0.15	0.22	56.5	< 0.007 U1	0.055	0.25	0.264	1.00	0.17	< 0.05 U1	0.00594	< 0.002 U1	1.1	1.39	< 0.04 U1
10/27/2021	Assessment	0.07 J1	0.23	53.4	< 0.007 U1	0.067	0.1 J1	0.331	1.20	0.16	< 0.05 U1	0.00631	< 0.002 U1	1.1	0.98	< 0.04 U1
3/2/2022	Corrective Action	0.11	0.28	55.5	< 0.007 U1	0.098	0.36	0.791	1.60	0.15	0.18 J1	0.00594	< 0.002 U1	1.1	1.70	< 0.04 U1
5/20/2022	Corrective Action	0.1	0.28	59.6	< 0.007 U1	0.072	0.35	0.522	1.58	0.15	0.17 J1	0.00603	< 0.002 U1	1.2	1.36	< 0.04 U1
11/3/2022	Corrective Action	0.07 J1	0.20	57.0	< 0.007 U1	0.068	0.30	0.442	2.17	0.14	< 0.05 U1	0.00619	< 0.002 U1	0.9	0.94	< 0.04 U1
2/14/2023	Corrective Action	0.07 J1	0.21	56.1	< 0.007 U1	0.068	0.34	0.442	1.38	0.14	< 0.05 U1	0.00593	< 0.002 U1	1.0	0.79	< 0.04 U1
5/24/2023	Corrective Action	0.079 J1	0.17	49.5	< 0.007 U1	0.067	0.31	0.434	2.73	0.13	< 0.05 U1	0.00559	< 0.002 U1	0.9	0.33 J1	< 0.02 U1
10/31/2023	Corrective Action	0.066 J1	0.21	56.0	< 0.007 U1	0.066	0.51	0.475	1.30	0.14	0.08 J1	0.00544	< 0.002 U1	0.8	0.60	< 0.02 U1
5/20/2024	Corrective Action	0.049 J1	0.17	52.3	< 0.007 U1	0.045	0.37	0.465	1.16	0.14	< 0.05 U1	0.00486	< 0.002 U1	0.9	0.95	< 0.02 U1
10/22/2024	Corrective Action	0.065 J1	0.15	48.3	< 0.007 U1	0.052	0.52	0.365	1.56	0.15	< 0.05 U1	0.00571	< 0.002 U1	0.7	0.61	< 0.02 U1

Table 1. Groundwater Data Summary: MW-1929
Mountaineer - BAP
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
4/10/2019	Assessment	0.243	115	11.7	0.19	7.5	214	574
6/18/2019	Assessment	0.219	97.8	13.6	0.20	7.5	237	541
9/10/2019	Assessment	0.236	113	15.1	0.19	7.6	234	528
3/10/2020	Assessment	--	--	--	0.23	7.2	--	--
5/13/2020	Assessment	0.189	98.0	10.7	0.23	7.2	176	461
10/9/2020	Assessment	0.218	104	10.7	0.22	7.2	198	508
3/23/2021	Assessment	0.183	103	9.16	0.27	7.6	179	484
5/18/2021	Assessment	0.182	111	8.60	0.23	7.2	163	510
10/27/2021	Assessment	0.248	112	8.13	0.25	7.3	202	520
3/1/2022	Corrective Action	0.155	116	18.9	0.20	7.3	191	480
5/17/2022	Corrective Action	0.179	122	14.3	0.20	7.3	185	480 L1
11/1/2022	Corrective Action	0.210	98.7	6.81	0.23	7.4	211	490
2/13/2023	Corrective Action	0.200	106	6.15	0.21	7.3	193	500
5/23/2023	Corrective Action	0.208	101	6.52	0.23	7.4	211	510
10/26/2023	Corrective Action	0.223	102	5.69	0.25	7.3	196	500
5/16/2024	Corrective Action	0.156	87	12.5	0.19	7.4	171	430
10/22/2024	Corrective Action	0.177	102	11.4	0.25	7.4	213	510

Table 1. Groundwater Data Summary: MW-1929
Mountaineer - BAP
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	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	< 0.1 U1	0.80	56.9	< 0.1 U1	< 0.05 U1	0.5 J1	3.03	0.823	0.19	1.15	0.01 J1	< 0.002 U1	< 2 U1	1.3	< 0.5 U1
6/18/2019	Assessment	0.02 J1	0.37	47.6	< 0.02 U1	0.02 J1	0.2 J1	0.157	0.398	0.20	0.08 J1	< 0.009 U1	< 0.002 U1	0.7 J1	1.3	< 0.1 U1
9/10/2019	Assessment	0.03 J1	0.47	52.1	< 0.02 U1	0.01 J1	0.280	0.606	2.994	0.19	0.274	0.00480	< 0.002 U1	0.7 J1	1.7	< 0.1 U1
3/10/2020	Assessment	< 0.02 U1	0.41	43.8	< 0.02 U1	< 0.01 U1	0.529	0.214	0.478	0.23	0.1 J1	0.00382	< 0.002 U1	0.5 J1	0.9	< 0.1 U1
5/13/2020	Assessment	0.04 J1	0.79	52.1	--	0.04 J1	0.584	1.81	0.880	0.23	0.870	0.00416	--	0.6 J1	1.1	< 0.1 U1
10/9/2020	Assessment	0.02 J1	0.41	44.6	--	0.01 J1	0.416	0.363	0.988	0.22	0.2 J1	0.00430	< 0.002 U1	0.6 J1	1.8	< 0.1 U1
3/23/2021	Assessment	0.04 J1	0.46	45.9	< 0.007 U1	0.02 J1	0.639	0.638	1.373	0.27	0.355	0.00352	< 0.002 U1	0.6 J1	1.6	< 0.04 U1
5/18/2021	Assessment	0.05 J1	0.47	51.9	< 0.007 U1	0.017 J1	0.40	0.437	1.17	0.23	0.21	0.00363	< 0.002 U1	0.5	0.89	< 0.04 U1
10/27/2021	Assessment	0.02 J1	0.33	45.4	< 0.007 U1	0.005 J1	0.51	0.182	3.24	0.25	0.1 J1	0.00463	< 0.002 U1	0.8	2.08	< 0.04 U1
3/1/2022	Corrective Action	0.03 J1	0.32	48.3	< 0.007 U1	0.009 J1	0.40	0.160	0.80	0.20	0.08 J1	0.00331	< 0.002 U1	0.3 J1	0.92	< 0.04 U1
5/17/2022	Corrective Action	0.02 J1	0.35	47.8	< 0.007 U1	0.01 J1	0.43	0.133	1.00	0.20	0.06 J1	0.00368	< 0.002 U1	0.3 J1	1.07	< 0.04 U1
11/1/2022	Corrective Action	0.03 J1	0.28	44.3	< 0.007 U1	0.007 J1	0.43	0.101	0.78	0.23	0.07 J1	0.00435	< 0.002 U1	0.6	2.23	< 0.04 U1
2/13/2023	Corrective Action	0.02 J1	0.32	46.3	< 0.007 U1	0.008 J1	0.32	0.144	0.53	0.21	0.10 J1	0.00445	< 0.002 U1	0.4 J1	1.72	< 0.04 U1
5/23/2023	Corrective Action	0.033 J1	0.36	43.7	< 0.007 U1	0.01 J1	0.92	0.257	0.34	0.23	0.20	0.00391	< 0.002 U1	0.6	1.91	< 0.02 U1
10/26/2023	Corrective Action	0.029 J1	0.35	44.6	< 0.007 U1	0.009 J1	0.45	0.200	0.73	0.25	0.18 J1	0.00422	< 0.002 U1	1.2	1.98	< 0.02 U1
5/16/2024	Corrective Action	0.020 J1	0.23	39.4	< 0.007 U1	0.006 J1	0.40	0.079	1.24	0.19	0.06 J1	0.00396	< 0.002 U1	0.6	1.12	< 0.02 U1
10/22/2024	Corrective Action	0.016 J1	0.23	43.3	< 0.007 U1	0.004 J1	0.36	0.047	0.50	0.25	0.06 J1	0.00427	< 0.002 U1	0.5	1.27	< 0.02 U1

Table 1. Groundwater Data Summary
Mountaineer - Bottom Ash Pond

Notes:
Combined radium values were calculated from the sum of the reported radium-226 and radium-228 results.
Radium data quality flags were not included. Reported negative radium-226 or radium-228 results were replaced with zero.
--: Not analyzed
<: 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.
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
mg/L: milligrams per liter
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
pCi/L: picocuries per liter
S7: Sample did not achieve constant weight.
SU: standard unit
µg/L: micrograms per liter

Table 1: Residence Time Calculation Summary
Mountaineer Bottom Ash Pond

			2024-03		**2024-05**		**2024-10**	
CCR Management Unit	Monitoring Well	Well Diameter (inches)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Bottom Ash Pond	MW-1601A [1]	2.0	78	0.777	123	0.493	101	0.602
	MW-1602 [1]	2.0	236	0.257	276	0.221	115	0.530
	MW-1603 [1]	2.0	118	0.517	127	0.478	130	0.466
	MW-1608 [1]	2.0	91	0.667	289	0.211	115	0.528
	MW-1604D [2]	2.0	62	0.988	153	0.397	69	0.887
	MW-1604S [2]	2.0	146	0.416	183	0.397	160	0.380
	MW-1605D [2]	2.0	141	0.432	172	0.332	165	0.370
	MW-1605S [2]	2.0	167	0.364	80	0.354	165	0.370
	MW-1606D [2]	2.0	190	0.321	137	0.443	166	0.367
	MW-1606S [2]	2.0	174	0.350	117	0.521	143	0.425
	MW-1607D [2]	2.0	127	0.481	184	0.331	102	0.595
	MW-1607S [2]	2.0	84	0.724	247	0.247	127	0.479
	JTMN-1 [3]	2.0	NC	NC	264	0.247	160	0.380
	JTMN-2 [3]	2.0	NC	NC	122	0.231	235	0.258
	MW-016 [3]	2.0	NC	NC	276	0.498	138	0.442
	MW-107 [3]	2.0	NC	NC	632	0.220	170	0.358
	MW-1921 [3]	2.0	NC	NC	1,127	0.054	119	0.512
	MW-1922S [3]	2.0	NC	NC	205	0.296	148	0.410
	MW-1923 [3]	2.0	NC	NC	1,381	0.044	225	0.270
	MW-1924 [3]	2.0	NC	NC	1,028	0.059	206	0.296
	MW-1925 [3]	2.0	NC	NC	193	0.316	187	0.325
	MW-1926 [3]	2.0	NC	NC	224	0.272	114	0.532
	MW-1927 [3]	2.0	NC	NC	231	0.263	81	0.749
	MW-203 [3]	2.0	NC	NC	504	0.121	195	0.311
	MW-1929 [4]	2.0	NC	NC	220	0.277	70	0.874

Notes:
[1] - Background Well
[2] - Downgradient Well
[3] - Nature and Extent Well
[4] Sentinel Well
NC - Not Calculated (Due to construction activities and safety concerns, these wells were not gauged)
Pumping wells were not in operation during the October 2024 event

Legend

◆ CCR Network Monitoring Wells

◇ Nature and Extent Monitoring Wells

△ AEP-Owned Pumping Well

— Groundwater Elevation Contour

- - Groundwater Elevation Contour (Inferred)

→ Approximate Groundwater Flow Direction

Notes

1. Monitoring well coordinates and water level data (collected on March 11, 2024) provided by AEP.
2. Only wells MW-1601A, MW-1602, MW-1603, MW-1604D, MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW1607D, MW-1607S, and MW-1608 were sampled during the March 2024 event.
3. Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis 2016) provided by AEP.
4. Groundwater elevation units are feet above mean sea level.
5. Only monitoring wells were used to generate groundwater contours. Water elevations were not collected for the pumping wells.
6. Normal lower pool elevation of the Ohio River at Racine Lock and Dam is 539.5 ft amsl (USACE).
7. Intermittent use of AEP-owned pumping wells for plant activities impact water levels in the vicinity. In general, shallow groundwater beneath the plant flows northeast toward the Ohio River.
8. Aerial imagery provided by Bing.

CCR: Coal combustion residuals
USACE: United States Army Core of Engineers

1,000 500 0 1,000
Feet

Potentiometric Surface Map - Uppermost Aquifer
March 2024

Mountaineer Former Bottom Ash Ponds
Letart, West Virginia

Geosyntec
consultants

Columbus, Ohio | May 2023

Figure
2

A:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2024\AEP-Mountaineer_BAP_GW_2024-03.mxd. ASoltero. 10/2/2024. CHA8423/07/08.

Legend

- CCR Network Monitoring Wells
- Nature and Extent Monitoring Wells
- Piezometer
- AEP-Owned Pumping Well
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)
- Approximate Groundwater Flow Direction

Notes

1. Monitoring well coordinates and water level data (collected on May 15, 2024) provided by AEP.
2. MW-005, MW-112, MW-1928, PZ-09-03, PZ-09-04, and PZ-09-05 were dry during the May 2024 event.
3. Wells not used for contouring are highlighted in gray.
4. Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis 2016) provided by AEP.
5. Groundwater elevation units are feet above mean sea level (ft amsl).
6. Only monitoring wells were used to generate groundwater contours. Water elevations were not collected for the pumping wells.
7. Intermittent use of AEP-owned pumping wells for plant activities impact water levels in the vicinity. In general, shallow groundwater beneath the plant flows northeast toward the Ohio River.
8. Aerial imagery provided by Bing.

AEP: American Electric Power
CCR: Coal combustion residuals

1,000 500 0 1,000
Feet

Potentiometric Surface Map - Uppermost Aquifer
May 2024

Mountaineer Former Bottom Ash Ponds
Letart, West Virginia

Geosyntec
consultants

Columbus, Ohio

May 2024

Figure

3

A:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2024\AEP-Mountaineer_BAP_GW_2024-05_v2.mxd. ASoltero. 10/2/2024. CHA8423/07/08.

Legend

⯐	CCR Network Monitoring Wells
⯐	Nature and Extent Monitoring Wells
⊕	Piezometer
△	AEP-Owned Pumping Well
—	Groundwater Elevation Contour
→	Approximate Groundwater Flow Direction

Notes

1. Monitoring well coordinates and water level data (collected on October 21, 2024) provided by AEP.
2. MW-005 (543.57 ft MSL) was not used for contouring due to an anomalous reading.
3. Wells MW-112, MW-1928, PZ-09-03, PZ-09-04, and PZ-09-05 were dry during the October 2024 event.
4. Pumping wells were not in operation during the October 2024 event.
5. Wells not used for contouring are highlighted in gray.
6. Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis 2016) provided by AEP.
7. Groundwater elevation units are feet above mean sea level (ft amsl).
8. Only monitoring wells were used to generate groundwater contours. Water elevations were not collected for the pumping wells.
9. Intermittent use of AEP-owned pumping wells for plant activities impact water levels in the vicinity. In general, shallow groundwater beneath the plant flows northeast toward the Ohio River.
10. Aerial imagery provided by Bing.

AEP: American Electric Power
CCR: Coal combustion residuals

1,000 500 0 1,000
Feet

Potentiometric Surface Map - Uppermost Aquifer
October 2024

Mountaineer Former Bottom Ash Ponds
Letart, West Virginia

Geosyntec
consultants

Figure
4

Columbus, Ohio
January 2025

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Appendix 2

The groundwater data statistical analyses completed in this reporting period follow.

Geosyntec consultants

engineers | scientists | innovators

AMERICAN ELECTRIC POWER

STATISTICAL ANALYSIS SUMMARY, BOTTOM ASH PONDS

Mountaineer Plant
Letart, West Virginia

Prepared for

American Electric Power
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Prepared by

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Project Number: CHA8500B

March 11, 2024

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ACRONYMS AND ABBREVIATIONS

ASD	alternative source demonstration
BAP	Bottom Ash Ponds
CCR	coal combustion residuals
CFR	code of federal regulations
GWPS	groundwater protection standard
LCL	lower confidence limit
LPL	lower prediction limit
mg/L	milligrams per liter
QA/QC	quality assurance/quality control
SSI	statistically significant increase
SSL	statistically significant level
TDS	total dissolved solids
UCL	upper confidence limit
UPL	upper prediction limit
WVA DEP	West Virginia Department of Environmental Protection

1. INTRODUCTION

In accordance with United States Environmental Protection Agency (Code of Federal Regulations [CFR] Title 40, Section 257, Subpart D) and West Virginia Department of Environmental Protection (WVA DEP) (WVA DEP 33CSR1 and 1B) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments, groundwater monitoring has been conducted at the Bottom Ash Ponds (BAP), an existing CCR unit at the Mountaineer Power Plant in Letart, West Virginia. Recent groundwater monitoring results were used to identify concentrations of Appendix IV constituents that are above the groundwater protection standards (GWPSs) and to evaluate progress towards completion of the selected corrective action.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, calcium, chloride, sulfate, and total dissolved solids (TDS) at the BAP. An alternative source was not identified at the time; thus, the BAP has been in assessment monitoring since 2018. A statistical evaluation of the assessment monitoring data, conducted in January 2019, identified statistically significant levels (SSLs) for lithium (Geosyntec 2019).

An alternative source was not identified, so the BAP initiated an assessment of corrective measures in accordance with 40 CFR 257.96. Source Removal and Hydraulic Containment was selected as the remedial approach for lithium exceedances at the BAP (Sanborn Head 2021). Corrective action monitoring was initiated in 2022 in accordance with 40 CFR 257.98(a)(1).

During the previous corrective action monitoring event, conducted in March and May 2023, SSLs were identified for arsenic, and corrective action statistics observed concentrations of lithium above the GWPSs (Geosyntec 2023a). In accordance with 40 CFR 257.95(g)(3)(ii), an alternative source demonstration (ASD) was successfully completed for arsenic (Geosyntec, 2023b).

A semiannual sampling event for Appendix III parameters and Appendix IV parameters, as required by 40 CFR 257.98(a)(1) and the *Corrective Action Monitoring Plan* (Sanborn Head 2022), was completed in October 2023. The results of the October 2023 corrective action monitoring sampling event are documented in this report.

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

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. GWPSs were reestablished for the Appendix IV parameters following calculation of site-specific background values. Confidence intervals were calculated from the Appendix IV parameter data at the compliance, nature-and-extent, and sentinel wells to assess whether any were present at SSLs above the corresponding GWPS. SSLs were identified for arsenic. Corrective action statistics identified concentrations of lithium above the GWPS. Therefore, the unit will continue corrective action monitoring. Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

2. BOTTOM ASH POND EVALUATION

2.1 Data Validation and QA/QC

One set of samples was collected for analysis from each background and compliance well to meet the requirements of 40 CFR 257.95(d)(1) in October 2023 as part of the corrective action monitoring program. Nature and extent wells MW-112 and MW-1928 were not sampled during this event due to insufficient water. Samples from the October 2023 sample event were analyzed for all Appendix III and Appendix IV parameters. A summary of data collected during this assessment monitoring event is presented in Table 1.

Chemical analysis was completed by a National Environmental Laboratory Accreditation Program-certified analytical laboratory. The laboratory completed analysis of quality assurance and quality control (QA/QC) samples such as laboratory reagent blanks, continuing calibration verification samples, and laboratory fortified blanks.

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.10.0.15 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues that would impact data usability were noted.

2.2 Statistical Analysis

Statistical analyses for the BAP were conducted in accordance with the January 2021 *Statistical Analysis Plan* (Geosyntec 2021). Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained in October 2023 were screened for potential outliers. Outliers were identified at background wells MW-1601A for barium, and MW-1601A and MW-1602 for combined radium. The combined radium value at background well MW-1601A was flagged and removed from the dataset to maintain conservative statistical limits. The remaining identified values were either similar to upgradient concentrations or below their respective maximum contaminant level (MCL); therefore, no additional outliers were flagged 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 2021). The established GWPS was determined to be the greater value of the background concentration and either the maximum contaminant level or risk-based level specified in 40 CFR 257.95(h)(2) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events.

Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for arsenic, chromium, cobalt, combined radium, and molybdenum. Nonparametric tolerance limits were calculated for antimony, barium, cadmium, fluoride, lead, lithium, and selenium due to apparent nonnormal distributions. Nonparametric tolerance limits were calculated for beryllium, mercury, and thallium because greater than 50% of the data was composed of nondetect results. Upper tolerance limits and the final GWPSs are summarized in Table 2.

2.2.2 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ($\alpha = 0.01$); however, nonparametric confidence limits were calculated in some cases (e.g., when the data were not normally distributed or when the nondetect frequency was too high). Excluding instances where previous lithium exceedances merited corrective action (see Section 2.2.3), an SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). The calculated confidence limits (Attachment B) were compared to the GWPSs provided in Table 2.

The following SSLs were identified at the Mountaineer BAP for assessment monitoring:

- The LCL for arsenic exceeded the GWPS of 0.0100 milligrams per liter (mg/L) at MW-1805 (0.0226 mg/L) and at MW-1922D (0.411 mg/L).

As a result, either an ASD for arsenic will be prepared in accordance with 40 CFR 257.95(g)(3)(ii) or an assessment of corrective measures will be initiated for this constituent. Additionally, the Mountaineer BAP will continue to monitor the groundwater network in accordance with the assessment monitoring program per 40 CFR 257.96(b).

2.2.3 Evaluation of Corrective Action Monitoring

The selected remedy of Source Removal and Hydraulic Containment is considered complete when it meets the requirements of 40 CFR 257.98(c), including the requirement to achieve compliance with the GWPS at all points within the plume of contamination (40 CFR 257.98[c][1]). For previously identified lithium exceedances, which are the subject of the current corrective measures, the upper confidence limit (UCL) of the confidence intervals constructed as described in Section 2.2.2 were compared to the GWPSs provided in Table 2. If the UCL is above the GWPS, compliance with the GWPSs has not been achieved. The following corrective action exceedances were identified:

- The UCL for lithium was above the GWPS of 0.0400 mg/L at MW-1605D (0.0652 mg/L), MW-1605S (0.0656 mg/L), MW-1606D (0.119 mg/L), MW-1606S (0.0967 mg/L), MW-1607D (0.0982 mg/L), MW-1607S (0.106 mg/L), MW-1922S (0.0583 mg/L), MW-1923 (0.198 mg/L), MW-1924 (0.105 mg/L), and MW-1925 (0.0844 mg/L).

For these lithium exceedances, which are the subject of corrective measures, concentrations remain above the GWPS. Statistically significant decreasing trends were observed for lithium at MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1922S, MW-1923, MW-1924, and MW-1925; however, upper confidence bands remain above the GWPS. The selected remedy will continue to be implemented.

It was previously noted that nature and extent well MW-1921 does not accurately represent groundwater conditions at the BAP (Geosyntec 2023a). Statistical analyses of lithium groundwater concentrations at MW-1921 were still completed to support corrective action monitoring, but the analysis is no longer for compliance purposes. Results of the MW-1921 statistical analyses are provided in Attachment B. The following SSL was identified for MW-1921:

- The LCL for lithium was above the GWPS of 0.0400 mg/L (0.0832 mg/L).

Because this analysis was not completed for compliance purposes, an ASD is not required for the lithium concentrations observed at MW-1921.

2.2.4 Updating Appendix III Prediction Limits

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

For intrawell tests, insufficient data was available to compare against the existing background dataset, and so the prediction limits were not updated for the intrawell tests at this time. The intrawell prediction limits were previously calculated using historical data through May 2022 (Geosyntec 2023c). The established intrawell prediction limits were used to evaluate potential SSIs for pH.

Prediction limits for the interwell tests were recalculated using data collected during the 2023 assessment monitoring events. New upgradient well data were tested for outliers prior to being added to the background dataset. Upgradient well data were also evaluated for statistically significant trends using the Sen's Slope/Mann-Kendall trend test, and the results are included in Attachment B. The revised interwell prediction limits were used to evaluate potential SSIs for boron, calcium, chloride, fluoride, sulfate, and TDS.

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

The updated interwell prediction limits for boron, calcium, chloride, fluoride, sulfate, and TDS and previously calculated intrawell prediction limits for pH are summarized in Table 3. The 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, or in the case of pH, is neither less than the lower prediction limit (LPL) nor greater than the UPL, then it can be concluded that an SSI has not occurred. In practice, where the initial result does not exceed the UPL, or in the case of pH, is neither less than the LPL nor greater than the UPL, a second sample will not be collected. The retesting procedures allow achieving an acceptably high statistical power to detect changes at downgradient wells for constituents evaluated using intrawell prediction limits.

2.2.4 Evaluation of Potential Appendix III SSIs

The Appendix III results were analyzed to assess whether concentrations of Appendix III parameters at the compliance wells were above background concentrations. Data collected during the October 2023 assessment monitoring event from each compliance well were compared to updated prediction limits to assess whether the results were statistically above background values. The results from these events and the prediction limits are summarized in Table 3. The following exceedances of the UPLs were noted:

- Boron concentrations were above the interwell UPL of 0.333 mg/L at MW-1604S (2.01 mg/L), MW-1605D (2.58 mg/L), MW-1605S (3.16 mg/L), MW-1606D (4.23 mg/L), MW-1606S (3.03 mg/L), MW-1607D (4.65 mg/L), and MW-1607S (2.87 mg/L).

- Calcium concentrations were above the interwell UPL of 202 mg/L at MW-1604S (227 mg/L), MW-1605D (222 mg/L), MW-1606D (212 mg/L), and MW-1607D (211 mg/L).

- Chloride concentrations were above the interwell UPL of 56.2 mg/L at MW-1604S (105 mg/L), MW-1605D (105 mg/L), MW-1605S (94.9 mg/L), MW-1606D (159 mg/L), MW-1606S (98.3 mg/L), MW-1607D (157 mg/L), and MW-1607S (116 mg/L).

- Fluoride concentrations were above the interwell UPL of 0.300 mg/L at MW-1606S (0.37 mg/L) and MW-1607D (0.48 mg/L).

- Sulfate concentrations were above the interwell UPL of 530 mg/L at MW-1604S (588 mg/L), MW-1605D (577 mg/L), MW-1605S (562 mg/L), MW-1606D (563 mg/L), and MW-1607D (624 mg/L).

- TDS concentrations were above the interwell UPL of 962 mg/L at MW-1604S (1,280 mg/L), MW-1605D (1,250 mg/L), MW-1605S (1,220 mg/L), MW-1606D (1,320 mg/L), MW-1606S (1,100 mg/L), and MW-1607D (1,510 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the October 2023 sample was above the UPL or, in the case of pH, below the LPL. Based on this evaluation, concentrations of Appendix III constituents appear to be above background concentrations and the unit will remain in assessment monitoring.

2.3 Conclusions

A semiannual corrective action monitoring event was conducted in accordance with the federal and state CCR Rules. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that prevented data usage. A review of outliers identified three potential outliers in the October 2023 data; however, two of the identified values were not removed from the dataset due to their similarity to other background locations or their relative concentration below their respective MCL. One outlier at background well MW-1601A for combined radium was removed from the dataset. GWPSs were reestablished 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 was above the GWPSs. SSLs were identified for arsenic. For previous lithium exceedances which are the subject of corrective measures, concentrations remain above the GWPS and implementation of the selected remedy will continue. Appendix III parameters were compared to updated prediction limits; concentrations of boron, calcium, chloride, fluoride, sulfate, and TDS were identified above the prediction limits.

Based on this evaluation, the Mountaineer BAP CCR unit will remain in corrective action monitoring.

3. REFERENCES

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TABLES

Table 1. Groundwater Data Summary
Statistical Analysis Summary
Mountaineer Plant – Bottom Ash Pond

Parameter	Unit	MW-016	MW-107	MW-203	MW-1601A	MW-1602	MW-1603	MW-1604D	MW-1604S	MW-1605D	MW-1605S
		10/30/2023	10/26/2023	10/31/2023	10/25/2023	10/25/2023	10/25/2023	10/25/2023	10/25/2023	10/26/2023	10/26/2023
Antimony	µg/L	0.014 J1	0.019 J1	0.024 J1	0.028 J1	0.020 J1	0.027 J1	0.040 J1	0.186	0.024 J1	0.037 J1
Arsenic	µg/L	2.60	0.28	0.23	0.42	0.25	0.21	0.26	0.23	2.85	0.41
Barium	µg/L	25.2	41.1	25.7	61.7	26.7	28.5	34.5	29.1	28.8	27.6
Beryllium	µg/L	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	1.13	0.583	0.083	0.133	0.104	0.206	0.130	2.01	2.58	3.16
Cadmium	µg/L	0.019 J1	0.028	0.005 J1	0.018 J1	0.013 J1	0.011 J1	0.022	0.302	0.008 J1	0.044
Calcium	mg/L	200	196	85.3	166	79.0	114	105	227	222 M1	160
Chloride	mg/L	73.8	40.1	21.7	27.8	8.69	10.9	20.7	105	105	94.9
Chromium	µg/L	0.41	0.22 J1	0.33	0.29 J1	0.44	0.37	0.44	0.43	0.22 J1	0.44
Cobalt	µg/L	1.04	0.495	0.026	0.014 J1	0.019 J1	0.112	0.607	4.11	1.14	0.439
Combined Radium	pCi/L	1.01	0.46	0.51	10.52	1.58	1.34	2.25	1.43	1.21	0.52
Fluoride	mg/L	0.25	0.22	0.28	0.11	0.19	0.06	0.25	0.25	0.22	0.27
Lead	µg/L	0.12 J1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.11 J1	0.32	0.2 U1	0.2 U1	0.18 J1
Lithium	mg/L	0.0244	0.00334	0.00201	0.00419	0.0152	0.0141	0.0128	0.0309	0.0400	0.0384
Mercury	µg/L	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1
Molybdenum	µg/L	34.0	0.3 J1	1.2	0.4 J1	0.6	0.1 J1	1.3	13.1	27.4	12.5
Selenium	µg/L	0.14 J1	0.39 J1	0.78	0.47 J1	0.52	0.14 J1	1.52	0.70	0.09 J1	1.53
Sulfate	mg/L	472	299	69.0	269	236	392	203	588	577	562
Thallium	µg/L	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.22	0.03 J1	0.03 J1
Total Dissolved Solids	mg/L	920	870	350	720	520	720	600	1,280	1,250	1,220
pH	SU	7.3	6.8	7.1	6.8	6.4	6.2	7.1	7.1	7.2	7.2

Table 1. Groundwater Data Summary
Statistical Analysis Summary
Mountaineer Plant – Bottom Ash Pond

Parameter	Unit	MW-1606D	MW-1606S	MW-1607D	MW-1607S	MW-1608	MW-1805	MW-1921	MW-1922D		MW-1922S
		10/27/2023	**10/27/2023**	**10/31/2023**	**10/31/2023**	**0/26/2023**	**10/25/2023**	**10/27/2023**	**10/25/2023**	**10/26/2023**	**10/26/2023**
Antimony	µg/L	0.143	0.147	0.033 J1	0.405	0.032 J1	0.022 J1	0.094 J1	--	0.474	0.018 J1
Arsenic	µg/L	0.28	0.58	1.97	0.83	0.41	27.4	1.18	--	323	1.89
Barium	µg/L	40.7	44.7	63.5	52.6	22.7	96.3	63.3	--	405	34.0
Beryllium	µg/L	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	--	0.05 U1	0.05 U1
Boron	mg/L	4.23	3.03	4.65	2.87	0.075	1.75	0.478	--	0.054	2.32
Cadmium	µg/L	0.060	0.048	0.004 J1	0.024	0.006 J1	0.02 U1	0.012 J1	--	0.02 U1	0.005 J1
Calcium	mg/L	212	160	211	134	75.9	63.4	95.4	--	52.5	303
Chloride	mg/L	159	98.3	157	116	1.28	133	71.6	--	16.0	113
Chromium	µg/L	0.45	0.29 J1	0.47	0.34	0.41	0.32	0.39	--	0.37	0.54
Cobalt	µg/L	1.18	0.154	0.859	1.26	0.080	0.037	0.562	--	0.089	1.15
Combined Radium	pCi/L	1.38	0.92	1.7	1.13	1.43	1.03	0.51	--	6.33	0.95
Fluoride	mg/L	0.26	0.37	0.48	0.24	0.27	0.64	1.11	--	0.29	0.15
Lead	µg/L	0.2 U1	0.05 J1	0.2 U1	0.2 U1	0.06 J1	0.2 U1	0.1 J1	--	0.2 U1	0.17 J1
Lithium	mg/L	0.0520	0.0473	0.0892	0.0827	0.00216	0.0187	0.0913	--	0.00675	0.0432
Mercury	µg/L	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	--	0.002 J1	0.005 U1
Molybdenum	µg/L	56.3	48.7	58.5	29.9	0.9	8.7	350	--	23.8	25.2
Selenium	µg/L	2.35	2.26	0.07 J1	3.16	1.03	0.5 U1	0.34 J1	--	0.5 U1	0.06 J1
Sulfate	mg/L	563	458	624	244	60.8	180	162	--	8.6	955
Thallium	µg/L	0.09 J1	0.06 J1	0.02 J1	0.04 J1	0.2 U1	0.2 U1	0.06 J1	--	0.2 U1	0.04 J1
Total Dissolved Solids	mg/L	1,320	1,100	1,510	940	320	800	510	--	320	1,730
pH	SU	7.2	7.0	7.3	7.1	6.9	8.0	7.6	7.4	--	7.1

Table 1. Groundwater Data Summary
Statistical Analysis Summary
Mountaineer Plant – Bottom Ash Pond

Parameter	Unit	MW-1923	MW-1924		MW-1925	MW-1926	MW-1927	MW-1929	JTMN-1	JTMN-2
		10/30/2023	10/30/2023	10/31/2023	10/26/2023	10/25/2023	10/31/2023	10/26/2023	10/31/2023	11/1/2023
Antimony	µg/L	0.156	--	0.055 J1	0.184	0.053 J1	0.066 J1	0.029 J1	0.045 J1	0.042 J1
Arsenic	µg/L	0.90	--	0.40	0.27	0.34	0.21	0.35	0.97	0.86
Barium	µg/L	89.9	--	48.6	34.1	18.4	56.0	44.6	67.6	83.0
Beryllium	µg/L	0.030 J1	--	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.026 J1	0.025 J1
Boron	mg/L	1.31	--	3.11	3.42	0.114	0.358	0.223	0.332	0.319
Cadmium	µg/L	0.024	--	0.040	0.036	0.033	0.066	0.009 J1	0.023	0.038
Calcium	mg/L	109	--	168 M1	165	83.5	152	102	219	190
Chloride	mg/L	32.3	--	84.5	64.7	4.53	12.1	5.69	58.3	55.6
Chromium	µg/L	0.99	--	0.40	0.43	0.54	0.51	0.45	1.01	1.26
Cobalt	µg/L	1.11	--	2.39	0.954	0.729	0.475	0.200	0.953	0.737
Combined Radium	pCi/L	1.49	--	1.65	1.8	0.55	1.3	0.73	1.03	1.29
Fluoride	mg/L	0.29	--	0.51	0.29	0.24	0.14	0.25	0.26	0.27
Lead	µg/L	0.83	--	0.08 J1	0.09 J1	0.18 J1	0.08 J1	0.18 J1	0.90	0.63
Lithium	mg/L	0.184	--	0.0603	0.0529	0.00629	0.00544	0.00422	0.0108	0.0134
Mercury	µg/L	0.005 U1	--	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1
Molybdenum	µg/L	303	--	105	43.1	4.1	0.8	1.2	12.4	14.3
Selenium	µg/L	12.6	--	0.37 J1	2.64	0.90	0.60	1.98	0.48 J1	0.39 J1
Sulfate	mg/L	222	--	424	462	21.1	279	196	442	410
Thallium	µg/L	0.2 U1	--	0.2 U1	0.2 U1	0.03 J1	0.2 U1	0.2 U1	0.04 J1	0.03 J1
Total Dissolved Solids	mg/L	580	--	1,040	1,030	340	660	500	1,000	930 S7
pH	SU	7.5	7.2	--	7.0	7.1	7.0	7.3	7.0	6.9

Notes:
--: not analyzed
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
mg/L: milligrams per liter
pCi/L: picocuries per liter
S7: The sample did not achieve constant weight.
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
µg/L: micrograms per liter

Table 2. Appendix IV Groundwater Protection Standards
Statistical Analysis Summary
Mountaineer Plant - Bottom Ash Pond

Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600		0.000520	0.00600
Arsenic, Total (mg/L)	0.0100		0.000680	0.0100
Barium, Total (mg/L)	2.00		0.0678	2.00
Beryllium, Total (mg/L)	0.00400		0.0000500	0.00400
Cadmium, Total (mg/L)	0.00500		0.0000500	0.00500
Chromium, Total (mg/L)	0.100		0.000718	0.100
Cobalt, Total (mg/L)	n/a	0.00600	0.000525	0.00600
Combined Radium, Total (pCi/L)	5.00		2.31	5.00
Fluoride, Total (mg/L)	4.00		0.300	4.00
Lead, Total (mg/L)	n/a	0.0150	0.000881	0.0150
Lithium, Total (mg/L)	n/a	0.0400	0.0300	0.0400
Mercury, Total (mg/L)	0.00200		0.00000500	0.00200
Molybdenum, Total (mg/L)	n/a	0.100	0.00279	0.100
Selenium, Total (mg/L)	0.0500		0.00430	0.0500
Thallium, Total (mg/L)	0.00200		0.000200	0.00200

Notes:

1. Calculated UTL (upper tolerance limit) represents site-specific background values.

CCR: coal combustion residuals
GWPS: groundwater protection standard
MCL: maximum contaminant level
mg/L: milligrams per liter
pCi/L: picocuries per liter

Table 3. Appendix III Data Summary
Statistical Analysis Summary
Mountaineer Plant – Bottom Ash Pond

Analyte	Unit	Description	MW-1604D	MW-1604S	MW-1605D	MW-1605S	MW-1606D	MW-1606S	MW-1607D	MW-1607S
			10/25/2023	10/25/2023	10/26/2023	10/26/2023	10/27/2023	10/27/2023	10/31/2023	10/31/2023
Boron	mg/L	Interwell Background Value (UPL)	0.333							
		Analytical Result	0.130	**2.01**	**2.58**	**3.16**	**4.23**	**3.03**	**4.65**	**2.87**
Calcium	mg/L	Interwell Background Value (UPL)	202							
		Analytical Result	105	**227**	**222**	160	**212**	160	**211**	134
Chloride	mg/L	Interwell Background Value (UPL)	56.2							
		Analytical Result	20.7	**105**	**105**	**94.9**	**159**	**98.3**	**157**	**116**
Fluoride	mg/L	Interwell Background Value (UPL)	0.300							
		Analytical Result	0.25	0.25	0.22	0.27	0.26	**0.37**	**0.48**	0.24
pH	SU	Intrawell Background Value (UPL)	7.8	7.7	7.8	7.7	7.8	7.8	8.0	7.9
		Intrawell Background Value (LPL)	6.5	6.6	6.8	6.8	6.8	6.3	7.0	6.8
		Analytical Result	7.1	7.1	7.2	7.2	7.2	7.0	7.3	7.1
Sulfate	mg/L	Interwell Background Value (UPL)	530							
		Analytical Result	203	**588**	**577**	**562**	**563**	458	**624**	244
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	962							
		Analytical Result	600	**1,280**	**1,250**	**1,220**	**1,320**	**1,100**	**1,510**	940

Notes:

1. Bold values exceed the background value.

2. Background values are shaded gray.

LPL: lower prediction limit

mg/L: milligrams per liter

SU: standard units

UPL: upper prediction limit

ATTACHMENT A
Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

I certify that selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Mountaineer Bottom Ash Pond CCR management area and that the requirements of 40 CFR 257.93(f) and WVA DEP 33CSR1 have been met.

DAVID ANTHONY MILLER
22663

David Anthony Miller
Printed Name of Licensed Professional Engineer

David Anthony Miller
Signature

22663
License Number

West Virginia
Licensing State

03.14.2024
Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS
CONSULTING

February 7, 2024

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

Re: Mountaineer Bottom Ash Pond
Assessment Monitoring Report & Background Update – 2023

Dear Ms. Kreinberg,

Groundwater Stats Consulting (GSC), formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the background update and the Assessment Monitoring and Corrective Action statistical analysis of groundwater data through October/November 2023 at American Electric Power Company's Mountaineer Bottom Ash Pond. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities (CCR Rule, 2015) as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009).

Sampling began at upgradient and downgradient wells for the CCR program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells:** MW-1601A, MW-1602, MW-1603, and MW-1608
- **Downgradient wells:** MW-1604D, MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S
- **Nature and Extent wells:** JTMN-1, JTMN-2, MW-016, MW-107, MW-112, MW-1805, MW-1921, MW-1922D, MW-1922S, MW-1923, MW-1924, MW-1925, MW-1926, MW-1927, and MW-203
- **Sentinel well**: MW-1929

Note that sampling began at the nature and extent wells along with the sentinel well in 2019. Although new upgradient well MW-1928 is considered part of the well network, it has been dry since 2019; therefore, it is not listed above, nor included in this analysis. Well MW-112 was dry for the October/November 2023 event; therefore, it was not sampled.

Data were sent electronically, and the statistical analysis was conducted according to the Statistical Analysis Plan and screening evaluation prepared by GSC and approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC. This analysis was reviewed by Andrew Collins, Project Manager of 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

Time series and box plots for Appendix III and IV parameters are provided for all wells and constituents and are used to evaluate concentrations over the entire record (Figures A and B, respectively). Values in background which have previously been flagged as outliers may be seen in a lighter font and disconnected symbol on the graphs. Additionally, a summary of flagged values follows this letter (Figure C). While the reporting limits may vary from well to well, a single reporting limit substitution is used across all wells for a given parameter in the time series plots since the wells are plotted as a group.

Note that when there are no detections present in downgradient wells for a given constituent, statistical analyses are not required. A summary of Appendix IV downgradient, nature and extent, and sentinel well/constituent pairs containing 100% non-detects follows this letter. For all constituents, a substitution of the most recent reporting limit is used for non-detect data. When 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.

Summary of Statistical Methods – Appendix III Parameters

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

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

2) Interwell prediction limits, combined with a 1-of-2 resample plan for boron, calcium, chloride, fluoride, 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 most data are non-detects, a nonparametric test is utilized. While the annual false positive rate associated with parametric limits is fixed at 10% as recommended by the EPA Unified Guidance (2009), the false positive rate associated with nonparametric limits is not fixed and depends upon the available background sample size, number of future comparisons, and verification resample plan. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction and tolerance 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, 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 for parametric limits. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% non-detects.

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

Initial Background Screening – 2017

All proposed background data were screened for outliers and trends during the background screening and the findings of those reports were submitted at that time. Intrawell prediction limits were recommended for pH while interwell prediction limits were recommended for boron, calcium, chloride, fluoride, sulfate, and TDS.

Background Update Summary – February 2024

Prior to updating background data during this analysis, Tukey's outlier test was used to evaluate data through October/November 2023 at upgradient wells for boron, calcium, chloride, fluoride, sulfate, and TDS, which are tested using interwell prediction limits. For pH, which uses intrawell prediction limits, values were not re-evaluated for new outliers as these records had insufficient samples for updating background at this time.

Outlier Analysis

Tukey's outlier test on pooled upgradient well data for boron, calcium, chloride, fluoride, sulfate, and TDS identified potential outliers for fluoride (Figure C). Any values identified by Tukey's but not flagged in the database were similar to historical data within the same well for and/or were similar to or lower than measurements in neighboring upgradient wells. Although not identified by Tukey's, the highest value for boron at MW-1601A was flagged in order to construct statistical limits that are more conservative from a regulatory perspective and are representative of present-day groundwater quality conditions. A summary of all flagged outliers follows this report (Figure C).

Intrawell – Prediction Limits

Intrawell prediction limits for pH, constructed using all historical data through June 2022 with a 1-of-2 resample plan, remain unchanged for this event as the limits were updated in a prior analysis. A summary of the limits follows this letter (Figure D) and no comparison of the October/November 2023 compliance data was performed in this analysis.

Interwell – Trend Test Evaluation

For constituents tested using interwell prediction limits, the Sen's Slope/Mann Kendall trend test was used to evaluate data at upgradient wells for boron, calcium, chloride, fluoride, sulfate, and TDS to identify statistically significant increasing or decreasing trends at the 99% confidence level (Figure F). The results of the trend analyses showed statistically significant trends for the following well/constituent pairs:

Increasing:
- Calcium: MW-1601A
- Fluoride: MW-1602
- Sulfate: MW-1601A
- TDS: MW-1601A

Decreasing:
- Boron: MW-1601A, MW-1603, and MW-1608
- Chloride: MW-1602, MW-1603, and MW-1608
- Fluoride: MW-1601A
- Sulfate: MW-1603

Elevated concentrations early in the record for boron at MW-1603 were truncated from the record to eliminate the influence of the decreasing trend and generate a statistical limit that is representative of present-day groundwater quality conditions. While the Sen's Slope/Mann Kendall trend test identified statistically significant increasing or decreasing trends in at least one upgradient well for calcium, boron, chloride, fluoride, sulfate, and TDS, the magnitudes of these trends would not greatly affect the interwell prediction limits and reported measurements are consistent with those reported at one or more neighboring upgradient wells; therefore, no adjustments were required for these records at this time. Additionally for calcium and fluoride, the statistical limits are nonparametric prediction limits constructed based on the highest reported concentration among the upgradient wells, and are not influenced by the magnitude of the significant trends. All records will be re-evaluated during the next background update and a list of well/constituent pairs using a truncated portion of their record follows this report.

Interwell – Prediction Limits

Interwell prediction limits, combined with a 1-of-2 resample plan, were constructed using all pooled upgradient well data through October/November 2023 for boron, calcium, chloride, fluoride, sulfate and TDS (Figure F). Time series graphs are included with the statistical limits for graphical representation of concentrations over time at upgradient wells. A summary table of the updated limits may be found following this letter in the Prediction Limit Summary Tables. No comparison of the October/November 2023 compliance data to statistical limits was made in this analysis.

Evaluation of Appendix IV Parameters – October/November 2023 Event

Prior to evaluating Appendix IV parameters, all background data at upgradient wells are screened through visual screening and Tukey's outlier test for potential outliers.

Outlier Analysis

For the current analysis, Tukey's outlier test on pooled upgradient well data through October 2023 identified outliers for arsenic, barium, combined radium 226 + 228, fluoride, and lithium (Figure C). A high value for combined radium 226 + 228 at upgradient well MW-1601A was flagged in order to maintain statistical limits that are conservative from a regulatory perspective. Any values identified by Tukey's test but not flagged in the database were either similar to concentrations from neighboring upgradient wells or were lower than the respective Maximum Contaminant Level (MCL). Tukey's outlier test and visual screening confirmed previously flagged values; therefore, no changes were made to values flagged during previous updates.

Previous screenings identified high values for chromium in several wells (both upgradient and downgradient) during the November and December 2016 samples events. These values were flagged in the database as outliers as they did not appear to represent the population at these wells and do not represent current conditions. Additionally, several high values for antimony, arsenic, barium, cadmium, cobalt, fluoride, lead, and selenium were recorded during the December 2016 sample event for downgradient wells MW-1606D, MW-1607D, and MW-1607S. High values above the MCL were flagged and are likely the result of a systematic error since they all occurred for the same sample event.

For the September 2016 sample event, a high value of combined radium in well MW-1606D and for molybdenum in well MW-1604S as well as a low value for combined radium in well MW-1604S were identified visually and flagged as outliers. All flagged values may be seen on the Outlier Summary following this letter (Figure C).

Interwell Upper Tolerance Limits

Upper tolerance limits were used to calculate background limits from pooled upgradient well data during the Fall 2023 statistical analysis using data through October/November 2023 for Appendix IV parameters (Figure H). These limits are updated on an annual basis and will be updated again during the Fall 2024 sample event. Parametric tolerance limits are calculated, with a target of 95% confidence and 95% coverage, when data follow a normal or transformed-normal distribution such as for arsenic, chromium, cobalt, combined radium 226 + 228, and molybdenum. When data contained greater than 50%

non-detects or did not follow a normal or transformed-normal distribution, non-parametric tolerance limits were constructed using the highest background measurement. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

Groundwater Protection Standards

Interwell upper tolerance limits were compared to the Maximum Contaminant Levels (MCLs) and CCR-Rule specified levels in the Groundwater Protection Standard (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure I).

Assessment Monitoring

Confidence intervals were constructed for downgradient, nature and extent, and sentinel wells for each of the Appendix IV parameters using data through October/November 2023 (Figure I). These intervals were constructed as either parametric or nonparametric confidence intervals depending on the data distribution and percentage of non-detects. When data followed a normal or transformed-normal distribution, parametric confidence intervals were used for Appendix IV parameters. The lower confidence limit, which is constructed with 99% confidence for parametric confidence intervals, is compared to the GWPS prepared as described above. Nonparametric confidence intervals were constructed when data did not follow a normal or transformed-normal distribution or when there were greater than 50% non-detects. The confidence level associated with nonparametric confidence intervals is dependent upon the number samples available.

As discussed above, the highest limit of the MCL, CCR-Rule specified level, or background limit was used to establish the GWPS. A statistically significant level (SSL) is declared only when the entire confidence interval is above a GWPS. Complete graphical results of the confidence intervals follow this letter. Note that lithium at wells which exceeded the GWPS during the previous analysis were evaluated only under the Corrective Action protocols described below. Confidence interval exceedances were identified for the following well/constituent pairs:

- Arsenic: MW-1805 and MW-1922D

Note that the exceedances listed above occurred in nature and extent wells, and no exceedances were identified among compliance wells. Further research beyond the scope of this analysis would be required to determine whether the exceedances are reflective of natural groundwater quality or are a result of practices at the site.

Corrective Action

In 2022, Mountaineer BAP entered Corrective Action protocols for lithium due to previously identified SSLs. Confidence intervals were constructed using data through October/November 2023 for this constituent at downgradient, nature and extent, and sentinel wells identified with SSL exceedances during Assessment Monitoring (Figure J). These confidence intervals are then compared to the same GWPS used in Assessment Monitoring to evaluate the effectiveness of remedial efforts over time. Only when the entire confidence interval is below the GWPS for a period of 3 years is the well/constituent pair declared to be in compliance with its respective standard.

Lithium will continue to be evaluated under Corrective Action protocols using confidence intervals for these well/constituent pairs during the Monitoring and Natural Attenuation program. In future analyses, if confidence interval exceedances are identified for lithium at additional wells during Assessment Monitoring, data from these wells will also be evaluated only within the Corrective Action protocols until compliance is achieved. Complete graphical results of the confidence intervals follow this letter. Exceedances were identified for the following well/constituent pairs:

- Lithium: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, MW-1607S, MW-1922S, MW-1923, MW-1924, and MW-1925

Trend Tests

Data at wells with confidence interval exceedances for the well/constituent pairs listed above in Assessment and Corrective Action are further evaluated using the Sen's Slope/Mann Kendall trend test at the 95% confidence level (Figure K). The 95% confidence level will identify whether statistically significant trends are present more rapidly and, therefore, is used in this analysis. The following statistically significant trends were identified:

Increasing
- Lithium: MW-1607D

Decreasing
- Arsenic: MW-1922D
- Lithium: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1922S, MW-1923, MW-1924, and MW-1925

Additionally, when statistically significant trends are present for exceedances identified with Corrective Action protocols, confidence bands are constructed around the trend line at the 95% confidence level to determine when average concentrations decrease and remain below a GWPS (i.e. the upper confidence band is below the GWPS). A summary of the Appendix IV trend test results follows this letter. During this analysis, none of the upper confidence bands were found to be below the GWPS.

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

For Groundwater Stats Consulting,

A Collins

Andrew Collins
Project Manager

Kristina Rayner

Kristina Rayner
Senior Statistician

Date Ranges

Date: 2/6/2024 4:49 PM

Mountaineer BAP   Data: Mountaineer BAP

Boron, total (mg/L)

MW-1603 overall:10/30/2017-10/25/2023

100% Non-Detects

Analysis Run 2/5/2024 11:47 AM View: Confidence Intervals
Mountaineer BAP Data: Mountaineer BAP

Beryllium, total (mg/L)
MW-107, MW-112, MW-1604D, MW-1605D, MW-1805, MW-1922D, MW-1926, MW-1927, MW-1929, MW-203

Cadmium, total (mg/L)
MW-1805

Mercury, total (mg/L)
MW-016, MW-107, MW-112, MW-1805, MW-1925, MW-1926, MW-1927, MW-1929, MW-203

Thallium, total (mg/L)
MW-016, MW-107, MW-112, MW-1805, MW-1922D, MW-1924, MW-1925, MW-1927, MW-1929, MW-203

FIGURE A

Time Series

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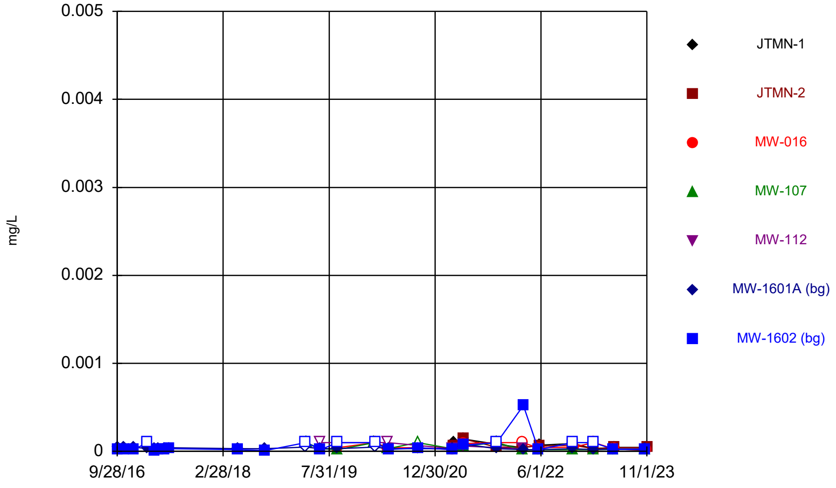
Time Series



Constituent: Antimony, total Analysis Run 2/6/2024 4:35 PM
Mountaineer BAP Data: Mountaineer BAP

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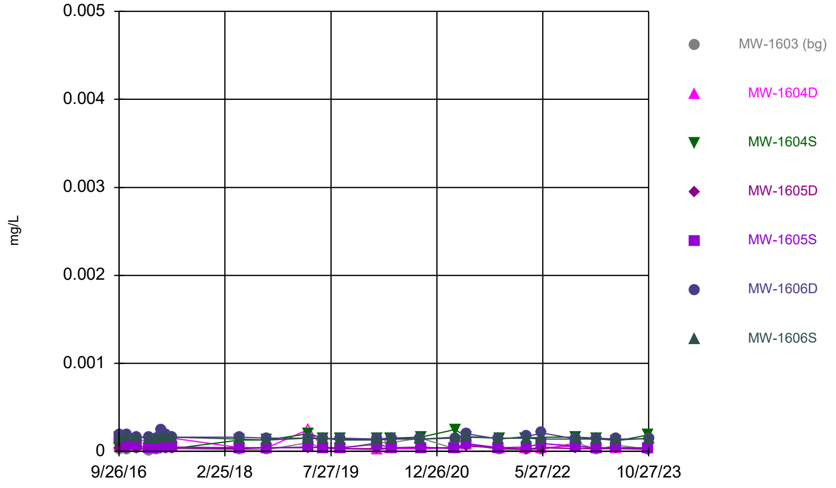

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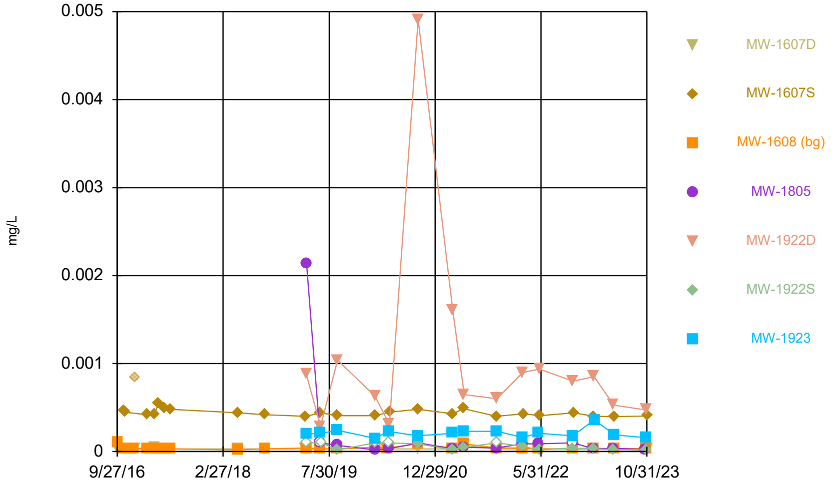

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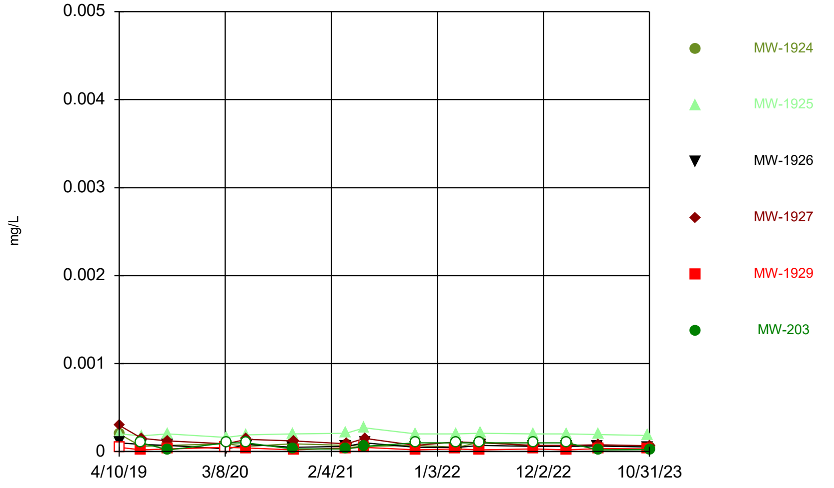

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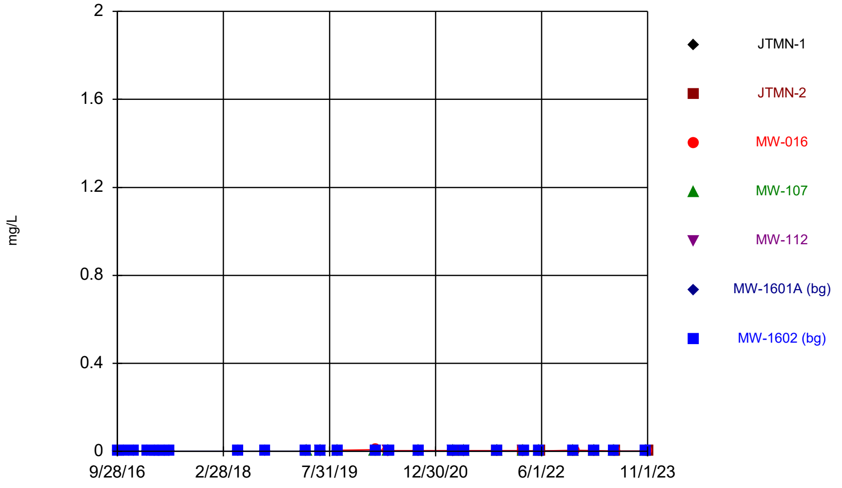

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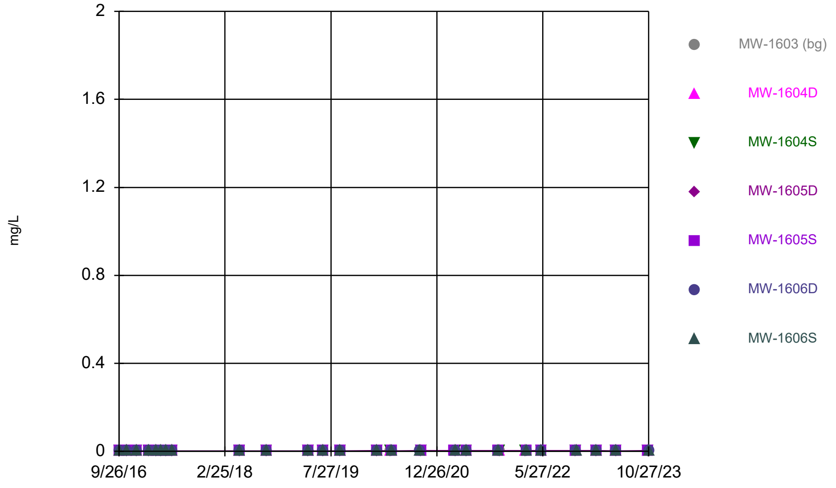

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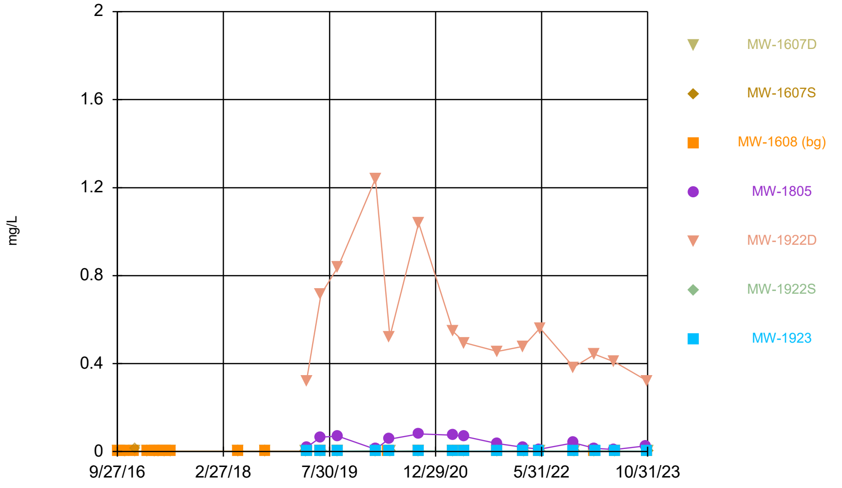

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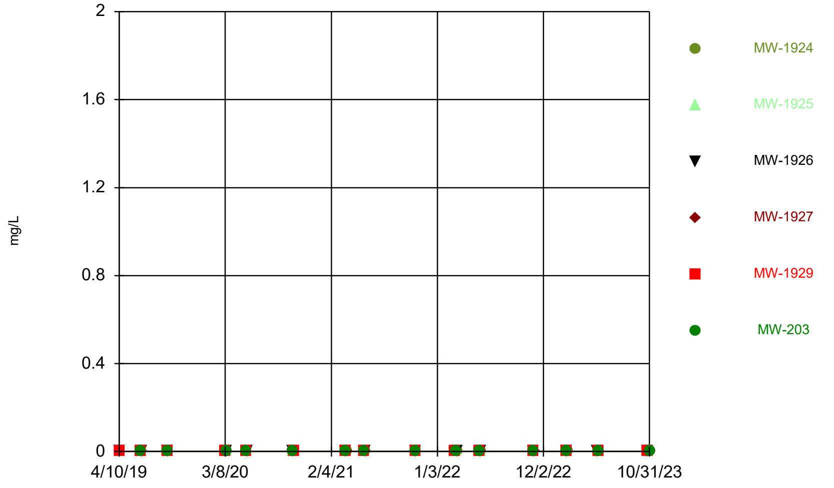

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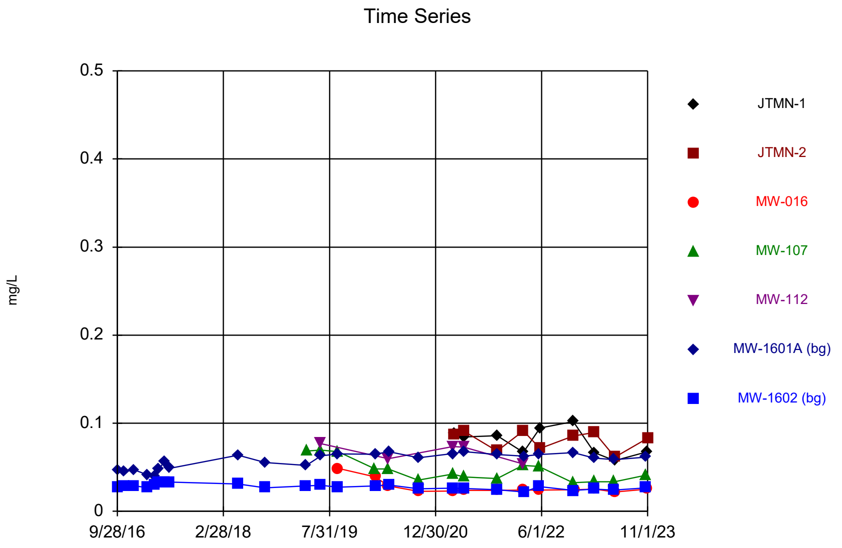

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Mountaineer BAP   Data: Mountaineer BAP

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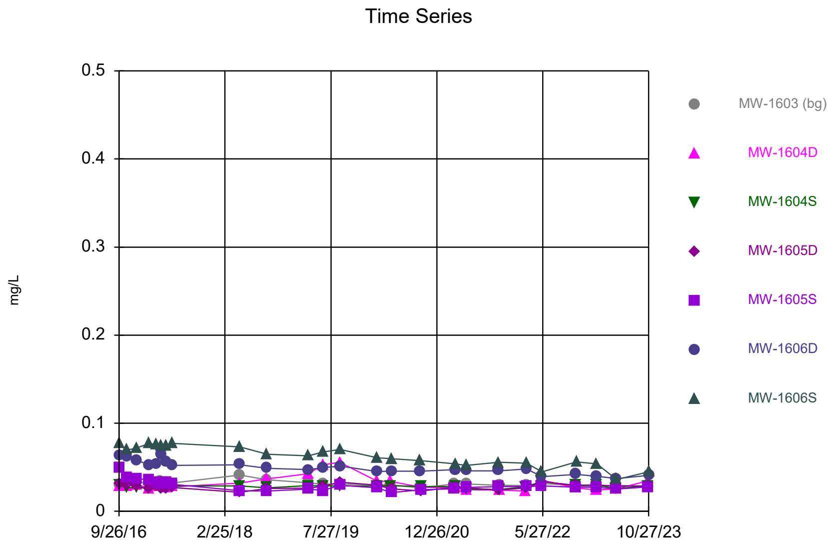

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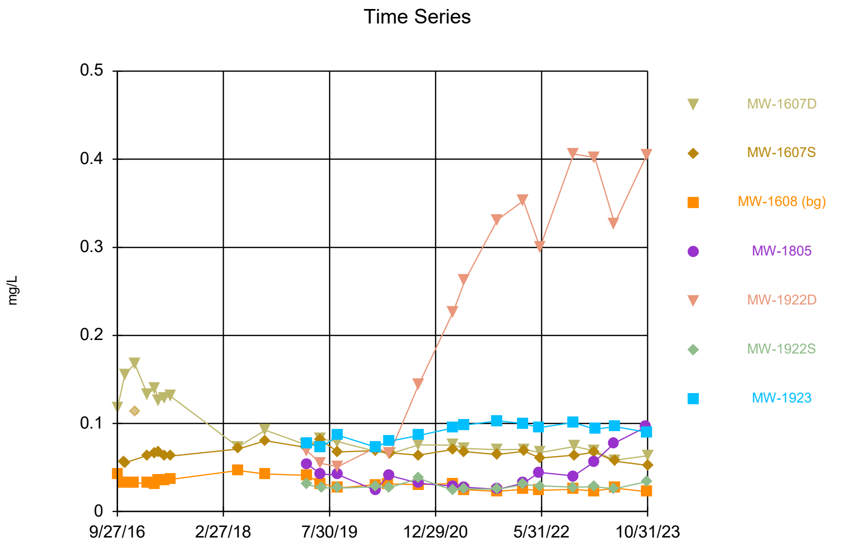

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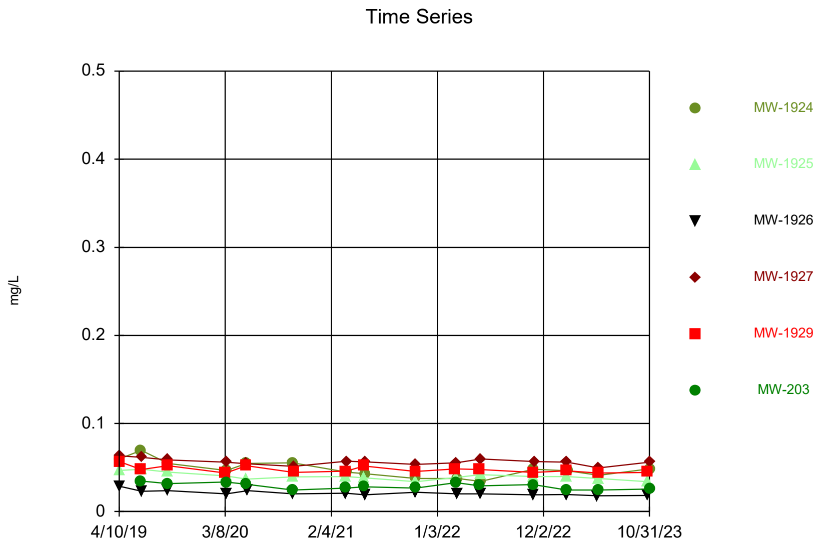

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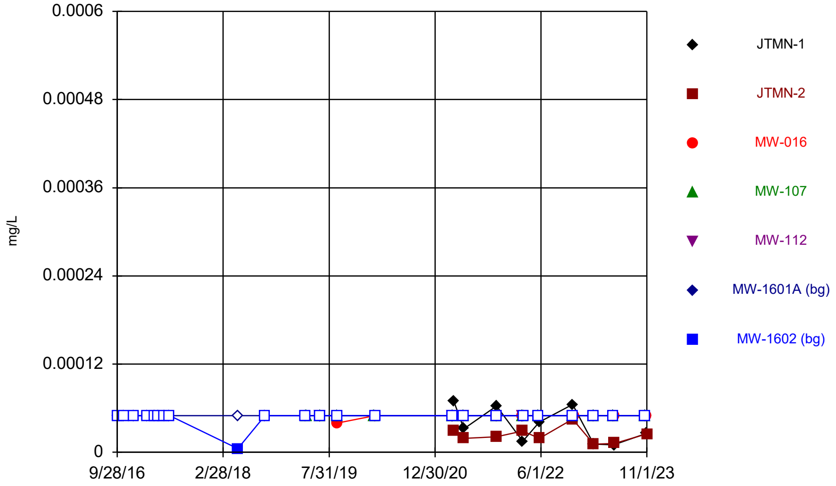

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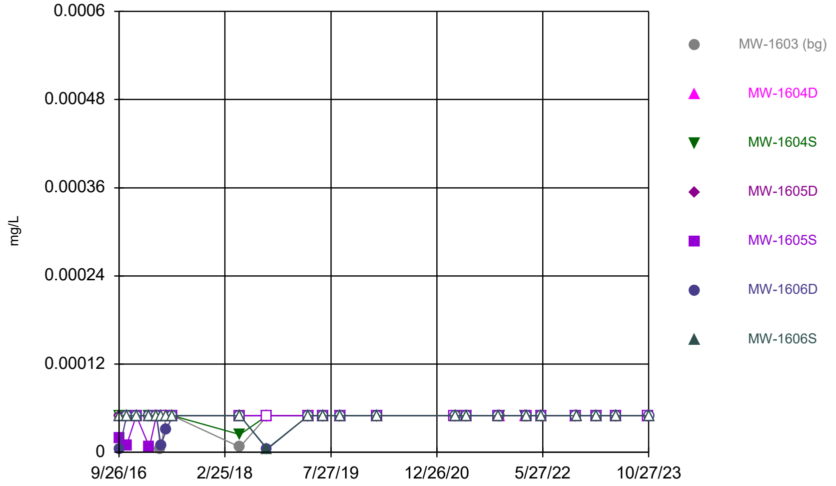

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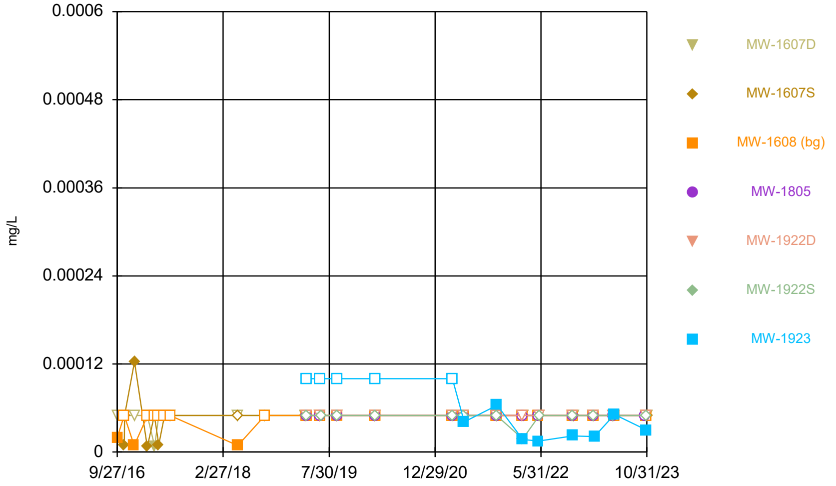

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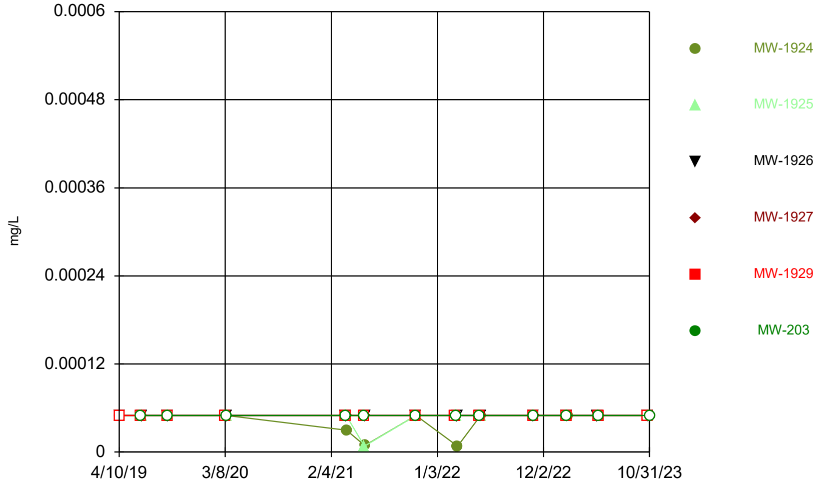

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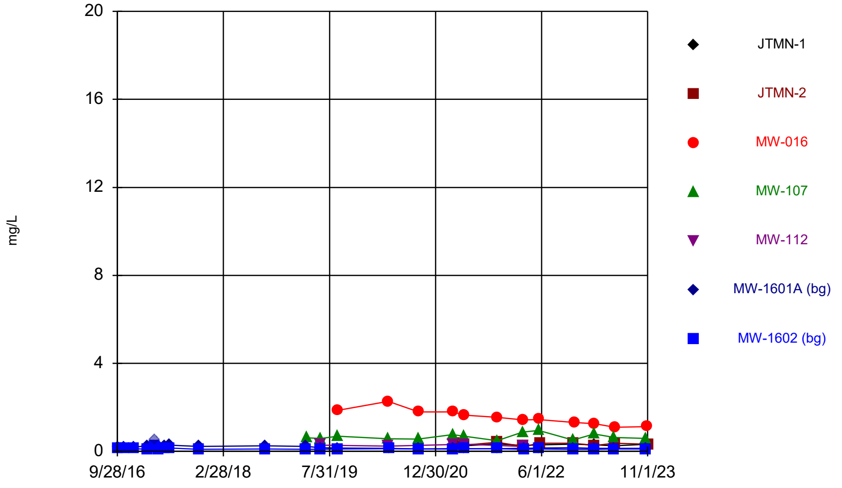

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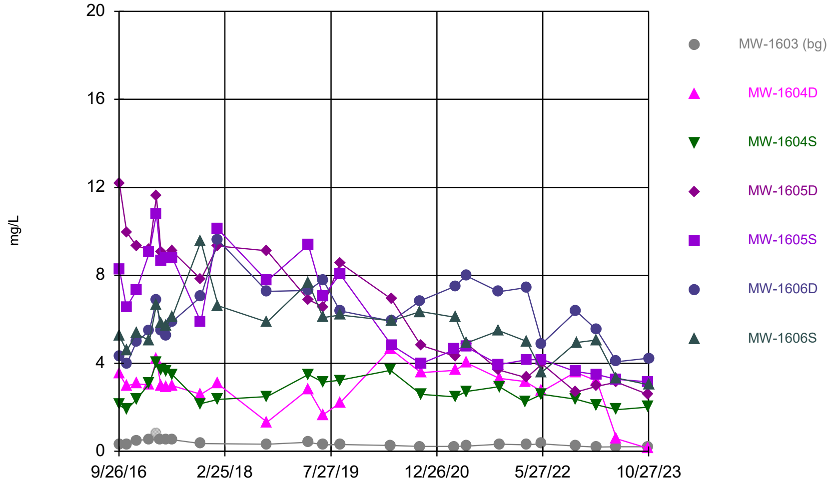

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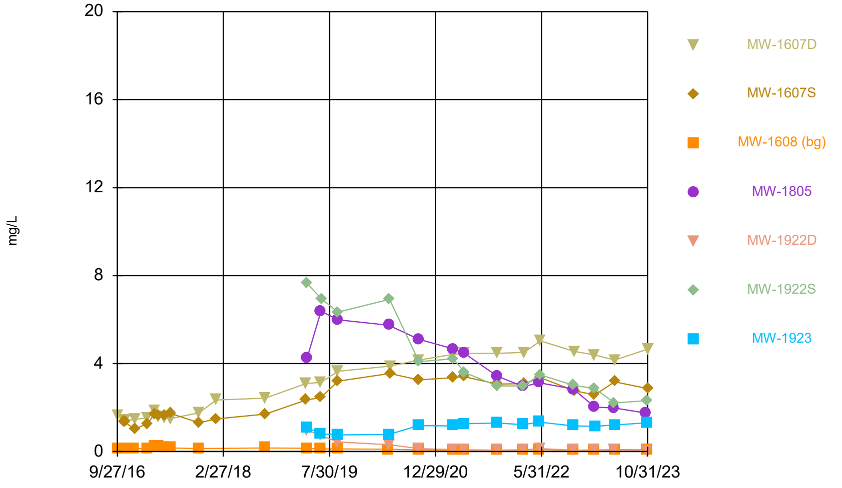

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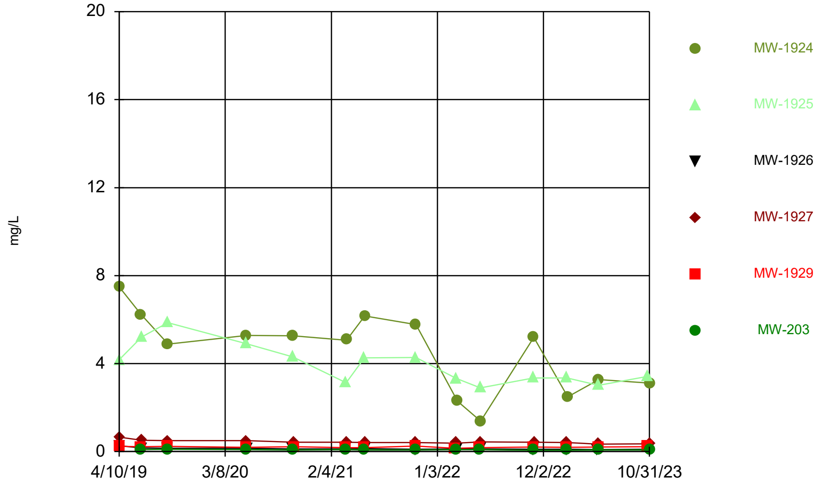

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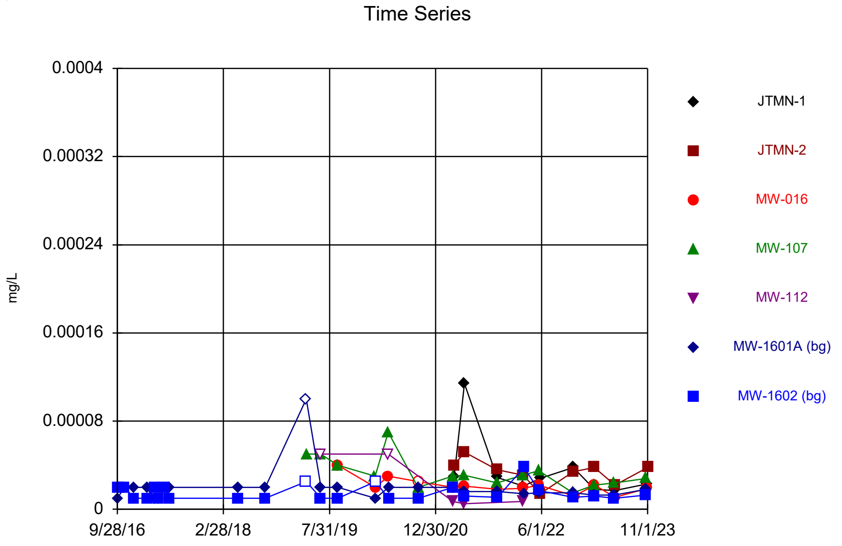

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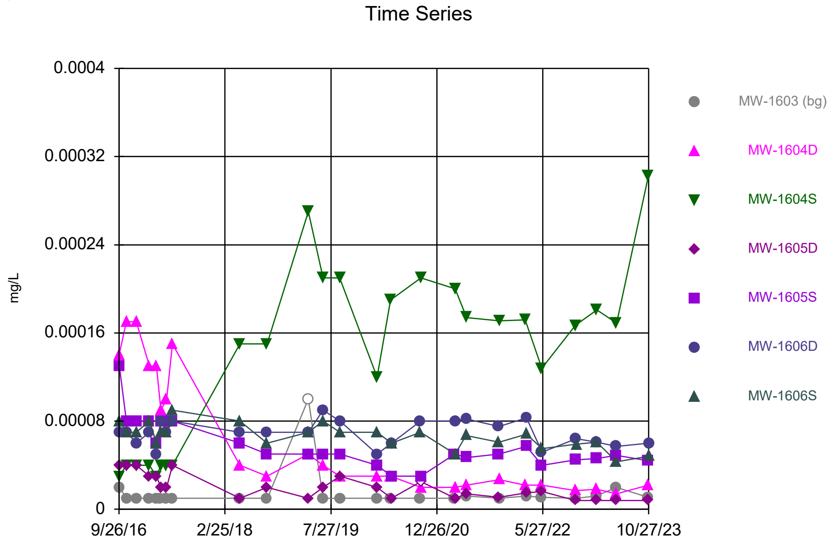

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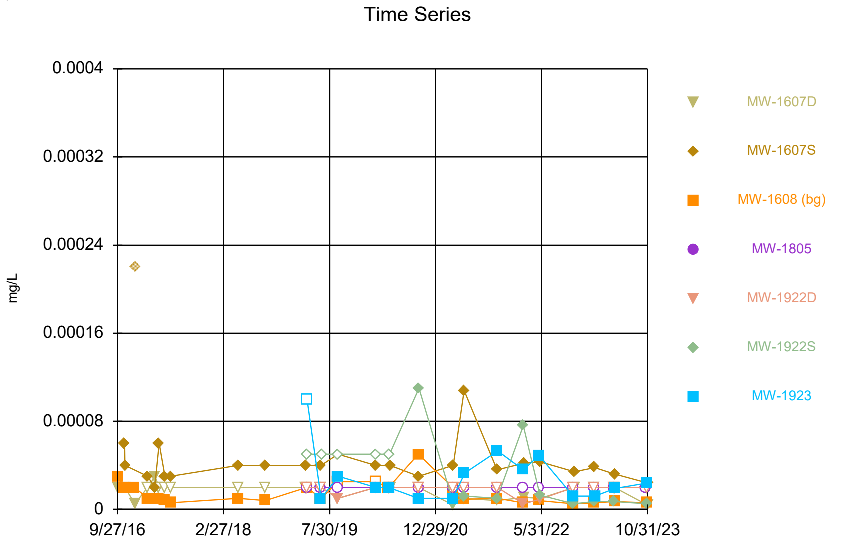

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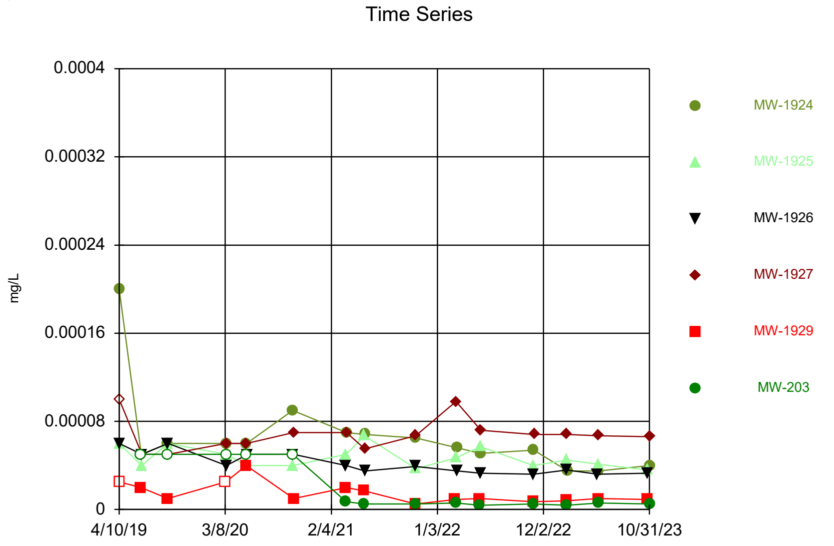

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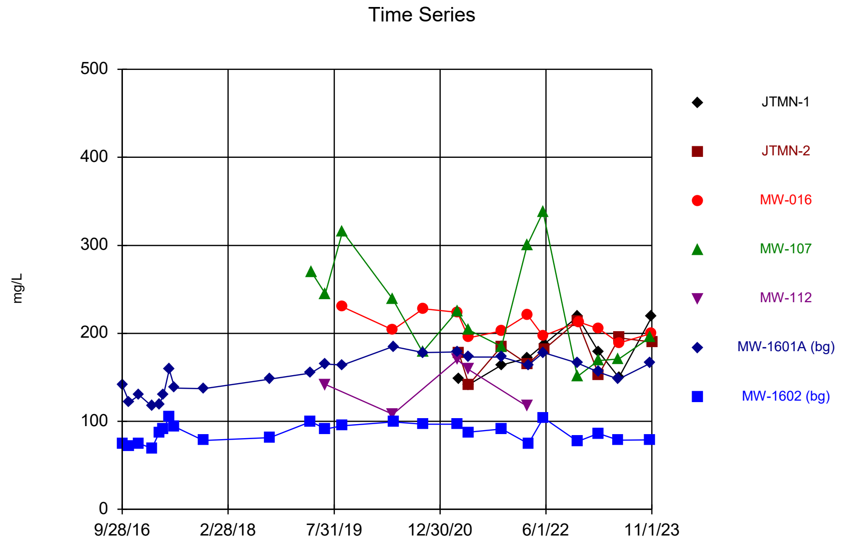

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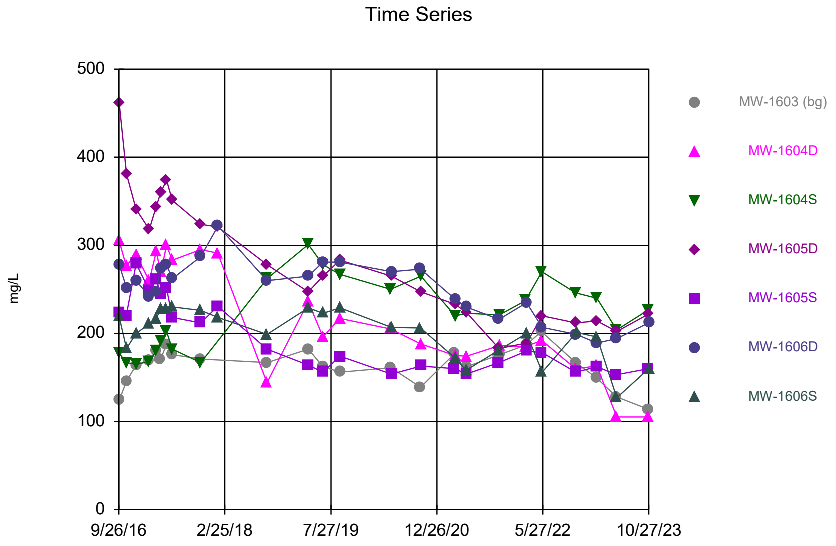

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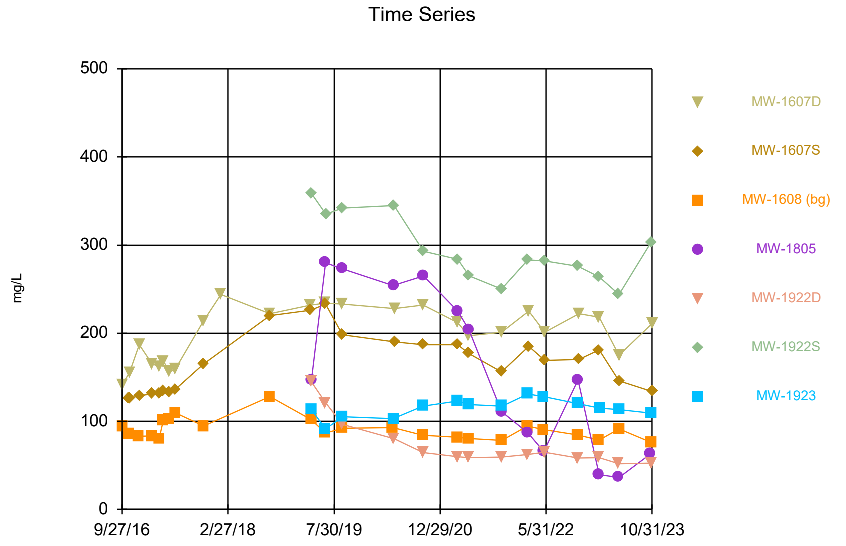

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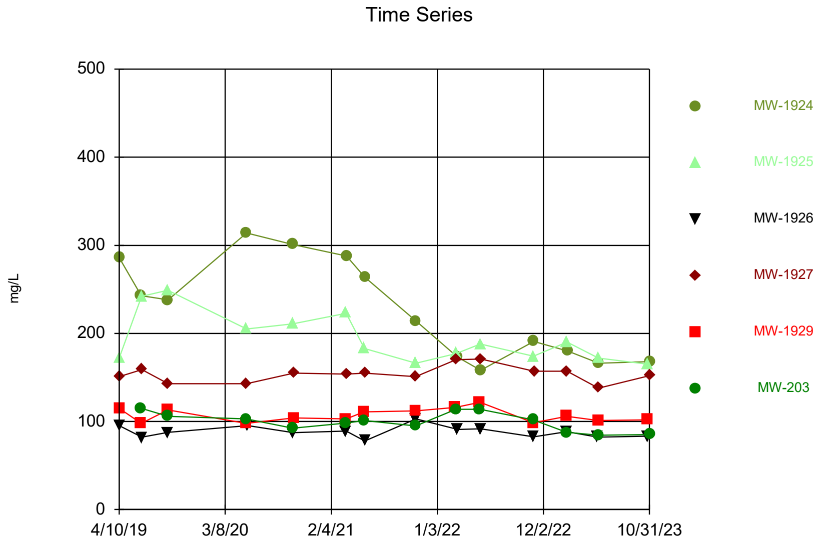

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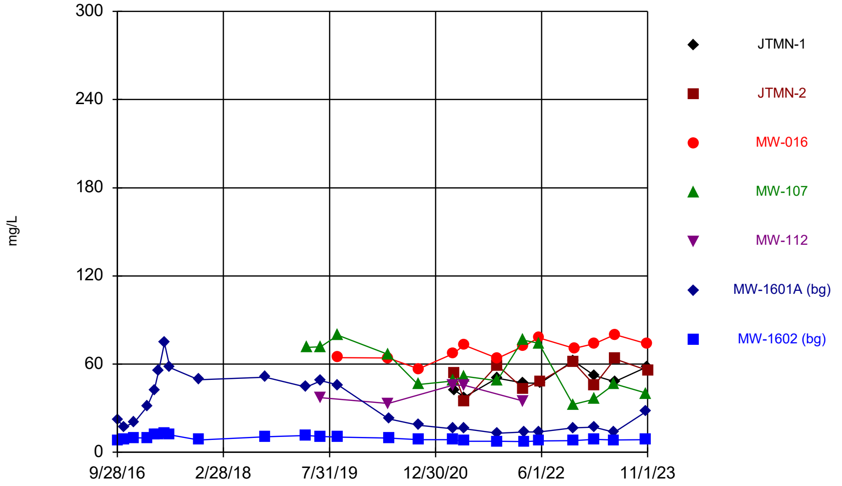
Time Series



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Mountaineer BAP   Data: Mountaineer BAP

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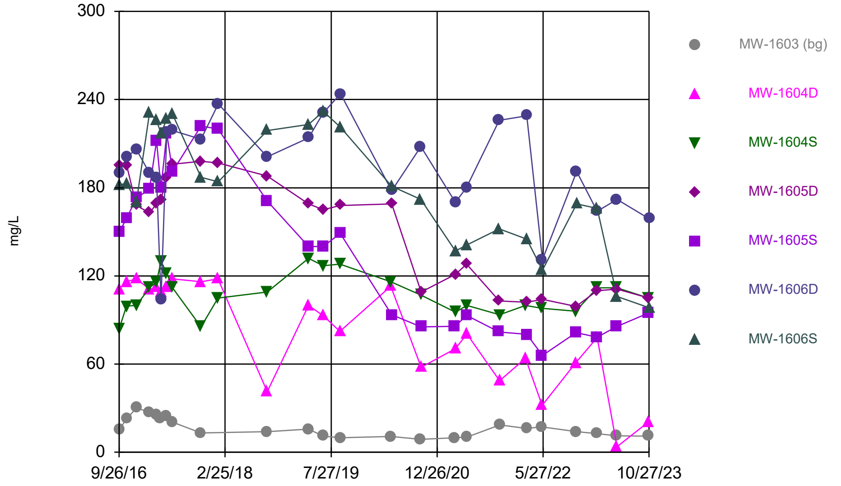
Time Series



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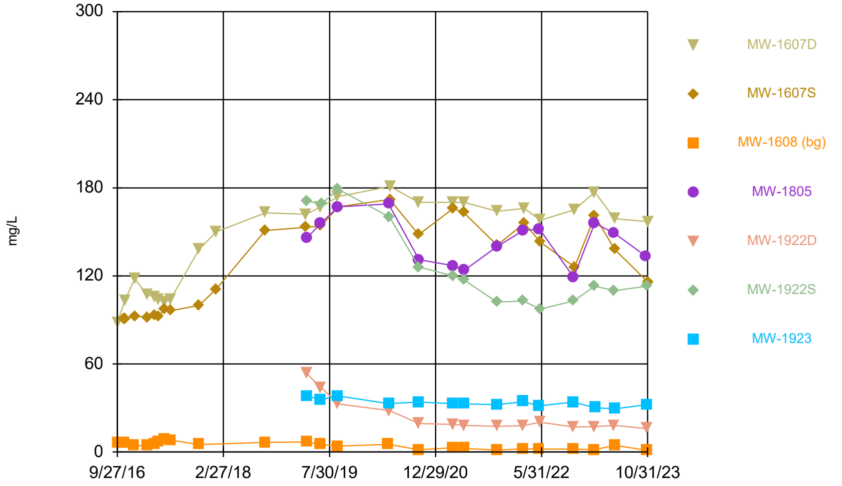

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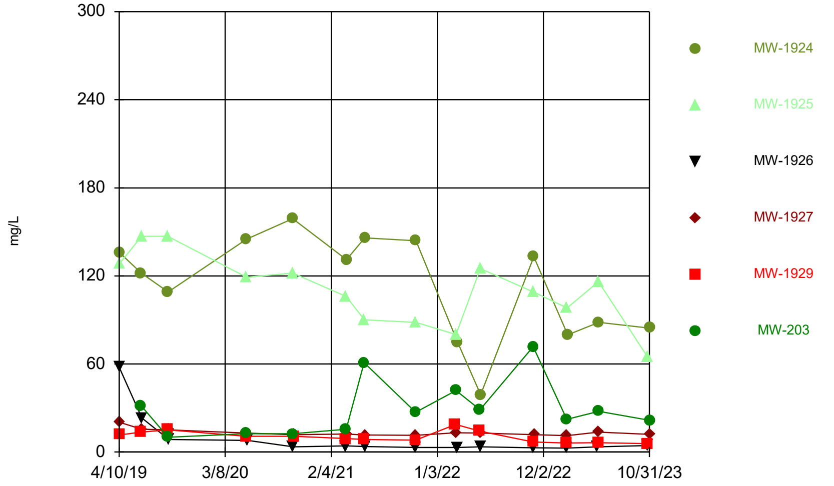

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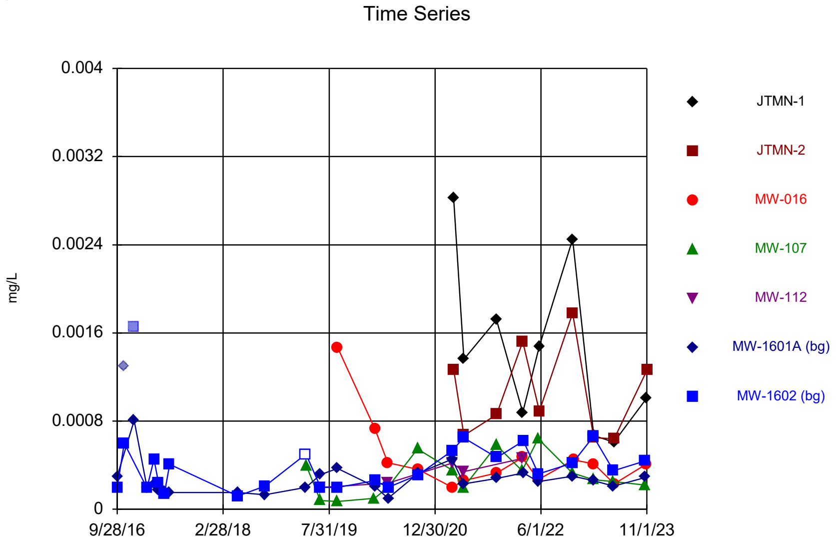

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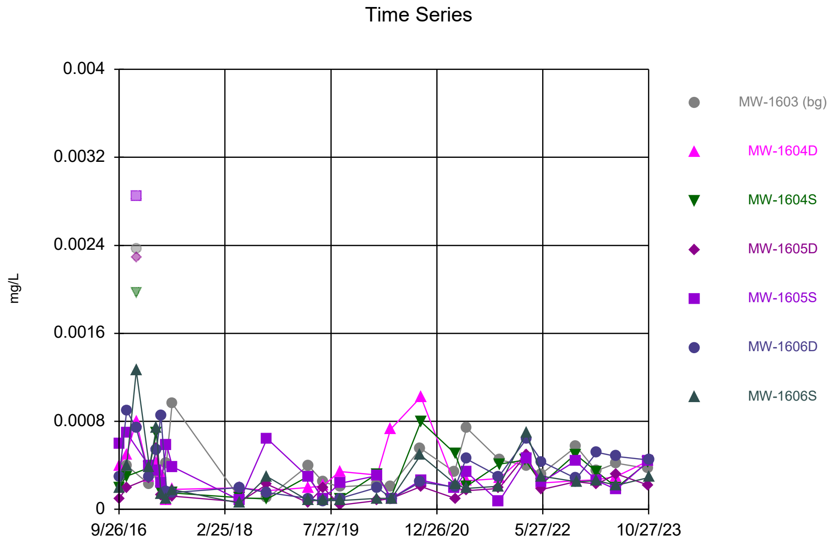

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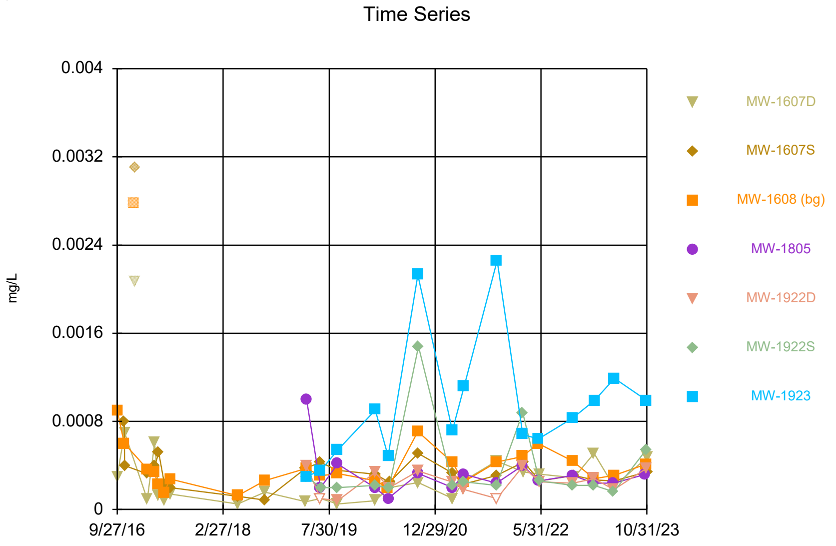

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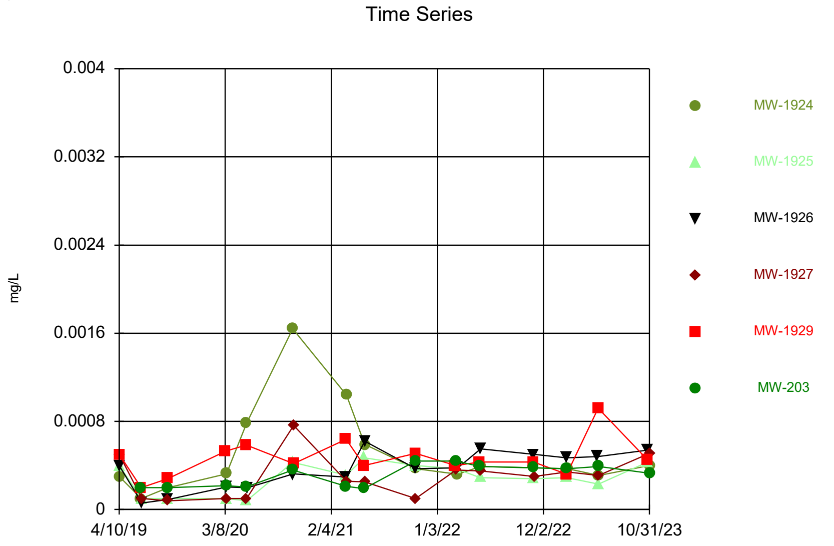

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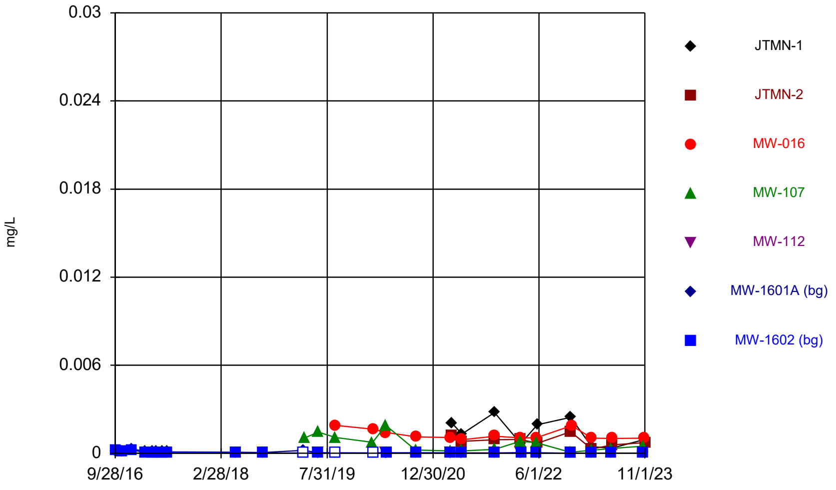
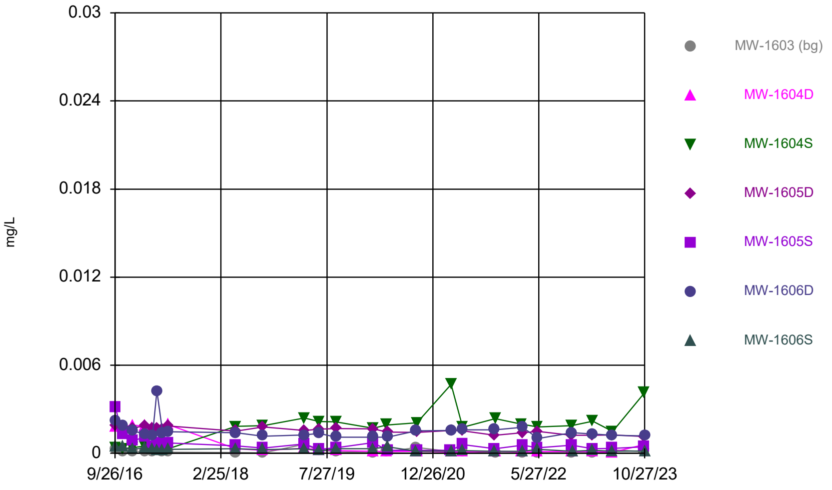


Constituent: Cobalt, total Analysis Run 2/6/2024 4:35 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



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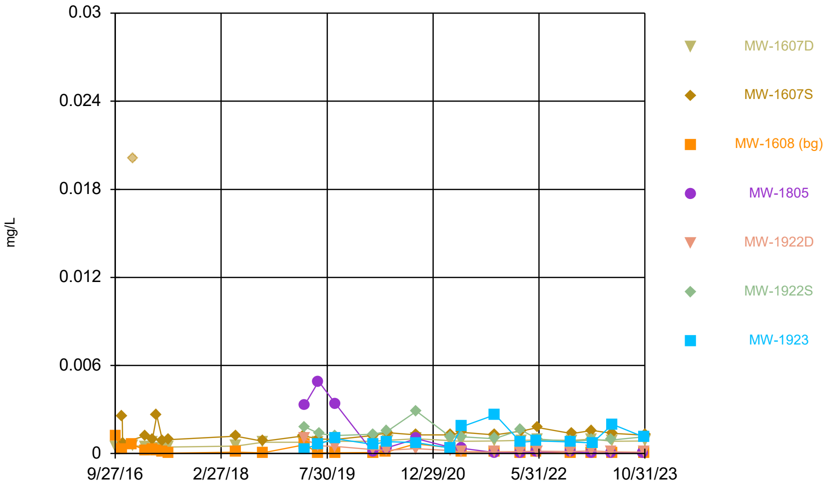
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



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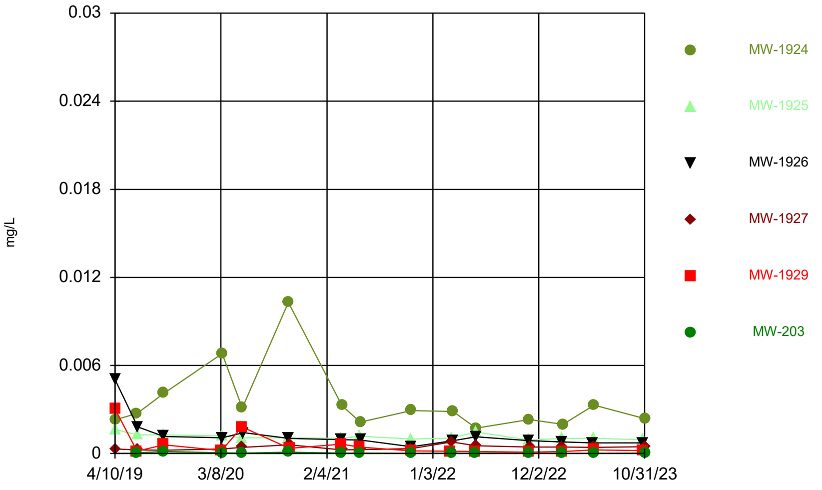
Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



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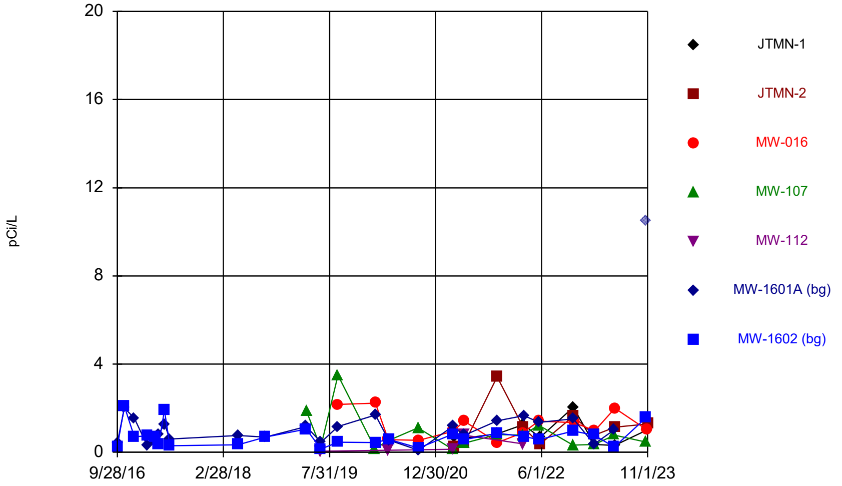
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



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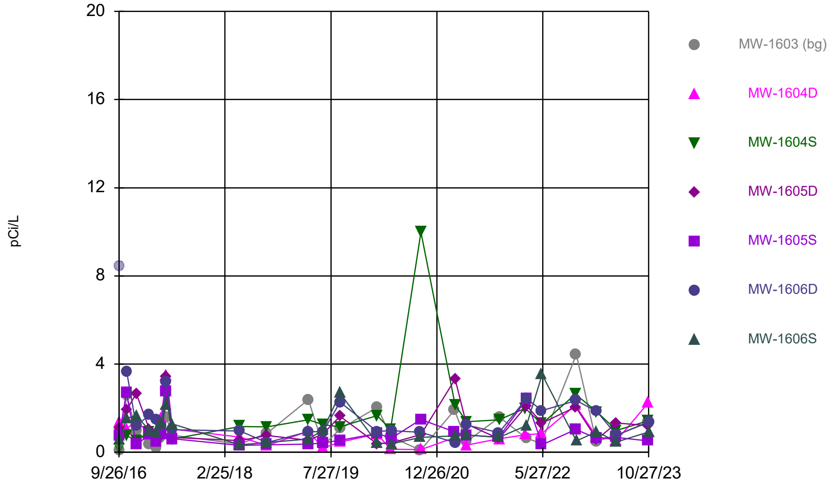
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



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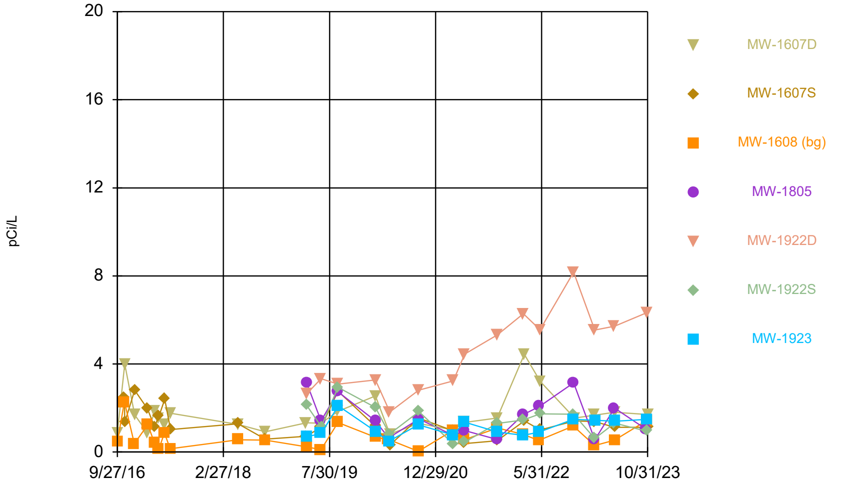
Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



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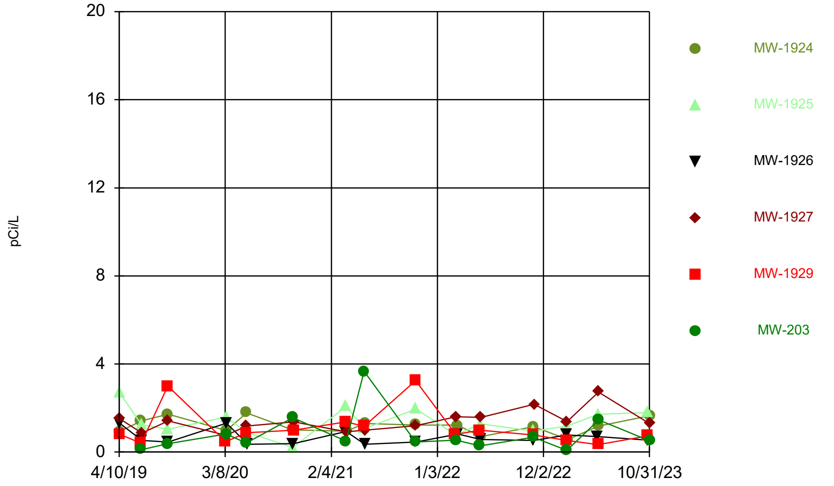
Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



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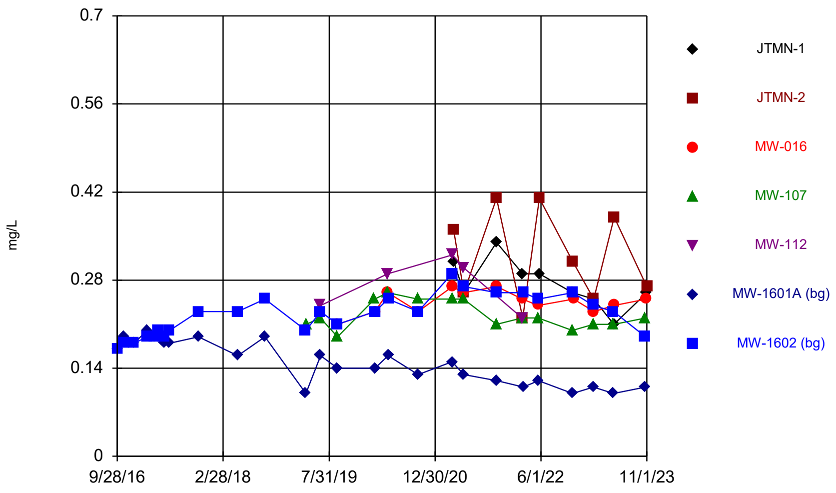
Time Series



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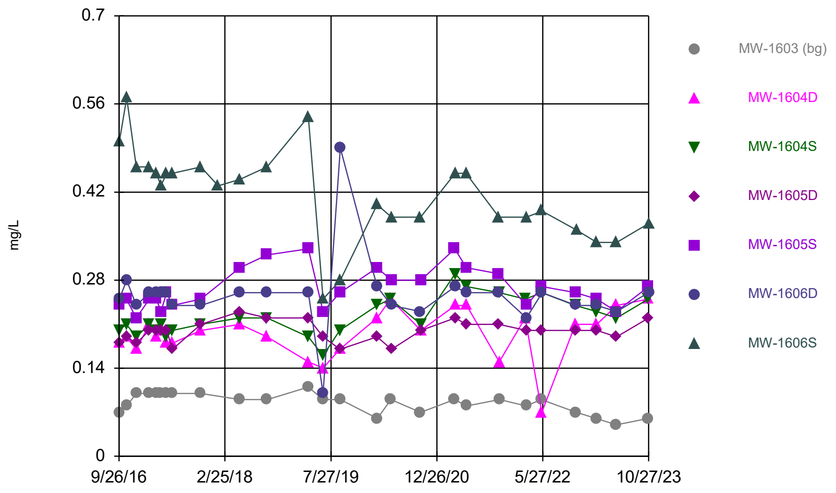
Time Series



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Mountaineer BAP Data: Mountaineer BAP

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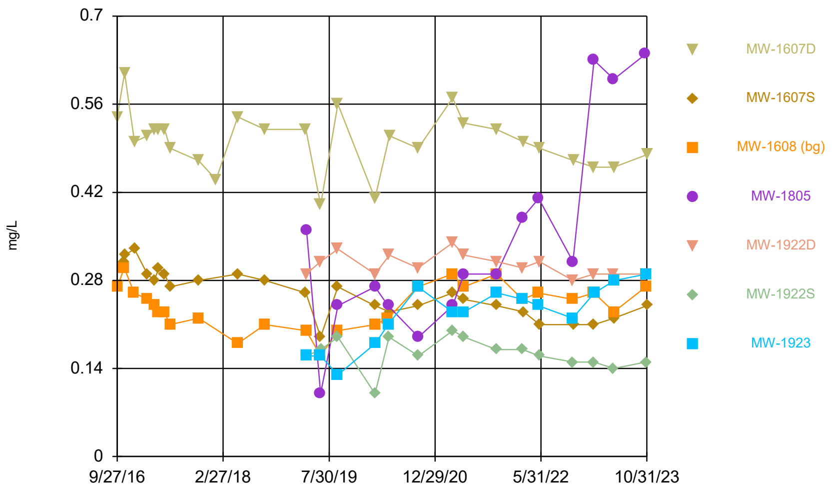
Time Series



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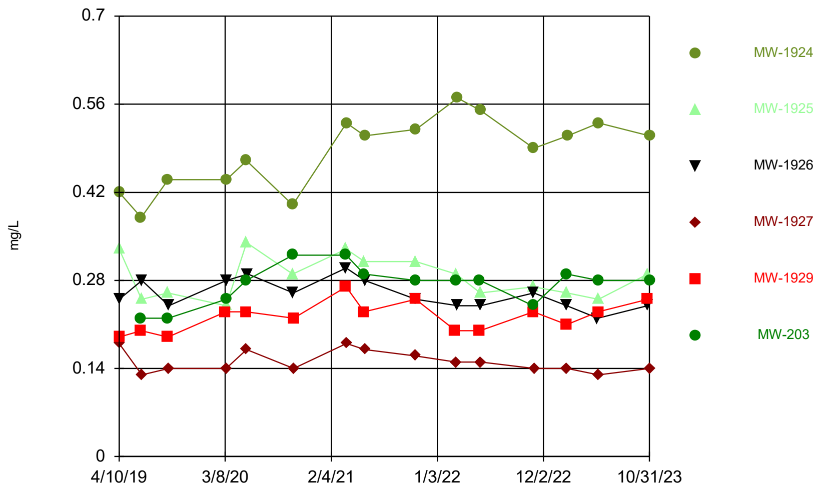
Time Series



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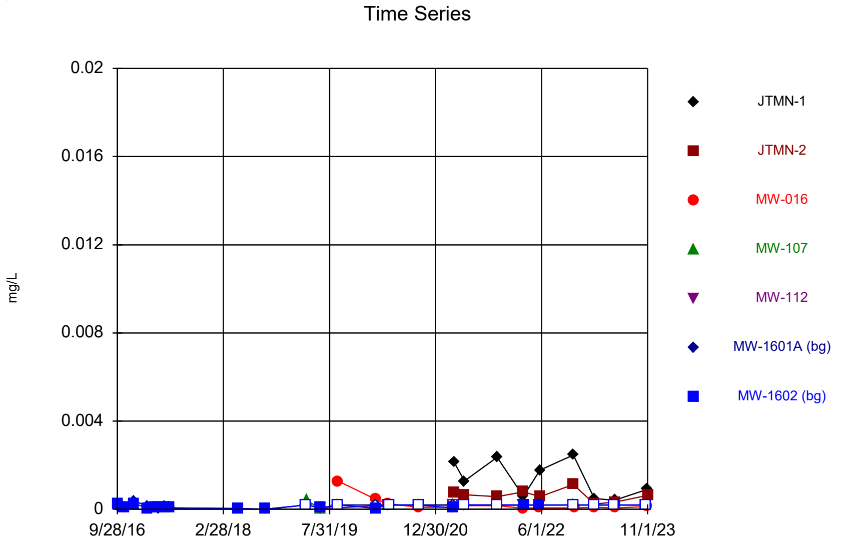

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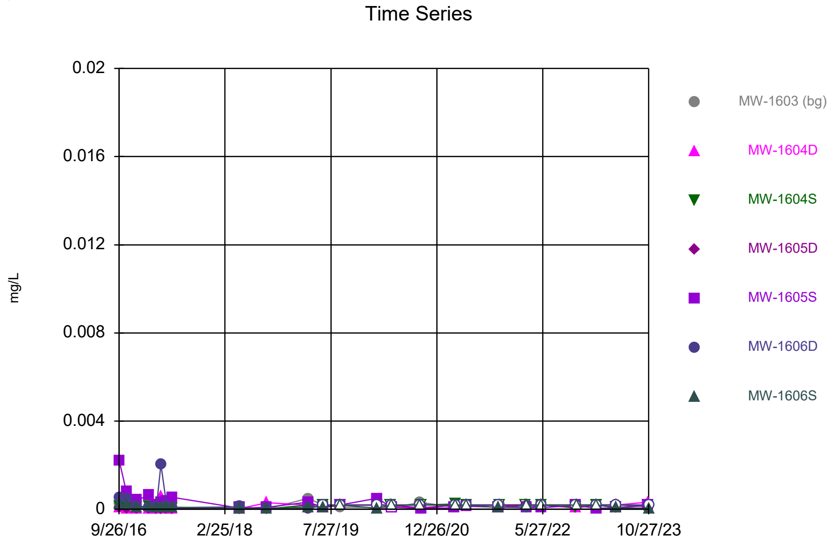

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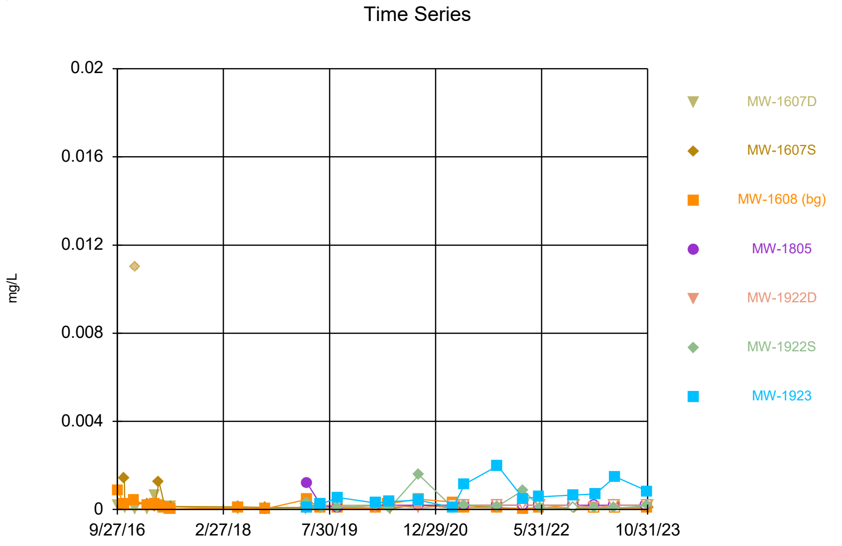

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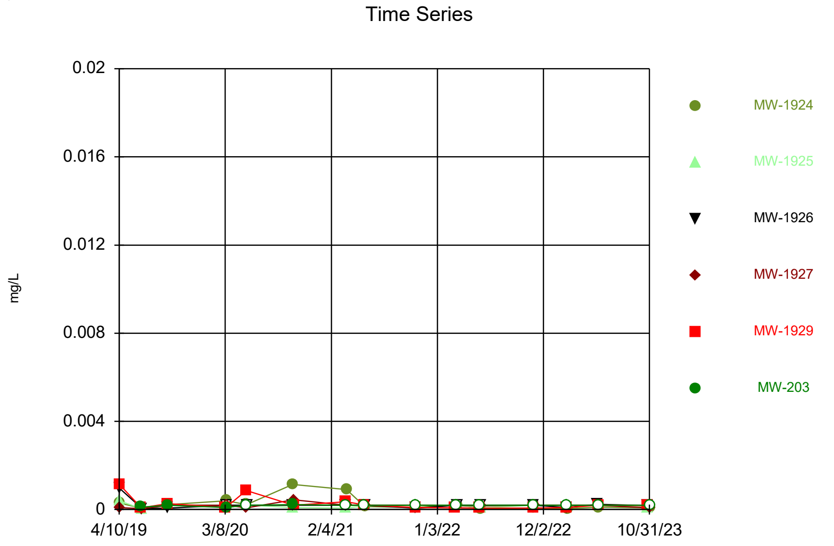

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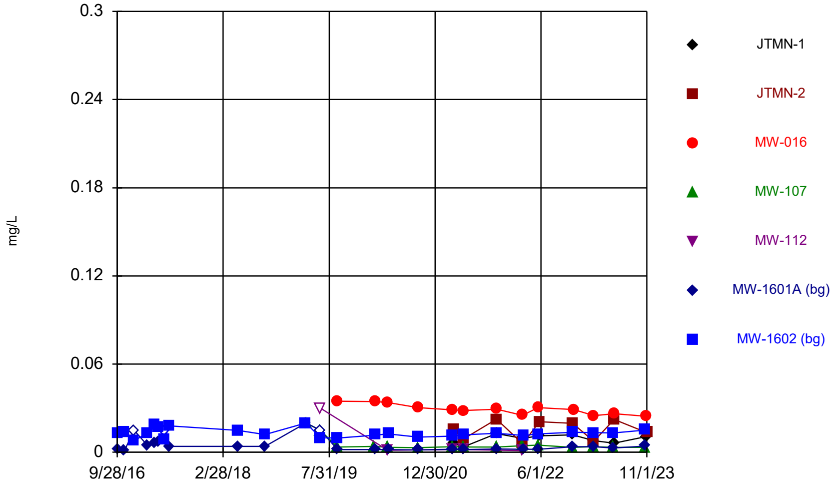
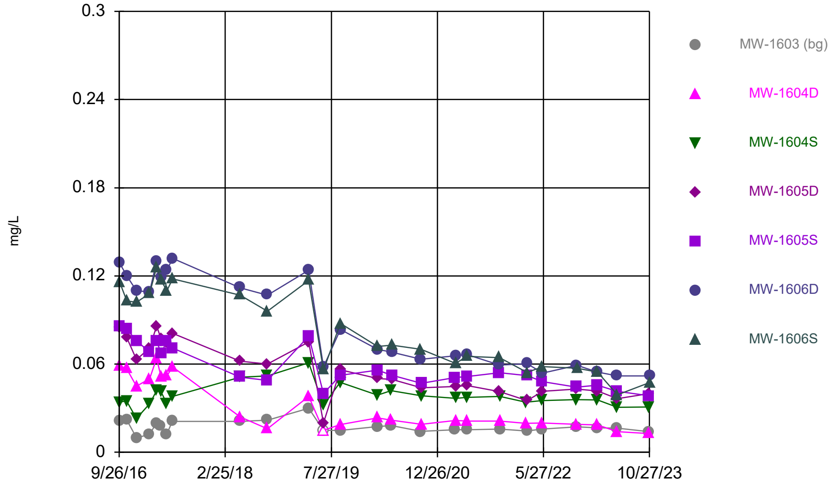
Time Series



Constituent: Lithium, total   Analysis Run 2/6/2024 4:36 PM
Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG
Hollow symbols indicate censored values.

Time Series



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Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG
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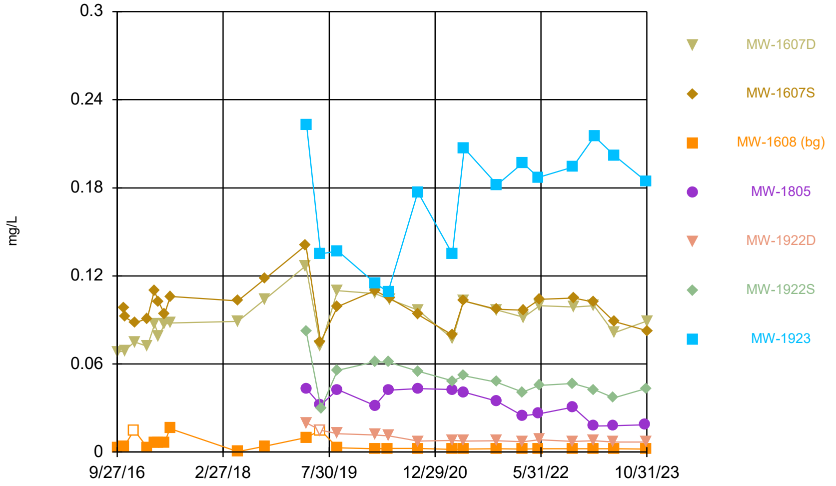
Time Series



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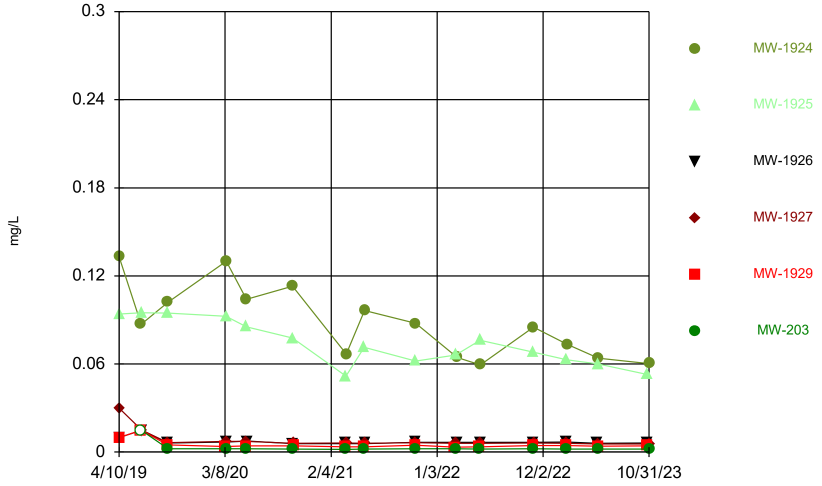
Time Series



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Mountaineer BAP   Data: Mountaineer BAP

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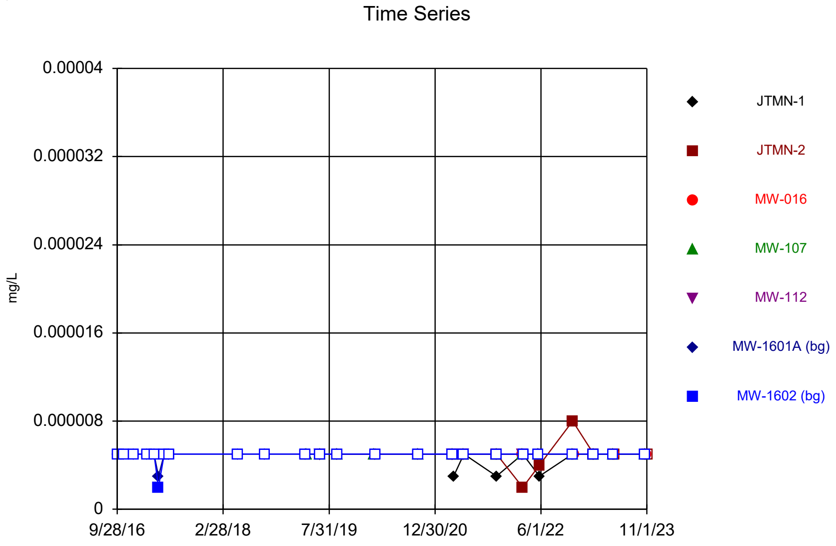

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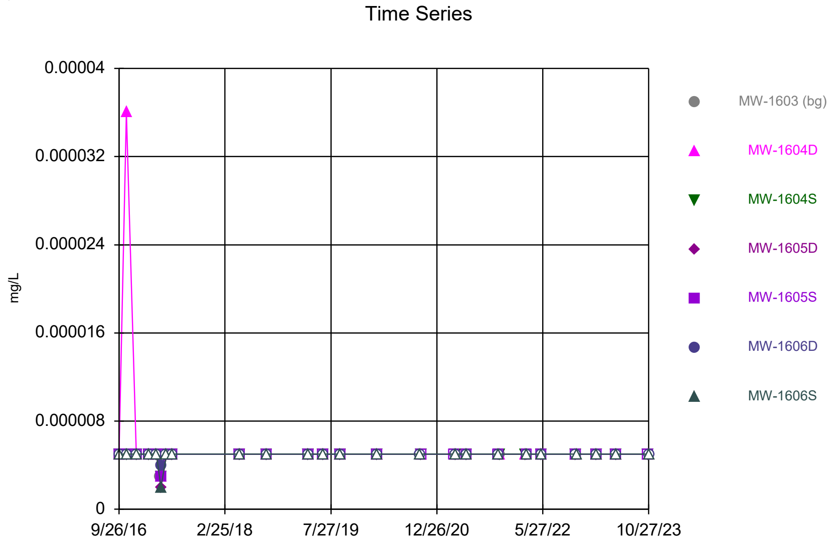

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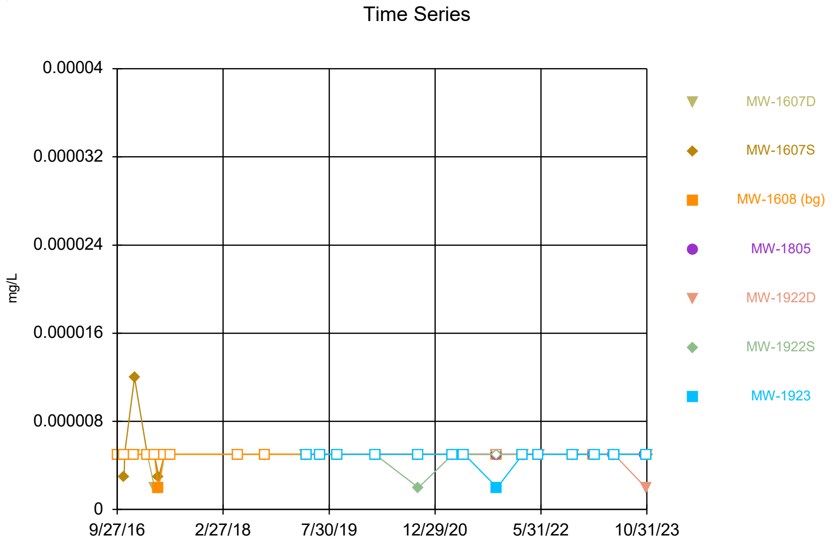

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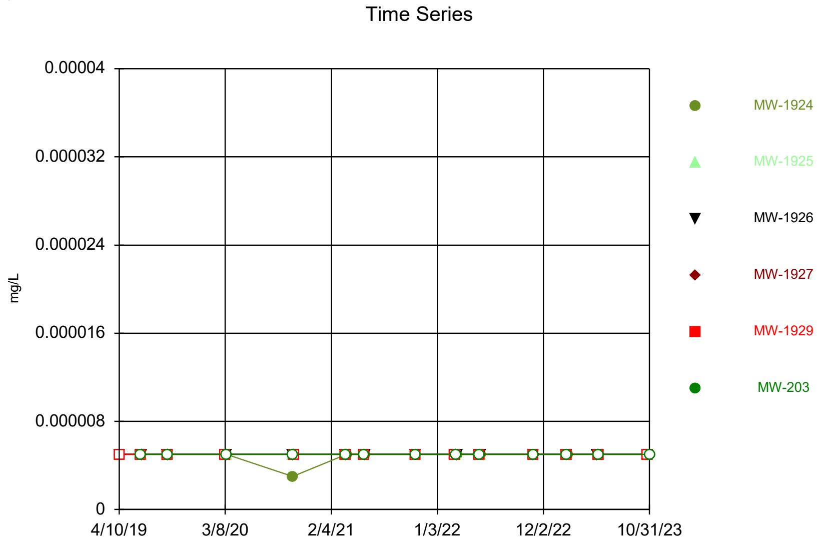

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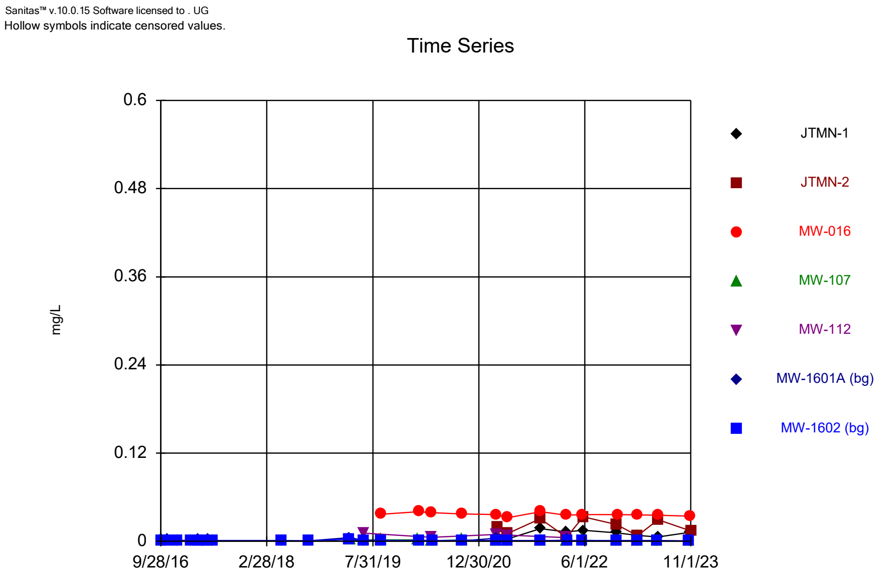

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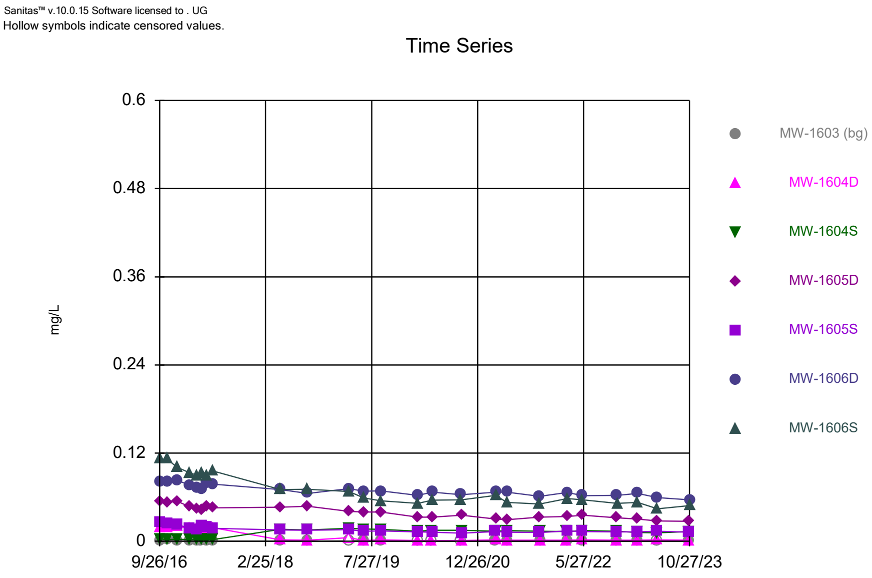

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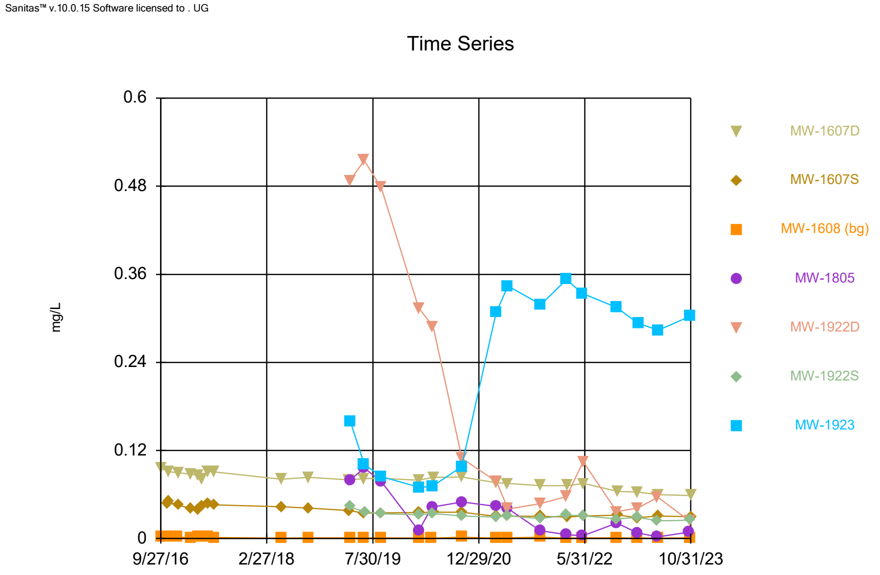

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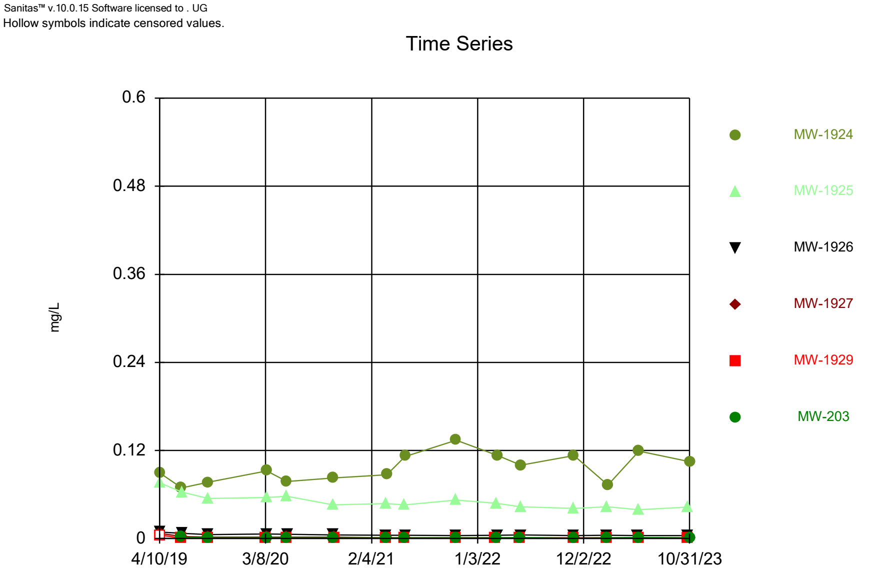

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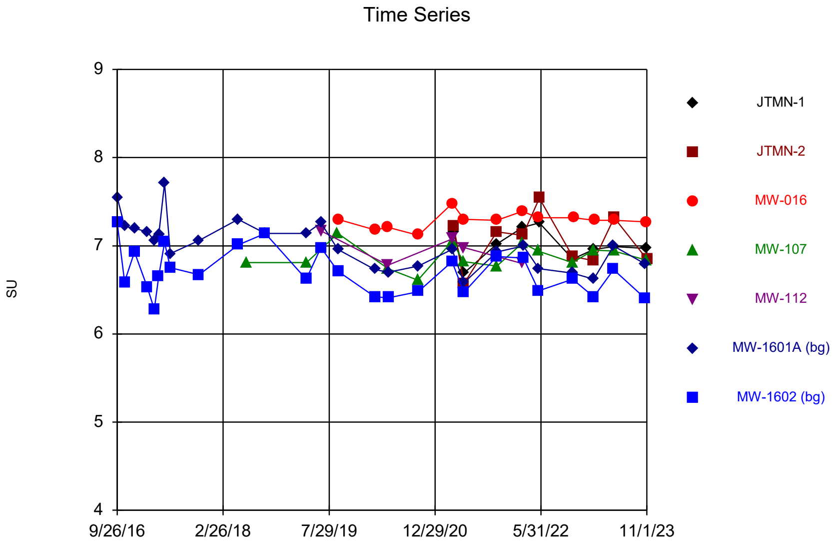

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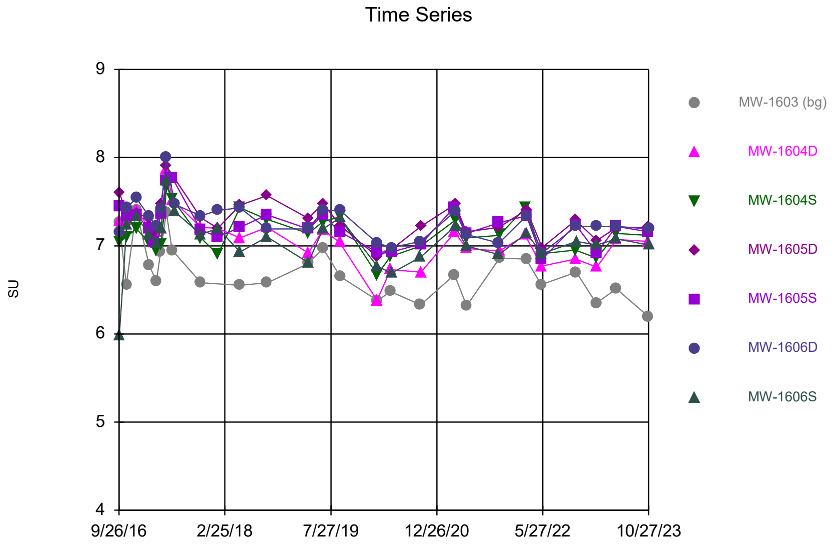

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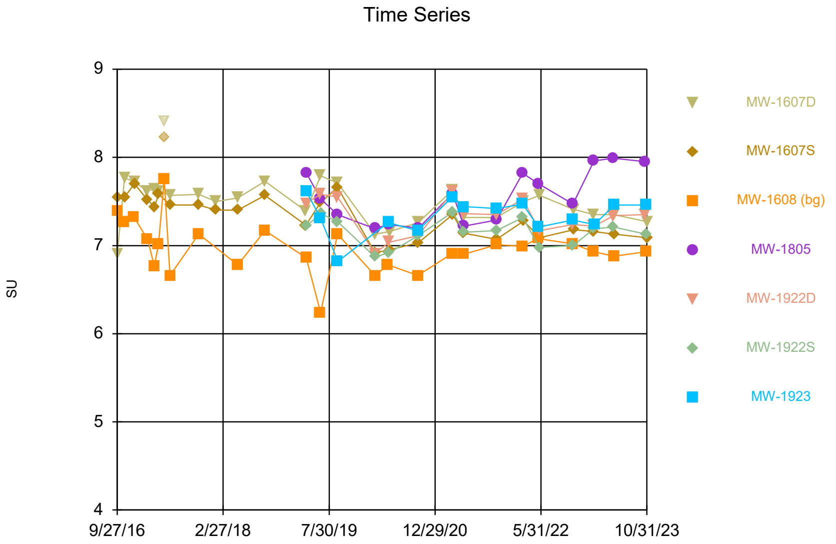

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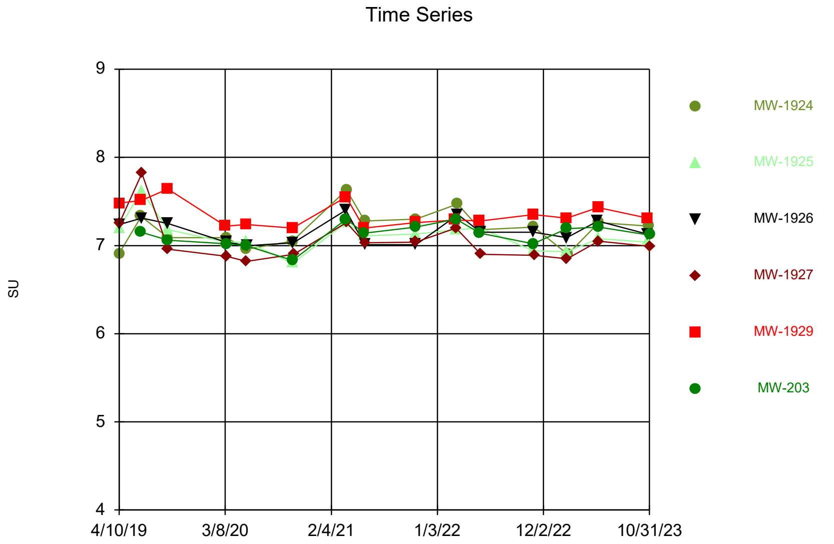

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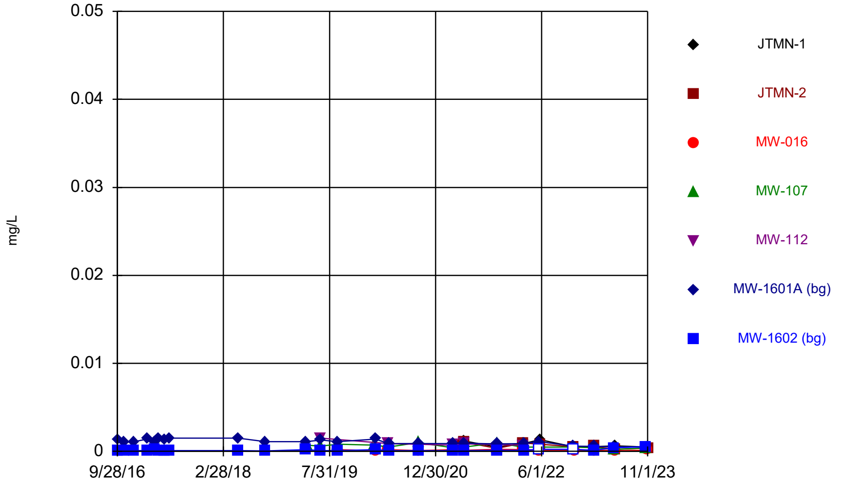
Hollow symbols indicate censored values.

Time Series



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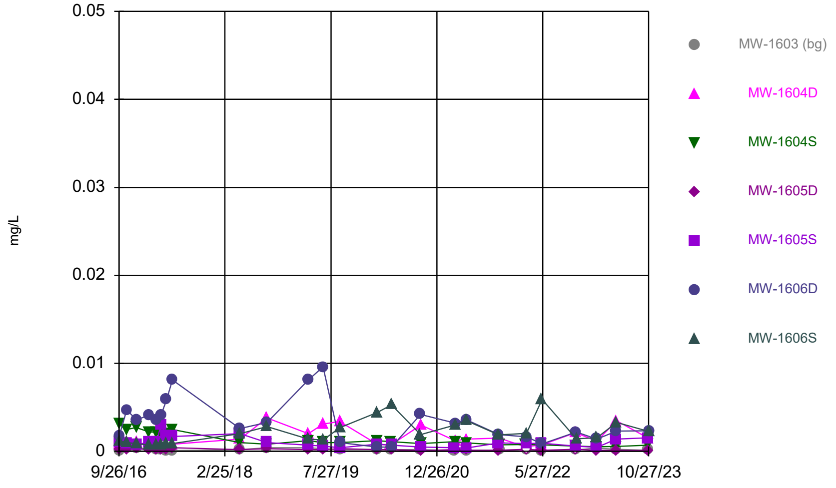
Time Series



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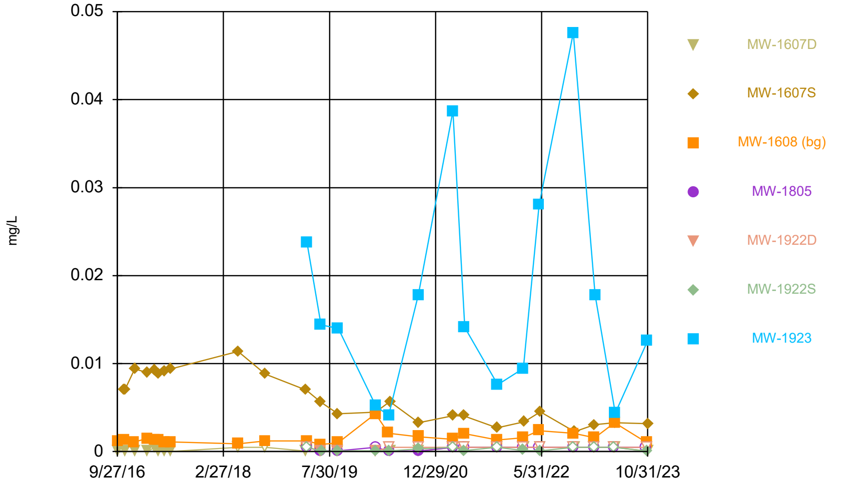
Time Series



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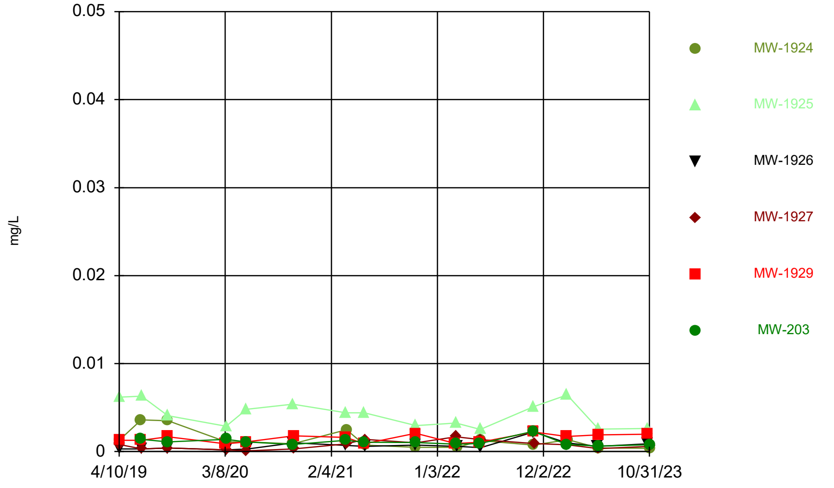
Time Series



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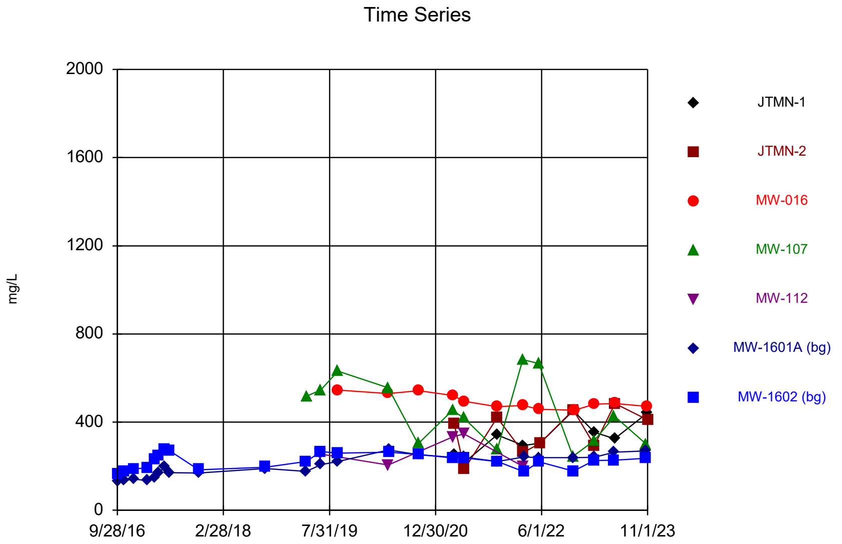

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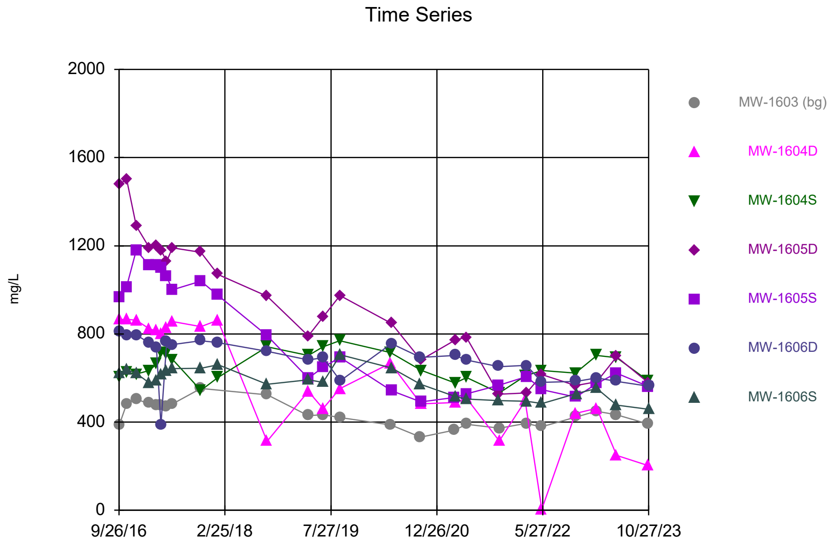

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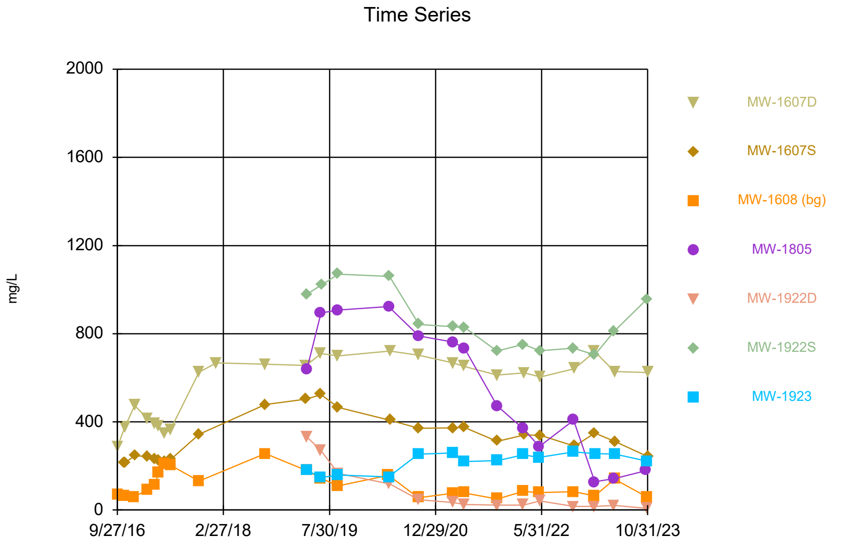

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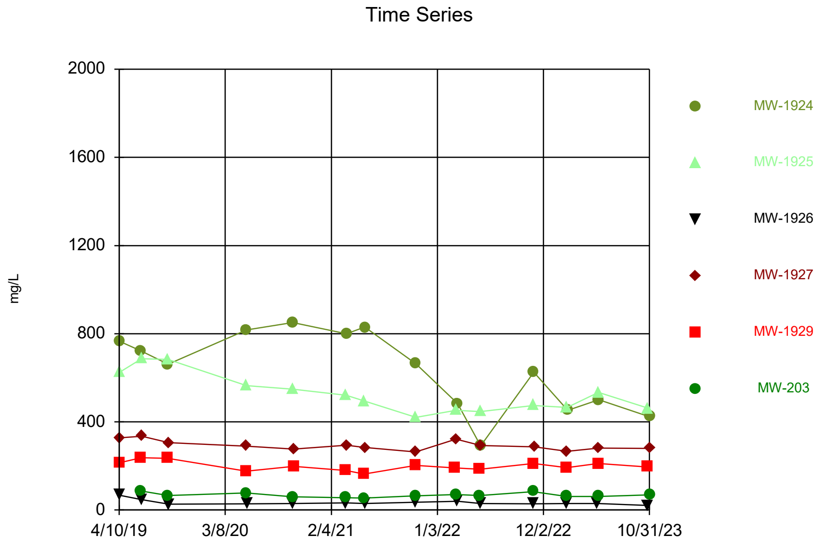

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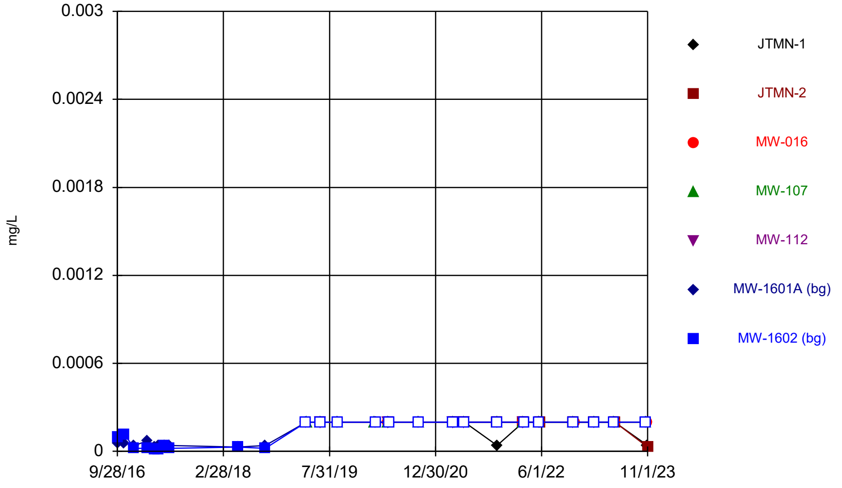

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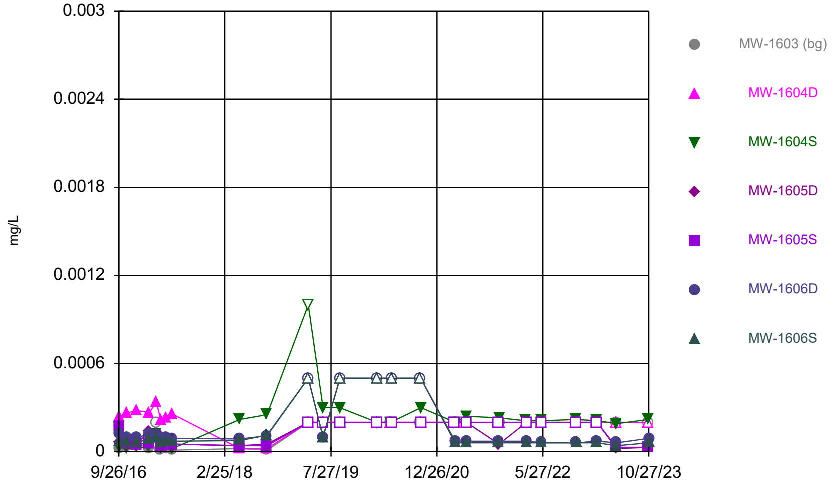

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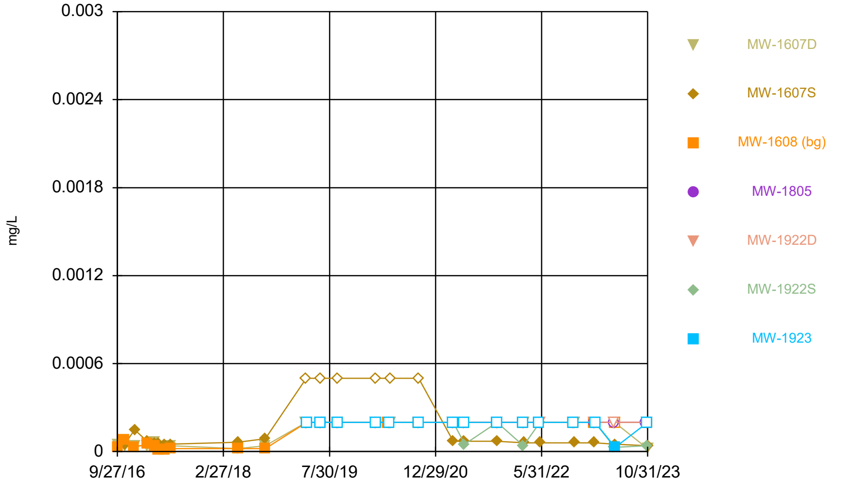

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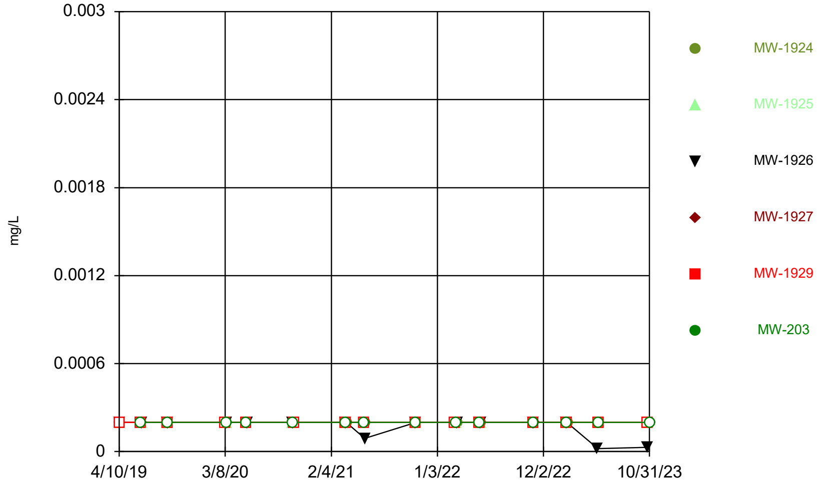

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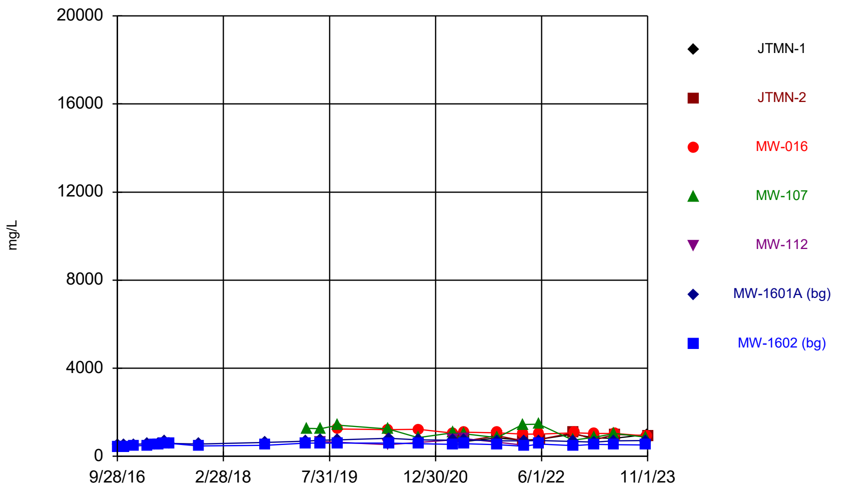
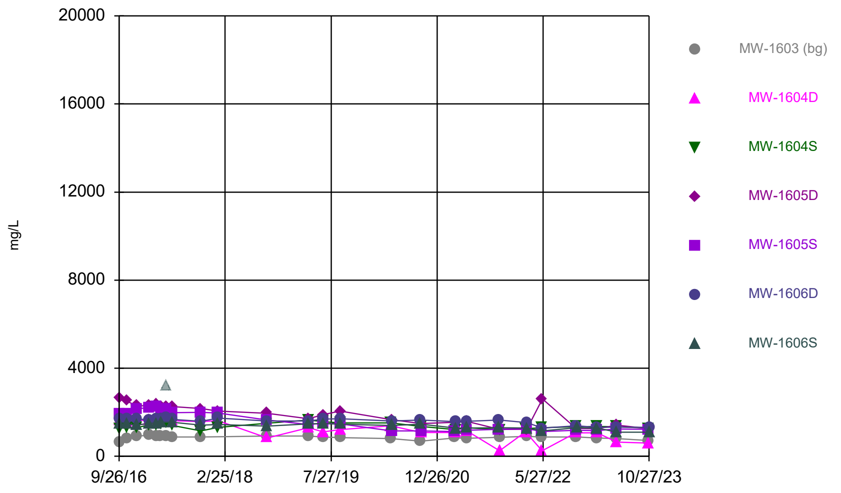
Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:36 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



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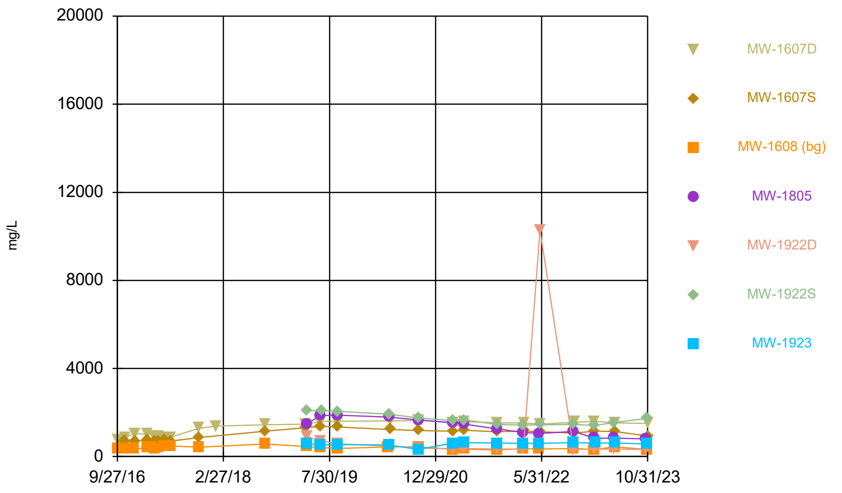
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

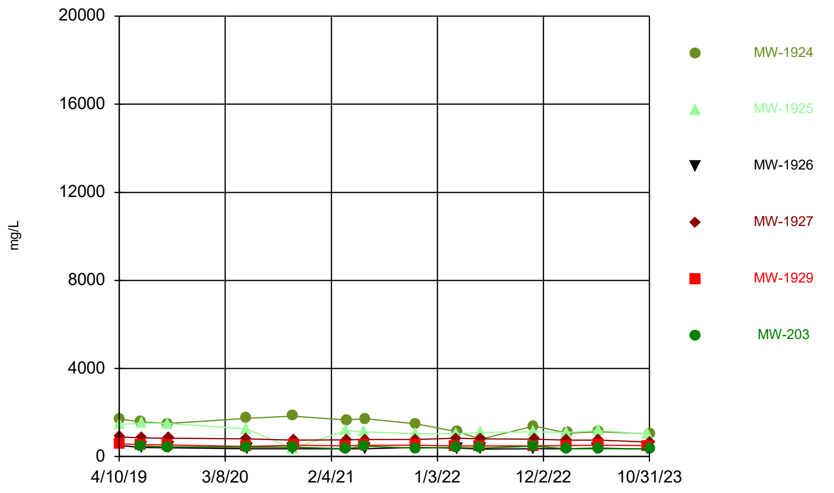
Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:36 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:36 PM
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FIGURE B

Box Plots

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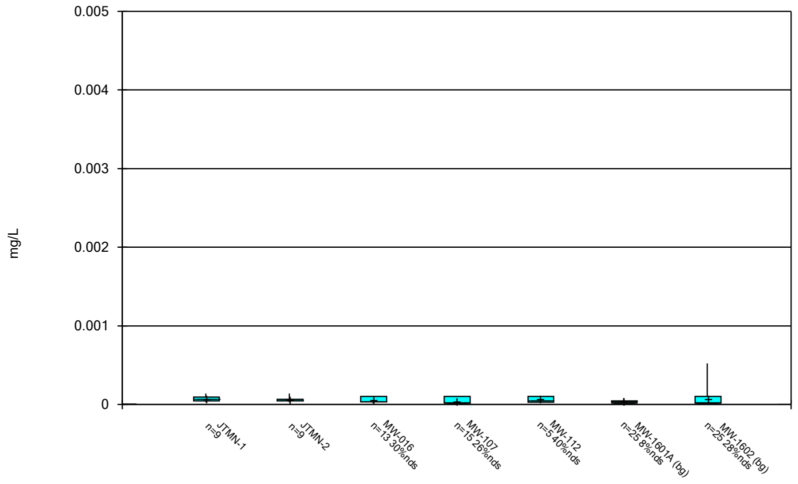
Box & Whiskers Plot



Constituent: Antimony, total Analysis Run 2/6/2024 4:37 PM

Mountaineer BAP Data: Mountaineer BAP

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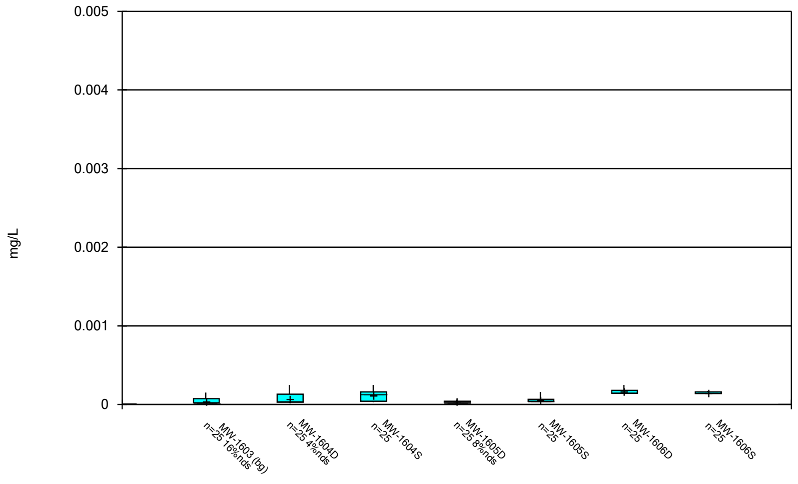
Box & Whiskers Plot



Constituent: Antimony, total Analysis Run 2/6/2024 4:37 PM

Mountaineer BAP Data: Mountaineer BAP

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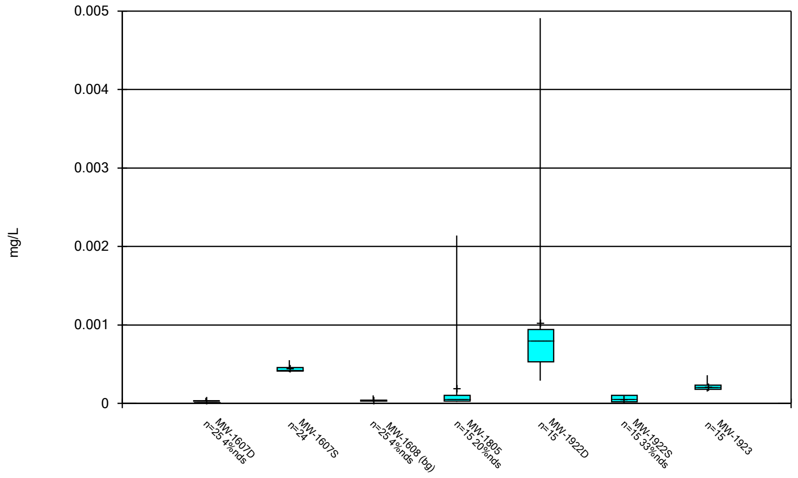
Box & Whiskers Plot



Constituent: Antimony, total Analysis Run 2/6/2024 4:37 PM

Mountaineer BAP Data: Mountaineer BAP

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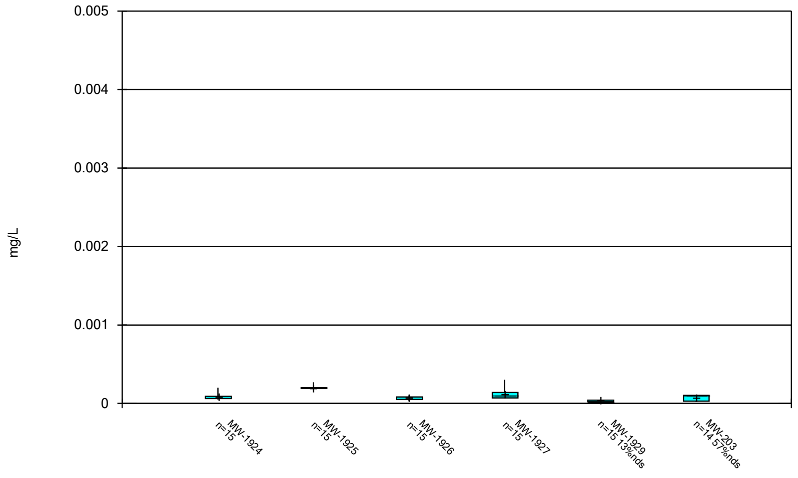
Box & Whiskers Plot



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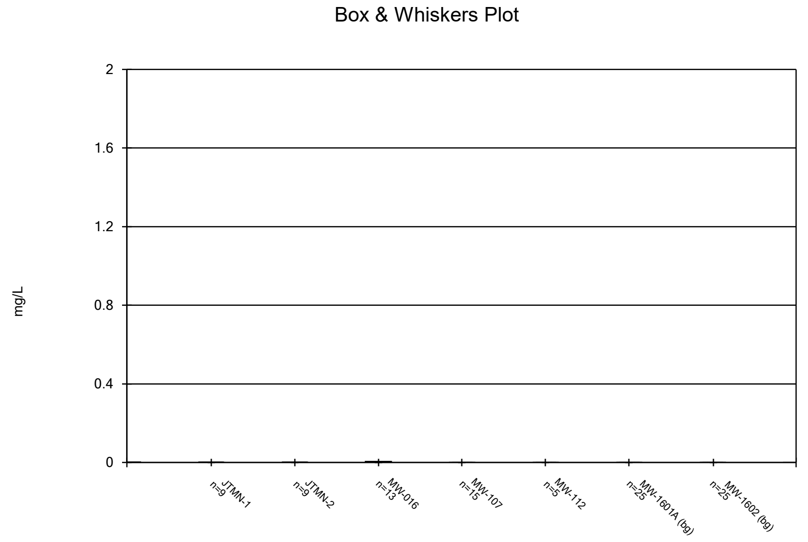

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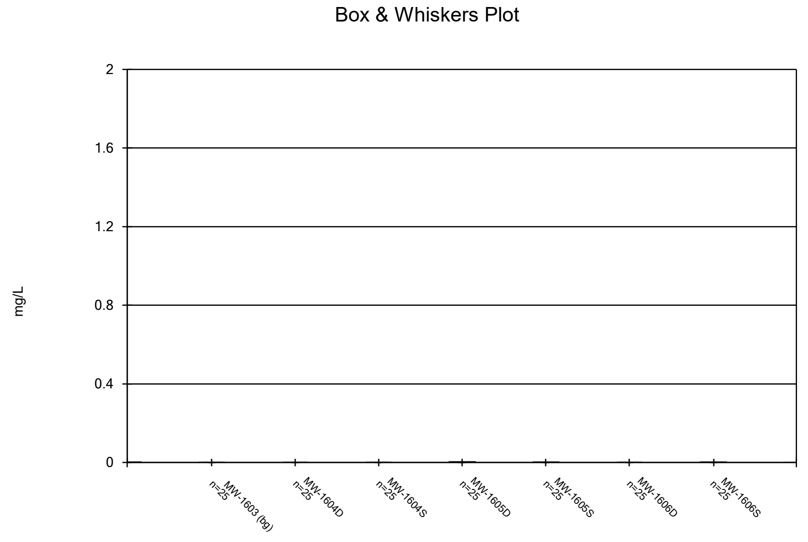

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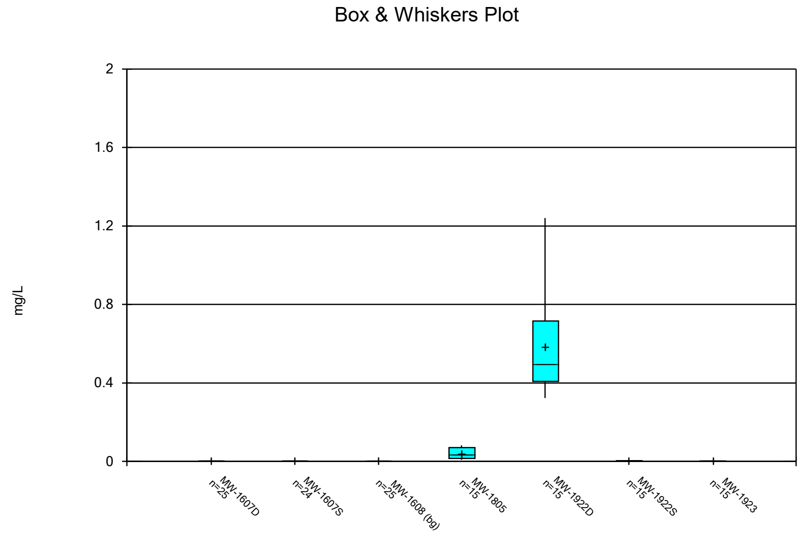

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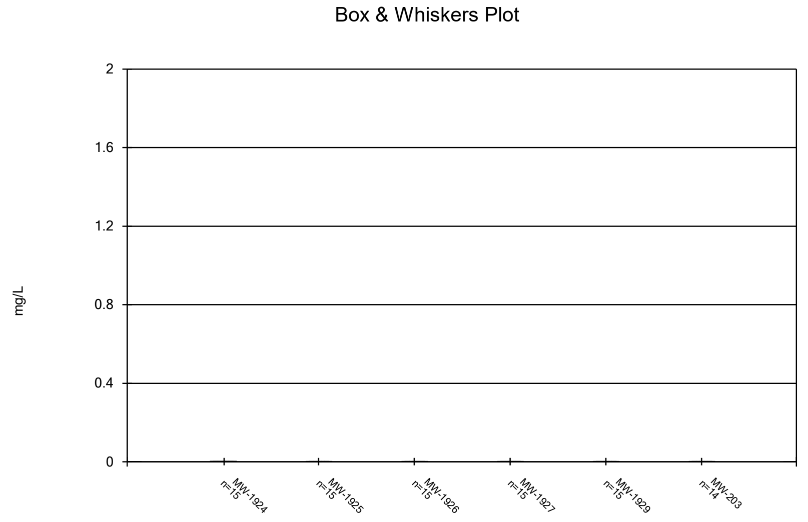
Sanitas™ v.10.0.15 Software licensed to . UG



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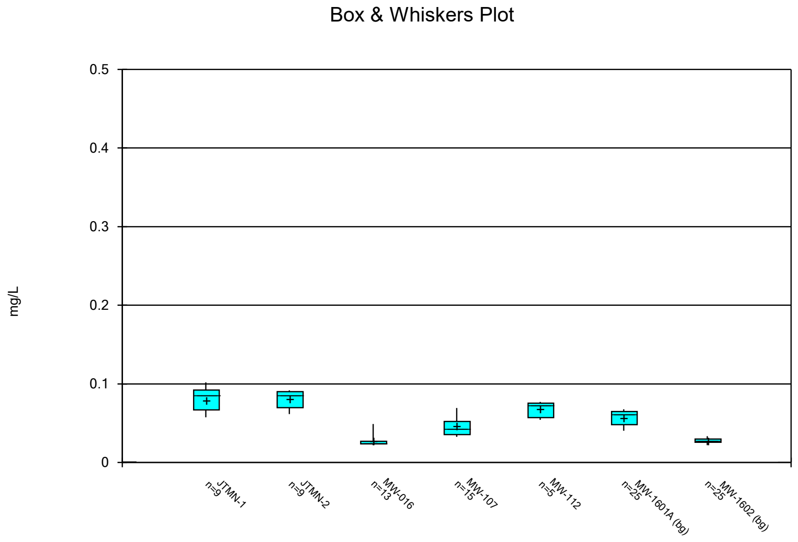
Box & Whiskers Plot

Constituent: Barium, total Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP Data: Mountaineer BAP

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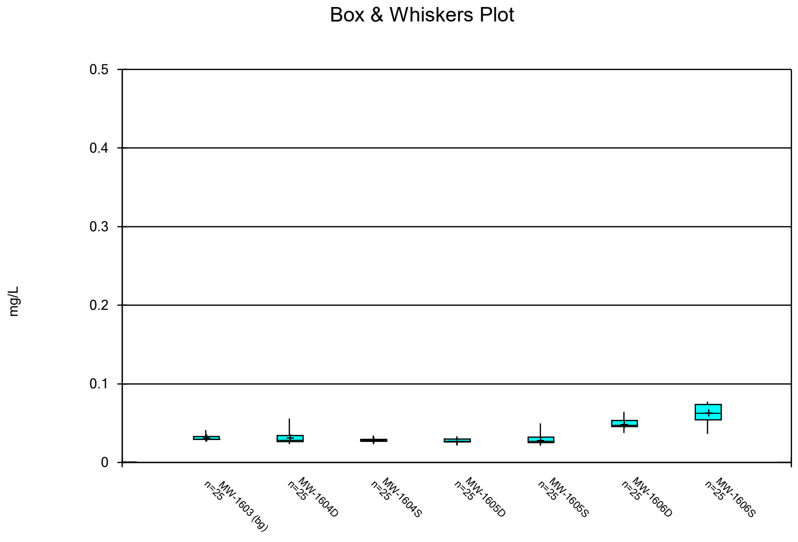
Box & Whiskers Plot

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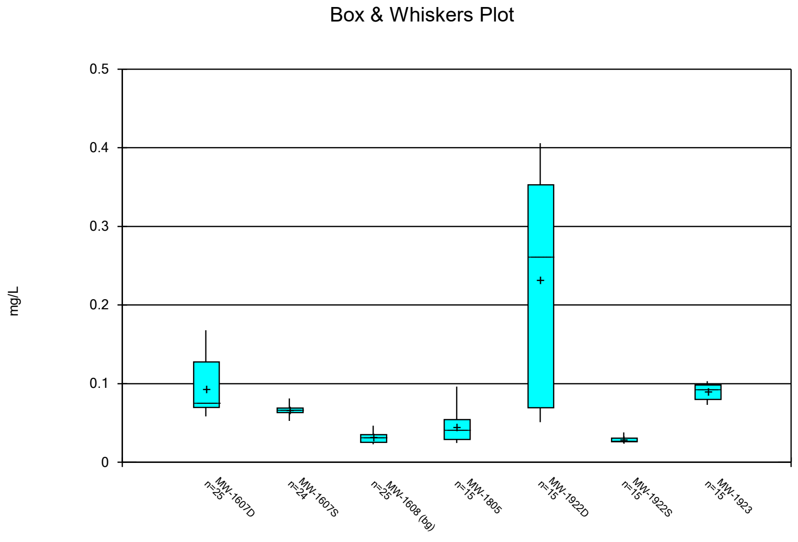
Box & Whiskers Plot

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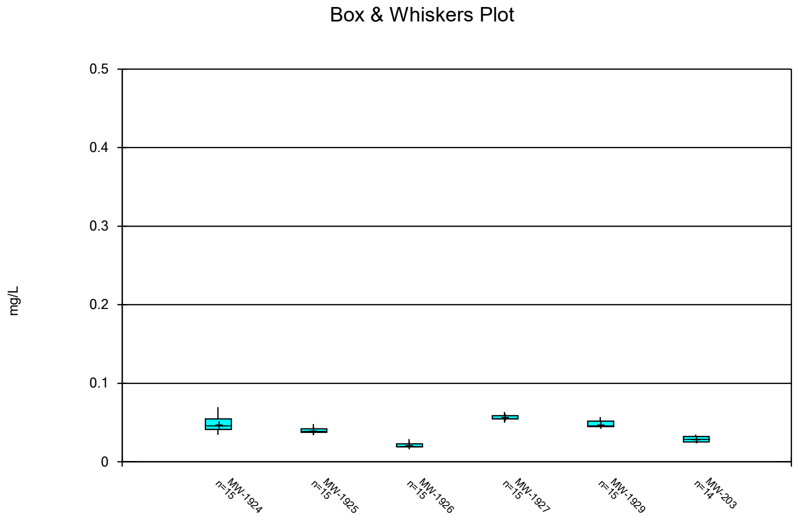
Box & Whiskers Plot

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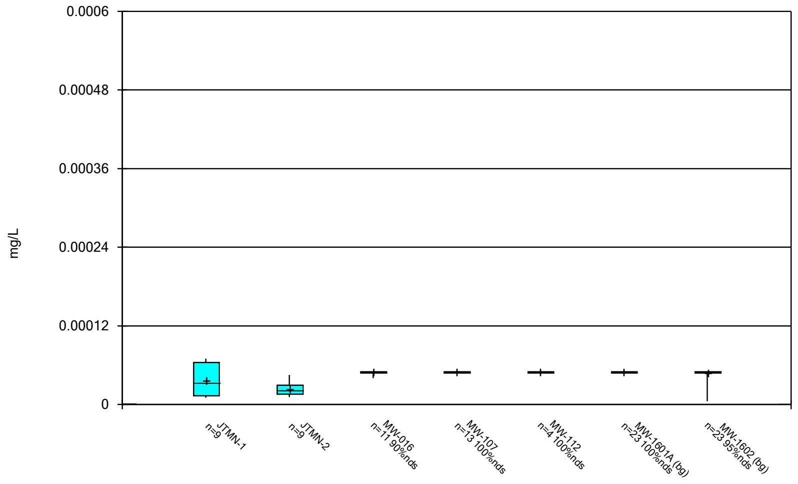
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



Constituent: Beryllium, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

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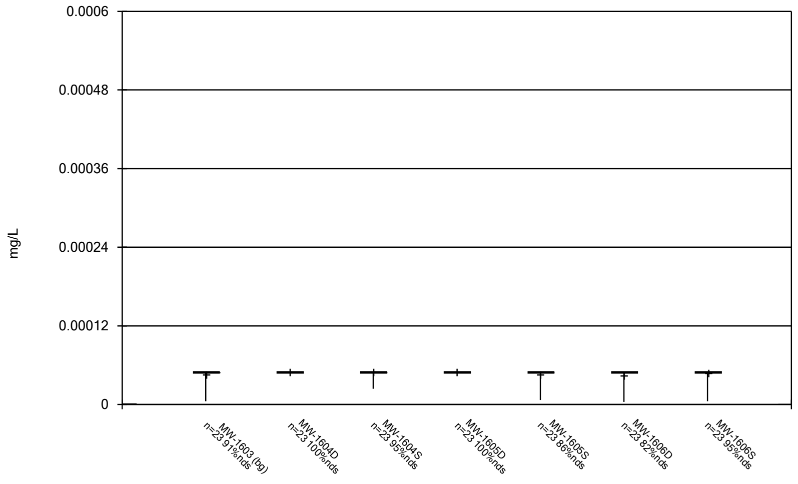
Box & Whiskers Plot



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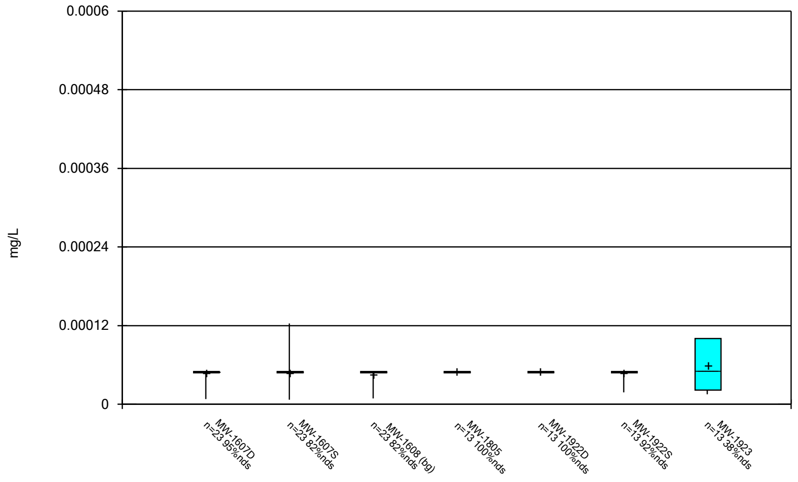
Box & Whiskers Plot



Constituent: Beryllium, total   Analysis Run 2/6/2024 4:38 PM

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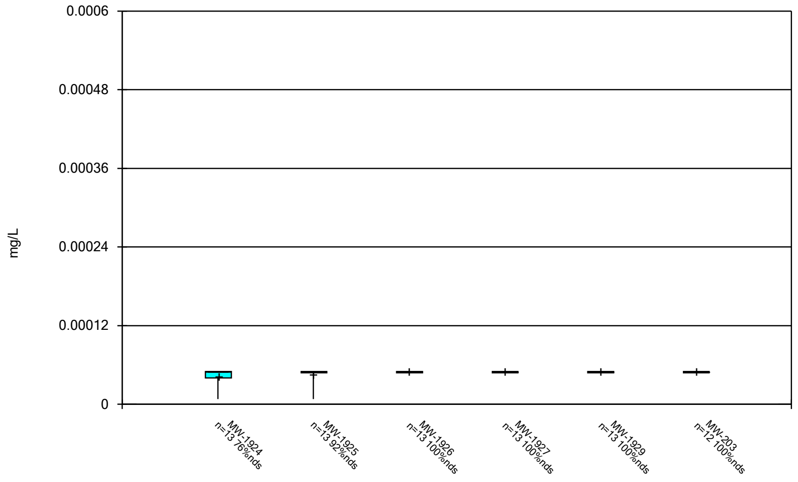
Box & Whiskers Plot



Constituent: Beryllium, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

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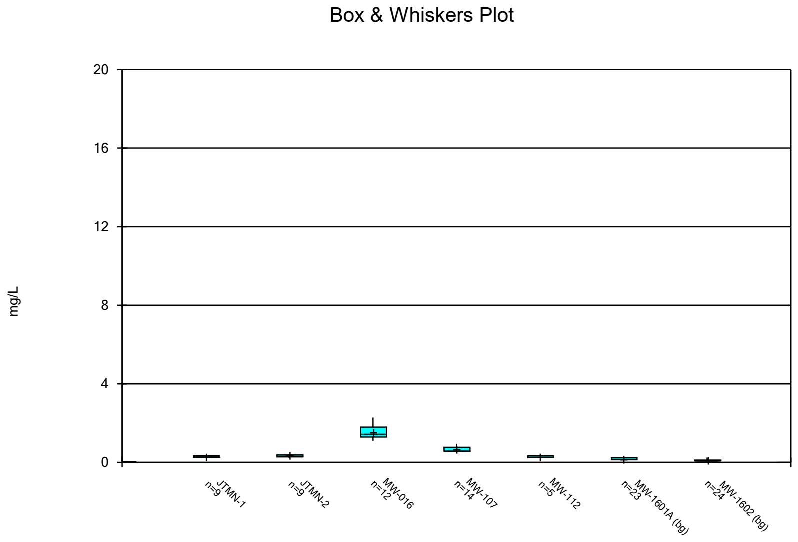

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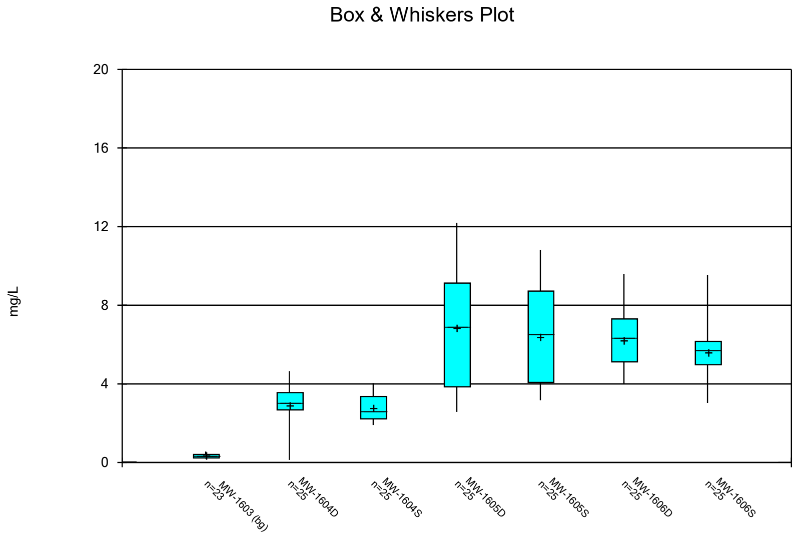

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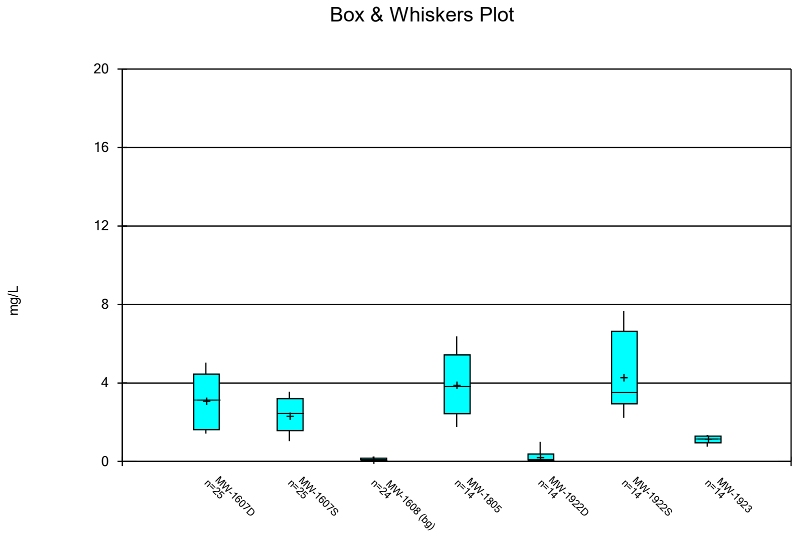

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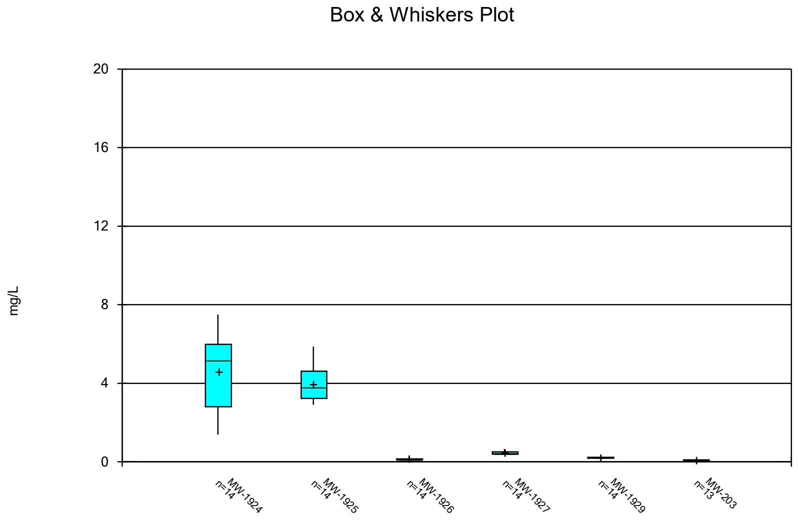

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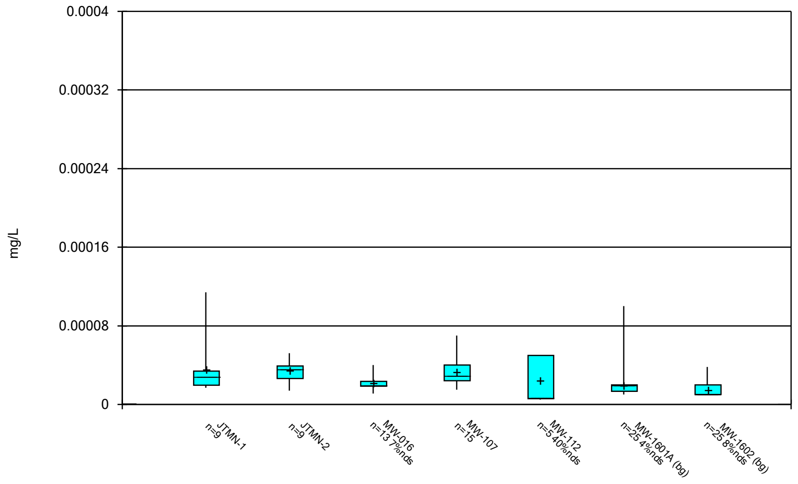
Box & Whiskers Plot

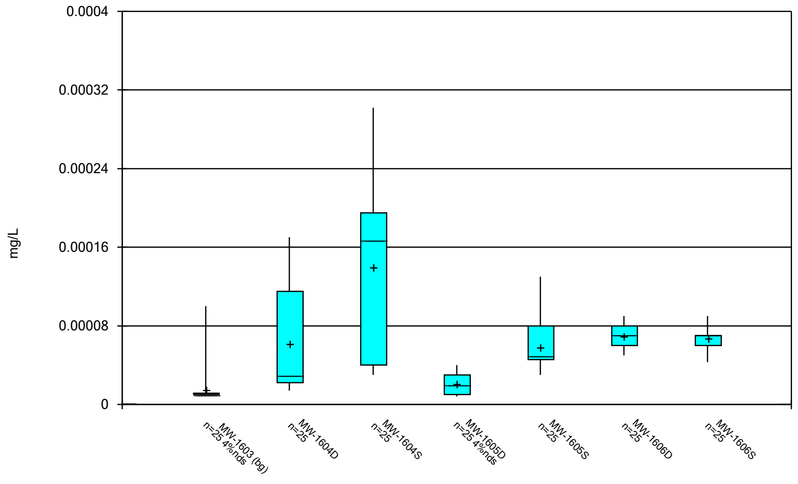


Constituent: Cadmium, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



Constituent: Cadmium, total   Analysis Run 2/6/2024 4:38 PM

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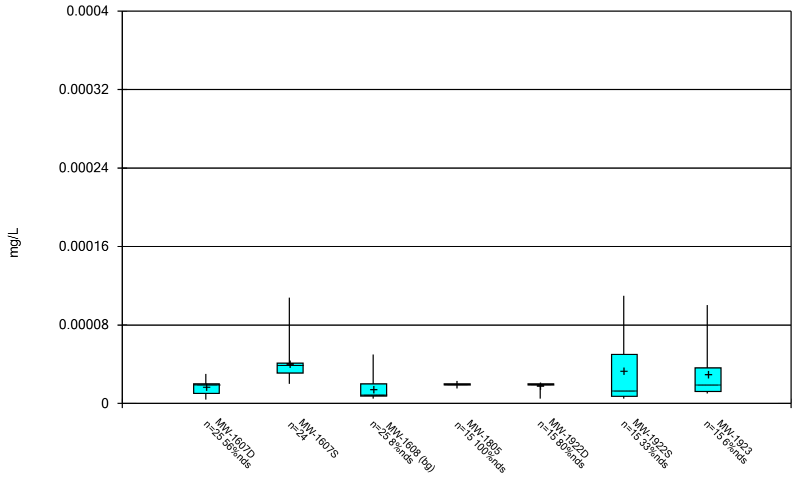
Box & Whiskers Plot



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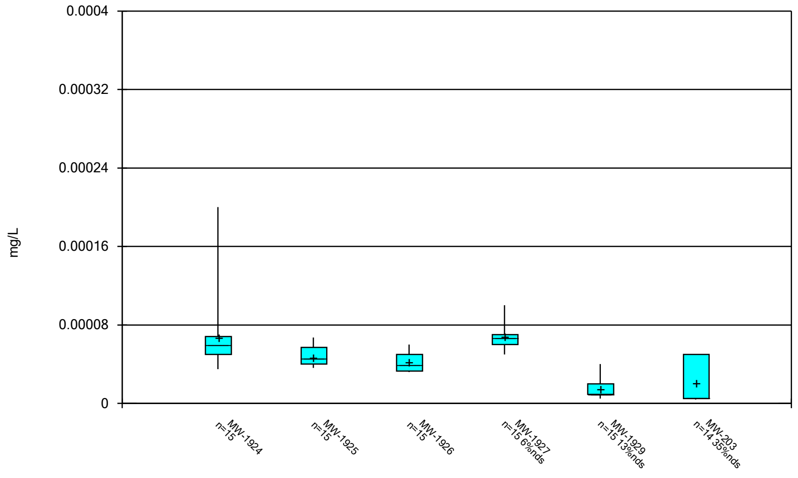
Box & Whiskers Plot



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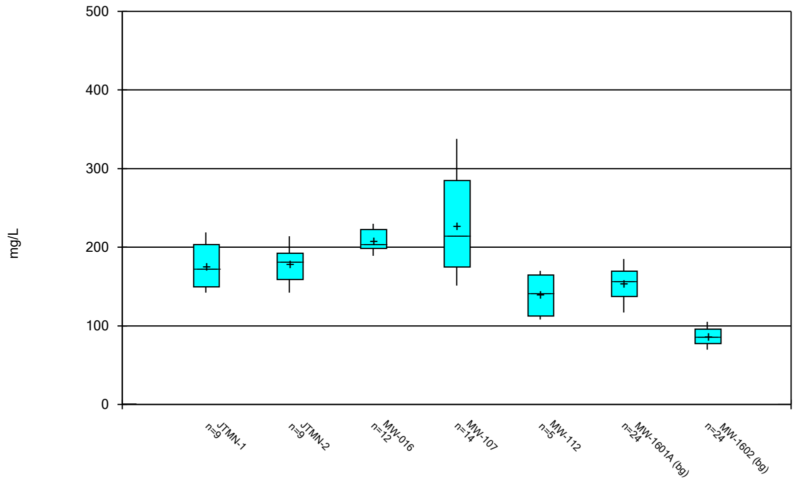
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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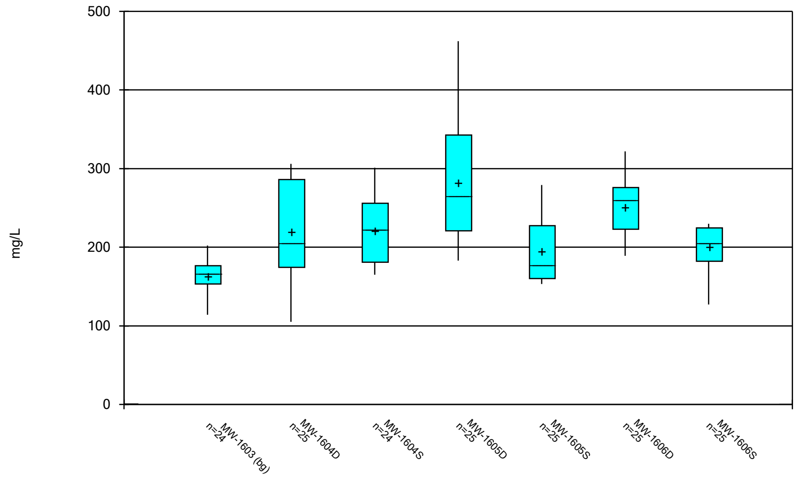
Box & Whiskers Plot



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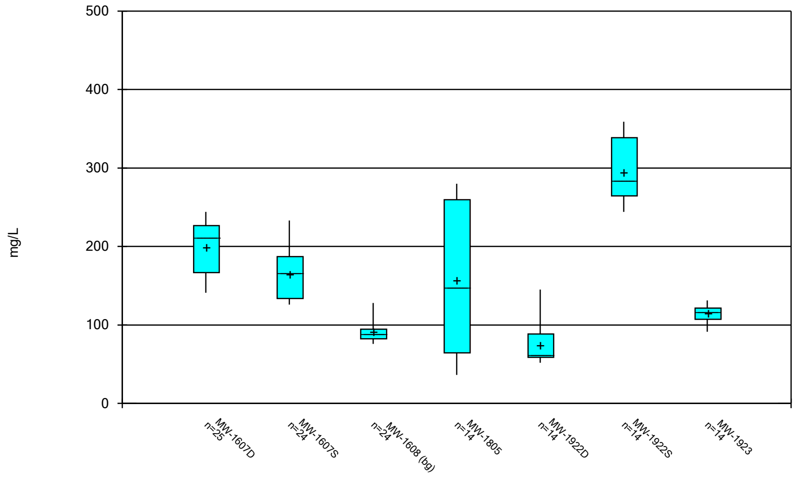
Box & Whiskers Plot



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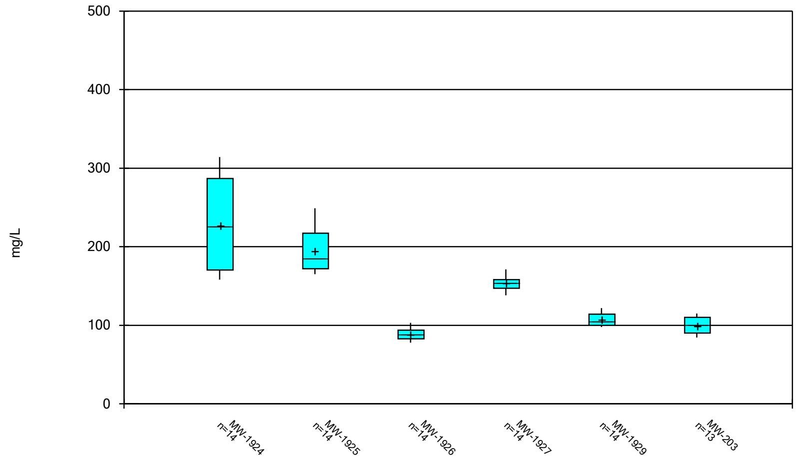
Box & Whiskers Plot



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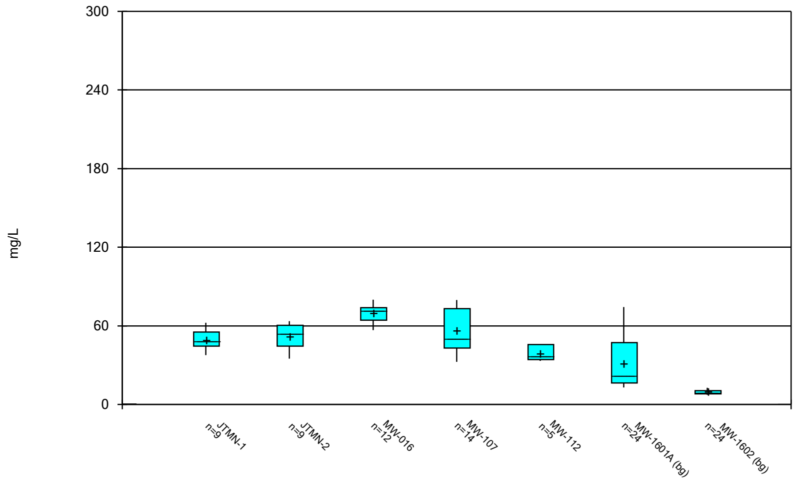
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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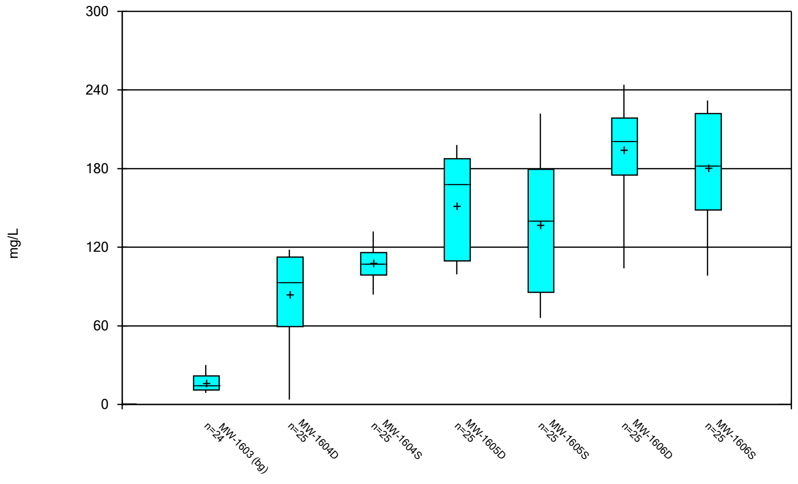
Box & Whiskers Plot



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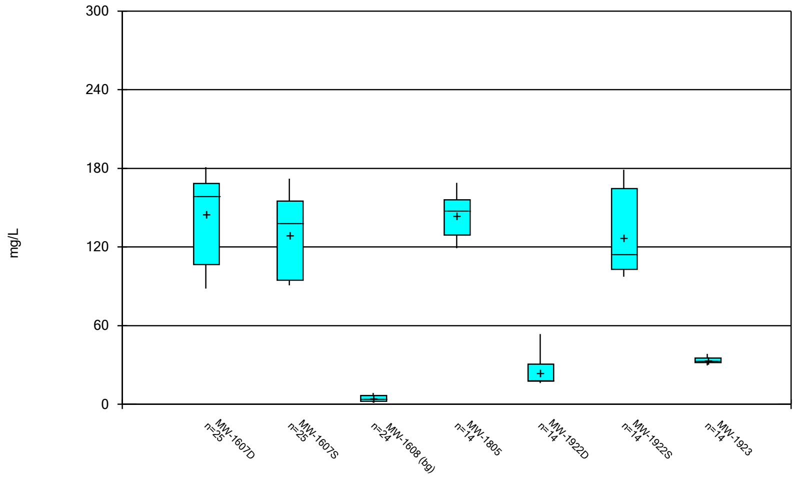
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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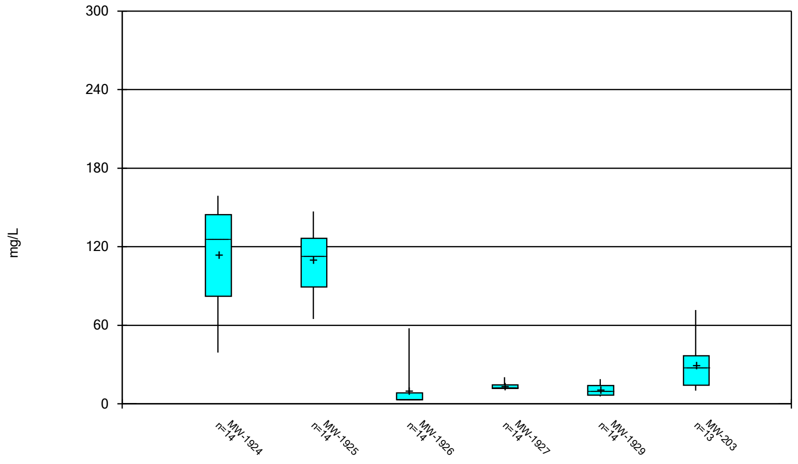
Box & Whiskers Plot



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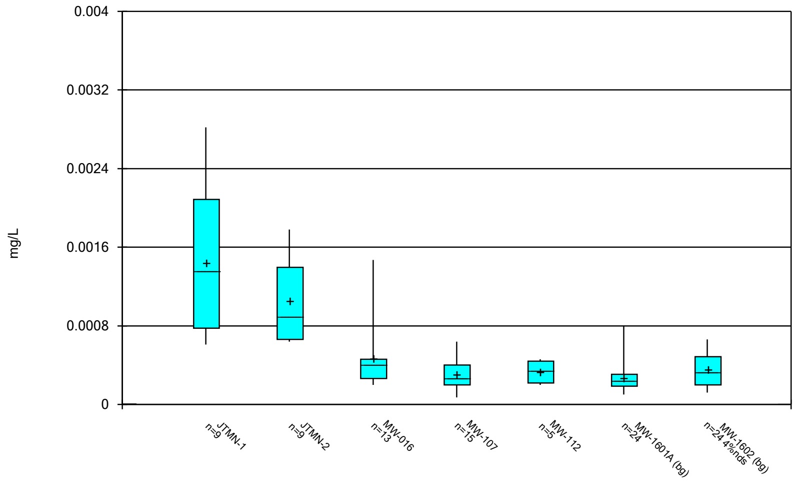
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



Constituent: Chromium, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

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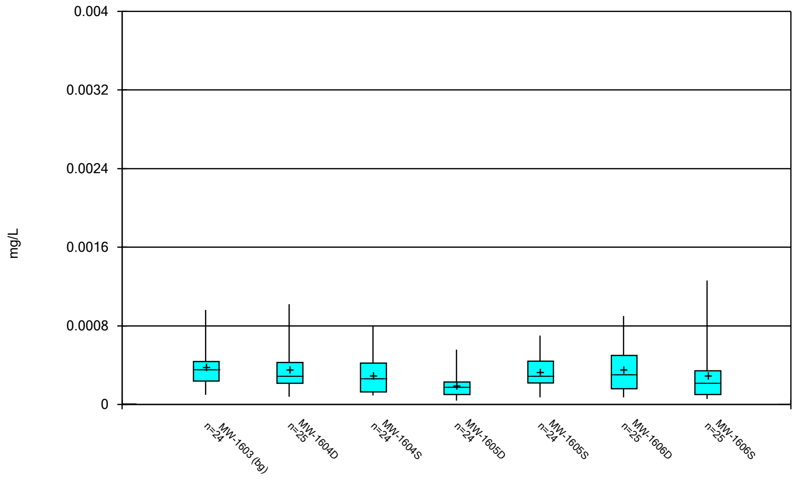
Box & Whiskers Plot



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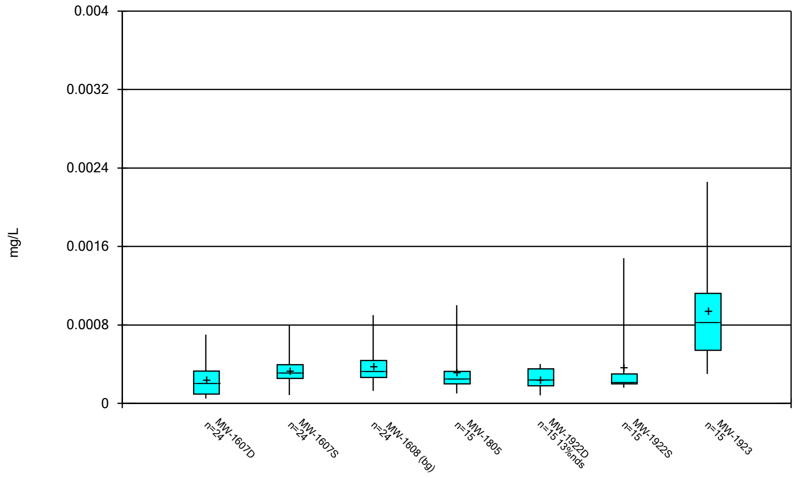
Box & Whiskers Plot



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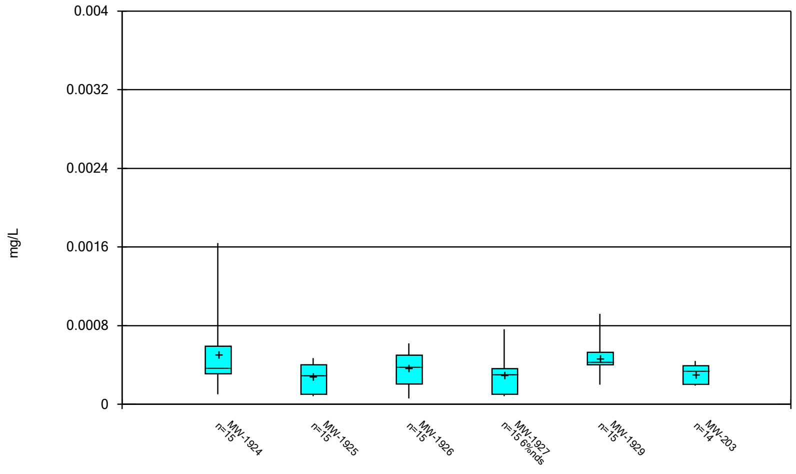
Box & Whiskers Plot



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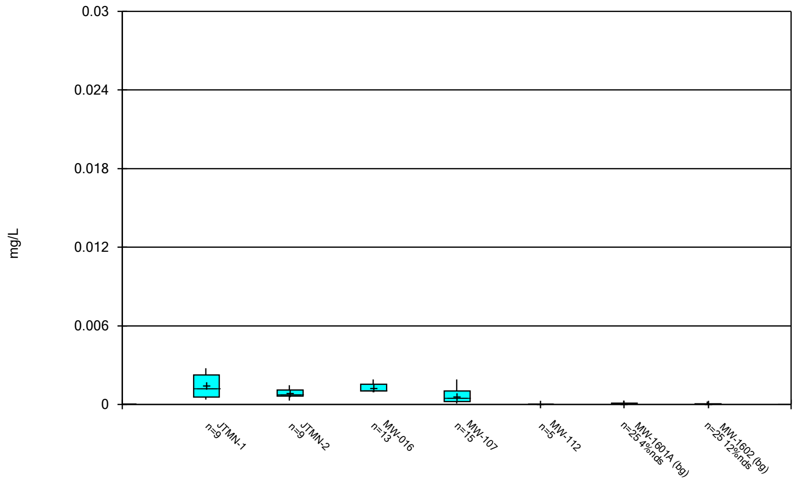
Box & Whiskers Plot



Constituent: Cobalt, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

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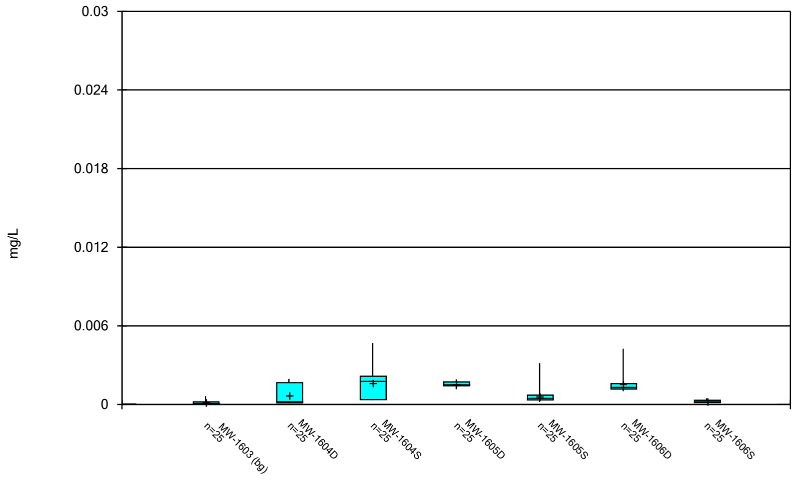
Box & Whiskers Plot



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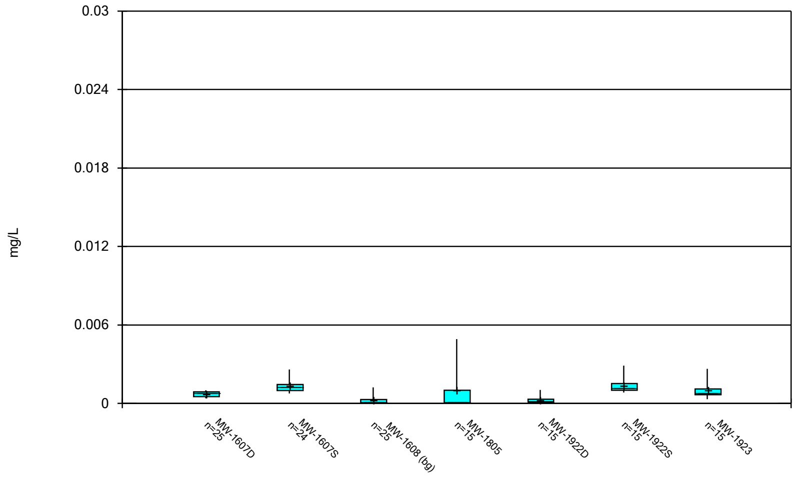
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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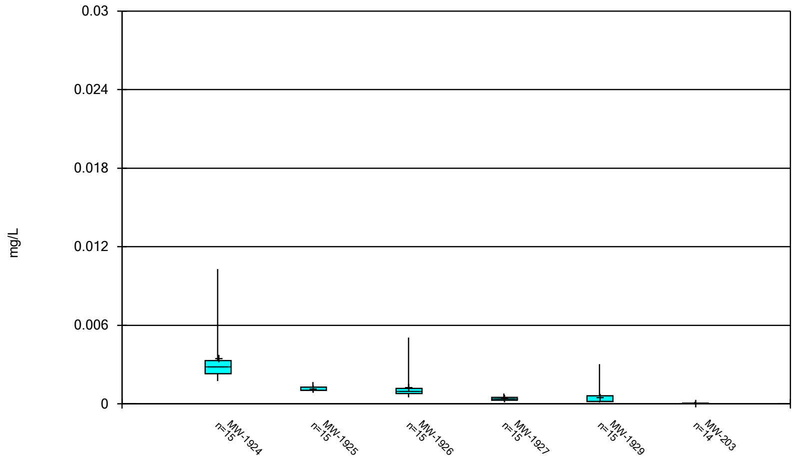
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



Constituent: Cobalt, total   Analysis Run 2/6/2024 4:38 PM

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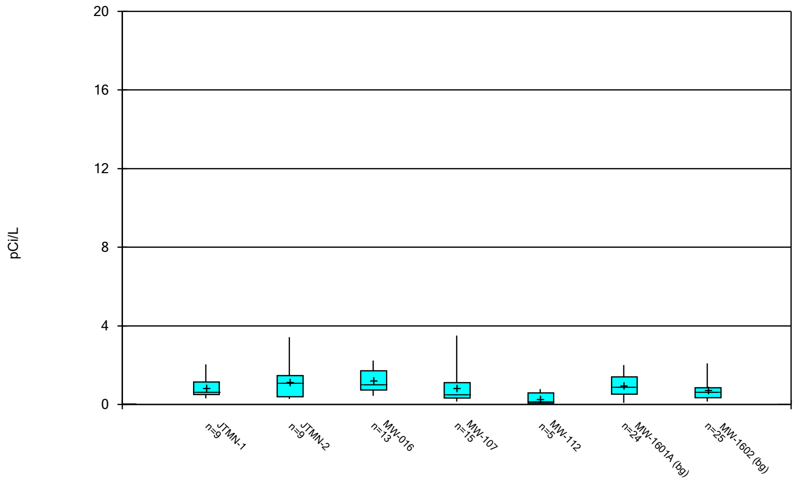
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



Constituent: Combined Radium 226 + 228   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

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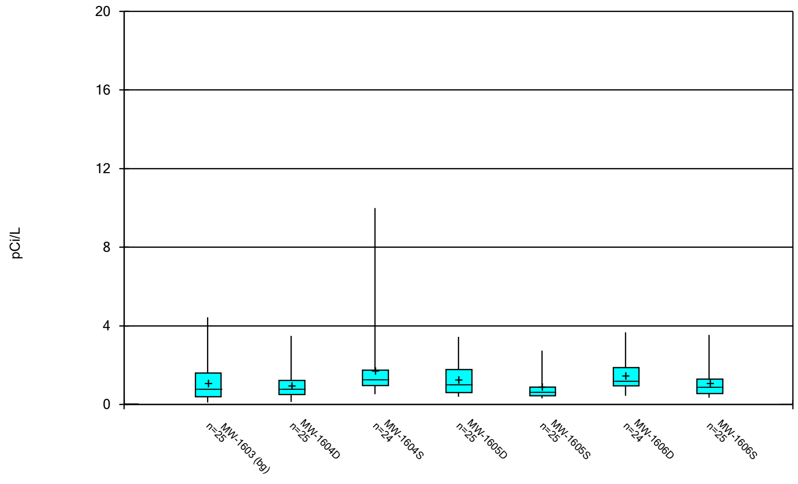
Box & Whiskers Plot

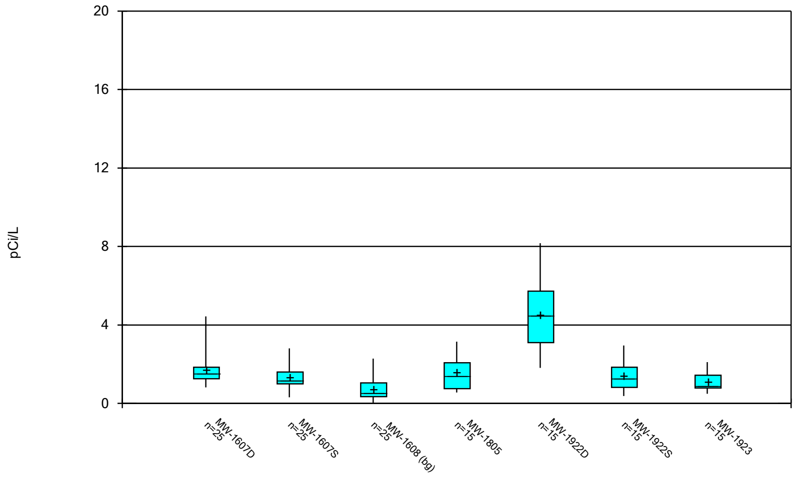


Constituent: Combined Radium 226 + 228   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



Constituent: Combined Radium 226 + 228   Analysis Run 2/6/2024 4:38 PM

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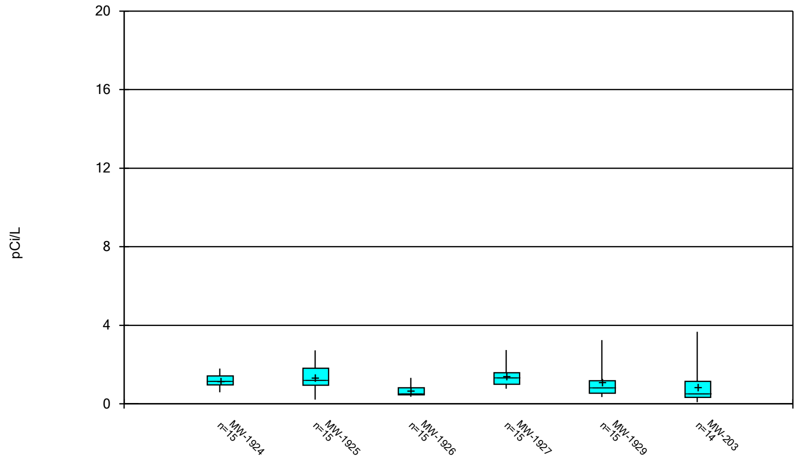
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot

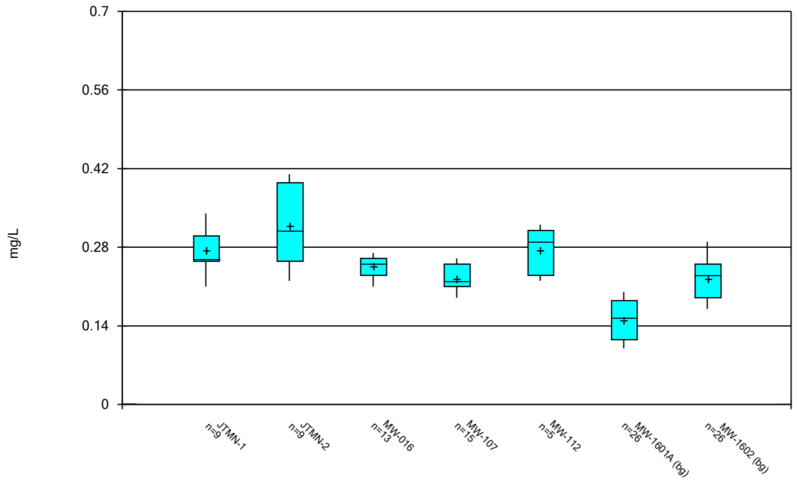


Constituent: Combined Radium 226 + 228   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

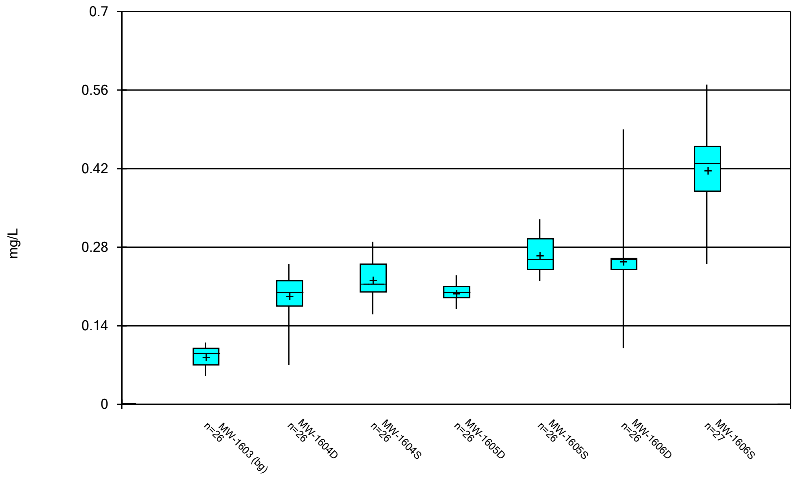
Box & Whiskers Plot



Constituent: Fluoride, total   Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

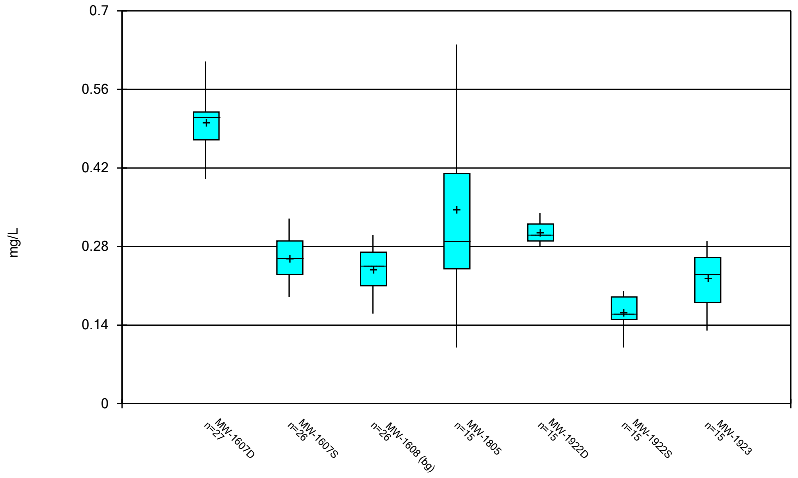
Box & Whiskers Plot



Constituent: Fluoride, total   Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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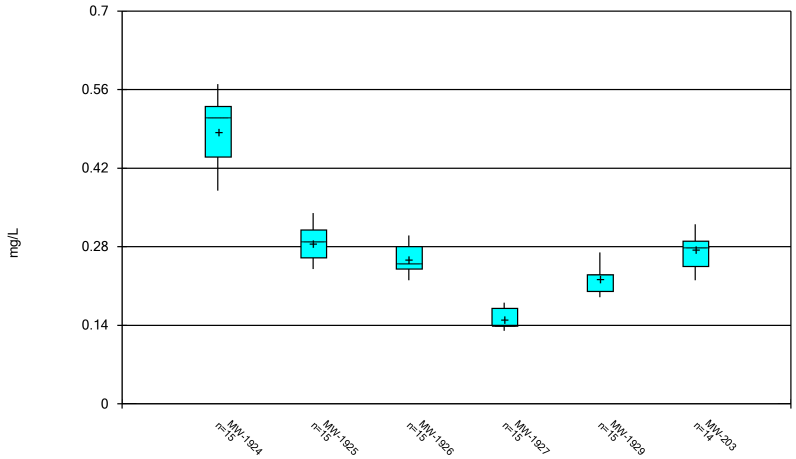
Box & Whiskers Plot



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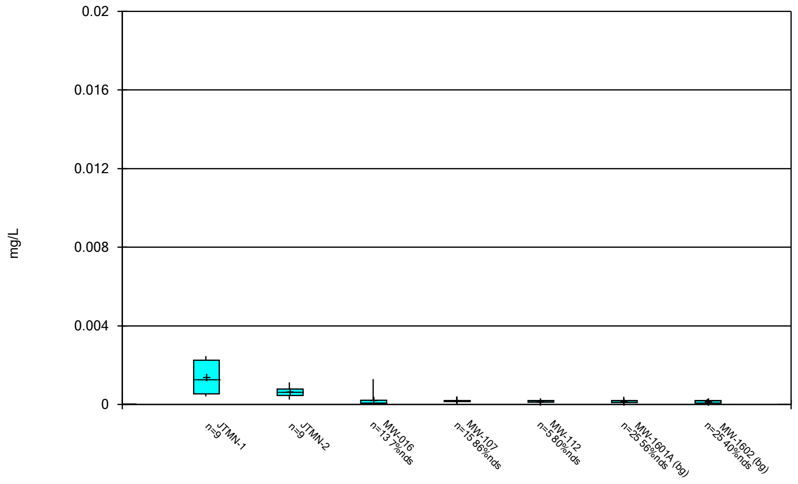
Box & Whiskers Plot



Constituent: Lead, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

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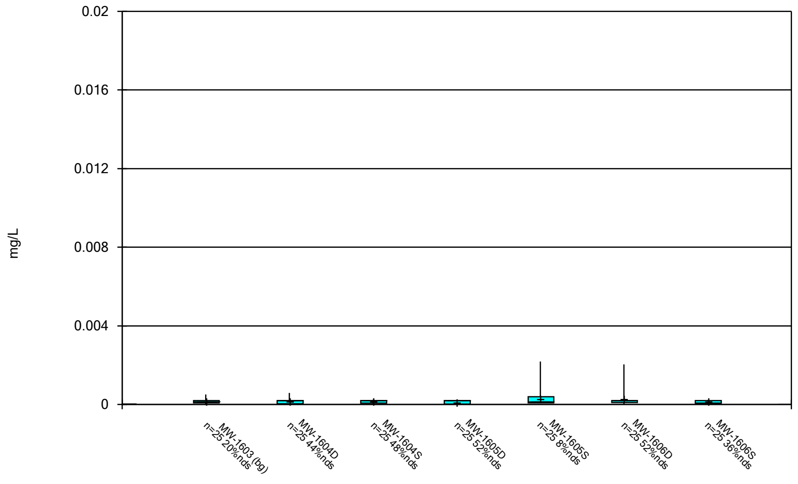
Box & Whiskers Plot

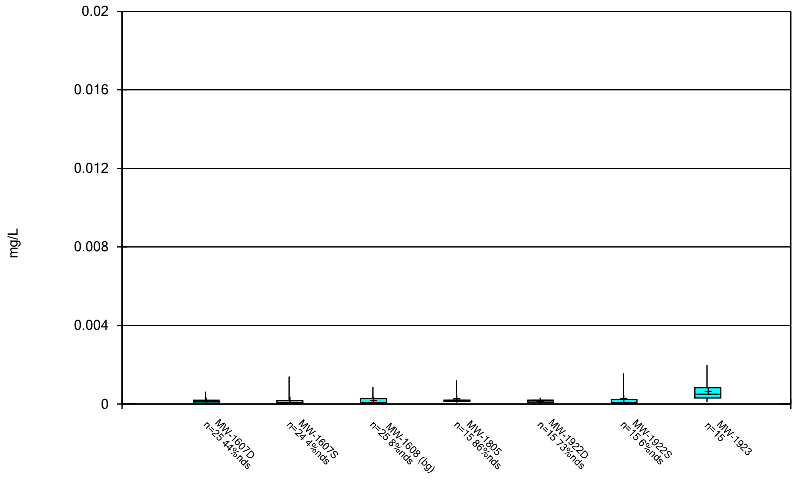


Constituent: Lead, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



Constituent: Lead, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

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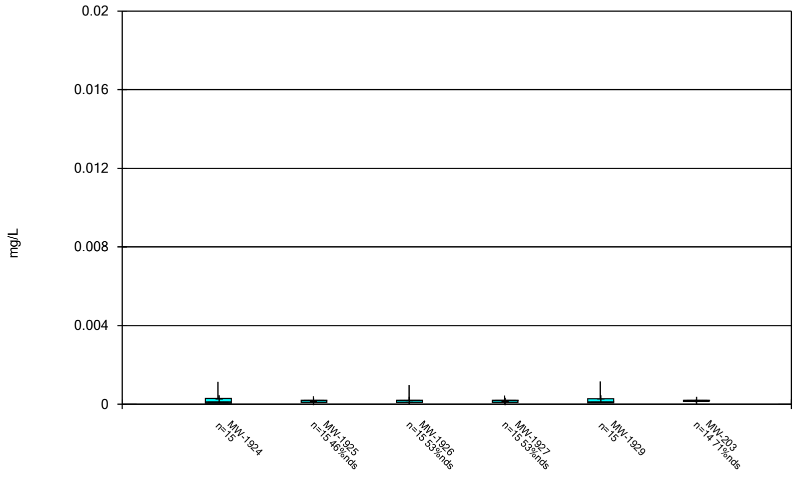
Box & Whiskers Plot



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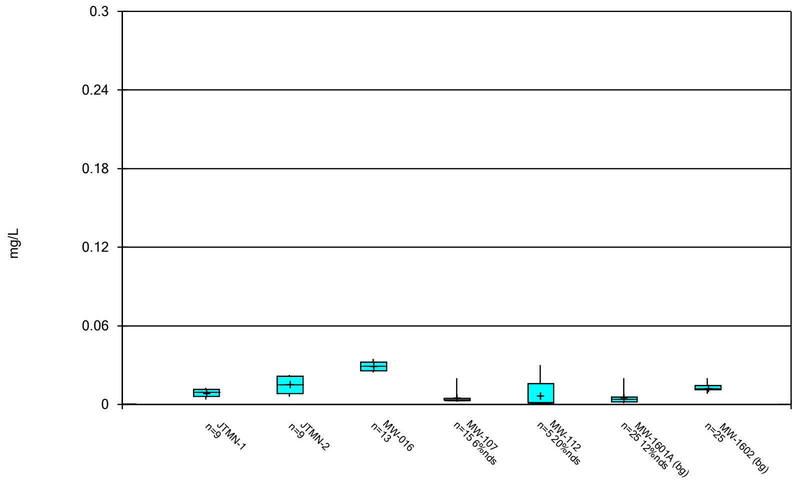
Box & Whiskers Plot



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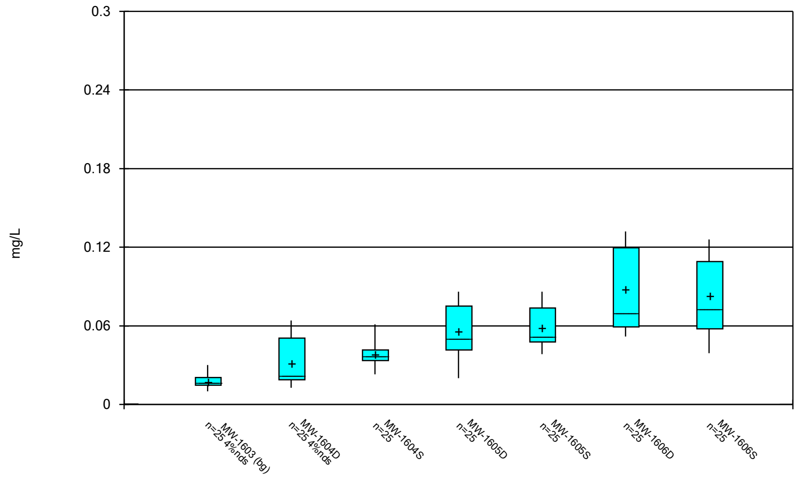
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

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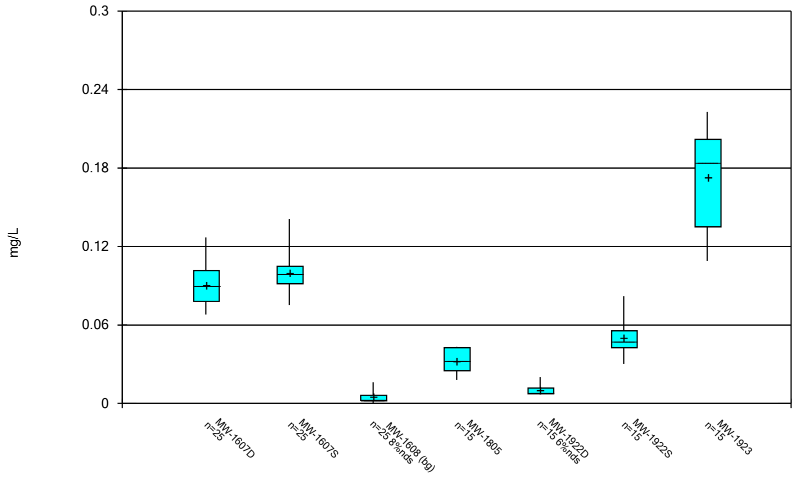
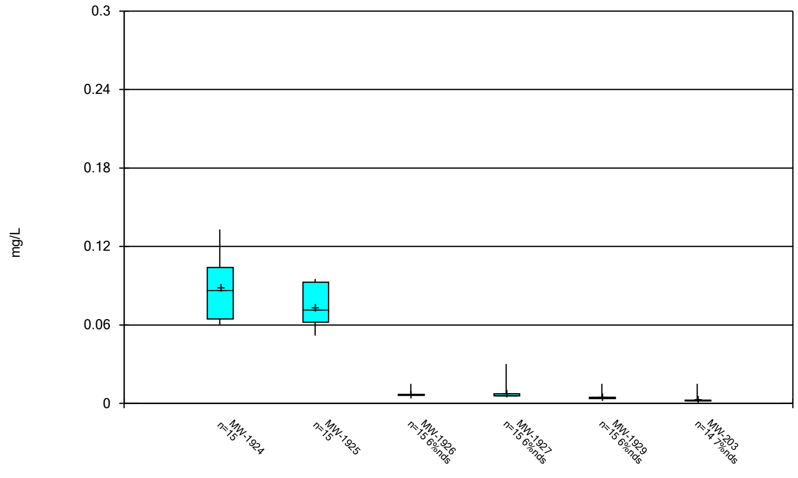


Constituent: Lithium, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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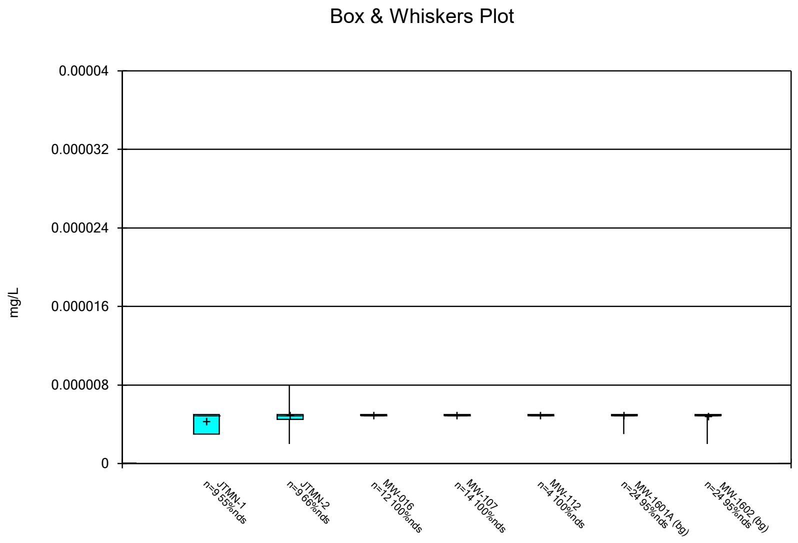
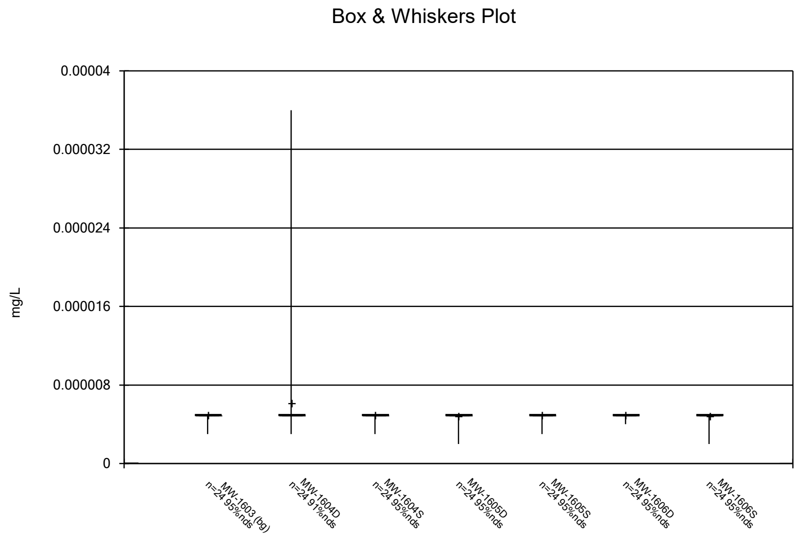
Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG



Constituent: Mercury, total Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG



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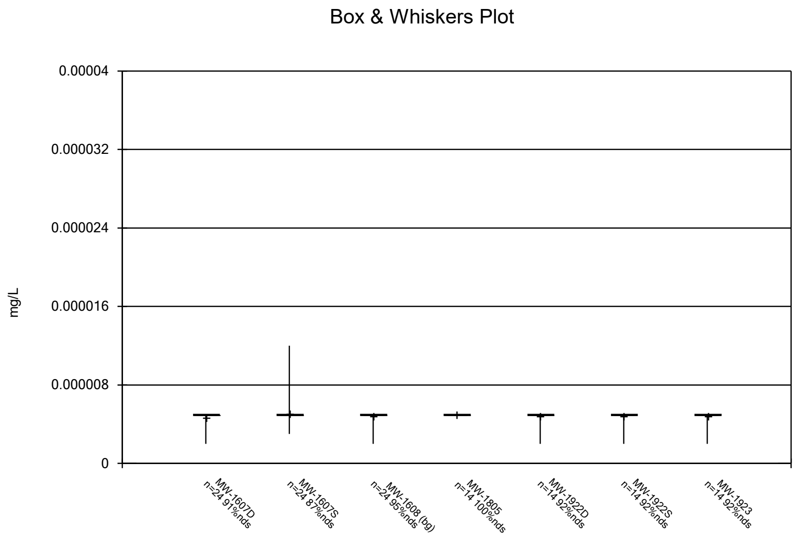
Sanitas™ v.10.0.15 Software licensed to . UG



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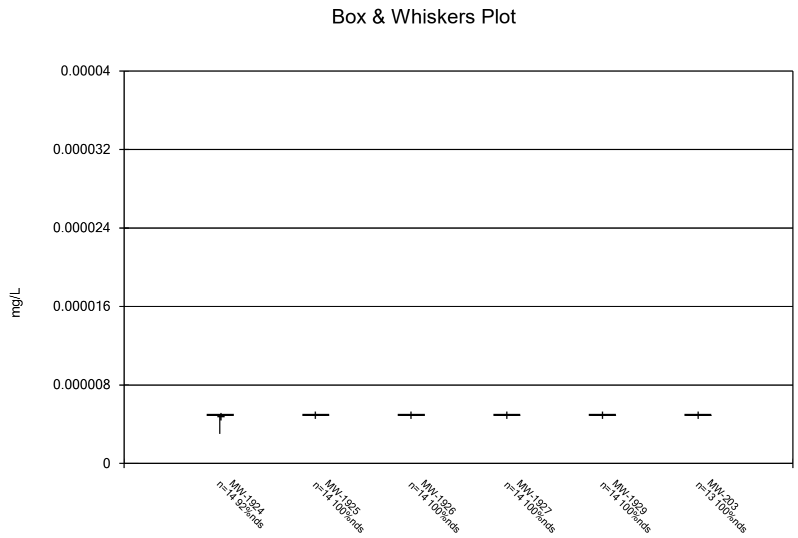
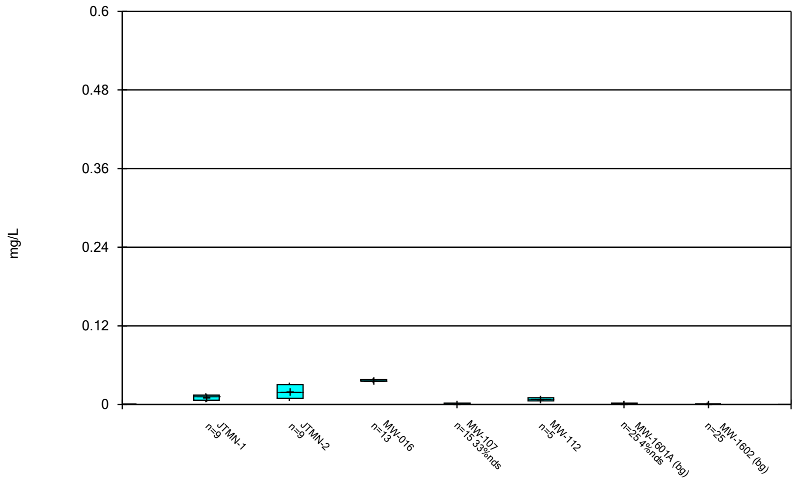
Sanitas™ v.10.0.15 Software licensed to . UG



Constituent: Mercury, total Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

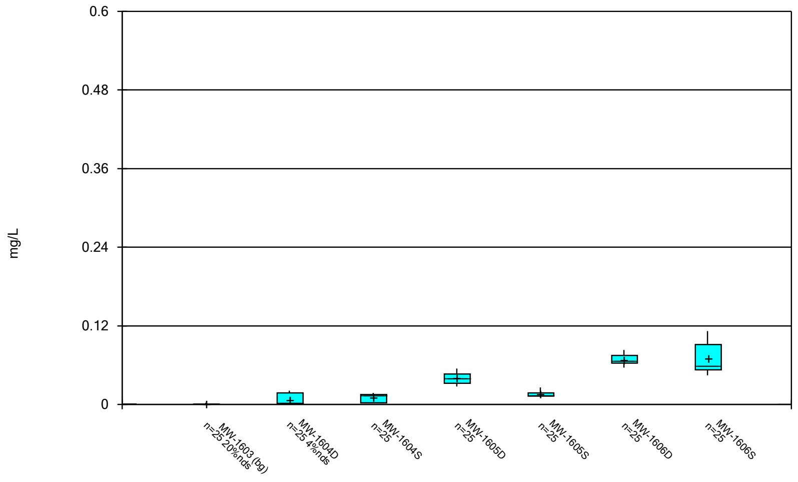
Box & Whiskers Plot



Constituent: Molybdenum, total Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

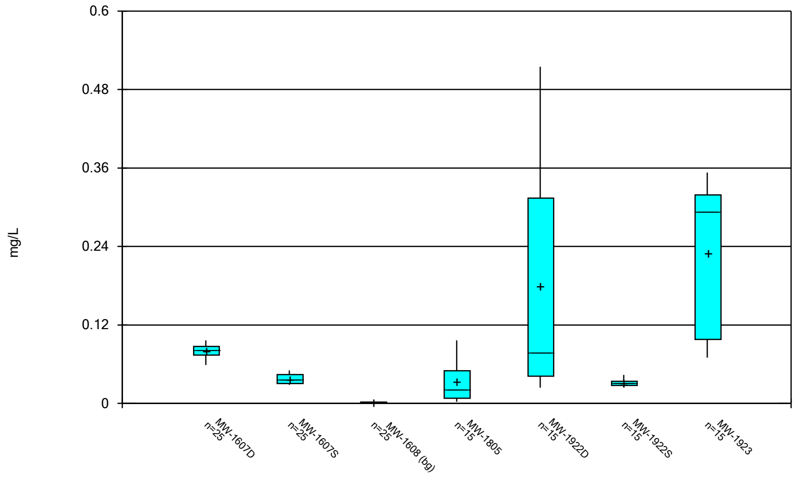
Box & Whiskers Plot



Constituent: Molybdenum, total Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

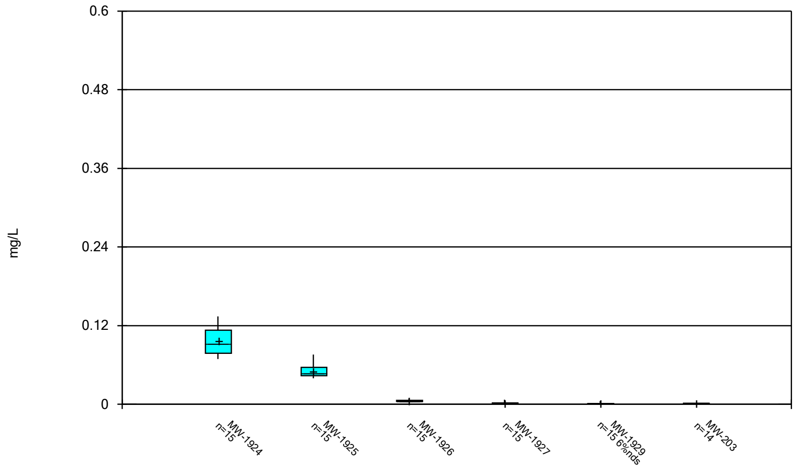
Box & Whiskers Plot



Constituent: Molybdenum, total Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

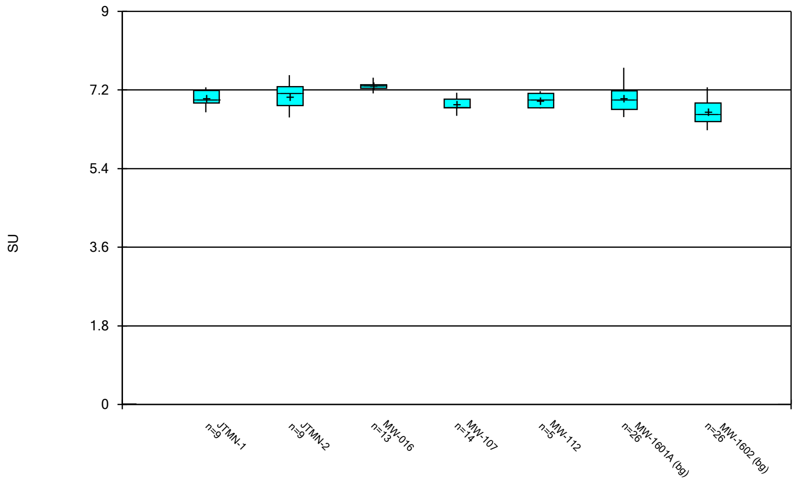
Box & Whiskers Plot



Constituent: Molybdenum, total Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

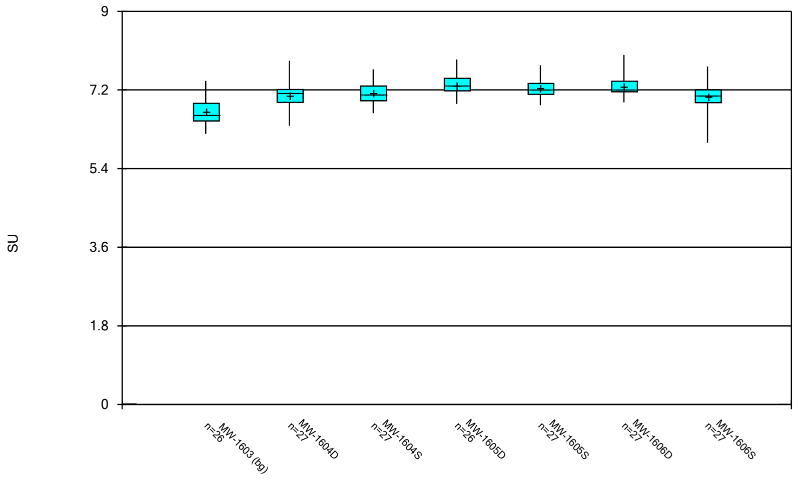
Box & Whiskers Plot



Constituent: pH, field Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

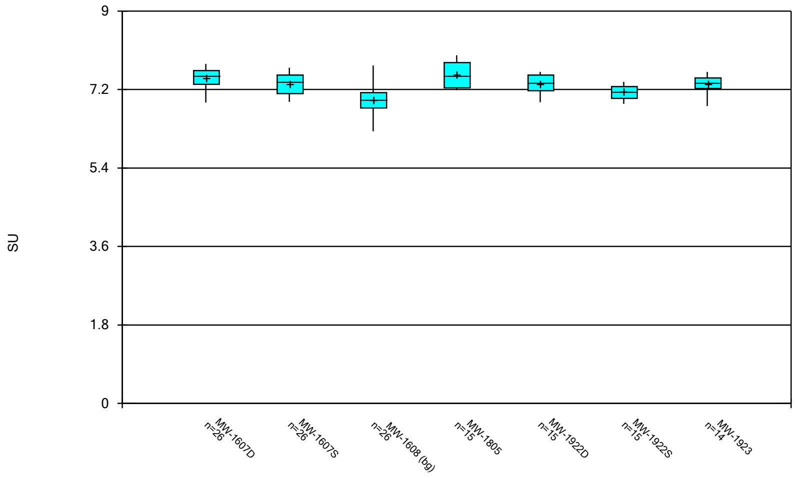
Box & Whiskers Plot



Constituent: pH, field Analysis Run 2/6/2024 4:38 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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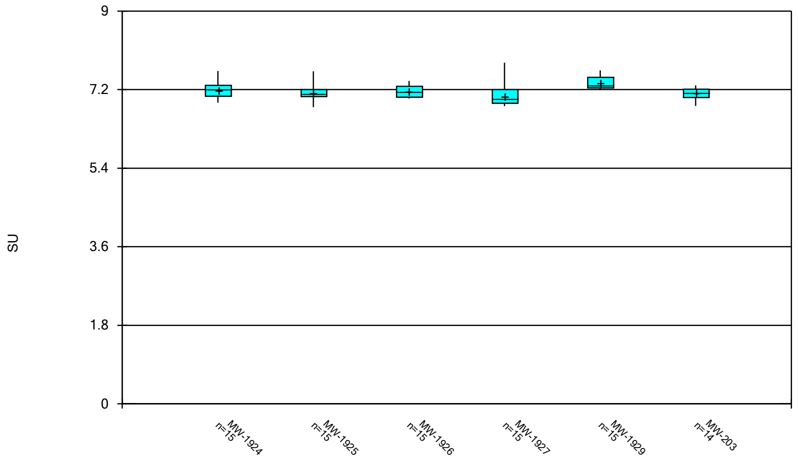
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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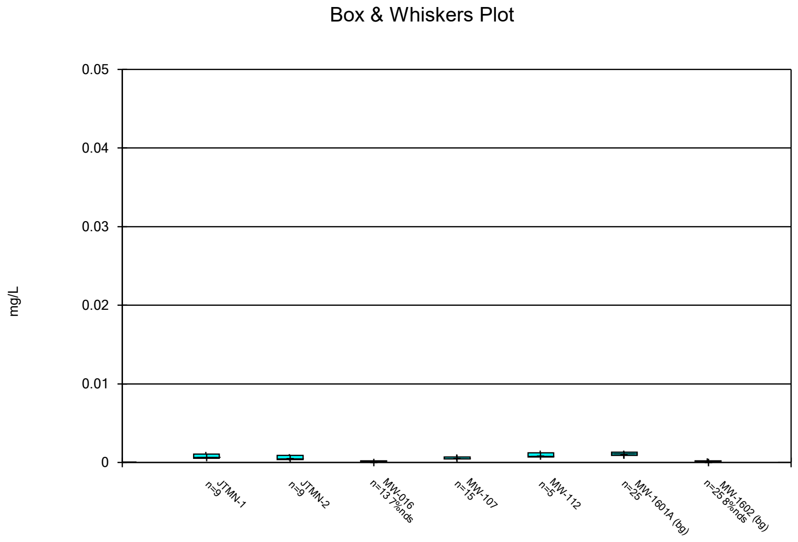
Sanitas™ v.10.0.15 Software licensed to . UG



Constituent: Selenium, total   Analysis Run 2/6/2024 4:38 PM

Mountaineer BAP   Data: Mountaineer BAP

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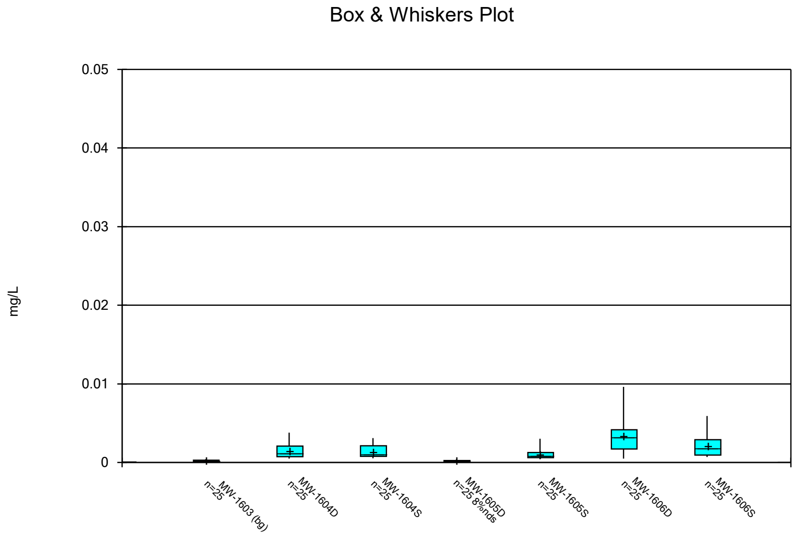

Constituent: Selenium, total   Analysis Run 2/6/2024 4:38 PM

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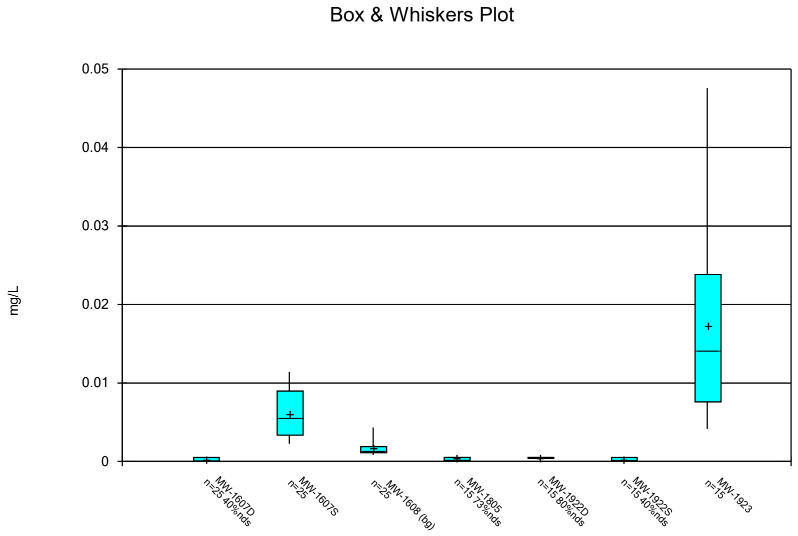
Sanitas™ v.10.0.15 Software licensed to . UG



Constituent: Selenium, total   Analysis Run 2/6/2024 4:38 PM

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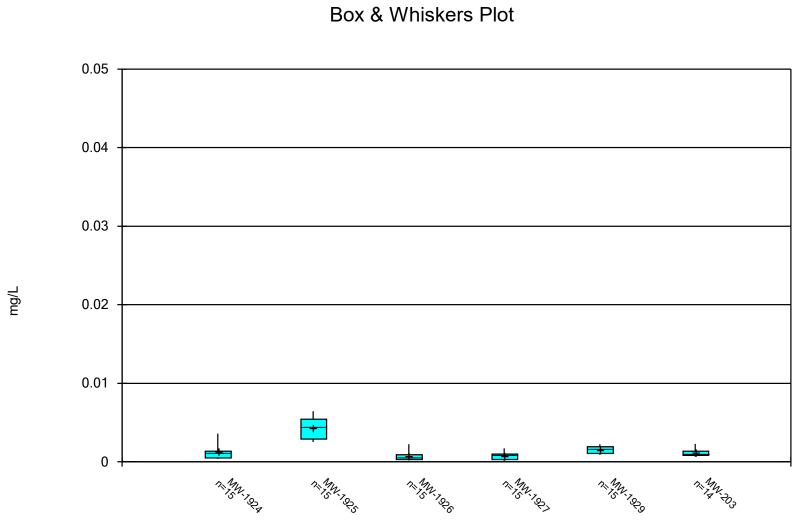
Sanitas™ v.10.0.15 Software licensed to . UG



Constituent: Selenium, total   Analysis Run 2/6/2024 4:38 PM

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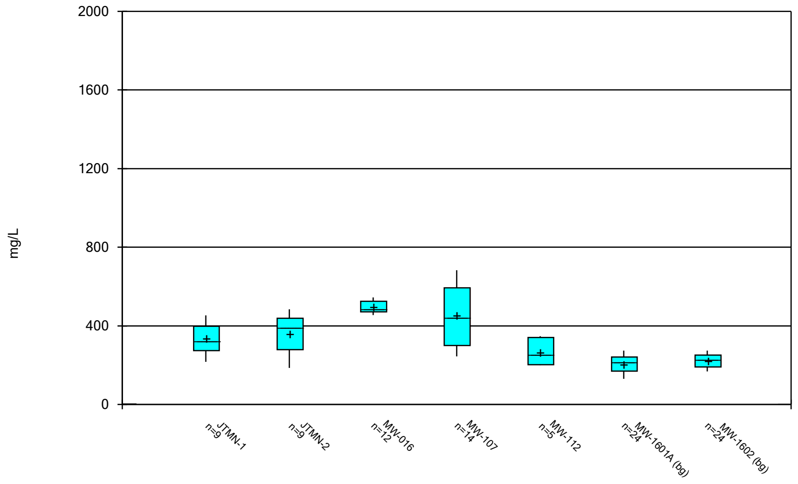
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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Mountaineer BAP Data: Mountaineer BAP

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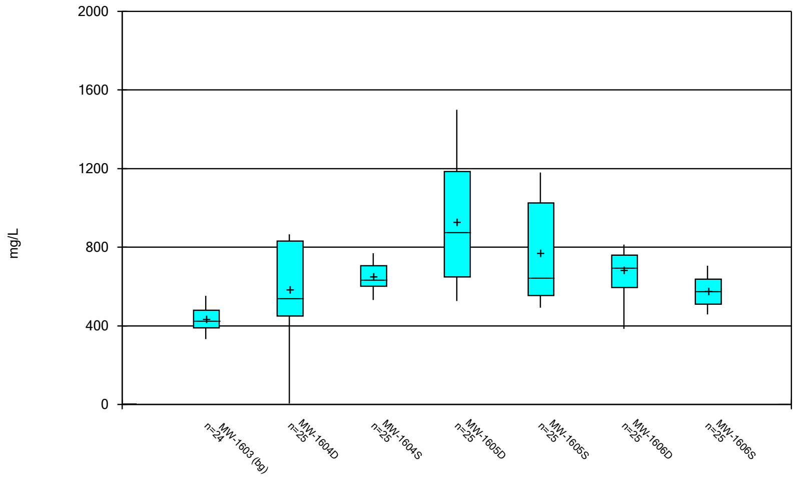
Box & Whiskers Plot



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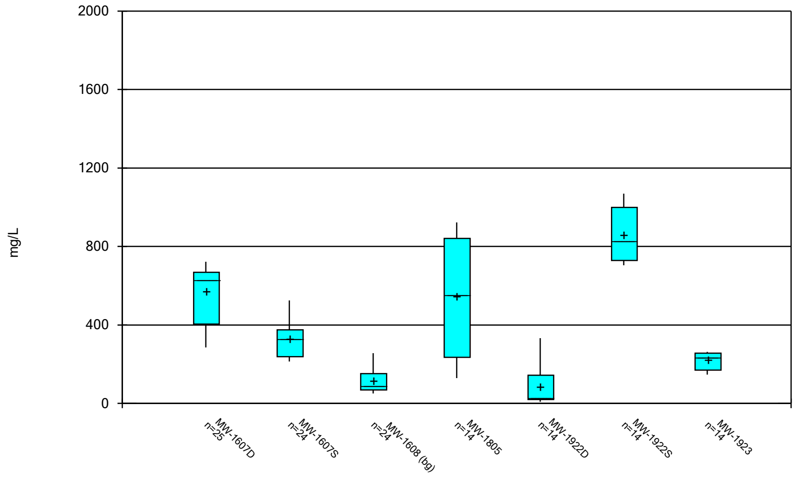
Sanitas™ v.10.0.15 Software licensed to . UG

Box & Whiskers Plot



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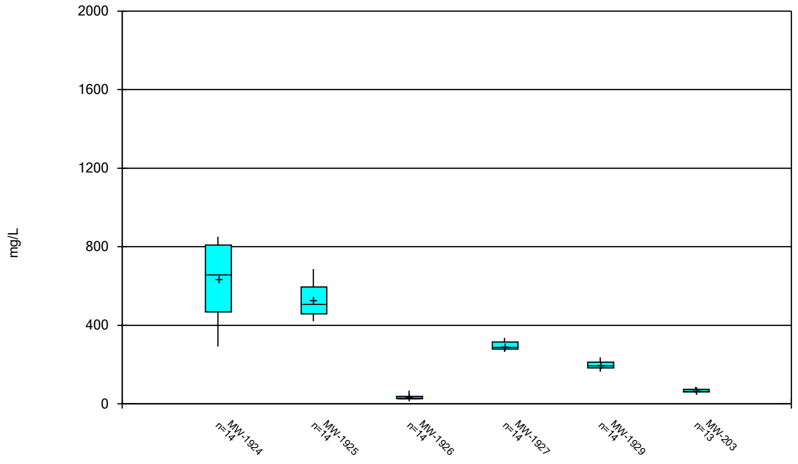
Box & Whiskers Plot



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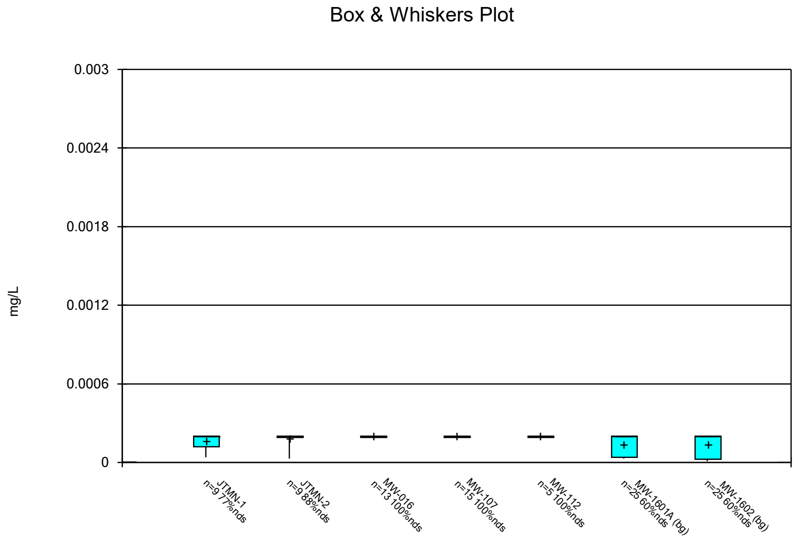

Constituent: Thallium, total   Analysis Run 2/6/2024 4:39 PM

Mountaineer BAP   Data: Mountaineer BAP

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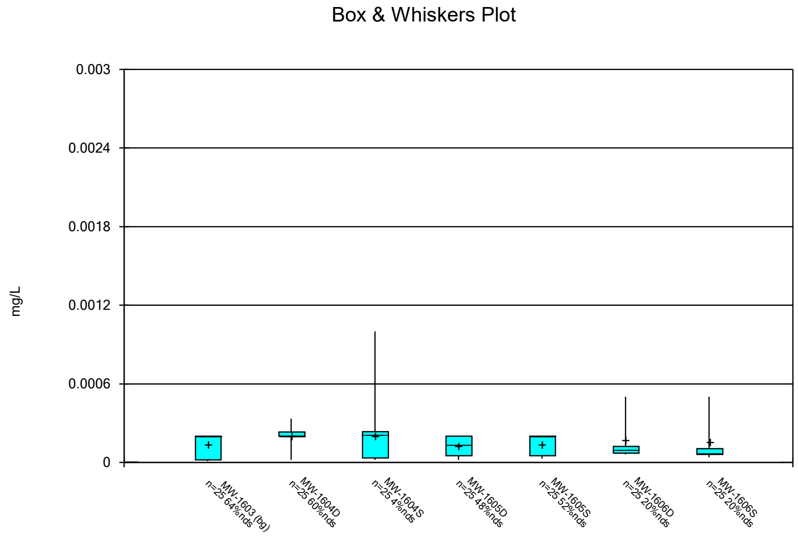

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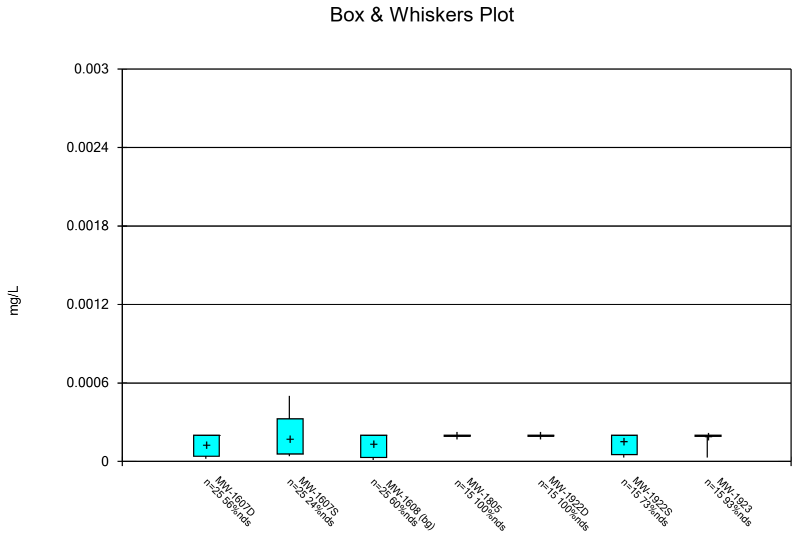

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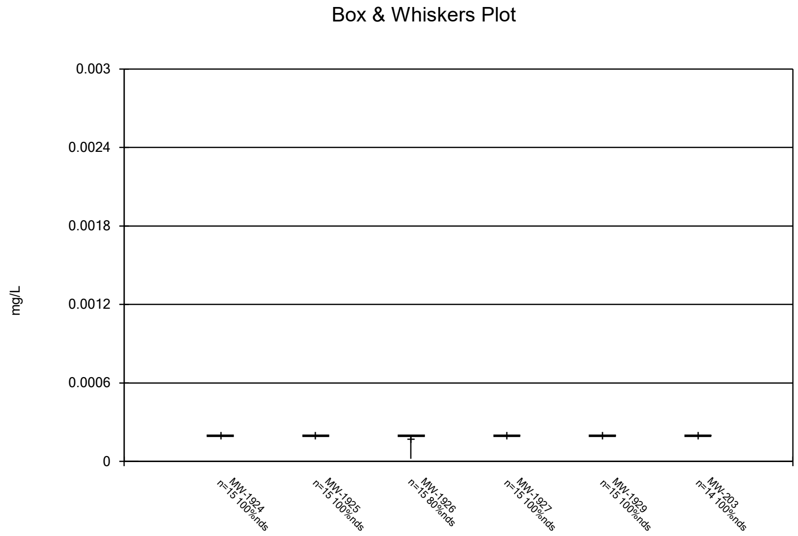
Sanitas™ v.10.0.15 Software licensed to . UG



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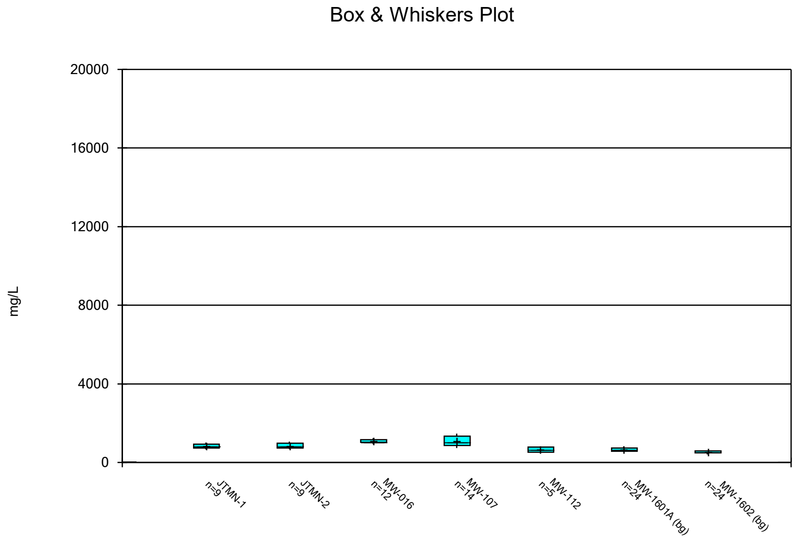
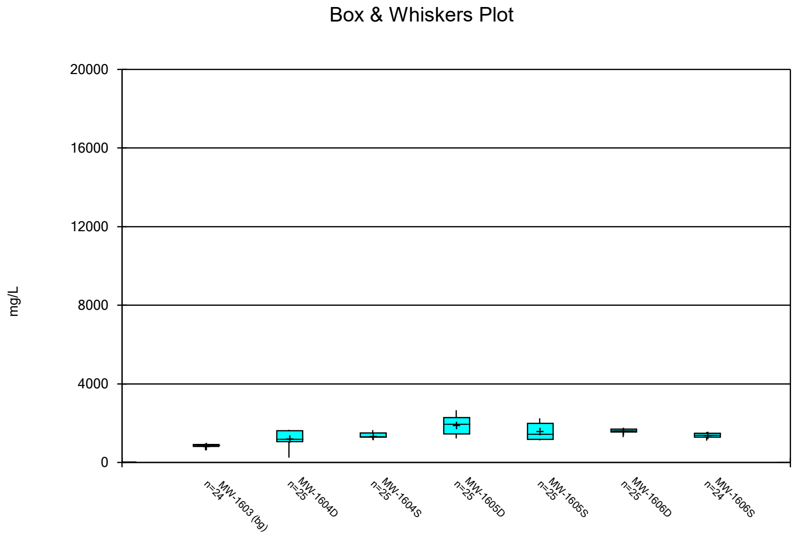
Sanitas™ v.10.0.15 Software licensed to . UG


Box & Whiskers Plot

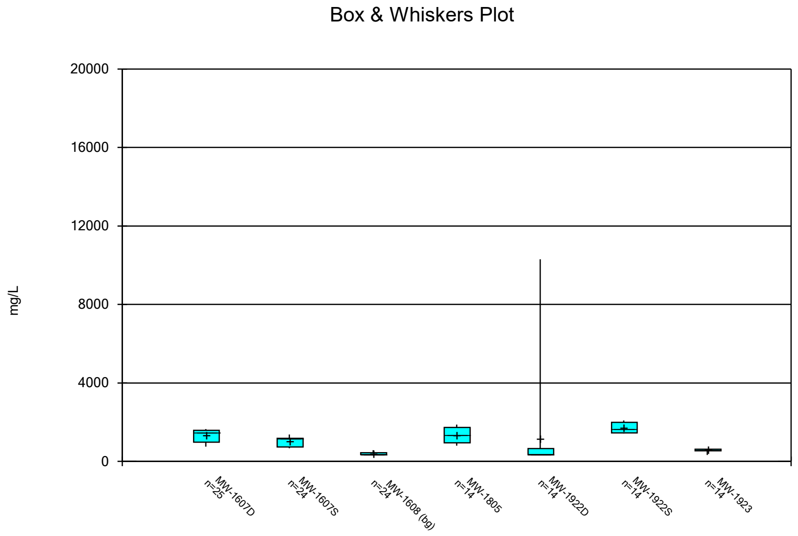
Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:39 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG


Box & Whiskers Plot

Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:39 PM
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG


Box & Whiskers Plot

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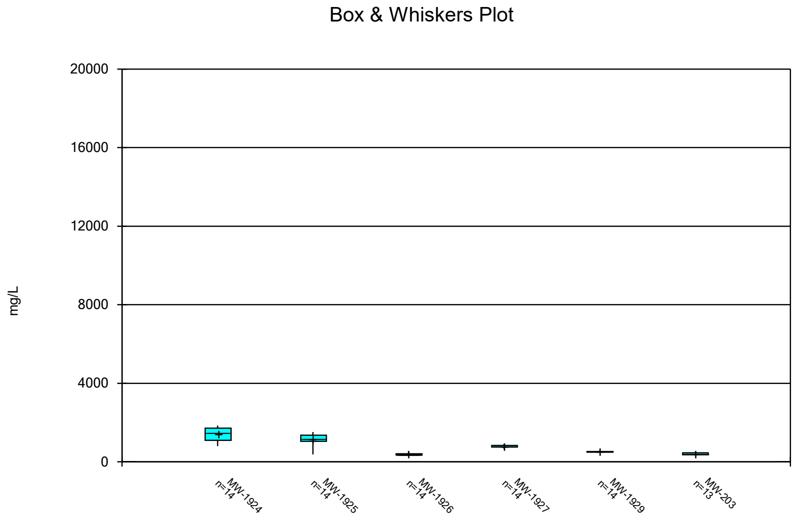
Sanitas™ v.10.0.15 Software licensed to . UG


Box & Whiskers Plot

Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:39 PM
Mountaineer BAP Data: Mountaineer BAP

FIGURE C

Outlier Summary and Tukey's Outlier Test

Outlier Summary

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/6/2024, 4:44 PM

	MW-1607S Antimony, total (mg/L)	MW-1607S Arsenic, total (mg/L)	MW-1607S Barium, total (mg/L)	MW-1601A Boron, total (mg/L)	MW-1603 Boron, total (mg/L)	MW-1607S Cadmium, total (mg/L)	MW-1601A Chromium, total (mg/L)	MW-1602 Chromium, total (mg/L)	MW-1603 Chromium, total (mg/L)	MW-1604S Chromium, total (mg/L)
9/26/2016										
9/27/2016										
11/1/2016							0.0013 (o)			
12/19/2016								0.00165 (o)	0.00237 (o)	
12/20/2016										0.00197 (o)
12/21/2016	0.00084 (o)	0.0112 (o)	0.114 (o)			0.00022 (o)				
3/27/2017				0.515 (o)						
3/28/2017					0.781 (o)					
5/16/2017										
10/25/2023										

	MW-1605D Chromium, total (mg/L)	MW-1605S Chromium, total (mg/L)	MW-1607D Chromium, total (mg/L)	MW-1607S Chromium, total (mg/L)	MW-1608 Chromium, total (mg/L)	MW-1607S Cobalt, total (mg/L)	MW-1601A Combined Radium 226 + 228 (pCi/L)	MW-1604S Combined Radium 226 + 228 (pCi/L)	MW-1606D Combined Radium 226 + 228 (pCi/L)	MW-1607S Lead, total (mg/L)
9/26/2016								0.136 (o)		
9/27/2016									8.459 (o)	
11/1/2016										
12/19/2016					0.00278 (o)					
12/20/2016	0.00229 (o)	0.00285 (o)	0.00207 (o)							
12/21/2016				0.0031 (o)		0.0201 (o)				0.011 (o)
3/27/2017										
3/28/2017										
5/16/2017										
10/25/2023							10.52 (o)			

	MW-1607D pH, field (SU)	MW-1607S pH, field (SU)	MW-1606S Total Dissolved Solids [TDS] (mg/L)
9/26/2016			
9/27/2016			
11/1/2016			
12/19/2016			
12/20/2016			
12/21/2016			
3/27/2017			
3/28/2017			
5/16/2017	8.41 (o)	8.23 (o)	3230 (o)
10/25/2023			

Tukey's Outlier Test - Upgradient Wells - Significant Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 2/2/2024, 12:28 PM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Arsenic, total (mg/L)	**MW-1601A,MW-1602,...**	**Yes**	**0.00079,0.00082,0.00068**	**NP**	**NaN**	**100**	**0.000428**	**0.0001312**	**x^6**	**ChiSquared**
Barium, total (mg/L)	**MW-1601A,MW-1602,...**	**Yes**	**0.0569,0.0639,0.0553,0.0631,0.0653,0.0649,0.0678,**	**NP**	**NaN**	**100**	**0.03706**	**0.01331**	**x^6**	**ChiSquared**
Combined Radium 226 + 228 (pCi/L)	**MW-1601A,MW-1602,...**	**Yes**	**2.011,1.544,1.685,1.67,1.52,10.52,2.086,1.912,1.5**	**NP**	**NaN**	**100**	**0.9649**	**1.177**	**x^6**	**ChiSquared**
Fluoride, total (mg/L)	**MW-1601A,MW-1602,...**	**Yes**	**0.29,0.29,0.3**	**NP**	**NaN**	**104**	**0.1745**	**0.06887**	**x^6**	**ChiSquared**
Lithium, total (mg/L)	**MW-1601A,MW-1602,...**	**Yes**	**0.02,0.02,0.021,0.021,0.021,0.022,0.022,0.03**	**NP**	**NaN**	**100**	**0.01006**	**0.006794**	**x^5**	**ChiSquared**

Tukey's Outlier Test - Upgradient Wells - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 2/2/2024, 12:28 PM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	NP	NaN	100	0.00004128	0.00005258	unknown	ChiSquared
Arsenic, total (mg/L)	**MW-1601A,MW-1602,...**	**Yes**	**0.00079,0.00082,0.00068**	**NP**	**NaN**	**100**	**0.000428**	**0.0001312**	**x^6**	**ChiSquared**
Barium, total (mg/L)	**MW-1601A,MW-1602,...**	**Yes**	**0.0569,0.0639,0.0553,0.0631,0.0653,0.0649,0.0678,**	**NP**	**NaN**	**100**	**0.03706**	**0.01331**	**x^6**	**ChiSquared**
Beryllium, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	NP	NaN	92	0.00004734	0.00001022	unknown	ShapiroFrancia
Boron, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	NP	NaN	96	0.1967	0.1313	ln(x)	ShapiroFrancia
Cadmium, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	NP	NaN	100	0.00001451	0.000007045	unknown	ChiSquared
Calcium, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	NP	NaN	96	123.6	38.91	ln(x)	ShapiroFrancia
Chloride, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	NP	NaN	96	15.36	13.86	ln(x)	ShapiroFrancia
Chromium, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	NP	NaN	100	0.0004143	0.0003908	unknown	ChiSquared
Cobalt, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	NP	NaN	100	0.0001232	0.0001745	unknown	ChiSquared
Combined Radium 226 + 228 (pCi/L)	**MW-1601A,MW-1602,...**	**Yes**	**2.011,1.544,1.685,1.67,1.52,10.52,2.086,1.912,1.5**	**NP**	**NaN**	**100**	**0.9649**	**1.177**	**x^6**	**ChiSquared**
Fluoride, total (mg/L)	**MW-1601A,MW-1602,...**	**Yes**	**0.29,0.29,0.3**	**NP**	**NaN**	**104**	**0.1745**	**0.06887**	**x^6**	**ChiSquared**
Lead, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	NP	NaN	100	0.000166	0.0001246	unknown	ChiSquared
Lithium, total (mg/L)	**MW-1601A,MW-1602,...**	**Yes**	**0.02,0.02,0.021,0.021,0.021,0.022,0.022,0.03**	**NP**	**NaN**	**100**	**0.01006**	**0.006794**	**x^5**	**ChiSquared**
Mercury, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	NP	NaN	96	0.000004896	5.1e-7	unknown	ShapiroFrancia
Molybdenum, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	NP	NaN	100	0.0009866	0.000733	unknown	ChiSquared
Selenium, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	NP	NaN	100	0.0007525	0.0007358	unknown	ChiSquared
Sulfate, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	NP	NaN	96	244.1	127.8	x^(1/3)	ShapiroFrancia
Thallium, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	NP	NaN	100	0.0001355	0.0000825	x^3	ChiSquared
Total Dissolved Solids [TDS] (mg/L)	MW-1601A,MW-1602,...	No	n/a	NP	NaN	96	608.3	184	x^(1/3)	ShapiroFrancia

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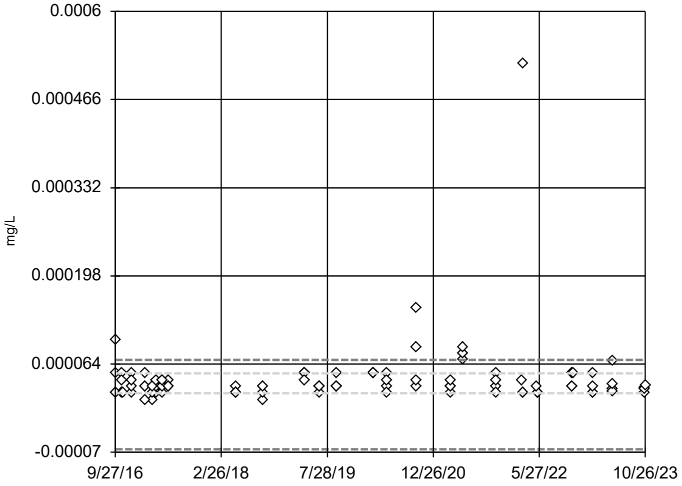
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

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

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

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

Constituent: Antimony, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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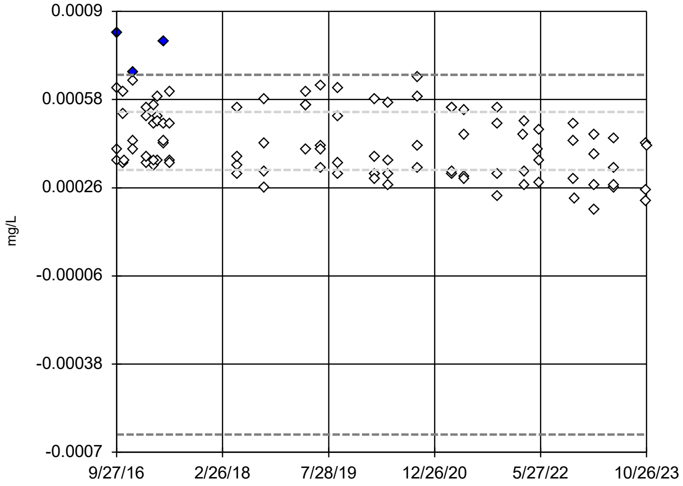
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

Outliers are drawn as solid.
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.0006699, low cutoff = -0.0006352, based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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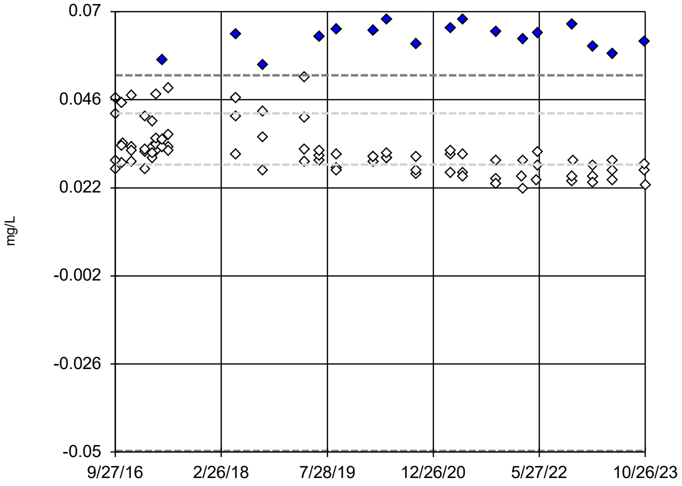
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

Outliers are drawn as solid.
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.05268, low cutoff = -0.04973, based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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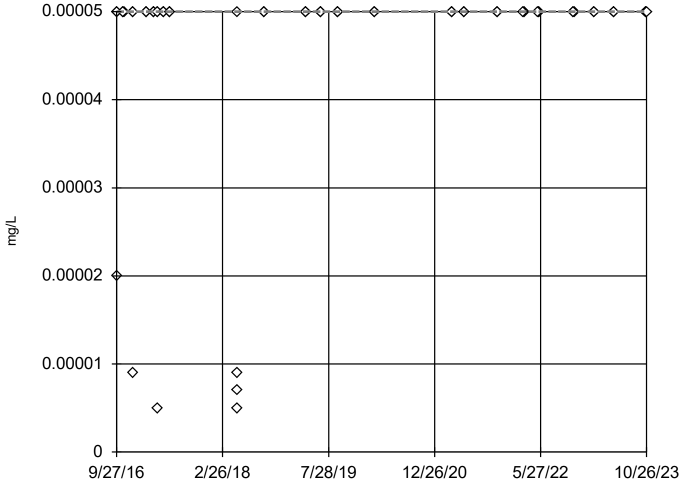
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 92

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, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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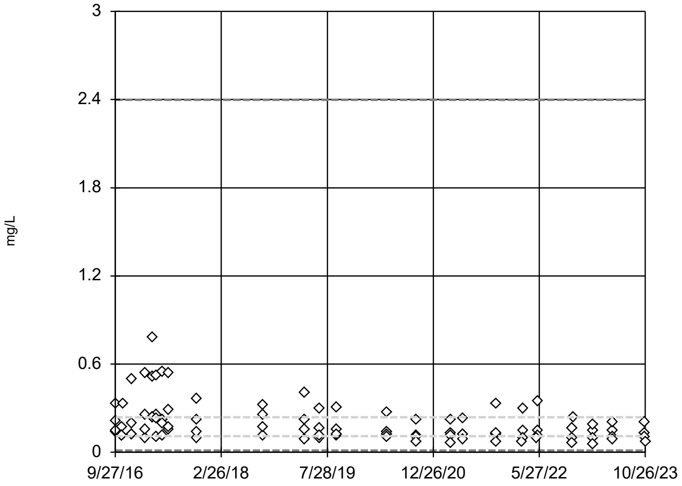
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 96

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 = 2.398, low cutoff = 0.01099, based on IQR multiplier of 3.

Constituent: Boron, total   Analysis Run 2/2/2024 12:27 PM   View: Outlier Tests
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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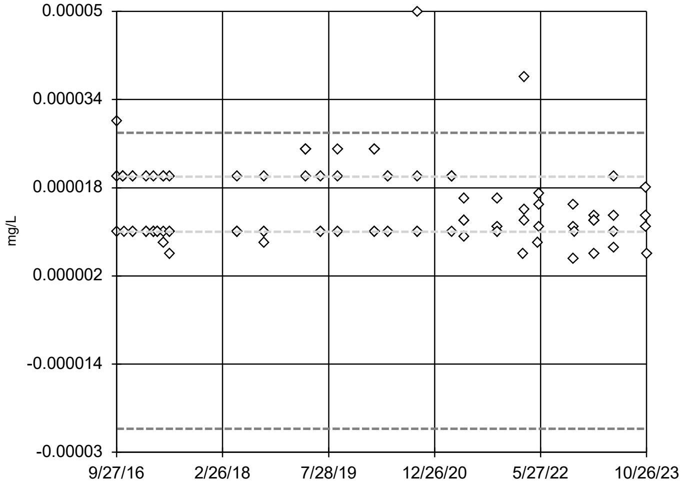
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

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

Data were x^4 transformed to achieve best W statistic (graph shown in original units).

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

Constituent: Cadmium, total   Analysis Run 2/2/2024 12:27 PM   View: Outlier Tests
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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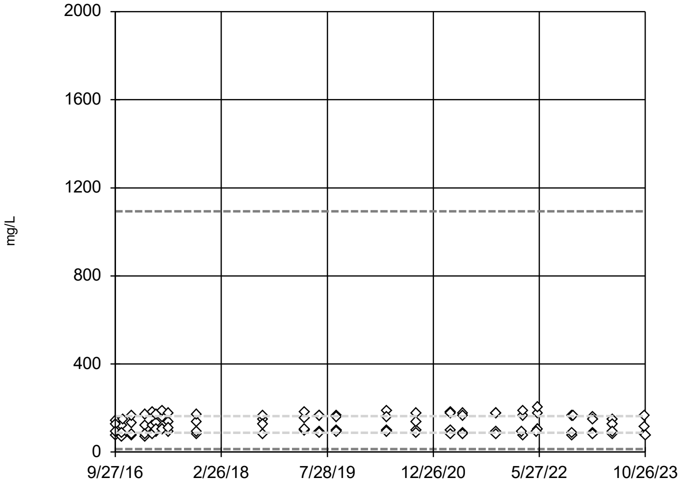
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 96

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 = 1093, low cutoff = 13.08, based on IQR multiplier of 3.

Constituent: Calcium, total   Analysis Run 2/2/2024 12:27 PM   View: Outlier Tests
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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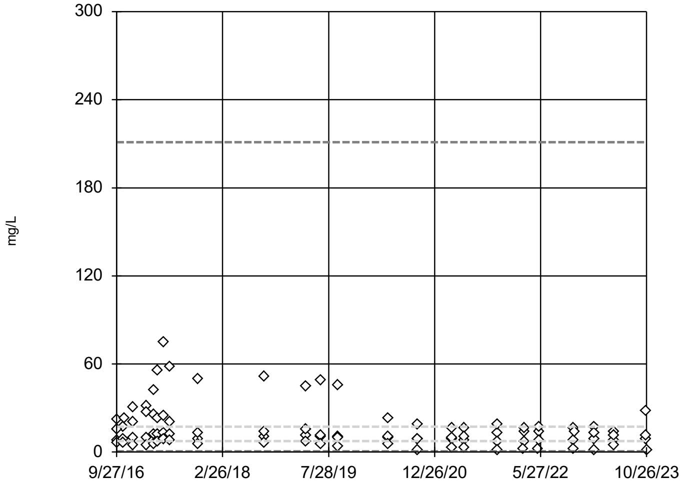
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 96

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

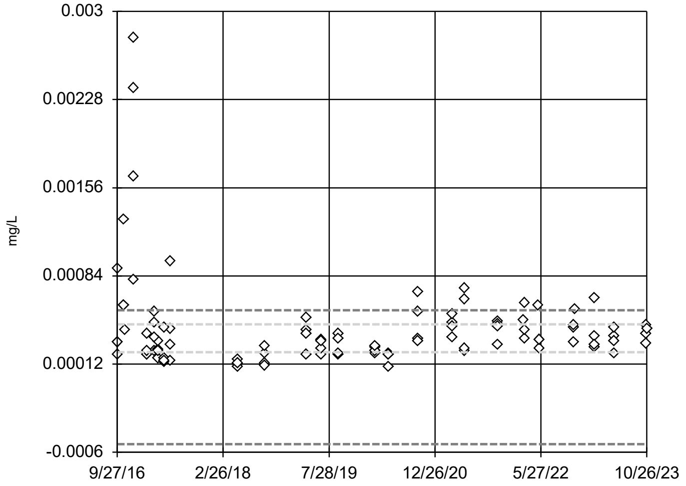
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 211.1, low cutoff = 0.616, based on IQR multiplier of 3.

Constituent: Chloride, total   Analysis Run 2/2/2024 12:27 PM   View: Outlier Tests
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

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

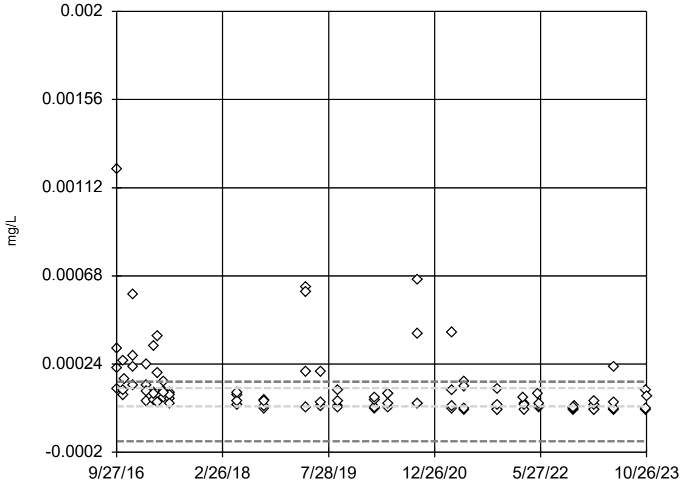
Data were x^6 transformed to achieve best W statistic (graph shown in original units).

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

Constituent: Chromium, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

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

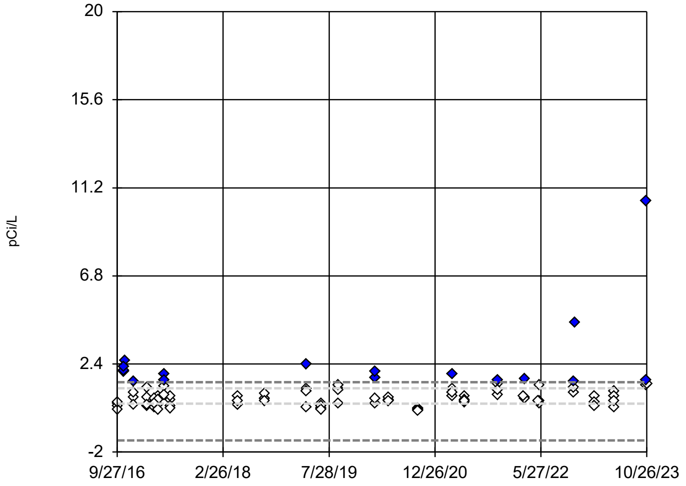
Data were x^6 transformed to achieve best W statistic (graph shown in original units).

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

Constituent: Cobalt, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

Outliers are drawn as solid.
Tukey's method selected by user.

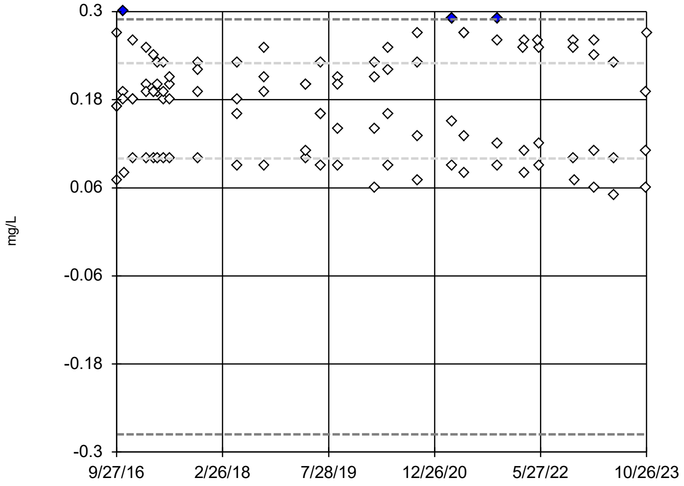
Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.487, low cutoff = -1.417, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 2/2/2024 12:27 PM View: Outlier Tests
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 104

Outliers are drawn as solid.
Tukey's method selected by user.

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.2895, low cutoff = -0.2758, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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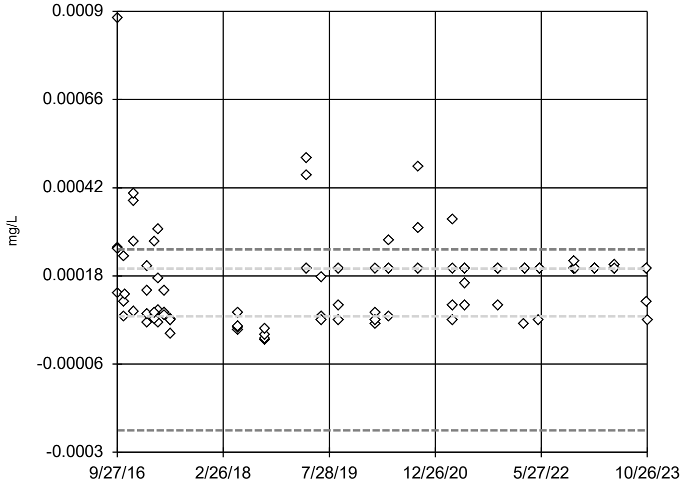
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

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

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

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

Constituent: Lead, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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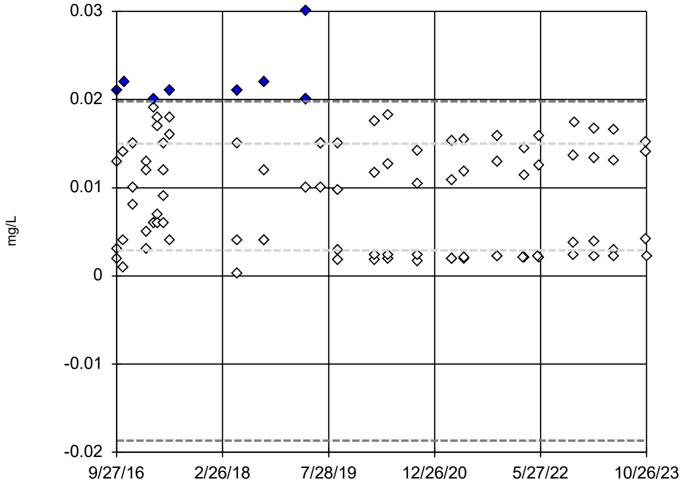
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

Outliers are drawn as solid.
Tukey's method selected by user.

Data were x^5 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.01979, low cutoff = -0.01868, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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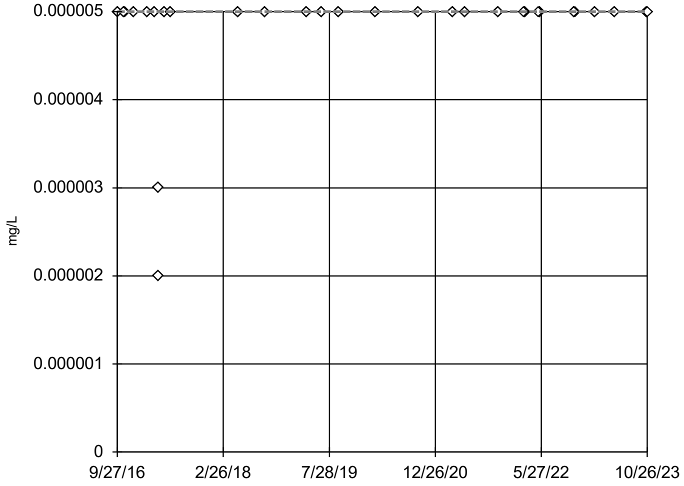
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 96

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

Data were square 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, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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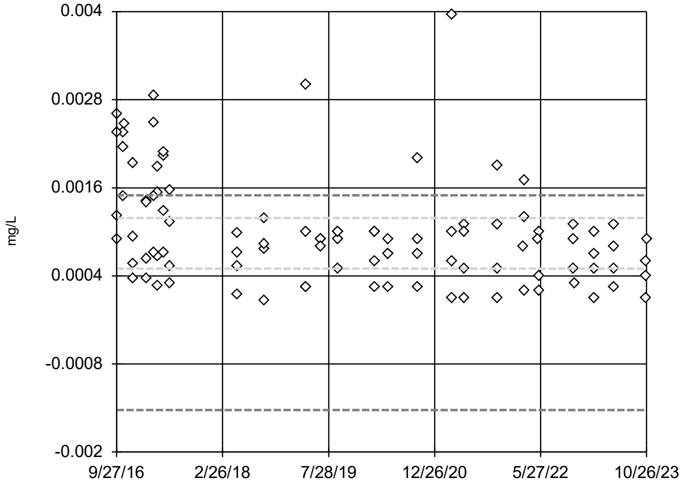
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

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

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

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

Constituent: Molybdenum, total Analysis Run 2/2/2024 12:27 PM View: Outlier Tests

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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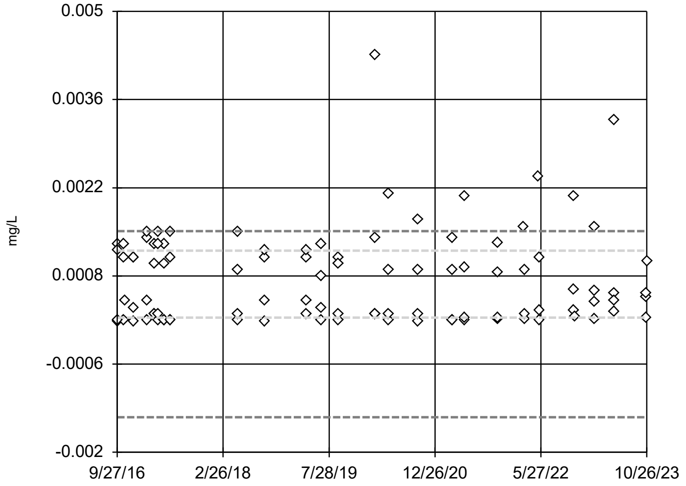
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

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

Data were x^6 transformed to achieve best W statistic (graph shown in original units).

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

Constituent: Selenium, total   Analysis Run 2/2/2024 12:27 PM   View: Outlier Tests
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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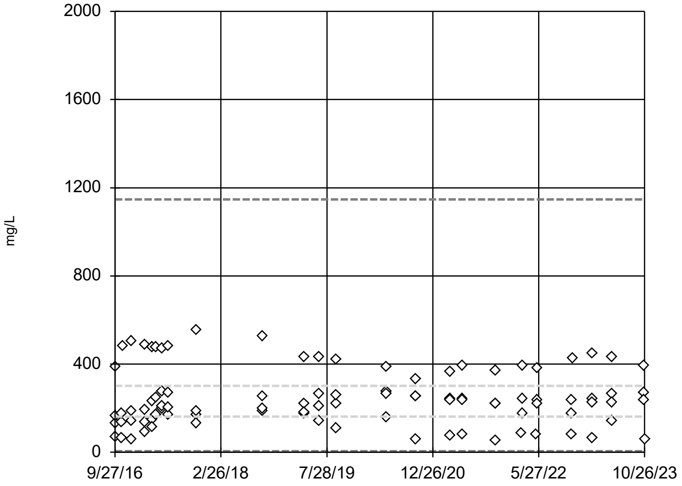
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 96

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 = 1148, low cutoff = 4.886, based on IQR multiplier of 3.

Constituent: Sulfate, total   Analysis Run 2/2/2024 12:27 PM   View: Outlier Tests
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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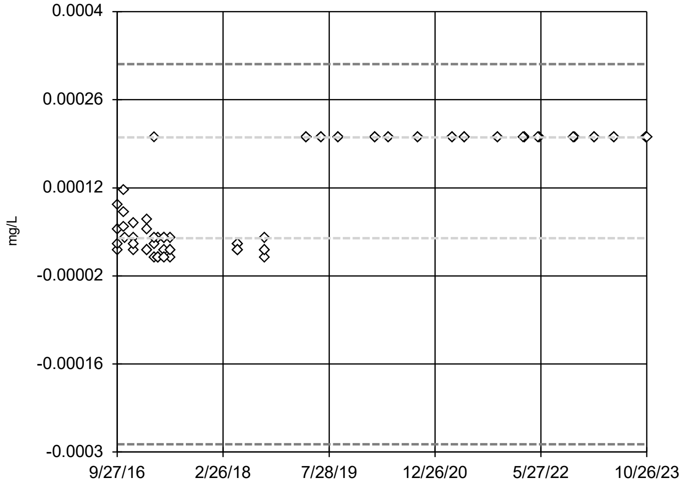
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 100

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 = 0.0003168, low cutoff = -0.0002874, based on IQR multiplier of 3.

Constituent: Thallium, total   Analysis Run 2/2/2024 12:27 PM   View: Outlier Tests
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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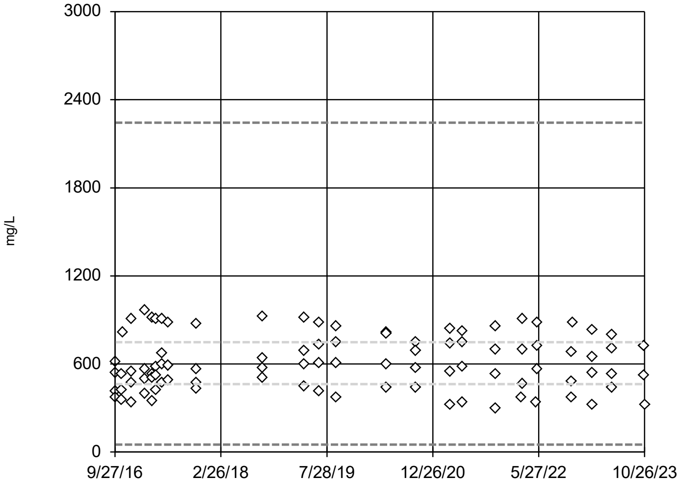
Tukey's Outlier Screening, Pooled Background

MW-1601A,MW-1602,MW-1603,MW-1608



n = 96

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 = 2245, low cutoff = 51.82, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS]   Analysis Run 2/2/2024 12:27 PM   View: Outlier Tests
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

FIGURE D

Intrawell PLs

Intrawell Prediction Limits - All Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 2/2/2024, 12:32 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
pH, field (SU)	MW-1601A	7.647	6.463	n/a	1 future	n/a	22	7.055	0.2718	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1602	7.298	6.157	n/a	1 future	n/a	22	6.727	0.2621	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1603	7.425	6.072	n/a	1 future	n/a	22	6.748	0.3108	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1604D	7.763	6.458	n/a	1 future	n/a	23	7.11	0.3018	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1604S	7.653	6.64	n/a	1 future	n/a	23	7.147	0.2342	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1605D	7.823	6.818	n/a	1 future	n/a	22	7.32	0.2308	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1605S	7.744	6.752	n/a	1 future	n/a	23	7.248	0.2295	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1606D	7.8	6.79	n/a	1 future	n/a	23	7.295	0.2336	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1606S	7.764	6.343	n/a	1 future	n/a	23	7.053	0.3287	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1607D	8.004	6.993	n/a	1 future	n/a	22	7.499	0.2322	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1607S	7.864	6.849	n/a	1 future	n/a	22	7.356	0.2331	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1608	7.661	6.297	n/a	1 future	n/a	22	6.979	0.3133	0	None	No	0.0004701	Param Intra 1 of 2

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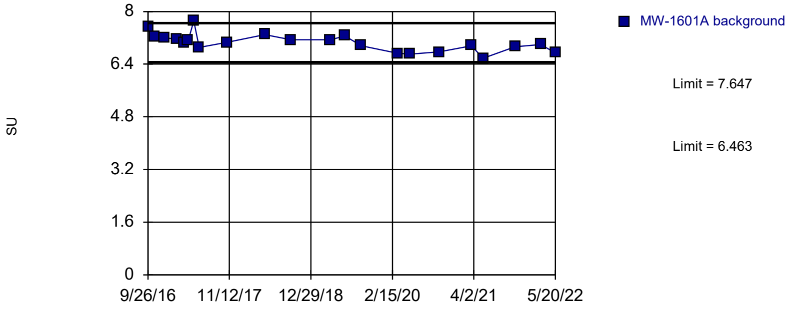
Prediction Limit

Intrawell Parametric, MW-1601A (bg)



Background Data Summary: Mean=7.055, Std. Dev.=0.2718, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9655, critical = 0.878. Kappa = 2.177 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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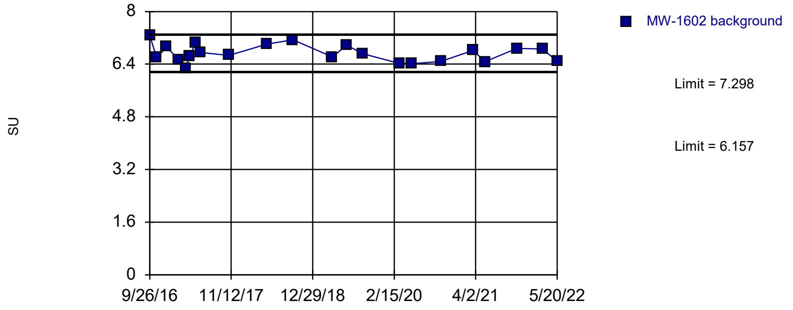
Prediction Limit

Intrawell Parametric, MW-1602 (bg)



Background Data Summary: Mean=6.727, Std. Dev.=0.2621, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9756, critical = 0.878. Kappa = 2.177 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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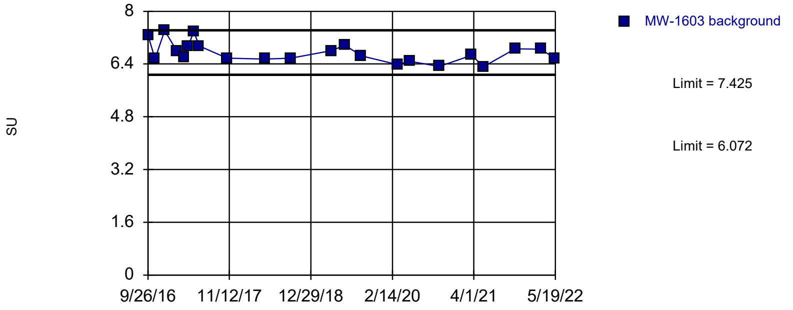
Prediction Limit

Intrawell Parametric, MW-1603 (bg)



Background Data Summary: Mean=6.748, Std. Dev.=0.3108, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9217, critical = 0.878. Kappa = 2.177 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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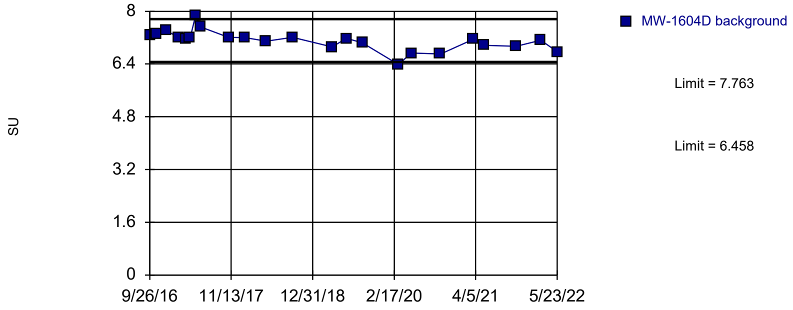
Prediction Limit

Intrawell Parametric, MW-1604D



Background Data Summary: Mean=7.11, Std. Dev.=0.3018, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9513, critical = 0.881. Kappa = 2.161 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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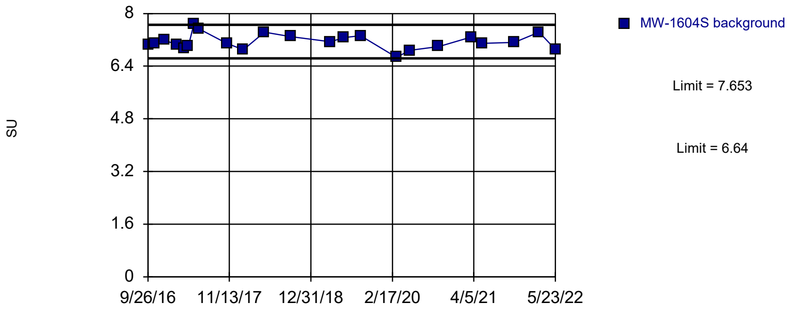
Prediction Limit

Intrawell Parametric, MW-1604S



Background Data Summary: Mean=7.147, Std. Dev.=0.2342, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9799, critical = 0.881. Kappa = 2.161 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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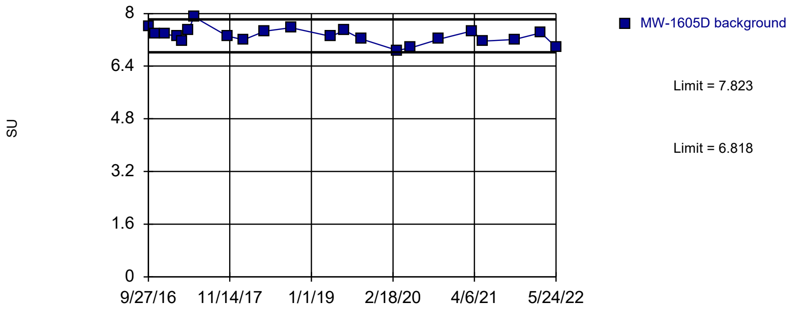
Prediction Limit

Intrawell Parametric, MW-1605D



Background Data Summary: Mean=7.32, Std. Dev.=0.2308, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9705, critical = 0.878. Kappa = 2.177 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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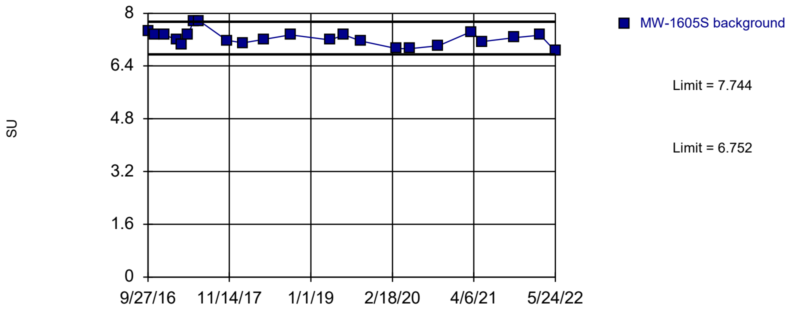
Prediction Limit

Intrawell Parametric, MW-1605S



Background Data Summary: Mean=7.248, Std. Dev.=0.2295, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.95, critical = 0.881. Kappa = 2.161 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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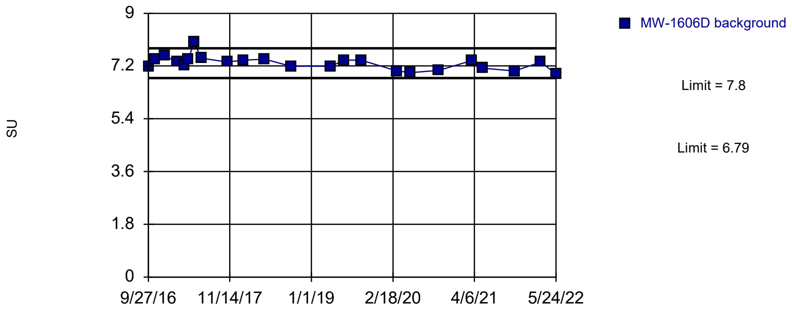
Prediction Limit

Intrawell Parametric, MW-1606D

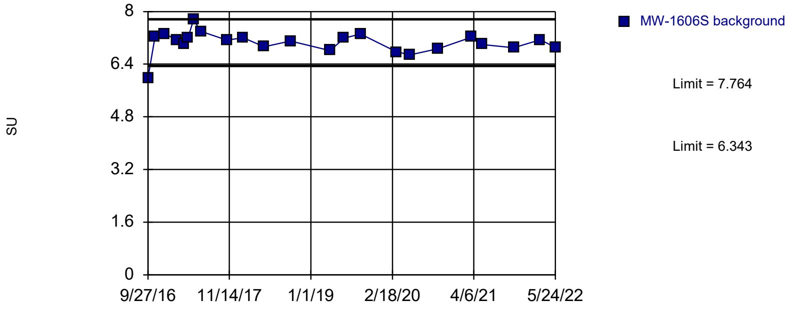


Background Data Summary: Mean=7.295, Std. Dev.=0.2336, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9113, critical = 0.881. Kappa = 2.161 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Prediction Limit

Intrawell Parametric, MW-1606S

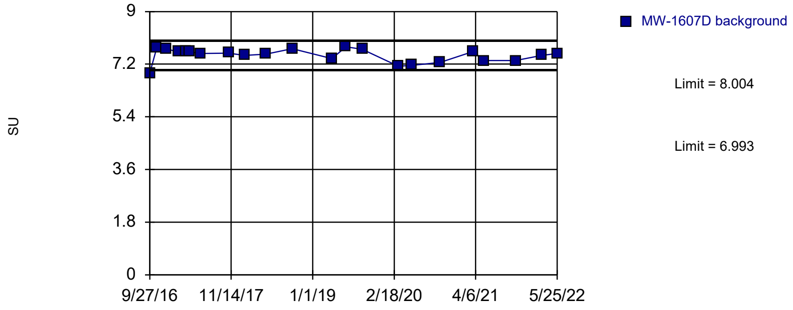


Background Data Summary: Mean=7.053, Std. Dev.=0.3287, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8956, critical = 0.881. Kappa = 2.161 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Prediction Limit

Intrawell Parametric, MW-1607D

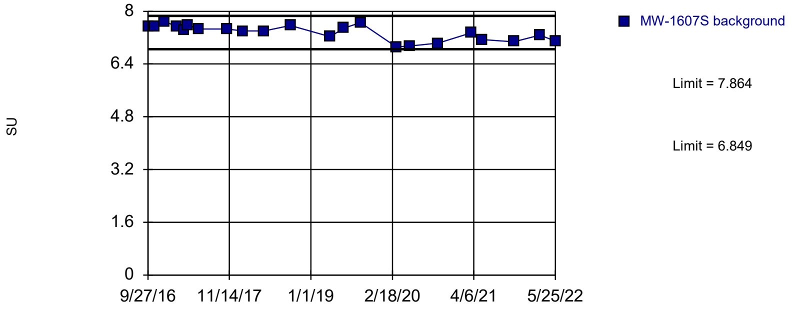


Background Data Summary: Mean=7.499, Std. Dev.=0.2322, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9134, critical = 0.878. Kappa = 2.177 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Prediction Limit

Intrawell Parametric, MW-1607S

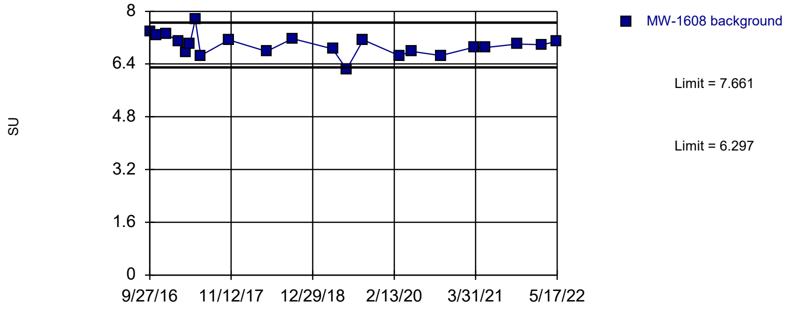


Background Data Summary: Mean=7.356, Std. Dev.=0.2331, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9323, critical = 0.878. Kappa = 2.177 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Prediction Limit

Intrawell Parametric, MW-1608 (bg)



Background Data Summary: Mean=6.979, Std. Dev.=0.3133, n=22. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9731, critical = 0.878. Kappa = 2.177 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 2/2/2024 12:29 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

FIGURE E

Upgradient Trend Tests

Trend Tests - Upgradient Wells - Significant Results

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/6/2024, 4:47 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Boron, total (mg/L)	**MW-1601A (bg)**	**-0.01501**	**-119**	**-98**	**Yes**	**23**	**0**	**n/a**	**0.01**	**NP**
Boron, total (mg/L)	**MW-1603 (bg)**	**-0.03422**	**-139**	**-98**	**Yes**	**23**	**0**	**n/a**	**0.01**	**NP**
Boron, total (mg/L)	**MW-1608 (bg)**	**-0.0155**	**-155**	**-105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Calcium, total (mg/L)	**MW-1601A (bg)**	**6.395**	**132**	**105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Chloride, total (mg/L)	**MW-1603 (bg)**	**-1.758**	**-119**	**-105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Chloride, total (mg/L)	**MW-1608 (bg)**	**-0.6859**	**-151**	**-105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**MW-1601A (bg)**	**-0.01306**	**-218**	**-118**	**Yes**	**26**	**0**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**MW-1602 (bg)**	**0.01134**	**176**	**118**	**Yes**	**26**	**0**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**MW-1603 (bg)**	**-0.003832**	**-145**	**-118**	**Yes**	**26**	**0**	**n/a**	**0.01**	**NP**
Sulfate, total (mg/L)	**MW-1601A (bg)**	**17.93**	**201**	**105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Total Dissolved Solids [TDS] (mg/L)	**MW-1601A (bg)**	**26.21**	**134**	**105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**

Trend Tests - Upgradient Wells - All Results

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/6/2024, 4:47 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Boron, total (mg/L)	**MW-1601A (bg)**	**-0.01501**	**-119**	**-98**	**Yes**	**23**	**0**	**n/a**	**0.01**	**NP**
Boron, total (mg/L)	MW-1602 (bg)	-0.001599	-56	-105	No	24	0	n/a	0.01	NP
Boron, total (mg/L)	**MW-1603 (bg)**	**-0.03422**	**-139**	**-98**	**Yes**	**23**	**0**	**n/a**	**0.01**	**NP**
Boron, total (mg/L)	**MW-1608 (bg)**	**-0.0155**	**-155**	**-105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Calcium, total (mg/L)	**MW-1601A (bg)**	**6.395**	**132**	**105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Calcium, total (mg/L)	MW-1602 (bg)	0.977	38	105	No	24	0	n/a	0.01	NP
Calcium, total (mg/L)	MW-1603 (bg)	-1.046	-19	-105	No	24	0	n/a	0.01	NP
Calcium, total (mg/L)	MW-1608 (bg)	-1.498	-73	-105	No	24	0	n/a	0.01	NP
Chloride, total (mg/L)	MW-1601A (bg)	-3.234	-104	-105	No	24	0	n/a	0.01	NP
Chloride, total (mg/L)	MW-1602 (bg)	-0.4103	-102	-105	No	24	0	n/a	0.01	NP
Chloride, total (mg/L)	**MW-1603 (bg)**	**-1.758**	**-119**	**-105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Chloride, total (mg/L)	**MW-1608 (bg)**	**-0.6859**	**-151**	**-105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**MW-1601A (bg)**	**-0.01306**	**-218**	**-118**	**Yes**	**26**	**0**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**MW-1602 (bg)**	**0.01134**	**176**	**118**	**Yes**	**26**	**0**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**MW-1603 (bg)**	**-0.003832**	**-145**	**-118**	**Yes**	**26**	**0**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	MW-1608 (bg)	0	14	118	No	26	0	n/a	0.01	NP
Sulfate, total (mg/L)	**MW-1601A (bg)**	**17.93**	**201**	**105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Sulfate, total (mg/L)	MW-1602 (bg)	1.779	20	105	No	24	0	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1603 (bg)	-16.25	-102	-105	No	24	0	n/a	0.01	NP
Sulfate, total (mg/L)	MW-1608 (bg)	-5.289	-44	-105	No	24	0	n/a	0.01	NP
Total Dissolved Solids [TDS] (mg/L)	**MW-1601A (bg)**	**26.21**	**134**	**105**	**Yes**	**24**	**0**	**n/a**	**0.01**	**NP**
Total Dissolved Solids [TDS] (mg/L)	MW-1602 (bg)	6.392	39	105	No	24	0	n/a	0.01	NP
Total Dissolved Solids [TDS] (mg/L)	MW-1603 (bg)	-11.07	-72	-105	No	24	0	n/a	0.01	NP
Total Dissolved Solids [TDS] (mg/L)	MW-1608 (bg)	-6.09	-48	-105	No	24	0	n/a	0.01	NP

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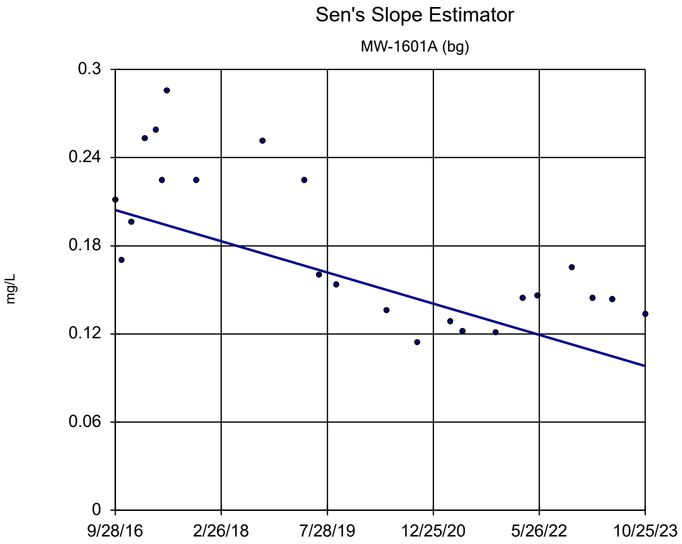


n = 23

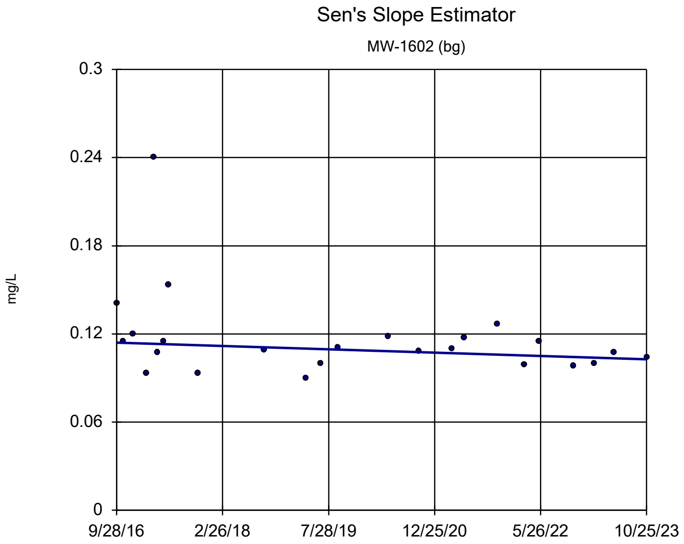
Slope = -0.01501
units per year.

Mann-Kendall
statistic = -119
critical = -98

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

Constituent: Boron, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG



n = 24

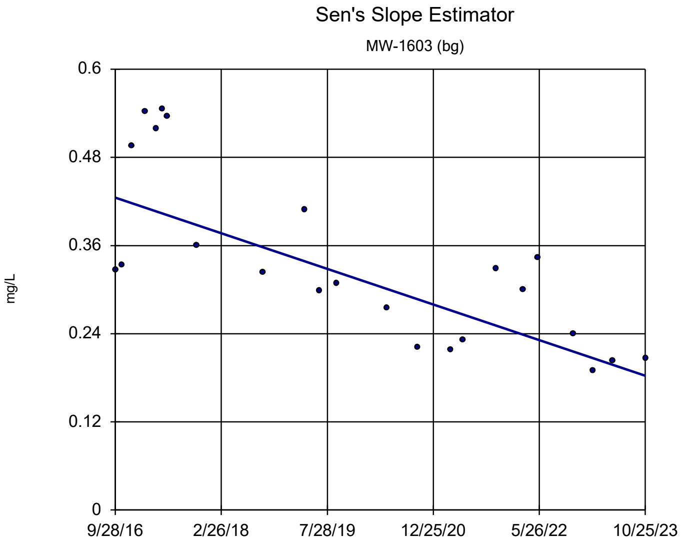
Slope = -0.001599
units per year.

Mann-Kendall
statistic = -56
critical = -105

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Boron, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG



n = 23

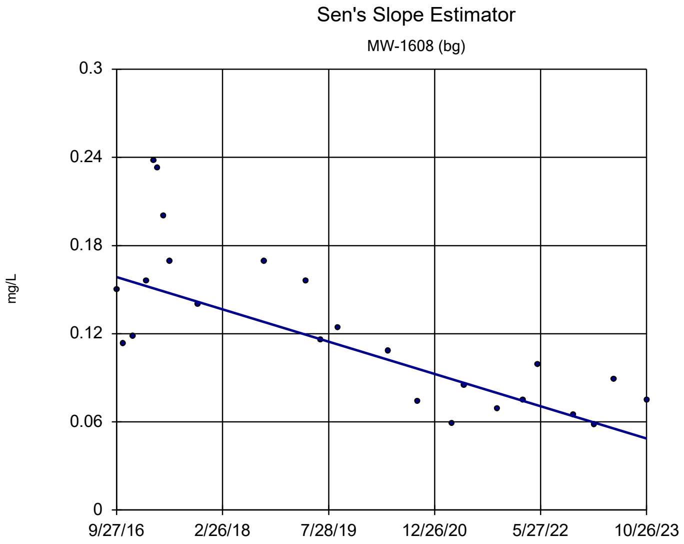
Slope = -0.03422
units per year.

Mann-Kendall
statistic = -139
critical = -98

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

Constituent: Boron, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG



n = 24

Slope = -0.0155
units per year.

Mann-Kendall
statistic = -155
critical = -105

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

Constituent: Boron, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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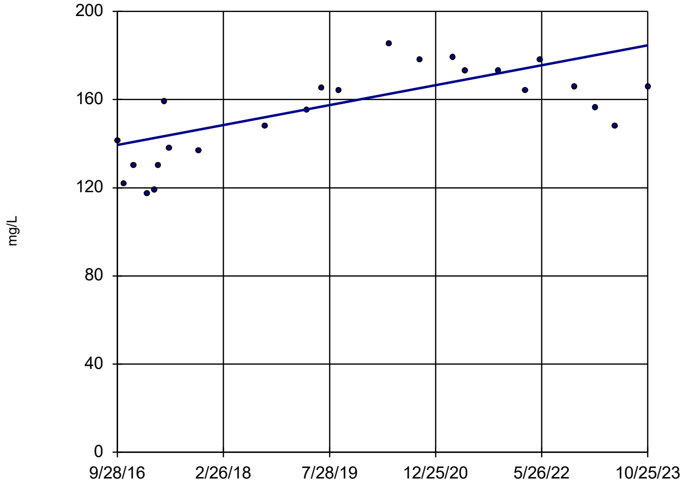
Sen's Slope Estimator

MW-1601A (bg)



n = 24

Slope = 6.395 units per year.

Mann-Kendall statistic = 132 critical = 105

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

Constituent: Calcium, total Analysis Run 2/6/2024 4:45 PM View: Interwell

Mountaineer BAP Data: Mountaineer BAP

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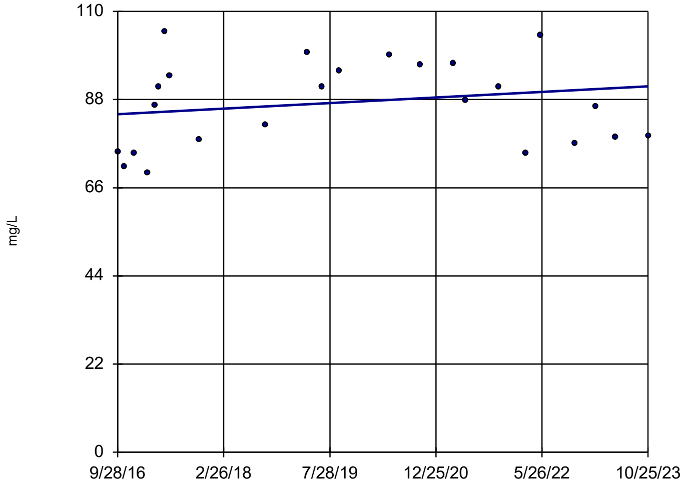
Sen's Slope Estimator

MW-1602 (bg)



n = 24

Slope = 0.977 units per year.

Mann-Kendall statistic = 38 critical = 105

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

Constituent: Calcium, total Analysis Run 2/6/2024 4:45 PM View: Interwell

Mountaineer BAP Data: Mountaineer BAP

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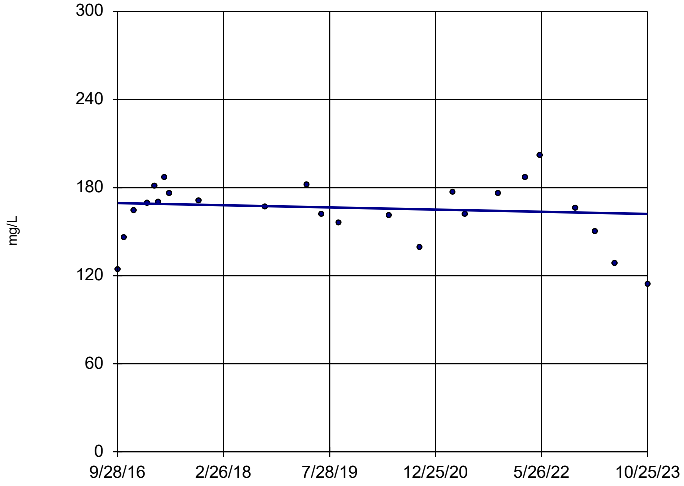
Sen's Slope Estimator

MW-1603 (bg)



n = 24

Slope = -1.046 units per year.

Mann-Kendall statistic = -19 critical = -105

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

Constituent: Calcium, total Analysis Run 2/6/2024 4:45 PM View: Interwell

Mountaineer BAP Data: Mountaineer BAP

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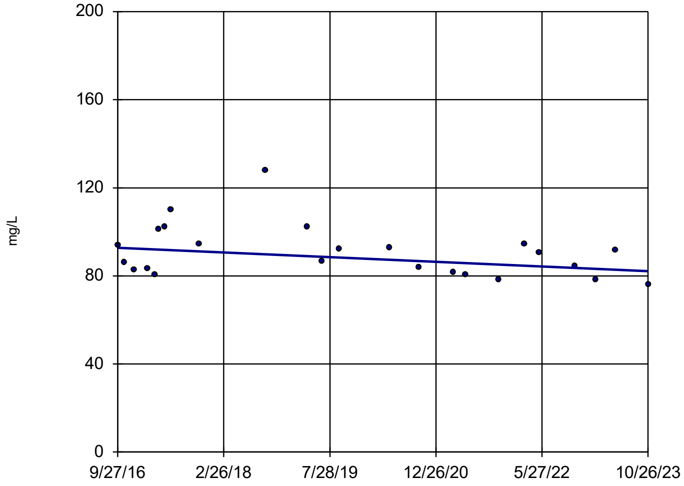
Sen's Slope Estimator

MW-1608 (bg)



n = 24

Slope = -1.498 units per year.

Mann-Kendall statistic = -73 critical = -105

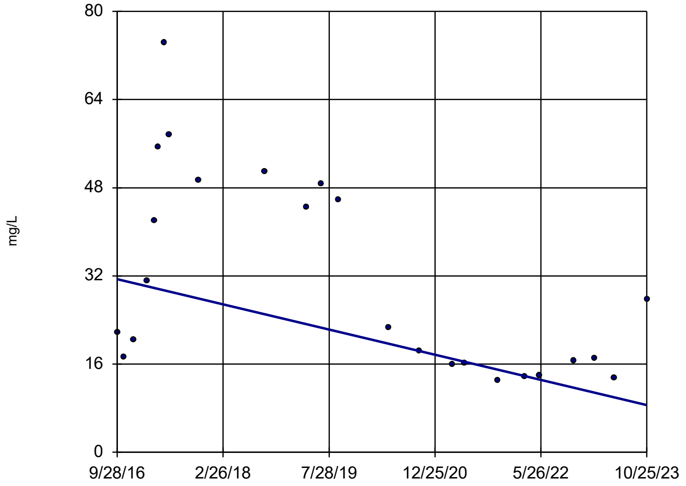
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, total Analysis Run 2/6/2024 4:45 PM View: Interwell

Mountaineer BAP Data: Mountaineer BAP

Sen's Slope Estimator

MW-1601A (bg)



n = 24

Slope = -3.234 units per year.

Mann-Kendall statistic = -104 critical = -105

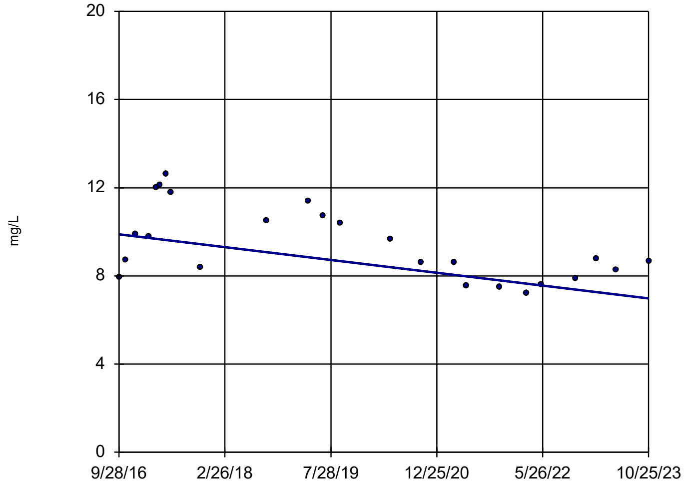
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride, total Analysis Run 2/6/2024 4:45 PM View: Interwell

Mountaineer BAP Data: Mountaineer BAP

Sen's Slope Estimator

MW-1602 (bg)



n = 24

Slope = -0.4103 units per year.

Mann-Kendall statistic = -102 critical = -105

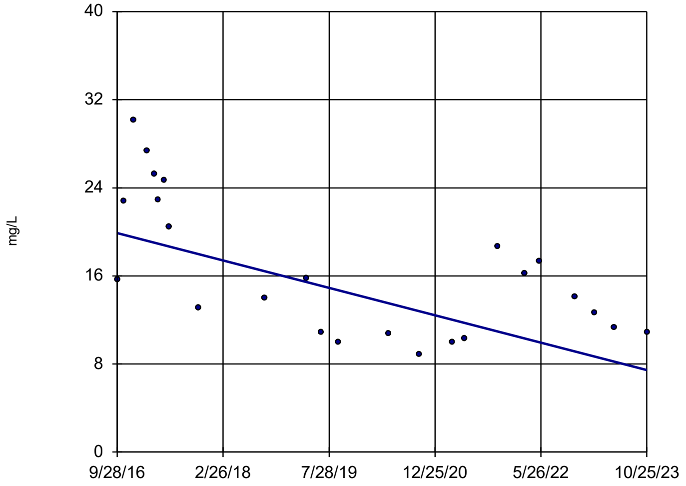
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride, total Analysis Run 2/6/2024 4:45 PM View: Interwell

Mountaineer BAP Data: Mountaineer BAP

Sen's Slope Estimator

MW-1603 (bg)



n = 24

Slope = -1.758 units per year.

Mann-Kendall statistic = -119 critical = -105

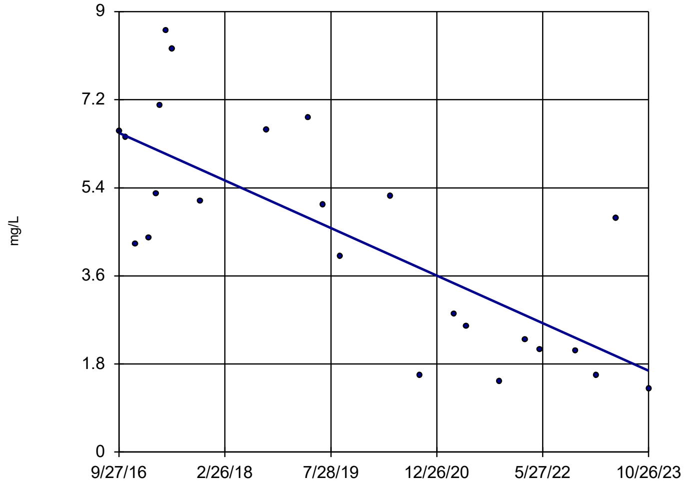
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride, total Analysis Run 2/6/2024 4:45 PM View: Interwell

Mountaineer BAP Data: Mountaineer BAP

Sen's Slope Estimator

MW-1608 (bg)



n = 24

Slope = -0.6859 units per year.

Mann-Kendall statistic = -151 critical = -105

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

Constituent: Chloride, total Analysis Run 2/6/2024 4:45 PM View: Interwell

Mountaineer BAP Data: Mountaineer BAP

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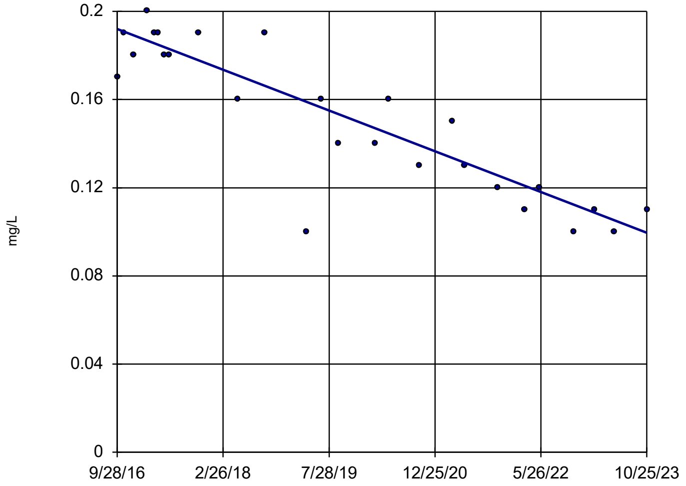
Sen's Slope Estimator

MW-1601A (bg)



n = 26

Slope = -0.01306
units per year.

Mann-Kendall
statistic = -218
critical = -118

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

Constituent: Fluoride, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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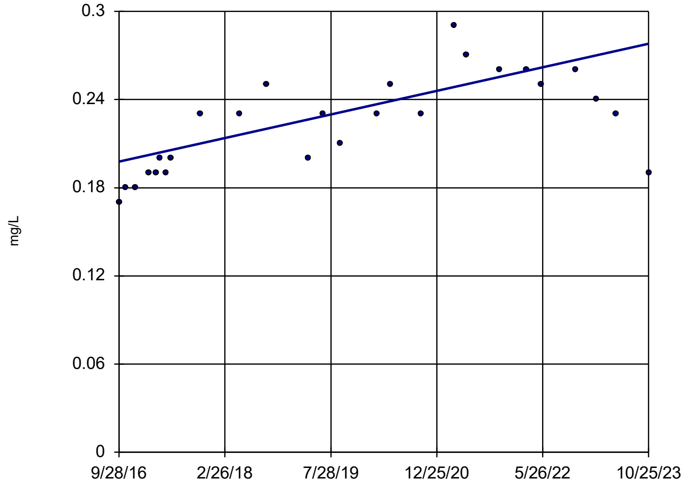
Sen's Slope Estimator

MW-1602 (bg)



n = 26

Slope = 0.01134
units per year.

Mann-Kendall
statistic = 176
critical = 118

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

Constituent: Fluoride, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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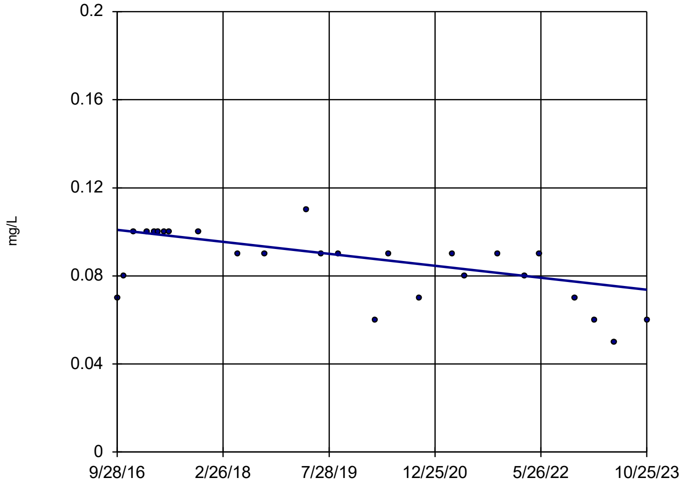
Sen's Slope Estimator

MW-1603 (bg)



n = 26

Slope = -0.003832
units per year.

Mann-Kendall
statistic = -145
critical = -118

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

Constituent: Fluoride, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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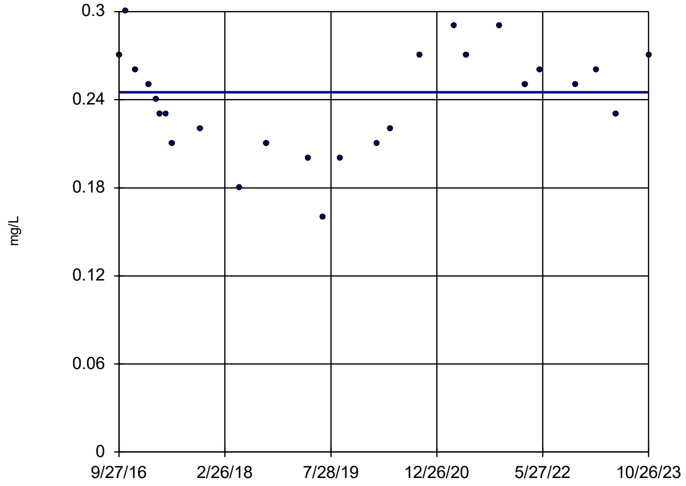
Sen's Slope Estimator

MW-1608 (bg)



n = 26

Slope = 0
units per year.

Mann-Kendall
statistic = 14
critical = 118

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

Constituent: Fluoride, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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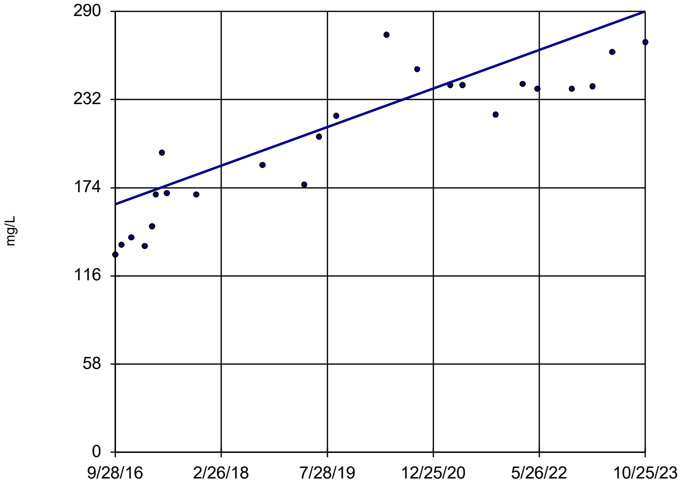
Sen's Slope Estimator

MW-1601A (bg)



n = 24

Slope = 17.93
units per year.

Mann-Kendall
statistic = 201
critical = 105

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

Constituent: Sulfate, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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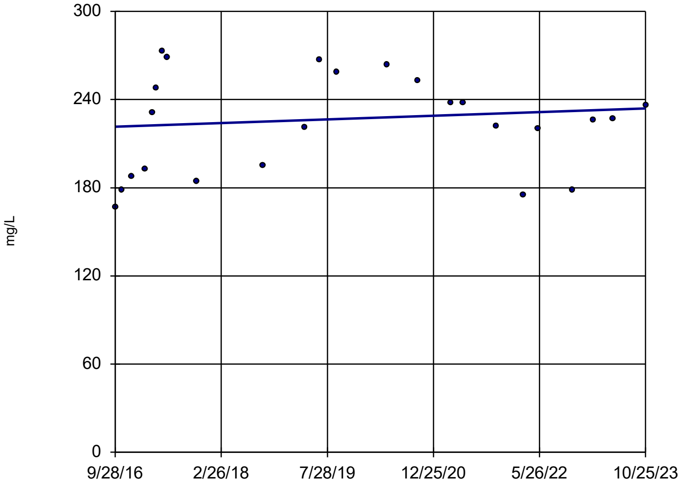
Sen's Slope Estimator

MW-1602 (bg)



n = 24

Slope = 1.779
units per year.

Mann-Kendall
statistic = 20
critical = 105

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Sulfate, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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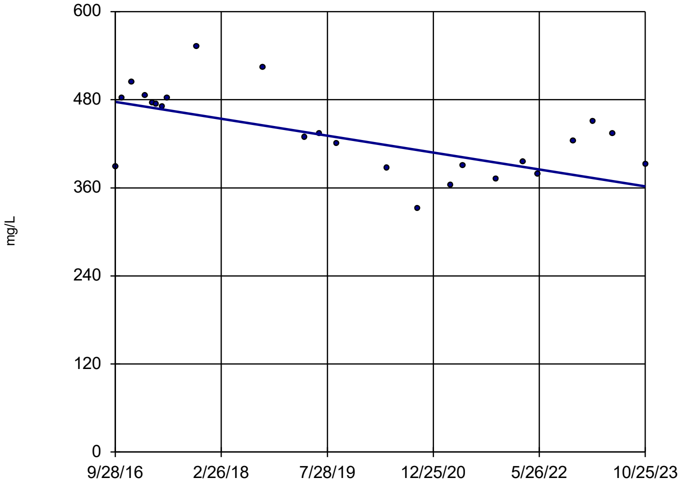
Sen's Slope Estimator

MW-1603 (bg)



n = 24

Slope = -16.25
units per year.

Mann-Kendall
statistic = -102
critical = -105

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Sulfate, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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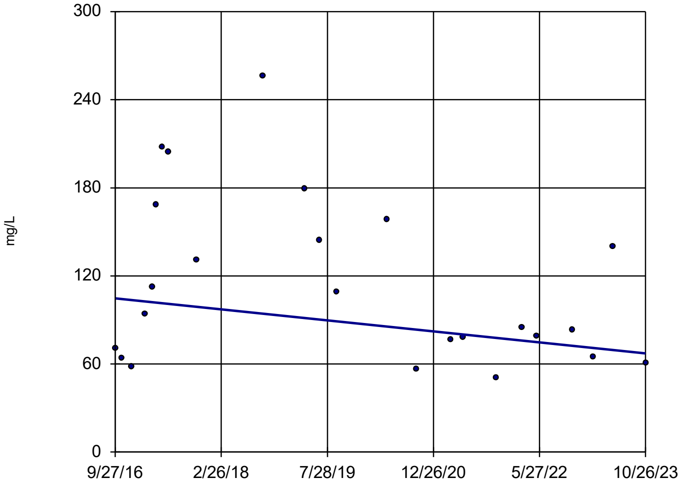
Sen's Slope Estimator

MW-1608 (bg)



n = 24

Slope = -5.289
units per year.

Mann-Kendall
statistic = -44
critical = -105

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Sulfate, total Analysis Run 2/6/2024 4:45 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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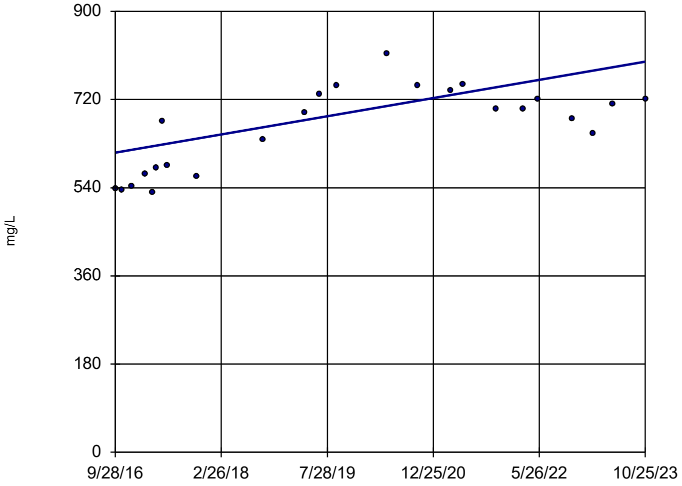
Sen's Slope Estimator

MW-1601A (bg)



n = 24

Slope = 26.21 units per year.

Mann-Kendall statistic = 134 critical = 105

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

Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:46 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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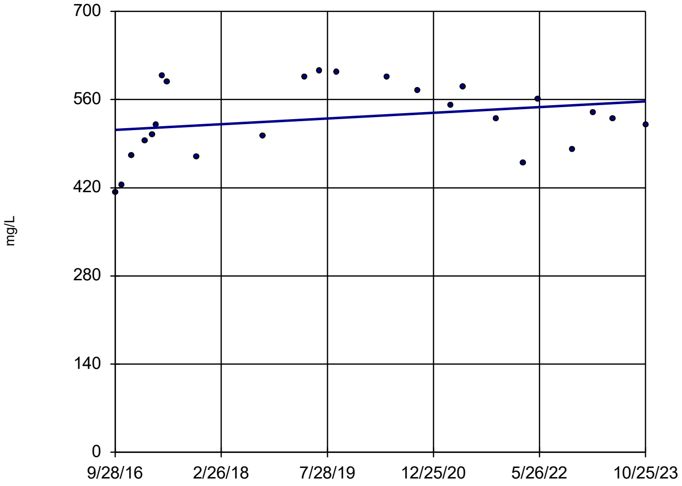
Sen's Slope Estimator

MW-1602 (bg)



n = 24

Slope = 6.392 units per year.

Mann-Kendall statistic = 39 critical = 105

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

Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:46 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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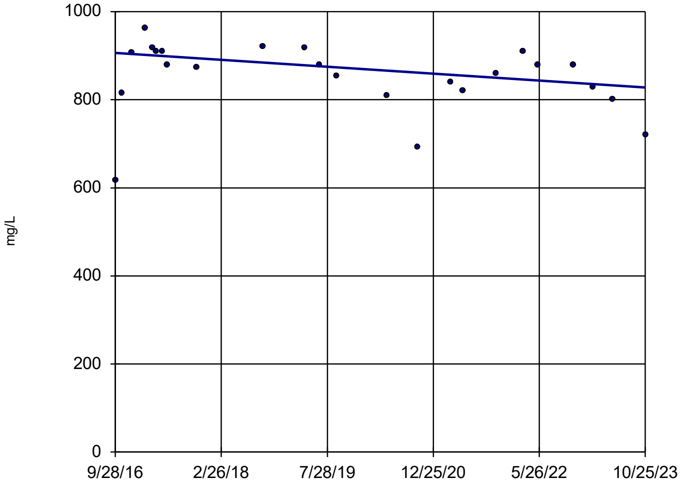
Sen's Slope Estimator

MW-1603 (bg)



n = 24

Slope = -11.07 units per year.

Mann-Kendall statistic = -72 critical = -105

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

Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:46 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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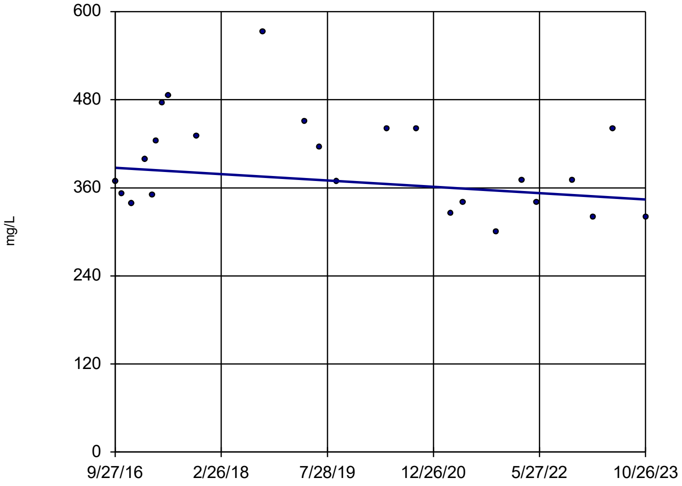
Sen's Slope Estimator

MW-1608 (bg)



n = 24

Slope = -6.09 units per year.

Mann-Kendall statistic = -48 critical = -105

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

Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:46 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

FIGURE F
Interwell PLs

Interwell Prediction Limits - All Results

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/6/2024, 4:51 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron, total (mg/L)	n/a	0.3327	n/a	n/a	8 future	n/a	87	0.5353	0.08183	0	None	x^(1/3)	0.0009403	Param Inter 1 of 2
Calcium, total (mg/L)	n/a	202	n/a	n/a	8 future	n/a	96	n/a	n/a	0	n/a	n/a	0.0002104	NP Inter (normality) 1 of 2
Chloride, total (mg/L)	n/a	56.19	n/a	n/a	8 future	n/a	96	2.395	0.8505	0	None	ln(x)	0.0009403	Param Inter 1 of 2
Fluoride, total (mg/L)	n/a	0.3	n/a	n/a	8 future	n/a	104	n/a	n/a	0	n/a	n/a	0.0001812	NP Inter (normality) 1 of 2
Sulfate, total (mg/L)	n/a	529.5	n/a	n/a	8 future	n/a	96	15.07	4.134	0	None	sqrt(x)	0.0009403	Param Inter 1 of 2
Total Dissolved Solids [TDS] (mg/L)	n/a	961.6	n/a	n/a	8 future	n/a	96	608.3	184	0	None	No	0.0009403	Param Inter 1 of 2

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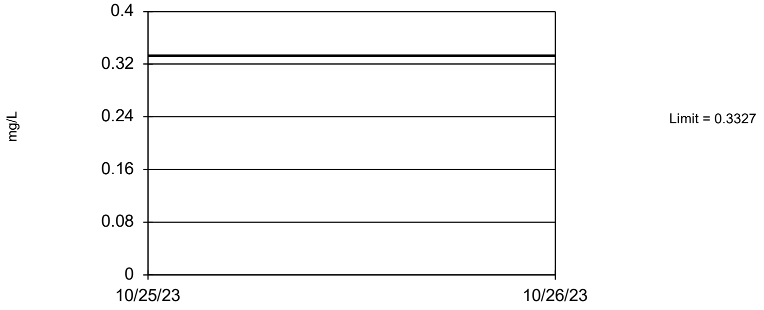
Prediction Limit

Interwell Parametric



Background Data Summary (based on cube root transformation): Mean=0.5353, Std. Dev.=0.08183, n=87. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9689, critical = 0.961. Kappa = 1.927 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009403. Assumes 8 future values.

Constituent: Boron, total Analysis Run 2/6/2024 4:49 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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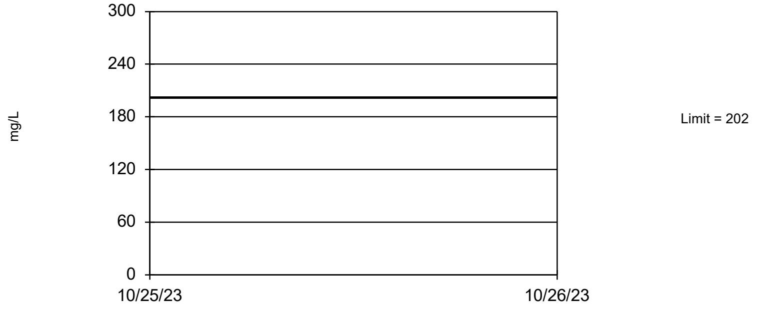
Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 96 background values. Annual per-constituent alpha = 0.003361. Individual comparison alpha = 0.0002104 (1 of 2). Assumes 8 future values.

Constituent: Calcium, total Analysis Run 2/6/2024 4:49 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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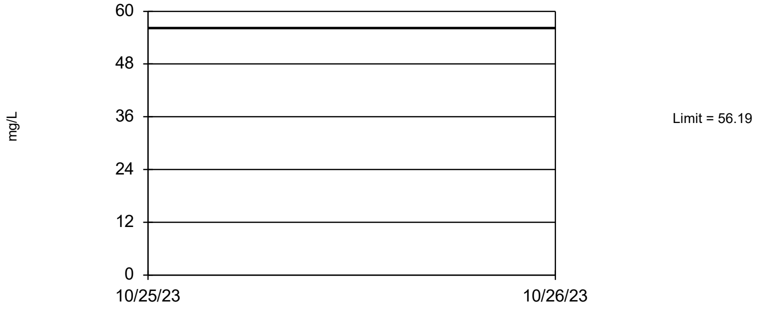
Prediction Limit

Interwell Parametric



Background Data Summary (based on natural log transformation): Mean=2.395, Std. Dev.=0.8505, n=96. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9741, critical = 0.965. Kappa = 1.92 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009403. Assumes 8 future values.

Constituent: Chloride, total Analysis Run 2/6/2024 4:49 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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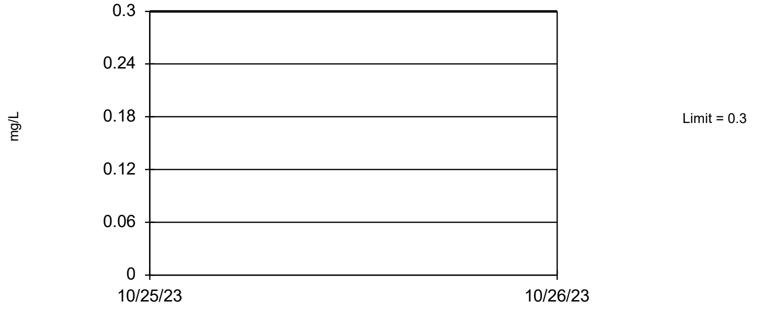
Prediction Limit

Interwell Non-parametric

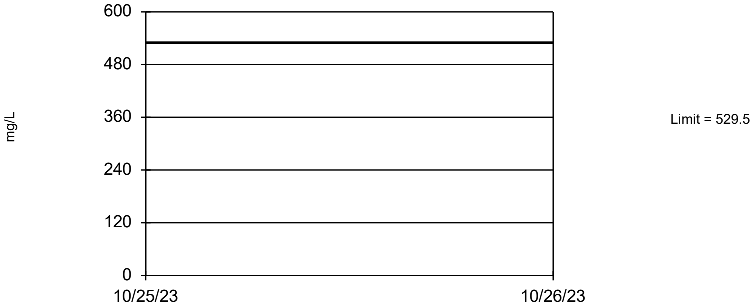


Non-parametric test used in lieu of parametric prediction limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 104 background values. Annual per-constituent alpha = 0.002895. Individual comparison alpha = 0.0001812 (1 of 2). Assumes 8 future values.

Constituent: Fluoride, total Analysis Run 2/6/2024 4:49 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

Prediction Limit

Interwell Parametric

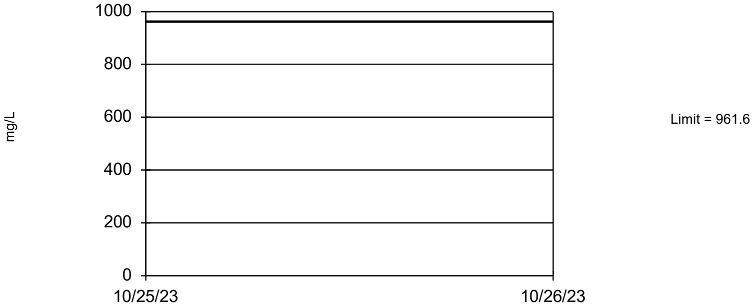


Background Data Summary (based on square root transformation): Mean=15.07, Std. Dev.=4.134, n=96. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9746, critical = 0.965. Kappa = 1.92 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009403. Assumes 8 future values.

Constituent: Sulfate, total Analysis Run 2/6/2024 4:49 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=608.3, Std. Dev.=184, n=96. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9657, critical = 0.965. Kappa = 1.92 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009403. Assumes 8 future values.

Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:49 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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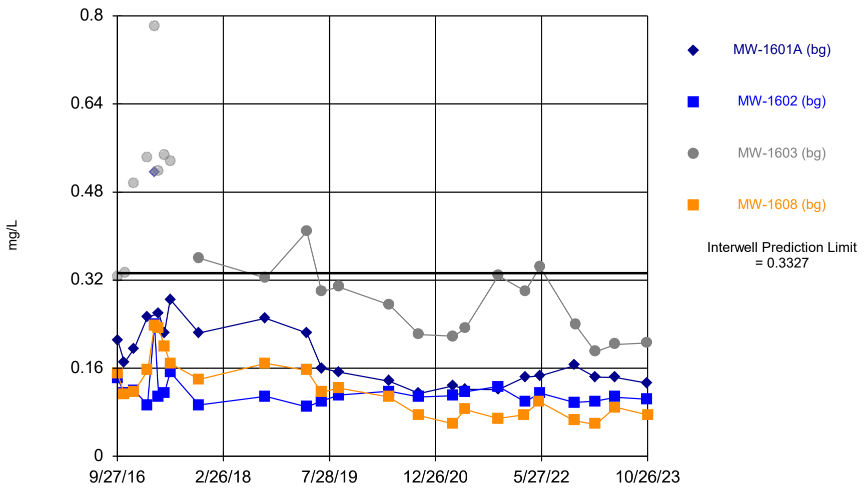
Time Series



Constituent: Boron, total Analysis Run 2/6/2024 4:51 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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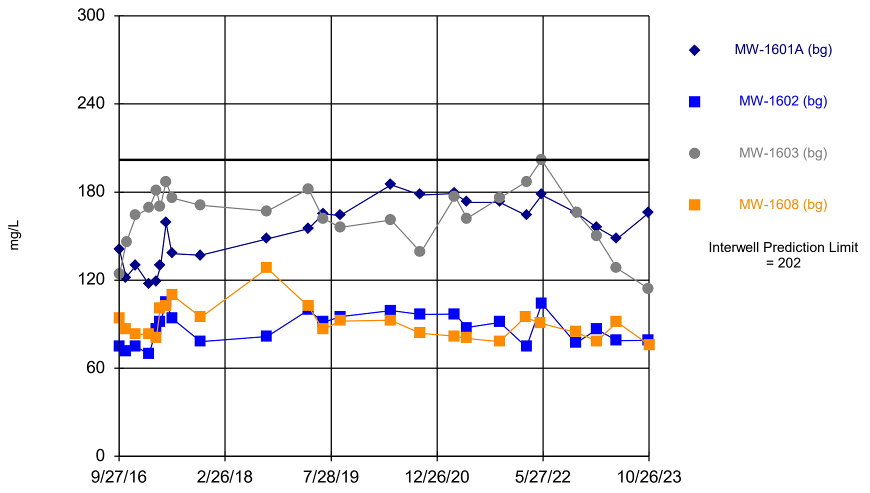
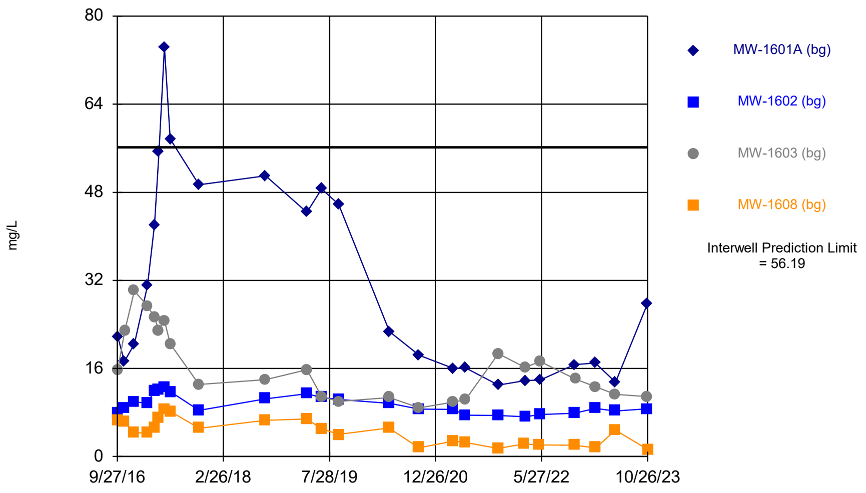
Time Series



Constituent: Calcium, total Analysis Run 2/6/2024 4:51 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

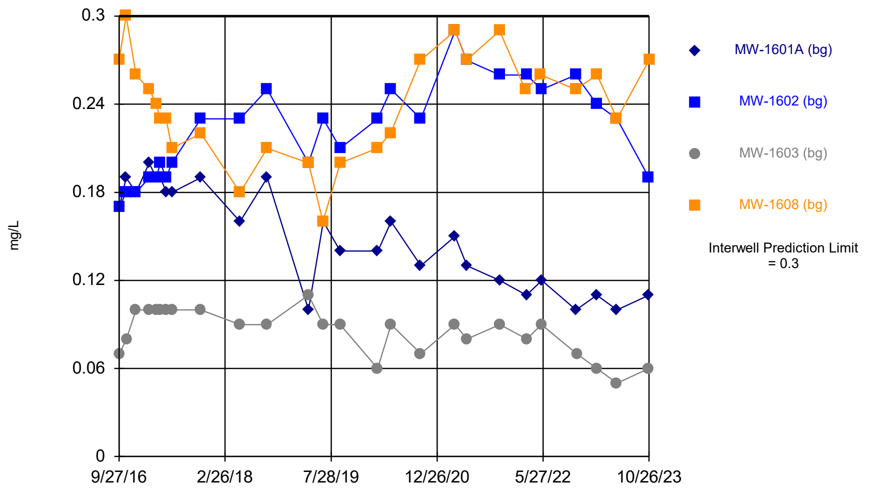
Time Series



Constituent: Chloride, total Analysis Run 2/6/2024 4:51 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Time Series



Constituent: Fluoride, total Analysis Run 2/6/2024 4:51 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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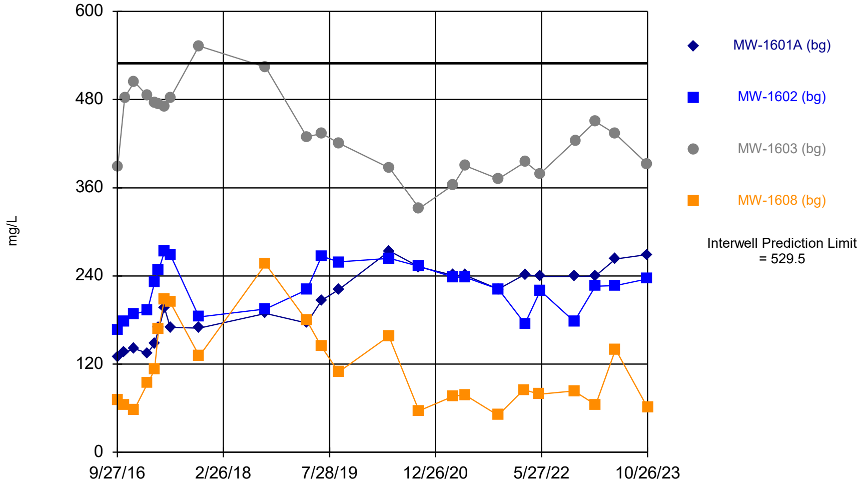
Time Series



Constituent: Sulfate, total Analysis Run 2/6/2024 4:51 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

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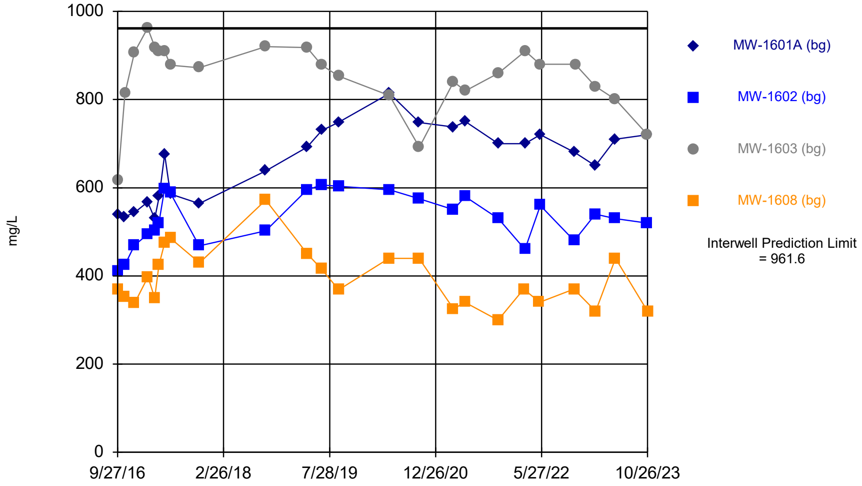
Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 2/6/2024 4:51 PM View: Interwell
Mountaineer BAP Data: Mountaineer BAP

FIGURE G
UTLs

Upper Tolerance Limits Summary Table

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/5/2024, 11:40 AM

Constituent	Upper Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	0.00052	100	n/a	n/a	14	n/a	n/a	0.005921	NP Inter(normality)
Arsenic, total (mg/L)	0.0006804	100	0.000428	0.0001312	0	None	No	0.05	Inter
Barium, total (mg/L)	0.0678	100	n/a	n/a	0	n/a	n/a	0.005921	NP Inter(normality)
Beryllium, total (mg/L)	0.00005	92	n/a	n/a	92.39	n/a	n/a	0.008924	NP Inter(NDs)
Cadmium, total (mg/L)	0.00005	100	n/a	n/a	6	n/a	n/a	0.005921	NP Inter(normality)
Chromium, total (mg/L)	0.0007184	96	0.01808	0.004515	1.042	None	sqrt(x)	0.05	Inter
Cobalt, total (mg/L)	0.0005254	100	-9.61	1.07	4	None	ln(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	2.305	99	0.8695	0.3368	0	None	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	0.3	104	n/a	n/a	0	n/a	n/a	0.004822	NP Inter(normality)
Lead, total (mg/L)	0.000881	100	n/a	n/a	31	n/a	n/a	0.005921	NP Inter(normality)
Lithium, total (mg/L)	0.03	100	n/a	n/a	6	n/a	n/a	0.005921	NP Inter(normality)
Mercury, total (mg/L)	0.000005	96	n/a	n/a	95.83	n/a	n/a	0.007269	NP Inter(NDs)
Molybdenum, total (mg/L)	0.002792	100	0.09353	0.02457	6	None	x^(1/3)	0.05	Inter
Selenium, total (mg/L)	0.0043	100	n/a	n/a	2	n/a	n/a	0.005921	NP Inter(normality)
Thallium, total (mg/L)	0.0002	100	n/a	n/a	61	n/a	n/a	0.005921	NP Inter(NDs)

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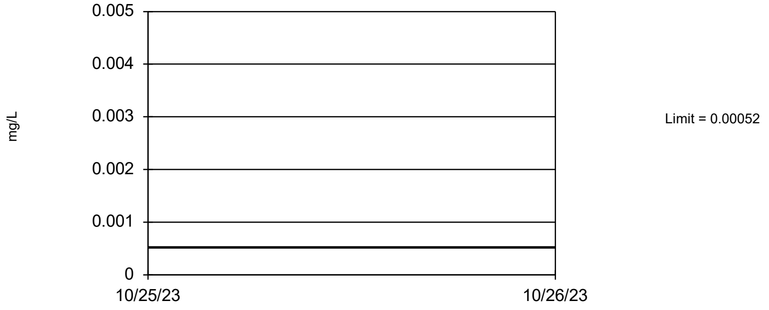
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 14% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Antimony, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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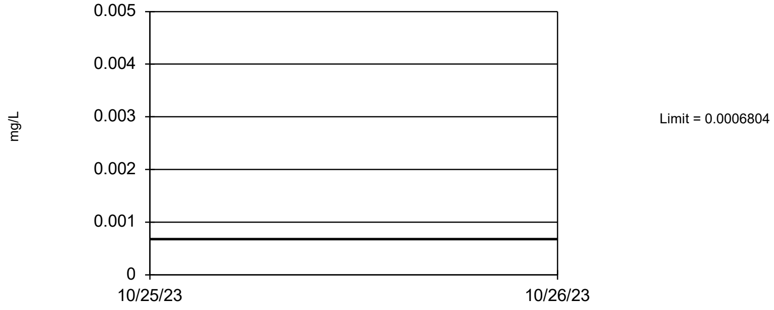
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary: Mean=0.000428, Std. Dev.=0.0001312, n=100. Normality test: Chi Squared @alpha = 0.01, calculated = 9.8, critical = 14.07. Report alpha = 0.05.

Constituent: Arsenic, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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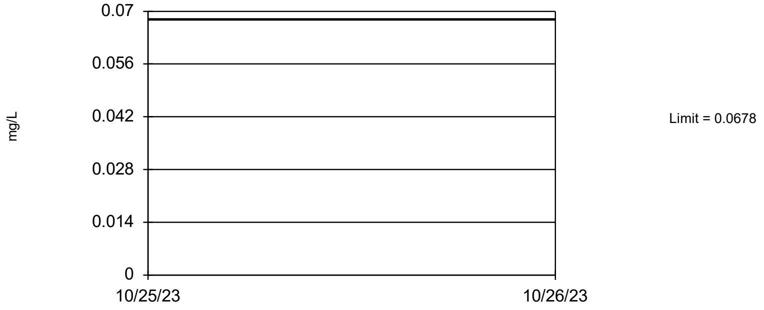
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Barium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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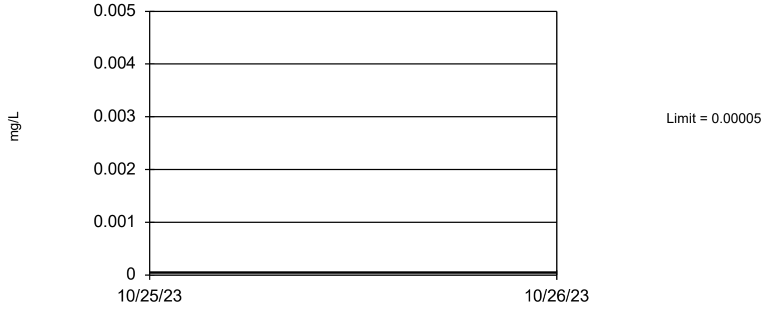
Tolerance Limit

Interwell Non-parametric



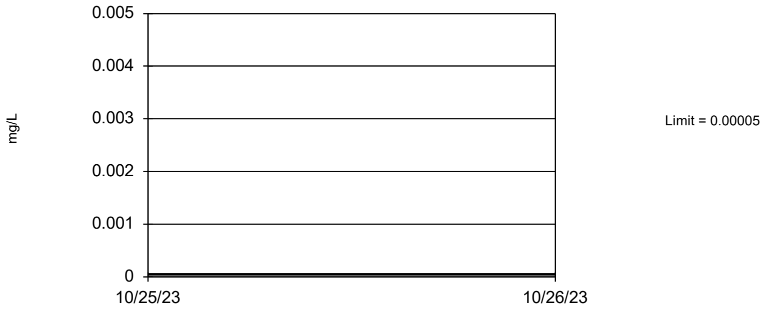
Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 92 background values. 92.39% NDs. 95.12% coverage at alpha=0.01; 96.68% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.008924.

Constituent: Beryllium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 6% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Cadmium, total   Analysis Run 2/5/2024 11:38 AM   View: Appendix IV - UTLs
Mountaineer BAP   Data: Mountaineer BAP

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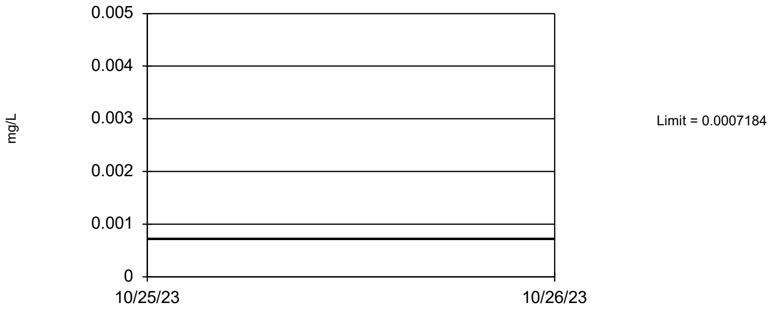
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.01808, Std. Dev.=0.004515, n=96, 1.042% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9768, critical = 0.965. Report alpha = 0.05.

Constituent: Chromium, total   Analysis Run 2/5/2024 11:38 AM   View: Appendix IV - UTLs
Mountaineer BAP   Data: Mountaineer BAP

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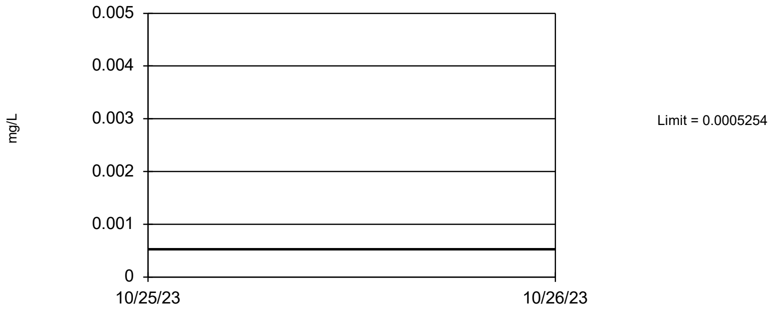
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on natural log transformation): Mean=-9.61, Std. Dev.=1.07, n=100, 4% NDs. Normality test: Chi Squared @alpha = 0.01, calculated = 9.2, critical = 14.07. Report alpha = 0.05.

Constituent: Cobalt, total   Analysis Run 2/5/2024 11:38 AM   View: Appendix IV - UTLs
Mountaineer BAP   Data: Mountaineer BAP

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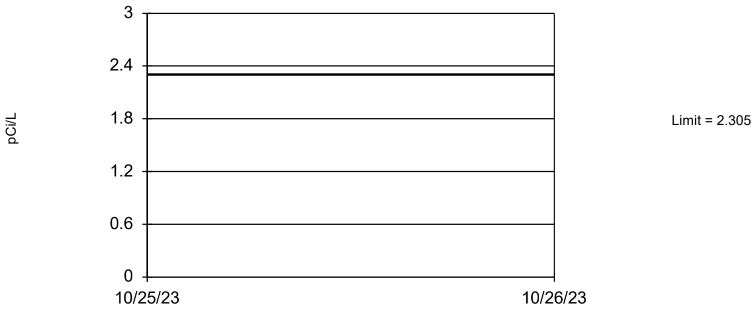
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.8695, Std. Dev.=0.3368, n=99. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9713, critical = 0.967. Report alpha = 0.05.

Constituent: Combined Radium 226 + 228   Analysis Run 2/5/2024 11:38 AM   View: Appendix IV - UTLs
Mountaineer BAP   Data: Mountaineer BAP

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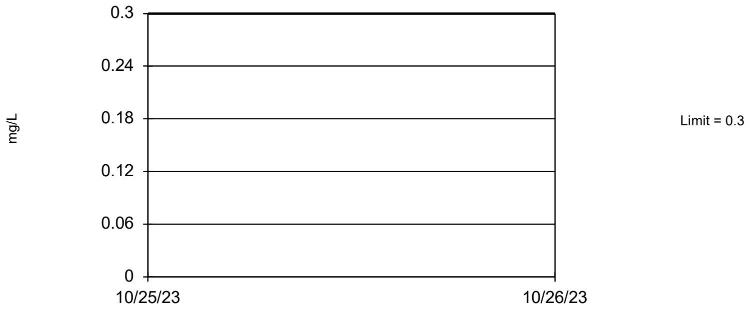
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 104 background values. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.004822.

Constituent: Fluoride, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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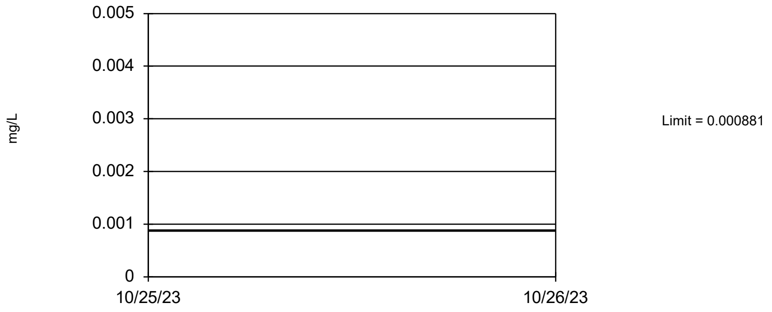
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 31% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Lead, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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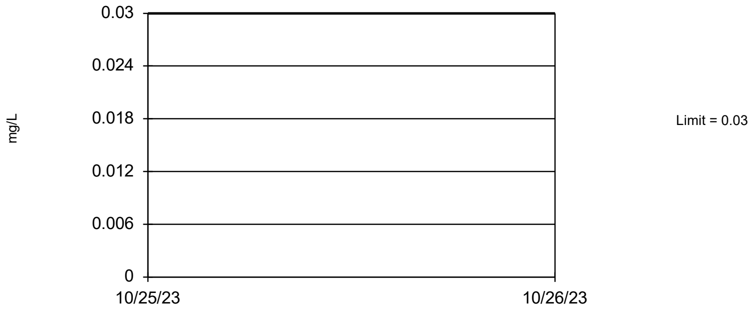
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 6% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Lithium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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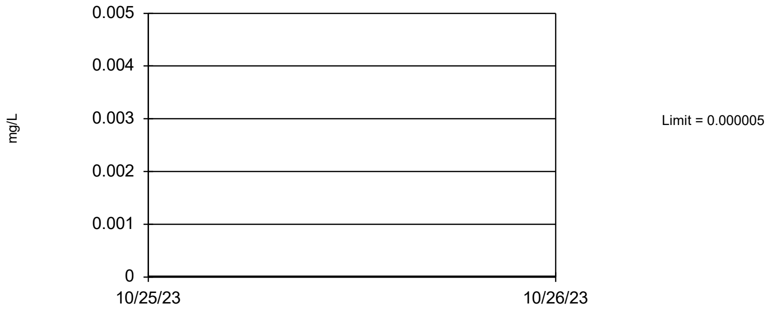
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 96 background values. 95.83% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.007269.

Constituent: Mercury, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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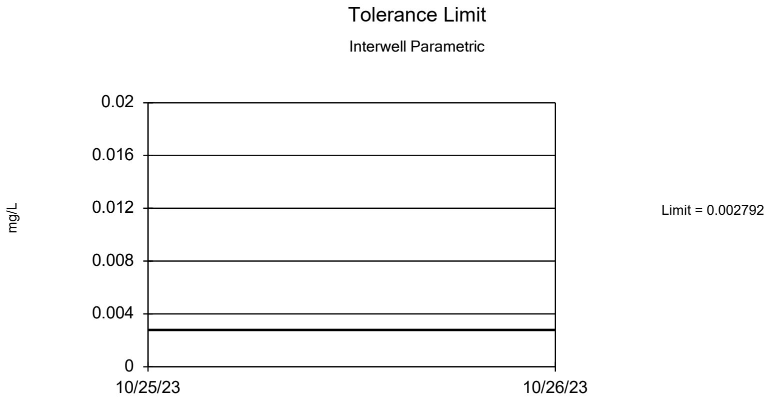

95% coverage. Background Data Summary (based on cube root transformation): Mean=0.09353, Std. Dev.=0.02457, n=100, 6% NDs. Normality test: Chi Squared @alpha = 0.01, calculated = 9.4, critical = 14.07. Report alpha = 0.05.

Constituent: Molybdenum, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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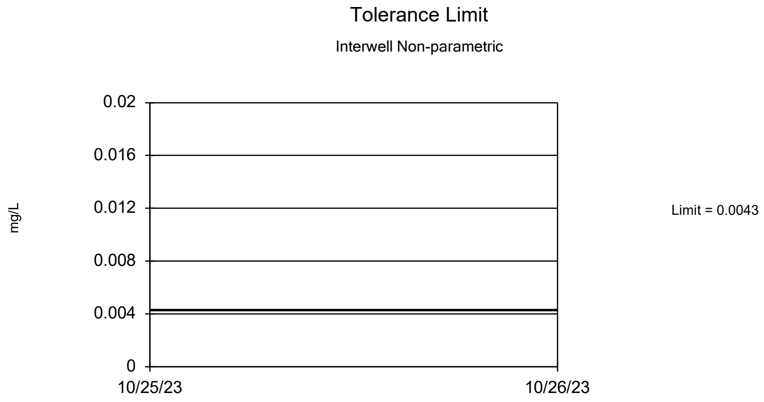
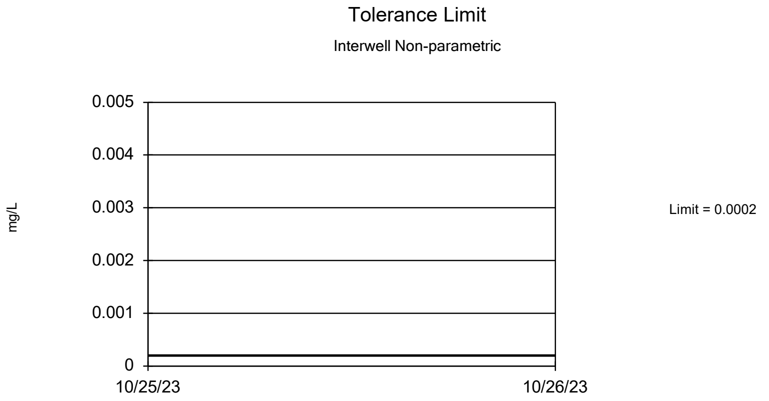


Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 2% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Selenium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 100 background values. 61% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Thallium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

FIGURE H
GWPS

MOUNTAINEER BAP GWPS

Constituent Name	MCL	CCR Rule-Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00052	0.006
Arsenic, Total (mg/L)	0.01		0.00071	0.01
Barium, Total (mg/L)	2		0.068	2
Beryllium, Total (mg/L)	0.004		0.00005	0.004
Cadmium, Total (mg/L)	0.005		0.00005	0.005
Chromium, Total (mg/L)	0.1		0.00074	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.00057	0.006
Combined Radium, Total (pCi/L)	5		2.38	5
Fluoride, Total (mg/L)	4		0.3	4
Lead, Total (mg/L)	0.015		0.00088	0.015
Lithium, Total (mg/L)	n/a	0.04	0.03	0.04
Mercury, Total (mg/L)	0.002		0.000005	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0027	0.1
Selenium, Total (mg/L)	0.05		0.0043	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**GWPS = Groundwater Protection Standard*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

FIGURE I

Confidence Intervals – Assessment

Confidence Intervals - Assessment Monitoring - Significant Results

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/5/2024, 11:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Arsenic, total (mg/L)	**MW-1805**	**0.05849**	**0.0226**	**0.01**	**Yes**	**15**	**0.04054**	**0.02648**	**0**	**None**	**No**	**0.01**	**Param.**
Arsenic, total (mg/L)	**MW-1922D**	**0.7348**	**0.4109**	**0.01**	**Yes**	**15**	**0.5849**	**0.2658**	**0**	**None**	**sqrt(x)**	**0.01**	**Param.**

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/5/2024, 11:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	JTMN-1	0.0001053	0.00003691	0.006	No	9	0.00007111	0.00003542	0	None	No	0.01	Param.
Antimony, total (mg/L)	JTMN-2	0.00008579	0.00003523	0.006	No	9	0.00006056	0.00003204	0	None	x^(1/3)	0.01	Param.
Antimony, total (mg/L)	MW-016	0.00004556	0.00001819	0.006	No	13	0.00005862	0.00003381	30.77	Kaplan-Meier	x^(1/3)	0.01	Param.
Antimony, total (mg/L)	MW-107	0.0001	0.00002	0.006	No	15	0.0000462	0.00003507	26.67	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-112	0.0000637	0.0000163	0.006	No	5	0.000064	0.00003507	40	Kaplan-Meier	No	0.01	Param.
Antimony, total (mg/L)	MW-1604D	0.00013	0.00003	0.006	No	25	0.00007764	0.00005894	4	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1604S	0.00016	0.00004	0.006	No	25	0.0001185	0.00006374	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1605D	0.00003882	0.00003048	0.006	No	25	0.0000354	0.000008916	8	None	ln(x)	0.01	Param.
Antimony, total (mg/L)	MW-1605S	0.00007	0.00004	0.006	No	25	0.000056	0.0000274	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606D	0.00017	0.000143	0.006	No	25	0.0001629	0.00002752	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606S	0.000154	0.0001418	0.006	No	25	0.0001479	0.00001224	0	None	No	0.01	Param.
Antimony, total (mg/L)	MW-1607D	0.000033	0.00003	0.006	No	25	0.00003412	0.000009541	4	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1607S	0.0004578	0.0004197	0.006	No	24	0.0004393	0.00003816	0	None	sqrt(x)	0.01	Param.
Antimony, total (mg/L)	MW-1805	0.0001	0.000022	0.006	No	15	0.0001966	0.0005385	20	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1922D	0.001232	0.0004911	0.006	No	15	0.001028	0.001122	0	None	ln(x)	0.01	Param.
Antimony, total (mg/L)	MW-1922S	0.0001	0.00002	0.006	No	15	0.00005807	0.00003603	33.33	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1923	0.0002387	0.0001762	0.006	No	15	0.0002092	0.00005059	0	None	x^(1/3)	0.01	Param.
Antimony, total (mg/L)	MW-1924	0.00009	0.000055	0.006	No	15	0.0000788	0.00003701	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1925	0.00021	0.000184	0.006	No	15	0.0001999	0.00002312	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1926	0.00007797	0.00005217	0.006	No	15	0.00006507	0.00001904	0	None	No	0.01	Param.
Antimony, total (mg/L)	MW-1927	0.0001387	0.00007993	0.006	No	15	0.000115	0.00005893	0	None	ln(x)	0.01	Param.
Antimony, total (mg/L)	MW-1929	0.00005	0.00002	0.006	No	15	0.00003213	0.00001147	13.33	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-203	0.0001	0.000024	0.006	No	14	0.00007014	0.00003702	57.14	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	JTMN-1	0.002259	0.000754	0.01	No	9	0.001507	0.0007796	0	None	No	0.01	Param.
Arsenic, total (mg/L)	JTMN-2	0.001139	0.0006343	0.01	No	9	0.0008867	0.0002614	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-016	0.004665	0.002853	0.01	No	13	0.003862	0.001567	0	None	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-107	0.00044	0.00028	0.01	No	15	0.0004073	0.0002069	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-112	0.0004338	0.0003062	0.01	No	5	0.00037	0.00003808	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1604D	0.0004049	0.0002978	0.01	No	25	0.0003572	0.0001123	0	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1604S	0.0003864	0.0002944	0.01	No	25	0.0003404	0.00009235	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605D	0.002882	0.002482	0.01	No	25	0.002682	0.0004018	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605S	0.0006853	0.0004755	0.01	No	25	0.0005996	0.0002409	0	None	x^(1/3)	0.01	Param.
Arsenic, total (mg/L)	MW-1606D	0.00051	0.0003	0.01	No	25	0.0004508	0.0002454	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1606S	0.0007708	0.0006564	0.01	No	25	0.0007136	0.0001147	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607D	0.001742	0.001309	0.01	No	25	0.001525	0.0004345	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607S	0.0011	0.00087	0.01	No	24	0.001024	0.0002583	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	**MW-1805**	**0.05849**	**0.0226**	**0.01**	**Yes**	**15**	**0.04054**	**0.02648**	**0**	**None**	**No**	**0.01**	**Param.**
Arsenic, total (mg/L)	**MW-1922D**	**0.7348**	**0.4109**	**0.01**	**Yes**	**15**	**0.5849**	**0.2658**	**0**	**None**	**sqrt(x)**	**0.01**	**Param.**
Arsenic, total (mg/L)	MW-1922S	0.00325	0.00179	0.01	No	15	0.002322	0.0007667	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1923	0.001009	0.0006258	0.01	No	15	0.0008293	0.0003107	0	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1924	0.0008154	0.0004773	0.01	No	15	0.000658	0.000274	0	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1925	0.0004888	0.0002787	0.01	No	15	0.0003913	0.0001736	0	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1926	0.00037	0.0003	0.01	No	15	0.0003733	0.0001621	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1927	0.0003125	0.0002193	0.01	No	15	0.000268	0.00007243	0	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1929	0.00047	0.00032	0.01	No	15	0.0004327	0.000158	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-203	0.0002848	0.0002352	0.01	No	14	0.00026	0.00003508	0	None	No	0.01	Param.
Barium, total (mg/L)	JTMN-1	0.09411	0.0648	2	No	9	0.07946	0.01517	0	None	No	0.01	Param.
Barium, total (mg/L)	JTMN-2	0.09112	0.07083	2	No	9	0.08094	0.011	0	None	x^2	0.01	Param.
Barium, total (mg/L)	MW-016	0.0391	0.0226	2	No	13	0.02735	0.007767	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-107	0.05467	0.03777	2	No	15	0.04662	0.01298	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW-112	0.08409	0.05071	2	No	5	0.0674	0.009961	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1604D	0.0342	0.0265	2	No	25	0.03145	0.008291	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1604S	0.0296	0.02752	2	No	25	0.02856	0.002082	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1605D	0.0291	0.02628	2	No	25	0.02769	0.002829	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1605S	0.03195	0.02622	2	No	25	0.02929	0.006112	0	None	sqrt(x)	0.01	Param.

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Data: Mountaineer BAP Printed 2/5/2024, 11:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Barium, total (mg/L)	MW-1606D	0.05321	0.04575	2	No	25	0.04948	0.007485	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1606S	0.06834	0.05689	2	No	25	0.06262	0.01149	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1607D	0.126	0.0703	2	No	25	0.09324	0.0328	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1607S	0.0695	0.06254	2	No	24	0.06602	0.00682	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1805	0.05579	0.03119	2	No	15	0.04441	0.02016	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW-1922D	0.402	0.0663	2	No	15	0.2314	0.1413	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1922S	0.03082	0.0262	2	No	15	0.02856	0.003528	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW-1923	0.09675	0.08312	2	No	15	0.08993	0.01006	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1924	0.05447	0.04177	2	No	15	0.04812	0.009365	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1925	0.04273	0.03722	2	No	15	0.03997	0.00407	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1926	0.02277	0.01926	2	No	15	0.0211	0.002802	0	None	ln(x)	0.01	Param.
Barium, total (mg/L)	MW-1927	0.05884	0.05399	2	No	15	0.05641	0.003577	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1929	0.05017	0.04506	2	No	15	0.04769	0.003908	0	None	ln(x)	0.01	Param.
Barium, total (mg/L)	MW-203	0.03137	0.02636	2	No	14	0.02886	0.003534	0	None	No	0.01	Param.
Beryllium, total (mg/L)	JTMN-1	0.00006015	0.00001385	0.004	No	9	0.000037	0.00002398	0	None	No	0.01	Param.
Beryllium, total (mg/L)	JTMN-2	0.00003353	0.00001336	0.004	No	9	0.00002344	0.00001044	0	None	No	0.01	Param.
Beryllium, total (mg/L)	MW-016	0.00005	0.00005	0.004	No	11	0.00004909	0.000003015	90.91	None	No	0.006	NP (NDs)
Beryllium, total (mg/L)	MW-1604S	0.00005	0.000024	0.004	No	23	0.00004887	0.000005421	95.65	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1605S	0.00005	0.00002	0.004	No	23	0.00004504	0.00001325	86.96	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1606D	0.00005	0.000031	0.004	No	23	0.00004348	0.00001526	82.61	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1606S	0.00005	0.000005	0.004	No	23	0.00004804	0.000009383	95.65	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1607D	0.00005	0.000008	0.004	No	23	0.00004817	0.000008758	95.65	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1607S	0.000123	0.00001	0.004	No	23	0.00004783	0.00002161	82.61	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1922S	0.00005	0.000018	0.004	No	13	0.00004754	0.000008875	92.31	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1923	0.0001	0.000017	0.004	No	13	0.00005854	0.00003671	38.46	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	MW-1924	0.00005	0.000009	0.004	No	13	0.00004208	0.00001589	76.92	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1925	0.00005	0.000008	0.004	No	13	0.00004677	0.00001165	92.31	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	JTMN-1	0.000114	0.000017	0.005	No	9	0.00003533	0.00003023	0	None	No	0.002	NP (normality)
Cadmium, total (mg/L)	JTMN-2	0.0000444	0.00002337	0.005	No	9	0.00003389	0.00001089	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-016	0.00002696	0.00001596	0.005	No	13	0.00002146	0.000007401	7.692	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-107	0.00004296	0.00002371	0.005	No	15	0.00003333	0.00001421	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-112	0.00005	0.000005	0.005	No	5	0.0000238	0.00002393	40	None	No	0.031	NP (normality)
Cadmium, total (mg/L)	MW-1604D	0.0001	0.000022	0.005	No	25	0.00006136	0.00005449	0	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1604S	0.000179	0.00009887	0.005	No	25	0.000139	0.00008043	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1605D	0.00002435	0.00001372	0.005	No	25	0.00002012	0.00001129	4	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1605S	0.00006704	0.00004708	0.005	No	25	0.00005832	0.0000218	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1606D	0.00007487	0.00006385	0.005	No	25	0.00006936	0.00001106	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1606S	0.00007198	0.00006098	0.005	No	25	0.00006648	0.00001104	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1607D	0.00002	0.00001	0.005	No	25	0.00001648	0.000006621	56	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	MW-1607S	0.00004589	0.00003276	0.005	No	24	0.00004113	0.00001705	0	None	ln(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1922D	0.00002	0.00001	0.005	No	15	0.0000176	0.000005068	80	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	MW-1922S	0.000076	0.000006	0.005	No	15	0.0000334	0.00003189	33.33	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1923	0.00003925	0.00001431	0.005	No	15	0.0000292	0.00002395	6.667	None	x^(1/3)	0.01	Param.
Cadmium, total (mg/L)	MW-1924	0.00007	0.00004	0.005	No	15	0.00006627	0.00003963	0	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1925	0.00005389	0.00004078	0.005	No	15	0.00004733	0.000009678	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1926	0.00005	0.000033	0.005	No	15	0.00004167	0.000009825	0	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1927	0.00007638	0.0000584	0.005	No	15	0.00006807	0.00001439	6.667	None	ln(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1929	0.00002008	0.00000872	0.005	No	15	0.000015	0.000009502	13.33	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-203	0.00005	0.000004	0.005	No	14	0.00002121	0.00002228	35.71	None	No	0.01	NP (normality)
Chromium, total (mg/L)	JTMN-1	0.002192	0.0006973	0.1	No	9	0.001444	0.0007739	0	None	No	0.01	Param.
Chromium, total (mg/L)	JTMN-2	0.001461	0.0006591	0.1	No	9	0.00106	0.0004153	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-016	0.0005863	0.0002698	0.1	No	13	0.0004626	0.0003318	0	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-107	0.0004267	0.0001857	0.1	No	15	0.0003062	0.0001778	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-112	0.0005196	0.0001424	0.1	No	5	0.000331	0.0001125	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1604D	0.0004319	0.0002451	0.1	No	25	0.0003573	0.0002154	0	None	sqrt(x)	0.01	Param.

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Data: Mountaineer BAP Printed 2/5/2024, 11:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Chromium, total (mg/L)	MW-1604S	0.0003974	0.0001995	0.1	No	24	0.0002985	0.0001939	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1605D	0.0002378	0.0001226	0.1	No	24	0.0001928	0.0001272	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1605S	0.000421	0.0002393	0.1	No	24	0.0003302	0.000178	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1606D	0.000474	0.0002359	0.1	No	25	0.000355	0.0002388	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1606S	0.0003666	0.0001568	0.1	No	25	0.0002931	0.0002697	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1607D	0.000341	0.0001537	0.1	No	24	0.0002474	0.0001835	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1607S	0.0004087	0.0002614	0.1	No	24	0.000335	0.0001443	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1805	0.0003911	0.0001996	0.1	No	15	0.0003181	0.0002057	0	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-1922D	0.0003196	0.0001743	0.1	No	15	0.0002469	0.0001072	13.33	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1922S	0.00054	0.0002	0.1	No	15	0.0003715	0.0003581	0	None	No	0.01	NP (normality)
Chromium, total (mg/L)	MW-1923	0.001252	0.0005602	0.1	No	15	0.0009417	0.0005733	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1924	0.0006681	0.0002605	0.1	No	15	0.0005012	0.0003909	0	None	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	MW-1925	0.0003772	0.0001933	0.1	No	15	0.0002853	0.0001357	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1926	0.0004803	0.0002507	0.1	No	15	0.0003655	0.0001694	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1927	0.000425	0.0001642	0.1	No	15	0.0002946	0.0001925	6.667	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1929	0.0005814	0.000353	0.1	No	15	0.0004672	0.0001686	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-203	0.00039	0.0002	0.1	No	14	0.0003087	0.00009855	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	JTMN-1	0.002306	0.000579	0.006	No	9	0.001443	0.0008944	0	None	No	0.01	Param.
Cobalt, total (mg/L)	JTMN-2	0.001192	0.0005203	0.006	No	9	0.000856	0.0003477	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-016	0.00188	0.00102	0.006	No	13	0.001255	0.0003399	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-107	0.001009	0.0002819	0.006	No	15	0.0006455	0.0005365	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-112	0.0000314	0.0000166	0.006	No	5	0.000024	0.000004416	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1604D	0.00174	0.000117	0.006	No	25	0.0006937	0.0007681	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1604S	0.00214	0.00039	0.006	No	25	0.00165	0.001143	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1605D	0.00167	0.001451	0.006	No	25	0.00156	0.0002197	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1605S	0.0006924	0.0003716	0.006	No	25	0.0006355	0.0005895	0	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1606D	0.00156	0.00118	0.006	No	25	0.001518	0.0006347	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1606S	0.0003052	0.0002056	0.006	No	25	0.0002554	0.00009992	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1607D	0.0008581	0.0006926	0.006	No	25	0.0007345	0.0002071	0	None	x^3	0.01	Param.
Cobalt, total (mg/L)	MW-1607S	0.001507	0.001087	0.006	No	24	0.001329	0.0004643	0	None	x^(1/3)	0.01	Param.
Cobalt, total (mg/L)	MW-1805	0.000787	0.00007164	0.006	No	15	0.000954	0.001568	0	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1922D	0.0003388	0.0001341	0.006	No	15	0.000275	0.0002458	0	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1922S	0.001561	0.001015	0.006	No	15	0.001327	0.0005115	0	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1923	0.001362	0.0005974	0.006	No	15	0.00102	0.0006447	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1924	0.0041	0.00215	0.006	No	15	0.003485	0.002242	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1925	0.001276	0.001014	0.006	No	15	0.001149	0.0002025	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1926	0.00142	0.000729	0.006	No	15	0.001271	0.001092	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1927	0.000511	0.0003031	0.006	No	15	0.0004071	0.0001534	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1929	0.000638	0.000144	0.006	No	15	0.0005621	0.0008061	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-203	0.00005343	0.00002017	0.006	No	14	0.00004229	0.00003679	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	JTMN-1	1.382	0.3595	5	No	9	0.8707	0.5294	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	JTMN-2	1.966	0.3713	5	No	9	1.161	0.966	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-016	1.678	0.7797	5	No	13	1.229	0.6041	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-107	1.218	0.3198	5	No	15	0.8434	0.8694	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-112	0.7965	-0.2224	5	No	5	0.287	0.304	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604D	1.203	0.5503	5	No	25	0.9672	0.7597	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604S	1.82	0.9704	5	No	24	1.698	1.858	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605D	1.568	0.8096	5	No	25	1.278	0.8656	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605S	0.9765	0.5245	5	No	25	0.8866	0.7018	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606D	1.77	1.009	5	No	24	1.461	0.8189	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606S	1.317	0.6808	5	No	25	1.074	0.7645	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607D	1.954	1.261	5	No	25	1.739	0.9153	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607S	1.692	1.006	5	No	25	1.349	0.6885	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1805	2.173	0.9776	5	No	15	1.575	0.8824	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1922D	5.71	3.299	5	No	15	4.505	1.779	0	None	No	0.01	Param.

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Data: Mountaineer BAP Printed 2/5/2024, 11:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Combined Radium 226 + 228 (pCi/L)	MW-1922S	1.865	0.9134	5	No	15	1.389	0.7023	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1923	1.409	0.8342	5	No	15	1.122	0.4243	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1924	1.425	0.9494	5	No	15	1.187	0.3506	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1925	1.79	0.9487	5	No	15	1.369	0.6205	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1926	0.8513	0.4596	5	No	15	0.6709	0.3154	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1927	1.746	1.056	5	No	15	1.401	0.5091	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1929	1.373	0.5769	5	No	15	1.102	0.8662	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-203	1.157	0.2704	5	No	14	0.8204	0.9287	0	None	x^(1/3)	0.01	Param.
Fluoride, total (mg/L)	JTMN-1	0.3109	0.238	4	No	9	0.2744	0.03779	0	None	No	0.01	Param.
Fluoride, total (mg/L)	JTMN-2	0.3893	0.2485	4	No	9	0.3189	0.07288	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-016	0.2585	0.2323	4	No	13	0.2454	0.01761	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-107	0.2394	0.21	4	No	15	0.2247	0.02167	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-112	0.3447	0.2033	4	No	5	0.274	0.04219	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1604D	0.2139	0.1754	4	No	26	0.1946	0.03952	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1604S	0.2369	0.2077	4	No	26	0.2223	0.02997	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605D	0.2068	0.1909	4	No	26	0.1988	0.01633	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605S	0.2819	0.2511	4	No	26	0.2665	0.03162	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1606D	0.26	0.24	4	No	26	0.2554	0.05812	0	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW-1606S	0.4503	0.383	4	No	27	0.4167	0.0706	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1607D	0.5237	0.48	4	No	27	0.5019	0.04583	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1607S	0.2773	0.2412	4	No	26	0.2592	0.03698	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1805	0.456	0.236	4	No	15	0.346	0.1623	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1922D	0.3164	0.293	4	No	15	0.3047	0.01727	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1922S	0.1803	0.1464	4	No	15	0.1633	0.02498	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1923	0.2573	0.1921	4	No	15	0.2247	0.04809	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1924	0.5232	0.4461	4	No	15	0.4847	0.05693	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1925	0.3075	0.2632	4	No	15	0.2853	0.0327	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1926	0.2736	0.2424	4	No	15	0.258	0.02305	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1927	0.17	0.13	4	No	15	0.1507	0.0171	0	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW-1929	0.238	0.206	4	No	15	0.222	0.02366	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-203	0.2956	0.2516	4	No	14	0.2736	0.03104	0	None	No	0.01	Param.
Lead, total (mg/L)	JTMN-1	0.002175	0.0005787	0.015	No	9	0.001377	0.0008265	0	None	No	0.01	Param.
Lead, total (mg/L)	JTMN-2	0.0008869	0.0003831	0.015	No	9	0.000635	0.0002609	0	None	No	0.01	Param.
Lead, total (mg/L)	MW-016	0.0002718	0.00006908	0.015	No	13	0.0002299	0.0003347	7.692	None	ln(x)	0.01	Param.
Lead, total (mg/L)	MW-107	0.0004	0.00004	0.015	No	15	0.0002027	0.0000684	86.67	None	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-112	0.0002	0.00002	0.015	No	5	0.000164	0.0000805	80	None	No	0.031	NP (NDs)
Lead, total (mg/L)	MW-1604D	0.0002	0.000039	0.015	No	25	0.0001566	0.0001281	44	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1604S	0.0002	0.00007	0.015	No	25	0.00014	0.00007219	48	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1605D	0.0002	0.000021	0.015	No	25	0.0001182	0.00008794	52	None	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1605S	0.0002927	0.0001073	0.015	No	25	0.0003095	0.0004403	8	None	ln(x)	0.01	Param.
Lead, total (mg/L)	MW-1606D	0.0002	0.000115	0.015	No	25	0.0002583	0.0003884	52	None	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1606S	0.0002	0.00007	0.015	No	25	0.0001328	0.00006947	36	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1607D	0.0002	0.00005	0.015	No	25	0.0001478	0.0001234	44	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1607S	0.00019	0.00007	0.015	No	24	0.000218	0.0003469	4.167	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1805	0.00121	0.0001	0.015	No	15	0.0002607	0.0002639	86.67	None	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1922D	0.0002	0.0001	0.015	No	15	0.0001693	0.00005325	73.33	None	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1922S	0.0003	0.00006	0.015	No	15	0.000274	0.0004133	6.667	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1923	0.0009368	0.0003041	0.015	No	15	0.0006652	0.0005232	0	None	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW-1924	0.0003192	0.00008385	0.015	No	15	0.0002704	0.0003245	0	None	ln(x)	0.01	Param.
Lead, total (mg/L)	MW-1925	0.0002	0.00008	0.015	No	15	0.0001687	0.00008863	46.67	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1926	0.00024	0.00007	0.015	No	15	0.0002187	0.0002197	53.33	None	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1927	0.000441	0.00008	0.015	No	15	0.0001787	0.0000927	53.33	None	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1929	0.000317	0.00009517	0.015	No	15	0.0002686	0.0003169	0	None	ln(x)	0.01	Param.
Lead, total (mg/L)	MW-203	0.0002	0.000113	0.015	No	14	0.0001885	0.00003551	71.43	None	No	0.01	NP (NDs)
Lithium, total (mg/L)	JTMN-1	0.01186	0.005876	0.04	No	9	0.008866	0.003096	0	None	No	0.01	Param.

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Data: Mountaineer BAP Printed 2/5/2024, 11:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Lithium, total (mg/L)	JTMN-2	0.0215	0.008873	0.04	No	9	0.01519	0.006539	0	None	No	0.01	Param.
Lithium, total (mg/L)	MW-016	0.0319	0.02662	0.04	No	13	0.02926	0.003547	0	None	No	0.01	Param.
Lithium, total (mg/L)	MW-107	0.00486	0.00334	0.04	No	15	0.005547	0.004967	6.667	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-112	0.03	0.00127	0.04	No	5	0.007288	0.0127	20	None	No	0.031	NP (normality)
Lithium, total (mg/L)	MW-1604D	0.05	0.0188	0.04	No	25	0.03122	0.01724	4	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1604S	0.04219	0.0343	0.04	No	25	0.03824	0.007916	0	None	No	0.01	Param.
Lithium, total (mg/L)	MW-1805	0.0426	0.0187	0.04	No	15	0.03258	0.009714	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1922D	0.0126	0.00712	0.04	No	15	0.009688	0.003771	6.667	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1926	0.00744	0.00586	0.04	No	15	0.007241	0.002378	6.667	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1927	0.00725	0.00593	0.04	No	15	0.008351	0.006425	6.667	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1929	0.0048	0.00363	0.04	No	15	0.005185	0.003145	6.667	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-203	0.00237	0.00199	0.04	No	14	0.003059	0.00344	7.143	None	No	0.01	NP (normality)
Mercury, total (mg/L)	JTMN-1	0.000005	0.000003	0.002	No	9	0.000004333	1.0e-6	55.56	None	No	0.002	NP (NDs)
Mercury, total (mg/L)	JTMN-2	0.000008	0.000002	0.002	No	9	0.000004889	0.000001537	66.67	None	No	0.002	NP (NDs)
Mercury, total (mg/L)	MW-1604D	0.000036	0.000003	0.002	No	24	0.000006208	0.000006359	91.67	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1604S	0.000005	0.000003	0.002	No	24	0.000004917	4.1e-7	95.83	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1605D	0.000005	0.000002	0.002	No	24	0.000004875	6.1e-7	95.83	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1605S	0.000005	0.000003	0.002	No	24	0.000004917	4.1e-7	95.83	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1606D	0.000005	0.000004	0.002	No	24	0.000004958	2.0e-7	95.83	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1606S	0.000005	0.000002	0.002	No	24	0.000004875	6.1e-7	95.83	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1607D	0.000005	0.000002	0.002	No	24	0.00000475	8.5e-7	91.67	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1607S	0.000012	0.000003	0.002	No	24	0.000005125	0.00001569	87.5	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1922D	0.000005	0.000002	0.002	No	14	0.000004786	8.0e-7	92.86	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1922S	0.000005	0.000002	0.002	No	14	0.000004786	8.0e-7	92.86	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1923	0.000005	0.000002	0.002	No	14	0.000004786	8.0e-7	92.86	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1924	0.000005	0.000003	0.002	No	14	0.000004857	5.3e-7	92.86	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	JTMN-1	0.01478	0.00586	0.1	No	9	0.01032	0.004621	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	JTMN-2	0.0294	0.009287	0.1	No	9	0.01934	0.01042	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-016	0.03833	0.0349	0.1	No	13	0.03662	0.002312	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-107	0.002	0.0002	0.1	No	15	0.001	0.0008255	33.33	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-112	0.0121	0.003696	0.1	No	5	0.0079	0.002509	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1604D	0.0181	0.0014	0.1	No	25	0.007169	0.008172	4	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1604S	0.01444	0.01086	0.1	No	25	0.01068	0.00581	0	None	x^3	0.01	Param.
Molybdenum, total (mg/L)	MW-1605D	0.04366	0.03509	0.1	No	25	0.03938	0.008589	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1605S	0.01706	0.01357	0.1	No	25	0.01563	0.003972	0	None	ln(x)	0.01	Param.
Molybdenum, total (mg/L)	MW-1606D	0.0728	0.06546	0.1	No	25	0.06913	0.007364	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1606S	0.07759	0.05826	0.1	No	25	0.07006	0.02126	0	None	ln(x)	0.01	Param.
Molybdenum, total (mg/L)	MW-1607D	0.08444	0.07439	0.1	No	25	0.07941	0.01008	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1607S	0.0409	0.03392	0.1	No	25	0.03741	0.007004	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1805	0.04913	0.01045	0.1	No	15	0.03347	0.03133	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW-1922D	0.2172	0.05112	0.1	No	15	0.1786	0.1848	0	None	ln(x)	0.01	Param.
Molybdenum, total (mg/L)	MW-1922S	0.0344	0.02786	0.1	No	15	0.03113	0.004825	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1923	0.334	0.0842	0.1	No	15	0.2291	0.1145	0	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1924	0.1093	0.08318	0.1	No	15	0.09623	0.01926	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1925	0.05724	0.04395	0.1	No	15	0.05059	0.009801	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1926	0.00616	0.0041	0.1	No	15	0.005191	0.001353	0	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1927	0.00282	0.0009	0.1	No	15	0.001795	0.001558	0	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1929	0.0008	0.0004	0.1	No	15	0.0008933	0.001157	6.667	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-203	0.0013	0.0009	0.1	No	14	0.001129	0.0002867	0	None	No	0.01	NP (normality)
Selenium, total (mg/L)	JTMN-1	0.001034	0.000483	0.05	No	9	0.0007578	0.0003133	0	None	x^(1/3)	0.01	Param.
Selenium, total (mg/L)	JTMN-2	0.0008791	0.0003453	0.05	No	9	0.0006122	0.0002764	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-016	0.000189	0.0001126	0.05	No	13	0.0001508	0.00005139	7.692	None	No	0.01	Param.
Selenium, total (mg/L)	MW-107	0.0007237	0.0004296	0.05	No	15	0.0005767	0.000217	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-112	0.001493	0.0004668	0.05	No	5	0.000928	0.0003327	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1604D	0.001816	0.00095	0.05	No	25	0.001524	0.001027	0	None	x^(1/3)	0.01	Param.

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Data: Mountaineer BAP Printed 2/5/2024, 11:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Selenium, total (mg/L)	MW-1604S	0.001632	0.0009339	0.05	No	25	0.001352	0.000766	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1605D	0.0002362	0.0001622	0.05	No	25	0.0001992	0.00007416	8	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1605S	0.001227	0.0007	0.05	No	25	0.001016	0.0006033	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1606D	0.004218	0.002024	0.05	No	25	0.003406	0.002395	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1606S	0.002634	0.001371	0.05	No	25	0.002149	0.001427	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1607D	0.0005	0.00005	0.05	No	25	0.000252	0.000225	40	None	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1607S	0.007369	0.004648	0.05	No	25	0.006008	0.002729	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1805	0.0005	0.0001	0.05	No	15	0.00039	0.0001892	73.33	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	MW-1922D	0.0005	0.00006	0.05	No	15	0.00041	0.0001864	80	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	MW-1922S	0.0005	0.00008	0.05	No	15	0.00027	0.000202	40	None	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1923	0.02397	0.008668	0.05	No	15	0.0173	0.01261	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1924	0.001787	0.0006414	0.05	No	15	0.001325	0.001048	0	None	x^(1/3)	0.01	Param.
Selenium, total (mg/L)	MW-1925	0.005226	0.003304	0.05	No	15	0.004265	0.001418	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1926	0.0009314	0.000377	0.05	No	15	0.000686	0.0004951	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1927	0.001066	0.0004129	0.05	No	15	0.0007393	0.0004818	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1929	0.001811	0.001189	0.05	No	15	0.0015	0.000459	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-203	0.001359	0.0008293	0.05	No	14	0.001108	0.000414	0	None	sqrt(x)	0.01	Param.
Thallium, total (mg/L)	JTMN-1	0.0002	0.00004	0.002	No	9	0.0001644	0.00007055	77.78	None	No	0.002	NP (NDs)
Thallium, total (mg/L)	JTMN-2	0.0002	0.00003	0.002	No	9	0.0001811	0.00005667	88.89	None	No	0.002	NP (NDs)
Thallium, total (mg/L)	MW-1604D	0.000231	0.0002	0.002	No	25	0.0002049	0.00006551	60	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1604S	0.00023	0.00004	0.002	No	25	0.0002004	0.0001929	4	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605D	0.0002	0.00005	0.002	No	25	0.0001243	0.00007718	48	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605S	0.0002	0.00005	0.002	No	25	0.000133	0.00007622	52	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1606D	0.000119	0.00007	0.002	No	25	0.0001695	0.0001696	20	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1606S	0.000112	0.00006	0.002	No	25	0.0001557	0.0001764	20	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1607D	0.0002	0.00004	0.002	No	25	0.0001277	0.00008376	56	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1607S	0.00015	0.000058	0.002	No	25	0.0001693	0.0001907	24	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1922S	0.0002	0.00004	0.002	No	15	0.0001573	0.00007334	73.33	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1923	0.0002	0.00003	0.002	No	15	0.0001887	0.00004389	93.33	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1926	0.0002	0.00009	0.002	No	15	0.0001693	0.00006508	80	None	No	0.01	NP (NDs)

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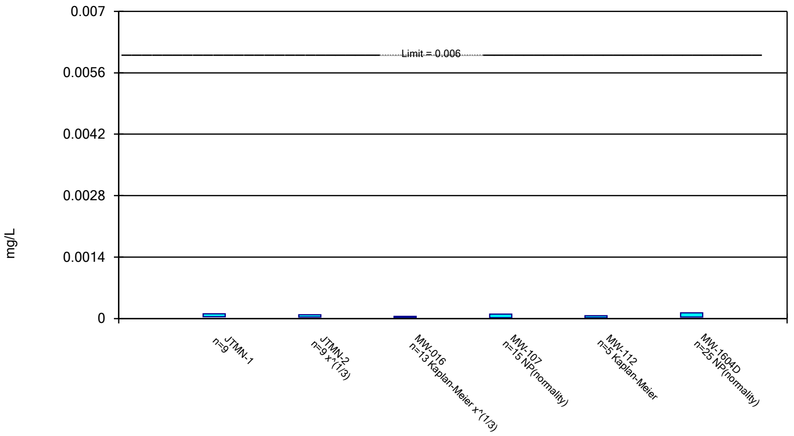
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Antimony, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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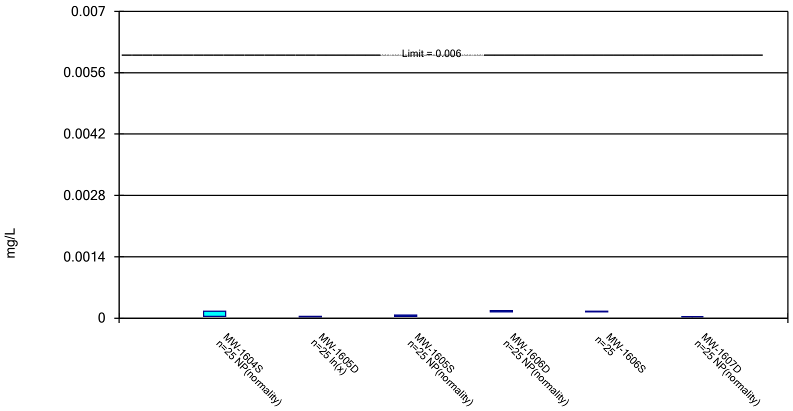
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Antimony, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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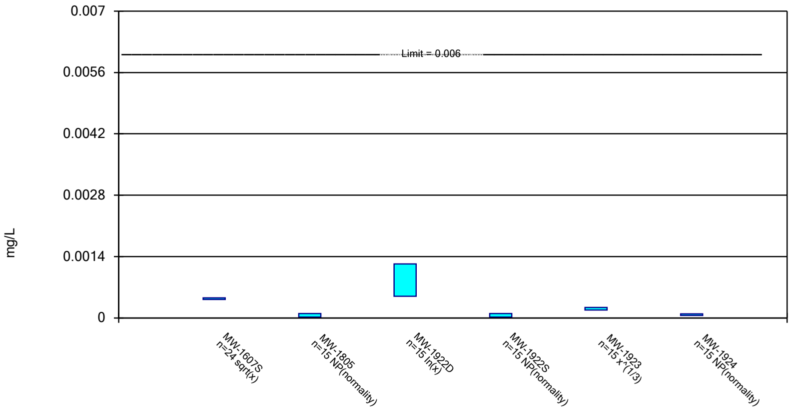
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Antimony, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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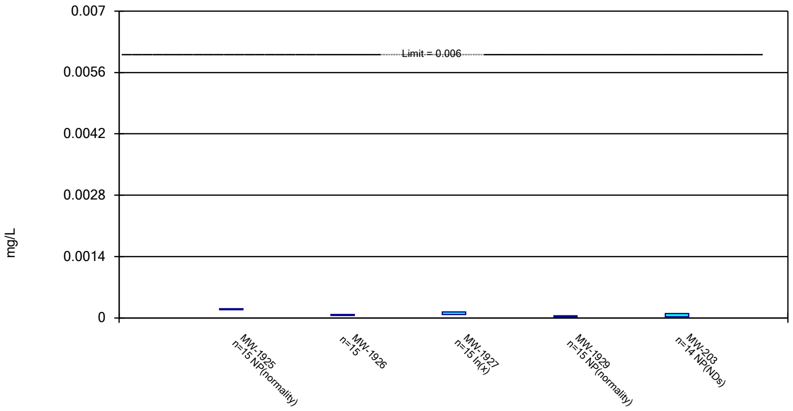
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Antimony, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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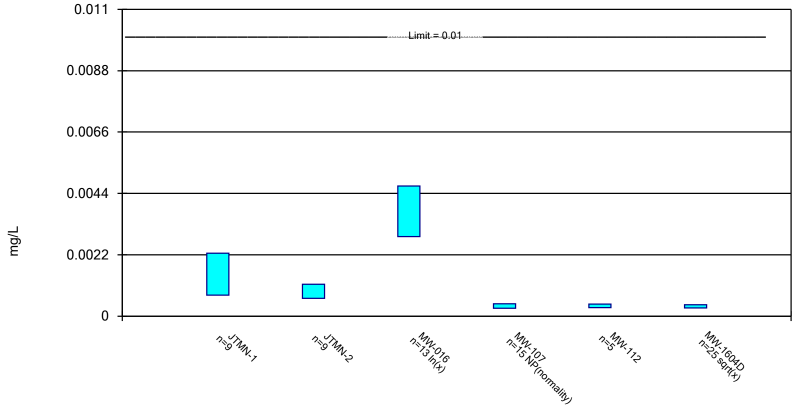
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Arsenic, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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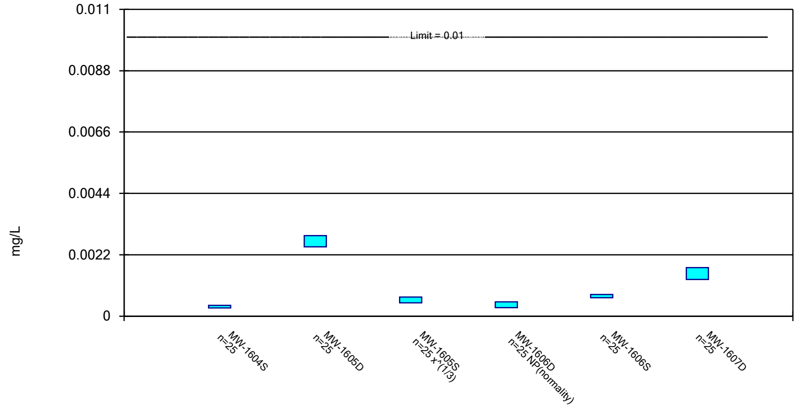
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Arsenic, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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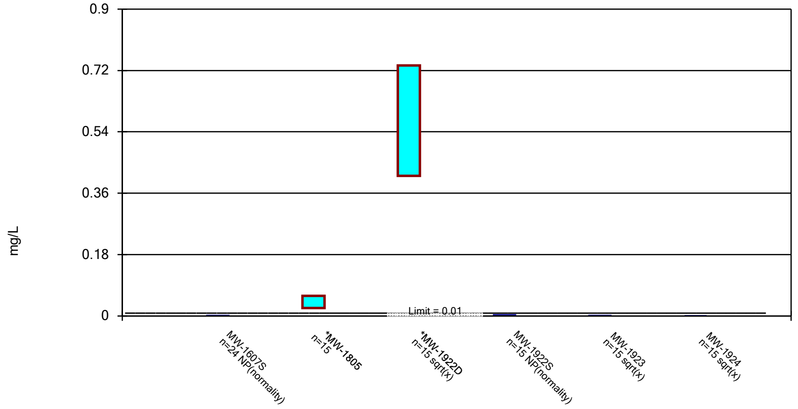
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Arsenic, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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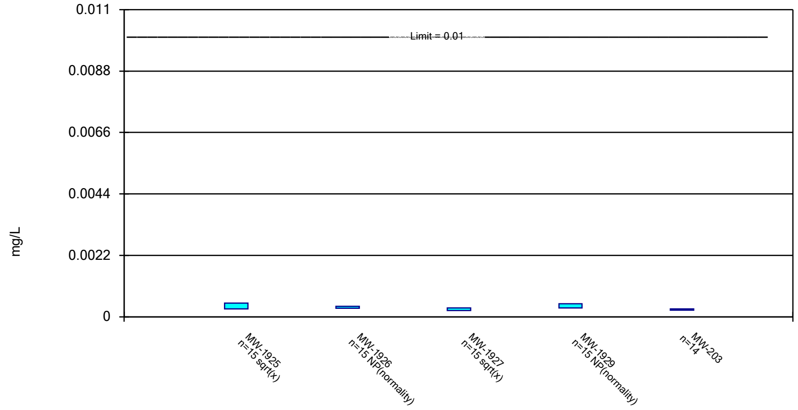
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Arsenic, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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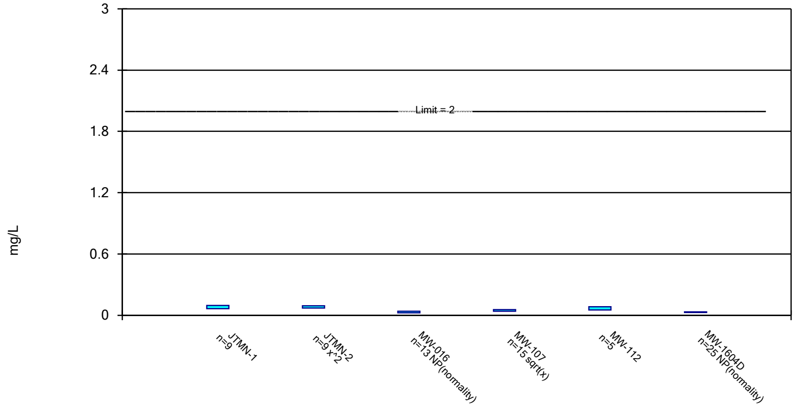
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Barium, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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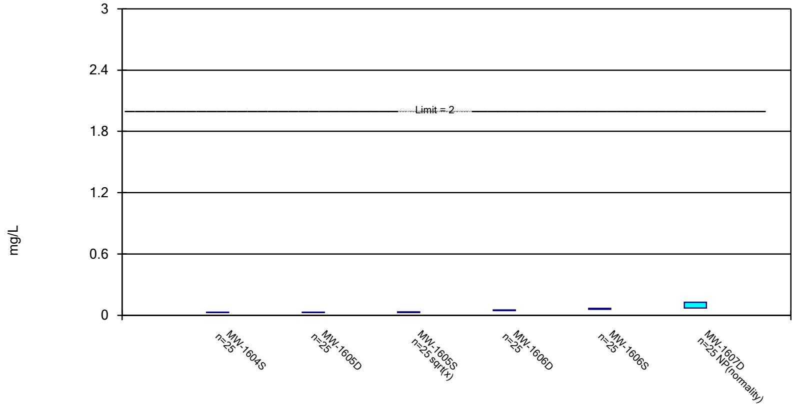
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Barium, total   Analysis Run 2/5/2024 11:57 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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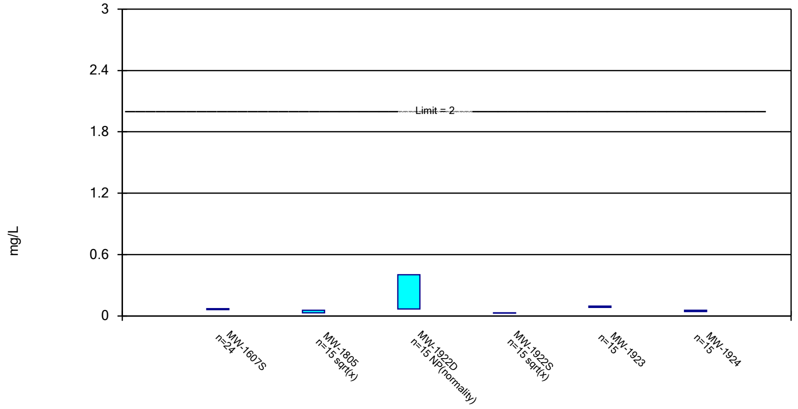
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Barium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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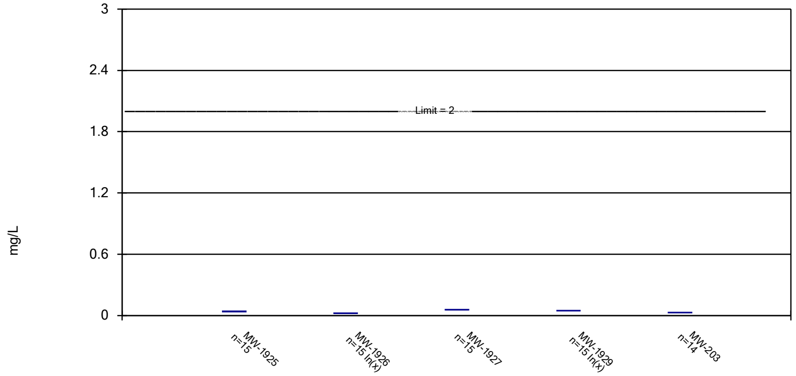
Parametric Confidence Interval

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



Constituent: Barium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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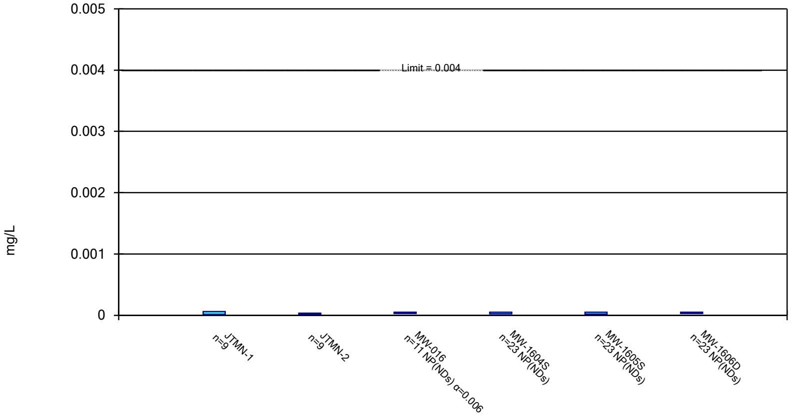
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Beryllium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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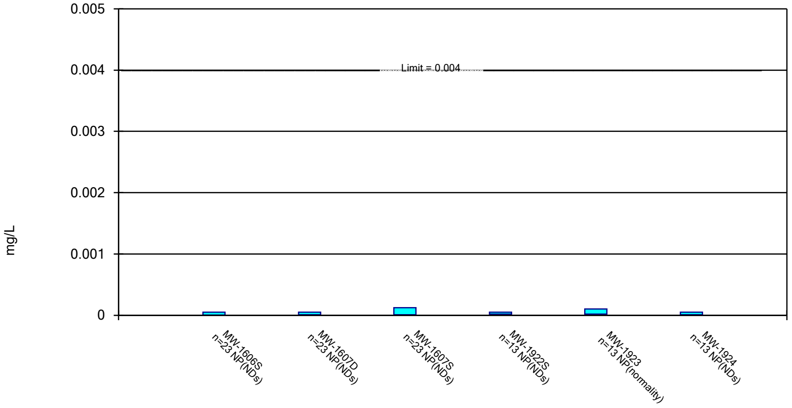
Non-Parametric Confidence Interval

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



Constituent: Beryllium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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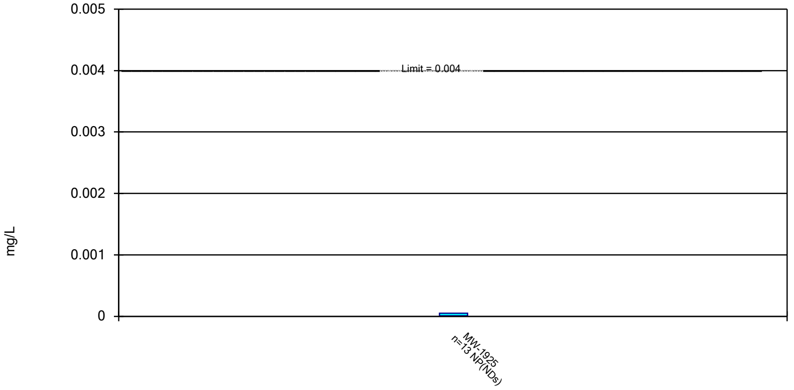
Non-Parametric Confidence Interval

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



Constituent: Beryllium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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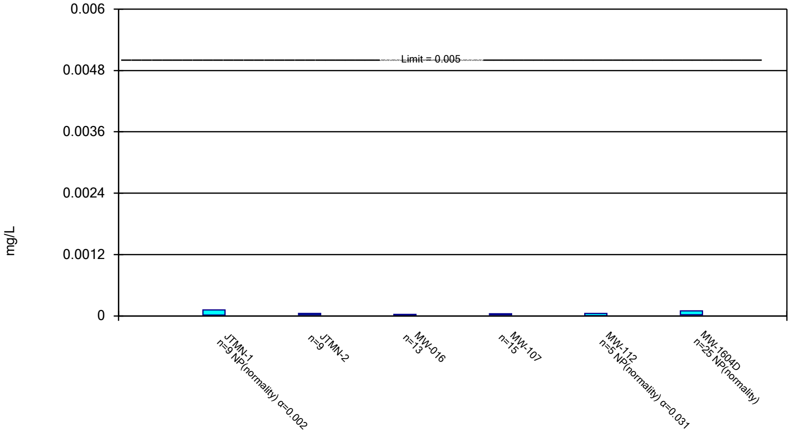
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Cadmium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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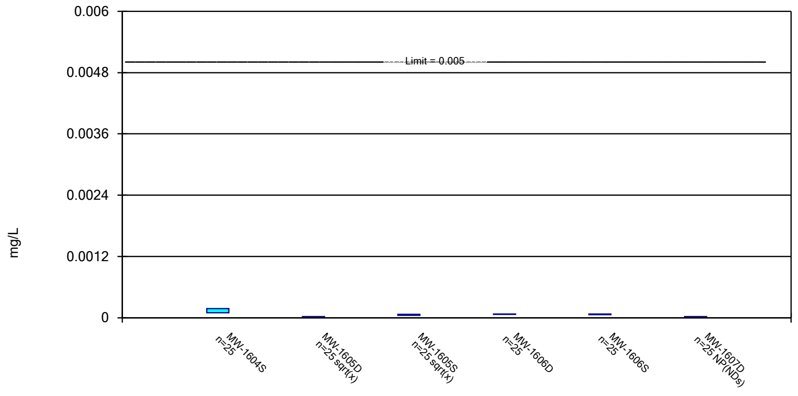
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Cadmium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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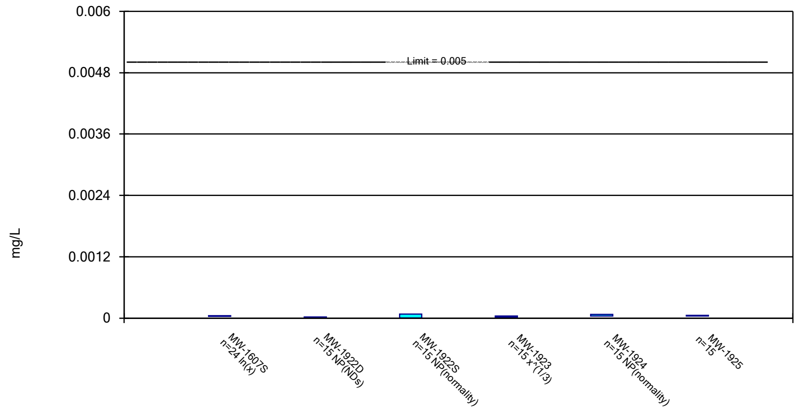
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Cadmium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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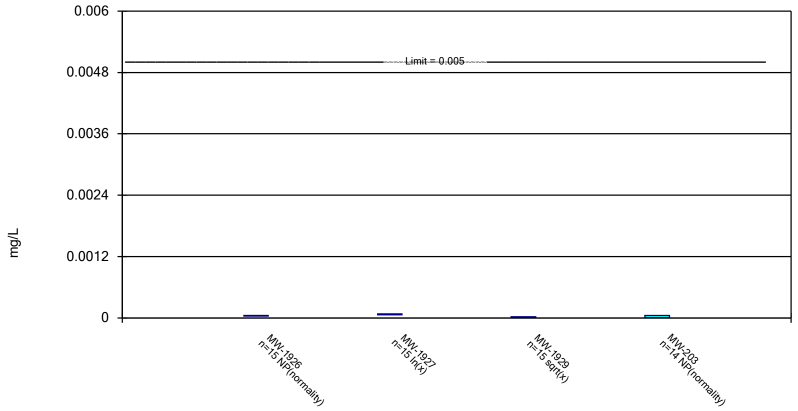
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Cadmium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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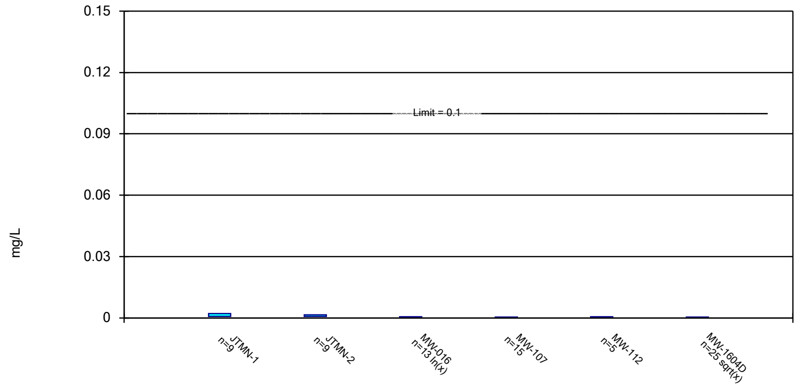
Parametric Confidence Interval

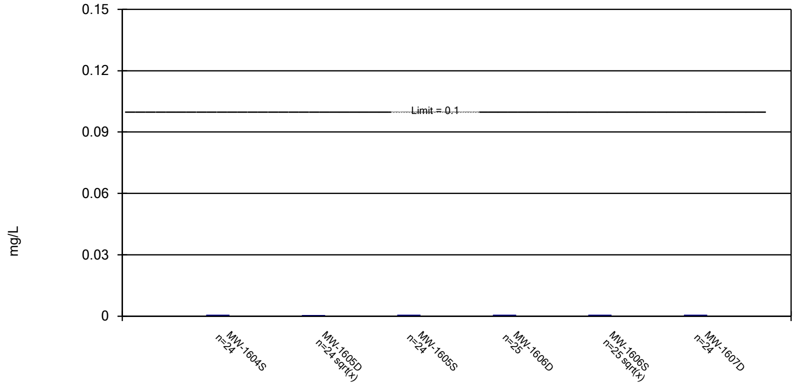
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

Parametric Confidence Interval

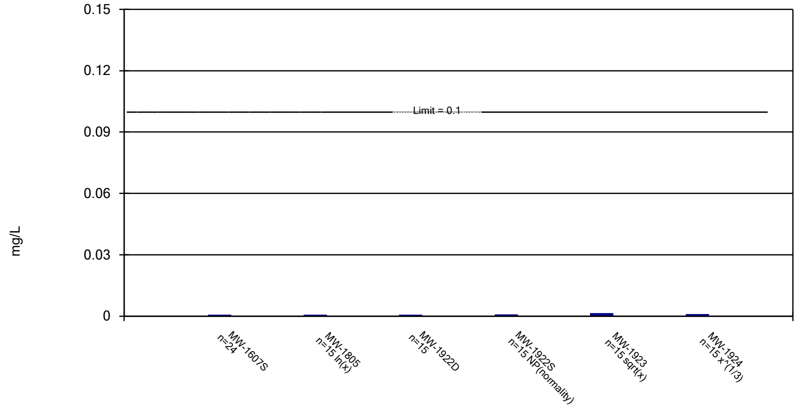
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

Parametric and Non-Parametric (NP) Confidence Interval

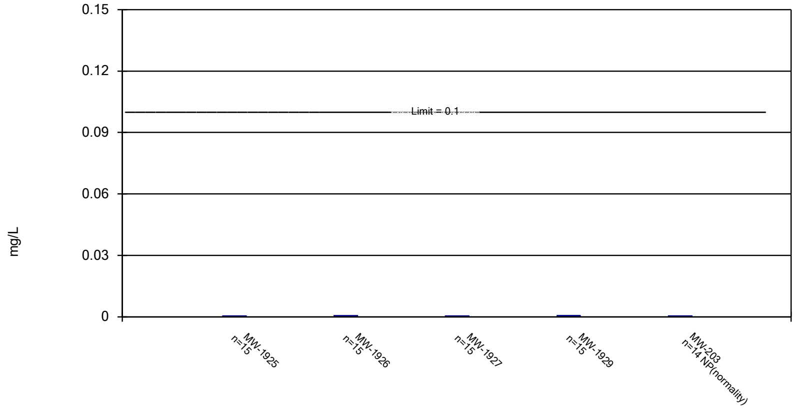
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

Parametric and Non-Parametric (NP) Confidence Interval

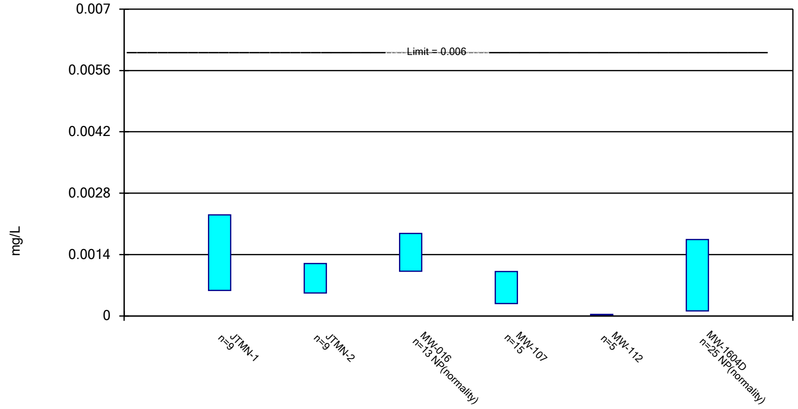
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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: Cobalt, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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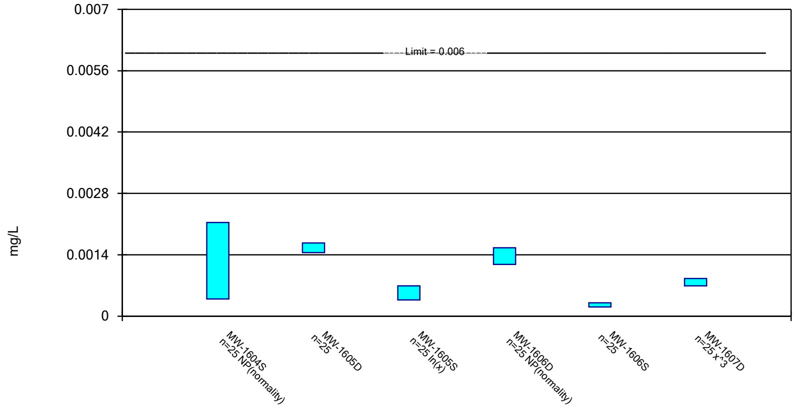
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Cobalt, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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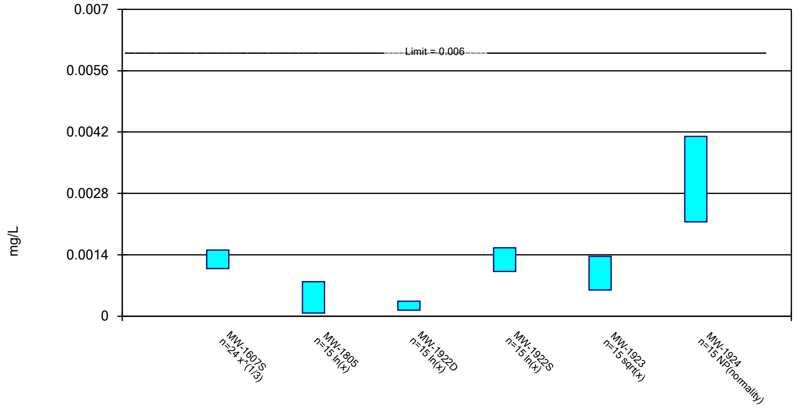
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Cobalt, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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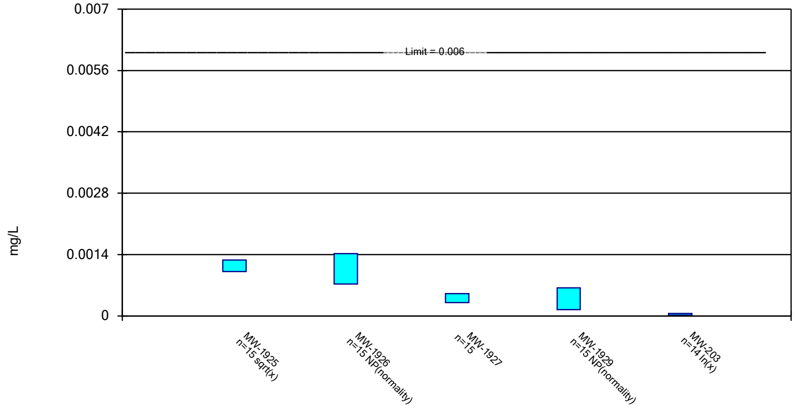
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Cobalt, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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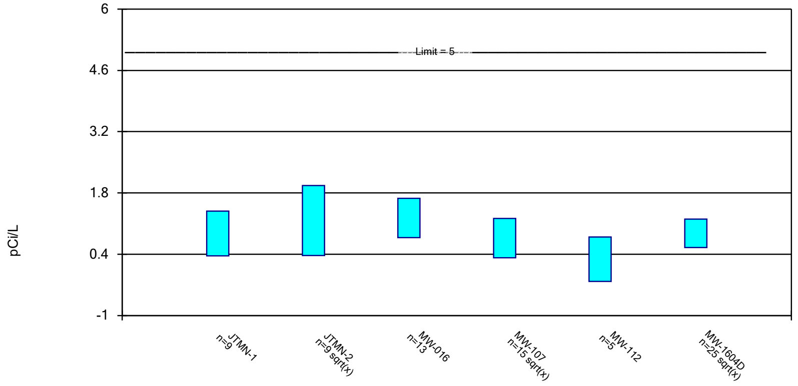
Parametric Confidence Interval

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



Constituent: Combined Radium 226 + 228   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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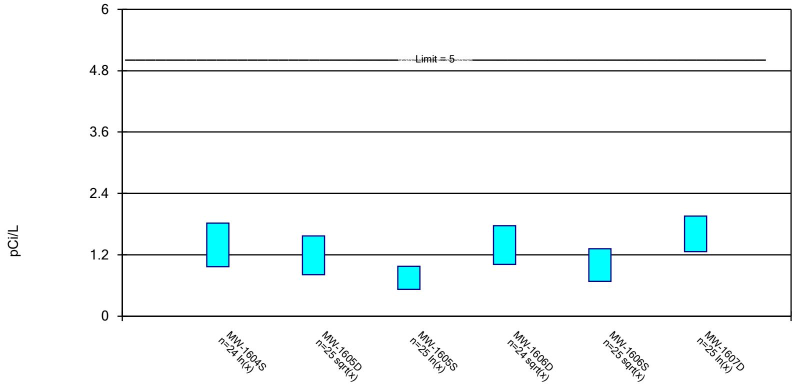
Parametric Confidence Interval

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



Constituent: Combined Radium 226 + 228 Analysis Run 2/5/2024 11:58 AM View: Confidence Intervals
Mountaineer BAP Data: Mountaineer BAP

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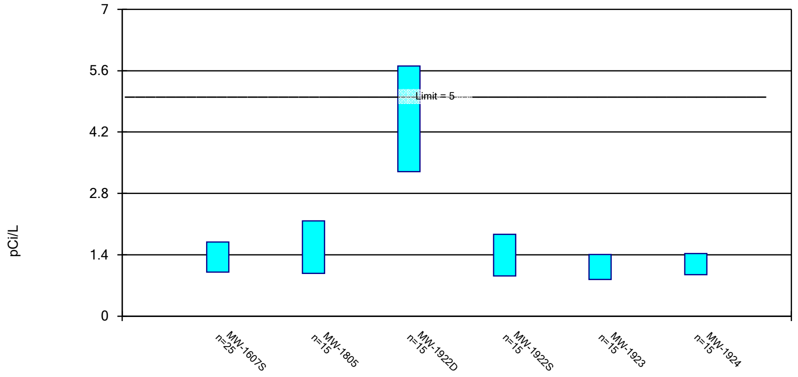
Parametric Confidence Interval

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



Constituent: Combined Radium 226 + 228 Analysis Run 2/5/2024 11:58 AM View: Confidence Intervals
Mountaineer BAP Data: Mountaineer BAP

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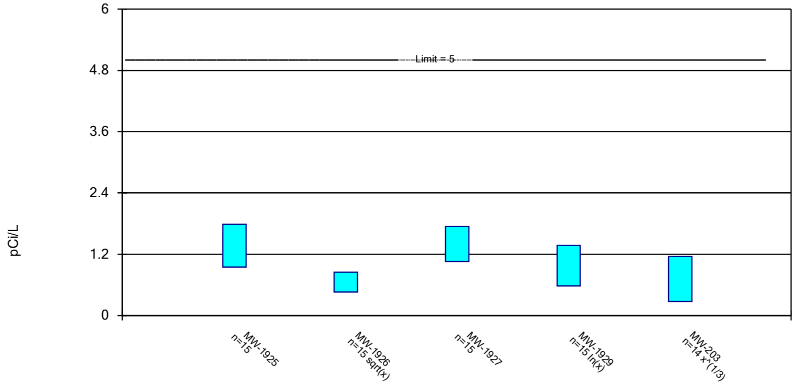
Parametric Confidence Interval

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



Constituent: Combined Radium 226 + 228 Analysis Run 2/5/2024 11:58 AM View: Confidence Intervals
Mountaineer BAP Data: Mountaineer BAP

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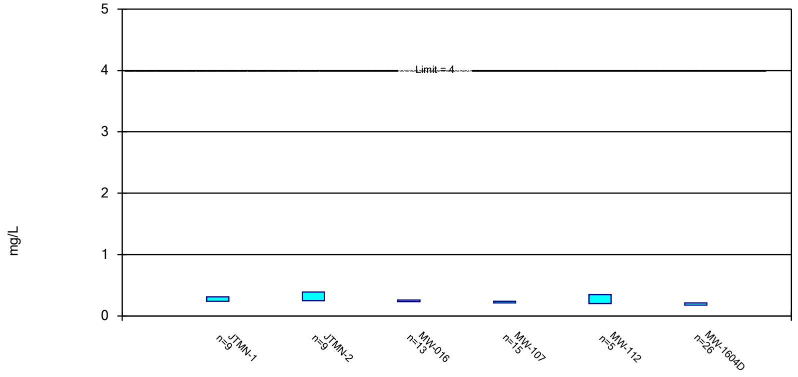
Parametric Confidence Interval

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



Constituent: Fluoride, total Analysis Run 2/5/2024 11:58 AM View: Confidence Intervals
Mountaineer BAP Data: Mountaineer BAP

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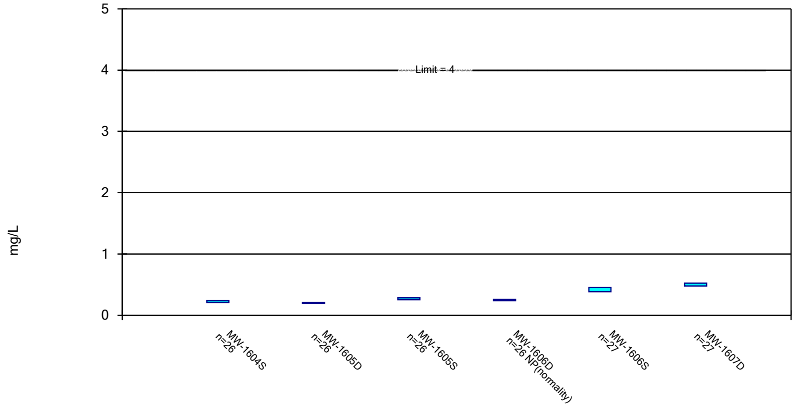
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Fluoride, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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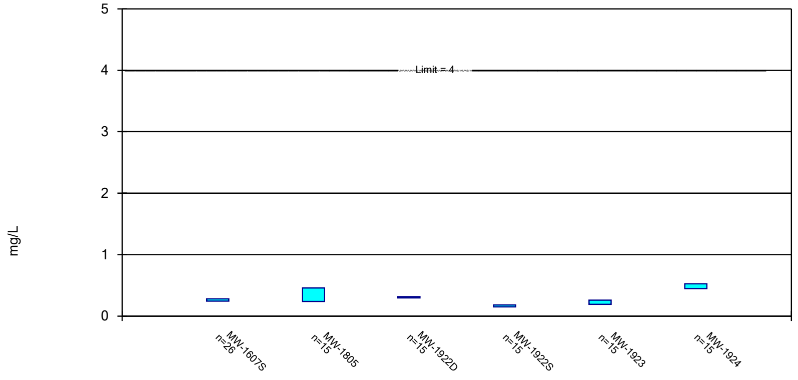
Parametric Confidence Interval

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



Constituent: Fluoride, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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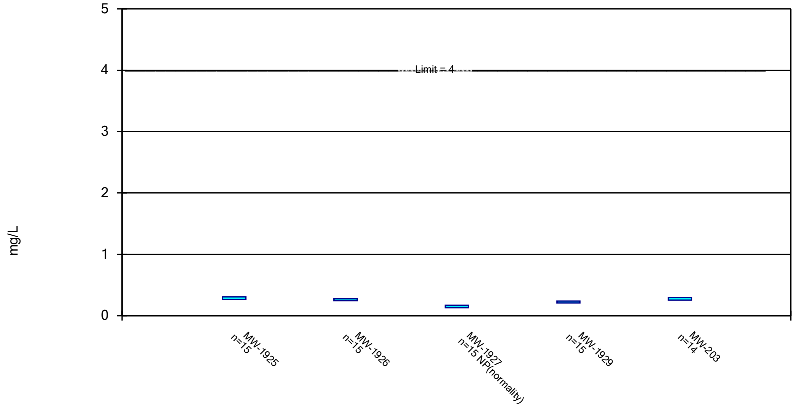
Parametric and Non-Parametric (NP) Confidence Interval

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

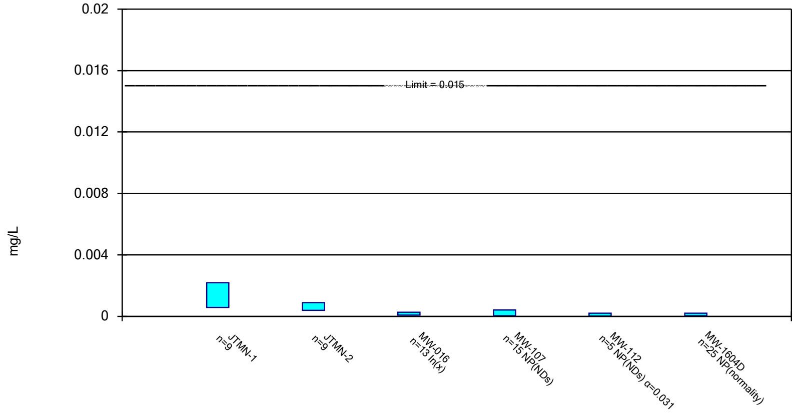


Constituent: Fluoride, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Lead, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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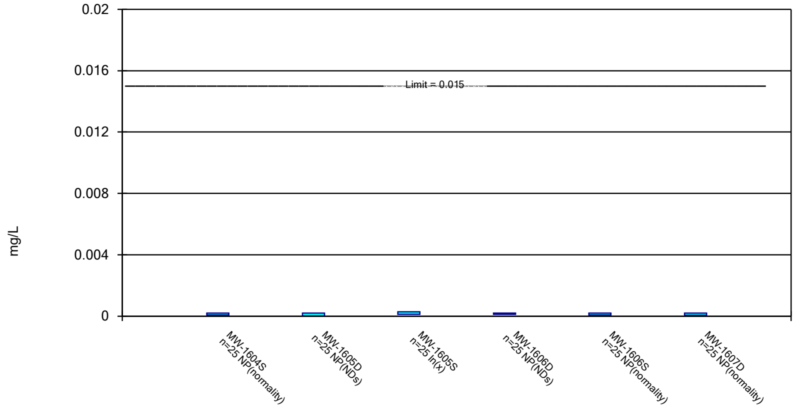
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Lead, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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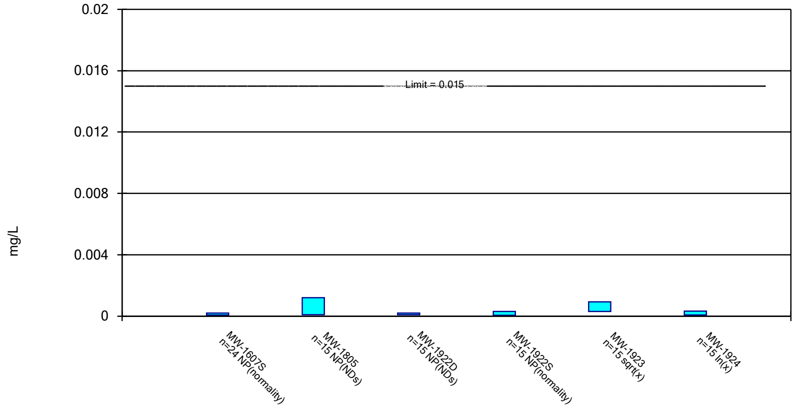
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Lead, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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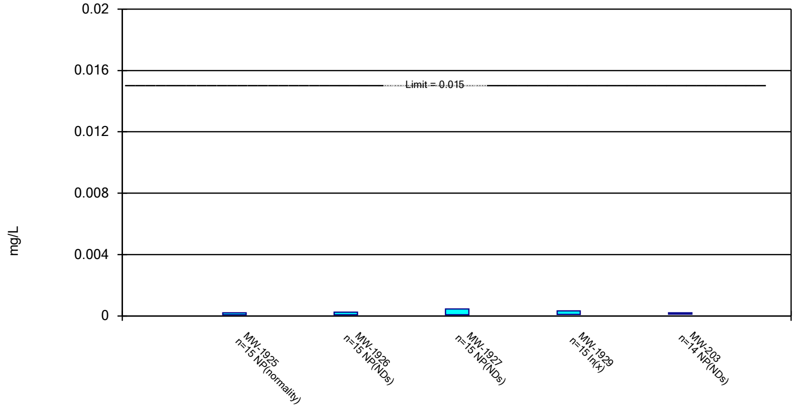
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Lead, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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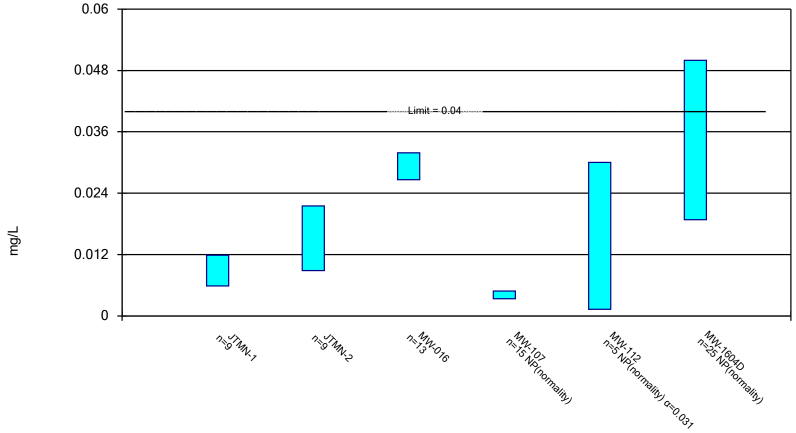
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Lithium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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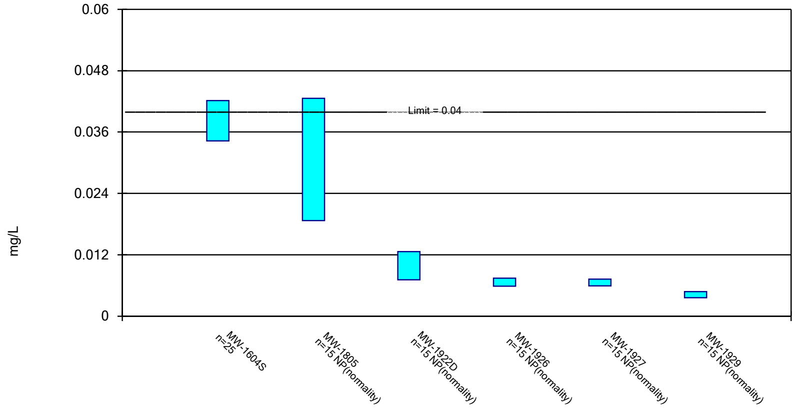
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Lithium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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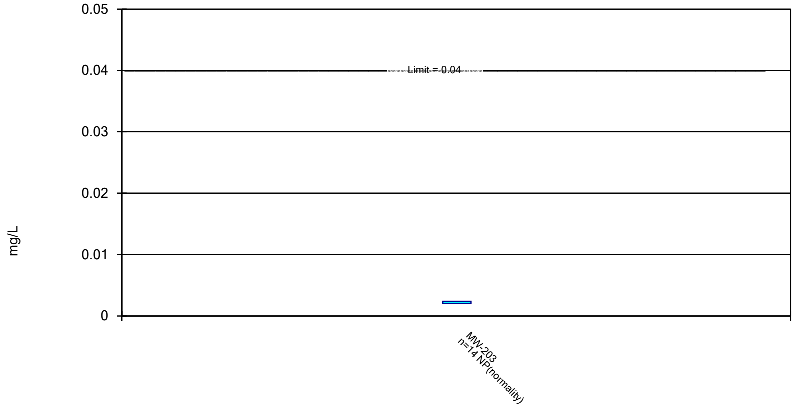
Non-Parametric Confidence Interval

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



Constituent: Lithium, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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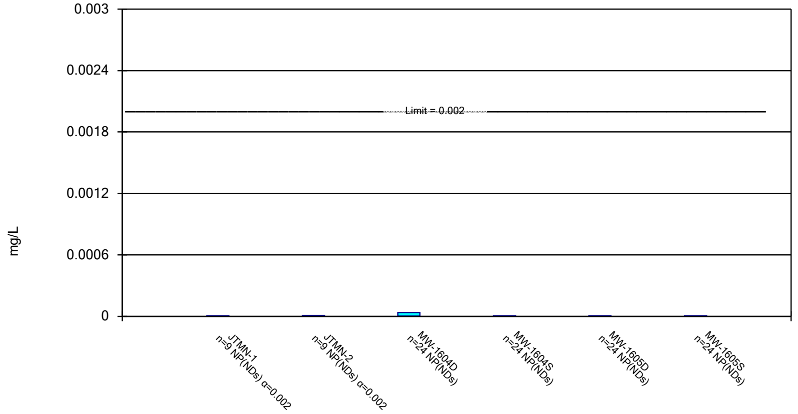
Non-Parametric Confidence Interval

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



Constituent: Mercury, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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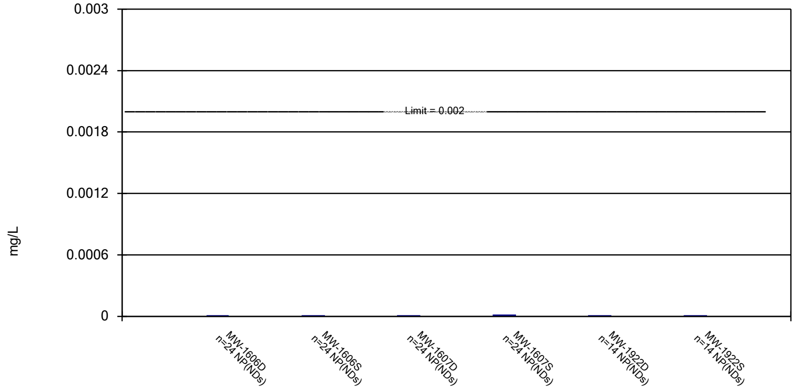
Non-Parametric Confidence Interval

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



Constituent: Mercury, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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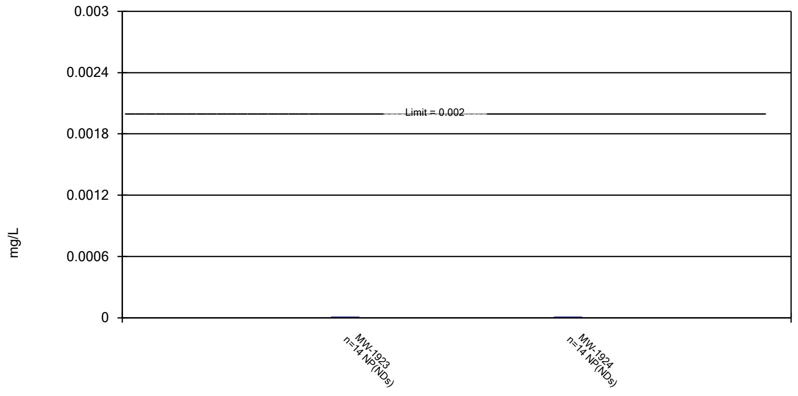
Non-Parametric Confidence Interval

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



Constituent: Mercury, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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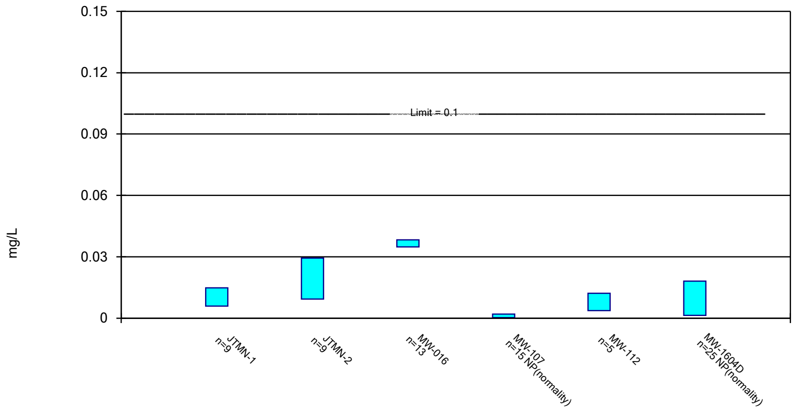
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Molybdenum, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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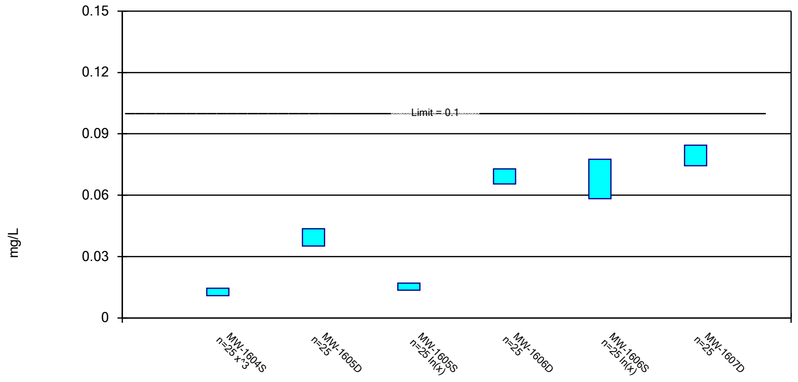
Parametric Confidence Interval

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



Constituent: Molybdenum, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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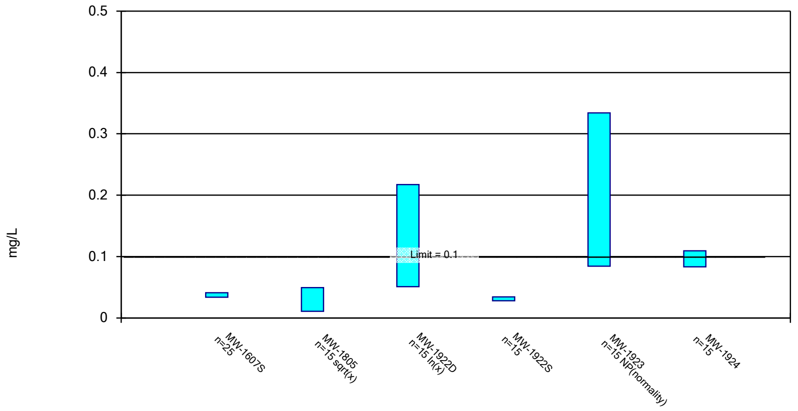
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Molybdenum, total   Analysis Run 2/5/2024 11:58 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

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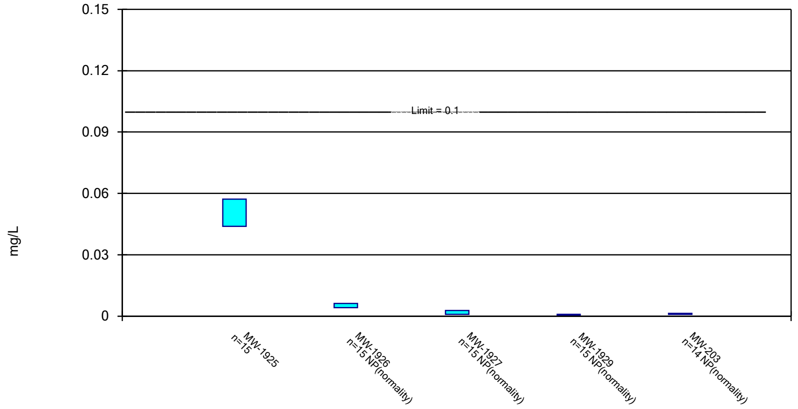
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Molybdenum, total Analysis Run 2/5/2024 11:58 AM View: Confidence Intervals

Mountaineer BAP Data: Mountaineer BAP

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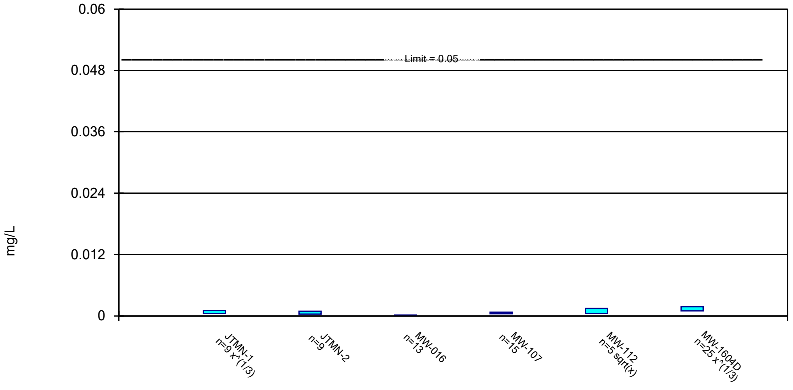
Parametric Confidence Interval

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



Constituent: Selenium, total Analysis Run 2/5/2024 11:58 AM View: Confidence Intervals

Mountaineer BAP Data: Mountaineer BAP

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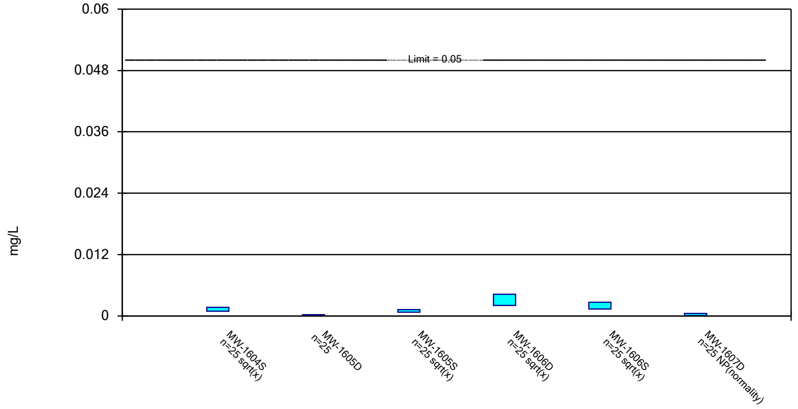
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Selenium, total Analysis Run 2/5/2024 11:58 AM View: Confidence Intervals

Mountaineer BAP Data: Mountaineer BAP

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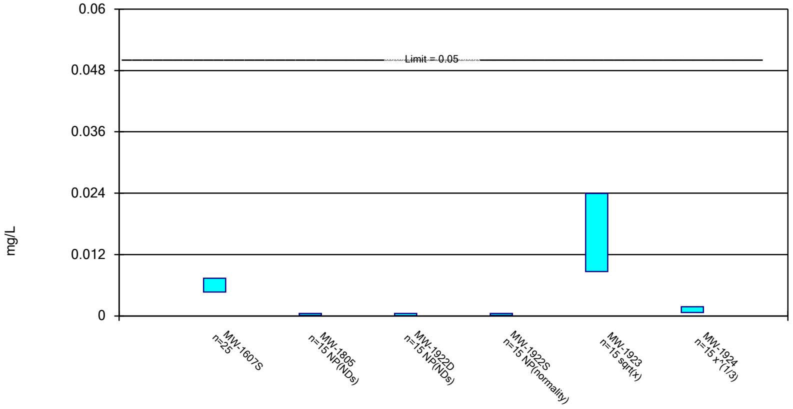
Parametric and Non-Parametric (NP) Confidence Interval

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



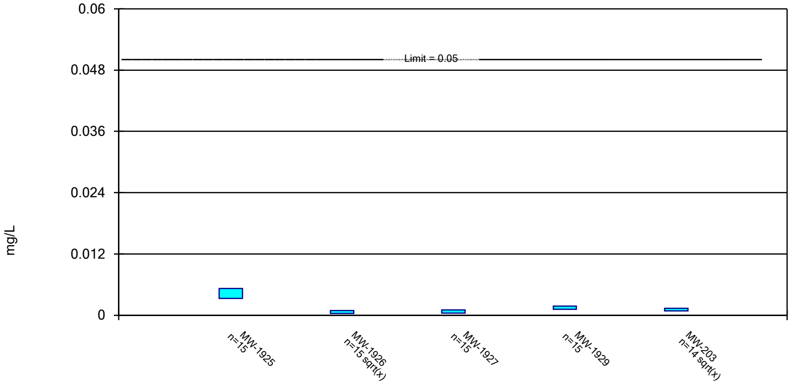
Constituent: Selenium, total Analysis Run 2/5/2024 11:58 AM View: Confidence Intervals

Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Parametric Confidence Interval

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

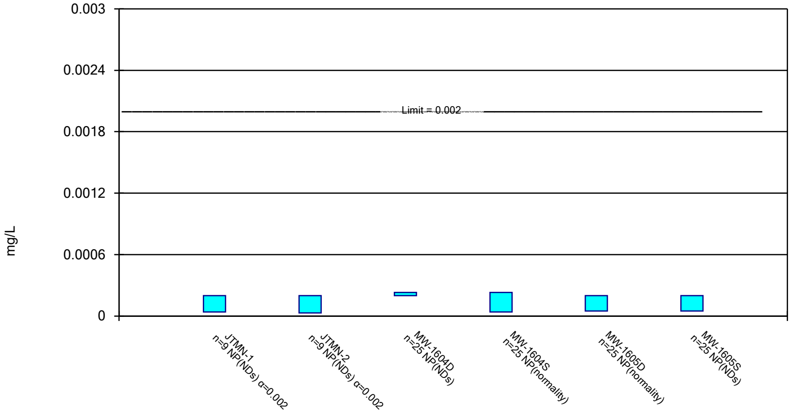


Constituent: Selenium, total   Analysis Run 2/5/2024 11:59 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Non-Parametric Confidence Interval

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

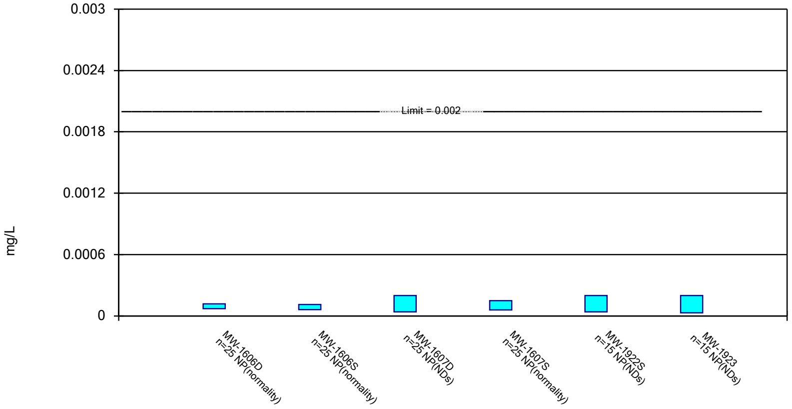


Constituent: Thallium, total   Analysis Run 2/5/2024 11:59 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Non-Parametric Confidence Interval

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

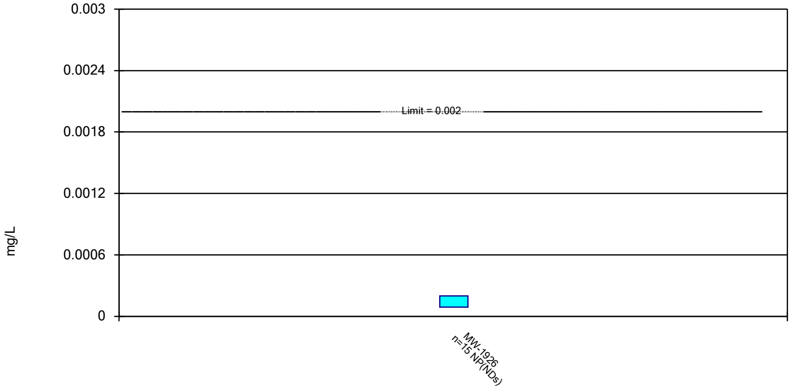


Constituent: Thallium, total   Analysis Run 2/5/2024 11:59 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Non-Parametric Confidence Interval

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



Constituent: Thallium, total   Analysis Run 2/5/2024 11:59 AM   View: Confidence Intervals
Mountaineer BAP   Data: Mountaineer BAP

FIGURE J

Confidence Intervals – Corrective Action

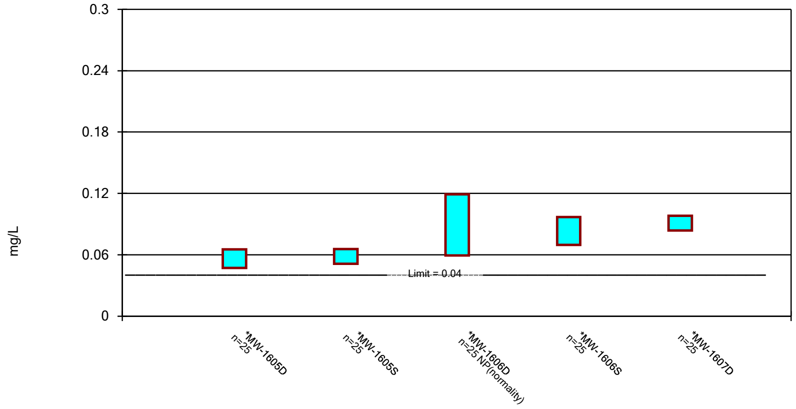
Confidence Intervals - Corrective Action - All/Significant Results

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/6/2024, 4:56 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Lithium, total (mg/L)	**MW-1605D**	**0.06517**	**0.04701**	**0.04**	**Yes**	**25**	**0.05609**	**0.01821**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605S**	**0.06556**	**0.05103**	**0.04**	**Yes**	**25**	**0.0583**	**0.01457**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606D**	**0.119**	**0.0594**	**0.04**	**Yes**	**25**	**0.0873**	**0.03049**	**0**	**None**	**No**	**0.01**	**NP (normality)**
Lithium, total (mg/L)	**MW-1606S**	**0.09674**	**0.06961**	**0.04**	**Yes**	**25**	**0.08318**	**0.02721**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607D**	**0.09824**	**0.08359**	**0.04**	**Yes**	**25**	**0.09092**	**0.0147**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607S**	**0.106**	**0.09283**	**0.04**	**Yes**	**25**	**0.0994**	**0.01319**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1922S**	**0.05832**	**0.04159**	**0.04**	**Yes**	**15**	**0.04995**	**0.01234**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1923**	**0.1984**	**0.1481**	**0.04**	**Yes**	**15**	**0.1733**	**0.03716**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1924**	**0.105**	**0.07191**	**0.04**	**Yes**	**15**	**0.08843**	**0.02438**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1925**	**0.08439**	**0.06369**	**0.04**	**Yes**	**15**	**0.07404**	**0.01527**	**0**	**None**	**No**	**0.01**	**Param.**

Parametric and Non-Parametric (NP) Confidence Interval, Corrective Action Mode

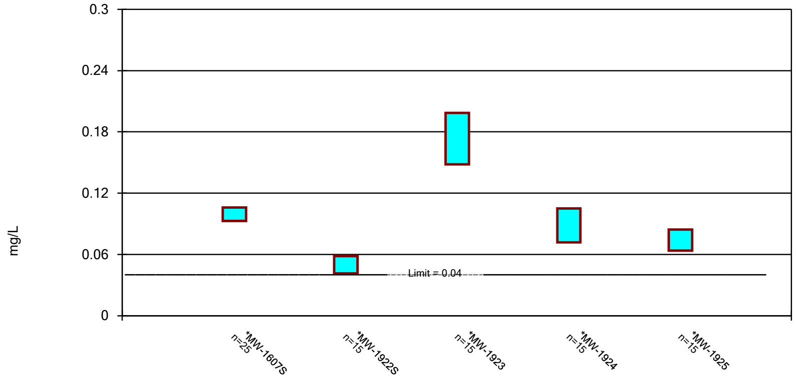
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 2/6/2024 4:56 PM View: Confidence Intervals - CA
Mountaineer BAP Data: Mountaineer BAP

Parametric Confidence Interval, Corrective Action Mode

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



Constituent: Lithium, total Analysis Run 2/6/2024 4:56 PM View: Confidence Intervals - CA
Mountaineer BAP Data: Mountaineer BAP

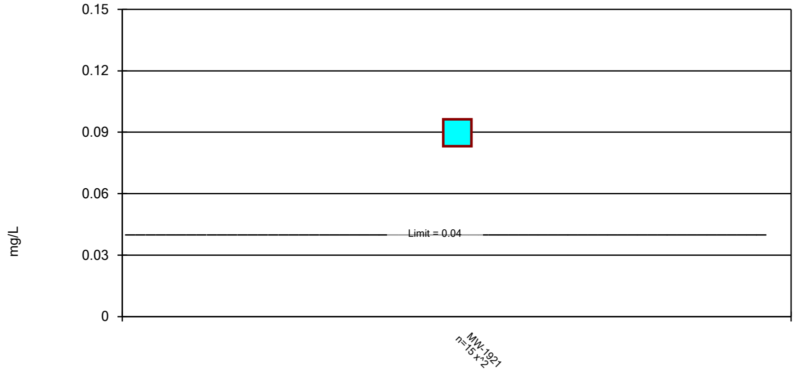
Confidence Interval Summary Table (Corrective Action) - MW-1921

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/20/2024, 9:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Lithium, total (mg/L)	**MW-1921**	**0.09638**	**0.08324**	**0.04**	**Yes**	**15**	**0.08951**	**0.01023**	**0**	**None**	**x^2**	**0.01**	**Param.**

Parametric Confidence Interval, Corrective Action Mode

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



Constituent: Lithium, total   Analysis Run 2/20/2024 9:49 AM

Mountaineer BAP   Data: Mountaineer BAP

FIGURE K

Confidence Intervals – Trend Tests

Trend Tests - Confidence Interval Exceedances - Significant Results

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/7/2024, 9:25 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Arsenic, total (mg/L)	**MW-1922D**	**-0.07533**	**-48**	**-41**	**Yes**	**15**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1605D**	**-0.00614**	**-209**	**-85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1605S**	**-0.005151**	**-193**	**-85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1606D**	**-0.01114**	**-217**	**-85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1606S**	**-0.01014**	**-211**	**-85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1607D**	**0.00258**	**99**	**85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1922S**	**-0.005202**	**-59**	**-41**	**Yes**	**15**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1924**	**-0.01346**	**-65**	**-41**	**Yes**	**15**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1925**	**-0.008877**	**-71**	**-41**	**Yes**	**15**	**0**	**n/a**	**0.05**	**NP**

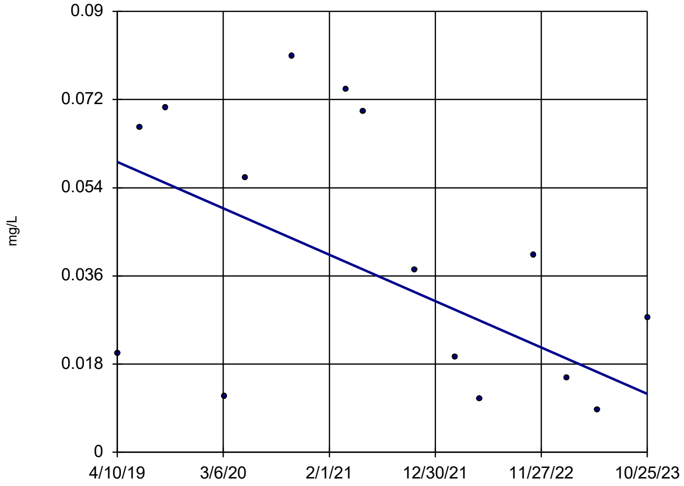
Trend Tests - Confidence Interval Exceedances - All Results

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/7/2024, 9:25 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Arsenic, total (mg/L)	MW-1805	-0.01042	-35	-41	No	15	0	n/a	0.05	NP
Arsenic, total (mg/L)	**MW-1922D**	**-0.07533**	**-48**	**-41**	**Yes**	**15**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1605D**	**-0.00614**	**-209**	**-85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1605S**	**-0.005151**	**-193**	**-85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1606D**	**-0.01114**	**-217**	**-85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1606S**	**-0.01014**	**-211**	**-85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1607D**	**0.00258**	**99**	**85**	**Yes**	**25**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	MW-1607S	-0.0002262	-12	-85	No	25	0	n/a	0.05	NP
Lithium, total (mg/L)	**MW-1922S**	**-0.005202**	**-59**	**-41**	**Yes**	**15**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	MW-1923	0.01476	34	41	No	15	0	n/a	0.05	NP
Lithium, total (mg/L)	**MW-1924**	**-0.01346**	**-65**	**-41**	**Yes**	**15**	**0**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1925**	**-0.008877**	**-71**	**-41**	**Yes**	**15**	**0**	**n/a**	**0.05**	**NP**

Sen's Slope Estimator

MW-1805



n = 15

Slope = -0.01042 units per year.

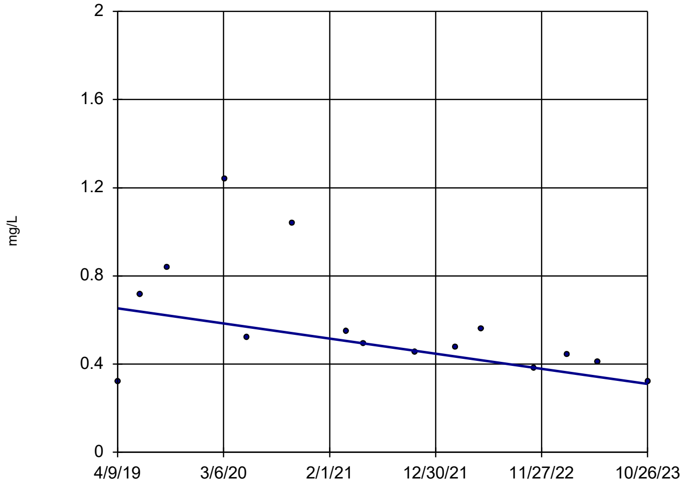
Mann-Kendall statistic = -35 critical = -41

Trend not significant at 95% confidence level (α = 0.025 per tail).

Constituent: Arsenic, total   Analysis Run 2/7/2024 9:24 AM   View: Trend Tests
Mountaineer BAP   Data: Mountaineer BAP

Sen's Slope Estimator

MW-1922D



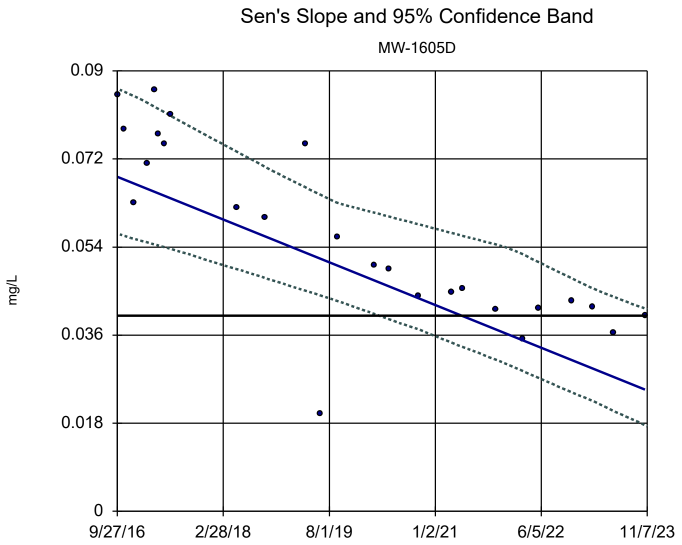
n = 15

Slope = -0.07533 units per year.

Mann-Kendall statistic = -48 critical = -41

Decreasing trend significant at 95% confidence level (α = 0.025 per tail).

Constituent: Arsenic, total   Analysis Run 2/7/2024 9:24 AM   View: Trend Tests
Mountaineer BAP   Data: Mountaineer BAP



n = 25

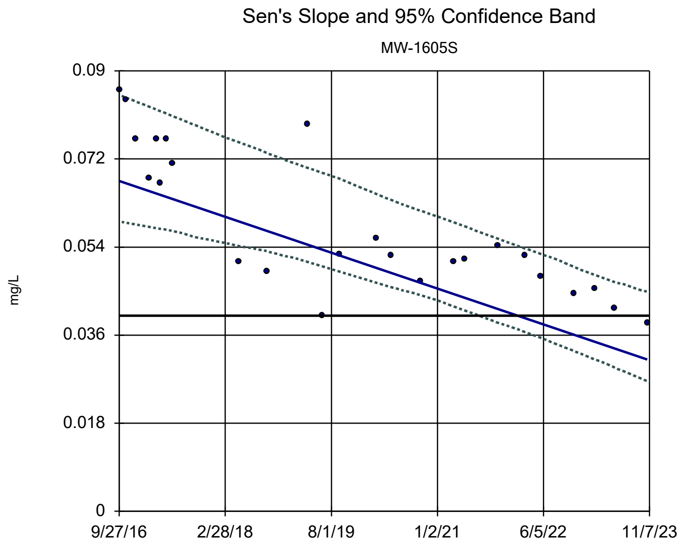
Slope = -0.00614
units per year.

Mann-Kendall
statistic = -209
critical = -85

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band intersects
GWPS (0.04) on 04/24/20.

Constituent: Lithium, total Analysis Run 2/7/2024 9:24 AM View: Trend Tests
Mountaineer BAP Data: Mountaineer BAP



n = 25

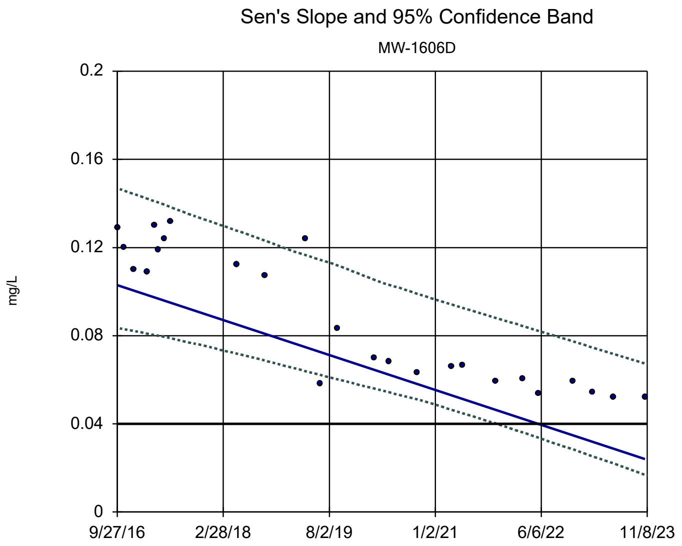
Slope = -0.005151
units per year.

Mann-Kendall
statistic = -193
critical = -85

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band intersects
GWPS (0.04) on 08/02/21.

Constituent: Lithium, total Analysis Run 2/7/2024 9:24 AM View: Trend Tests
Mountaineer BAP Data: Mountaineer BAP



n = 25

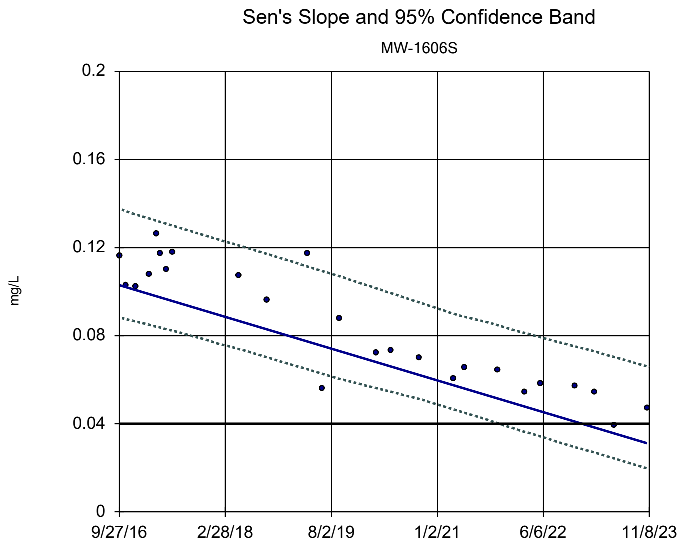
Slope = -0.01114
units per year.

Mann-Kendall
statistic = -217
critical = -85

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band intersects
GWPS (0.04) on 11/14/21.

Constituent: Lithium, total Analysis Run 2/7/2024 9:24 AM View: Trend Tests
Mountaineer BAP Data: Mountaineer BAP



n = 25

Slope = -0.01014
units per year.

Mann-Kendall
statistic = -211
critical = -85

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band intersects
GWPS (0.04) on 11/14/21.

Constituent: Lithium, total Analysis Run 2/7/2024 9:24 AM View: Trend Tests
Mountaineer BAP Data: Mountaineer BAP

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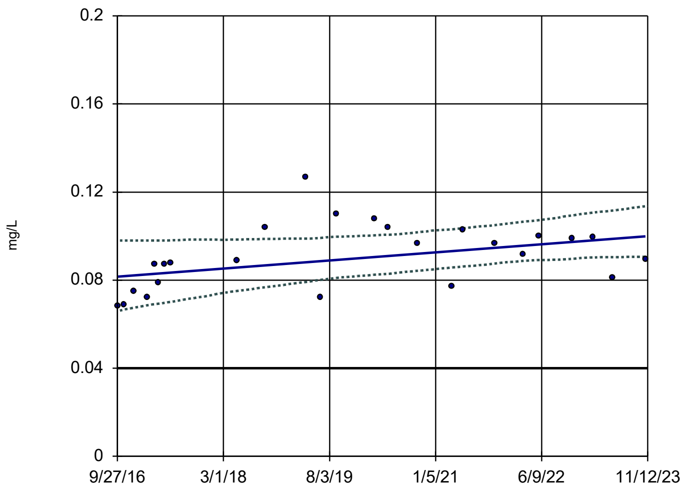
Sen's Slope and 95% Confidence Band

MW-1607D



n = 25

Slope = 0.00258
units per year.

Mann-Kendall
statistic = 99
critical = 85

Increasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

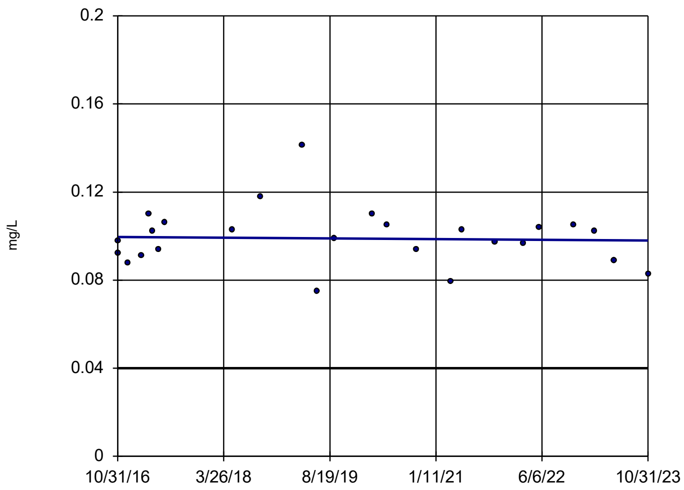
Confidence band is
above GWPS (0.04).

Constituent: Lithium, total Analysis Run 2/7/2024 9:24 AM View: Trend Tests
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Sen's Slope Estimator

MW-1607S



n = 25

Slope = -0.0002262
units per year.

Mann-Kendall
statistic = -12
critical = -85

Trend not sig-
nificant at 95%
confidence level
(α = 0.025 per
tail).

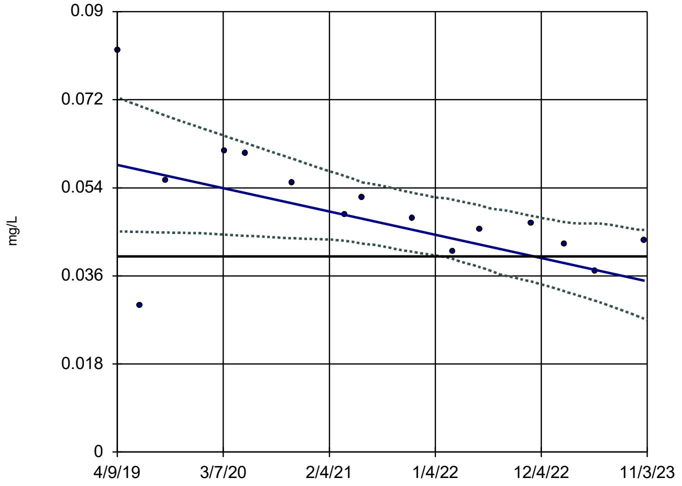
GWPS = 0.04.

Constituent: Lithium, total Analysis Run 2/7/2024 9:24 AM View: Trend Tests
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Sen's Slope and 95% Confidence Band

MW-1922S



n = 15

Slope = -0.005202
units per year.

Mann-Kendall
statistic = -59
critical = -41

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

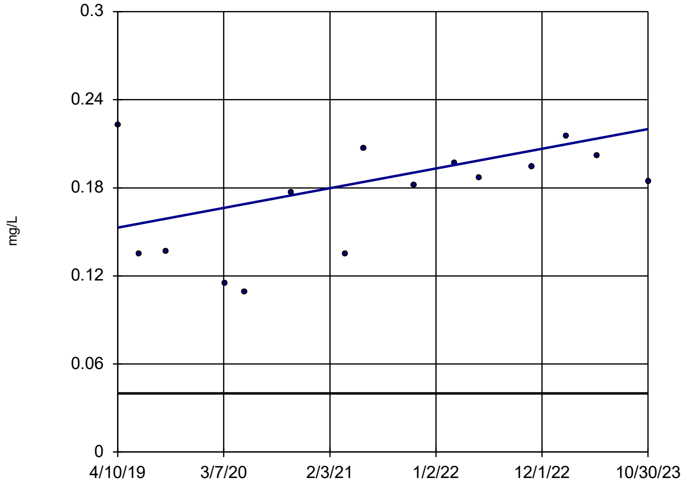
Confidence band intersects
GWPS (0.04) on 02/10/22.

Constituent: Lithium, total Analysis Run 2/7/2024 9:24 AM View: Trend Tests
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Sen's Slope Estimator

MW-1923



n = 15

Slope = 0.01476
units per year.

Mann-Kendall
statistic = 34
critical = 41

Trend not sig-
nificant at 95%
confidence level
(α = 0.025 per
tail).

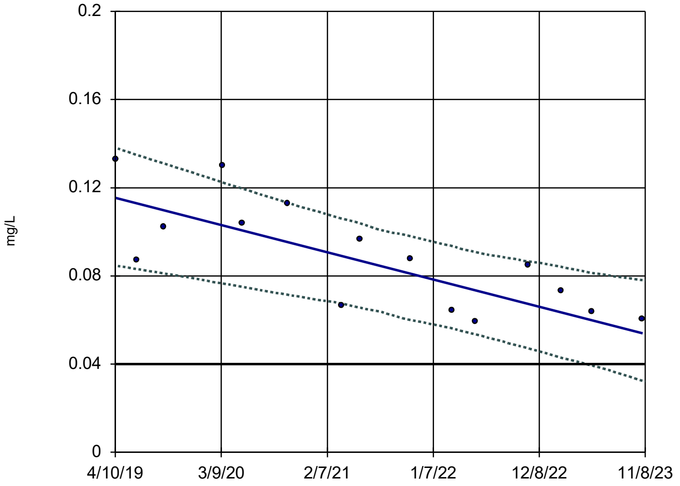
GWPS = 0.04.

Constituent: Lithium, total Analysis Run 2/7/2024 9:24 AM View: Trend Tests
Mountaineer BAP Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Sen's Slope and 95% Confidence Band

MW-1924



n = 15

Slope = -0.01346
units per year.

Mann-Kendall
statistic = -65
critical = -41

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band intersects
GWPS (0.04) on 05/09/23.

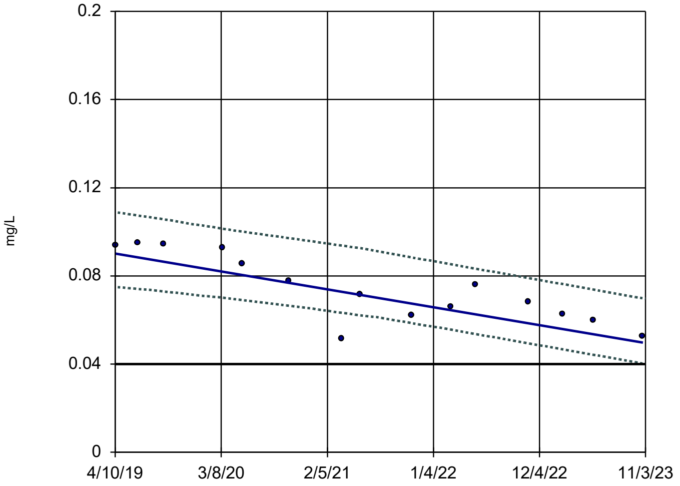
Constituent: Lithium, total   Analysis Run 2/7/2024 9:24 AM   View: Trend Tests

Mountaineer BAP   Data: Mountaineer BAP

Sanitas™ v.10.0.15 Software licensed to . UG

Sen's Slope and 95% Confidence Band

MW-1925



n = 15

Slope = -0.008877
units per year.

Mann-Kendall
statistic = -71
critical = -41

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band is
above GWPS (0.04).

Constituent: Lithium, total   Analysis Run 2/7/2024 9:24 AM   View: Trend Tests

Mountaineer BAP   Data: Mountaineer BAP

STATISTICAL ANALYSIS SUMMARY 2024 1^{ST} SEMIANNUAL EVENT BOTTOM ASH PONDS

Mountaineer Plant
Letart, West Virginia

Prepared for

American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215-2372

Prepared by

Geosyntec Consultants, Inc.
500 West Wilson Bridge Road, Suite 250
Worthington, Ohio 43085

Project Number: CHA8500B

September 24, 2024

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

ASD	alternative source demonstration
BAP	Bottom Ash Ponds
CCR	coal combustion residuals
CFR	Code of Federal Regulations
GWPS	groundwater protection standard
LCL	lower confidence limit
mg/L	milligrams per liter
QA/QC	quality assurance and quality control
SSI	statistically significant increase
SSL	statistically significant level
TDS	total dissolved solids
UCL	upper confidence limit
UPL	upper prediction limit
WVDEP	West Virginia Department of Environmental Protection

1. INTRODUCTION

In accordance with United States Environmental Protection Agency (Code of Federal Regulations [CFR] Title 40, Section 257, Subpart D) and West Virginia Department of Environmental Protection (WVDEP) (WVDEP 33CSR1 and 1B) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments, groundwater monitoring has been conducted at the Bottom Ash Ponds (BAP), a former CCR unit at the Mountaineer Power Plant in Letart, West Virginia. Recent groundwater monitoring results were used to identify concentrations of Appendix IV constituents that are above site-specific groundwater protection standards (GWPS) and to evaluate progress towards completion of the selected corrective action.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, calcium, chloride, sulfate, and total dissolved solids (TDS) at the BAP. An alternative source was not identified at the time; thus, the BAP has been in assessment monitoring since 2018. A statistical evaluation of the assessment monitoring data, conducted in January 2019, identified statistically significant levels (SSLs) for lithium (Geosyntec 2019).

An alternative source was not identified, so the BAP initiated an assessment of corrective measures in accordance with 40 CFR 257.96. Source Removal and Hydraulic Containment was selected as the remedial approach for lithium exceedances at the BAP (Sanborn Head 2021). Corrective action monitoring was initiated in 2022 in accordance with 40 CFR 257.98(a)(1).

During the previous corrective action monitoring event, conducted in October 2023, SSLs were identified for arsenic, and corrective action statistics observed concentrations of lithium above the GWPSs (Geosyntec 2024a). In accordance with 40 CFR 257.95(g)(3)(ii), an alternative source demonstration (ASD) was successfully completed for arsenic (Geosyntec 2024b).

The sampling events as required by 40 CFR 257.98(a)(1) and the *Corrective Action Monitoring Plan* (Sanborn Head 2022), were conducted at the BAP in March and May 2024. The results of these corrective action monitoring events are documented in this report.

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

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Confidence intervals were calculated from the Appendix IV parameter data at the compliance, nature-and-extent, and sentinel wells to assess whether any were present at SSLs above previously established GWPS. SSLs were identified for arsenic and molybdenum. Corrective action statistics identified concentrations of lithium above the GWPS. Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

2. BOTTOM ASH PONDS EVALUATION

2.1 Data Validation and QA/QC

Samples were collected for analysis from the background and compliance wells to meet the requirements of 40 CFR 257.95(b) in March 2024 and 40 CFR 257.95(d)(1) in May 2024 as part of the corrective action monitoring program. Nature and extent wells were sampled during the May 2024 event. Nature and extent wells MW-112 and MW-1928 were not sampled during this event due to insufficient water. Samples from the May 2024 sampling event were analyzed for all Appendix III and IV parameters, whereas samples from the March 2024 event were analyzed for Appendix IV parameters only. A summary of data collected during these assessment monitoring events are presented in Table 1.

Chemical analysis was completed by a National Environmental Laboratory Accreditation Program–certified analytical laboratory. The laboratory completed analysis of quality assurance and quality control (QA/QC) samples such as laboratory reagent blanks, continuing calibration verification samples, and laboratory fortified blanks.

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.10.0.20 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues that would impact data usability were noted.

2.2 Statistical Analysis

Statistical analyses for the BAP were conducted in accordance with the January 2021 *Statistical Analysis Plan* (Geosyntec 2021). Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained in March and May 2024 were screened for potential outliers. No outliers were identified for these events.

2.2.1 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ($\alpha = 0.01$); however, nonparametric confidence limits were calculated in some cases (e.g., when the data were not normally distributed or when the nondetect frequency was too high). Excluding instances where previous lithium exceedances merited corrective action (see Section 2.2.2), an SSL was concluded if the lower confidence limit (LCL) was above the GWPS (i.e., if the entire confidence interval was above the GWPS). The calculated confidence limits (Attachment B) were compared to the GWPSs provided in Table 2. The GWPSs were established during a previous statistical analysis as either (a) the background concentration or (b) the maximum contaminant level and risk-based levels specified in 40 CFR 257.95(h)(2), whichever was greater (Geosyntec 2024a).

The following SSLs were identified at the Mountaineer BAP for assessment monitoring:

- The LCL for arsenic was above the GWPS of 0.0100 milligrams per liter (mg/L) at MW-1805 (0.0190 mg/L) and MW-1922D (0.430 mg/L).

- The LCL for molybdenum was above the GWPS of 0.100 mg/L at MW-1923 (0.242 mg/L).

As a result, either an ASD for arsenic and molybdenum will be prepared in accordance with 40 CFR 257.95(g)(3)(ii) or an assessment of corrective measures will be initiated for one or both constituents.

It was previously noted that nature-and-extent well MW-1921 does not accurately represent groundwater conditions downgradient of the BAPs (Geosyntec 2023). Statistical analyses were still completed for groundwater data at this location to support corrective action monitoring, but the analysis is no longer for compliance purposes. Results of the MW-1921 statistical analyses are provided in Attachment C.

2.2.2 Evaluation of Corrective Action Monitoring

The selected remedy of Source Removal and Hydraulic Containment is considered complete when it meets the requirements of 40 CFR 257.98(c). For previously identified lithium exceedances, which are the subject of the current corrective measures, the upper confidence limit (UCL) of the confidence intervals constructed as described in Section 2.2.1 were compared to the GWPSs provided in Table 2. If the UCL is above the GWPS, compliance with the GWPSs has not been achieved. The following corrective action exceedances were identified:[1]

- The UCL for lithium was above the GWPS of 0.0400 mg/L at MW-1605D (0.0635 mg/L), MW-1605S (0.0631 mg/L), MW-1606D (0.119 mg/L), MW-1606S (0.0938 mg/L), MW-1607D (0.0976 mg/L), MW-1607S (0.105 mg/L), MW-1922S (0.0573 mg/L), MW-1923 (0.199 mg/L), MW-1924 (0.103 mg/L), and MW-1925 (0.0829 mg/L).

For these lithium exceedances, which are the subject of corrective measures, concentrations remain above the GWPS.

Wells with confidence interval exceedances with visually apparent decreasing trends were further evaluated using Mann Kendall trend tests at the 95% confidence level, with confidence bands at 95% confidence around the trend line. Statistically significant decreasing trends were identified for lithium at MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1922S, MW-1924, and MW-1925. The 95% lower confidence band is below the lithium GWPS at MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1922S, MW-1924, and MW-1925. The 95% upper confidence band is below the lithium GWPS at MW-1605D as of May 2, 2024. These

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[1] As discussed in Section 2.2.1, MW-1921 was also evaluated to support corrective action monitoring. The UCL for lithium at MW-1921 (0.0958 mg/L) was above the GWPS.

results suggest the selected remedy is working as intended and lithium concentrations are decreasing downgradient of the BAPs.

2.2.3 Evaluation of Potential Appendix III SSIs

The Appendix III results were analyzed to assess whether concentrations of Appendix III parameters at the compliance wells were above background concentrations. Data collected during the May 2024 assessment monitoring event from each compliance well were compared to previously established prediction limits to assess whether the results were statistically above background values (Table 3). The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations were above the interwell UPL of 0.333 mg/L at MW-1604S (1.93 mg/L), MW-1605D (2.66 mg/L), MW-1605S (3.57 mg/L), MW-1606D (1.93 mg/L), MW-1606S (2.10 mg/L), MW-1607D (4.29 mg/L), and MW-1607S (3.06 mg/L).
- Calcium concentrations were above the interwell UPL of 202 mg/L at MW-1604S (232 mg/L) and MW-1607D (206 mg/L).
- Chloride concentrations were above the interwell UPL of 56.2 mg/L at MW-1604S (105 mg/L), MW-1605D (132 mg/L), MW-1605S (113 mg/L), MW-1606D (106 mg/L), MW-1606S (78.8 mg/L), MW-1607D (176 mg/L), and MW-1607S (149 mg/L).
- Fluoride concentrations were above the interwell UPL of 0.300 mg/L at MW-1606D (0.31 mg/L), MW-1606S (0.41 mg/L), and MW-1607D (0.49 mg/L).
- Sulfate concentrations were above the interwell UPL of 530 mg/L at MW-1604S (685 mg/L), MW-1605D (554 mg/L), MW-1605S (563 mg/L), and MW-1607D (623 mg/L).
- TDS concentrations were above the interwell UPL of 962 mg/L at MW-1604S (1,330 mg/L), MW-1605D (1,300 mg/L), MW-1605S (1,270 mg/L), MW-1606D (1,080 mg/L), MW-1607D (1,500 mg/L), and MW-1607S (1,000 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed and no resampling was conducted if the May 2024 sample was above the UPL or, in the case of pH, below the lower prediction limit. Based on this evaluation, concentrations of Appendix III constituents appear to be above background levels.

2.3 Conclusions

Annual and semiannual corrective action monitoring events were conducted in accordance with the federal and state CCR Rules. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that prevented data usage. A review of outliers identified no potential outliers in the March or May 2024 data. A confidence interval was constructed at each compliance, nature-and-extent, and sentinel well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval was above the GWPS. SSLs were identified for arsenic and molybdenum. For previous lithium exceedances, which are the subject of corrective measures, UCLs remain above the GWPS at select locations, and implementation of the selected remedy will continue. However, statistically significant decreasing trends were observed for lithium at several locations in corrective action. Appendix III parameters were compared to previously calculated prediction limits; concentrations of boron, calcium, chloride, fluoride, sulfate, and TDS were identified above prediction limits.

Based on this evaluation, the Mountaineer BAP CCR unit will remain in corrective action monitoring.

3. REFERENCES

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TABLES

Table 1. Groundwater Data Summary
Statistical Analysis Summary
Mountaineer Plant – Bottom Ash Pond

Parameter	Unit	JTMN-1	JTMN-2	MW-016	MW-107	MW-1601A		MW-1602		MW-1603		MW-1604D		MW-1604S	
		5/20/2024	5/21/2024	5/20/2024	5/17/2024	3/12/2024	5/16/2024	3/12/2024	5/16/2024	3/12/2024	5/16/2024	3/13/2024	5/17/2024	3/13/2024	5/17/2024
Antimony	µg/L	0.036 J1	0.042 J1	0.013 J1	0.019 J1	0.022 J1	0.020 J1	0.020 J1	0.017 J1	0.022 J1	0.017 J1	0.026 J1	0.077 J1	0.129	0.173
Arsenic	µg/L	0.82	0.79	1.62	0.28	0.40	0.41	0.25	0.25	0.18	0.14	0.18	0.30	0.18	0.28
Barium	µg/L	55.2	81.2	22.8	45.9	64.4	70.3	32.1	35.5	28.8	28.4	46.0	43.3	30.0	30.7
Beryllium	µg/L	0.019 J1	0.021 J1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.1 U1
Boron	mg/L	0.252	0.252	0.895	0.766	--	0.120	--	0.109	--	0.194	--	0.132	--	1.93
Cadmium	µg/L	0.015 J1	0.024	0.015 J1	0.031	0.018 J1	0.021	0.017 J1	0.022	0.010 J1	0.010 J1	0.014 J1	0.012 J1	0.211	0.313
Calcium	mg/L	147	146	193	282	--	193	--	103	--	117 M1	--	124	--	232
Chloride	mg/L	38.3	46.3	68.1	90.8	--	52.0	--	13.6	--	11.7	--	25.0	--	105
Chromium	µg/L	1.09	1.14	0.32	0.30	0.27 J1	0.22 J1	0.28 J1	0.36	0.47	0.28 J1	0.25 J1	0.44	0.33	0.51
Cobalt	µg/L	0.719	0.709	0.903	1.22	0.016 J1	0.019 J1	0.029	0.016 J1	0.063	0.026	0.088	0.090	1.83	5.05
Combined Radium	pCi/L	1.4	0.87	1.35	0.45	0.68	0.73	0.62	0.51	0.41	0.64	0.72	0.88	1.35	2.22
Fluoride	mg/L	0.22	0.21	0.23	0.21	0.11	0.12	0.17	0.17	0.06	0.07	0.21	0.23	0.23	0.25
Lead	µg/L	0.75	0.61	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.05 J1	0.06 J1	0.2 U1	0.2 U1	0.05 J1	0.2 U1	0.2 U1
Lithium	mg/L	0.00704	0.00620	0.0232	0.00445	0.00256	0.00256	0.0169	0.0187	0.0136	0.0132	0.0138	0.0124	0.0323	0.0324
Mercury	µg/L	0.003 J1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1
Molybdenum	µg/L	5.5	7.6	31.1	0.2 J1	0.5	0.5	0.6	0.6	0.5 U1	0.5 U1	1.4	1.6	11.9	15.2
Selenium	µg/L	0.97	1.05	0.15 J1	0.33 J1	0.55	1.02	1.11	0.41 J1	0.10 J1	0.07 J1	2.46	2.04	0.53	0.71
Sulfate	mg/L	260	308	464	712	--	276	--	330	--	384	--	270	--	685
Thallium	µg/L	0.02 J1	0.2 U1	0.2 U1	0.2 U1	0.02 J1	0.03 J1	0.02 J1	0.04 J1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.15 J1	0.17 J1
Total Dissolved Solids	mg/L	740	750	980	1,530	--	820	--	690	--	750	--	670	--	1,330
pH	SU	7.0	6.7	7.3	6.9	6.9	6.9	6.4	6.4	6.3	6.3	7.0	7.1	7.1	7.1

Table 1. Groundwater Data Summary
Statistical Analysis Summary
Mountaineer Plant – Bottom Ash Pond

Parameter	**Unit**	**MW-1605D**		**MW-1605S**		**MW-1606D**		**MW-1606S**		**MW-1607D**		**MW-1607S**		**MW-1608**	
		3/12/2024	**5/16/2024**	**3/12/2024**	**5/16/2024**	**3/12/2024**	**5/15/2024**	**3/12/2024**	**5/15/2024**	**3/13/2024**	**5/15/2024**	**3/13/2024**	**5/15/2024**	**3/13/2024**	**5/16/2024**
Antimony	µg/L	0.021 J1	0.024 J1	0.049 J1	0.033 J1	0.142	0.133	0.144	0.129	0.024 J1	0.028 J1	0.431	0.453	0.029 J1	0.023 J1
Arsenic	µg/L	3.32	3.04	0.44	0.39	0.22	0.22	0.57	0.59	2.18	1.99	0.83	0.75	0.32	0.30
Barium	µg/L	29.0	28.5	30.3	29.7	34.3	31.4	42.9	35.8	64.2	60.3	57.7	58.4	27.3	31.8
Beryllium	µg/L	0.05 U1	0.1 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.25 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	--	2.66	--	3.57	--	1.93	--	2.10	--	4.29	--	3.06	--	0.084
Cadmium	µg/L	0.008 J1	0.011 J1	0.052	0.052	0.054	0.054	0.054	0.049	0.009 J1	0.010 J1	0.026	0.022	0.006 J1	0.007 J1
Calcium	mg/L	--	181 M1	--	172	--	150	--	121	--	206	--	153	--	101
Chloride	mg/L	--	132	--	113	--	106	--	78.8	--	176	--	149	--	6.18
Chromium	µg/L	0.20 J1	0.27 J1	0.32	0.42	0.85	0.46	0.27 J1	0.23 J1	0.43	1.03	0.28 J1	0.44	0.32	0.50
Cobalt	µg/L	1.30	1.17	0.443	0.451	0.889	0.844	0.152	0.155	0.854	0.808	1.36	1.33	0.039	0.051
Combined Radium	pCi/L	0.8	1.27	0.31	0.51	0.8	0.55	0.59	1.54	1.2	1.37	0.56	1.47	0.5	0.93
Fluoride	mg/L	0.21	0.21	0.24	0.25	0.28	0.31	0.37	0.41	0.47	0.49	0.24	0.24	0.23	0.22
Lead	µg/L	0.06 J1	0.2 U1	0.23	0.10 J1	0.2 U1	0.11 J1	0.2 U1	0.17 J1	0.2 U1	0.2 U1	0.07 J1	0.25	0.2 U1	0.2 U1
Lithium	mg/L	0.0394	0.0402	0.0417	0.0380	0.0514	0.0500	0.0467	0.0444	0.0906	0.0895	0.0954	0.0832	0.00226	0.00212
Mercury	µg/L	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1
Molybdenum	µg/L	28.0	27.7	14.8	14.8	55.1	53.8	56.0	56.7	58.9	56.9	29.7	28.3	0.6	0.6
Selenium	µg/L	0.05 J1	0.09 J1	0.99	1.55	2.68	0.58	3.23	3.84	0.04 J1	0.04 J1	3.41	4.06	2.96	1.74
Sulfate	mg/L	--	554	--	563	--	490	--	366	--	623	--	262	--	155
Thallium	µg/L	0.03 J1	0.03 J1	0.03 J1	0.02 J1	0.06 J1	0.06 J1	0.06 J1	0.06 J1	0.03 J1	0.02 J1	0.08 J1	0.05 J1	0.05 J1	0.2 U1
Total Dissolved Solids	mg/L	--	1,300	--	1,270	--	1,080	--	900	--	1,500	--	1,000	--	430
pH	SU	7.1	7.2	7.0	7.1	7.1	7.3	7.0	7.3	7.3	7.4	7.1	7.1	6.8	6.8

Table 1. Groundwater Data Summary
Statistical Analysis Summary
Mountaineer Plant – Bottom Ash Pond

Parameter	Unit	MW-1805	MW-1921	MW-1922D	MW-1922S	MW-1923	MW-1924	MW-1925	MW-1926	MW-1927	MW-1929	MW-203
		5/21/2024	5/20/2024	5/16/2024	5/16/2024	5/21/2024	5/21/2024	5/20/2024	5/15/2024	5/20/2024	5/16/2024	5/17/2024
Antimony	µg/L	0.037 J1	0.083 J1	0.411	0.018 J1	0.171	0.041 J1	0.185	0.055 J1	0.049 J1	0.020 J1	0.020 J1
Arsenic	µg/L	9.30	1.14	861	1.79	1.05	0.31	0.23	0.26	0.17	0.23	0.29
Barium	µg/L	54.1	58.2	334	29.5	93.3	60.9	31.5	15.8	52.3	39.4	24.7
Beryllium	µg/L	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.038 J1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	1.45	0.531	0.128	2.45	1.27	0.812	3.23	0.096	0.329	0.156	0.071
Cadmium	µg/L	0.02 U1	0.017 J1	0.02 U1	0.005 J1	0.025	0.038	0.036	0.031	0.045	0.006 J1	0.005 J1
Calcium	mg/L	19.9	91.6	60.6	289	111	163 M1	149	77.8	135	87	93.6
Chloride	mg/L	137	55.5	21.6	111	24.6	103	75.0	6.02	8.52	12.5	22.2
Chromium	µg/L	0.27 J1	0.30	0.20 J1	0.25 J1	1.13	0.37	0.29 J1	0.52	0.37	0.40	0.32
Cobalt	µg/L	0.060	0.656	0.074	0.907	1.35	1.40	1.13	0.643	0.465	0.079	0.021
Combined Radium	pCi/L	1.35	1.23	1.92	1.01	0.89	1.08	1.16	0.91	1.16	1.24	0.6
Fluoride	mg/L	0.87	1.20	0.30	0.18	0.29	0.44	0.28	0.22	0.14	0.19	0.29
Lead	µg/L	0.2 U1	0.07 J1	0.2 U1	0.08 J1	1.15	0.2 U1	0.2 U1	0.09 J1	0.2 U1	0.06 J1	0.2 U1
Lithium	mg/L	0.0127	0.0868	0.00788	0.0397	0.198	0.0490 M1	0.0528	0.00570	0.00486	0.00396	0.00182
Mercury	µg/L	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1
Molybdenum	µg/L	7.2	358	102	24.9	297	56.9	49.2	3.9	0.9	0.6	1.2
Selenium	µg/L	0.5 U1	0.08 J1	0.5 U1	0.06 J1	7.29	0.28 J1	3.32	0.87	0.95	1.12	0.77
Sulfate	mg/L	87.9	140	36.8	865	223	213	434	17.3	214	171	58.6
Thallium	µg/L	0.2 U1	0.05 J1	0.2 U1	0.03 J1	0.2 U1	0.2 U1	0.2 U1	0.02 J1	0.2 U1	0.2 U1	0.03 J1
Total Dissolved Solids	mg/L	710	490	370	1,520	600	790	1,040	310	660	430	370
pH	SU	8.3	7.7	7.4	7.2	7.4	7.1	7.2	7.1	7.1	7.4	7.2

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

Table 2. Appendix IV Groundwater Protection Standards
Statistical Analysis Summary
Mountaineer Plant – Bottom Ash Pond

Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600		0.000520	0.00600
Arsenic, Total (mg/L)	0.0100		0.000680	0.0100
Barium, Total (mg/L)	2.00		0.0678	2.00
Beryllium, Total (mg/L)	0.00400		0.0000500	0.00400
Cadmium, Total (mg/L)	0.00500		0.0000500	0.00500
Chromium, Total (mg/L)	0.100		0.000718	0.100
Cobalt, Total (mg/L)	n/a	0.00600	0.000525	0.00600
Combined Radium, Total (pCi/L)	5.00		2.31	5.00
Fluoride, Total (mg/L)	4.00		0.300	4.00
Lead, Total (mg/L)	n/a	0.0150	0.000881	0.0150
Lithium, Total (mg/L)	n/a	0.0400	0.0300	0.0400
Mercury, Total (mg/L)	0.00200		0.00000500	0.00200
Molybdenum, Total (mg/L)	n/a	0.100	0.00279	0.100
Selenium, Total (mg/L)	0.0500		0.00430	0.0500
Thallium, Total (mg/L)	0.00200		0.000200	0.00200

Notes:
1. Calculated UTL (upper tolerance limit) represents site-specific background values.
CCR: coal combustion residuals
GWPS: groundwater protection standard
MCL: maximum contaminant level
mg/L: milligrams per liter
n/a: not applicable
pCi/L: picocuries per liter

Table 3. Appendix III Data Summary
Statistical Analysis Summary
Mountaineer Plant – Bottom Ash Pond

Analyte	Unit	Description	MW-1604D	MW-1604S	MW-1605D	MW-1605S	MW-1606D	MW-1606S	MW-1607D	MW-1607S
			5/17/2024	5/17/2024	5/16/2024	5/16/2024	5/15/2024	5/15/2024	5/15/2024	5/15/2024
Boron	mg/L	Interwell Background Value (UPL)	0.333							
		Analytical Result	0.132	**1.93**	**2.66**	**3.57**	**1.93**	**2.10**	**4.29**	**3.06**
Calcium	mg/L	Interwell Background Value (UPL)	202							
		Analytical Result	124	**232**	181	172	150	121	**206**	153
Chloride	mg/L	Interwell Background Value (UPL)	56.2							
		Analytical Result	25.0	**105**	**132**	**113**	**106**	**78.8**	**176**	**149**
Fluoride	mg/L	Interwell Background Value (UPL)	0.300							
		Analytical Result	0.23	0.25	0.21	0.25	**0.31**	**0.41**	**0.49**	0.24
pH	SU	Intrawell Background Value (UPL)	7.8	7.7	7.8	7.7	7.8	7.8	8.0	7.9
		Intrawell Background Value (LPL)	6.5	6.6	6.8	6.8	6.8	6.3	7.0	6.8
		Analytical Result	7.1	7.1	7.2	7.1	7.3	7.3	7.4	7.1
Sulfate	mg/L	Interwell Background Value (UPL)	530							
		Analytical Result	270	**685**	**554**	**563**	490	366	**623**	262
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	962							
		Analytical Result	670	**1,330**	**1,300**	**1,270**	**1,080**	900	**1,500**	**1,000**

Notes:

1. Bold values exceed the background value.

2. Background values are shaded gray.

LPL: lower prediction limit

mg/L: milligrams per liter

SU: standard units

UPL: upper prediction limit

ATTACHMENT A
Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

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

DAVID ANTHONY MILLER
22663

David Anthony Miller
Printed Name of Licensed Professional Engineer

David Anthony Miller
Signature

22663	West Virginia	09.25.2024
License Number	Licensing State	Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS
CONSULTING

September 23, 2024

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

Re: Mountaineer Bottom Ash Pond
Assessment Monitoring Report & Corrective Action – 2024

Dear Ms. Kreinberg,

Groundwater Stats Consulting (GSC), formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the Assessment Monitoring and Corrective Action statistical analysis of groundwater data through May 2024 at American Electric Power Company's Mountaineer Bottom Ash Pond. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities (CCR Rule, 2015) as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009).

Sampling began at upgradient and downgradient wells for the CCR program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells:** MW-1601A, MW-1602, MW-1603, and MW-1608
- **Downgradient wells:** MW-1604D, MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S
- **Nature and Extent wells:** JTMN-1, JTMN-2, MW-016, MW-107, MW-112, MW-1805, MW-1921, MW-1922D, MW-1922S, MW-1923, MW-1924, MW-1925, MW-1926, MW-1927, and MW-203
- **Sentinel well**: MW-1929

Note that sampling began at the nature and extent wells along with the sentinel well in 2019. Although new upgradient well MW-1928 is considered part of the well network, it has been dry since 2019; therefore, it is not listed above, nor included in this analysis.

Nature and extent well MW-112 was not sampled for this analysis due to insufficient water and was last sampled in March 2022; therefore, it is also not included in this analysis.

As requested by Geosyntec Consultants, Inc., MW-1921 was analyzed and discussed separately from the other wells.

Data were sent electronically, and the statistical analysis was conducted according to the Statistical Analysis Plan and screening evaluation prepared by GSC and approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC. This analysis was reviewed by Andrew Collins, Project Manager of 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

Time series and box plots for Appendix IV parameters are provided for all wells and constituents and are used to evaluate concentrations over the entire record (Figures A and B, respectively). Values in background which have previously been flagged as outliers may be seen in a lighter font and disconnected symbol on the graphs. Additionally, a summary of flagged values follows this letter (Figure C).

Note that when there are no detections present in downgradient wells for a given constituent, statistical analyses are not required. A summary of Appendix IV downgradient, nature and extent, and sentinel well/constituent pairs containing 100% non-detects follows this letter. For all constituents, a substitution of the most recent reporting limit is used for non-detect data. When calculating confidence intervals, the substitution is performed for individual wells and may differ across wells. This generally gives the most conservative limit in each case.

Summary of Statistical Methods – Appendix IV Parameters

Interwell upper tolerance limits (UTLs) are used to establish background limits for both Assessment Monitoring and Corrective Action Monitoring. A Groundwater Protection Standard (GWPS) for each Appendix IV constituent is then established using the higher of the background limit or a regulatory limit. A confidence interval for each downgradient well/constituent is compared against the corresponding GWPS. More details for both Assessment and Corrective Action monitoring are given below.

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 tolerance 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, 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 for parametric limits. 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.

Summary of Appendix IV Background Update – Conducted in February 2024

Outlier Analysis

Prior to evaluating Appendix IV parameters, background (upgradient) data were screened through visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits. High outliers are also 'cautiously' flagged in the downgradient wells when they are clearly much different from the rest of the data. This is intended to be a regulatory conservative approach in that it will reduce the variance and thus reduce the width of parametric confidence intervals; although it will also reduce the mean and thus lower the entire interval. The intent is to better represent the actual downgradient mean.

For the February 2024 update, Tukey's outlier test on pooled upgradient well data through the 2023 2nd semi-annual sample event identified outliers for arsenic, barium, combined radium 226 + 228, fluoride, and lithium. A high value for combined radium 226 + 228 at upgradient well MW-1601A was flagged in order to maintain statistical limits that are conservative from a regulatory perspective. Any values identified by Tukey's test but not flagged in the database were either similar to concentrations from neighboring upgradient wells or were lower than the respective Maximum Contaminant Level (MCL). Tukey's outlier test and visual screening confirmed previously flagged values; therefore, no changes were made to values flagged during previous updates.

Previous screenings identified high values for chromium in several wells (both upgradient and downgradient) during the November and December 2016 samples events. These values were flagged in the database as outliers as these measurements did not appear to represent the population at these wells and do not represent current conditions. Additionally, several high values for antimony, arsenic, barium, cadmium, cobalt, fluoride, lead, and selenium were recorded during the December 2016 sample event for downgradient wells MW-1606D, MW-1607D, and MW-1607S. High values above the MCL were flagged and are likely the result of a systematic error since they all occurred for the same sample event.

For the September 2016 sample event, a high value of combined radium in well MW-1606D and for molybdenum in well MW-1604S as well as a low value for combined radium in well MW-1604S were identified visually and flagged as outliers. All flagged values may be seen on the Outlier Summary following this letter (Figure C).

Interwell Upper Tolerance Limits

Upper tolerance limits were used to calculate background limits from pooled upgradient well data during the Fall 2023 statistical analysis using data through October/November 2023 for Appendix IV parameters (Figure D). These limits are updated on an annual basis and will be updated again during the Fall 2024 sample event. Parametric tolerance limits are calculated, with a target of 95% confidence and 95% coverage, when data follow a normal or transformed-normal distribution such as for arsenic, chromium, cobalt, combined radium 226 + 228, and molybdenum. When data contained greater than 50% non-detects or did not follow a normal or transformed-normal distribution, non-parametric tolerance limits were constructed using the highest background measurement. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

Groundwater Protection Standards

Interwell upper tolerance limits were compared to the Maximum Contaminant Levels (MCLs) and CCR-Rule specified levels in the Groundwater Protection Standard (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure E).

Evaluation of Appendix IV Parameters – March/May 2024 Event

Confidence Intervals - Assessment Monitoring

Confidence intervals were constructed for downgradient, nature and extent, and sentinel wells for each of the Appendix IV parameters using data through May 2024 (Figure F). These intervals were constructed as either parametric or nonparametric confidence intervals depending on the data distribution and percentage of non-detects. When data followed a normal or transformed-normal distribution, parametric confidence intervals were used for Appendix IV parameters. The lower confidence limit, which is constructed with 99% confidence for parametric confidence intervals, is compared to the GWPS prepared as described above. Nonparametric confidence intervals were constructed when data did not follow a normal or transformed-normal distribution or when there were greater than 50% non-detects. The confidence level associated with nonparametric confidence intervals is dependent upon the number samples available.

As discussed above, the highest limit of the MCL, CCR-Rule specified level, or background limit was used to establish the GWPS. A statistically significant level (SSL) is declared only when the entire confidence interval is above a GWPS. Complete graphical results of the confidence intervals follow this letter. Note that lithium at wells which exceeded the GWPS during the previous analysis were evaluated only under the Corrective Action protocols described below. Confidence interval exceedances were identified for the following well/constituent pairs:

• Arsenic:	MW-1805 and MW-1922D
• Molybdenum:	MW-1923

Note that the exceedances listed above occurred in nature and extent wells, and no exceedances were identified among compliance wells. Further research beyond the scope of this analysis would be required to determine whether the exceedances are reflective of natural groundwater quality or are a result of practices at the site.

Confidence Intervals - Corrective Action

In 2022, Mountaineer BAP entered Corrective Action protocols for lithium due to previously identified SSLs. Confidence intervals were constructed using data through May 2023 for this constituent at downgradient, nature and extent, and sentinel wells identified with SSL exceedances during Assessment Monitoring (Figure H). These confidence intervals are then compared to the same GWPS used in Assessment Monitoring to evaluate the effectiveness of remedial efforts over time. Only when the entire confidence interval is below the GWPS for a period of 3 years is the well/constituent pair declared to be in compliance with its respective standard.

Lithium will continue to be evaluated under Corrective Action protocols using confidence intervals for these well/constituent pairs during the Source Control and Hydraulic Containment program. In future analyses, if confidence interval exceedances are identified for lithium at additional wells during Assessment Monitoring, data from these wells will also be evaluated only within the Corrective Action protocols until compliance is achieved. Complete graphical results of the confidence intervals follow this letter. Exceedances were identified for the following well/constituent pairs:

- Lithium: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, MW-1607S, MW-1922S, MW-1923, MW-1924, and MW-1925

Trend Tests

Data at wells with confidence interval exceedances are evaluated using the Sen's Slope/Mann Kendall trend test at the 95% confidence level (Figure I). The 95% confidence level will identify whether statistically significant trends are present more rapidly and, therefore, is used in this analysis. The confidence intervals constructed for lithium include confidence bands at 95% confidence around the trend line when the Sen's Slope/Mann Kendall trend test identifies a statistically significant trend. The confidence bands are particularly useful in Corrective Action for determining the point in time when concentrations fall below an established GWPS (i.e., the entire confidence band is below the GWPS). The Sen's Slope/Mann Kendall trend test identified the following statistically significant trends:

Increasing
- Lithium: MW-1607D

Decreasing

- Arsenic: MW-1805
- Lithium: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1922S, MW-1924, and MW-1925

A summary of the Appendix IV trend test results follows this letter. During this analysis, the upper confidence band for the following well/constituent pair was identified to be below the established GWPS:

- Lithium: MW-1605D

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

For Groundwater Stats Consulting,

Kristina Rayner A Collins

Kristina Rayner
Senior Statistician

Andrew Collins
Project Manager

100% Non-Detects

Analysis Run 8/5/2024 1:28 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Beryllium, total (mg/L)
MW-107, MW-1604D, MW-1605D, MW-1805, MW-1922D, MW-1926, MW-1927, MW-1929, MW-203

Cadmium, total (mg/L)
MW-1805

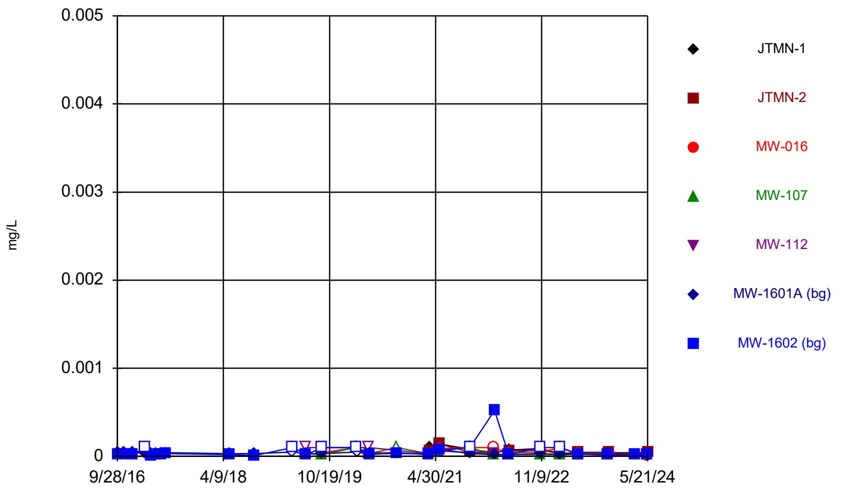
Mercury, total (mg/L)
MW-016, MW-107, MW-1805, MW-1925, MW-1926, MW-1927, MW-1929, MW-203

Thallium, total (mg/L)
MW-016, MW-107, MW-1805, MW-1922D, MW-1924, MW-1925, MW-1927, MW-1929

FIGURE A
Time Series

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

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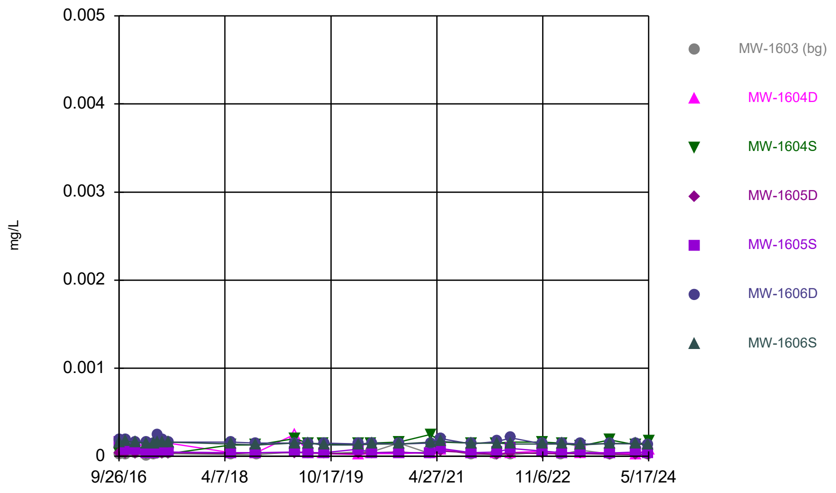

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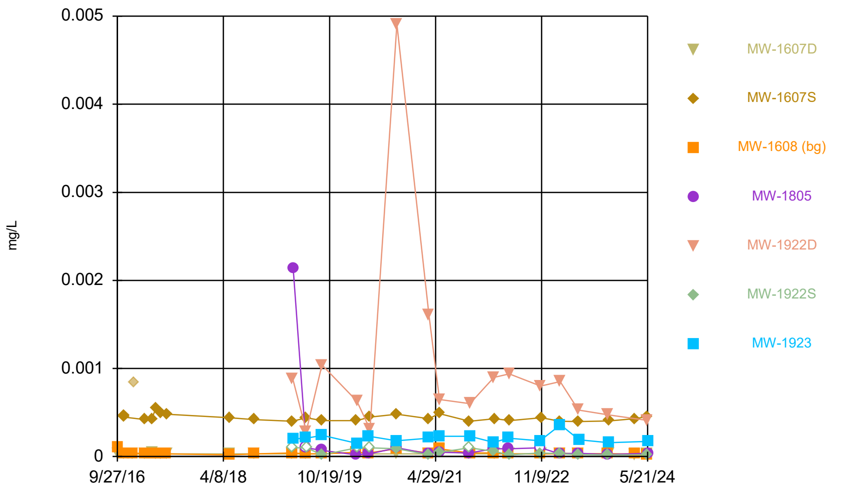

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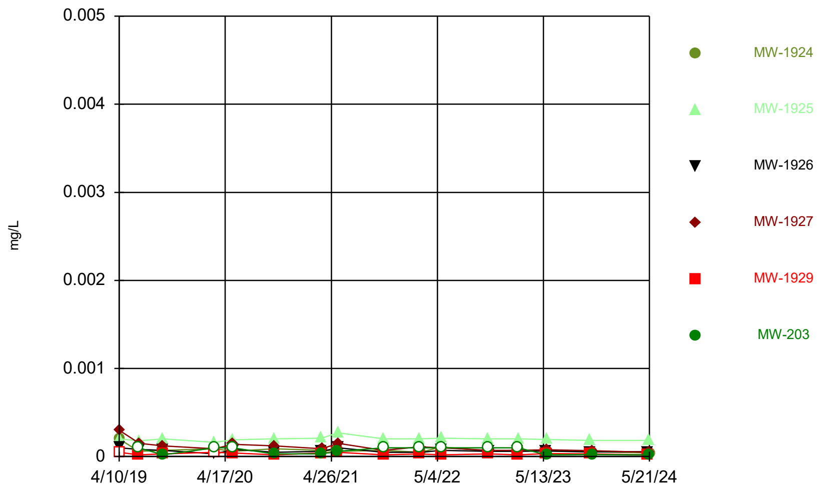

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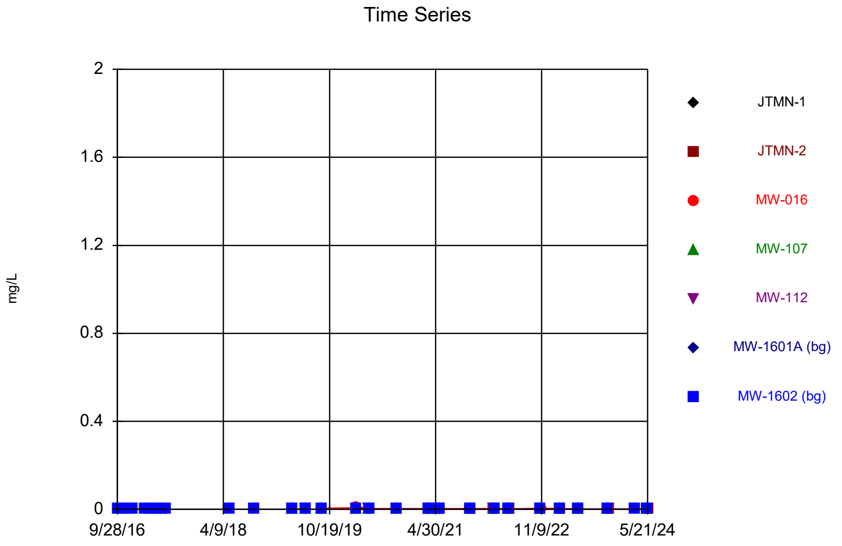

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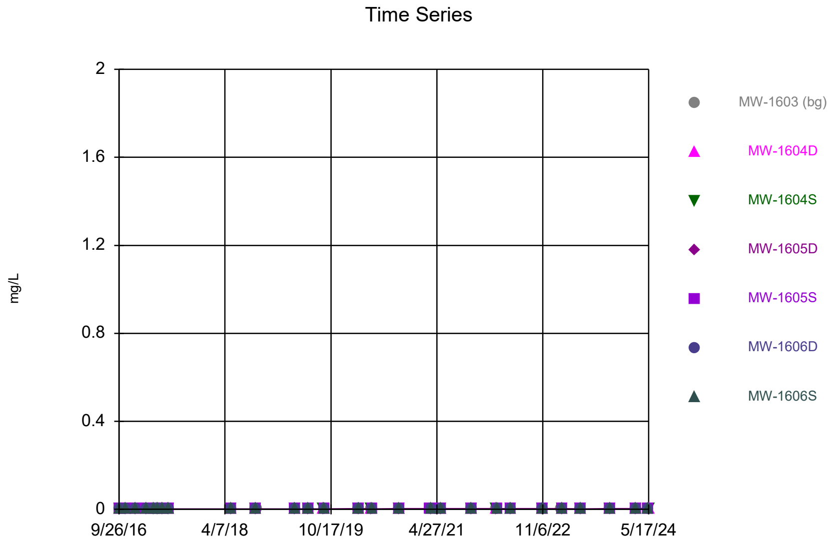

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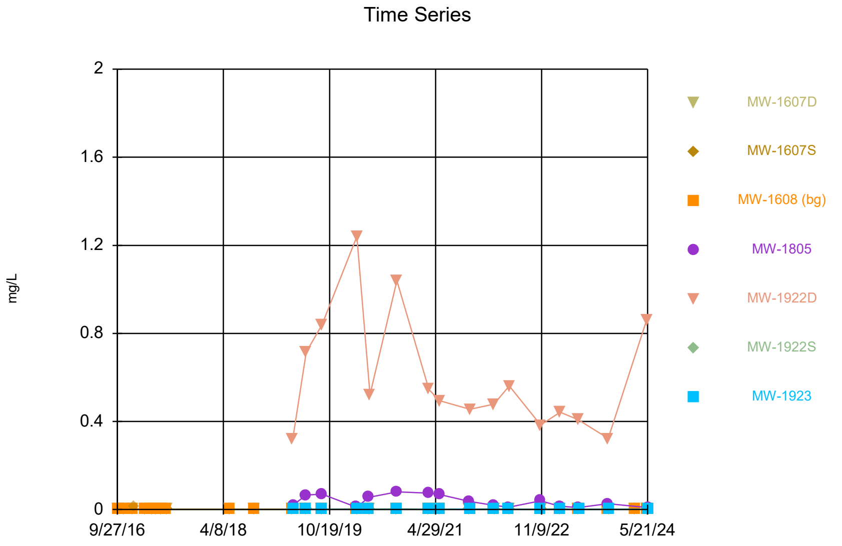

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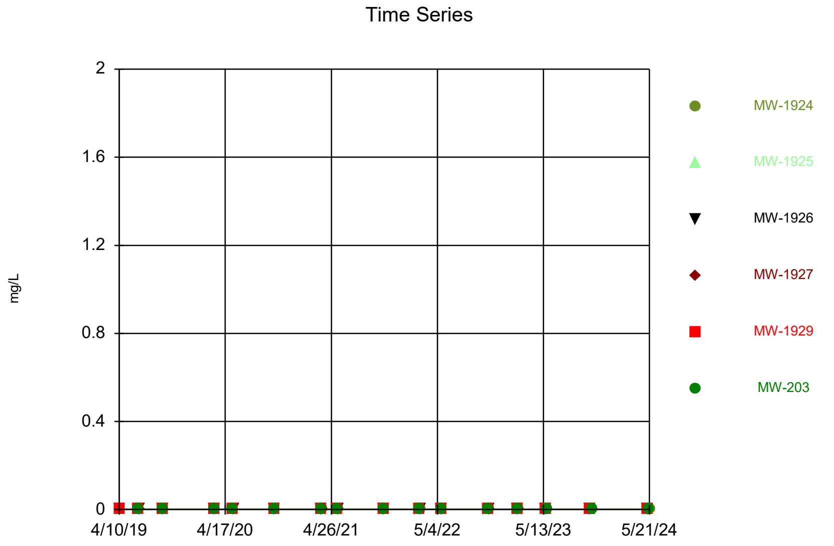

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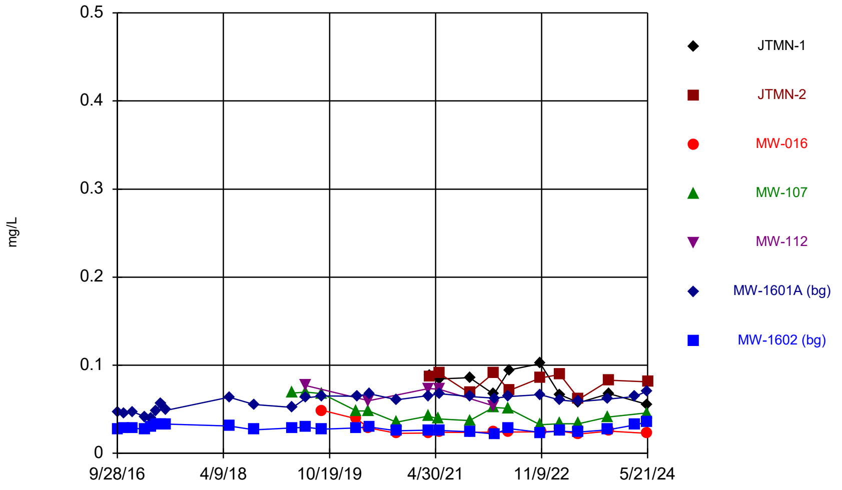

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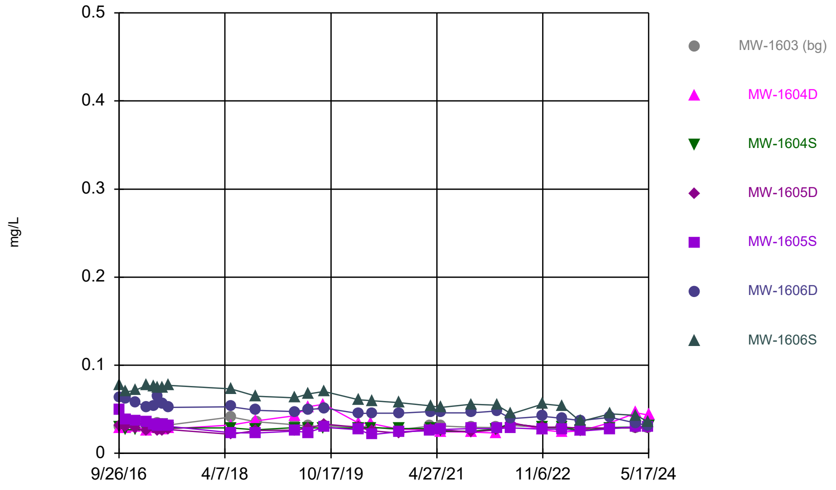

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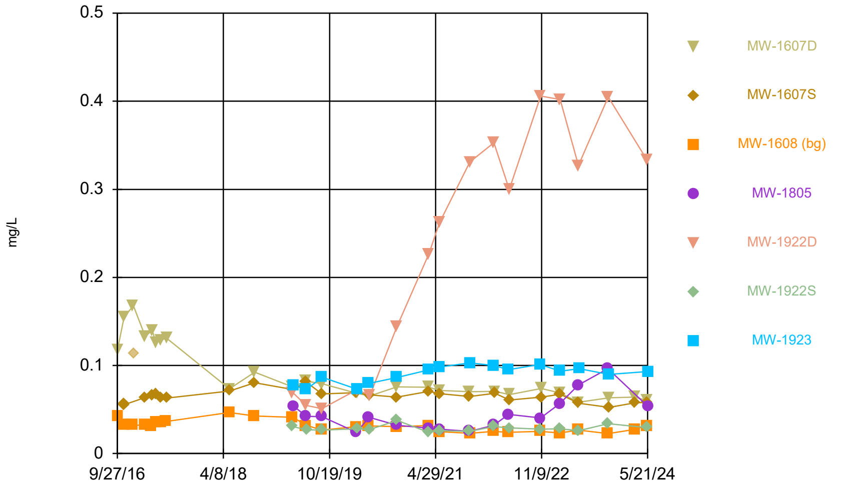

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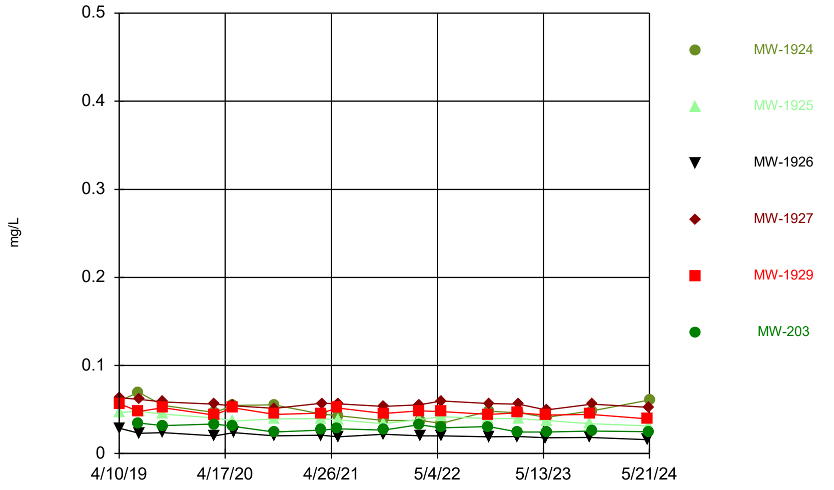

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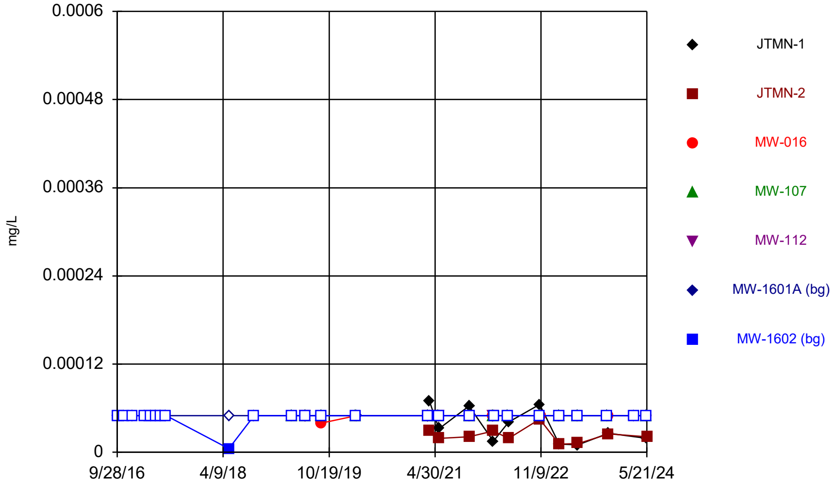

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Hollow symbols indicate censored values.

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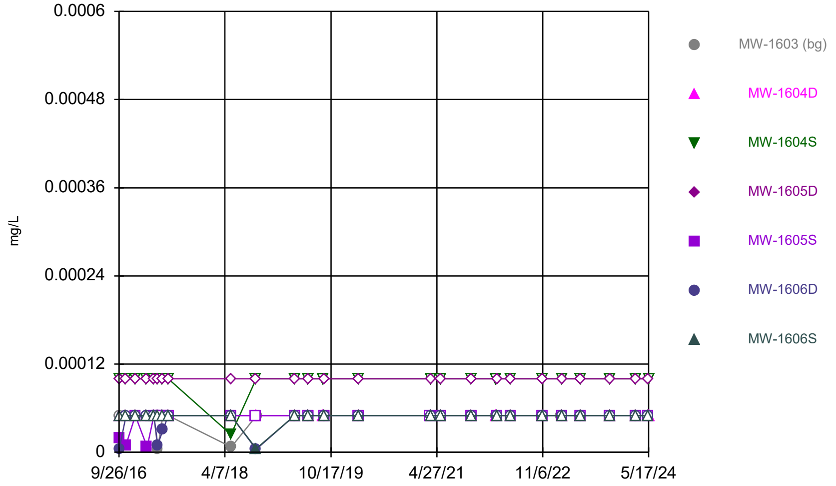

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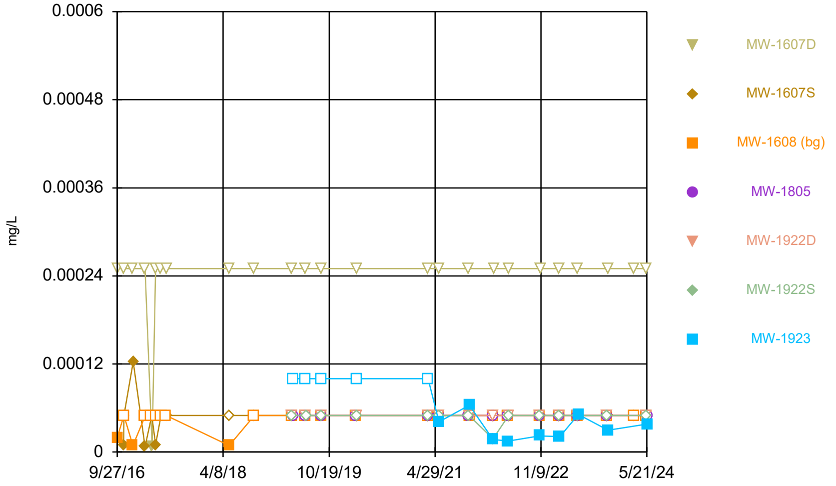

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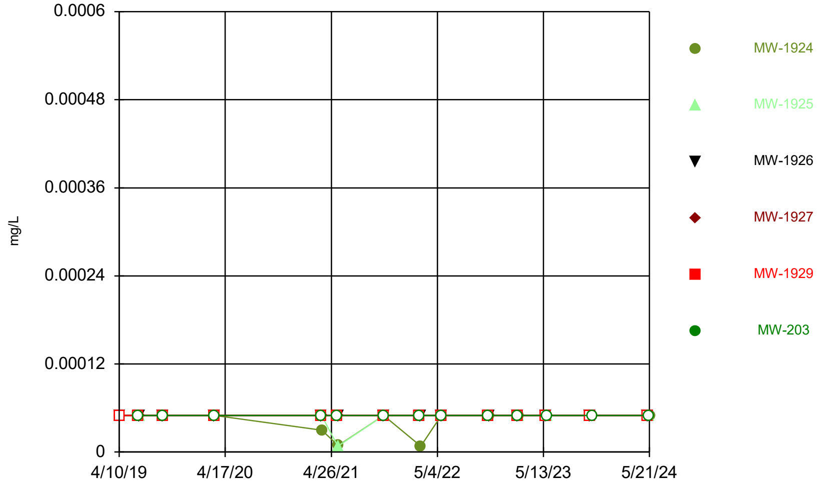
Time Series



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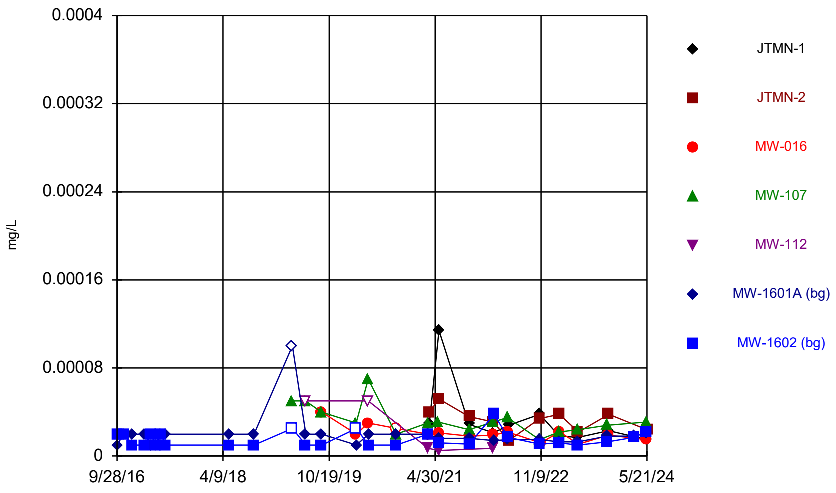
Time Series



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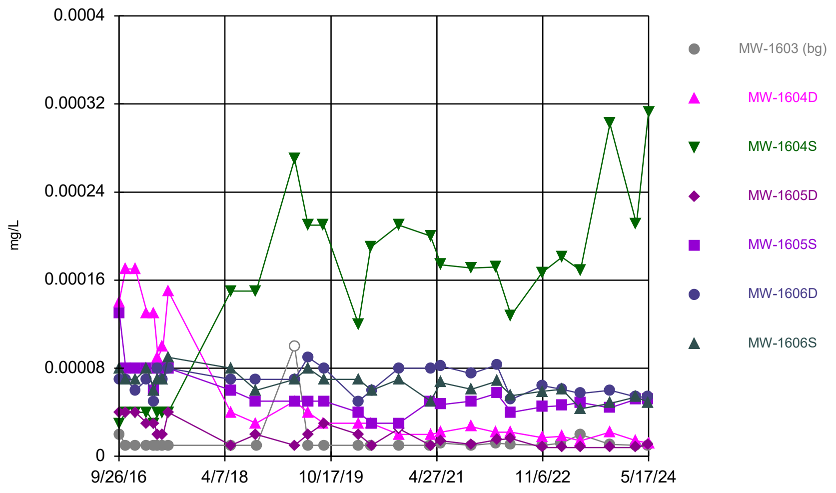
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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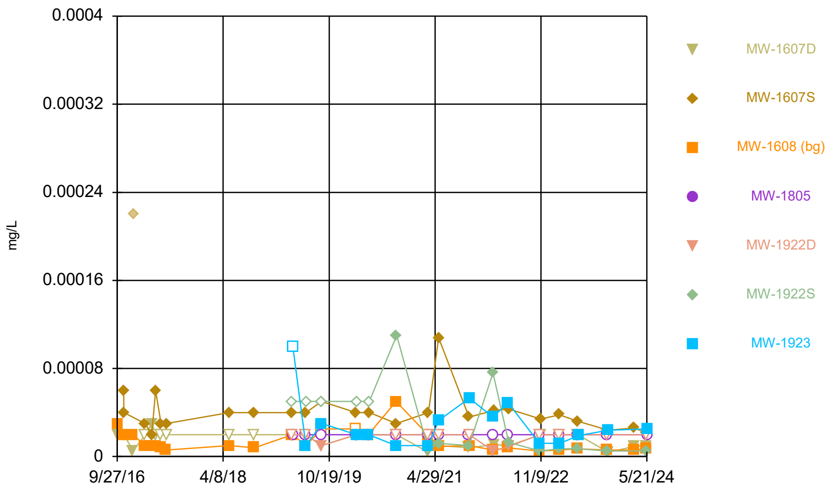
Time Series



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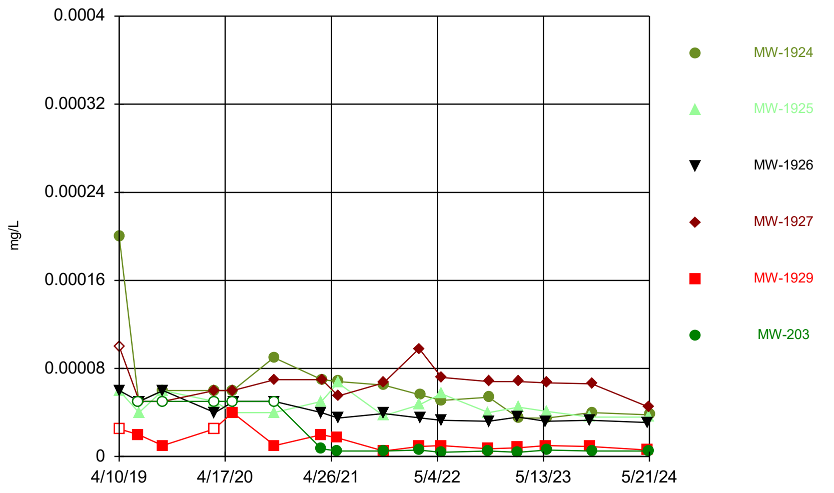
Time Series



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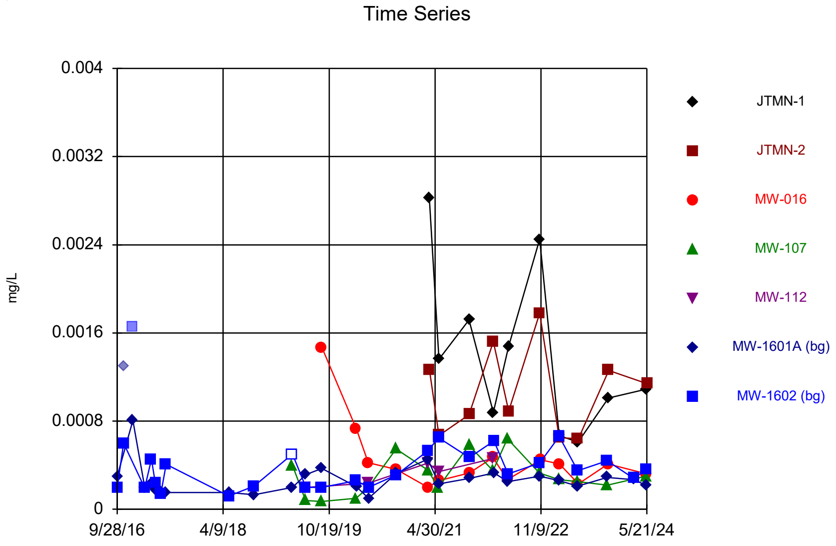

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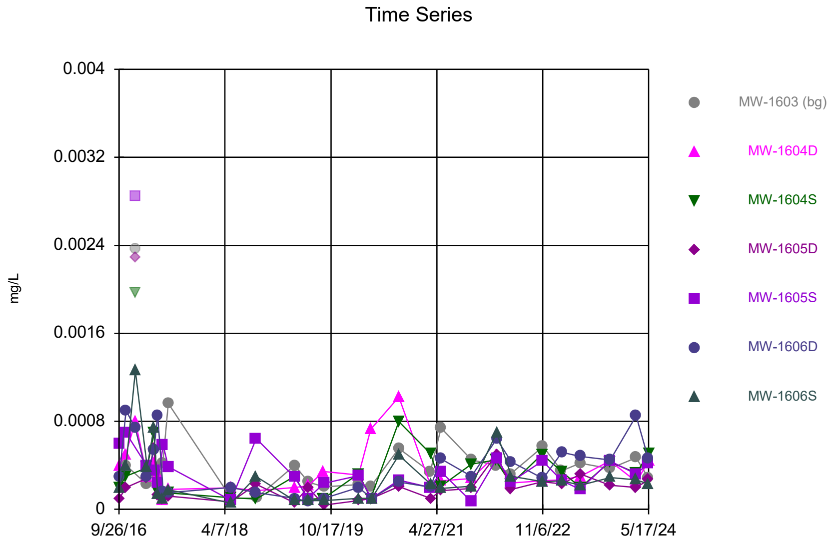
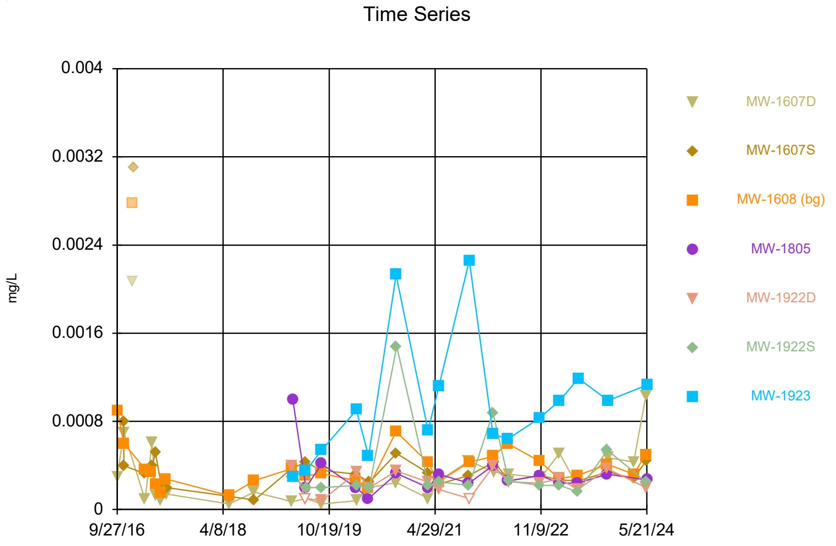
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



Constituent: Chromium, total Analysis Run 8/5/2024 1:21 PM View: Desc.
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.



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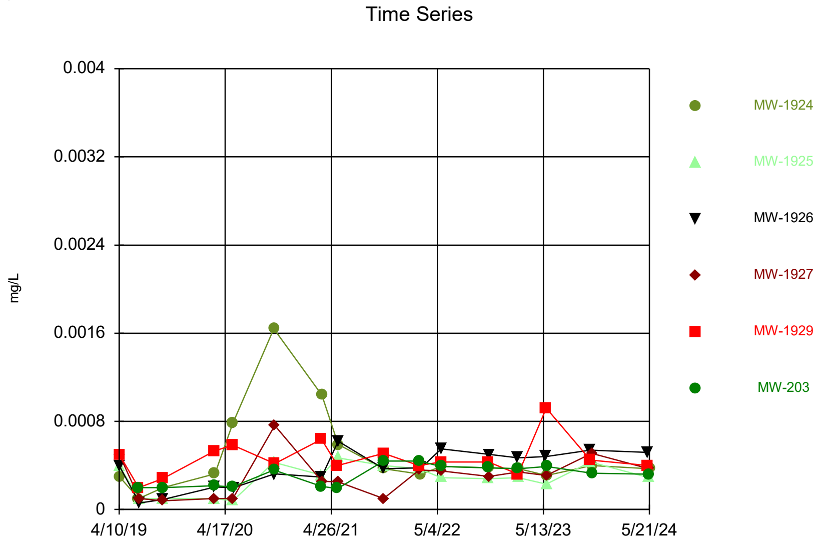
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.



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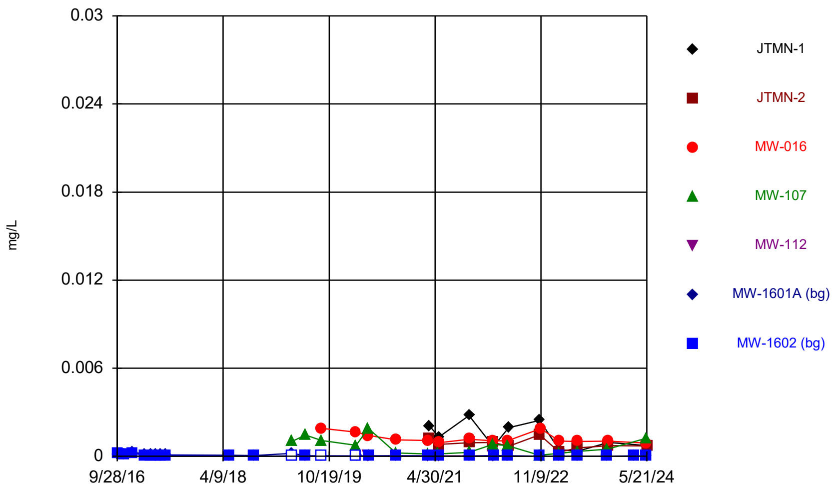
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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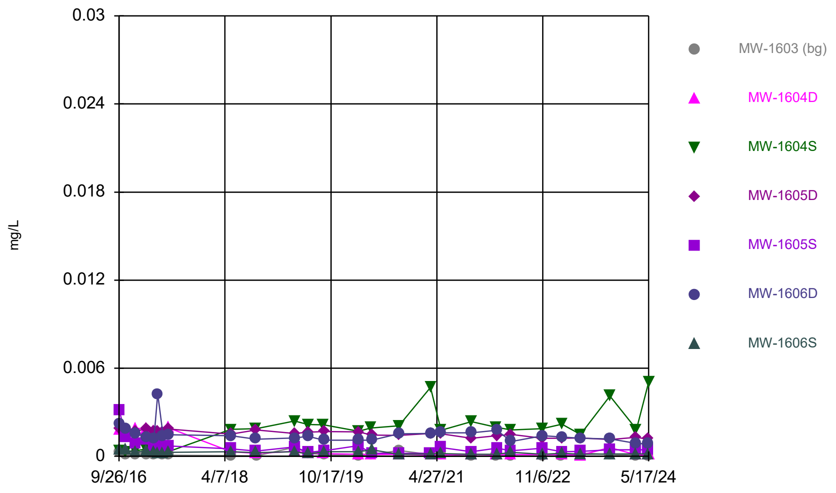
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Time Series



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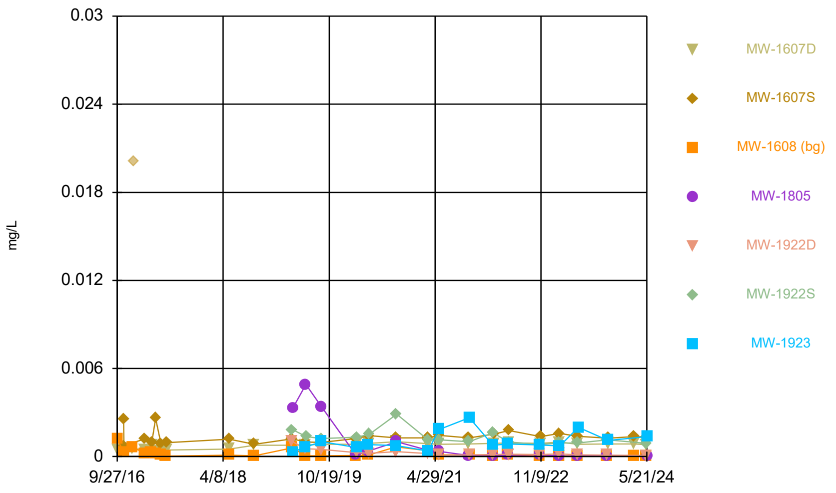
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Time Series



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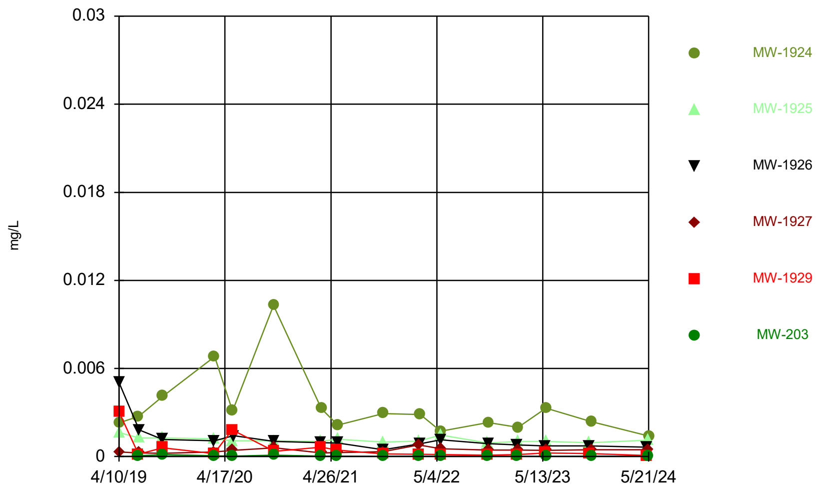
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Time Series



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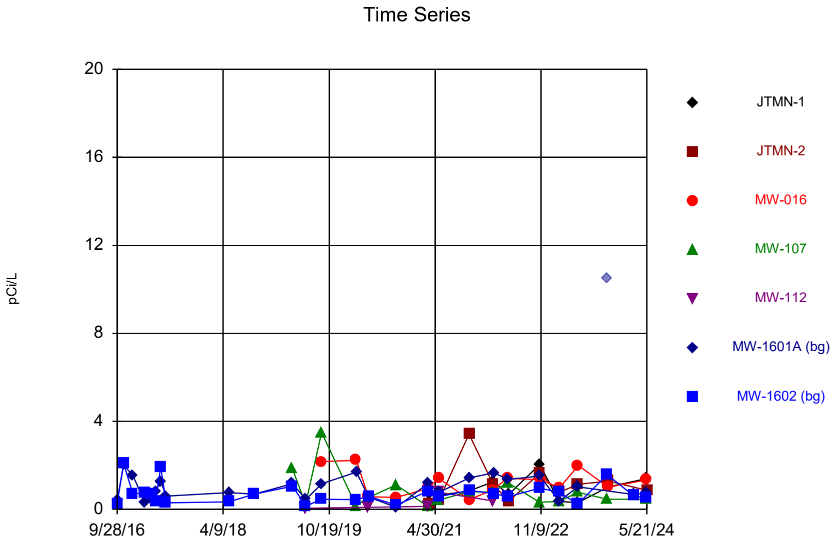

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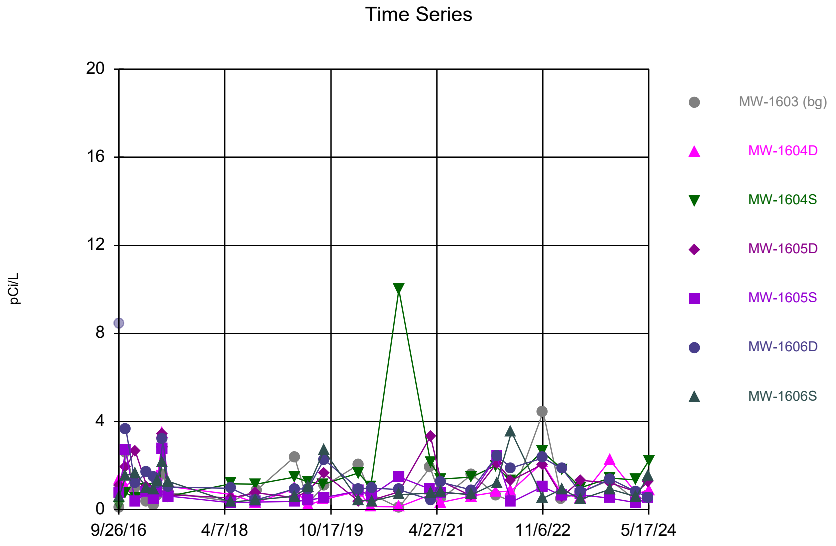

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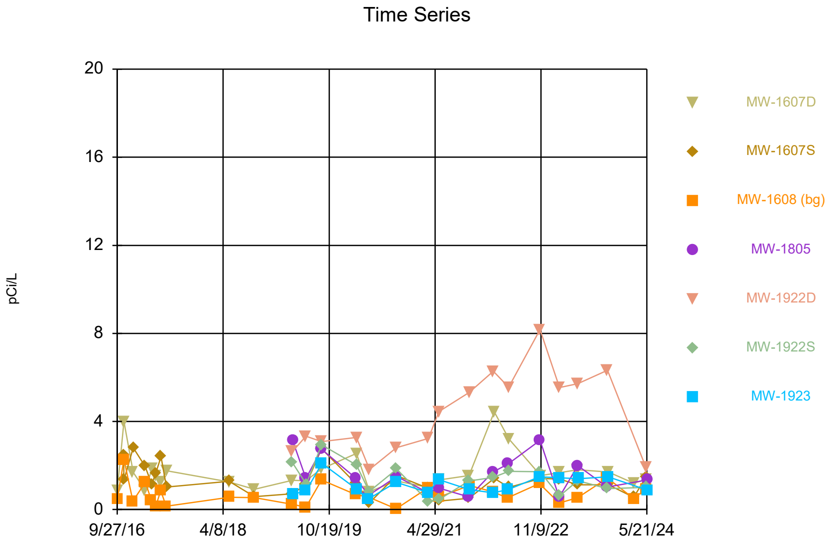

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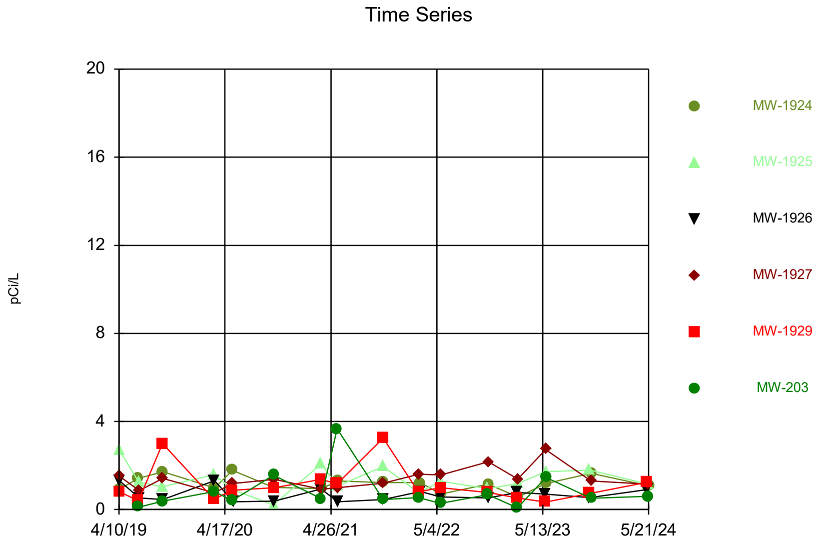

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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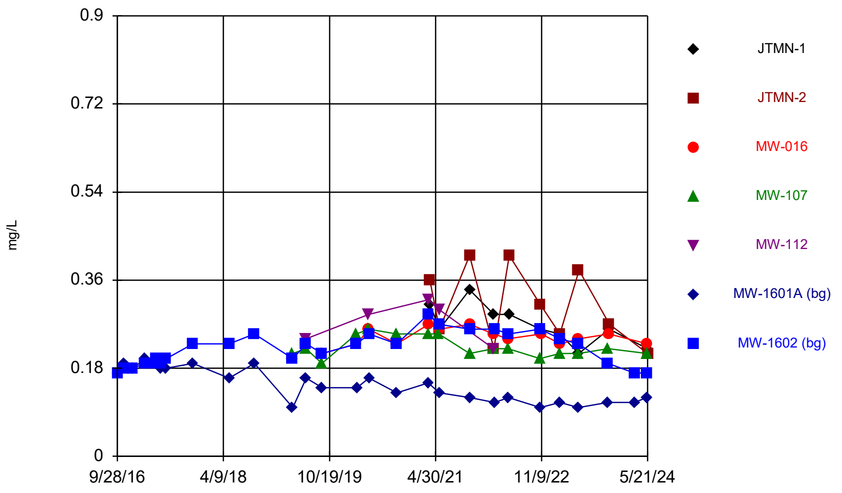
Time Series



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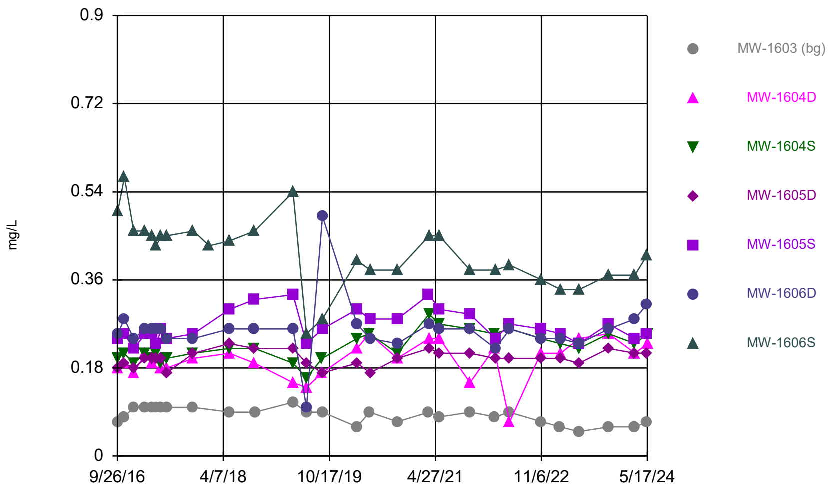
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Time Series



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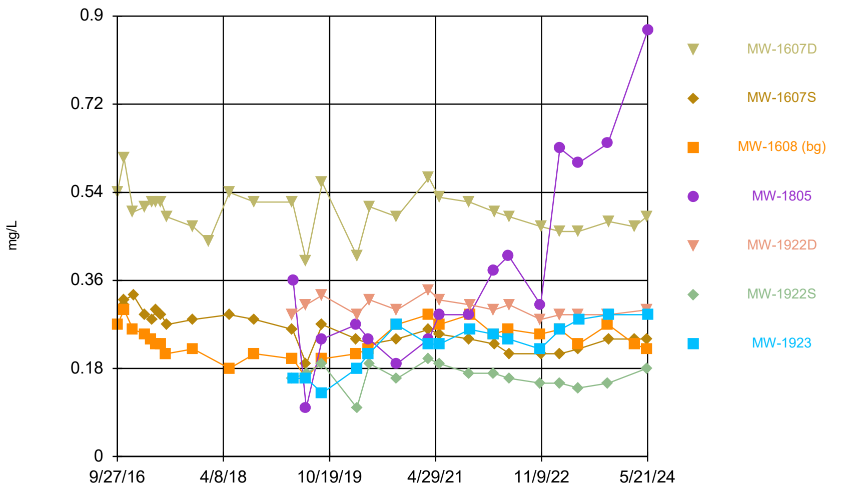
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Time Series



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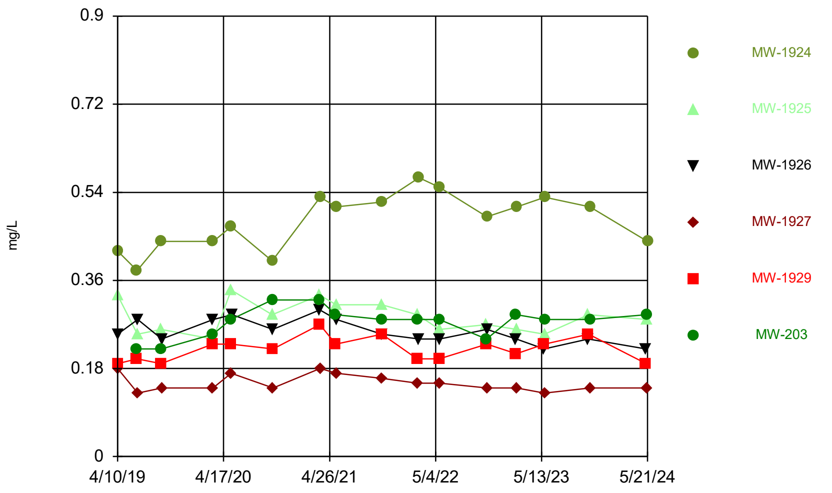
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Time Series



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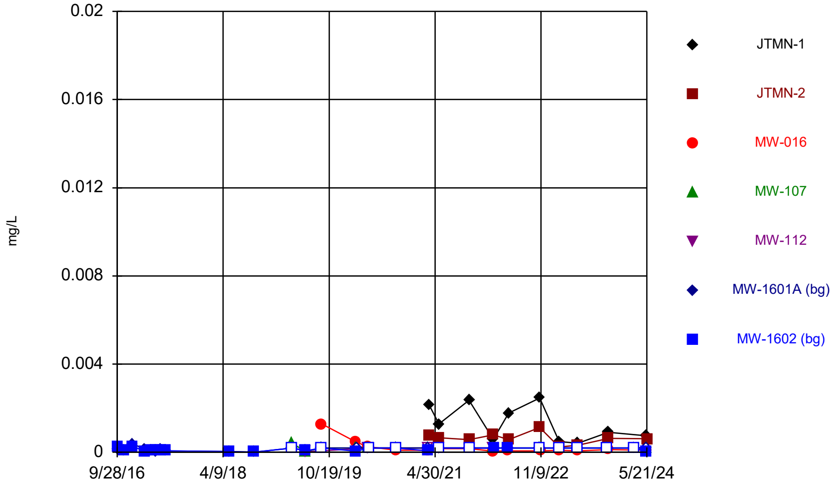
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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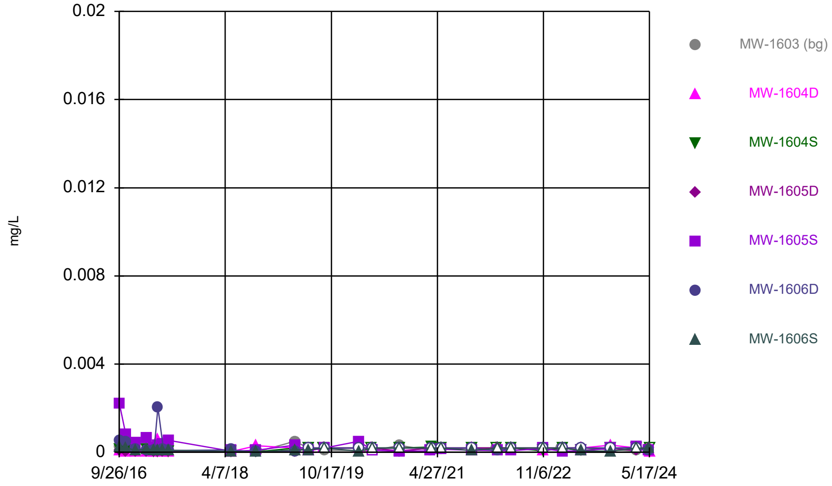
Hollow symbols indicate censored values.

Time Series



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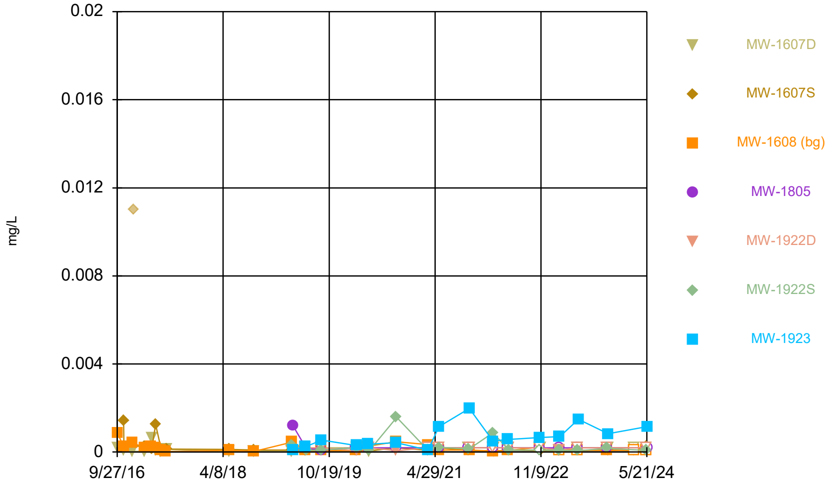
Time Series



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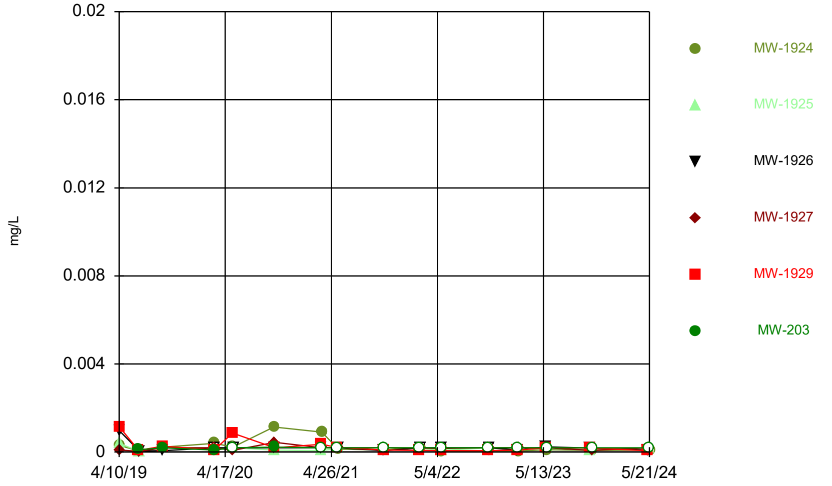
Time Series



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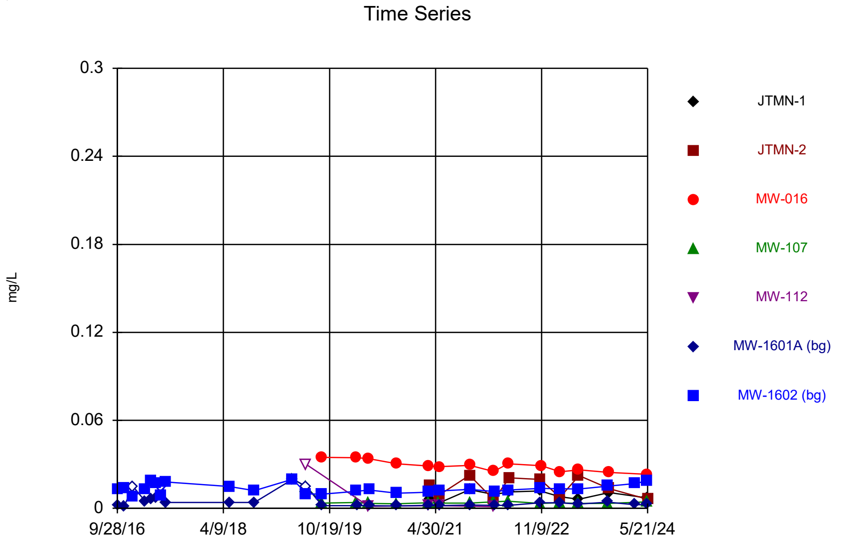

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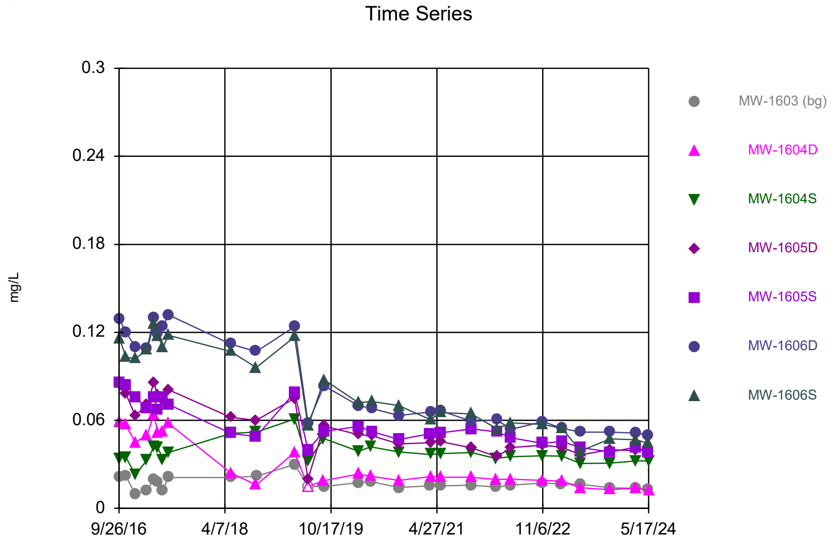

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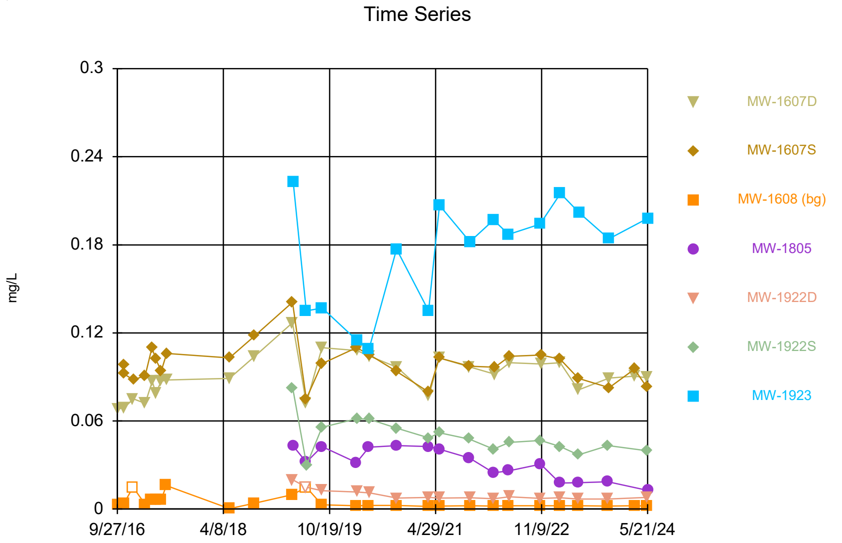

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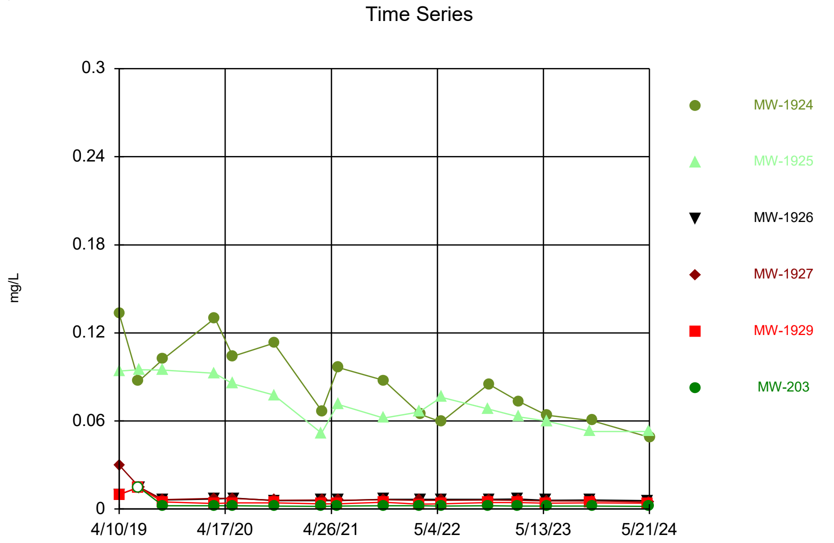

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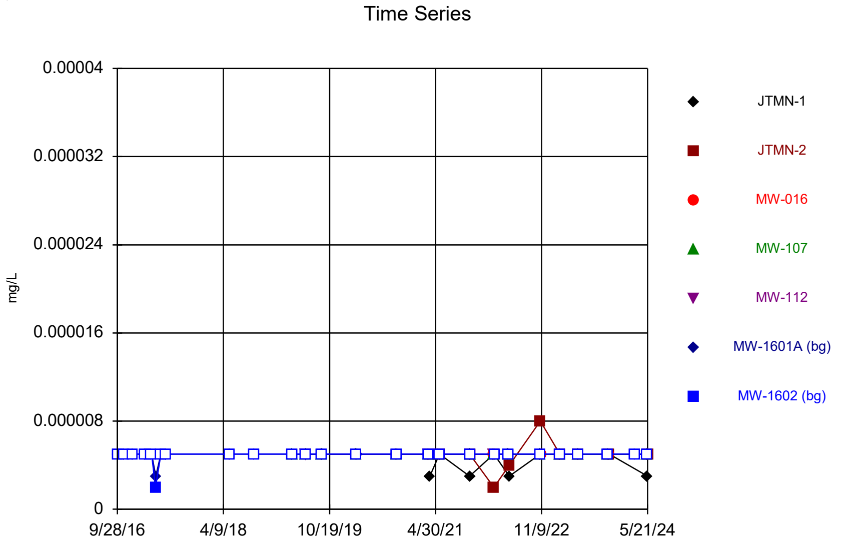

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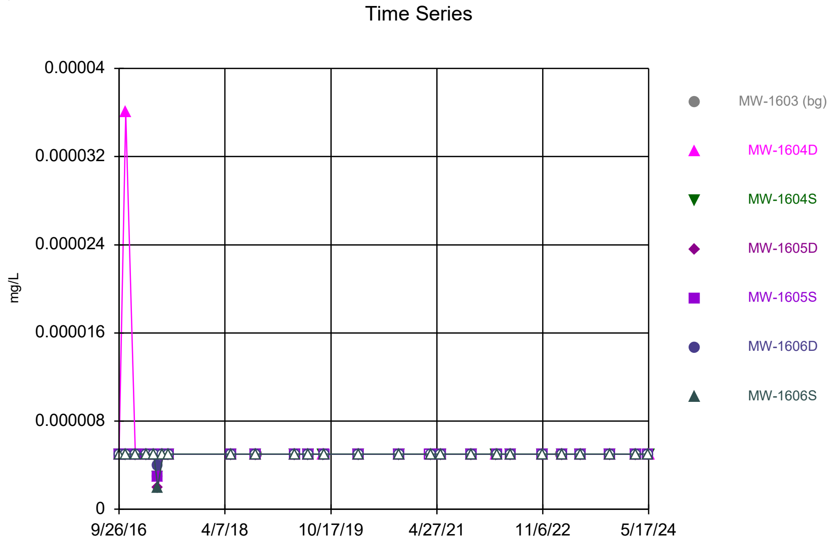

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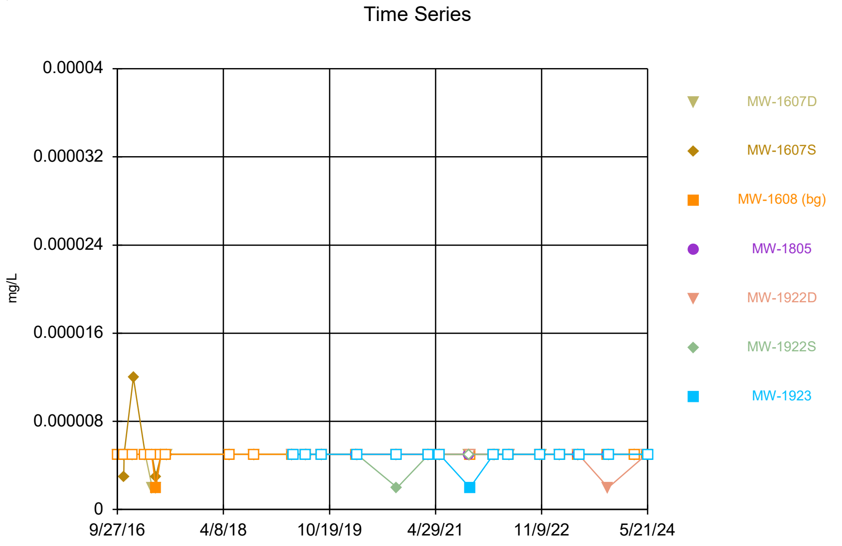

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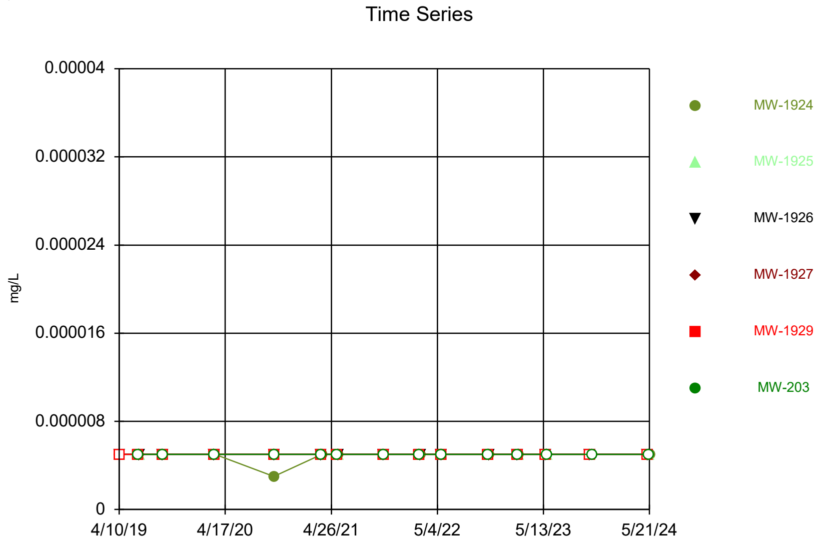

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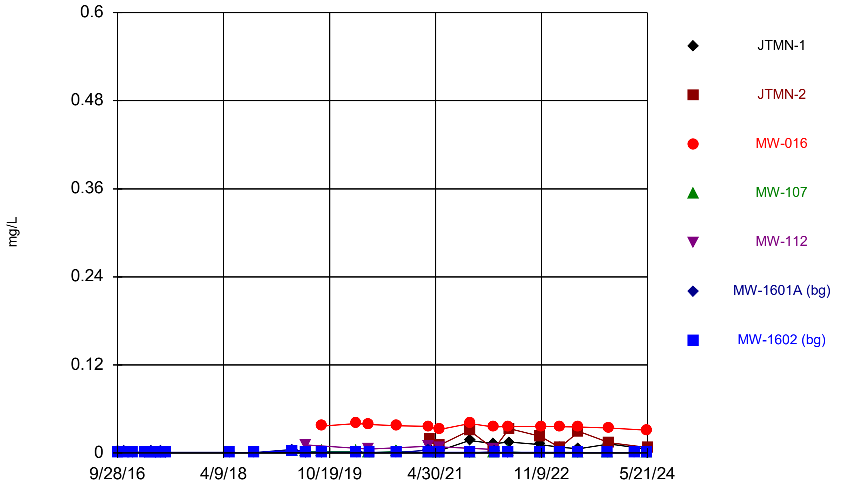
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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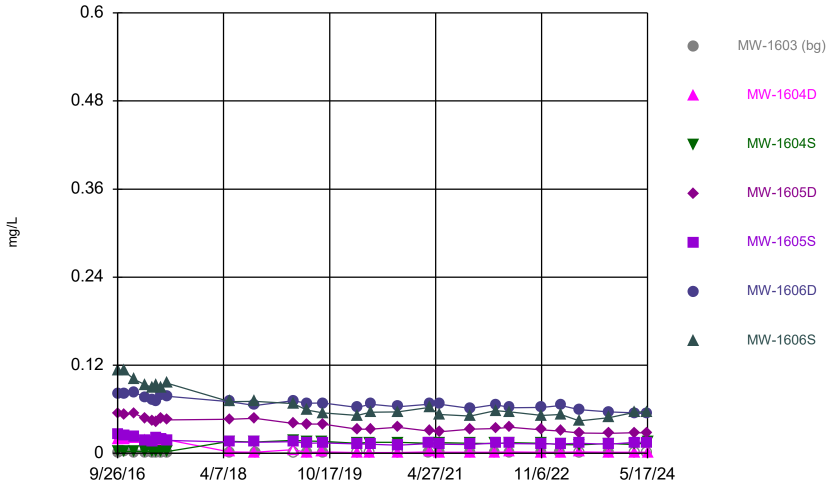
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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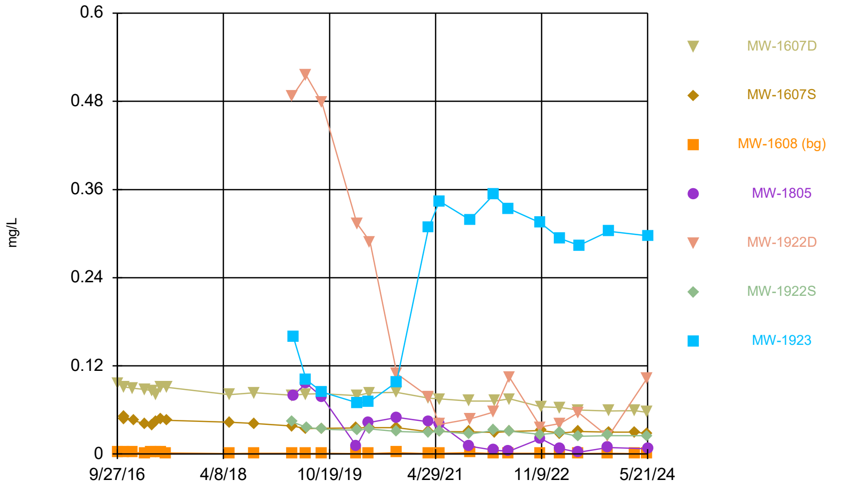
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Time Series



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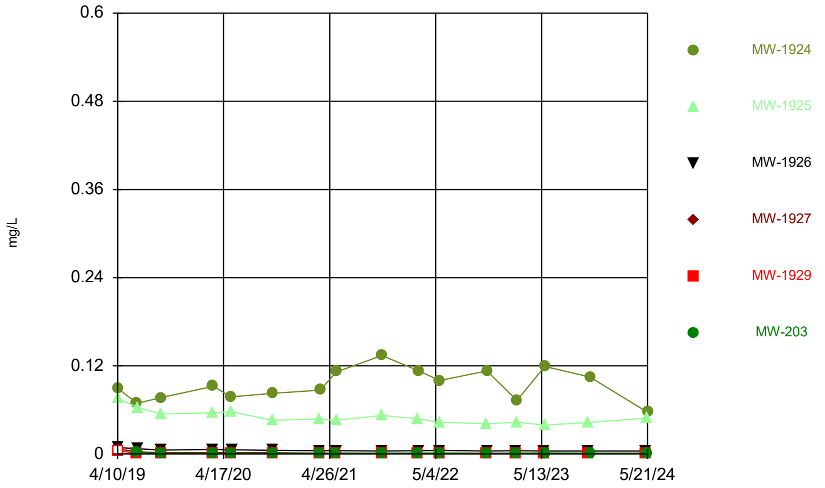

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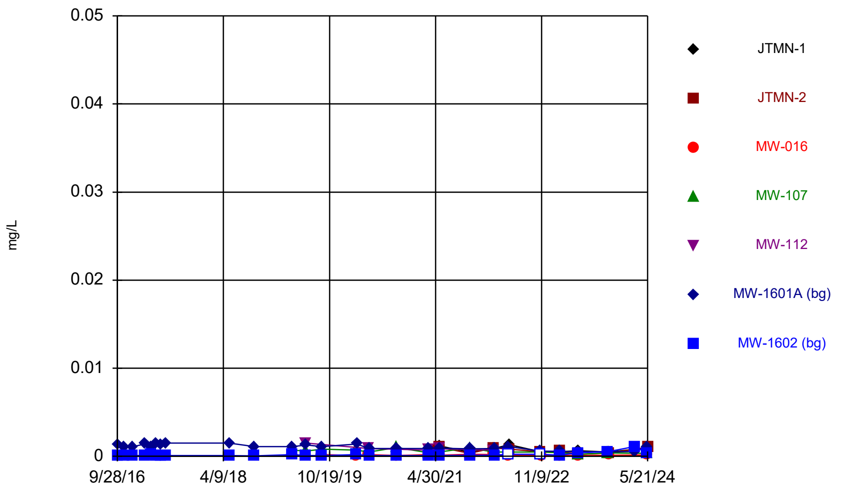
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

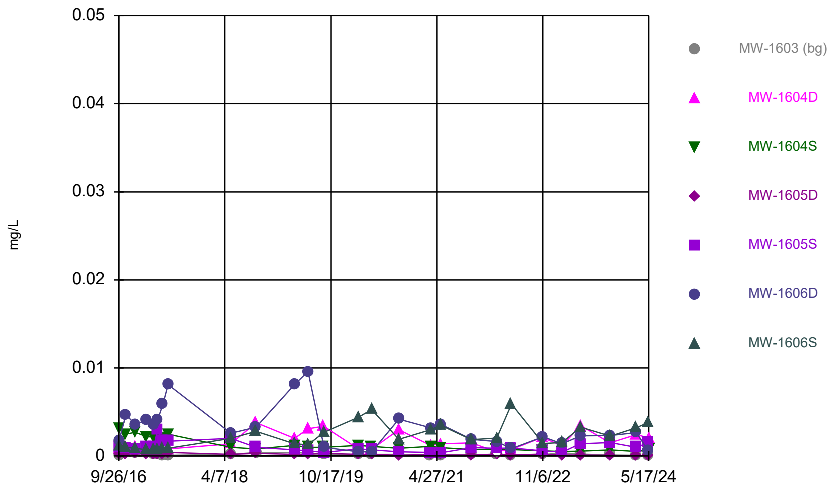
Time Series



Constituent: Selenium, total   Analysis Run 8/5/2024 1:22 PM   View: Desc.
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



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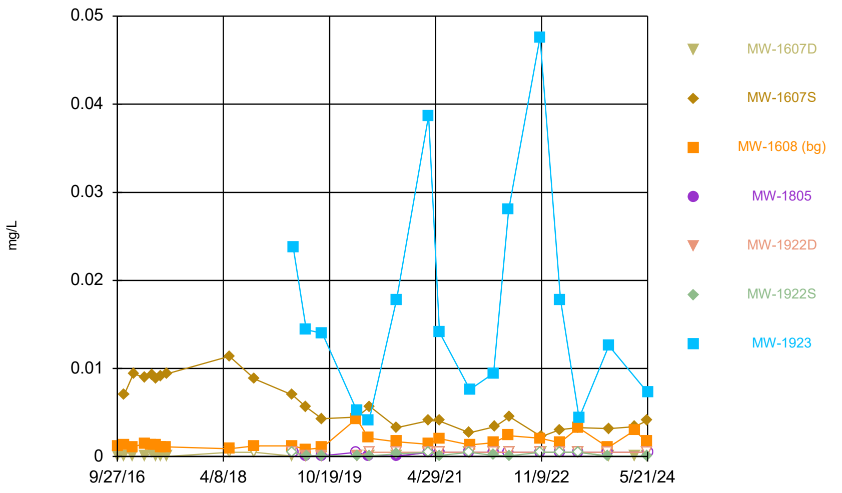
Time Series



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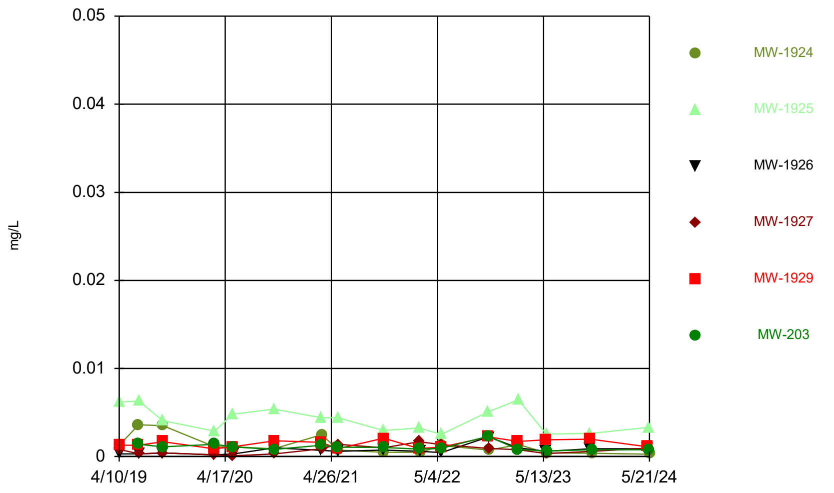
Time Series



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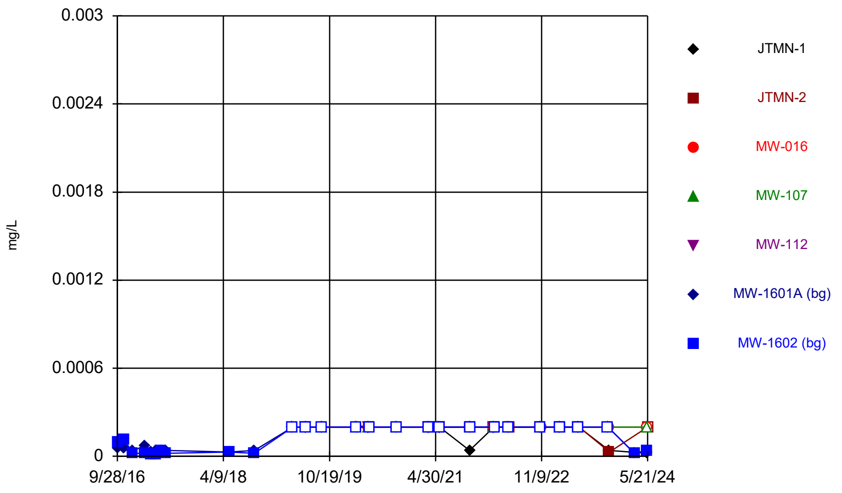
Hollow symbols indicate censored values.


Time Series

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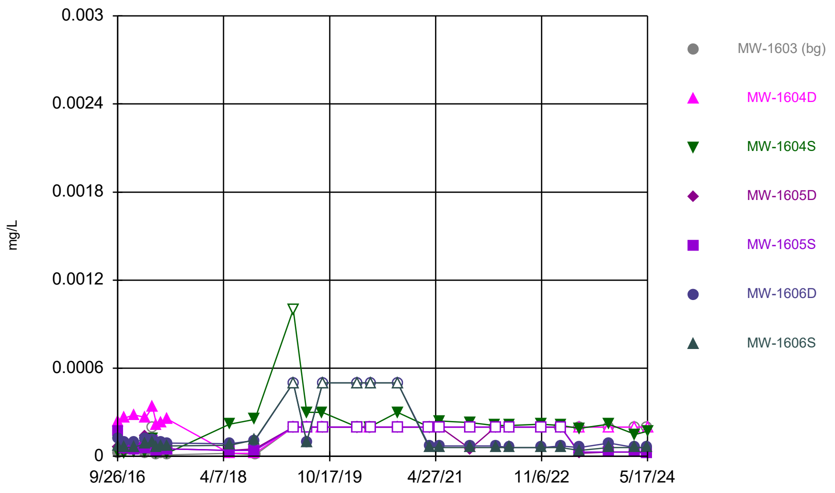
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.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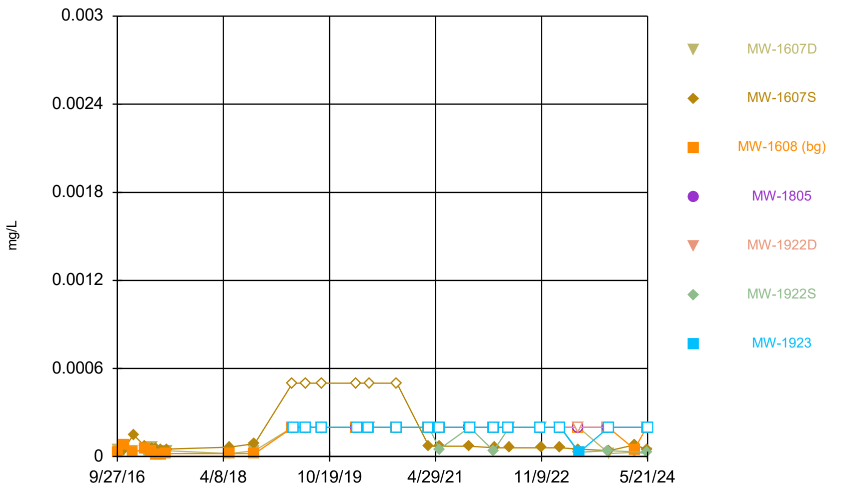
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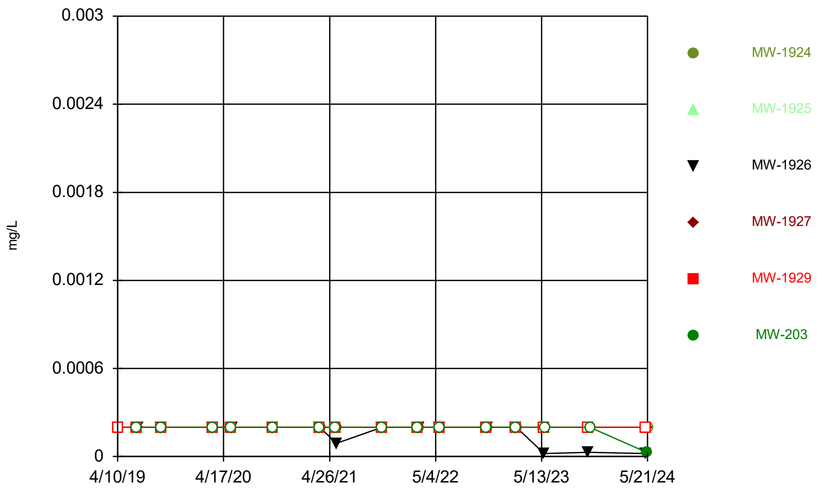
Time Series

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

FIGURE B

Box Plots

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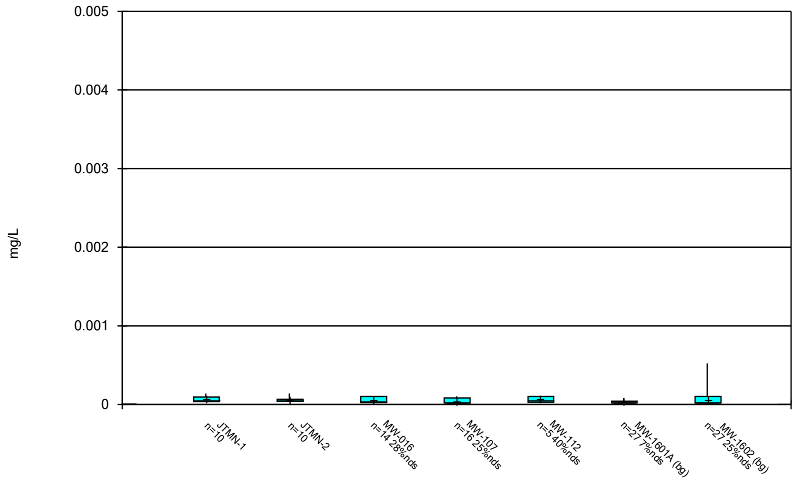
Box & Whiskers Plot



Constituent: Antimony, total   Analysis Run 8/5/2024 1:23 PM   View: Desc.
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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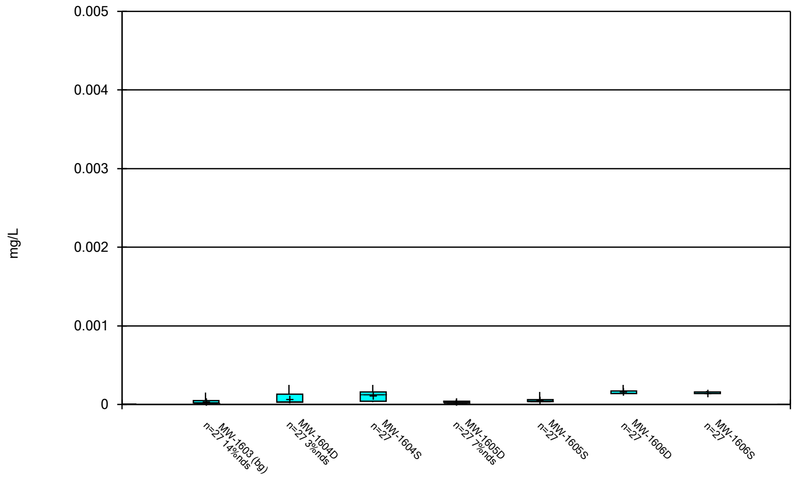
Box & Whiskers Plot



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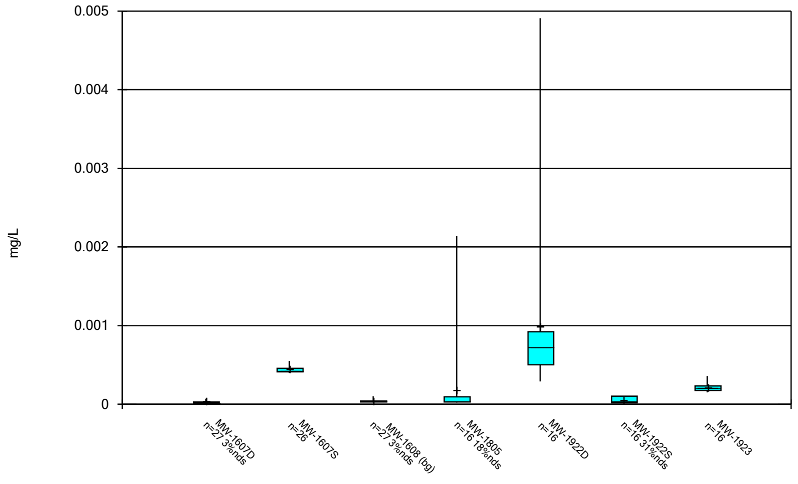
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



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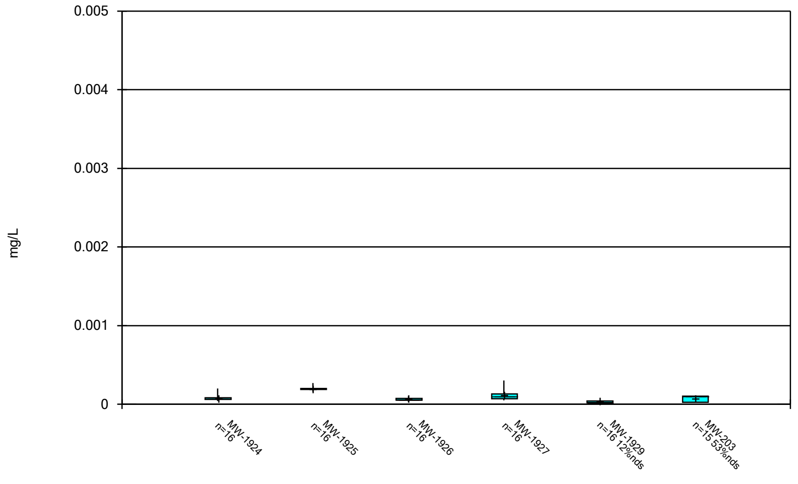
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



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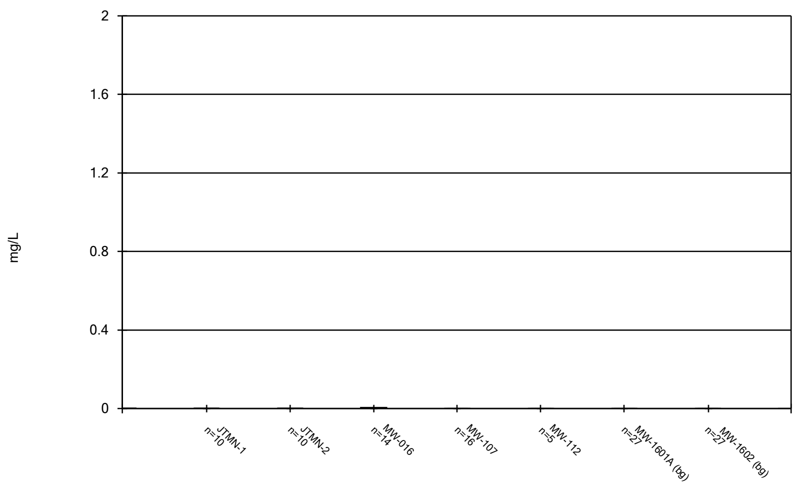
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



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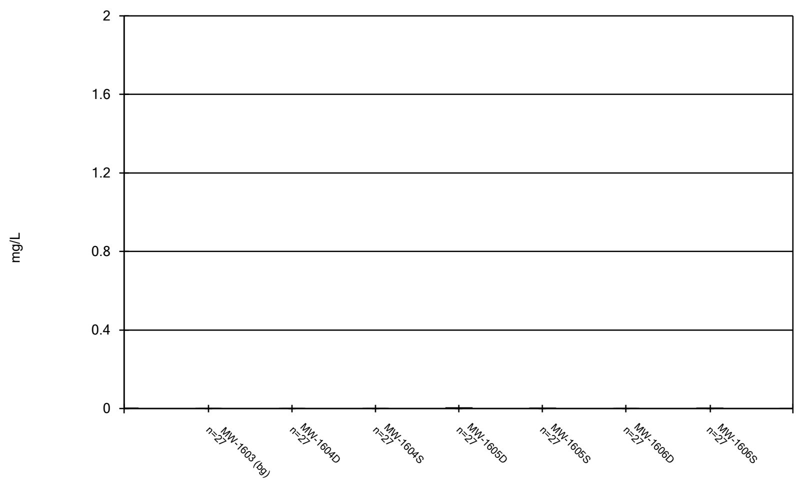
Box & Whiskers Plot



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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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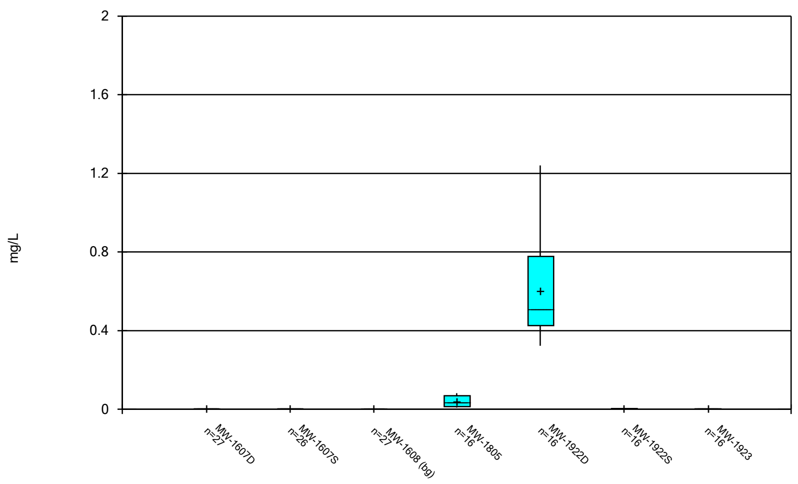
Box & Whiskers Plot



Constituent: Arsenic, total Analysis Run 8/5/2024 1:23 PM View: Desc.

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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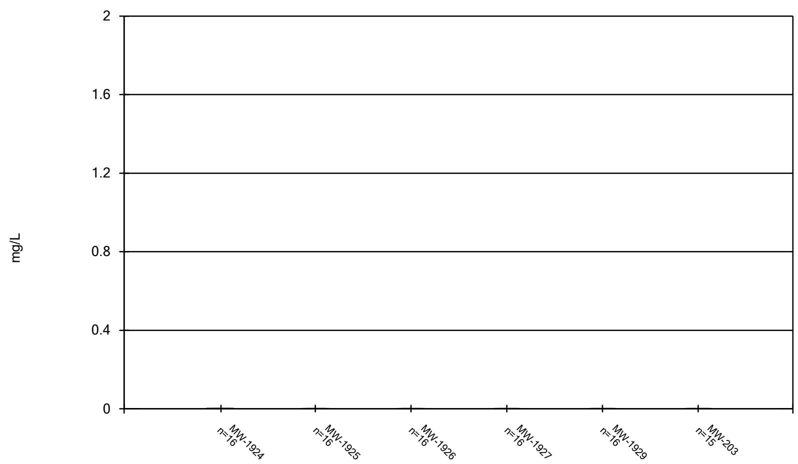
Box & Whiskers Plot



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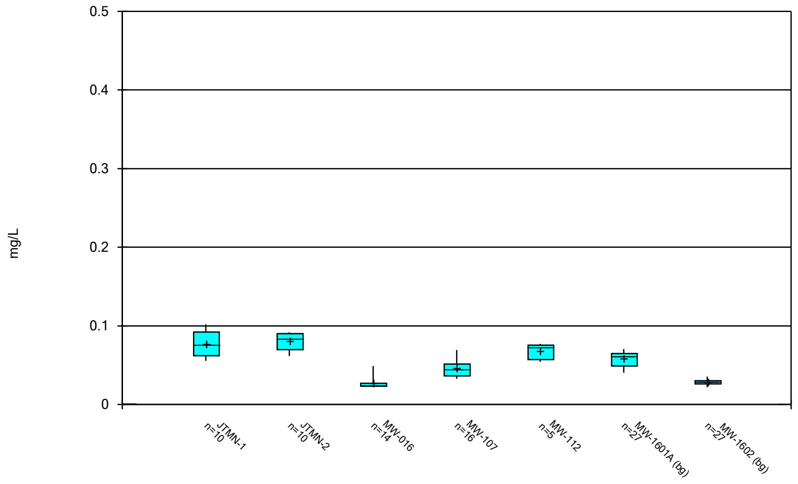
Box & Whiskers Plot



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Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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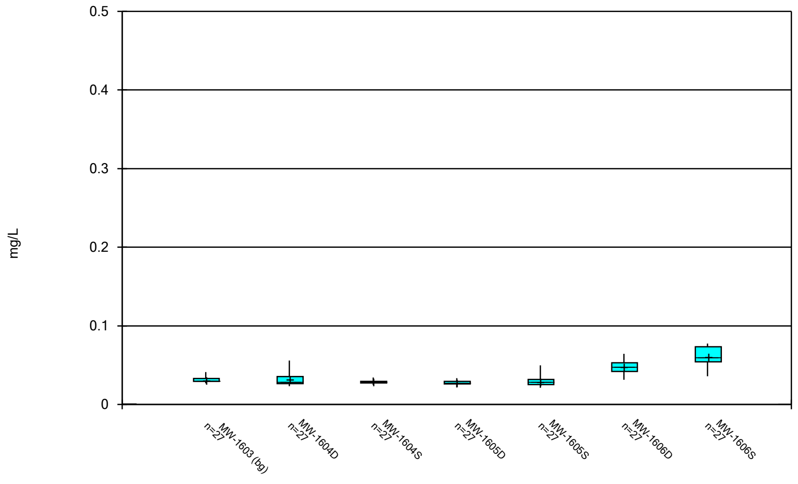
Box & Whiskers Plot



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Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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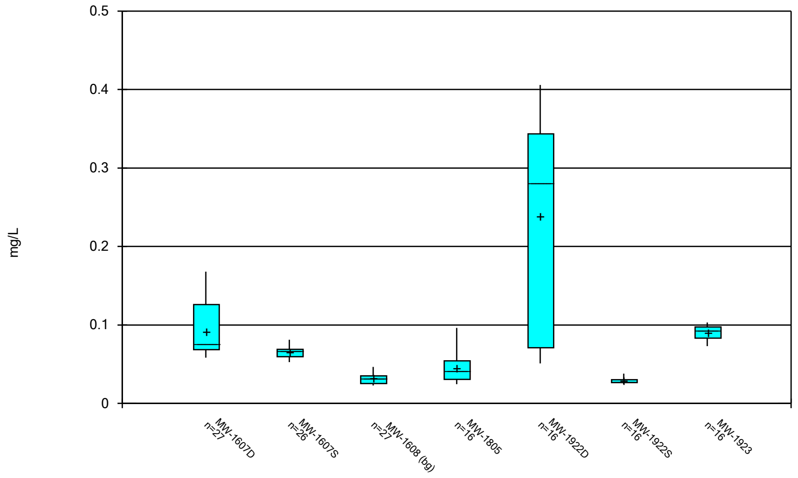
Box & Whiskers Plot



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Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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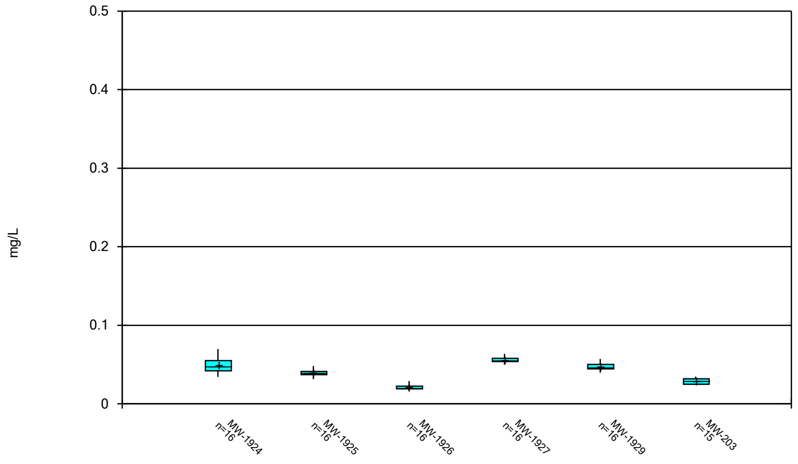
Box & Whiskers Plot



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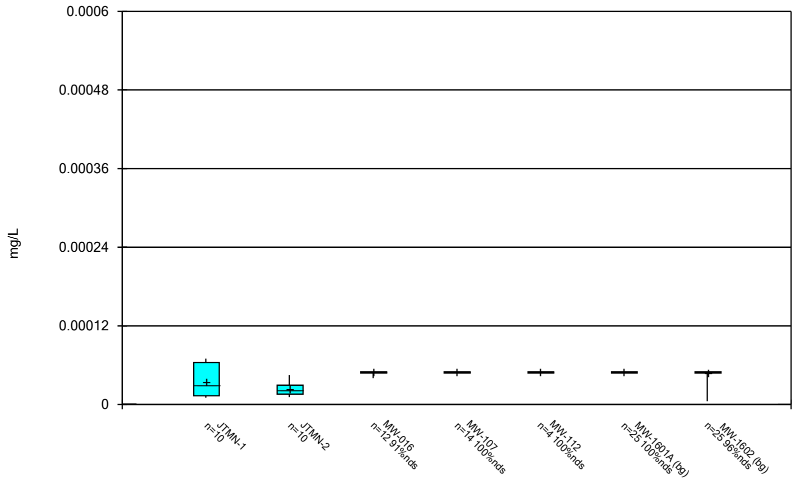
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

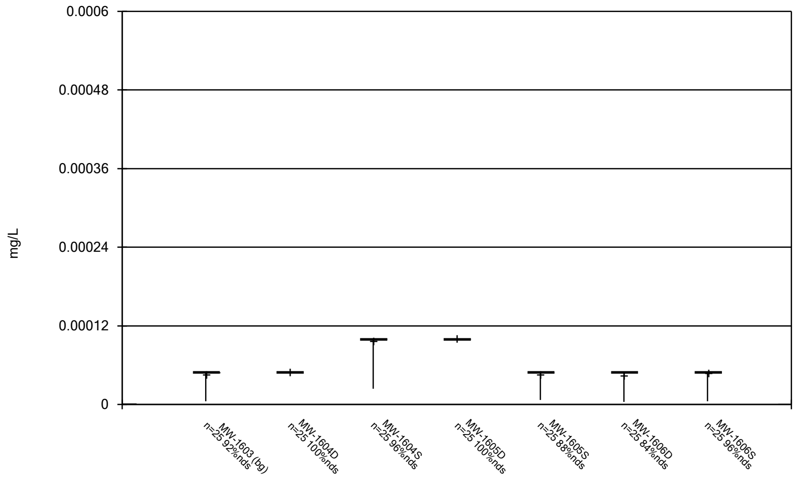
Box & Whiskers Plot



Constituent: Beryllium, total   Analysis Run 8/5/2024 1:23 PM   View: Desc.

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Box & Whiskers Plot



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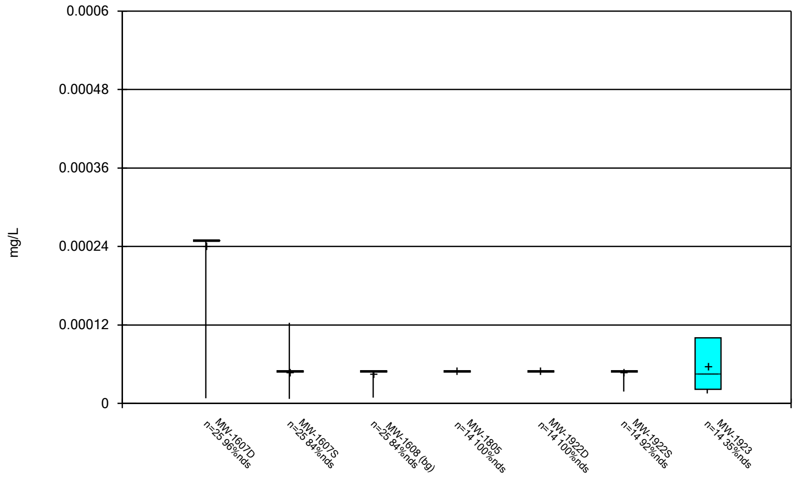
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Box & Whiskers Plot



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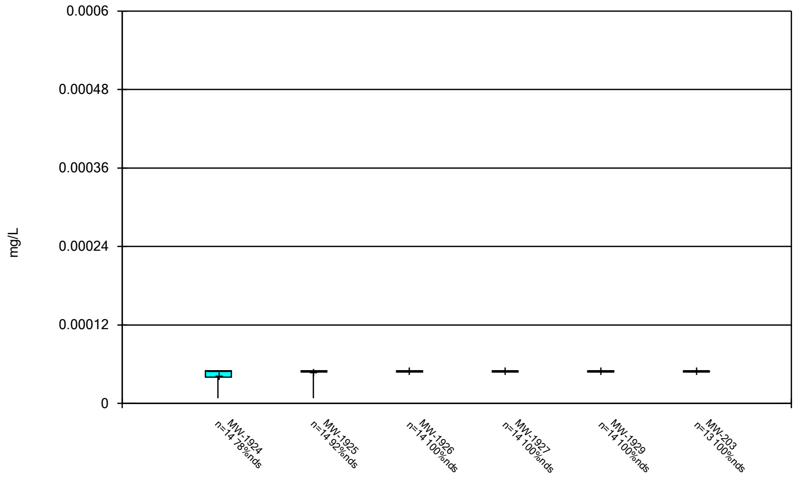
Box & Whiskers Plot



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Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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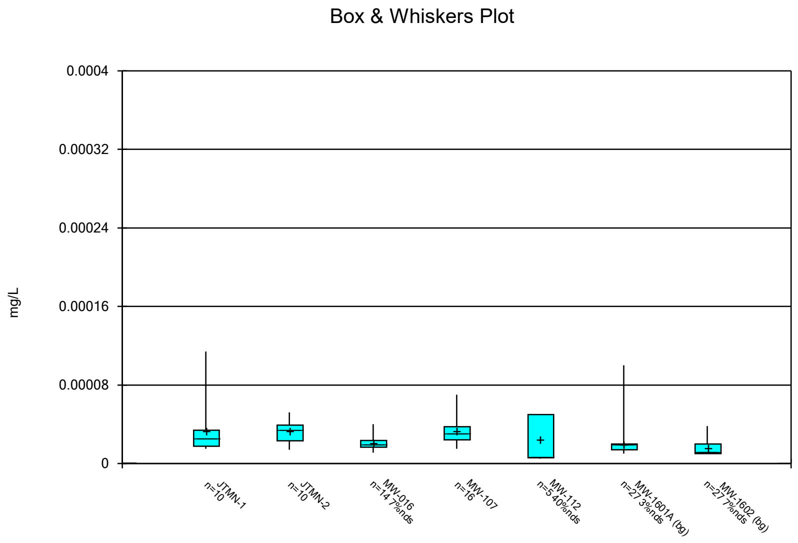

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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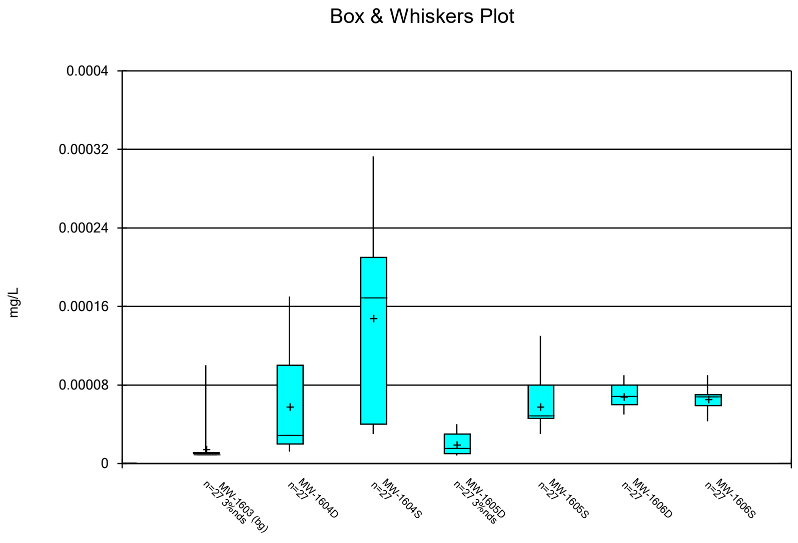

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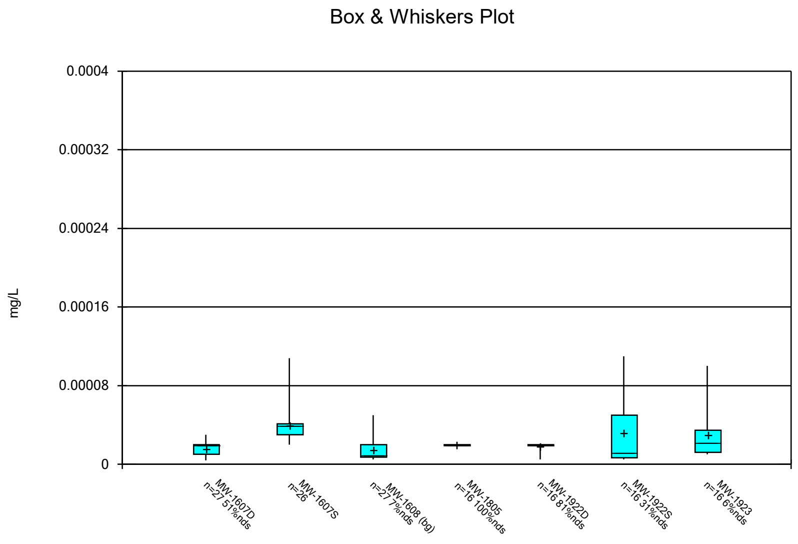

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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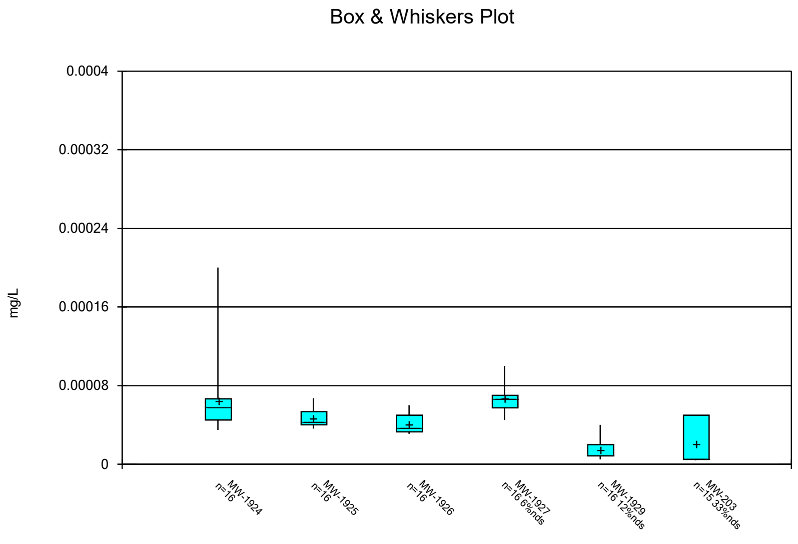

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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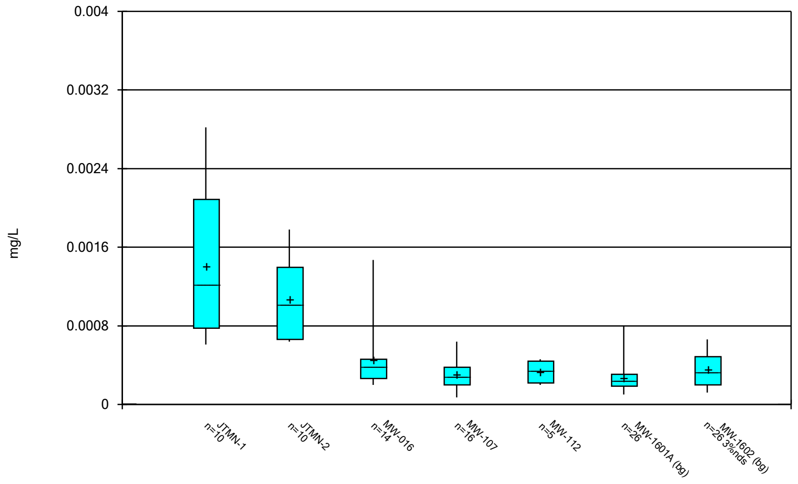
Box & Whiskers Plot



Constituent: Chromium, total Analysis Run 8/5/2024 1:23 PM View: Desc.
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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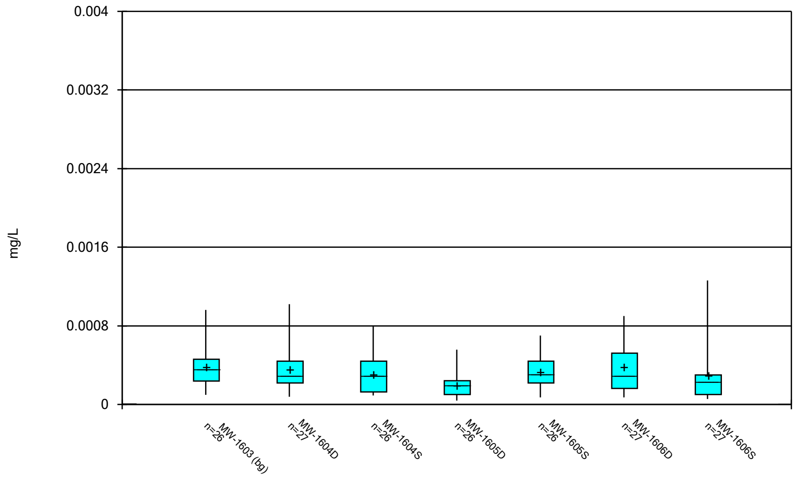
Box & Whiskers Plot



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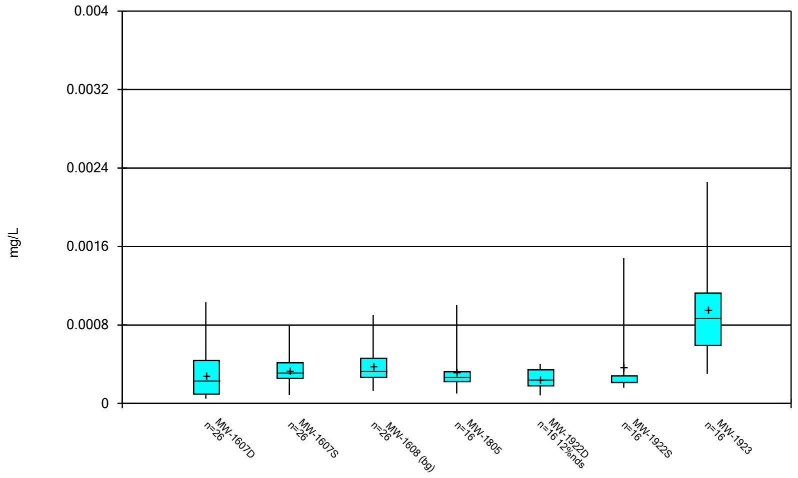
Box & Whiskers Plot



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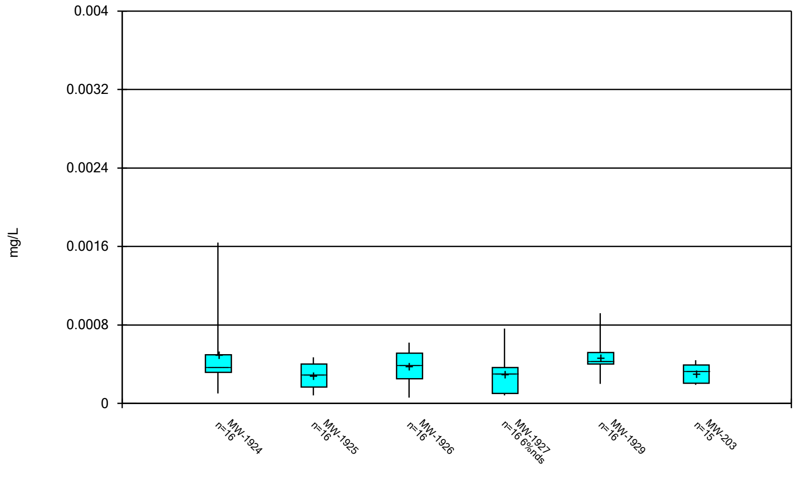
Box & Whiskers Plot



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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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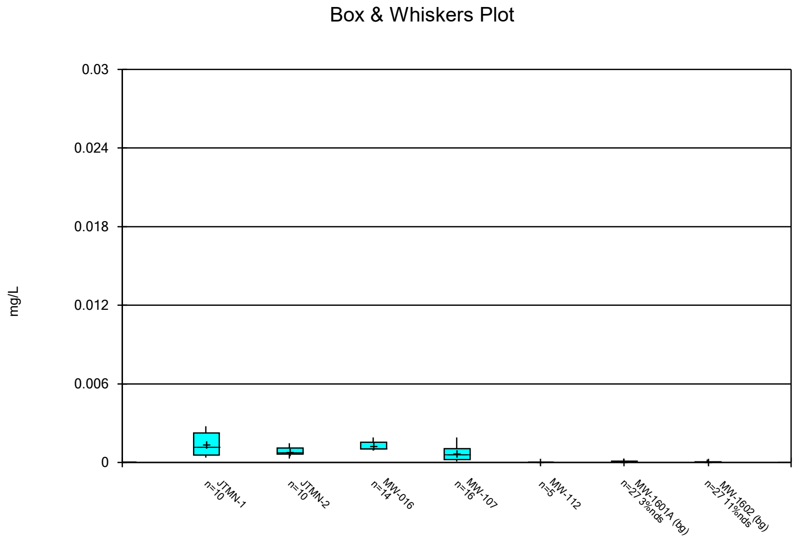

Constituent: Cobalt, total   Analysis Run 8/5/2024 1:23 PM   View: Desc.
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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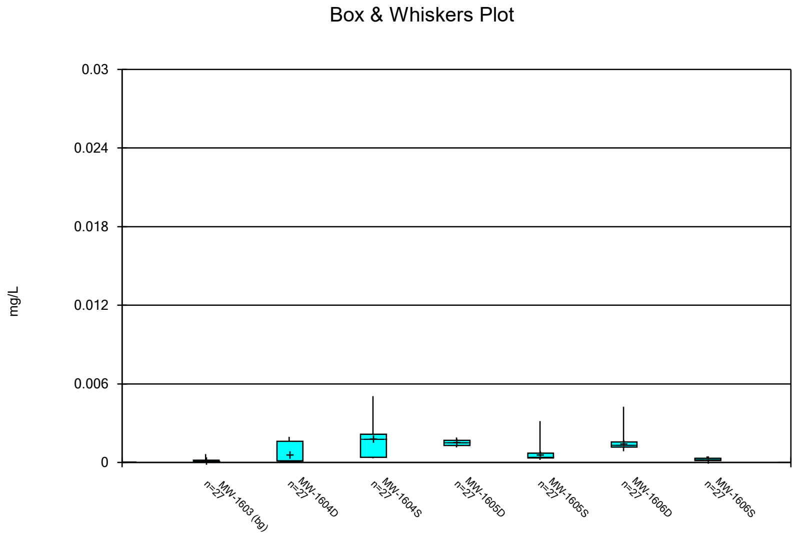

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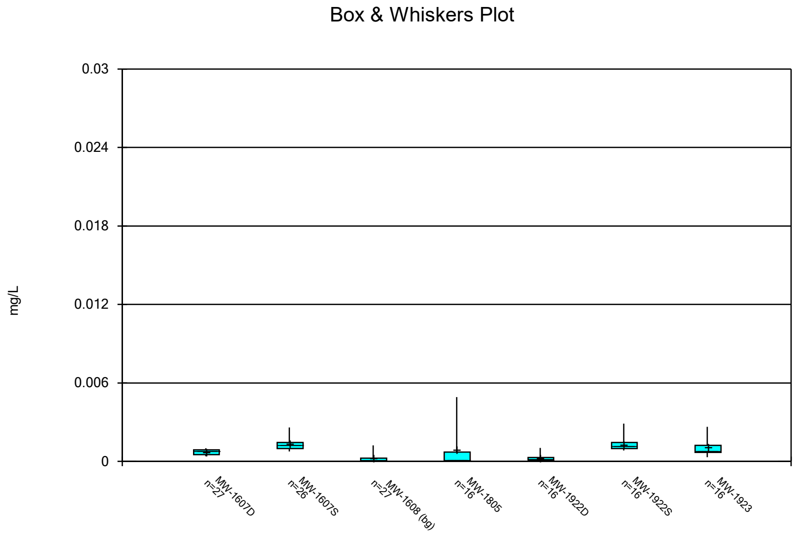

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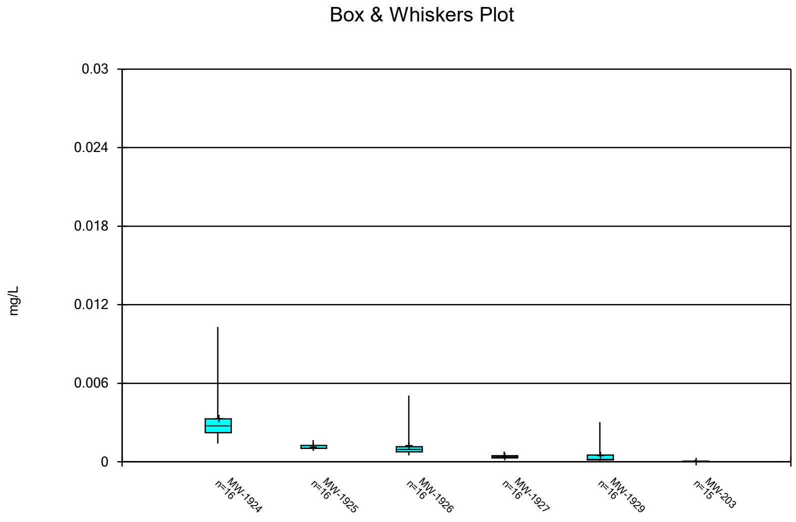

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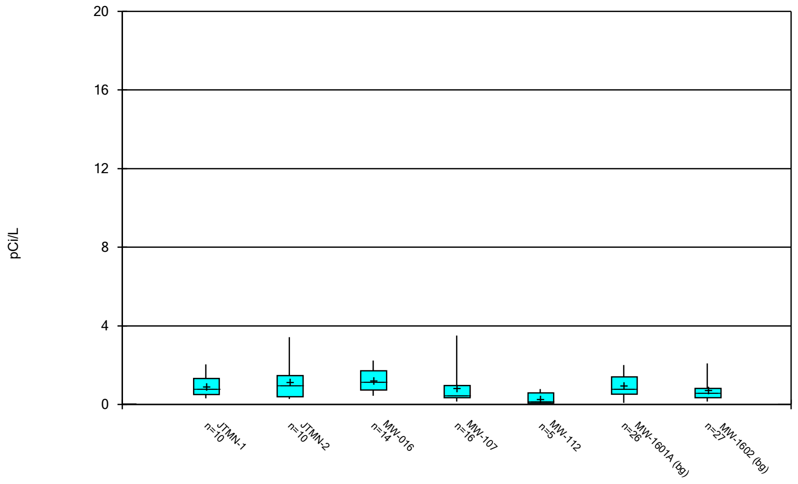
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228   Analysis Run 8/5/2024 1:23 PM   View: Desc.
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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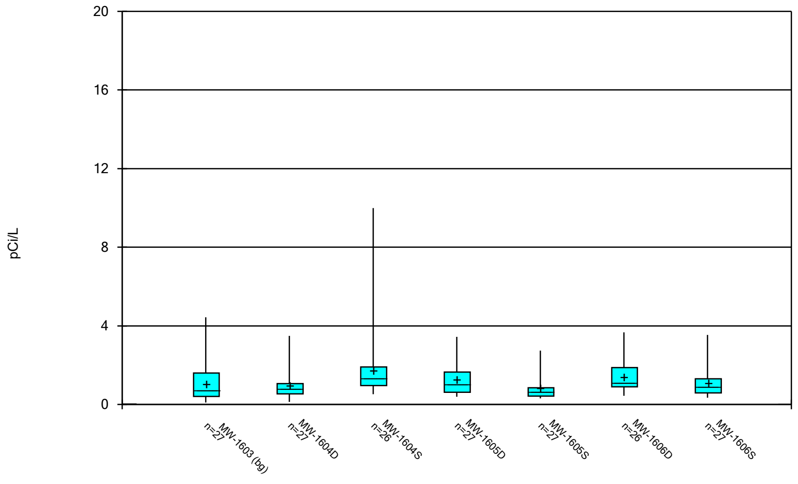

Constituent: Combined Radium 226 + 228   Analysis Run 8/5/2024 1:23 PM   View: Desc.
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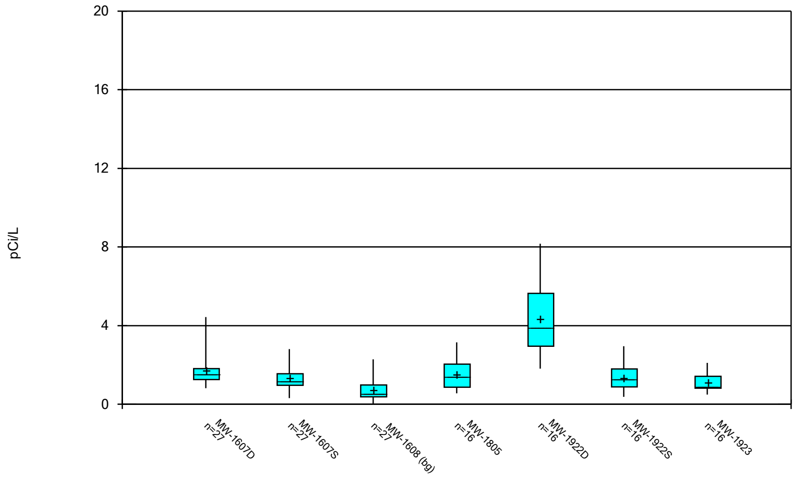
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228   Analysis Run 8/5/2024 1:23 PM   View: Desc.
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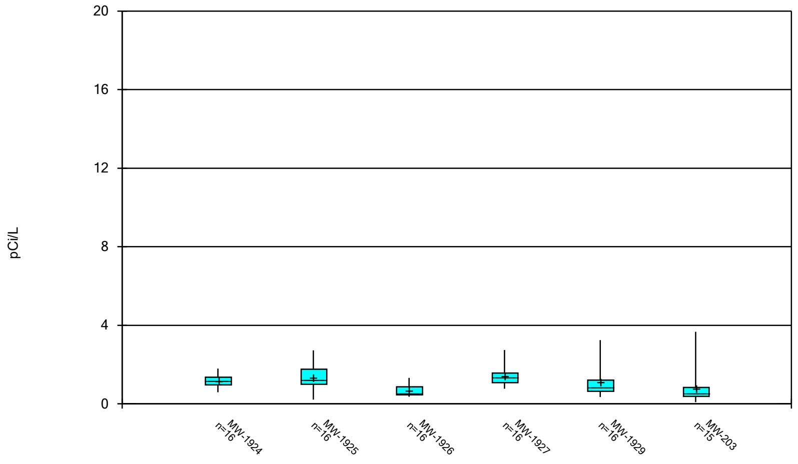
Box & Whiskers Plot



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Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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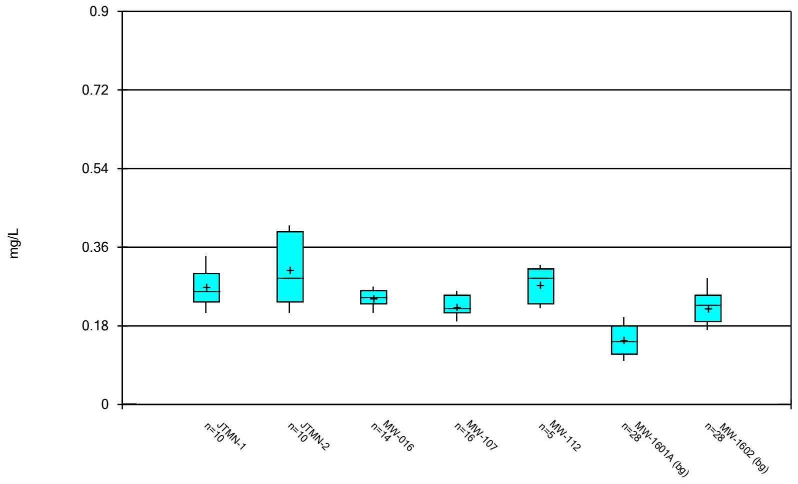
Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 8/5/2024 1:23 PM View: Desc.
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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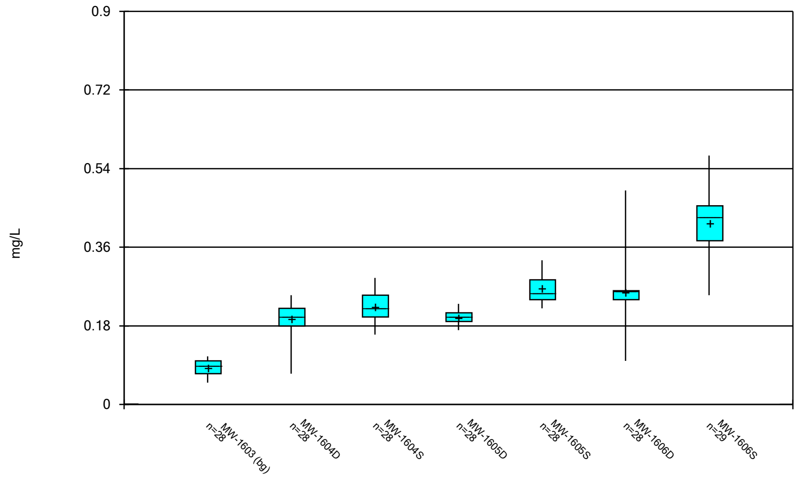
Box & Whiskers Plot



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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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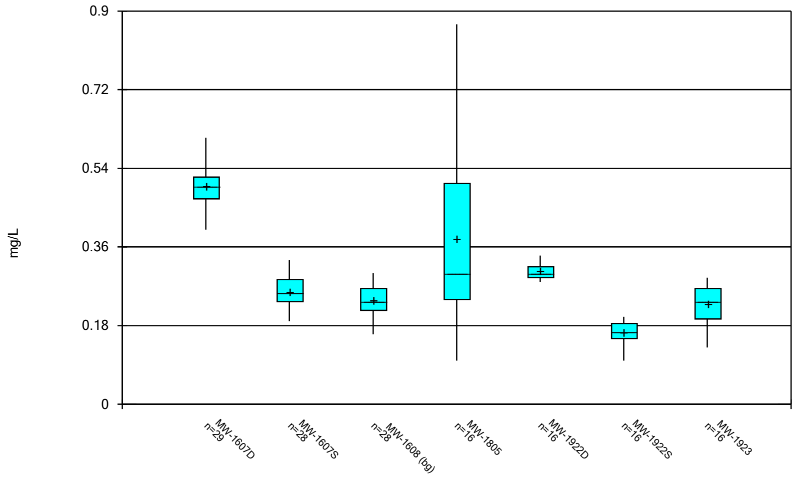
Box & Whiskers Plot



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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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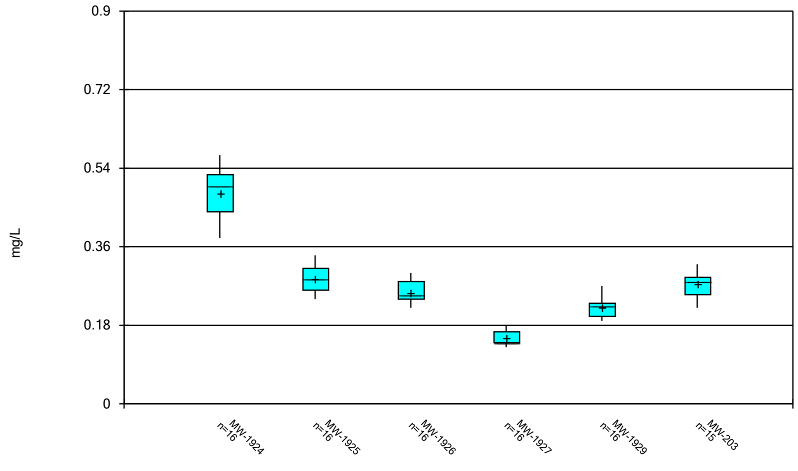
Box & Whiskers Plot



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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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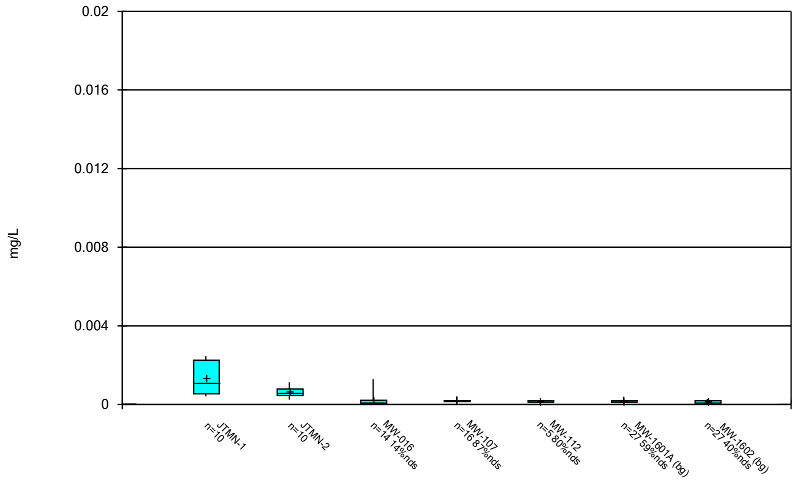
Box & Whiskers Plot



Constituent: Lead, total Analysis Run 8/5/2024 1:23 PM View: Desc.
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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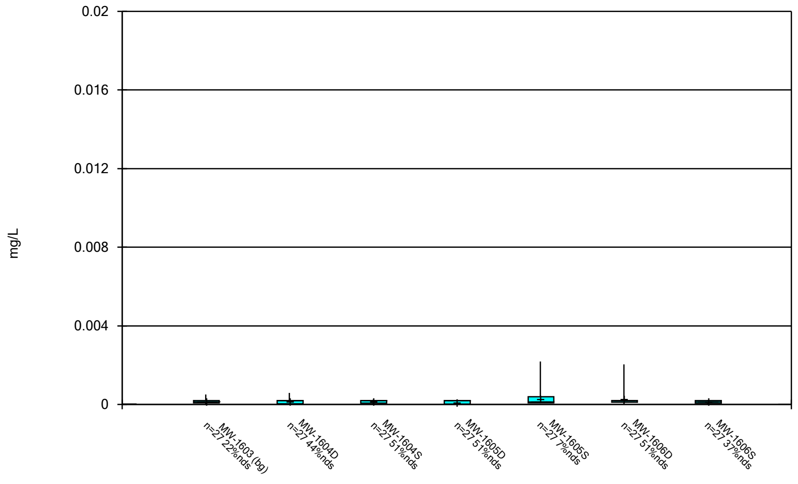
Box & Whiskers Plot



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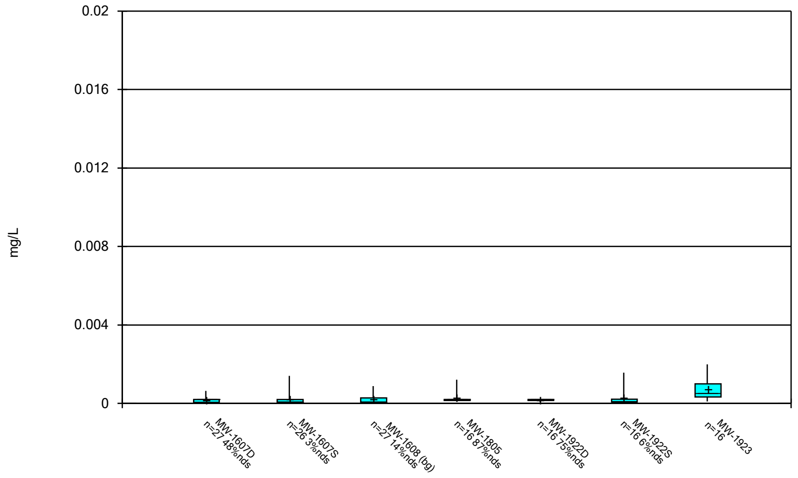
Box & Whiskers Plot



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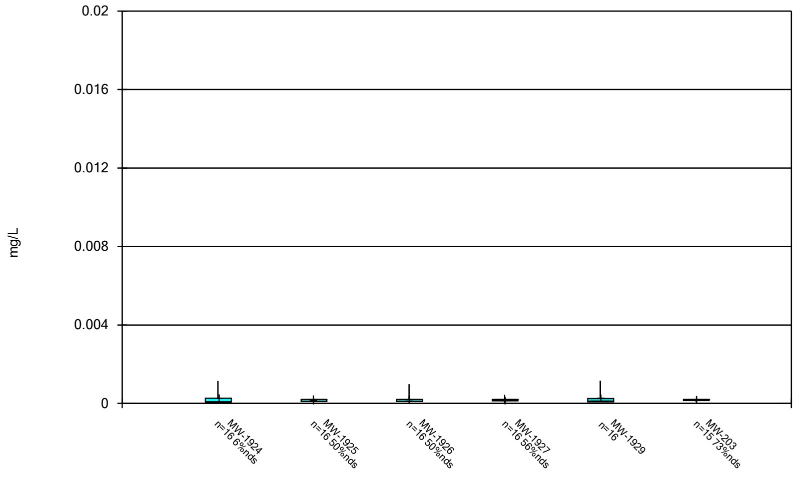
Box & Whiskers Plot



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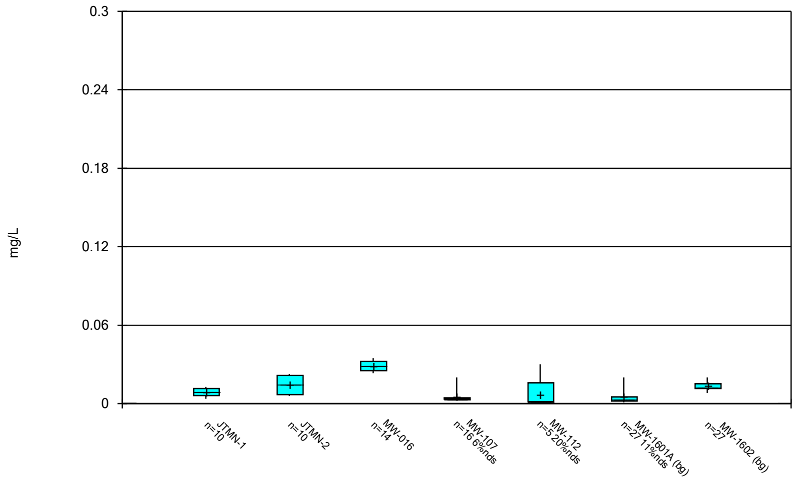
Box & Whiskers Plot



Constituent: Lithium, total   Analysis Run 8/5/2024 1:23 PM   View: Desc.
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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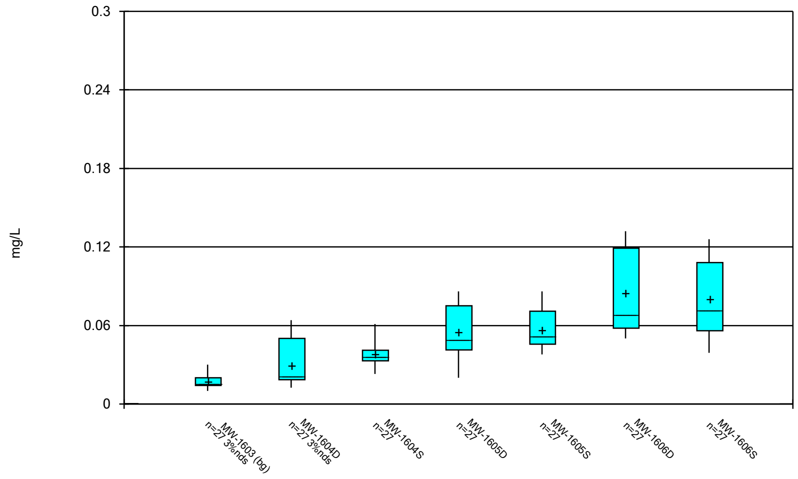
Box & Whiskers Plot



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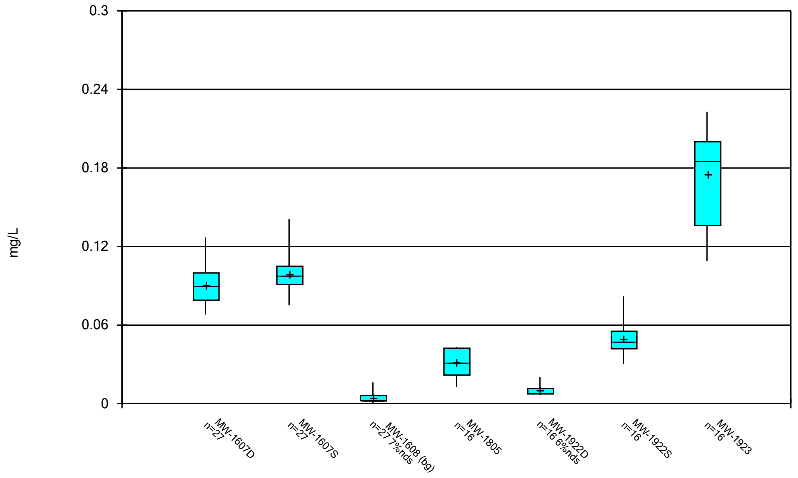
Box & Whiskers Plot



Constituent: Lithium, total   Analysis Run 8/5/2024 1:23 PM   View: Desc.
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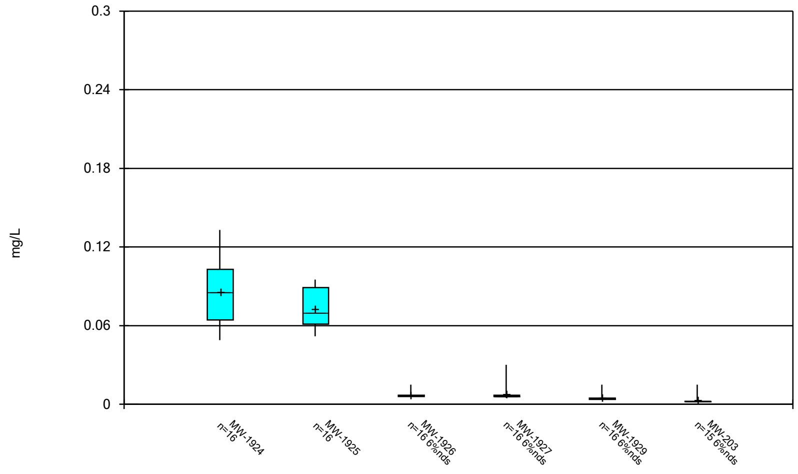
Box & Whiskers Plot



Constituent: Lithium, total   Analysis Run 8/5/2024 1:23 PM   View: Desc.
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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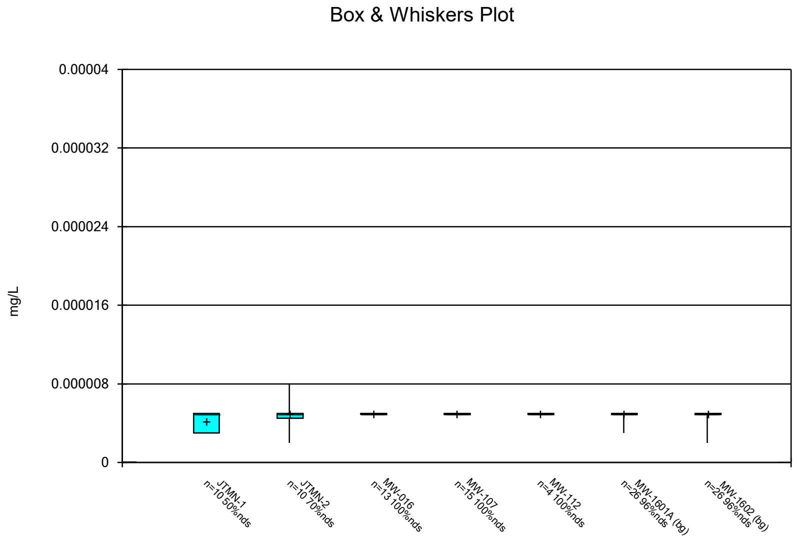

Constituent: Mercury, total   Analysis Run 8/5/2024 1:23 PM   View: Desc.
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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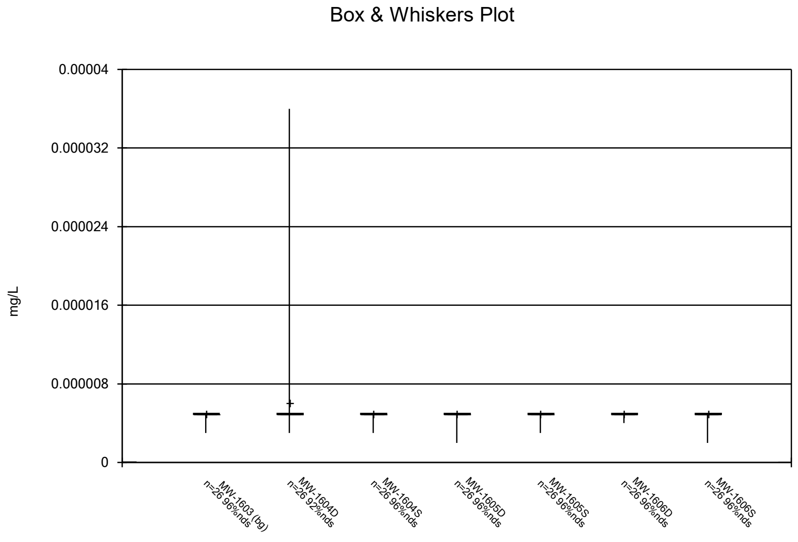

Constituent: Mercury, total   Analysis Run 8/5/2024 1:23 PM   View: Desc.
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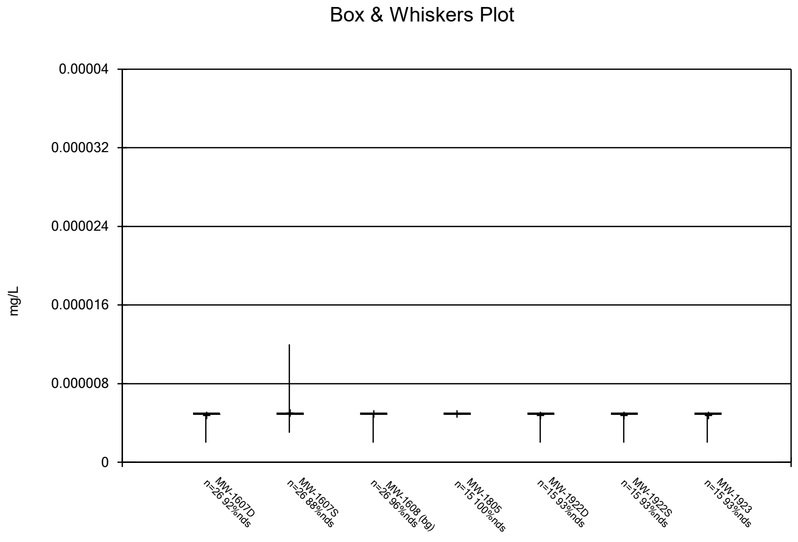

Constituent: Mercury, total   Analysis Run 8/5/2024 1:23 PM   View: Desc.
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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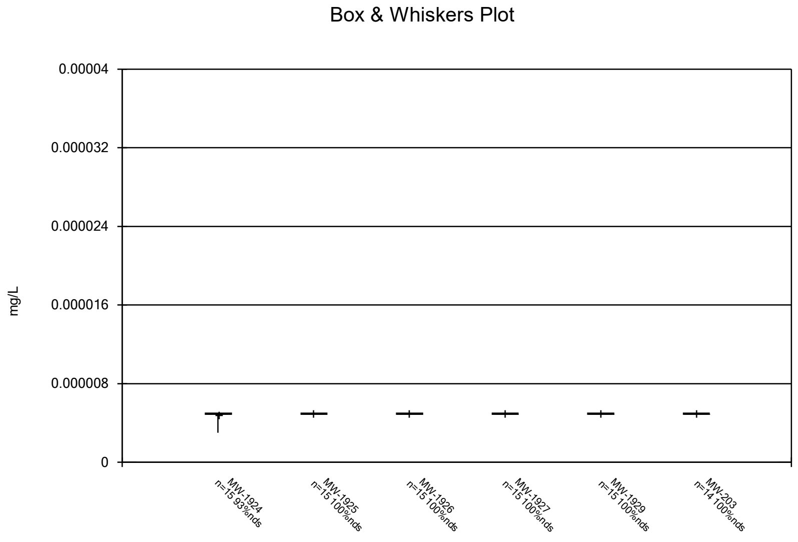

Constituent: Mercury, total   Analysis Run 8/5/2024 1:24 PM   View: Desc.
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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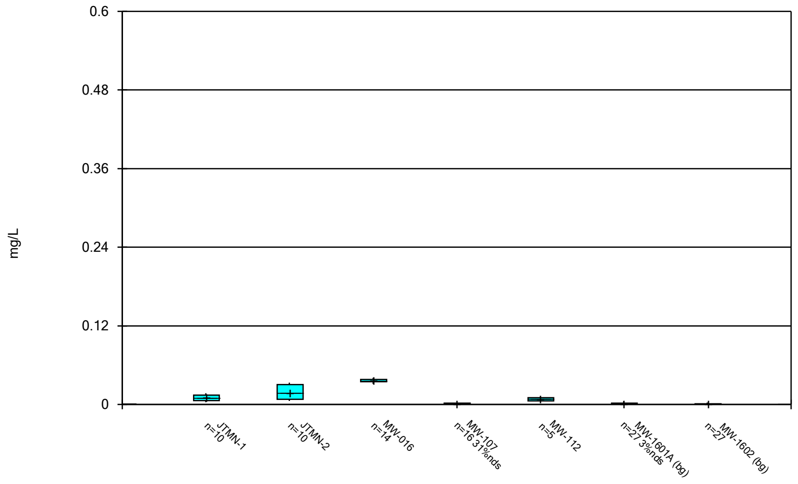
Box & Whiskers Plot



Constituent: Molybdenum, total   Analysis Run 8/5/2024 1:24 PM   View: Desc.

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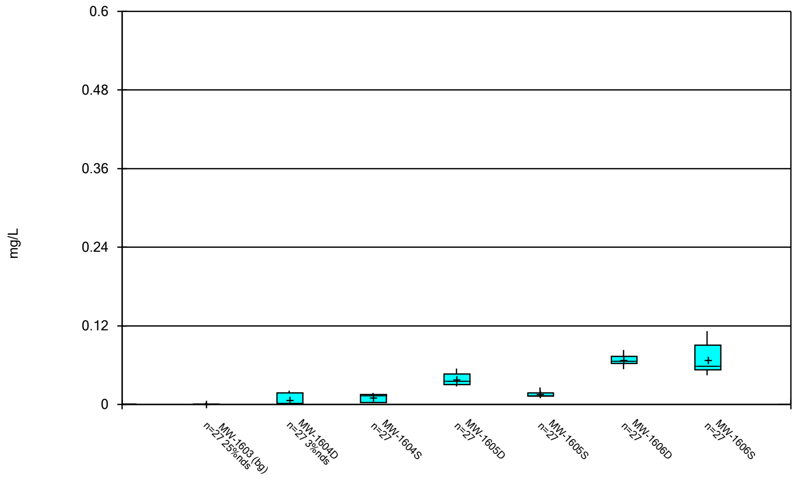
Box & Whiskers Plot



Constituent: Molybdenum, total   Analysis Run 8/5/2024 1:24 PM   View: Desc.

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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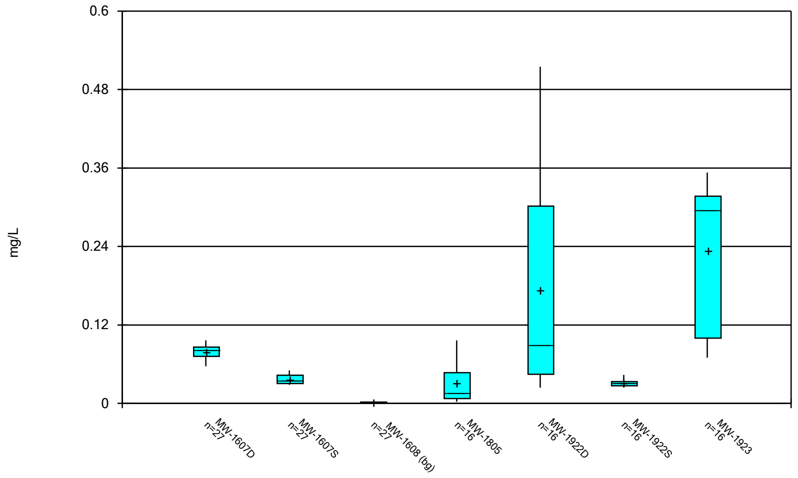
Box & Whiskers Plot



Constituent: Molybdenum, total   Analysis Run 8/5/2024 1:24 PM   View: Desc.

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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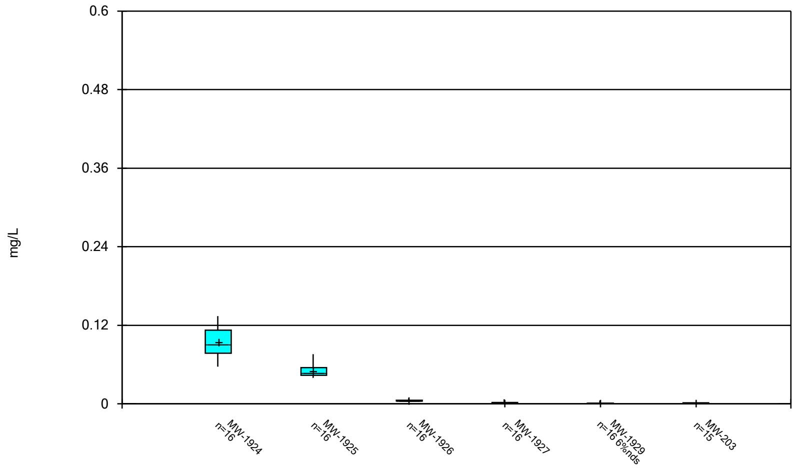
Box & Whiskers Plot



Constituent: Molybdenum, total   Analysis Run 8/5/2024 1:24 PM   View: Desc.

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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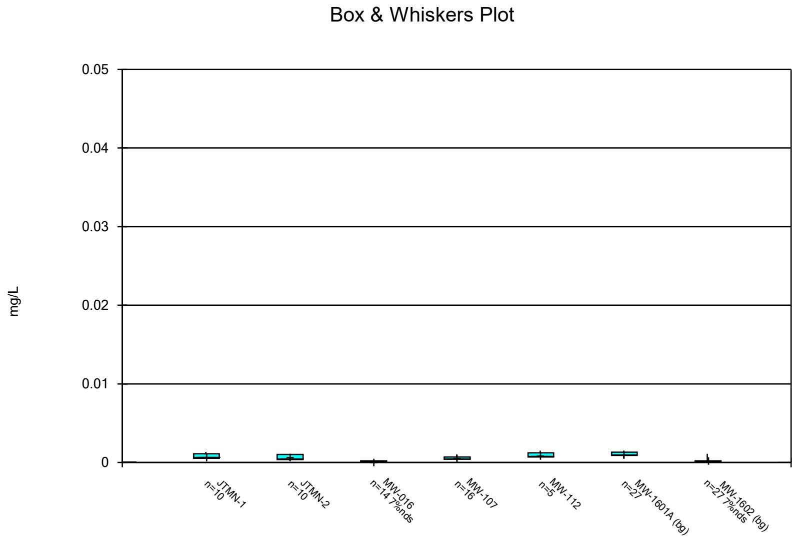

Constituent: Selenium, total   Analysis Run 8/5/2024 1:24 PM   View: Desc.

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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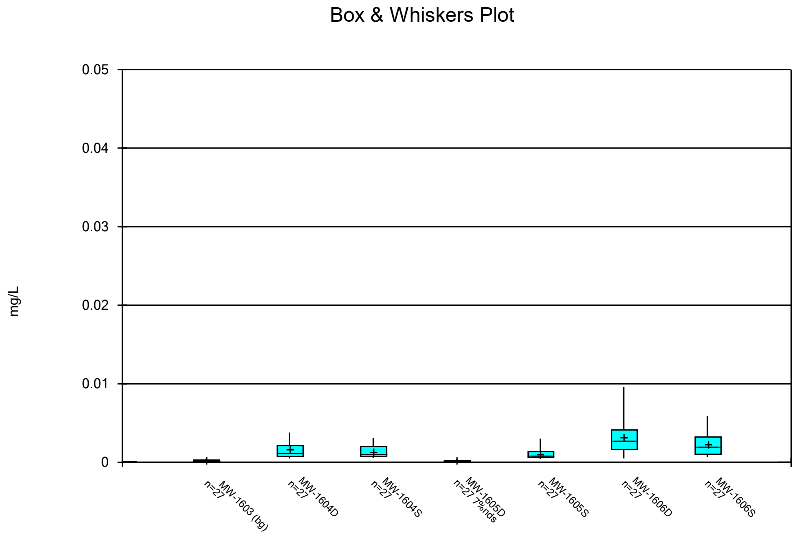
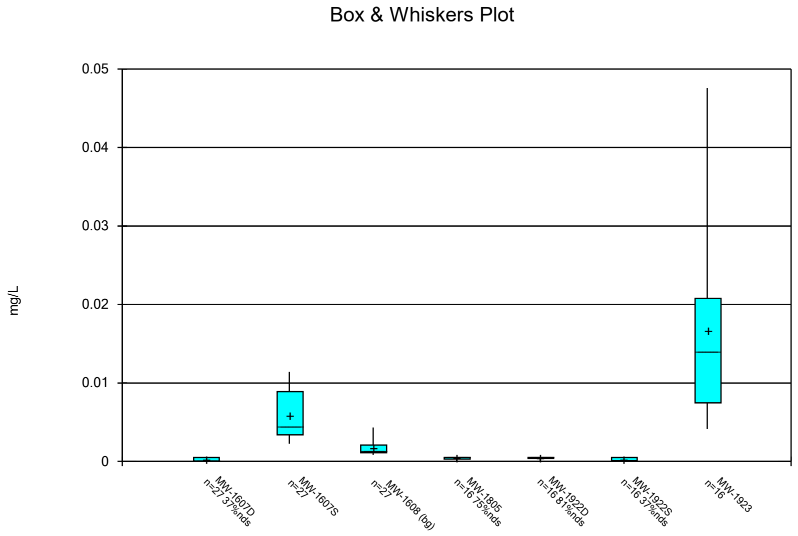


Constituent: Selenium, total   Analysis Run 8/5/2024 1:24 PM   View: Desc.

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

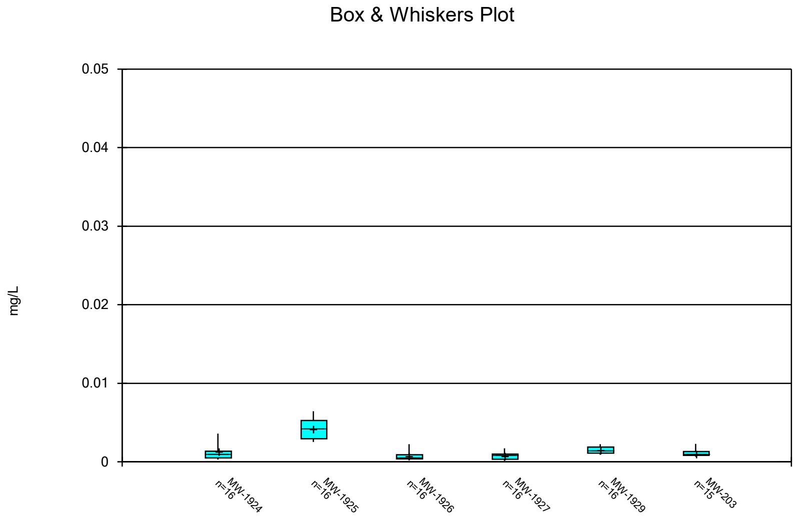
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



Constituent: Selenium, total   Analysis Run 8/5/2024 1:24 PM   View: Desc.

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

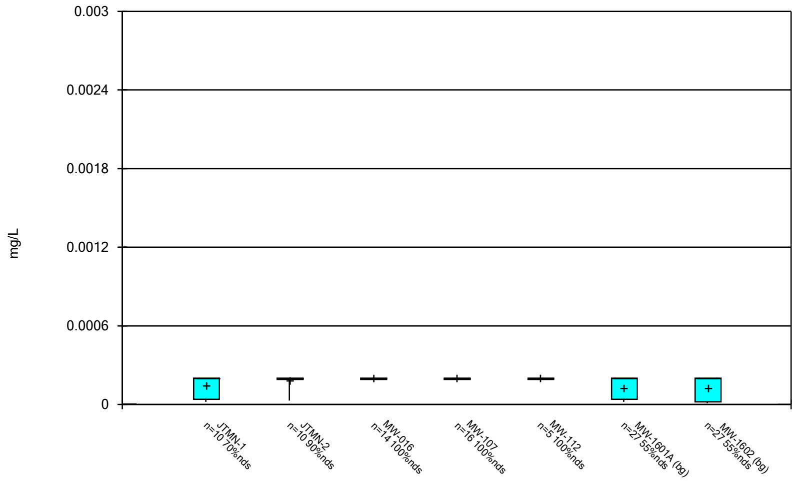


Constituent: Selenium, total   Analysis Run 8/5/2024 1:24 PM   View: Desc.

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/5/2024 1:24 PM View: Desc.
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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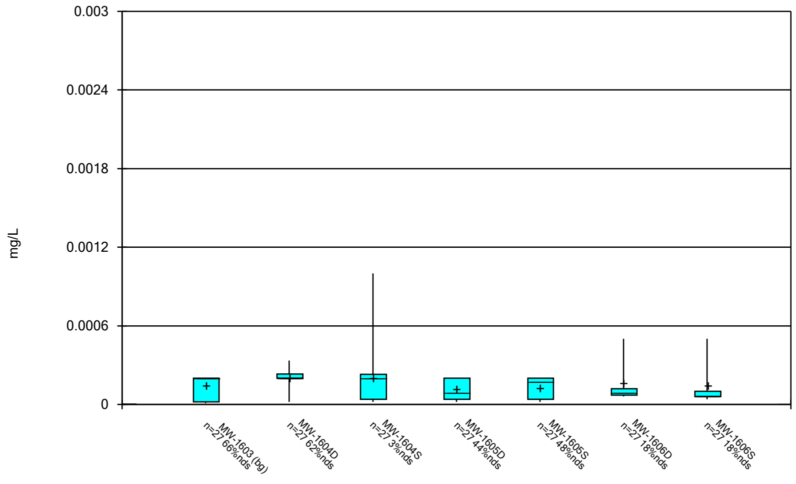
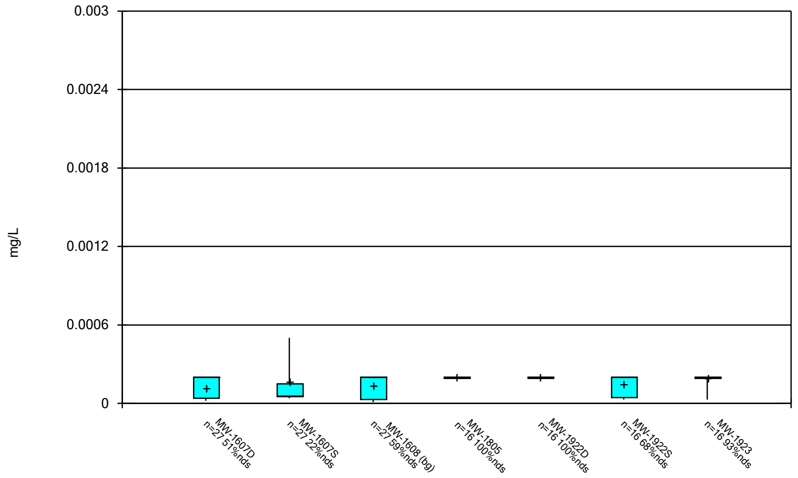
Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/5/2024 1:24 PM View: Desc.
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

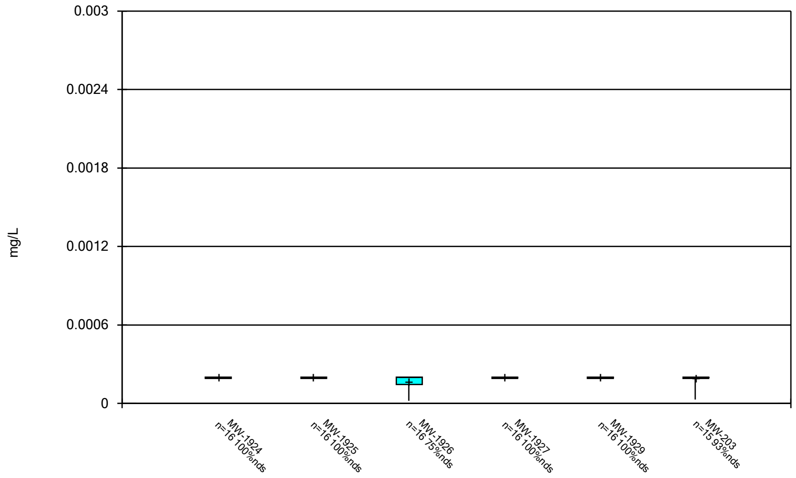
Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/5/2024 1:24 PM View: Desc.
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/5/2024 1:24 PM View: Desc.
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

FIGURE C

Outlier Summary

Outlier Summary

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/5/2024, 2:09 PM

	MW-1607S Antimony, total (mg/L)	MW-1607S Arsenic, total (mg/L)	MW-1607S Barium, total (mg/L)	MW-1607S Cadmium, total (mg/L)	MW-1601A Chromium, total (mg/L)	MW-1602 Chromium, total (mg/L)	MW-1603 Chromium, total (mg/L)	MW-1604S Chromium, total (mg/L)	MW-1605D Chromium, total (mg/L)	MW-1605S Chromium, total (mg/L)
9/26/2016										
9/27/2016										
11/1/2016					0.0013 (o)					
12/19/2016						0.00165 (o)	0.00237 (o)			
12/20/2016								0.00197 (o)	0.00229 (o)	0.00285 (o)
12/21/2016	0.00084 (o)	0.0112 (o)	0.114 (o)	0.00022 (o)						
10/25/2023										

	MW-1607D Chromium, total (mg/L)	MW-1607S Chromium, total (mg/L)	MW-1608 Chromium, total (mg/L)	MW-1607S Cobalt, total (mg/L)	MW-1601A Combined Radium 226 + 228 (pCi/L)	MW-1604S Combined Radium 226 + 228 (pCi/L)	MW-1606D Combined Radium 226 + 228 (pCi/L)	MW-1607S Lead, total (mg/L)
9/26/2016						0.136 (o)		
9/27/2016							8.459 (o)	
11/1/2016								
12/19/2016			0.00278 (o)					
12/20/2016	0.00207 (o)							
12/21/2016		0.0031 (o)		0.0201 (o)				0.011 (o)
10/25/2023					10.52 (o)			

FIGURE D
UTLs

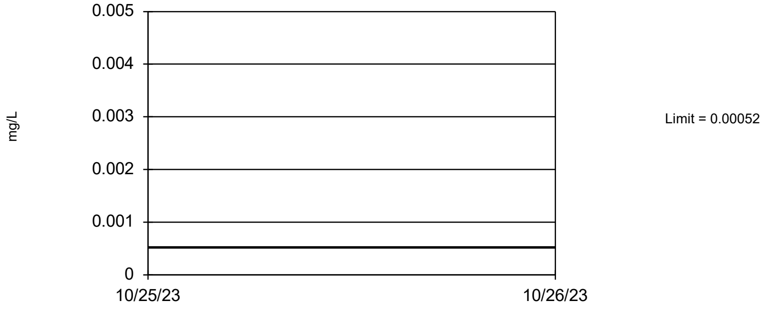
Upper Tolerance Limits Summary Table

Mountaineer BAP Data: Mountaineer BAP Printed 2/5/2024, 11:40 AM

Constituent	Upper Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	0.00052	100	n/a	n/a	14	n/a	n/a	0.005921	NP Inter(normality)
Arsenic, total (mg/L)	0.0006804	100	0.000428	0.0001312	0	None	No	0.05	Inter
Barium, total (mg/L)	0.0678	100	n/a	n/a	0	n/a	n/a	0.005921	NP Inter(normality)
Beryllium, total (mg/L)	0.00005	92	n/a	n/a	92.39	n/a	n/a	0.008924	NP Inter(NDs)
Cadmium, total (mg/L)	0.00005	100	n/a	n/a	6	n/a	n/a	0.005921	NP Inter(normality)
Chromium, total (mg/L)	0.0007184	96	0.01808	0.004515	1.042	None	sqrt(x)	0.05	Inter
Cobalt, total (mg/L)	0.0005254	100	-9.61	1.07	4	None	ln(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	2.305	99	0.8695	0.3368	0	None	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	0.3	104	n/a	n/a	0	n/a	n/a	0.004822	NP Inter(normality)
Lead, total (mg/L)	0.000881	100	n/a	n/a	31	n/a	n/a	0.005921	NP Inter(normality)
Lithium, total (mg/L)	0.03	100	n/a	n/a	6	n/a	n/a	0.005921	NP Inter(normality)
Mercury, total (mg/L)	0.000005	96	n/a	n/a	95.83	n/a	n/a	0.007269	NP Inter(NDs)
Molybdenum, total (mg/L)	0.002792	100	0.09353	0.02457	6	None	x^(1/3)	0.05	Inter
Selenium, total (mg/L)	0.0043	100	n/a	n/a	2	n/a	n/a	0.005921	NP Inter(normality)
Thallium, total (mg/L)	0.0002	100	n/a	n/a	61	n/a	n/a	0.005921	NP Inter(NDs)

Tolerance Limit

Interwell Non-parametric

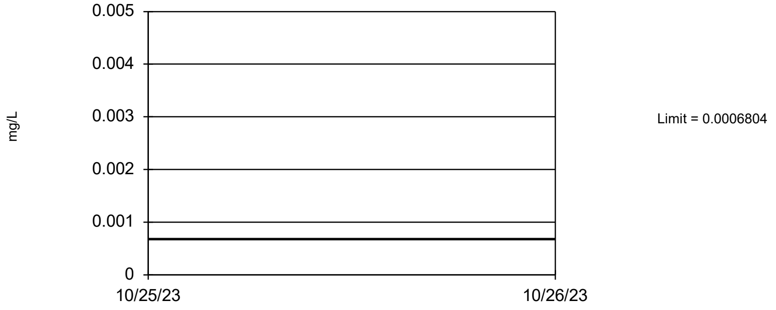


Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 14% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Antimony, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

Tolerance Limit

Interwell Parametric

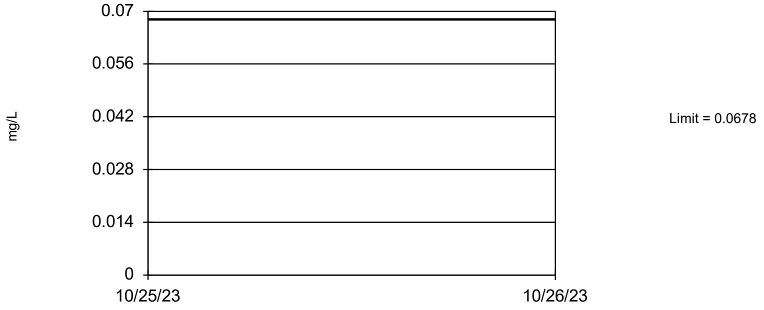


95% coverage. Background Data Summary: Mean=0.000428, Std. Dev.=0.0001312, n=100. Normality test: Chi Squared @alpha = 0.01, calculated = 9.8, critical = 14.07. Report alpha = 0.05.

Constituent: Arsenic, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

Tolerance Limit

Interwell Non-parametric

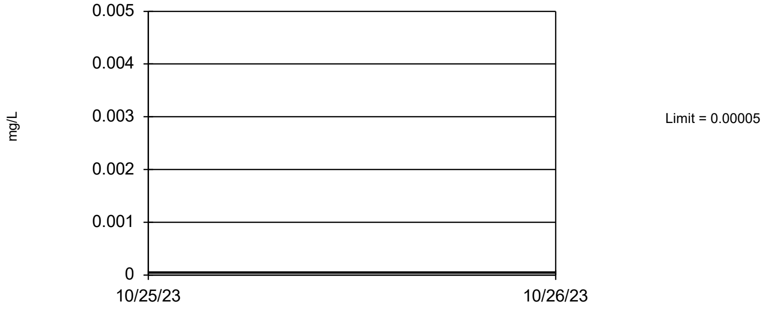


Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Barium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 92 background values. 92.39% NDs. 95.12% coverage at alpha=0.01; 96.68% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.008924.

Constituent: Beryllium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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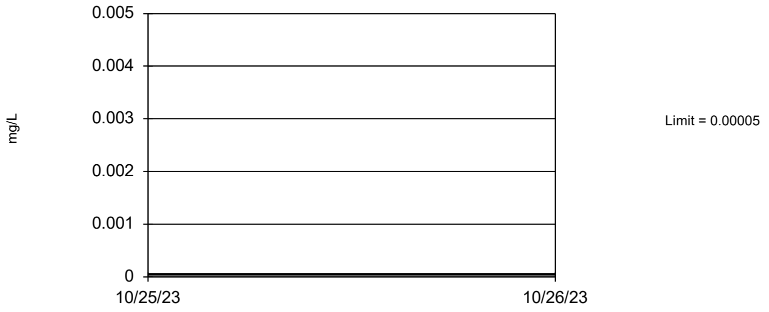
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 6% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Cadmium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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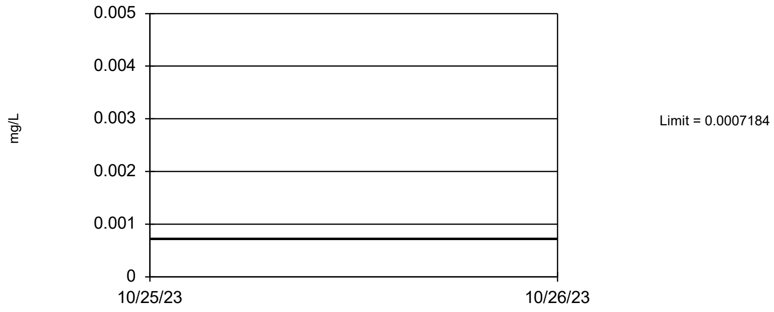
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.01808, Std. Dev.=0.004515, n=96, 1.042% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9768, critical = 0.965. Report alpha = 0.05.

Constituent: Chromium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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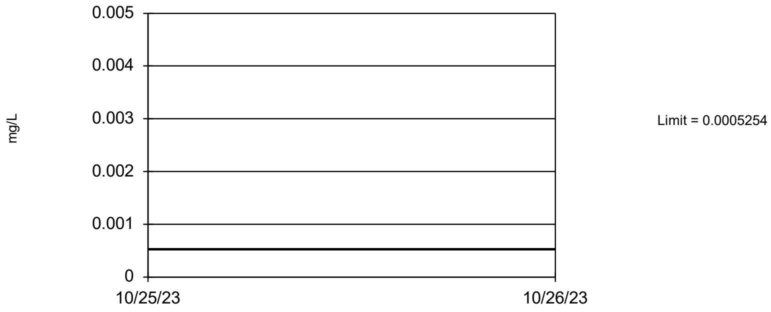
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on natural log transformation): Mean=-9.61, Std. Dev.=1.07, n=100, 4% NDs. Normality test: Chi Squared @alpha = 0.01, calculated = 9.2, critical = 14.07. Report alpha = 0.05.

Constituent: Cobalt, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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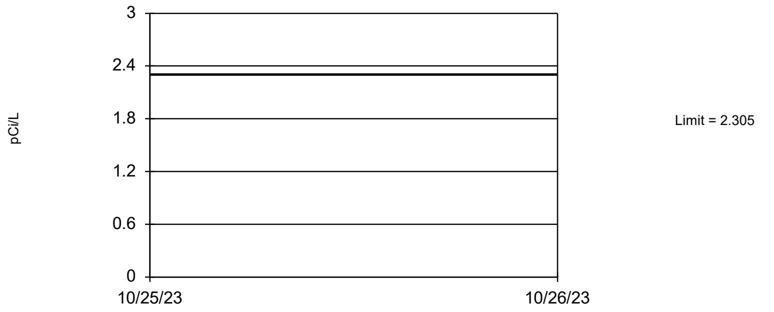
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.8695, Std. Dev.=0.3368, n=99. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9713, critical = 0.967. Report alpha = 0.05.

Constituent: Combined Radium 226 + 228 Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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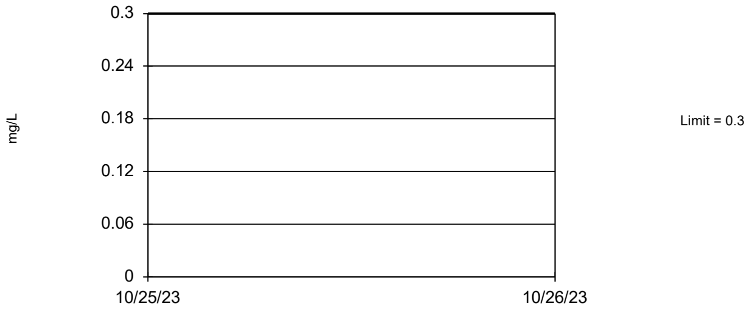
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 104 background values. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.004822.

Constituent: Fluoride, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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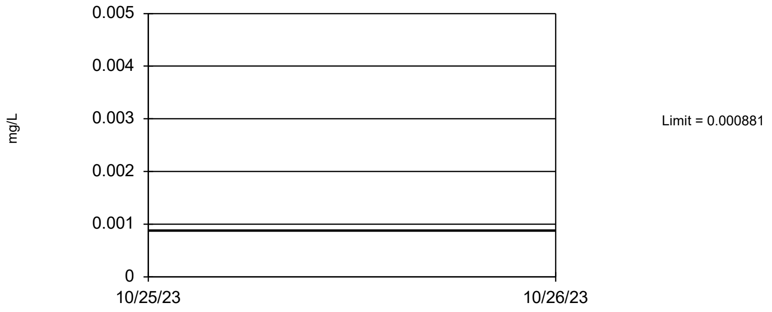
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 31% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Lead, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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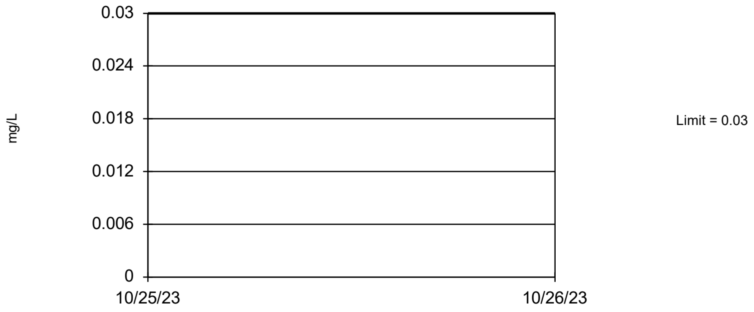
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 6% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Lithium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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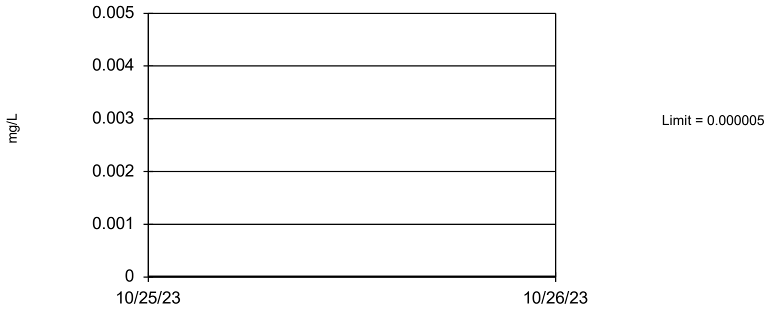
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 96 background values. 95.83% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.007269.

Constituent: Mercury, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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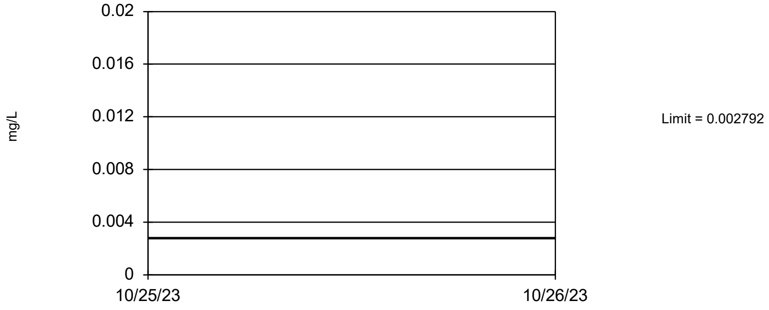
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on cube root transformation): Mean=0.09353, Std. Dev.=0.02457, n=100, 6% NDs. Normality test: Chi Squared @alpha = 0.01, calculated = 9.4, critical = 14.07. Report alpha = 0.05.

Constituent: Molybdenum, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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Tolerance Limit

Interwell Non-parametric

Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 2% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Selenium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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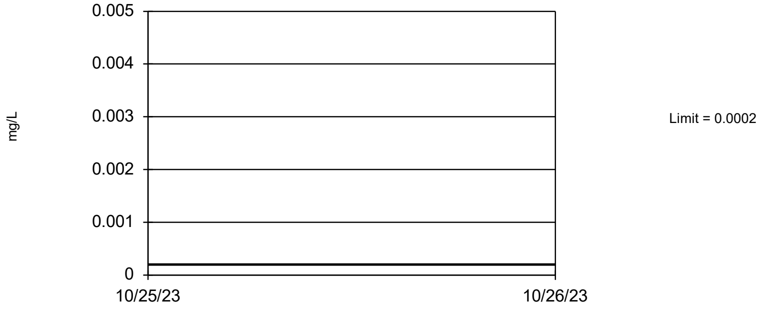
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 100 background values. 61% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Thallium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

FIGURE E
GWPS

MOUNTAINEER BAP GWPS				
Constituent Name	**MCL**	**CCR Rule-Specified**	**Background Limit**	**GWPS**
Antimony, Total (mg/L)	0.006		0.00052	0.006
Arsenic, Total (mg/L)	0.01		0.00071	0.01
Barium, Total (mg/L)	2		0.068	2
Beryllium, Total (mg/L)	0.004		0.00005	0.004
Cadmium, Total (mg/L)	0.005		0.00005	0.005
Chromium, Total (mg/L)	0.1		0.00074	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.00057	0.006
Combined Radium, Total (pCi/L)	5		2.38	5
Fluoride, Total (mg/L)	4		0.3	4
Lead, Total (mg/L)	n/a	0.015	0.00088	0.015
Lithium, Total (mg/L)	n/a	0.04	0.03	0.04
Mercury, Total (mg/L)	0.002		0.000005	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0027	0.1
Selenium, Total (mg/L)	0.05		0.0043	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**GWPS = Groundwater Protection Standard*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

FIGURE F

Confidence Intervals – Assessment

Confidence Interval - Assessment Monitoring - Significant Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 8/5/2024, 1:38 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Arsenic, total (mg/L)	**MW-1805**	**0.05298**	**0.01904**	**0.01**	**Yes**	**16**	**0**	**sqrt(x)**	**0.01**	**Param.**
Arsenic, total (mg/L)	**MW-1922D**	**0.7477**	**0.4302**	**0.01**	**Yes**	**16**	**0**	**sqrt(x)**	**0.01**	**Param.**
Molybdenum, total (mg/L)	**MW-1923**	**0.318**	**0.2418**	**0.1**	**Yes**	**16**	**0**	**x^5**	**0.01**	**Param.**

Confidence Interval - Assessment Monitoring - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/5/2024, 1:38 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	JTMN-1	0.000099	0.0000362	0.006	No	10	0	No	0.01	Param.
Antimony, total (mg/L)	JTMN-2	0.00007765	0.00003718	0.006	No	10	0	ln(x)	0.01	Param.
Antimony, total (mg/L)	MW-016	0.00004158	0.00001624	0.006	No	14	28.57	x^(1/3)	0.01	Param.
Antimony, total (mg/L)	MW-107	0.0001	0.00002	0.006	No	16	25	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1604D	0.00012	0.00003	0.006	No	27	3.704	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1604S	0.00016	0.00004	0.006	No	27	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1605D	0.00003827	0.00002976	0.006	No	27	7.407	sqrt(x)	0.01	Param.
Antimony, total (mg/L)	MW-1605S	0.00006	0.00004	0.006	No	27	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606D	0.00017	0.000142	0.006	No	27	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606S	0.0001529	0.0001412	0.006	No	27	0	No	0.01	Param.
Antimony, total (mg/L)	MW-1607D	0.000033	0.00003	0.006	No	27	3.704	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1607S	0.0004565	0.0004215	0.006	No	26	0	sqrt(x)	0.01	Param.
Antimony, total (mg/L)	MW-1805	0.0001	0.00003	0.006	No	16	18.75	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1922D	0.001159	0.0004819	0.006	No	16	0	ln(x)	0.01	Param.
Antimony, total (mg/L)	MW-1922S	0.0001	0.00002	0.006	No	16	31.25	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1923	0.0002323	0.0001759	0.006	No	16	0	ln(x)	0.01	Param.
Antimony, total (mg/L)	MW-1924	0.00009	0.000055	0.006	No	16	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1925	0.00021	0.000184	0.006	No	16	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1926	0.00007651	0.00005236	0.006	No	16	0	No	0.01	Param.
Antimony, total (mg/L)	MW-1927	0.000138	0.00007537	0.006	No	16	0	x^(1/3)	0.01	Param.
Antimony, total (mg/L)	MW-1929	0.00005	0.00002	0.006	No	16	12.5	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-203	0.0001	0.00002	0.006	No	15	53.33	No	0.01	NP (NDs)
Arsenic, total (mg/L)	JTMN-1	0.002122	0.0007542	0.01	No	10	0	No	0.01	Param.
Arsenic, total (mg/L)	JTMN-2	0.001099	0.0006554	0.01	No	10	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-016	0.004662	0.002617	0.01	No	14	0	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-107	0.00044	0.00028	0.01	No	16	0	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1604D	0.0004027	0.0002944	0.01	No	27	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1604S	0.0003773	0.0002871	0.01	No	27	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605D	0.002915	0.002523	0.01	No	27	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605S	0.0006488	0.0004661	0.01	No	27	0	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1606D	0.0004798	0.0003191	0.01	No	27	0	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1606S	0.000759	0.0006484	0.01	No	27	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607D	0.001779	0.001355	0.01	No	27	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607S	0.0011	0.00085	0.01	No	26	0	No	0.01	NP (normality)
Arsenic, total (mg/L)	**MW-1805**	**0.05298**	**0.01904**	**0.01**	**Yes**	**16**	**0**	**sqrt(x)**	**0.01**	**Param.**
Arsenic, total (mg/L)	**MW-1922D**	**0.7477**	**0.4302**	**0.01**	**Yes**	**16**	**0**	**sqrt(x)**	**0.01**	**Param.**
Arsenic, total (mg/L)	MW-1922S	0.00325	0.00179	0.01	No	16	0	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1923	0.001014	0.0006474	0.01	No	16	0	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1924	0.0007882	0.0004571	0.01	No	16	0	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1925	0.0004541	0.0002743	0.01	No	16	0	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1926	0.00037	0.0003	0.01	No	16	0	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1927	0.0003052	0.0002136	0.01	No	16	0	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1929	0.0004924	0.0003203	0.01	No	16	0	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-203	0.0002855	0.0002385	0.01	No	15	0	No	0.01	Param.
Barium, total (mg/L)	JTMN-1	0.09151	0.06255	2	No	10	0	No	0.01	Param.
Barium, total (mg/L)	JTMN-2	0.09022	0.07172	2	No	10	0	No	0.01	Param.
Barium, total (mg/L)	MW-016	0.0287	0.0228	2	No	14	0	No	0.01	NP (normality)
Barium, total (mg/L)	MW-107	0.05401	0.03833	2	No	16	0	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW-1604D	0.03531	0.02805	2	No	27	0	ln(x)	0.01	Param.
Barium, total (mg/L)	MW-1604S	0.02967	0.02771	2	No	27	0	No	0.01	Param.

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Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Barium, total (mg/L)	MW-1605D	0.02907	0.02647	2	No	27	0	No	0.01	Param.
Barium, total (mg/L)	MW-1605S	0.03179	0.02651	2	No	27	0	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW-1606D	0.05229	0.04422	2	No	27	0	No	0.01	Param.
Barium, total (mg/L)	MW-1606S	0.06695	0.05483	2	No	27	0	No	0.01	Param.
Barium, total (mg/L)	MW-1607D	0.126	0.0683	2	No	27	0	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1607S	0.06877	0.06205	2	No	26	0	No	0.01	Param.
Barium, total (mg/L)	MW-1805	0.0557	0.03243	2	No	16	0	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW-1922D	0.402	0.0663	2	No	16	0	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1922S	0.03072	0.02642	2	No	16	0	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW-1923	0.09649	0.0838	2	No	16	0	No	0.01	Param.
Barium, total (mg/L)	MW-1924	0.05516	0.04268	2	No	16	0	No	0.01	Param.
Barium, total (mg/L)	MW-1925	0.04235	0.03654	2	No	16	0	No	0.01	Param.
Barium, total (mg/L)	MW-1926	0.02273	0.01881	2	No	16	0	No	0.01	Param.
Barium, total (mg/L)	MW-1927	0.0585	0.05381	2	No	16	0	No	0.01	Param.
Barium, total (mg/L)	MW-1929	0.04997	0.04437	2	No	16	0	No	0.01	Param.
Barium, total (mg/L)	MW-203	0.03101	0.02617	2	No	15	0	No	0.01	Param.
Beryllium, total (mg/L)	JTMN-1	0.000056	0.0000144	0.004	No	10	0	No	0.01	Param.
Beryllium, total (mg/L)	JTMN-2	0.00003201	0.00001439	0.004	No	10	0	No	0.01	Param.
Beryllium, total (mg/L)	MW-016	0.00005	0.00004	0.004	No	12	91.67	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1604S	0.0001	0.000024	0.004	No	25	96	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1605S	0.00005	0.00002	0.004	No	25	88	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1606D	0.00005	0.000031	0.004	No	25	84	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1606S	0.00005	0.000005	0.004	No	25	96	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1607D	0.00025	0.000008	0.004	No	25	96	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1607S	0.00005	0.00001	0.004	No	25	84	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1922S	0.00005	0.000018	0.004	No	14	92.86	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1923	0.00004159	0.00002121	0.004	No	14	35.71	ln(x)	0.01	Param.
Beryllium, total (mg/L)	MW-1924	0.00005	0.00003	0.004	No	14	78.57	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1925	0.00005	0.000008	0.004	No	14	92.86	No	0.01	NP (NDs)
Cadmium, total (mg/L)	JTMN-1	0.000038	0.000017	0.005	No	10	0	No	0.011	NP (normality)
Cadmium, total (mg/L)	JTMN-2	0.00004248	0.00002332	0.005	No	10	0	No	0.01	Param.
Cadmium, total (mg/L)	MW-016	0.00002618	0.00001582	0.005	No	14	7.143	No	0.01	Param.
Cadmium, total (mg/L)	MW-107	0.00004078	0.00002431	0.005	No	16	0	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1604D	0.0001	0.00002	0.005	No	27	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1604S	0.0001887	0.0001075	0.005	No	27	0	No	0.01	Param.
Cadmium, total (mg/L)	MW-1605D	0.00002168	0.00001254	0.005	No	27	3.704	ln(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1605S	0.00006518	0.00004732	0.005	No	27	0	x^(1/3)	0.01	Param.
Cadmium, total (mg/L)	MW-1606D	0.00007366	0.00006279	0.005	No	27	0	No	0.01	Param.
Cadmium, total (mg/L)	MW-1606S	0.00007079	0.00005995	0.005	No	27	0	No	0.01	Param.
Cadmium, total (mg/L)	MW-1607D	0.00002	0.00001	0.005	No	27	51.85	No	0.01	NP (NDs)
Cadmium, total (mg/L)	MW-1607S	0.00004417	0.00003159	0.005	No	26	0	ln(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1922D	0.00002	0.00001	0.005	No	16	81.25	No	0.01	NP (NDs)
Cadmium, total (mg/L)	MW-1922S	0.000076	0.000006	0.005	No	16	31.25	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1923	0.00003806	0.00001496	0.005	No	16	6.25	x^(1/3)	0.01	Param.
Cadmium, total (mg/L)	MW-1924	0.00007	0.000038	0.005	No	16	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1925	0.00005254	0.00004021	0.005	No	16	0	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1926	0.00005	0.000032	0.005	No	16	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1927	0.00007565	0.00005678	0.005	No	16	6.25	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1929	0.00001914	0.000008408	0.005	No	16	12.5	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-203	0.00005	0.000004	0.005	No	15	33.33	No	0.01	NP (normality)

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Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Chromium, total (mg/L)	JTMN-1	0.002068	0.0007504	0.1	No	10	0	No	0.01	Param.
Chromium, total (mg/L)	JTMN-2	0.001418	0.0007179	0.1	No	10	0	No	0.01	Param.
Chromium, total (mg/L)	MW-016	0.0005599	0.0002738	0.1	No	14	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-107	0.0004176	0.0001941	0.1	No	16	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1604D	0.0004249	0.0002512	0.1	No	27	0	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1604S	0.0004007	0.0002149	0.1	No	26	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1605D	0.0002377	0.0001296	0.1	No	26	0	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1605S	0.0004169	0.0002496	0.1	No	26	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1606D	0.0004959	0.0002584	0.1	No	27	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1606S	0.0003401	0.0001602	0.1	No	27	0	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	MW-1607D	0.0003529	0.0001548	0.1	No	26	0	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1607S	0.0004054	0.0002685	0.1	No	26	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1805	0.0003809	0.0002041	0.1	No	16	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-1922D	0.0003118	0.0001762	0.1	No	16	12.5	No	0.01	Param.
Chromium, total (mg/L)	MW-1922S	0.00054	0.0002	0.1	No	16	0	No	0.01	NP (normality)
Chromium, total (mg/L)	MW-1923	0.001243	0.0005908	0.1	No	16	0	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1924	0.0006095	0.0002645	0.1	No	16	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-1925	0.0003709	0.0002003	0.1	No	16	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1926	0.0004846	0.0002658	0.1	No	16	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1927	0.0004209	0.0001777	0.1	No	16	6.25	No	0.01	Param.
Chromium, total (mg/L)	MW-1929	0.0005695	0.0003565	0.1	No	16	0	No	0.01	Param.
Chromium, total (mg/L)	MW-203	0.00039	0.0002	0.1	No	15	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	JTMN-1	0.00215	0.0005906	0.006	No	10	0	No	0.01	Param.
Cobalt, total (mg/L)	JTMN-2	0.001137	0.0005459	0.006	No	10	0	No	0.01	Param.
Cobalt, total (mg/L)	MW-016	0.00164	0.00102	0.006	No	14	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-107	0.001031	0.0003314	0.006	No	16	0	No	0.01	Param.
Cobalt, total (mg/L)	MW-1604D	0.0016	0.000112	0.006	No	27	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1604S	0.00216	0.00039	0.006	No	27	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1605D	0.001646	0.001427	0.006	No	27	0	No	0.01	Param.
Cobalt, total (mg/L)	MW-1605S	0.0006693	0.0003773	0.006	No	27	0	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1606D	0.00156	0.00117	0.006	No	27	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1606S	0.0002955	0.0002003	0.006	No	27	0	No	0.01	Param.
Cobalt, total (mg/L)	MW-1607D	0.000856	0.0007051	0.006	No	27	0	x^3	0.01	Param.
Cobalt, total (mg/L)	MW-1607S	0.001493	0.001106	0.006	No	26	0	x^(1/3)	0.01	Param.
Cobalt, total (mg/L)	MW-1805	0.00331	0.000039	0.006	No	16	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1922D	0.000317	0.0001256	0.006	No	16	0	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1922S	0.001516	0.001003	0.006	No	16	0	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1923	0.001363	0.0006345	0.006	No	16	0	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1924	0.004037	0.002124	0.006	No	16	0	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1925	0.001265	0.001022	0.006	No	16	0	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1926	0.00142	0.000728	0.006	No	16	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1927	0.0005076	0.0003138	0.006	No	16	0	No	0.01	Param.
Cobalt, total (mg/L)	MW-1929	0.000561	0.0001505	0.006	No	16	0	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-203	0.00005026	0.0000202	0.006	No	15	0	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	JTMN-1	1.393	0.4539	5	No	10	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	JTMN-2	1.807	0.4257	5	No	10	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-016	1.649	0.8258	5	No	14	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-107	1.095	0.3313	5	No	16	0	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604D	1.168	0.5686	5	No	27	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604S	1.816	1.013	5	No	26	0	ln(x)	0.01	Param.

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Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Combined Radium 226 + 228 (pCi/L)	MW-1605D	1.523	0.8248	5	No	27	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605S	0.9223	0.509	5	No	27	0	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606D	1.683	0.9685	5	No	26	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606S	1.298	0.6991	5	No	27	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607D	1.895	1.262	5	No	27	0	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607S	1.648	1	5	No	27	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1805	2.117	1.006	5	No	16	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1922D	5.538	3.149	5	No	16	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1922S	1.811	0.9199	5	No	16	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1923	1.377	0.8379	5	No	16	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1924	1.401	0.9593	5	No	16	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1925	1.748	0.9646	5	No	16	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1926	0.8577	0.4812	5	No	16	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1927	1.665	1.068	5	No	16	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1929	1.363	0.6056	5	No	16	0	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-203	1.105	0.2902	5	No	15	0	x^(1/3)	0.01	Param.
Fluoride, total (mg/L)	JTMN-1	0.3043	0.2337	4	No	10	0	No	0.01	Param.
Fluoride, total (mg/L)	JTMN-2	0.3766	0.2394	4	No	10	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-016	0.2566	0.2319	4	No	14	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-107	0.2368	0.2096	4	No	16	0	ln(x)	0.01	Param.
Fluoride, total (mg/L)	MW-1604D	0.2145	0.1783	4	No	28	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1604S	0.2373	0.2099	4	No	28	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605D	0.2071	0.1922	4	No	28	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605S	0.2795	0.2505	4	No	28	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1606D	0.27	0.24	4	No	28	0	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW-1606S	0.4463	0.3834	4	No	29	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1607D	0.5208	0.4799	4	No	29	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1607S	0.2747	0.2411	4	No	28	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1805	0.5117	0.2458	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1922D	0.3153	0.2935	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1922S	0.1803	0.1484	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1923	0.2608	0.1967	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1924	0.5184	0.4454	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1925	0.3056	0.2644	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1926	0.2714	0.2399	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1927	0.17	0.13	4	No	16	0	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW-1929	0.2358	0.2042	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-203	0.2954	0.2556	4	No	15	0	x^2	0.01	Param.
Lead, total (mg/L)	JTMN-1	0.002031	0.0005966	0.015	No	10	0	No	0.01	Param.
Lead, total (mg/L)	JTMN-2	0.0008521	0.0004129	0.015	No	10	0	No	0.01	Param.
Lead, total (mg/L)	MW-016	0.00026	0.00006	0.015	No	14	14.29	No	0.01	NP (normality)
Lead, total (mg/L)	MW-107	0.0004	0.00004	0.015	No	16	87.5	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1604D	0.0002	0.000039	0.015	No	27	44.44	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1604S	0.0002	0.00007	0.015	No	27	51.85	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1605D	0.0002	0.000021	0.015	No	27	51.85	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1605S	0.000279	0.0001101	0.015	No	27	7.407	ln(x)	0.01	Param.
Lead, total (mg/L)	MW-1606D	0.0002	0.00011	0.015	No	27	51.85	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1606S	0.0002	0.00007	0.015	No	27	37.04	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1607D	0.0002	0.000058	0.015	No	27	48.15	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1607S	0.00019	0.00007	0.015	No	26	3.846	No	0.01	NP (normality)

Confidence Interval - Assessment Monitoring - All Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 8/5/2024, 1:38 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Lead, total (mg/L)	MW-1805	0.00121	0.0001	0.015	No	16	87.5	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1922D	0.0002	0.0001	0.015	No	16	75	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1922S	0.0003	0.00006	0.015	No	16	6.25	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1923	0.001034	0.0003573	0.015	No	16	0	No	0.01	Param.
Lead, total (mg/L)	MW-1924	0.0002964	0.0000849	0.015	No	16	6.25	ln(x)	0.01	Param.
Lead, total (mg/L)	MW-1925	0.0002	0.00008	0.015	No	16	50	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1926	0.00024	0.00007	0.015	No	16	50	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1927	0.000441	0.0001	0.015	No	16	56.25	No	0.01	NP (NDs)
Lead, total (mg/L)	MW-1929	0.0002915	0.00009062	0.015	No	16	0	ln(x)	0.01	Param.
Lead, total (mg/L)	MW-203	0.0002	0.000113	0.015	No	15	73.33	No	0.01	NP (NDs)
Lithium, total (mg/L)	JTMN-1	0.01134	0.006028	0.04	No	10	0	No	0.01	Param.
Lithium, total (mg/L)	JTMN-2	0.02034	0.008231	0.04	No	10	0	No	0.01	Param.
Lithium, total (mg/L)	MW-016	0.0315	0.02616	0.04	No	14	0	No	0.01	Param.
Lithium, total (mg/L)	MW-107	0.00486	0.00334	0.04	No	16	6.25	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1604D	0.05	0.0186	0.04	No	27	3.704	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1604S	0.04151	0.0341	0.04	No	27	0	No	0.01	Param.
Lithium, total (mg/L)	MW-1805	0.03825	0.02443	0.04	No	16	0	No	0.01	Param.
Lithium, total (mg/L)	MW-1922D	0.0126	0.00712	0.04	No	16	6.25	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1926	0.00744	0.00585	0.04	No	16	6.25	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1927	0.00725	0.00553	0.04	No	16	6.25	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1929	0.0048	0.00363	0.04	No	16	6.25	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-203	0.00237	0.00199	0.04	No	15	6.667	No	0.01	NP (normality)
Mercury, total (mg/L)	JTMN-1	0.000005	0.000003	0.002	No	10	50	No	0.011	NP (normality)
Mercury, total (mg/L)	JTMN-2	0.000005	0.000004	0.002	No	10	70	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-1604D	0.000036	0.000003	0.002	No	26	92.31	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1604S	0.000005	0.000003	0.002	No	26	96.15	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1605D	0.000005	0.000002	0.002	No	26	96.15	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1605S	0.000005	0.000003	0.002	No	26	96.15	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1606D	0.000005	0.000004	0.002	No	26	96.15	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1606S	0.000005	0.000002	0.002	No	26	96.15	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1607D	0.000005	0.000002	0.002	No	26	92.31	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1607S	0.000005	0.000003	0.002	No	26	88.46	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1922D	0.000005	0.000002	0.002	No	15	93.33	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1922S	0.000005	0.000002	0.002	No	15	93.33	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1923	0.000005	0.000002	0.002	No	15	93.33	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1924	0.000005	0.000003	0.002	No	15	93.33	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	JTMN-1	0.01396	0.005721	0.1	No	10	0	No	0.01	Param.
Molybdenum, total (mg/L)	JTMN-2	0.02754	0.008802	0.1	No	10	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-016	0.03811	0.03433	0.1	No	14	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-107	0.002	0.0002	0.1	No	16	31.25	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1604D	0.0174	0.0014	0.1	No	27	3.704	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1604S	0.0144	0.01112	0.1	No	27	0	x^3	0.01	Param.
Molybdenum, total (mg/L)	MW-1605D	0.04272	0.03432	0.1	No	27	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1605S	0.01687	0.01366	0.1	No	27	0	ln(x)	0.01	Param.
Molybdenum, total (mg/L)	MW-1606D	0.0719	0.06419	0.1	No	27	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1606S	0.0902	0.0549	0.1	No	27	0	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1607D	0.08319	0.07245	0.1	No	27	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1607S	0.03986	0.03322	0.1	No	27	0	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW-1805	0.04576	0.01007	0.1	No	16	0	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW-1922D	0.2057	0.05376	0.1	No	16	0	ln(x)	0.01	Param.

Confidence Interval - Assessment Monitoring - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/5/2024, 1:38 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Molybdenum, total (mg/L)	MW-1922S	0.03393	0.02754	0.1	No	16	0	No	0.01	Param.
Molybdenum, total (mg/L)	**MW-1923**	**0.318**	**0.2418**	**0.1**	**Yes**	**16**	**0**	**x^5**	**0.01**	**Param.**
Molybdenum, total (mg/L)	MW-1924	0.1075	0.08008	0.1	No	16	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1925	0.05617	0.04442	0.1	No	16	0	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW-1926	0.00616	0.0041	0.1	No	16	0	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1927	0.002	0.0009	0.1	No	16	0	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1929	0.0008	0.0004	0.1	No	16	6.25	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-203	0.0013	0.0009	0.1	No	15	0	No	0.01	NP (normality)
Selenium, total (mg/L)	JTMN-1	0.001049	0.0005088	0.05	No	10	0	No	0.01	Param.
Selenium, total (mg/L)	JTMN-2	0.0009193	0.0003927	0.05	No	10	0	No	0.01	Param.
Selenium, total (mg/L)	MW-016	0.0001857	0.0001157	0.05	No	14	7.143	No	0.01	Param.
Selenium, total (mg/L)	MW-107	0.0007034	0.0004191	0.05	No	16	0	No	0.01	Param.
Selenium, total (mg/L)	MW-1604D	0.001908	0.001035	0.05	No	27	0	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1604S	0.001518	0.0008859	0.05	No	27	0	x^(1/3)	0.01	Param.
Selenium, total (mg/L)	MW-1605D	0.0002275	0.0001518	0.05	No	27	7.407	No	0.01	Param.
Selenium, total (mg/L)	MW-1605S	0.001232	0.0007327	0.05	No	27	0	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1606D	0.004008	0.001945	0.05	No	27	0	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1606S	0.002721	0.001477	0.05	No	27	0	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1607D	0.0005	0.00005	0.05	No	27	37.04	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1607S	0.006859	0.00437	0.05	No	27	0	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1805	0.0005	0.0001	0.05	No	16	75	No	0.01	NP (NDs)
Selenium, total (mg/L)	MW-1922D	0.0005	0.00006	0.05	No	16	81.25	No	0.01	NP (NDs)
Selenium, total (mg/L)	MW-1922S	0.0005	0.00007	0.05	No	16	37.5	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1923	0.02276	0.00851	0.05	No	16	0	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1924	0.001741	0.0005957	0.05	No	16	0	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1925	0.005111	0.003302	0.05	No	16	0	No	0.01	Param.
Selenium, total (mg/L)	MW-1926	0.0009273	0.000402	0.05	No	16	0	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1927	0.001057	0.0004477	0.05	No	16	0	No	0.01	Param.
Selenium, total (mg/L)	MW-1929	0.001771	0.001181	0.05	No	16	0	No	0.01	Param.
Selenium, total (mg/L)	MW-203	0.001319	0.0008219	0.05	No	15	0	sqrt(x)	0.01	Param.
Thallium, total (mg/L)	JTMN-1	0.0002	0.00004	0.002	No	10	70	No	0.011	NP (NDs)
Thallium, total (mg/L)	JTMN-2	0.0002	0.0002	0.002	No	10	90	No	0.011	NP (NDs)
Thallium, total (mg/L)	MW-1604D	0.000231	0.0002	0.002	No	27	62.96	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1604S	0.00023	0.00004	0.002	No	27	3.704	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605D	0.0002	0.00004	0.002	No	27	44.44	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605S	0.0002	0.00005	0.002	No	27	48.15	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1606D	0.000119	0.00007	0.002	No	27	18.52	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1606S	0.0001	0.00006	0.002	No	27	18.52	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1607D	0.0002	0.00003	0.002	No	27	51.85	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1607S	0.00015	0.000052	0.002	No	27	22.22	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1922S	0.0002	0.00004	0.002	No	16	68.75	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1923	0.0002	0.00003	0.002	No	16	93.75	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1926	0.0002	0.00003	0.002	No	16	75	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-203	0.0002	0.00003	0.002	No	15	93.33	No	0.01	NP (NDs)

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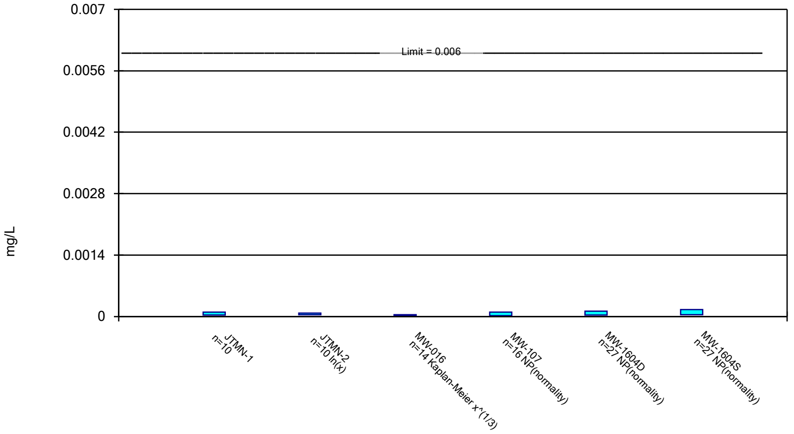
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Antimony, total   Analysis Run 8/5/2024 1:35 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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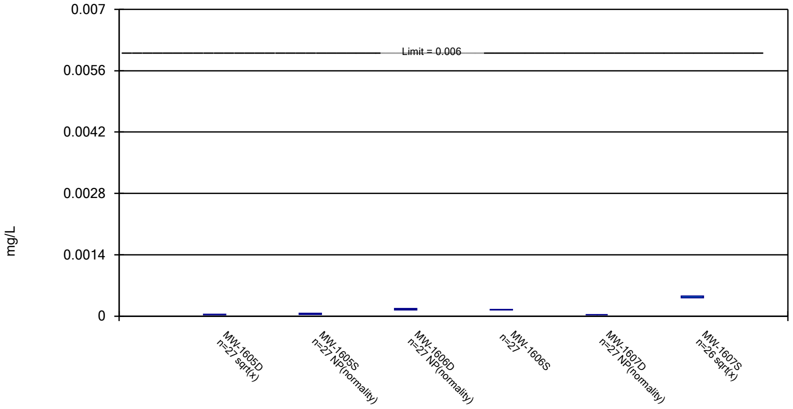
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Antimony, total   Analysis Run 8/5/2024 1:35 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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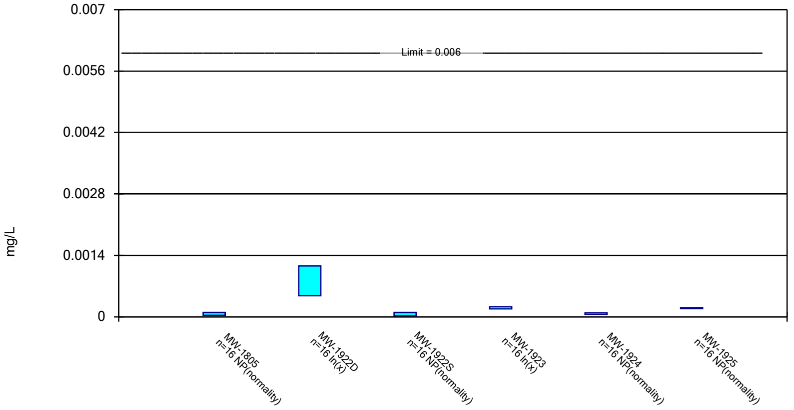
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Antimony, total   Analysis Run 8/5/2024 1:35 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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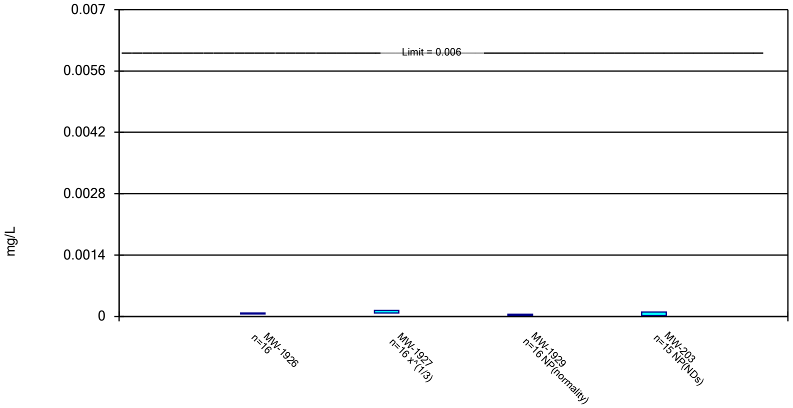
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Antimony, total   Analysis Run 8/5/2024 1:35 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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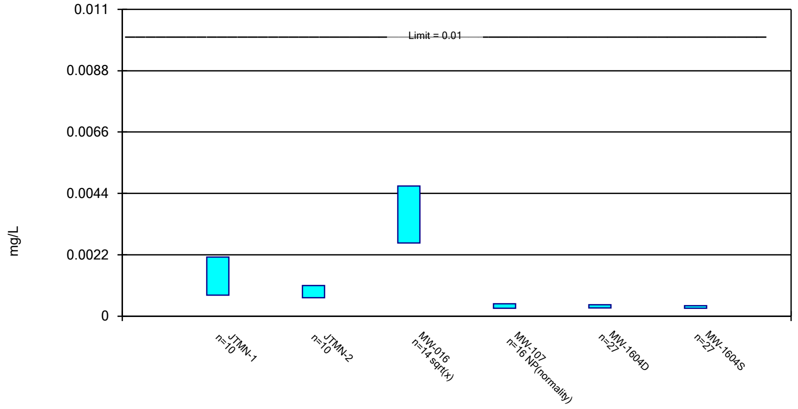
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Arsenic, total   Analysis Run 8/5/2024 1:35 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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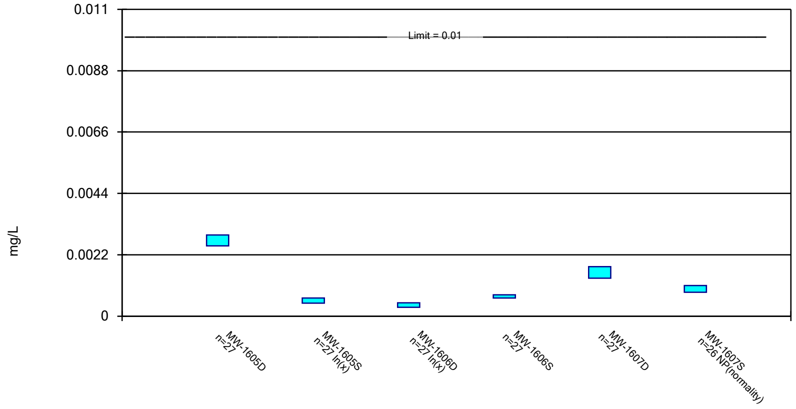
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Arsenic, total   Analysis Run 8/5/2024 1:35 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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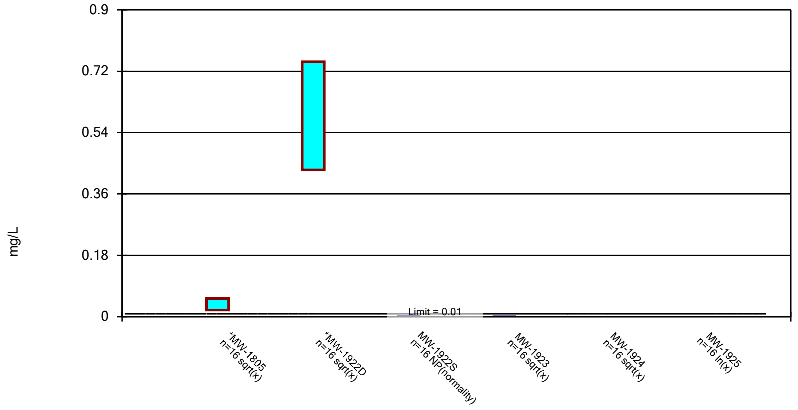
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Arsenic, total   Analysis Run 8/5/2024 1:35 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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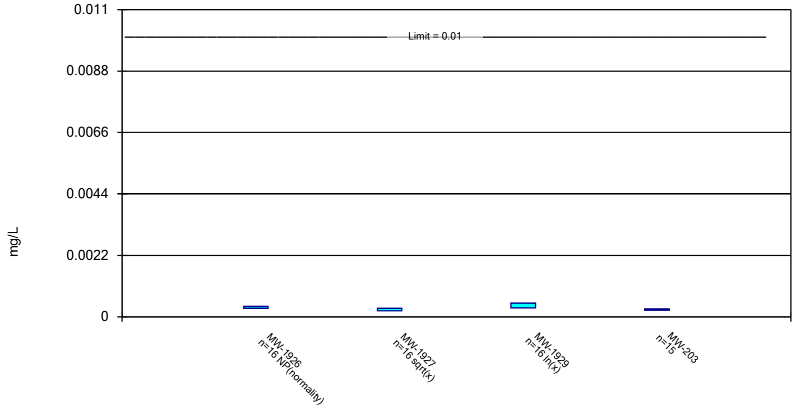
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Arsenic, total   Analysis Run 8/5/2024 1:35 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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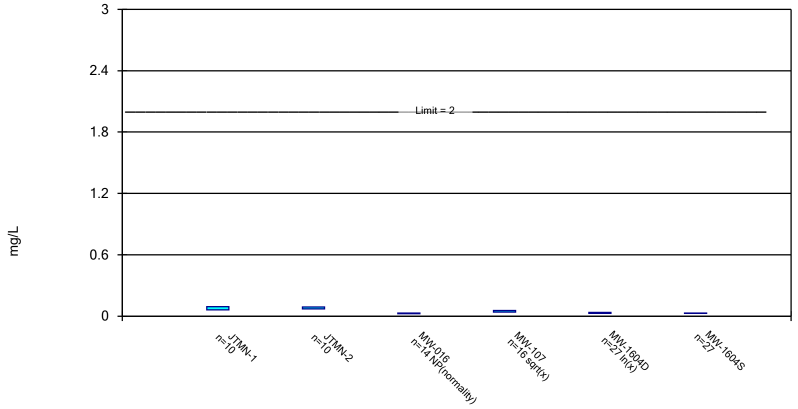
Parametric and Non-Parametric (NP) Confidence Interval

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

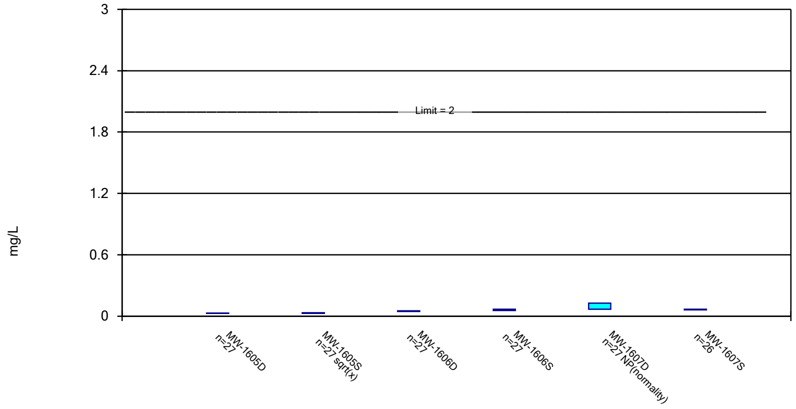


Constituent: Barium, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

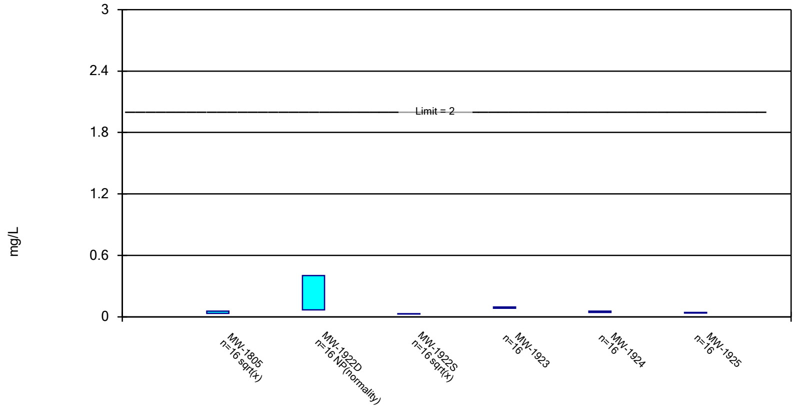


Constituent: Barium, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

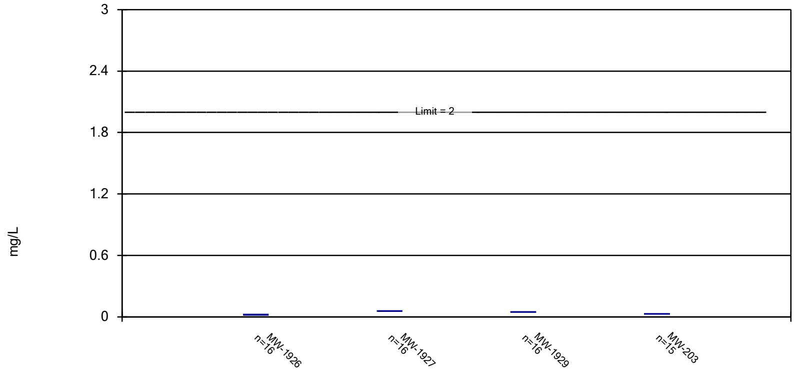


Constituent: Barium, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

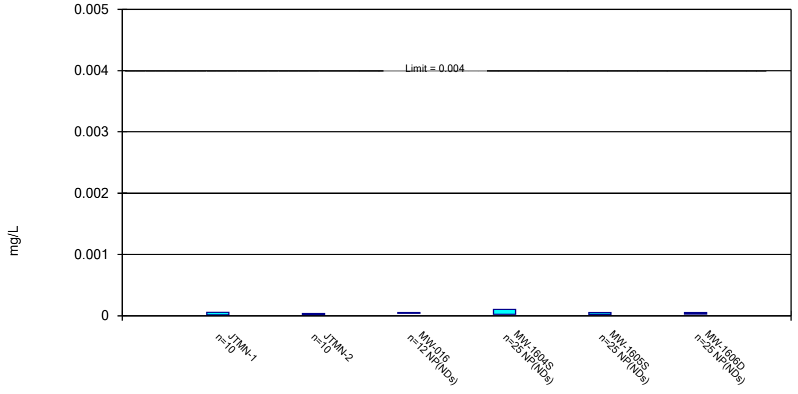


Constituent: Barium, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Beryllium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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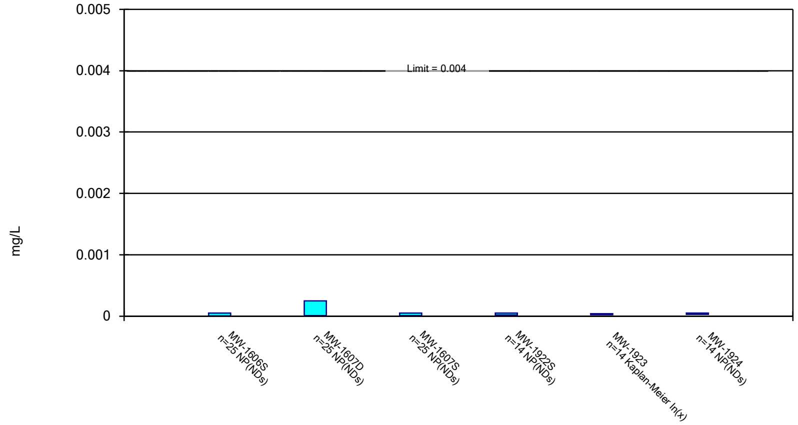
Parametric and Non-Parametric (NP) Confidence Interval

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

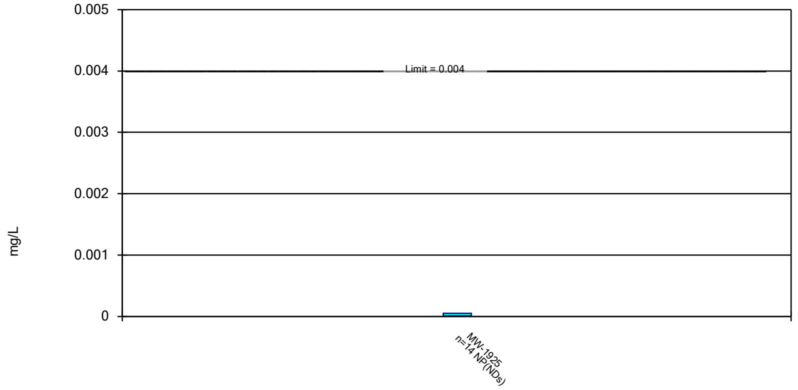


Constituent: Beryllium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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



Constituent: Beryllium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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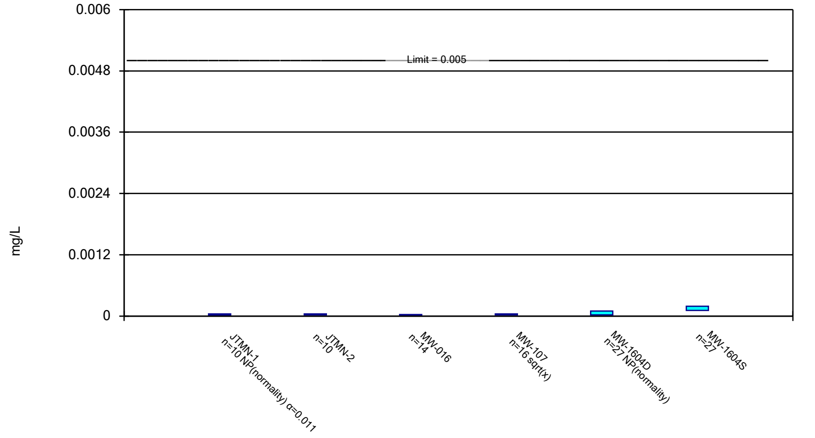
Parametric and Non-Parametric (NP) Confidence Interval

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

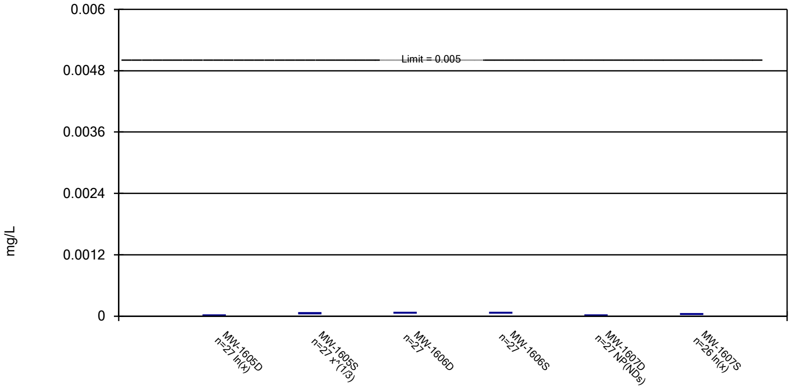


Constituent: Cadmium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

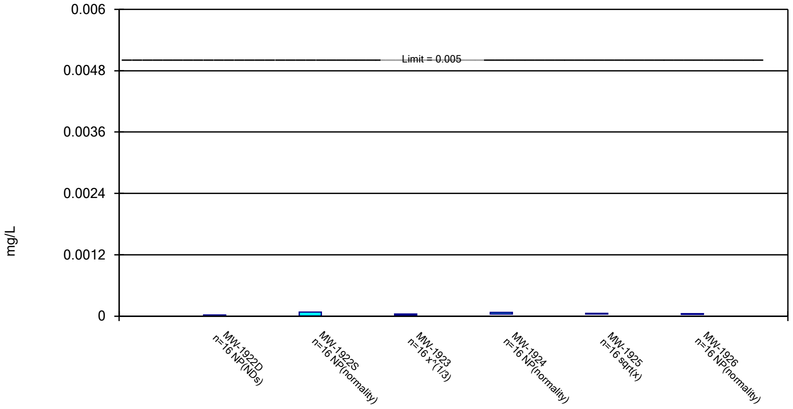


Constituent: Cadmium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

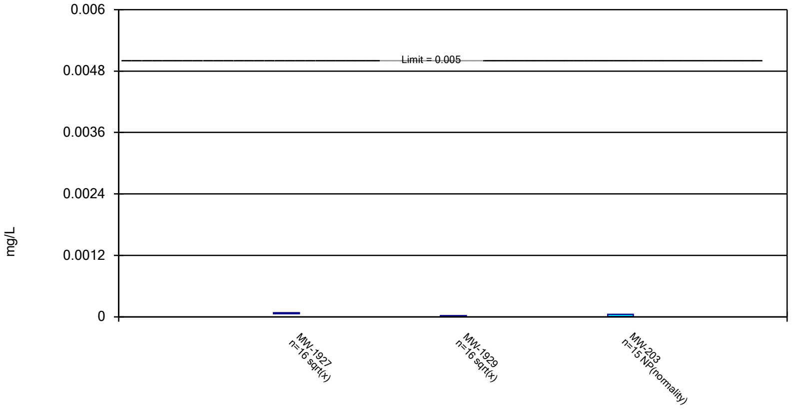


Constituent: Cadmium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

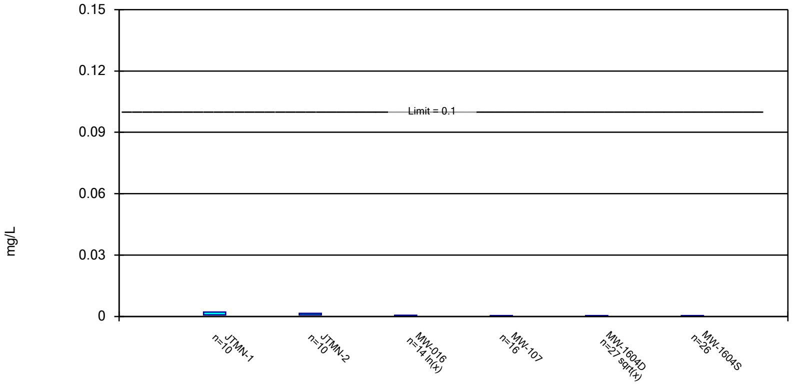


Constituent: Cadmium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

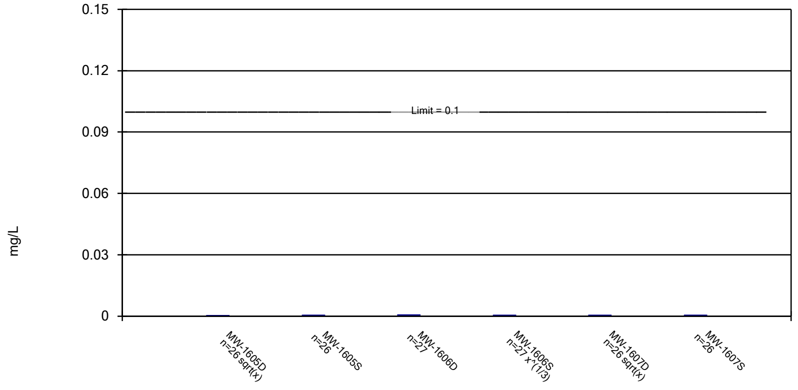


Constituent: Chromium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

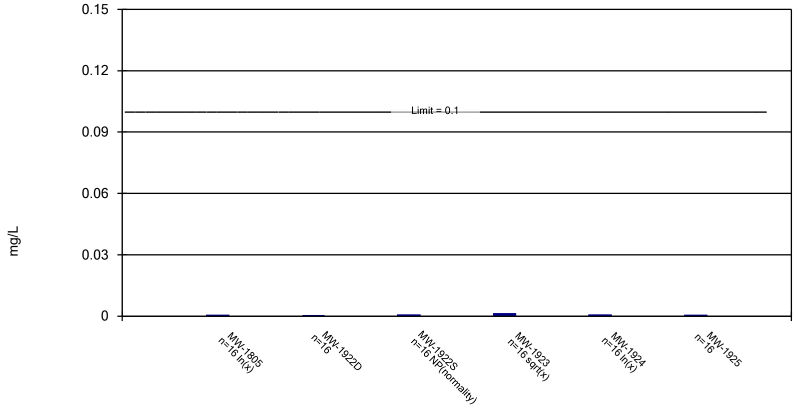


Constituent: Chromium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Chromium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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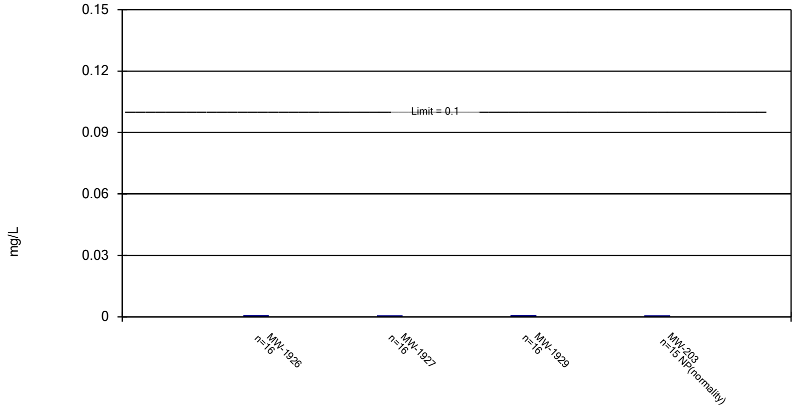
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Chromium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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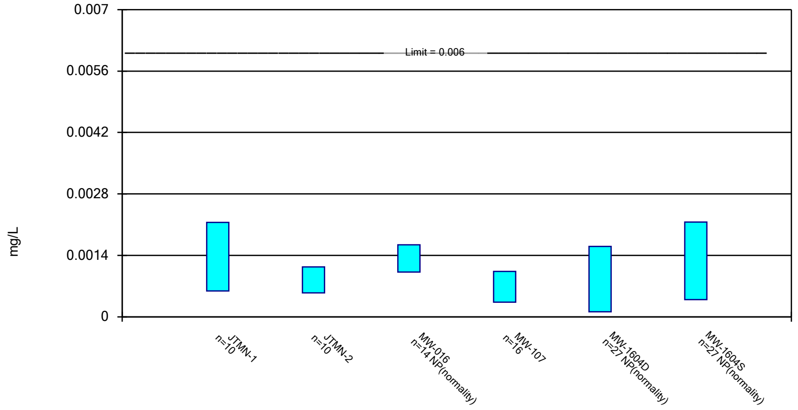
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Cobalt, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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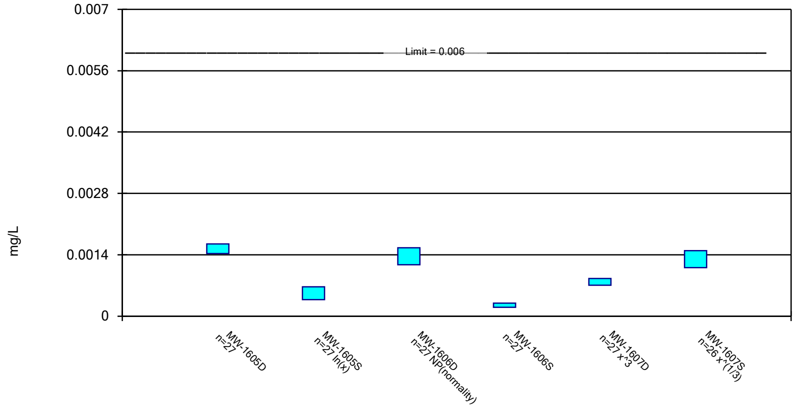
Parametric and Non-Parametric (NP) Confidence Interval

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

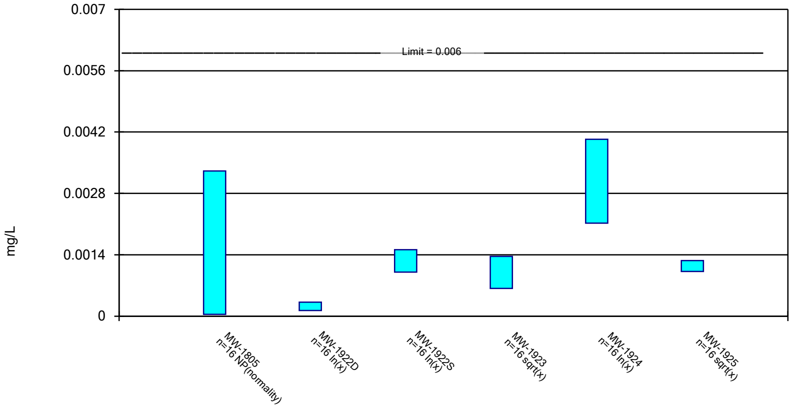


Constituent: Cobalt, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Cobalt, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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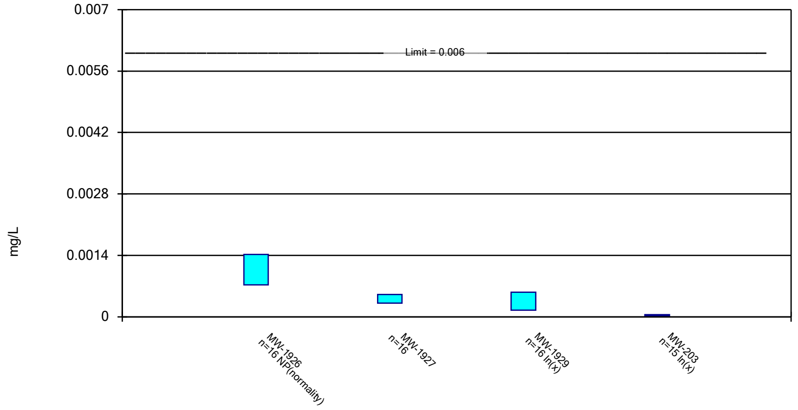
Parametric and Non-Parametric (NP) Confidence Interval

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

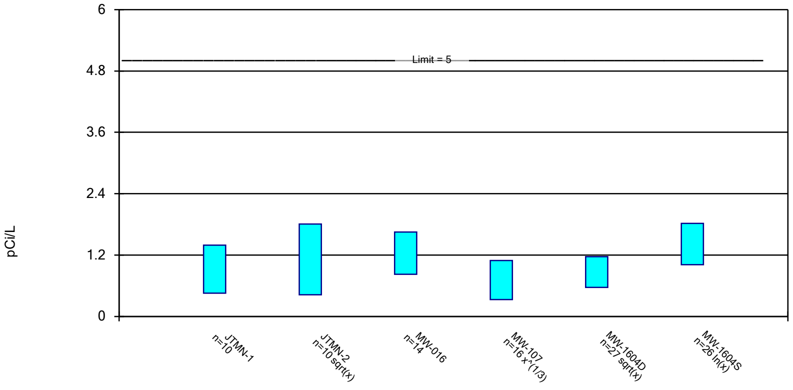


Constituent: Cobalt, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

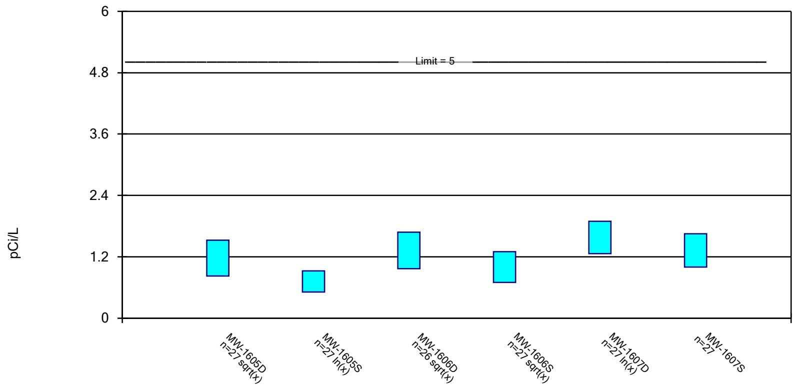


Constituent: Combined Radium 226 + 228 Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

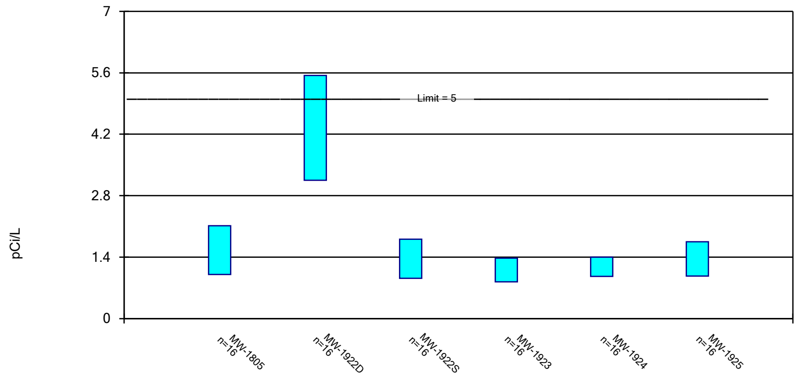


Constituent: Combined Radium 226 + 228 Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



Constituent: Combined Radium 226 + 228 Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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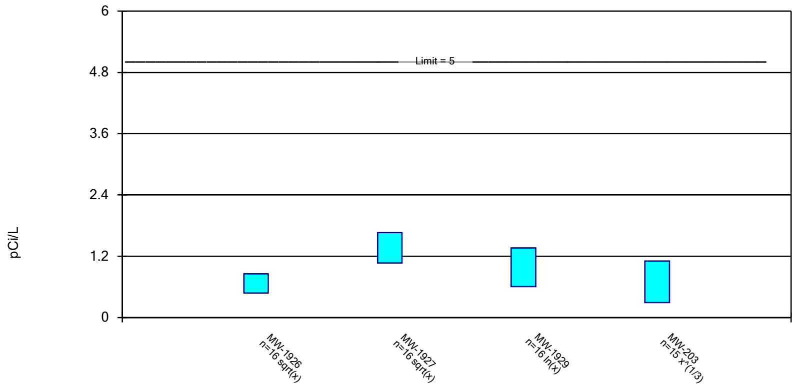
Parametric Confidence Interval

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



Constituent: Combined Radium 226 + 228 Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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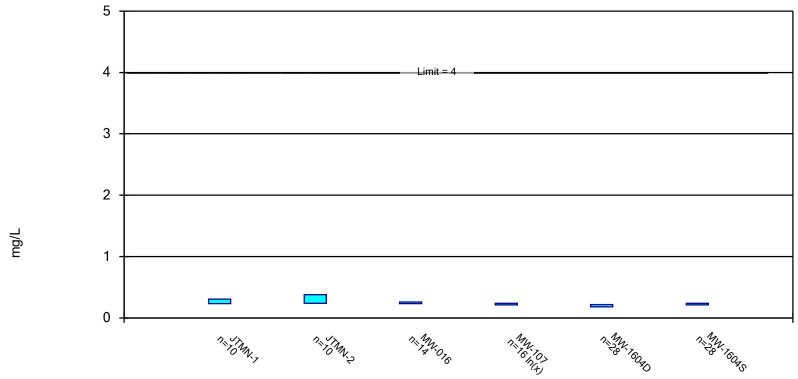
Parametric Confidence Interval

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

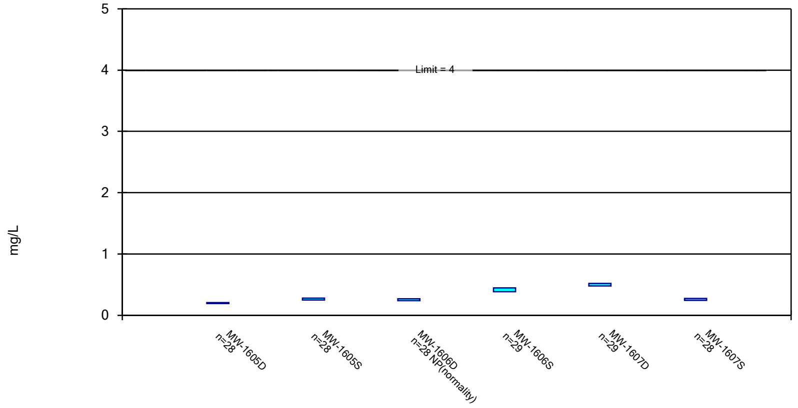


Constituent: Fluoride, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

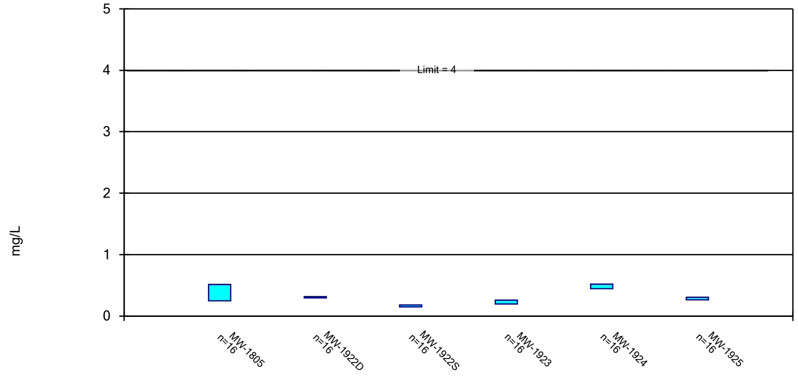


Constituent: Fluoride, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

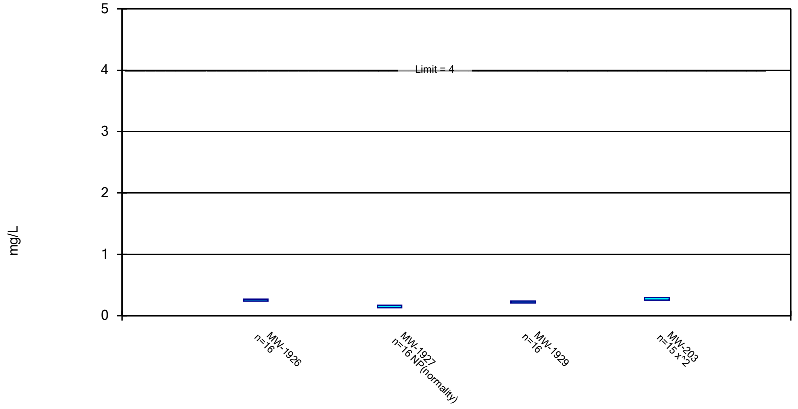


Constituent: Fluoride, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

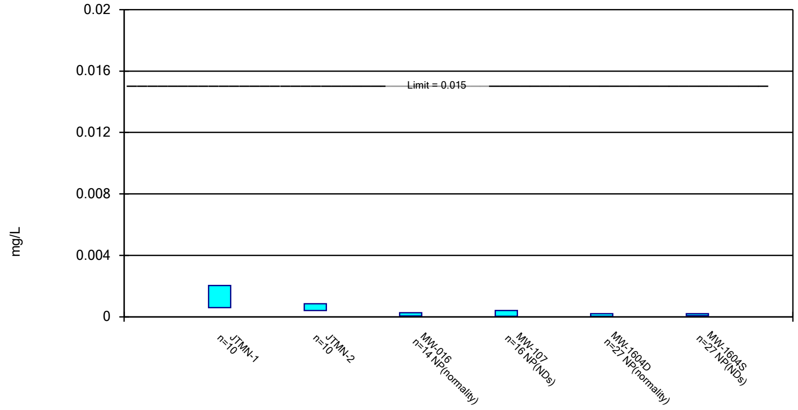


Constituent: Fluoride, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

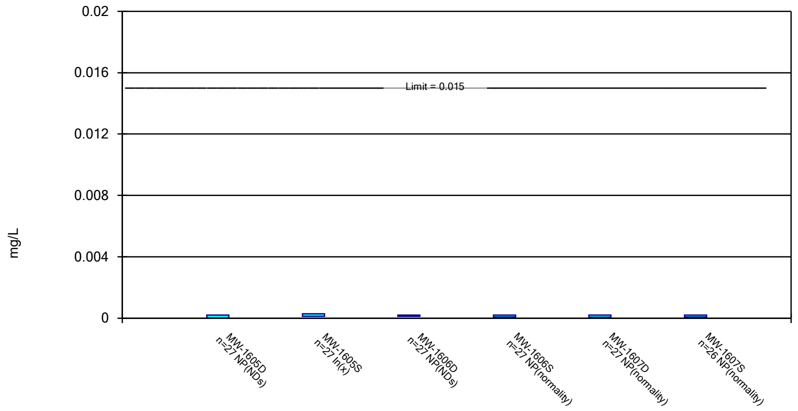


Constituent: Lead, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

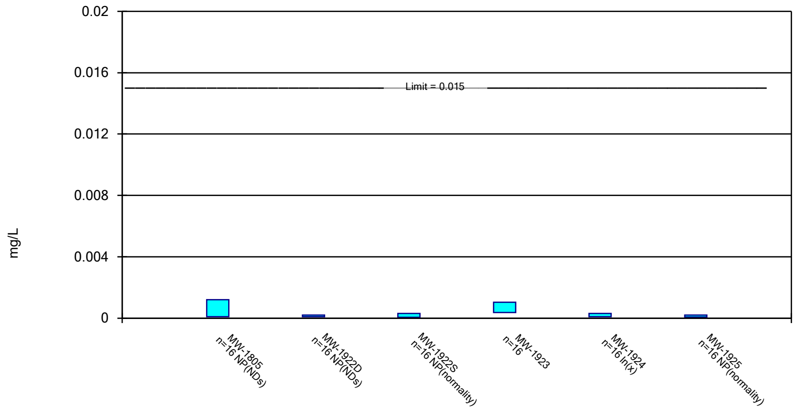


Constituent: Lead, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

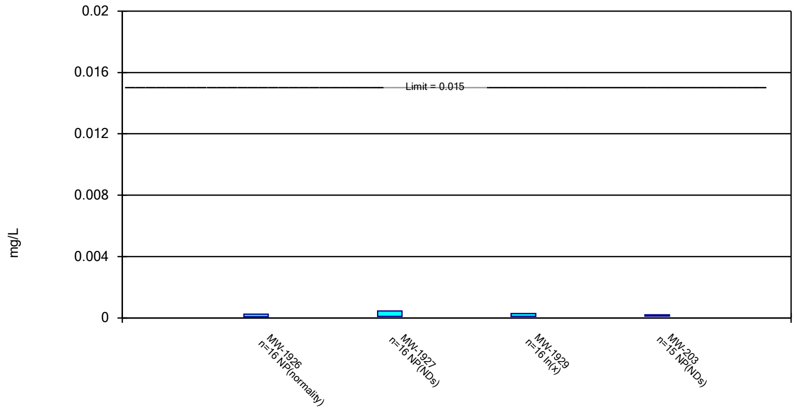


Constituent: Lead, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

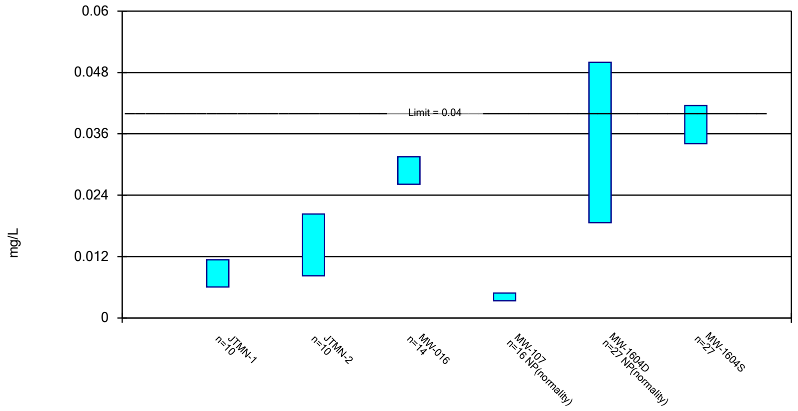


Constituent: Lead, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

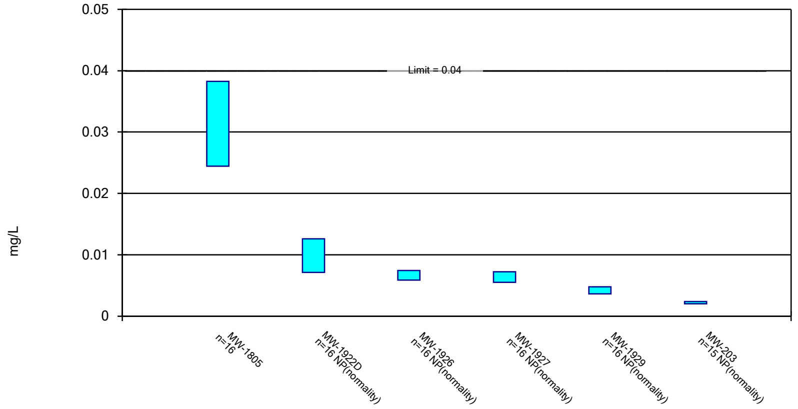


Constituent: Lithium, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

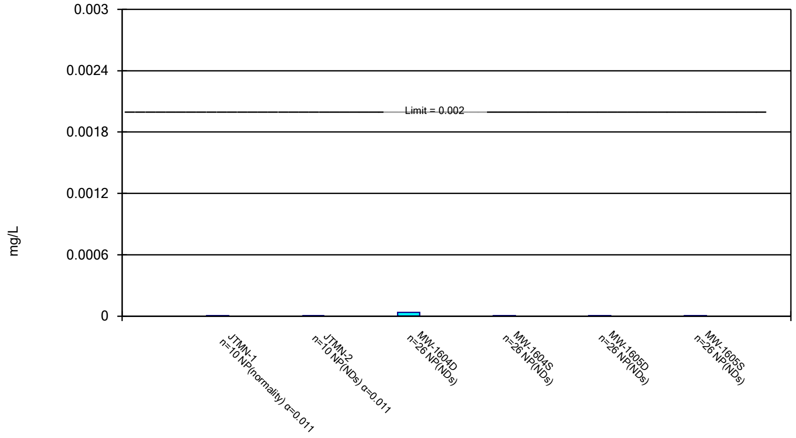


Constituent: Lithium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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

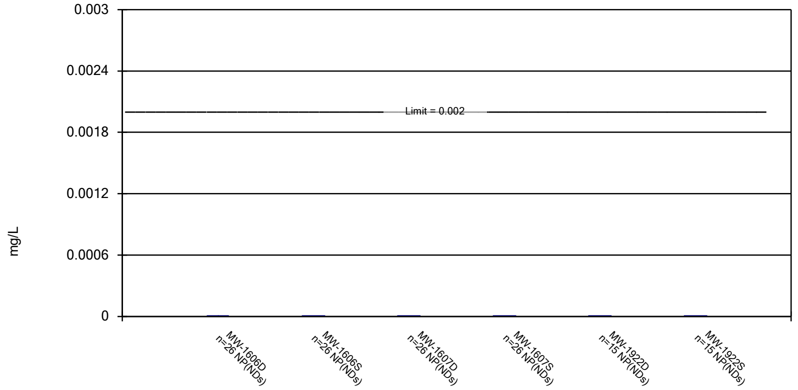


Constituent: Mercury, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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

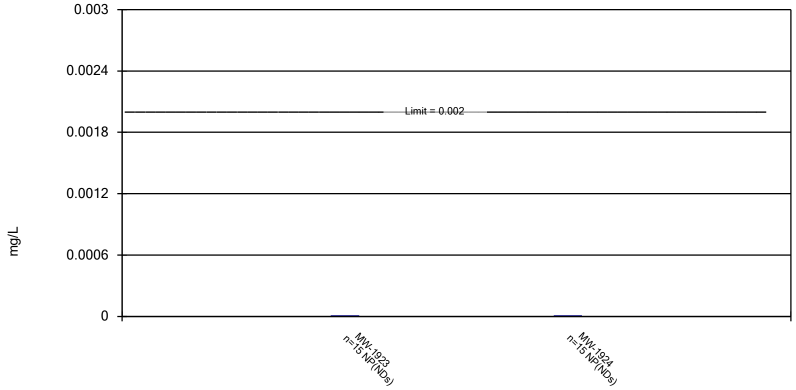


Constituent: Mercury, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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

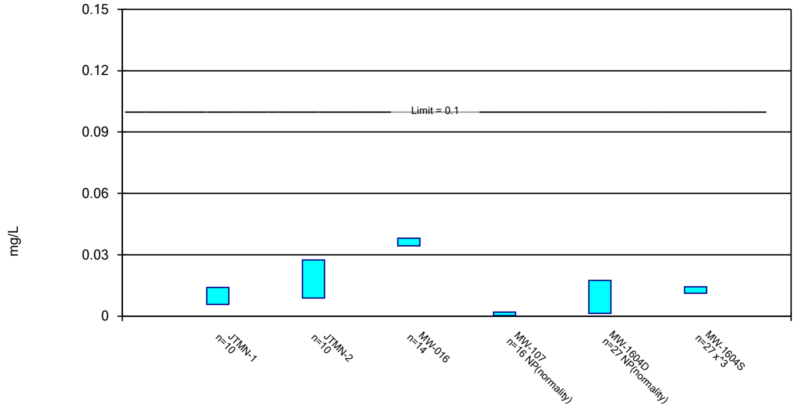


Constituent: Mercury, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Molybdenum, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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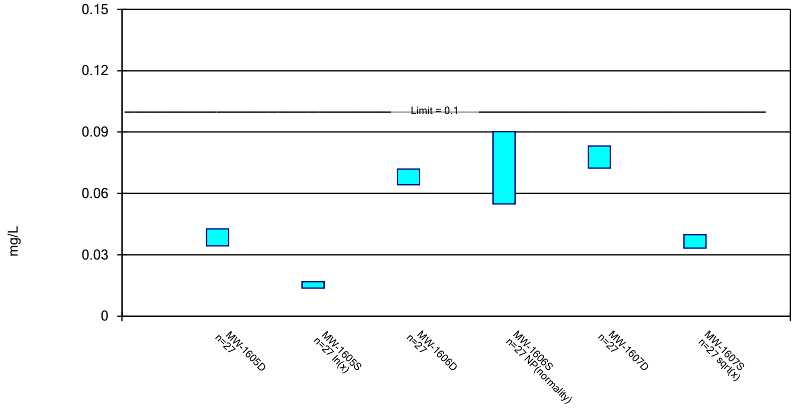
Parametric and Non-Parametric (NP) Confidence Interval

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

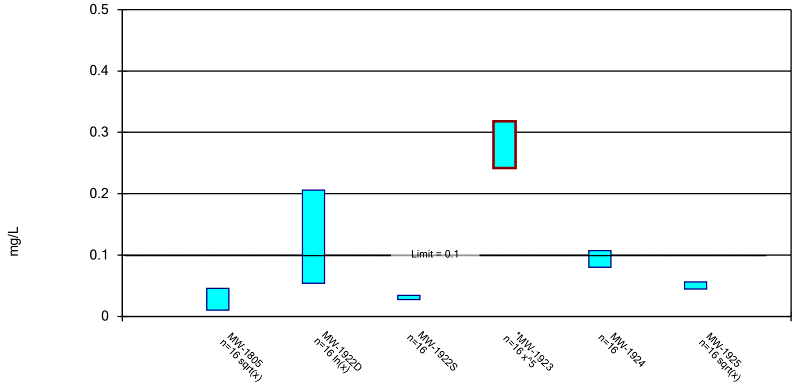


Constituent: Molybdenum, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

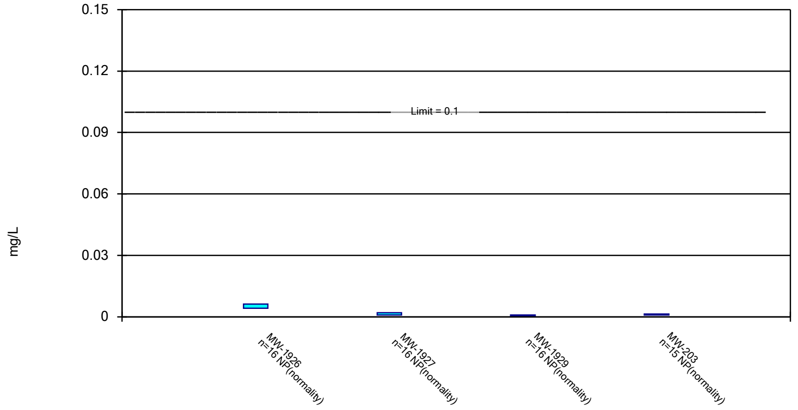


Constituent: Molybdenum, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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

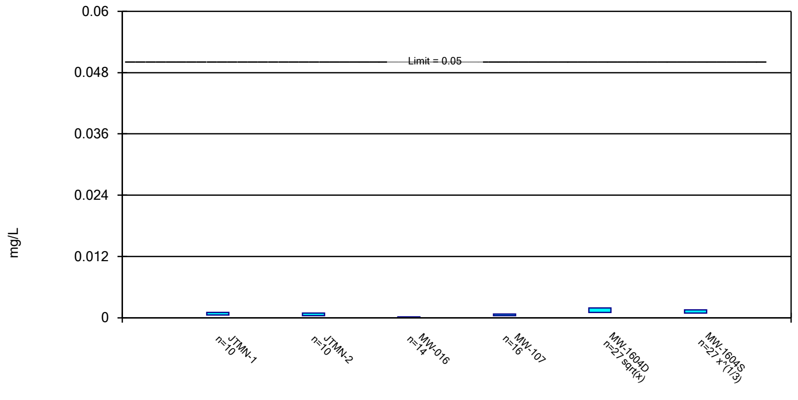


Constituent: Molybdenum, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

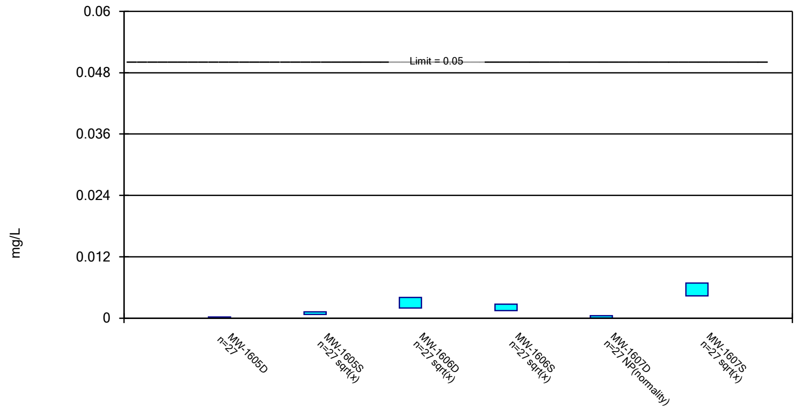


Constituent: Selenium, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

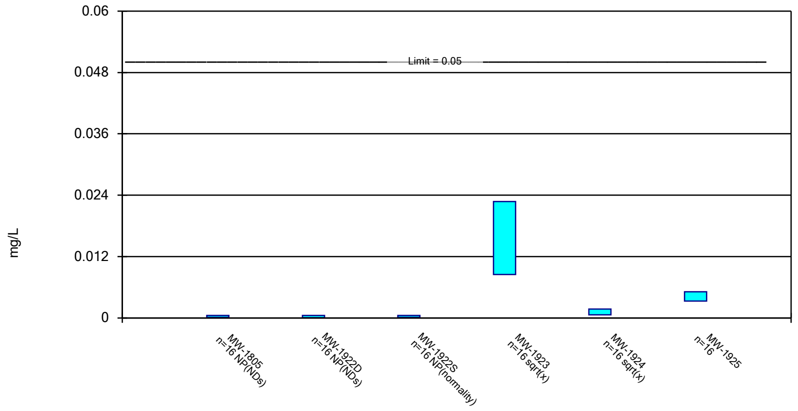


Constituent: Selenium, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

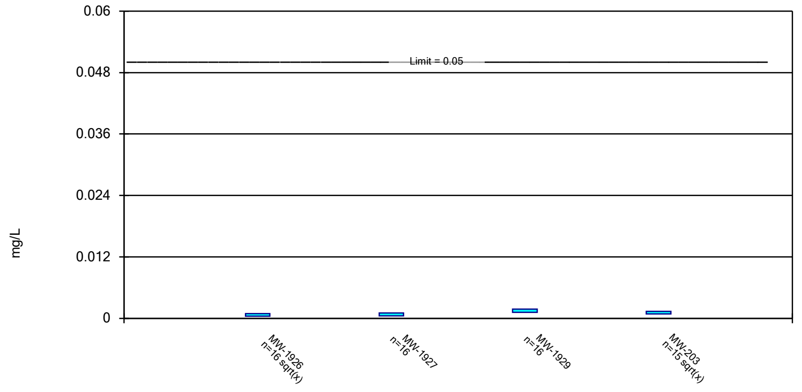


Constituent: Selenium, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



Constituent: Selenium, total Analysis Run 8/5/2024 1:36 PM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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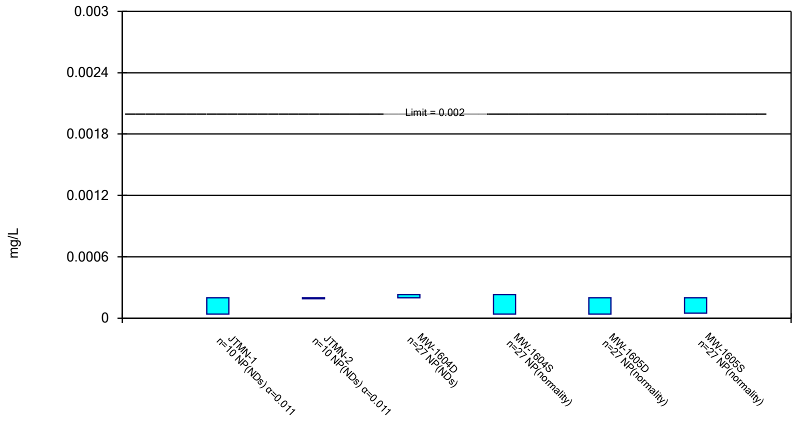
Non-Parametric Confidence Interval

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

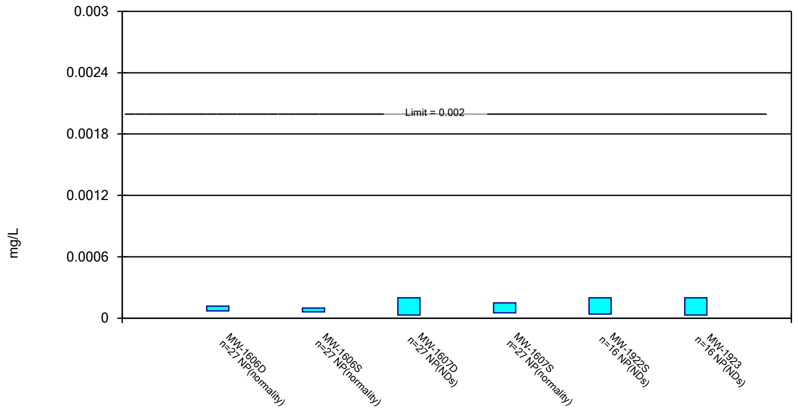


Constituent: Thallium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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



Constituent: Thallium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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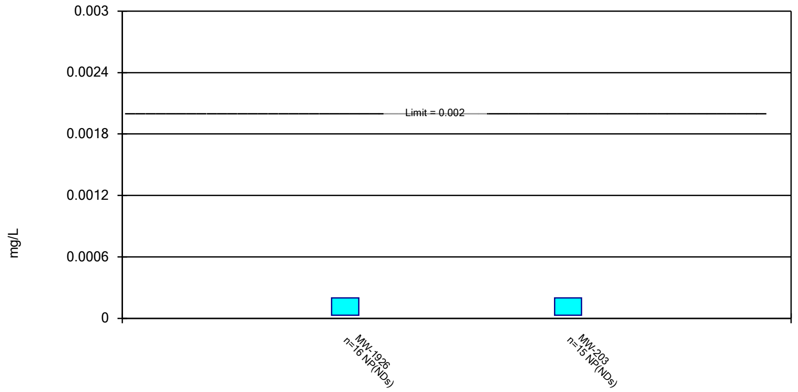
Non-Parametric Confidence Interval

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



Constituent: Thallium, total   Analysis Run 8/5/2024 1:36 PM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

FIGURE G

Confidence Intervals – Corrective Action

Confidence Interval - Corrective Action - All/Significant Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 8/5/2024, 1:45 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Lithium, total (mg/L)	**MW-1605D**	**0.06348**	**0.04628**	**0.04**	**Yes**	**27**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605S**	**0.06312**	**0.04937**	**0.04**	**Yes**	**27**	**0**	**sqrt(x)**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606D**	**0.119**	**0.058**	**0.04**	**Yes**	**27**	**0**	**No**	**0.01**	**NP (normality)**
Lithium, total (mg/L)	**MW-1606S**	**0.09375**	**0.06703**	**0.04**	**Yes**	**27**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607D**	**0.09759**	**0.08411**	**0.04**	**Yes**	**27**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607S**	**0.1049**	**0.09242**	**0.04**	**Yes**	**27**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1922S**	**0.05725**	**0.04138**	**0.04**	**Yes**	**16**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1923**	**0.1985**	**0.1511**	**0.04**	**Yes**	**16**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1924**	**0.1026**	**0.06936**	**0.04**	**Yes**	**16**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1925**	**0.08291**	**0.06251**	**0.04**	**Yes**	**16**	**0**	**No**	**0.01**	**Param.**

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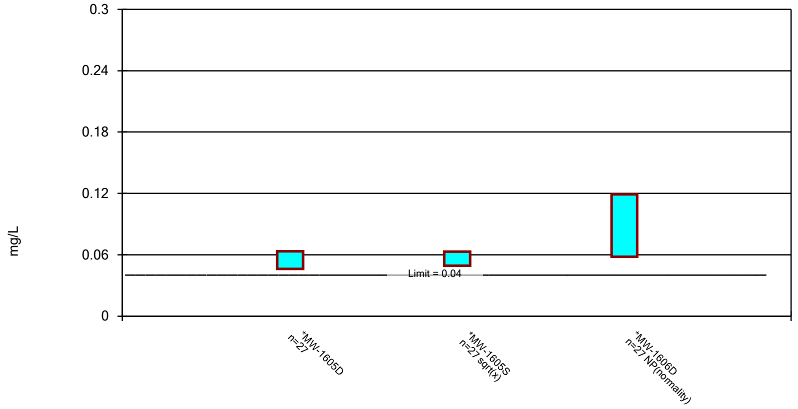
Parametric and Non-Parametric (NP) Confidence Interval, Corrective Action Mode

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



Constituent: Lithium, total   Analysis Run 8/5/2024 1:43 PM   View: Confidence Intervals - CA
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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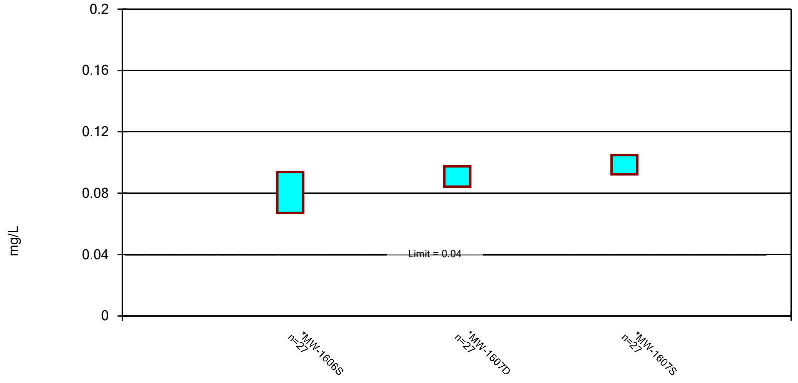
Parametric Confidence Interval, Corrective Action Mode

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



Constituent: Lithium, total   Analysis Run 8/5/2024 1:43 PM   View: Confidence Intervals - CA
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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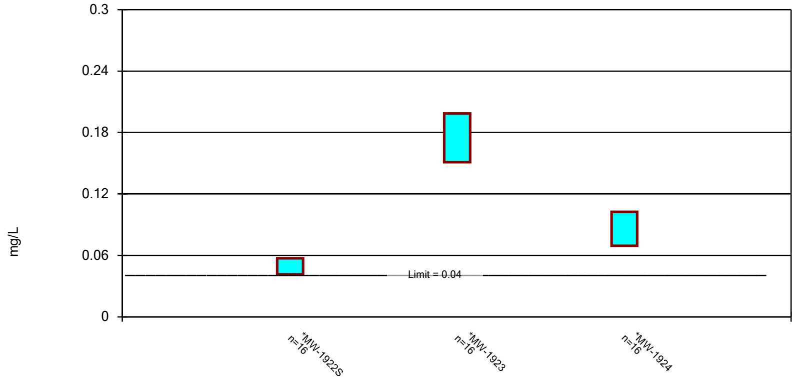
Parametric Confidence Interval, Corrective Action Mode

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

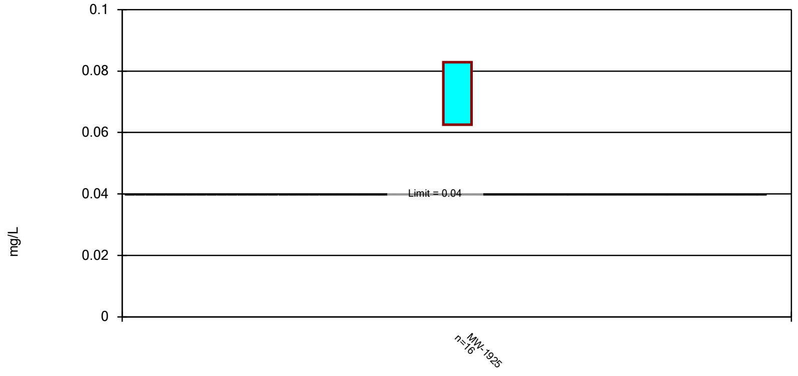


Constituent: Lithium, total   Analysis Run 8/5/2024 1:43 PM   View: Confidence Intervals - CA
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval, Corrective Action Mode

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



Constituent: Lithium, total   Analysis Run 8/5/2024 1:43 PM   View: Confidence Intervals - CA
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

FIGURE H

Appendix IV Trend Tests

Trend Tests Appendix IV - Significant Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 8/5/2024, 2:48 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Arsenic, total (mg/L)	**MW-1805**	**-0.01114**	**-48**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1605D**	**-0.005615**	**-244**	**-96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1605S**	**-0.004928**	**-238**	**-96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1606D**	**-0.01037**	**-268**	**-96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1606S**	**-0.009642**	**-258**	**-96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1607D**	**0.002157**	**100**	**96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1922S**	**-0.004853**	**-70**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1924**	**-0.01366**	**-80**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1925**	**-0.008407**	**-84**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**

Trend Tests Appendix IV - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/5/2024, 2:48 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Arsenic, total (mg/L)	**MW-1805**	**-0.01114**	**-48**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Arsenic, total (mg/L)	MW-1922D	-0.06323	-37	-45	No	16	0	n/a	n/a	0.05	NP
Molybdenum, total (mg/L)	MW-1923	0.04369	32	45	No	16	0	n/a	n/a	0.05	NP
Lithium, total (mg/L)	**MW-1605D**	**-0.005615**	**-244**	**-96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1605S**	**-0.004928**	**-238**	**-96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1606D**	**-0.01037**	**-268**	**-96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1606S**	**-0.009642**	**-258**	**-96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1607D**	**0.002157**	**100**	**96**	**Yes**	**27**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	MW-1607S	-0.0007723	-39	-96	No	27	0	n/a	n/a	0.05	NP
Lithium, total (mg/L)	**MW-1922S**	**-0.004853**	**-70**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	MW-1923	0.01289	41	45	No	16	0	n/a	n/a	0.05	NP
Lithium, total (mg/L)	**MW-1924**	**-0.01366**	**-80**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**
Lithium, total (mg/L)	**MW-1925**	**-0.008407**	**-84**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**

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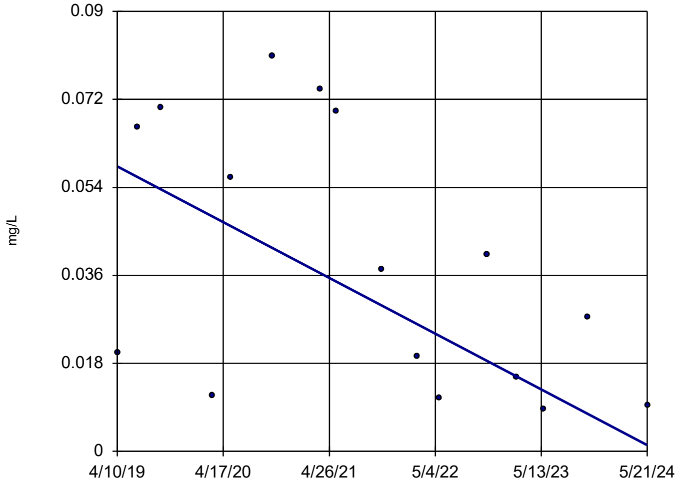
Sen's Slope Estimator

MW-1805



n = 16

Slope = -0.01114
units per year.

Mann-Kendall
statistic = -48
critical = -45

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Constituent: Arsenic, total   Analysis Run 8/5/2024 2:43 PM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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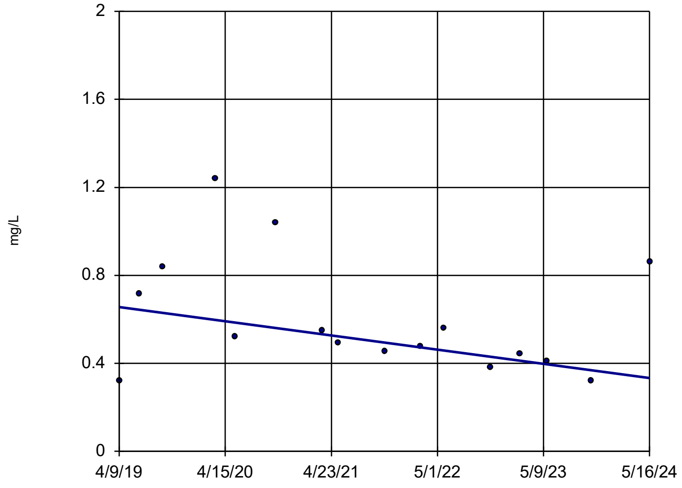
Sen's Slope Estimator

MW-1922D



n = 16

Slope = -0.06323
units per year.

Mann-Kendall
statistic = -37
critical = -45

Trend not significant at 95%
confidence level
(α = 0.025 per
tail).

Constituent: Arsenic, total   Analysis Run 8/5/2024 2:43 PM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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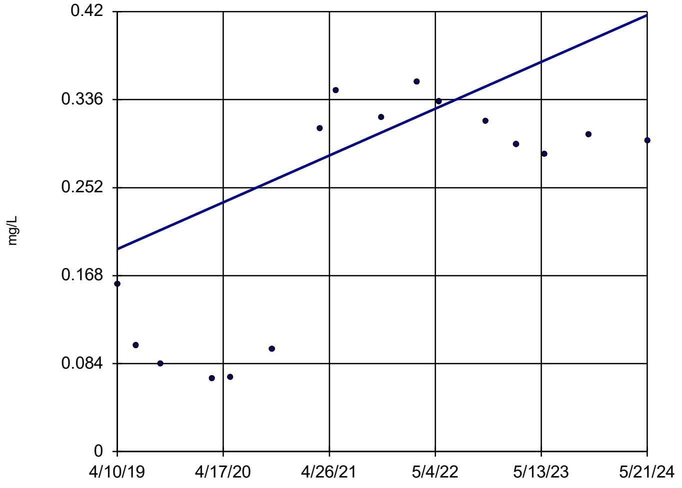
Sen's Slope Estimator

MW-1923



n = 16

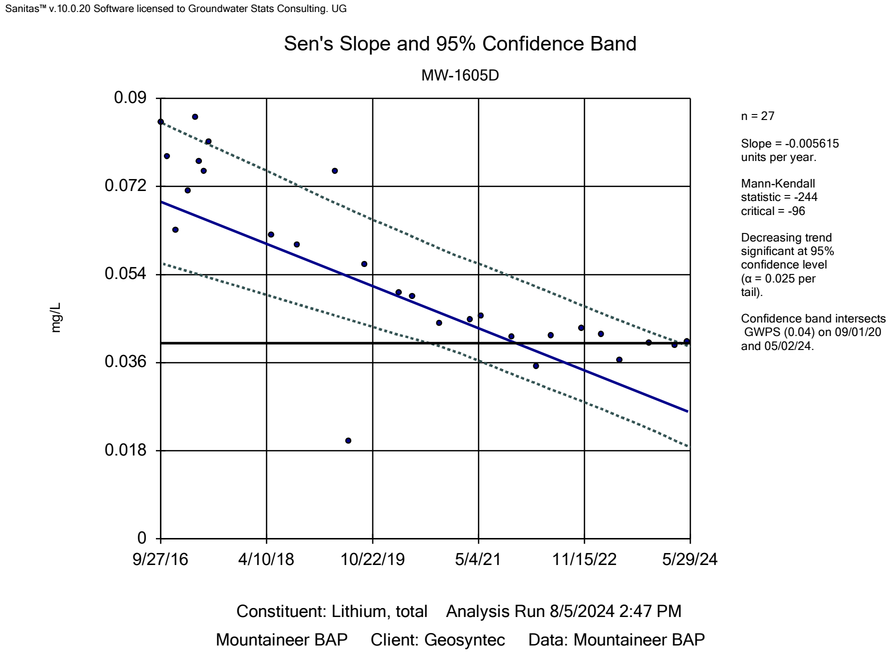
Slope = 0.04369
units per year.

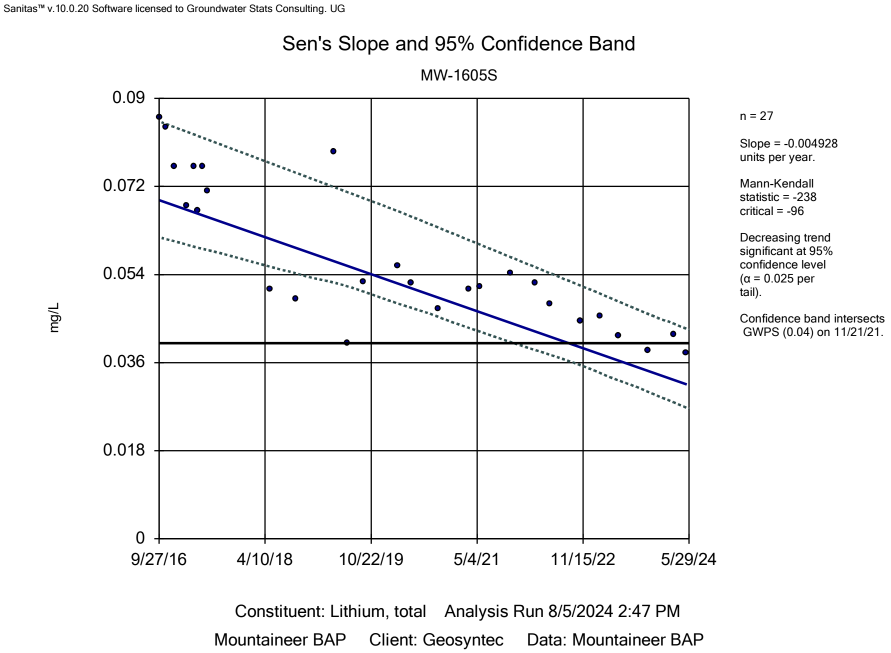
Mann-Kendall
statistic = 32
critical = 45

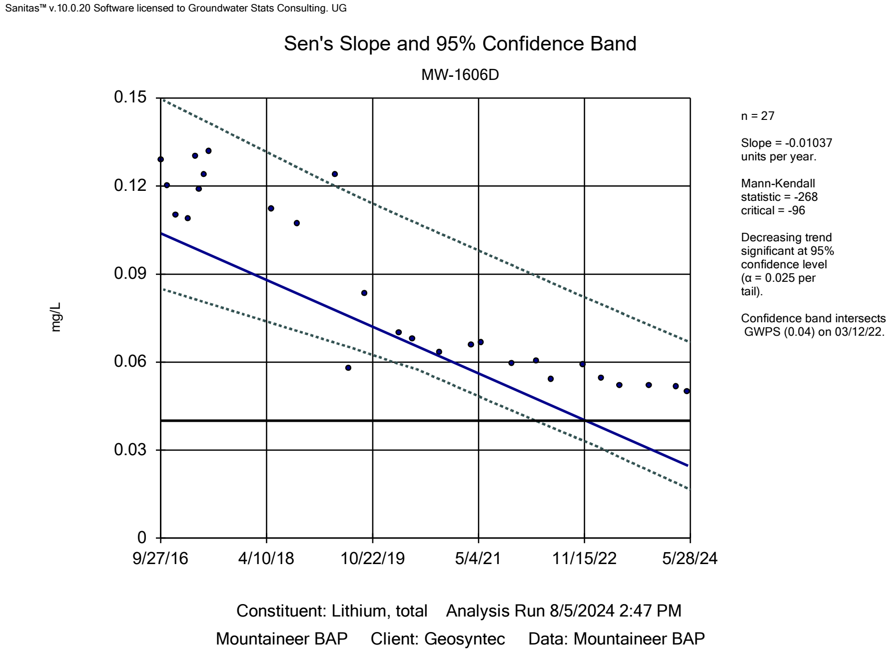
Trend not significant at 95%
confidence level
(α = 0.025 per
tail).

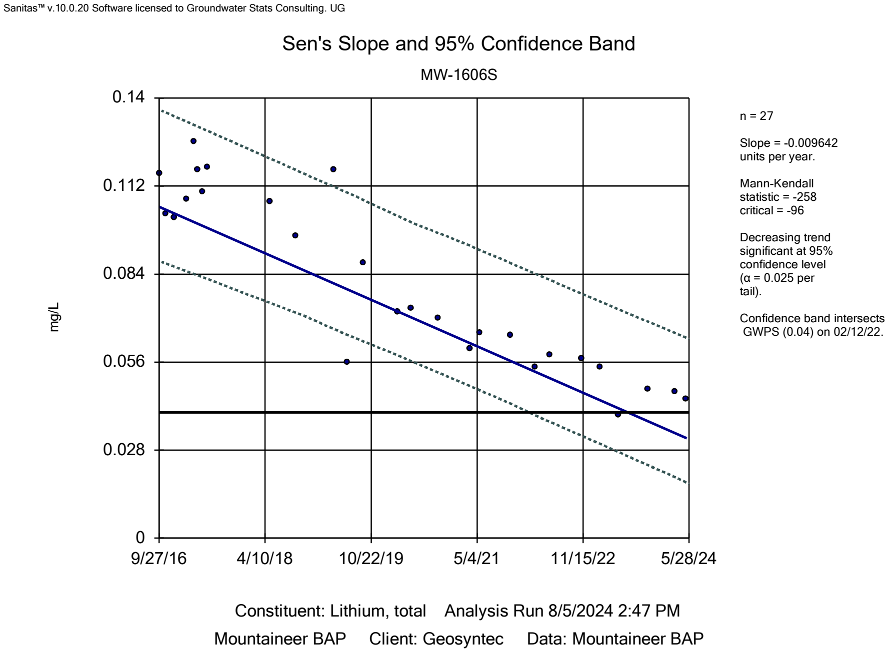
Constituent: Molybdenum, total   Analysis Run 8/5/2024 2:44 PM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP


Sanitas™ v.10.0.20 Software licensed to Groundwater Stats Consulting. UG
Sen's Slope and 95% Confidence Band
MW-1605D
0.09
0.072
0.054
0.036
0.018
0
mg/L
9/27/16
4/10/18
10/22/19
5/4/21
11/15/22
5/29/24
n = 27
Slope = -0.005615 units per year.
Mann-Kendall statistic = -244 critical = -96
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).
Confidence band intersects GWPS (0.04) on 09/01/20 and 05/02/24.
Constituent: Lithium, total Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.10.0.20 Software licensed to Groundwater Stats Consulting. UG
Sen's Slope and 95% Confidence Band
MW-1605S
0.09
0.072
0.054
0.036
0.018
0
mg/L
9/27/16
4/10/18
10/22/19
5/4/21
11/15/22
5/29/24
n = 27
Slope = -0.004928 units per year.
Mann-Kendall statistic = -238 critical = -96
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).
Confidence band intersects GWPS (0.04) on 11/21/21.
Constituent: Lithium, total Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.10.0.20 Software licensed to Groundwater Stats Consulting. UG
Sen's Slope and 95% Confidence Band
MW-1606D
0.15
0.12
0.09
0.06
0.03
0
mg/L
9/27/16
4/10/18
10/22/19
5/4/21
11/15/22
5/28/24
n = 27
Slope = -0.01037 units per year.
Mann-Kendall statistic = -268 critical = -96
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).
Confidence band intersects GWPS (0.04) on 03/12/22.
Constituent: Lithium, total Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.10.0.20 Software licensed to Groundwater Stats Consulting. UG
Sen's Slope and 95% Confidence Band
MW-1606S
0.14
0.112
0.084
0.056
0.028
0
mg/L
9/27/16
4/10/18
10/22/19
5/4/21
11/15/22
5/28/24
n = 27
Slope = -0.009642 units per year.
Mann-Kendall statistic = -258 critical = -96
Decreasing trend significant at 95% confidence level (α = 0.025 per tail).
Confidence band intersects GWPS (0.04) on 02/12/22.
Constituent: Lithium, total Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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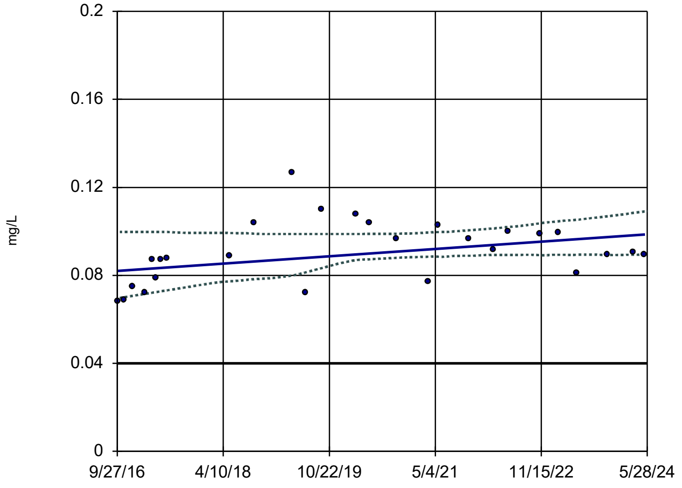
Sen's Slope and 95% Confidence Band

MW-1607D



n = 27

Slope = 0.002157
units per year.

Mann-Kendall
statistic = 100
critical = 96

Increasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band is
above GWPS (0.04).

Constituent: Lithium, total   Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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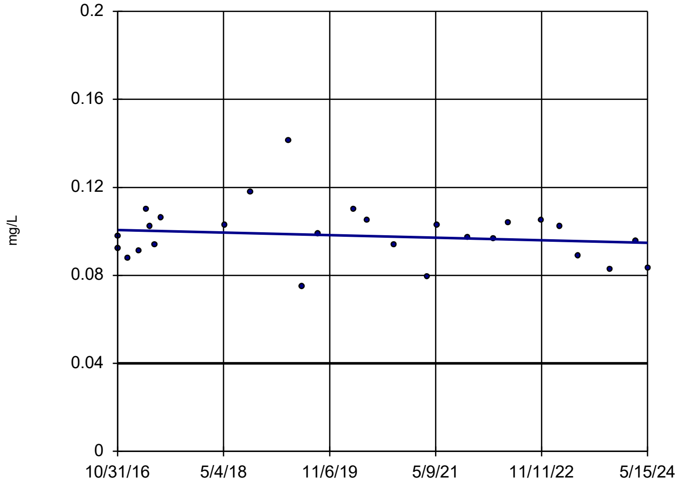
Sen's Slope Estimator

MW-1607S



n = 27

Slope = -0.0007723
units per year.

Mann-Kendall
statistic = -39
critical = -96

Trend not sig-
nificant at 95%
confidence level
(α = 0.025 per
tail).

GWPS = 0.04.

Constituent: Lithium, total   Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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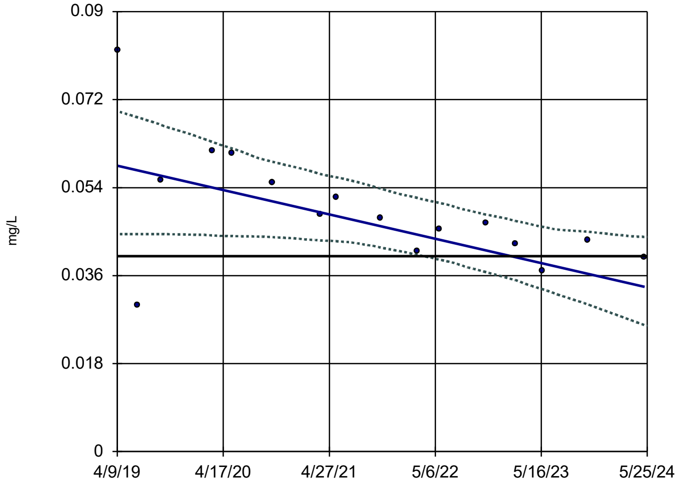
Sen's Slope and 95% Confidence Band

MW-1922S



n = 16

Slope = -0.004853
units per year.

Mann-Kendall
statistic = -70
critical = -45

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band intersects
GWPS (0.04) on 04/03/22.

Constituent: Lithium, total   Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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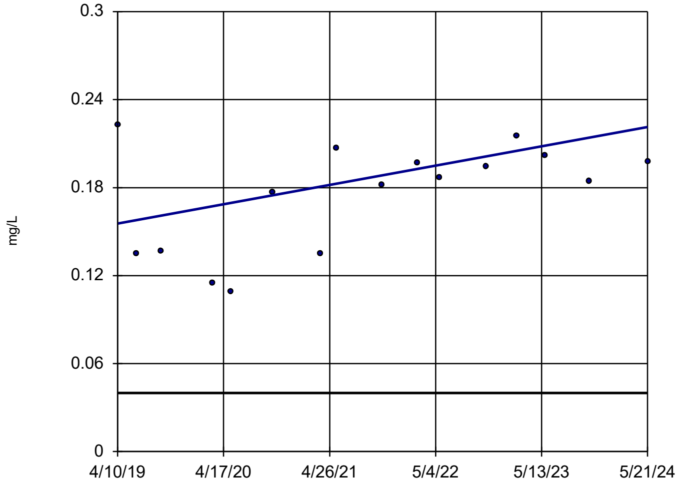
Sen's Slope Estimator

MW-1923



n = 16

Slope = 0.01289
units per year.

Mann-Kendall
statistic = 41
critical = 45

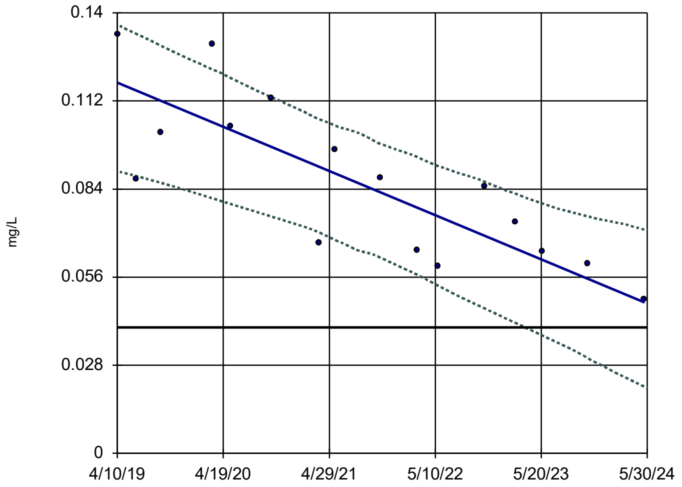
Trend not sig-
nificant at 95%
confidence level
(α = 0.025 per
tail).

GWPS = 0.04.

Constituent: Lithium, total   Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sen's Slope and 95% Confidence Band

MW-1924



n = 16

Slope = -0.01366
units per year.

Mann-Kendall
statistic = -80
critical = -45

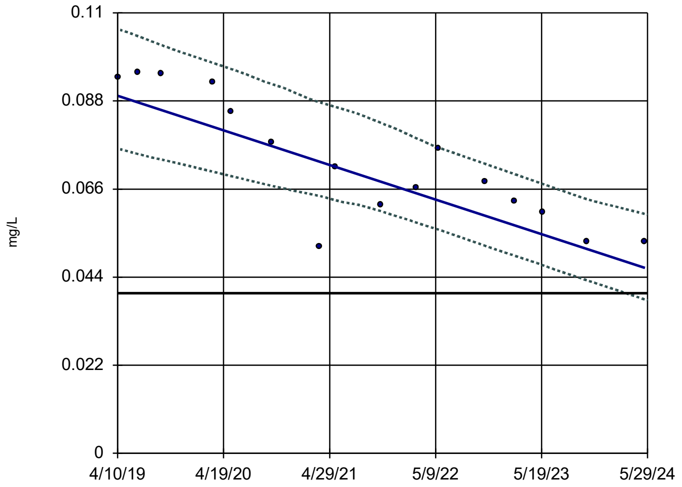
Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band intersects
GWPS (0.04) on 03/27/23.

Constituent: Lithium, total Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sen's Slope and 95% Confidence Band

MW-1925



n = 16

Slope = -0.008407
units per year.

Mann-Kendall
statistic = -84
critical = -45

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Confidence band intersects
GWPS (0.04) on 03/15/24.

Constituent: Lithium, total Analysis Run 8/5/2024 2:47 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

ATTACHMENT C

MW-1921 Statistical Analysis Output

GROUNDWATER STATS
CONSULTING

August 8, 2024

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

Re: Mountaineer Bottom Ash Pond
Assessment Monitoring Report & Corrective Action – 2024
Well MW-1921

Dear Ms. Kreinberg,

Groundwater Stats Consulting (GSC), formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the Assessment Monitoring and Corrective Action statistical analysis of groundwater data for Nature and Extent well MW-1921 through May 2024 at American Electric Power Company's Mountaineer Bottom Ash Pond. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities (CCR Rule, 2015) as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009). Sampling began at this well in 2019.

Data were sent electronically, and the statistical analysis was conducted according to the Statistical Analysis Plan and screening evaluation prepared by GSC and approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC. This analysis was reviewed by Andrew Collins, Project Manager of 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

Time series and box plots for Appendix IV parameters are provided for all constituents and are used to evaluate concentrations over the entire record (Figures A and B, respectively). While no measurements have been flagged as outliers, any outliers are plotted in a lighter font and disconnected symbol on the graphs.

Note that when there are no detections present in downgradient wells for a given constituent, statistical analyses are not required. Since all data sets contained less than 100% non-detects, all constituents were analyzed for nature and extent well MW-1921. For all constituents, a substitution of the most recent reporting limit is used for non-detect data. This generally gives the most conservative limit in each case.

Summary of Statistical Methods – Appendix IV Parameters

Interwell upper tolerance limits (UTLs) are used to establish background limits for both Assessment Monitoring and Corrective Action Monitoring. A Groundwater Protection Standard (GWPS) for each Appendix IV constituent is then established using the higher of the background limit or a regulatory limit. A confidence interval for each downgradient well/constituent is compared against the corresponding GWPS. More details for both Assessment and Corrective Action monitoring are given below.

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 tolerance 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, 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.

Summary of Appendix IV Background Update – Conducted in February 2024

Outlier Analysis

Prior to evaluating Appendix IV parameters, background (upgradient) data were screened through visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits for interwell tolerance limits. For the February 2024 update, Tukey's outlier test on pooled upgradient well data through October 2023 identified outliers for arsenic, barium, combined radium 226 + 228, fluoride, and lithium. A high value for combined radium 226 + 228 at upgradient well MW-1601A was flagged in order to maintain statistical limits that are conservative from a regulatory perspective. Any values identified by Tukey's test but not flagged in the database were either similar to concentrations from neighboring upgradient wells or were lower than the respective Maximum Contaminant Level (MCL). Tukey's outlier test and visual screening confirmed previously flagged values; therefore, no changes were made to values flagged during previous updates.

High outliers are also 'cautiously' flagged in the downgradient wells when they are clearly much different from the rest of the data. This is intended to be a regulatory conservative approach in that it will reduce the variance and thus reduce the width of parametric confidence intervals; although it will also reduce the mean and thus lower the entire interval. The intent is to better represent the actual downgradient mean. For the February 2024 update, any elevated not flagged in the database were either similar to concentrations from neighboring upgradient wells or were lower than the respective Maximum Contaminant Levels (MCL). No outliers were identified Therefore, no values were flagged as outliers for nature and extent well MW-1921 (Figure C).

Interwell Upper Tolerance Limits

Upper tolerance limits were used to calculate background limits from pooled upgradient well data during the February 2024 statistical analysis using data through October 2023 for Appendix IV parameters (Figure D). Parametric tolerance limits are calculated with a target of 95% confidence and 95% coverage when data follow a normal or transformed-normal distribution. When data contained greater than 50% non-detects or did not follow a normal or transformed-normal distribution, non-parametric tolerance limits were constructed using the highest background measurement. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. These limits are updated annually and will be updated again after the Fall 2024 sample event.

Groundwater Protection Standards

Interwell upper tolerance limits were compared to the Maximum Contaminant Levels (MCLs) and CCR-Rule specified levels in the Groundwater Protection Standard (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure E).

Evaluation of Appendix IV Parameters – Well MW-1921 – May 2024

Assessment Monitoring

Confidence intervals were constructed for all Appendix IV parameters under assessment monitoring protocols and compared to the GWPS described above (Figure F). These intervals were constructed as either parametric or nonparametric confidence intervals depending on the data distribution and percentage of non-detects. When data followed a normal or transformed-normal distribution, parametric confidence intervals were used for Appendix IV parameters. The lower confidence limit, which is constructed with 99% confidence for parametric confidence intervals, is compared to the GWPS prepared as described above. Nonparametric confidence intervals were constructed when data did not follow a normal or transformed-normal distribution or when there were greater than 50% non-detects. The confidence level associated with nonparametric confidence intervals is dependent upon the number samples available.

As discussed above, the highest limit of the MCL, CCR-Rule specified level, or background limit was used to establish the GWPS. A statistically significant level (SSL) is declared only when the entire confidence interval is above a GWPS. Complete graphical results of the confidence intervals follow this letter. The following exceedance was identified:

- Molybdenum: MW-1921

Corrective Action

In 2022, Mountaineer BAP entered Corrective Action protocols for lithium due to previously identified SSLs. A confidence interval was constructed using data through May 2024 for this constituent at nature and extent well MW-1921 (Figure G). The confidence interval is then compared to the same GWPS used in Assessment Monitoring to evaluate the effectiveness of remedial efforts over time. Only when the entire confidence interval is below the GWPS for a period of 3 years is the well/constituent pair declared to be in compliance with its respective standard.

Lithium will continue to be evaluated under Corrective Action protocols using confidence intervals for these well/constituent pairs during the Monitoring and Natural Attenuation program. Complete graphical results of the confidence interval follow this letter. The following exceedance was identified:

- Lithium: MW-1921

Trend Tests

Data at wells with confidence interval exceedances are evaluated using the Sen's Slope/Mann Kendall trend test at the 95% confidence level (Figure H). The 95% confidence level will identify whether statistically significant trends are present more rapidly and, therefore, is used in this analysis. The confidence intervals constructed for lithium include confidence bands at 95% confidence around the trend line when the Sen's Slope/Mann Kendall trend test identifies a statistically significant trend. The confidence bands are particularly useful in Corrective Action for determining the point in time when concentrations fall below an established GWPS (i.e., the entire confidence band is below the GWPS). The Sen's Slope/Mann Kendall trend test identified the following statistically significant trends:

Increasing:
- None

Decreasing:
- Molybdenum: MW-1921

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

For Groundwater Stats Consulting,

Kristina Rayner　　A Collins

Kristina Rayner
Senior Statistician

Andrew Collins
Project Manager

FIGURE A

Time Series

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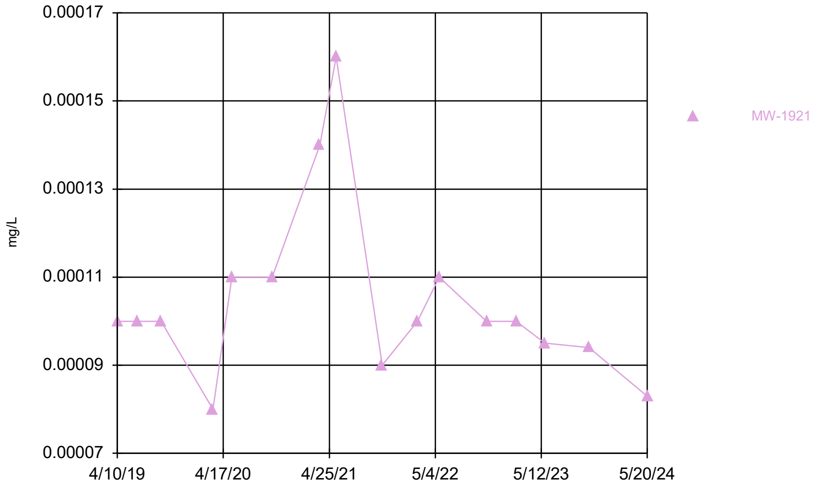
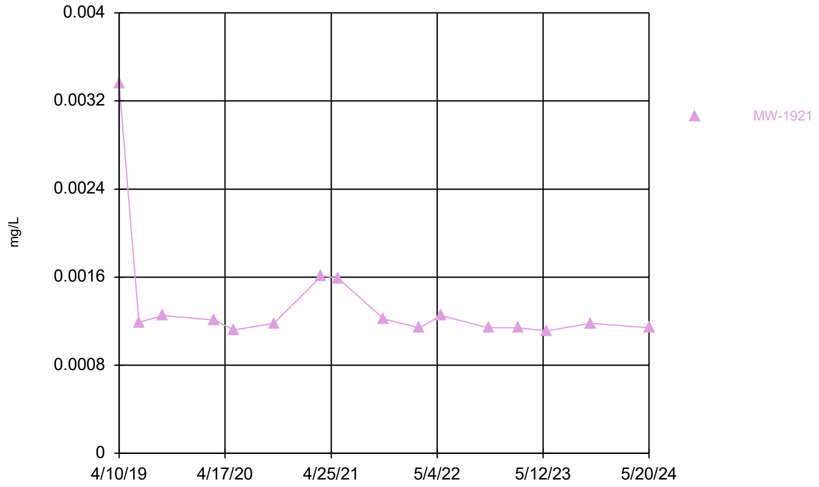
Time Series



Constituent: Antimony, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

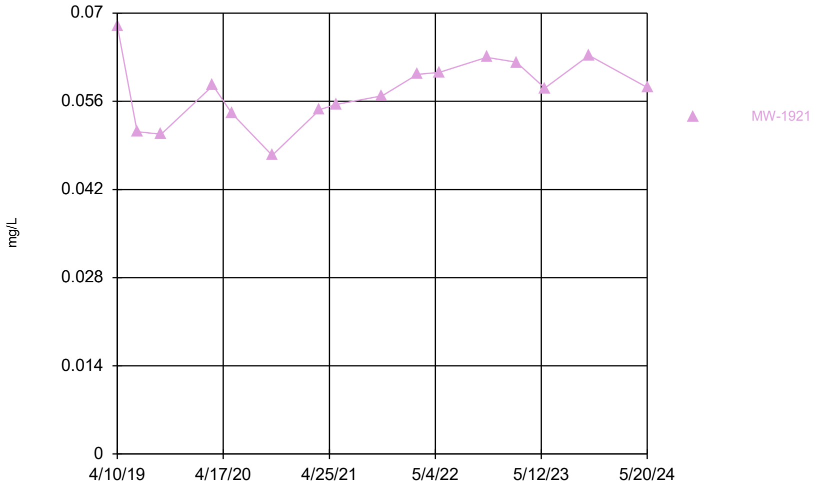
Time Series



Constituent: Arsenic, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

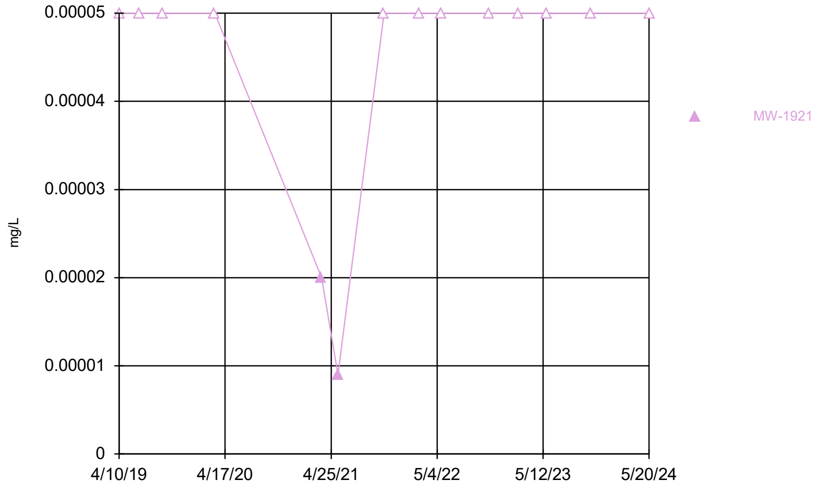
Time Series



Constituent: Barium, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

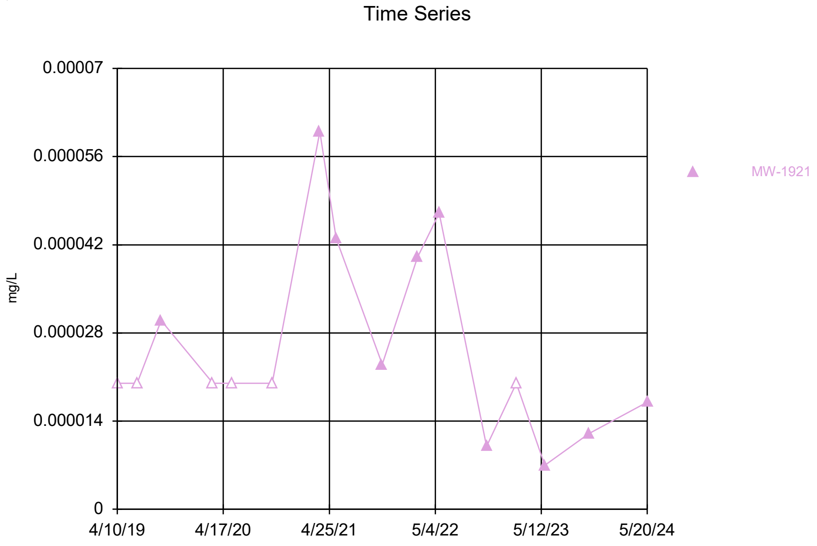
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



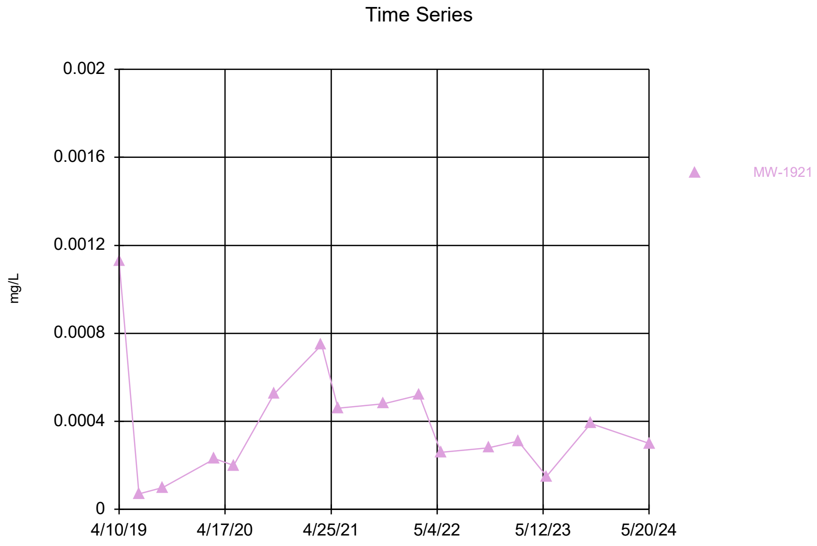
Constituent: Beryllium, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.



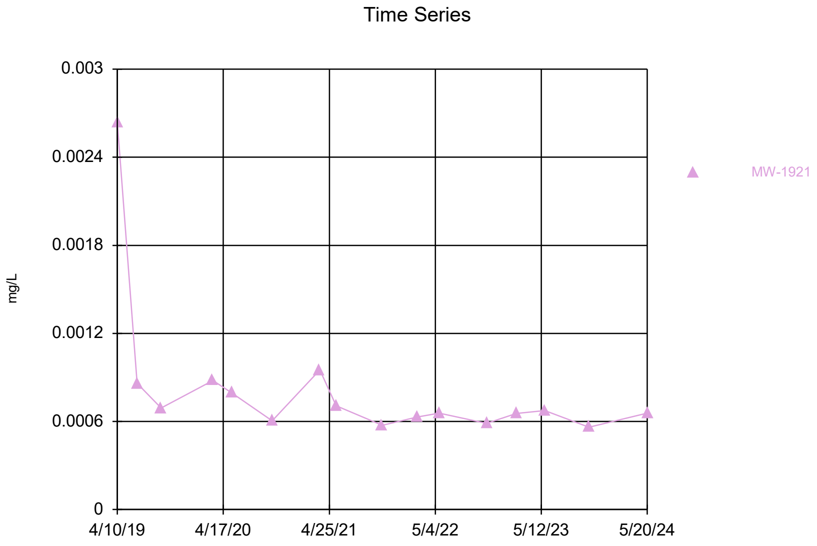
Constituent: Cadmium, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



Constituent: Chromium, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



Constituent: Cobalt, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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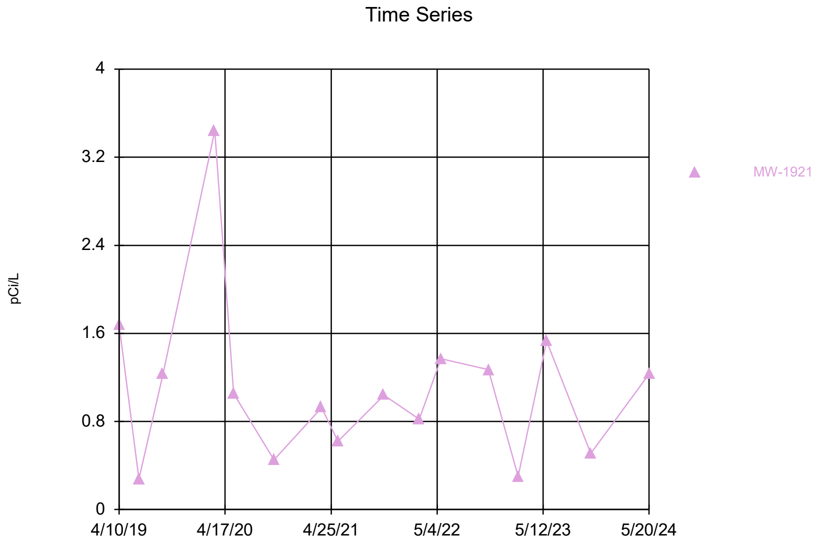
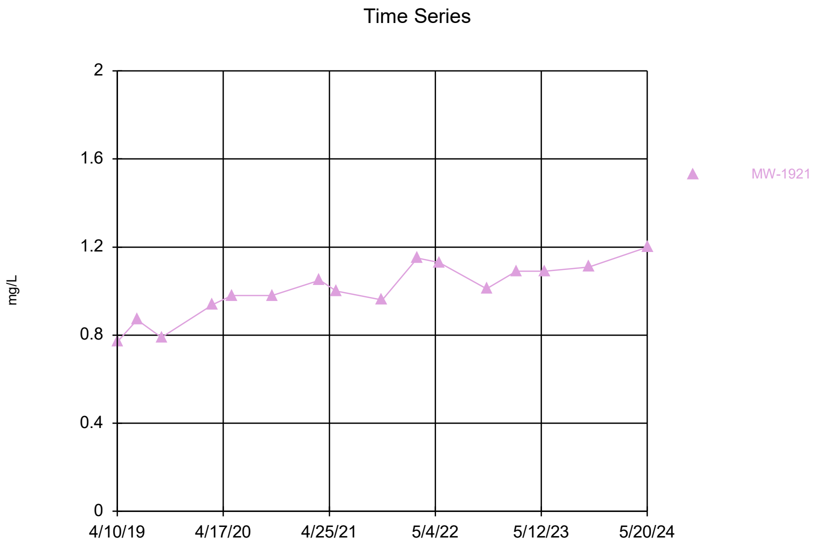


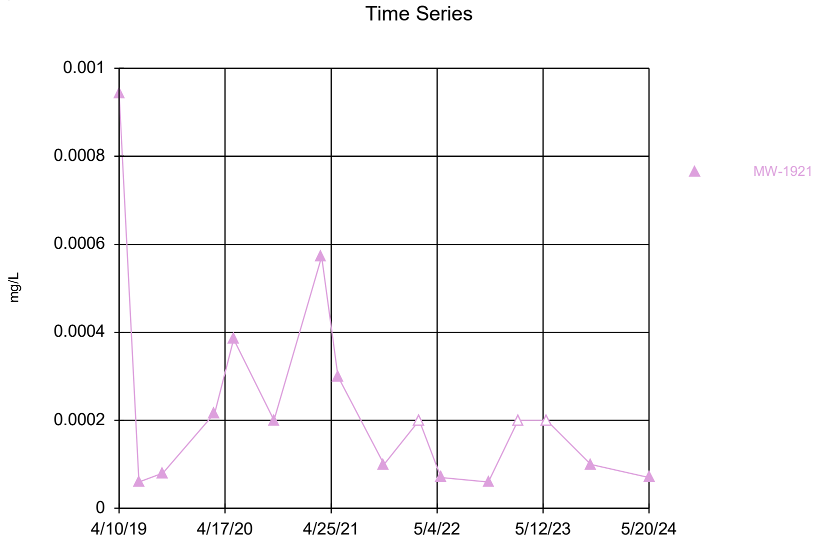
Constituent: Combined Radium 226 + 228 Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - M
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



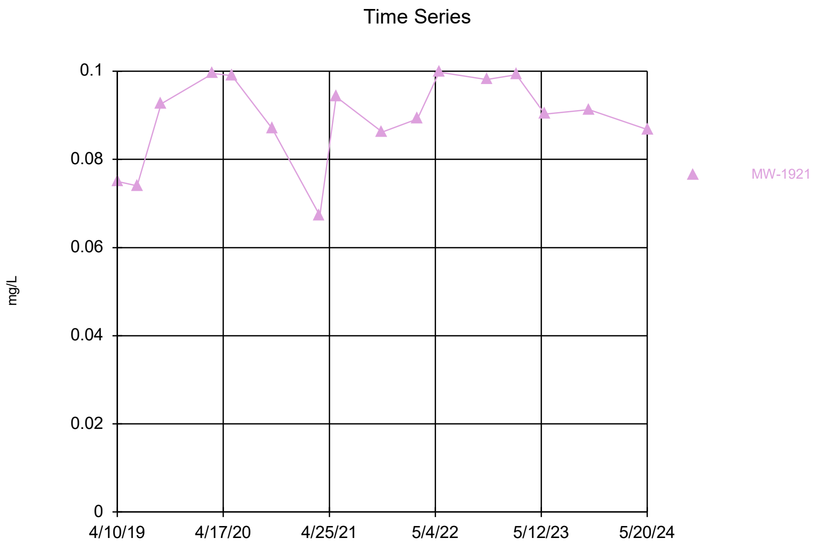
Constituent: Fluoride, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.



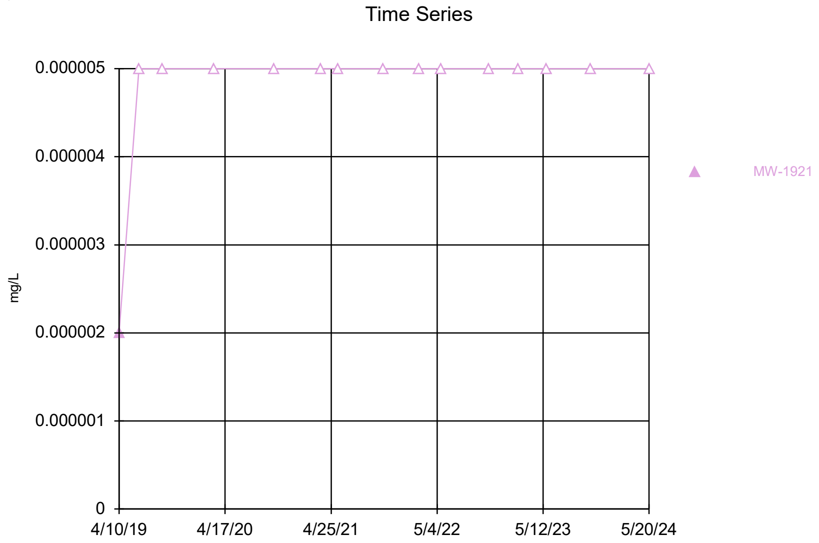
Constituent: Lead, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



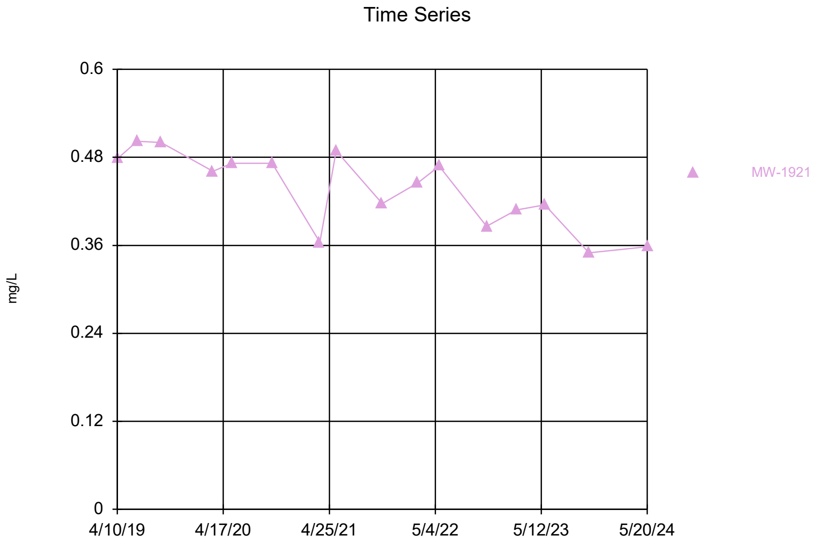
Constituent: Lithium, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.



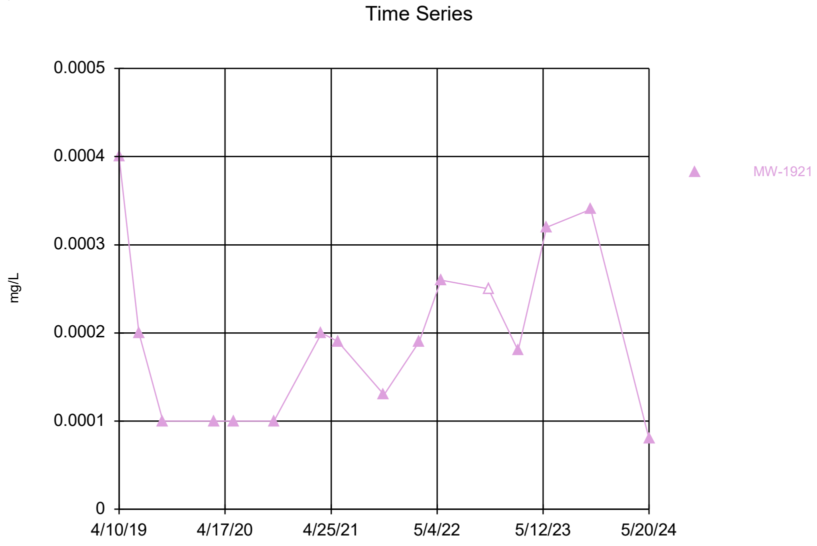
Constituent: Mercury, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



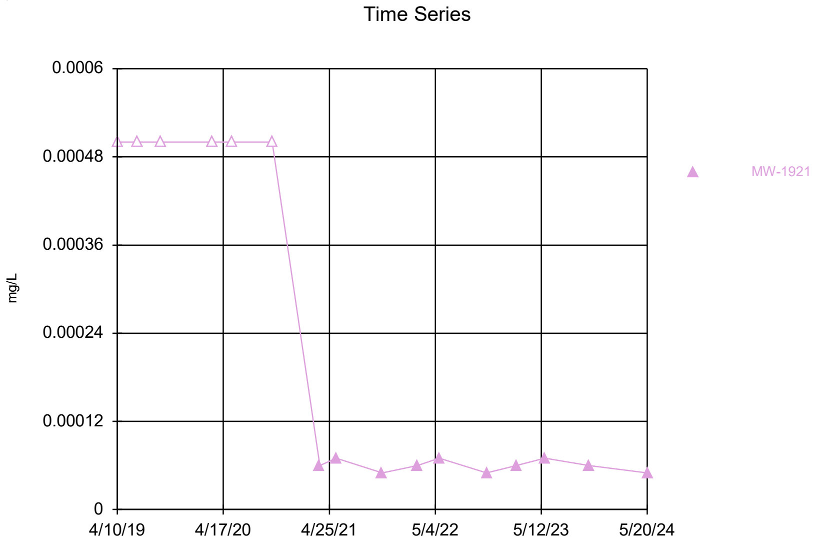
Constituent: Molybdenum, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.



Constituent: Selenium, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.



Constituent: Thallium, total Analysis Run 8/5/2024 1:41 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

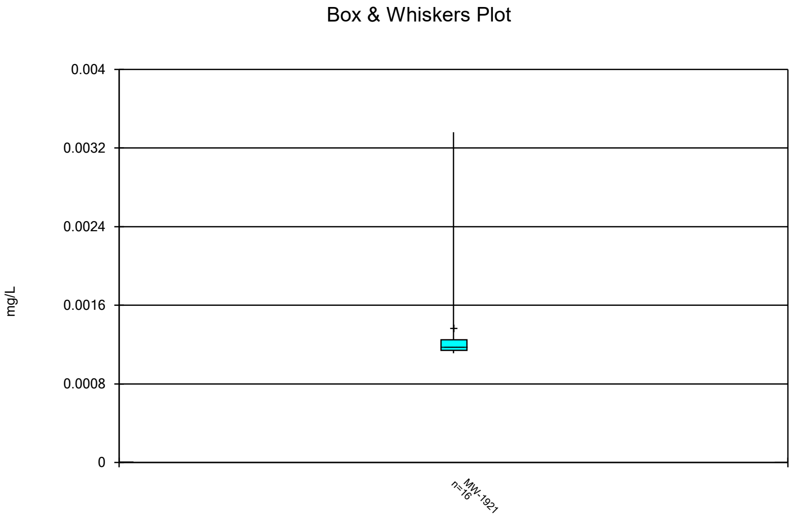
FIGURE B

Box Plots

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

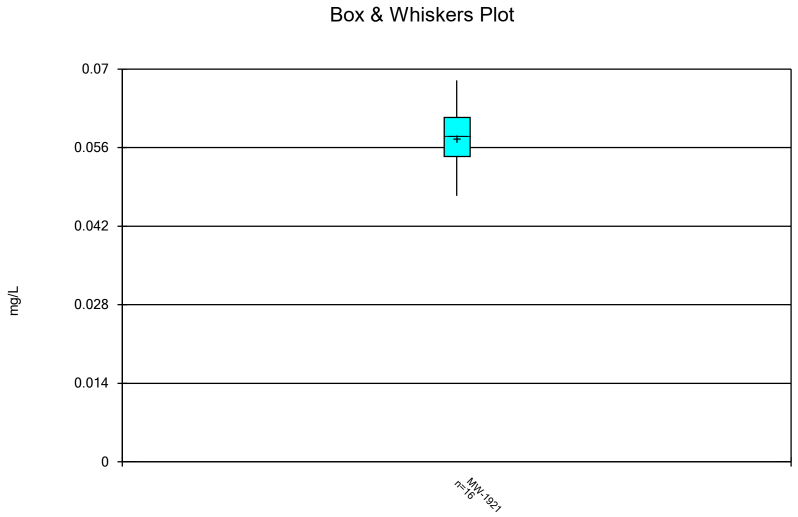
Constituent: Antimony, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



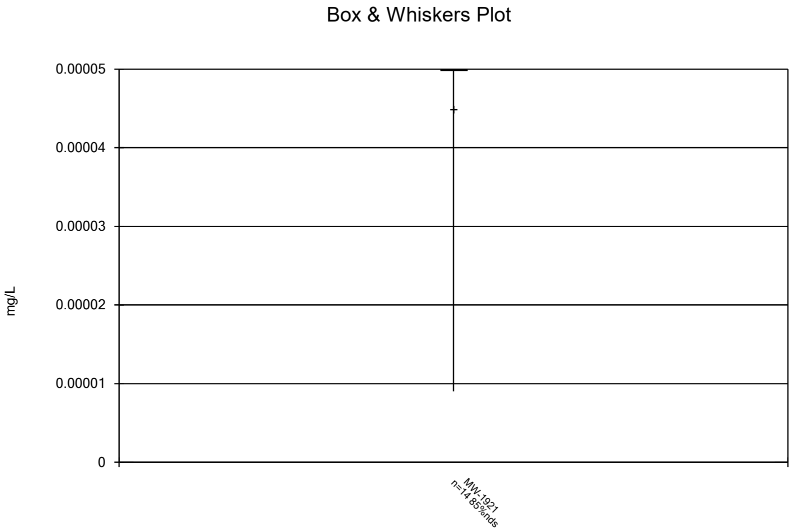
Constituent: Arsenic, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



Constituent: Barium, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



Constituent: Beryllium, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

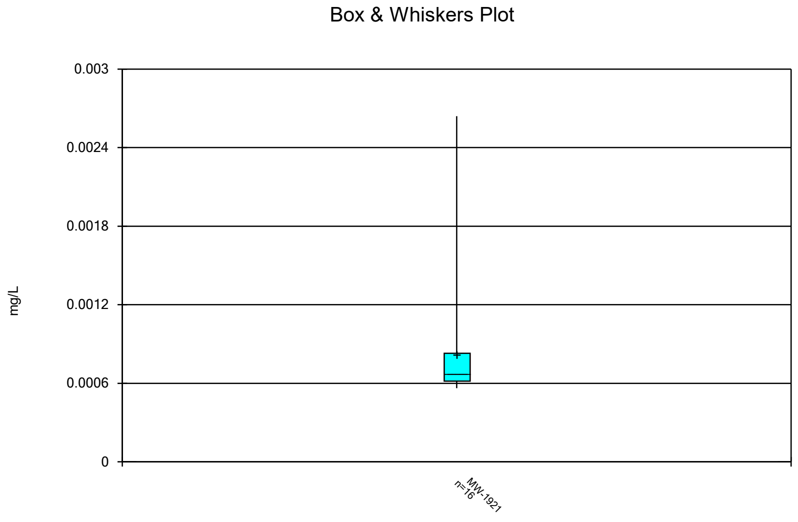
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Constituent: Cadmium, total Analysis Run 8/5/2024 1:42 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

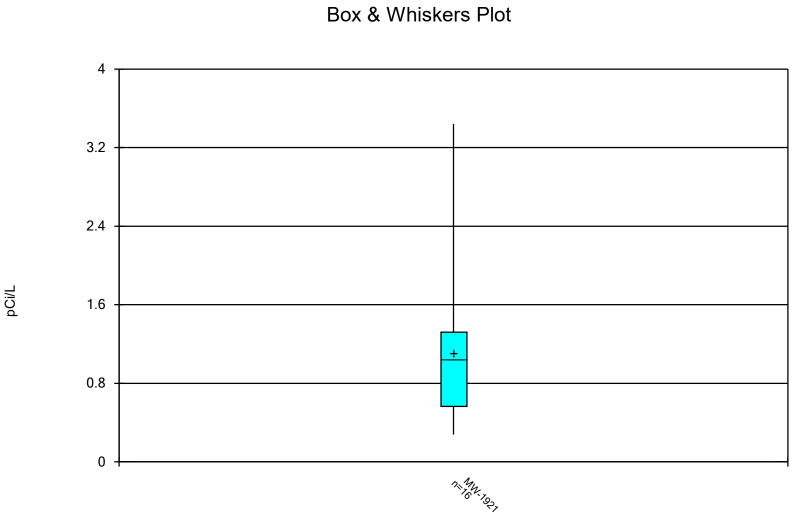
Constituent: Chromium, total Analysis Run 8/5/2024 1:42 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



Constituent: Cobalt, total Analysis Run 8/5/2024 1:42 PM View: Confidence Intervals - MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

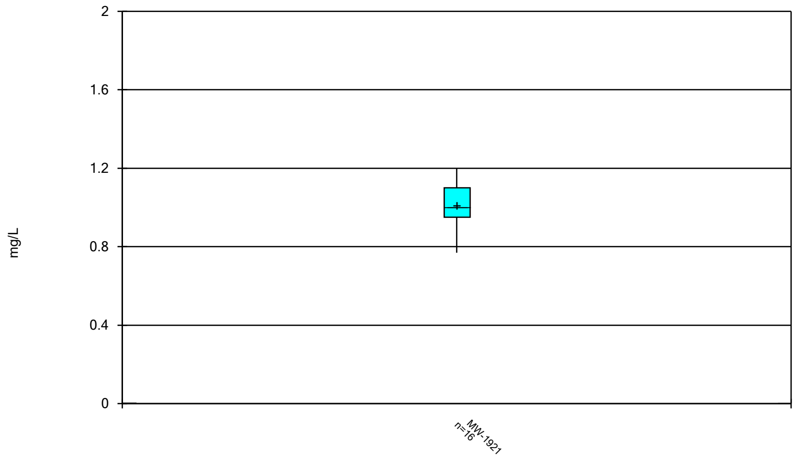
Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG



Constituent: Combined Radium 226 + 228 Analysis Run 8/5/2024 1:42 PM View: Confidence Intervals - M
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

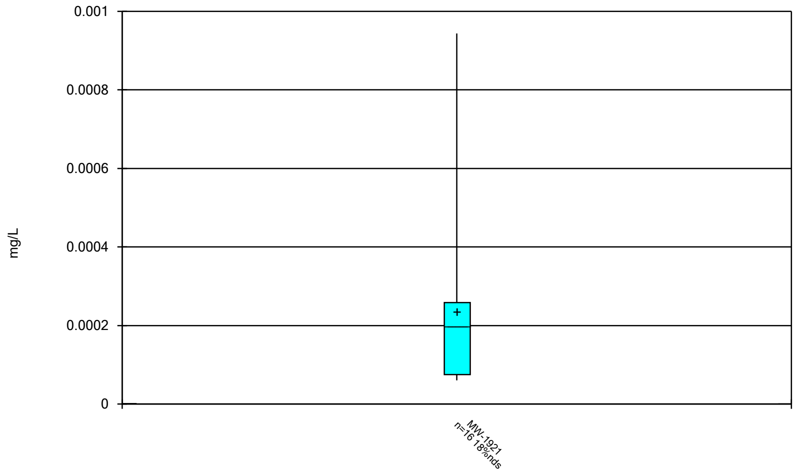
Box & Whiskers Plot



Constituent: Fluoride, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.19h Software licensed to Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Lead, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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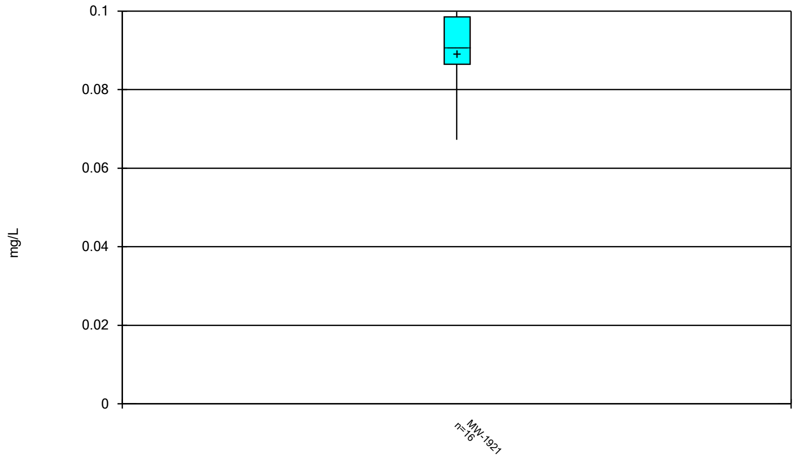
Box & Whiskers Plot



Constituent: Lithium, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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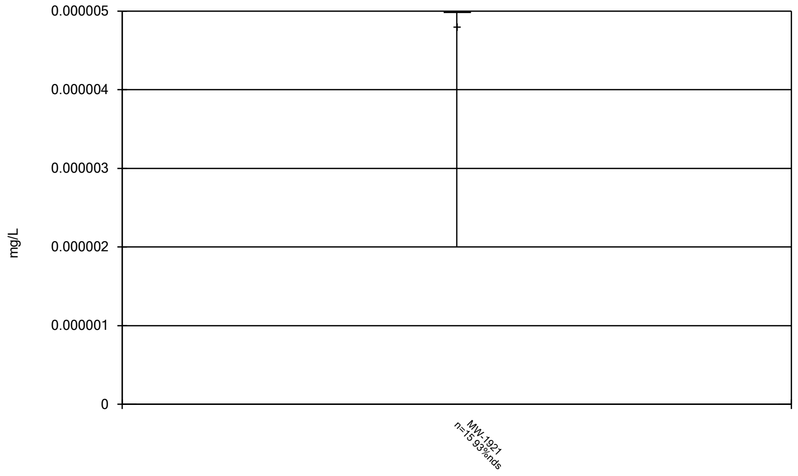
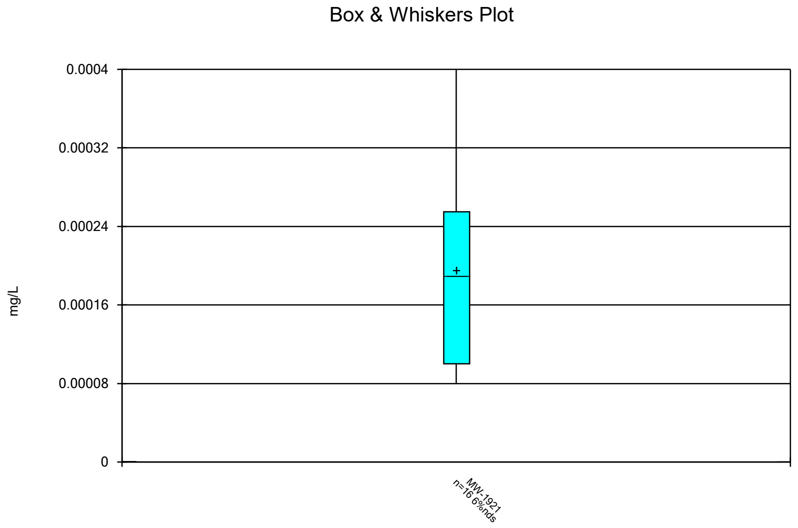
Box & Whiskers Plot

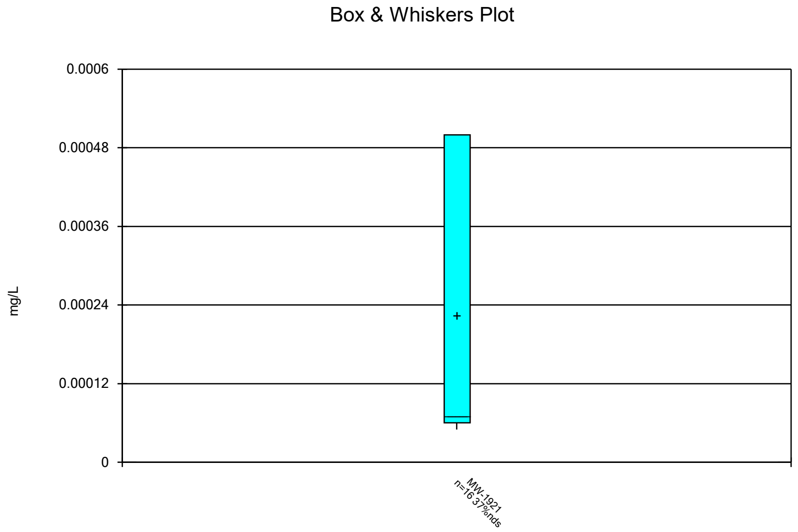


Constituent: Mercury, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Constituent: Molybdenum, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP



Constituent: Selenium, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP



Constituent: Thallium, total   Analysis Run 8/5/2024 1:42 PM   View: Confidence Intervals - MW-1921
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

FIGURE C

Outlier Summary

Outlier Summary

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/7/2024, 9:55 AM

No values were flagged as outliers.

FIGURE D
UTLs

Upper Tolerance Limits Summary Table

Mountaineer BAP   Data: Mountaineer BAP   Printed 2/5/2024, 11:40 AM

Constituent	Upper Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	0.00052	100	n/a	n/a	14	n/a	n/a	0.005921	NP Inter(normality)
Arsenic, total (mg/L)	0.0006804	100	0.000428	0.0001312	0	None	No	0.05	Inter
Barium, total (mg/L)	0.0678	100	n/a	n/a	0	n/a	n/a	0.005921	NP Inter(normality)
Beryllium, total (mg/L)	0.00005	92	n/a	n/a	92.39	n/a	n/a	0.008924	NP Inter(NDs)
Cadmium, total (mg/L)	0.00005	100	n/a	n/a	6	n/a	n/a	0.005921	NP Inter(normality)
Chromium, total (mg/L)	0.0007184	96	0.01808	0.004515	1.042	None	sqrt(x)	0.05	Inter
Cobalt, total (mg/L)	0.0005254	100	-9.61	1.07	4	None	ln(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	2.305	99	0.8695	0.3368	0	None	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	0.3	104	n/a	n/a	0	n/a	n/a	0.004822	NP Inter(normality)
Lead, total (mg/L)	0.000881	100	n/a	n/a	31	n/a	n/a	0.005921	NP Inter(normality)
Lithium, total (mg/L)	0.03	100	n/a	n/a	6	n/a	n/a	0.005921	NP Inter(normality)
Mercury, total (mg/L)	0.000005	96	n/a	n/a	95.83	n/a	n/a	0.007269	NP Inter(NDs)
Molybdenum, total (mg/L)	0.002792	100	0.09353	0.02457	6	None	x^(1/3)	0.05	Inter
Selenium, total (mg/L)	0.0043	100	n/a	n/a	2	n/a	n/a	0.005921	NP Inter(normality)
Thallium, total (mg/L)	0.0002	100	n/a	n/a	61	n/a	n/a	0.005921	NP Inter(NDs)

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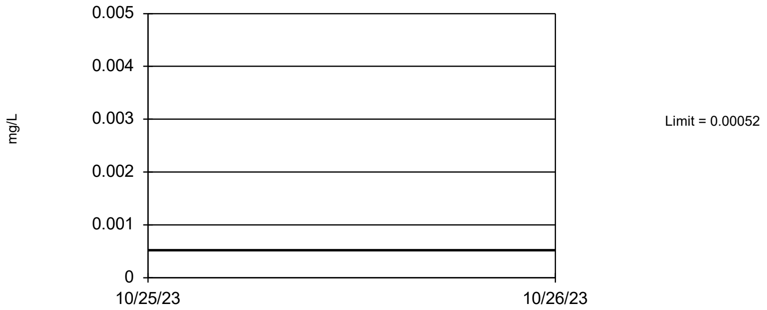
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 14% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Antimony, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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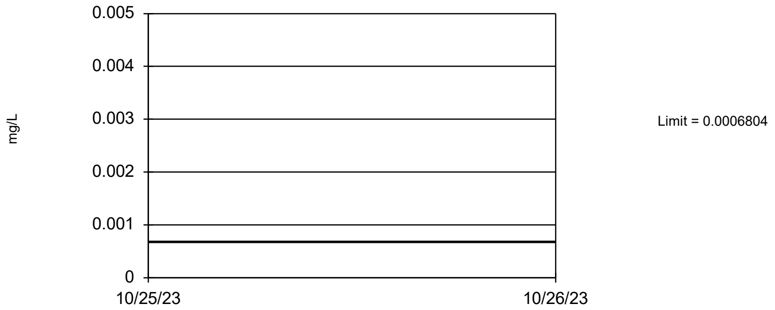
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary: Mean=0.000428, Std. Dev.=0.0001312, n=100. Normality test: Chi Squared @alpha = 0.01, calculated = 9.8, critical = 14.07. Report alpha = 0.05.

Constituent: Arsenic, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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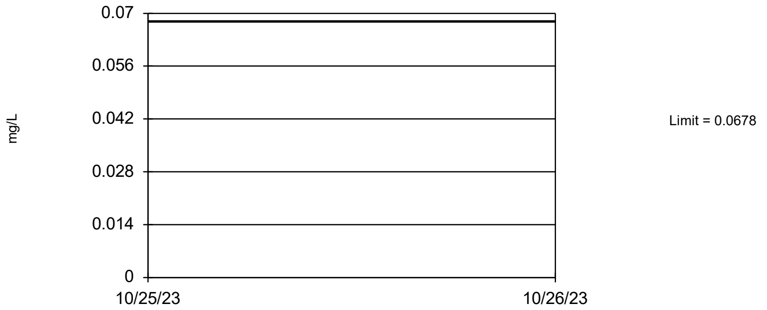
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Barium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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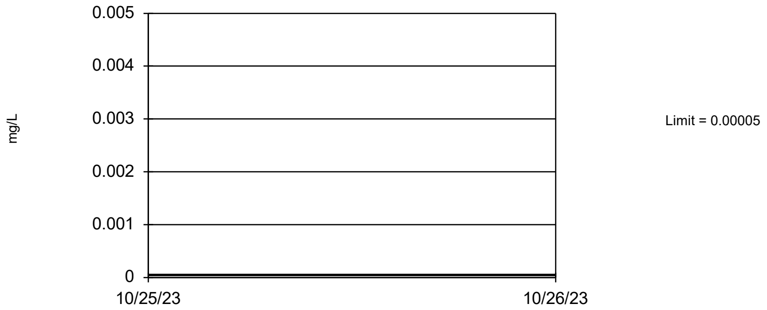
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 92 background values. 92.39% NDs. 95.12% coverage at alpha=0.01; 96.68% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.008924.

Constituent: Beryllium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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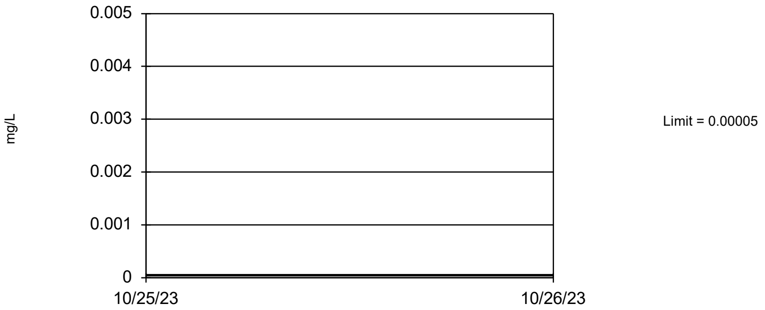
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 6% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Cadmium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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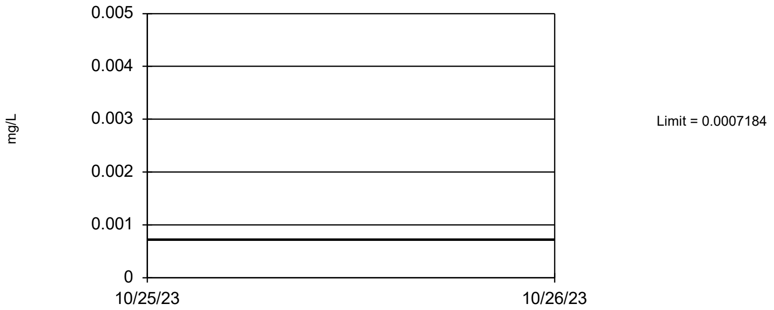
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.01808, Std. Dev.=0.004515, n=96, 1.042% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9768, critical = 0.965. Report alpha = 0.05.

Constituent: Chromium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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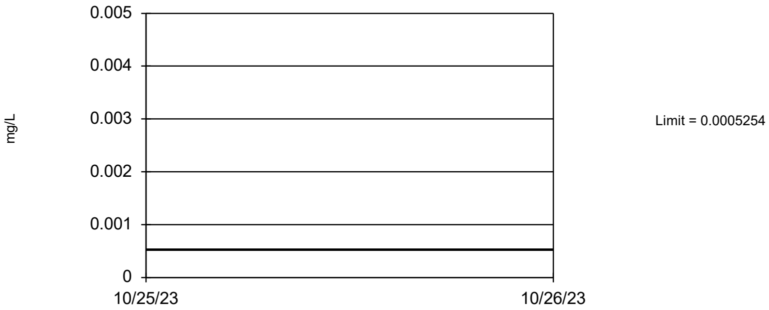
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on natural log transformation): Mean=-9.61, Std. Dev.=1.07, n=100, 4% NDs. Normality test: Chi Squared @alpha = 0.01, calculated = 9.2, critical = 14.07. Report alpha = 0.05.

Constituent: Cobalt, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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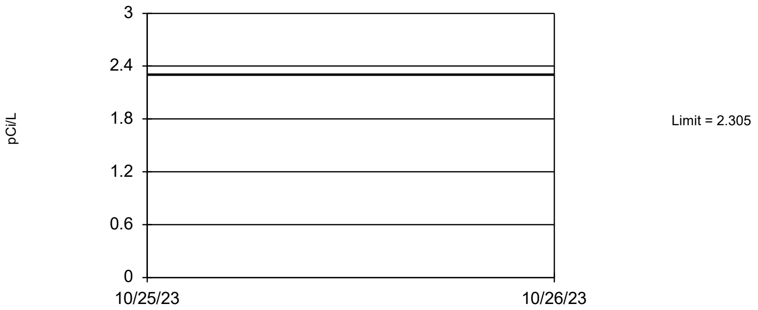
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.8695, Std. Dev.=0.3368, n=99. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9713, critical = 0.967. Report alpha = 0.05.

Constituent: Combined Radium 226 + 228 Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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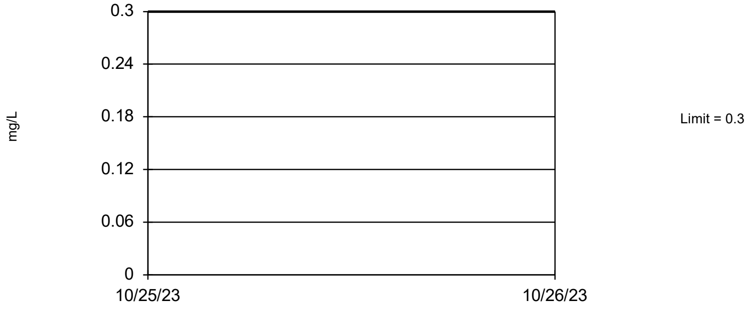
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 104 background values. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.004822.

Constituent: Fluoride, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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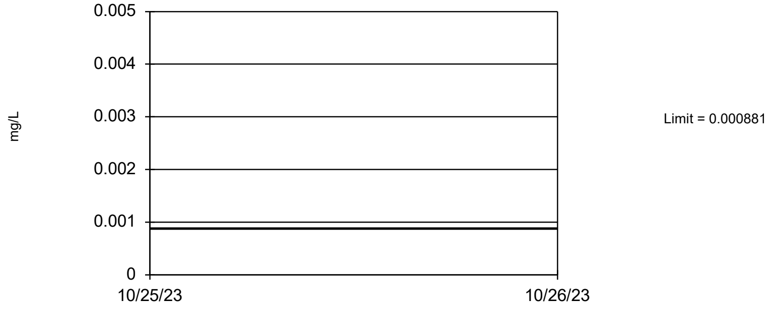
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 31% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Lead, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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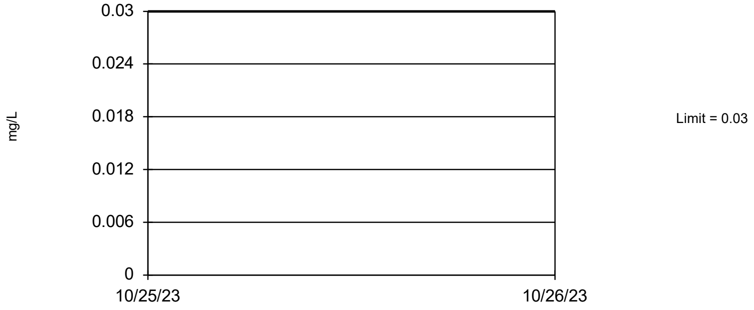
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 6% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Lithium, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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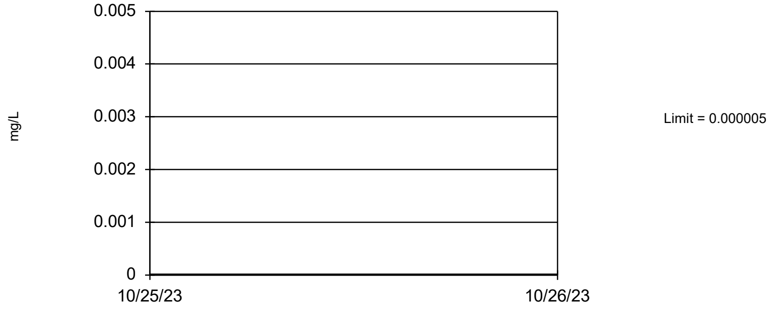
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 96 background values. 95.83% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.007269.

Constituent: Mercury, total Analysis Run 2/5/2024 11:38 AM View: Appendix IV - UTLs
Mountaineer BAP Data: Mountaineer BAP

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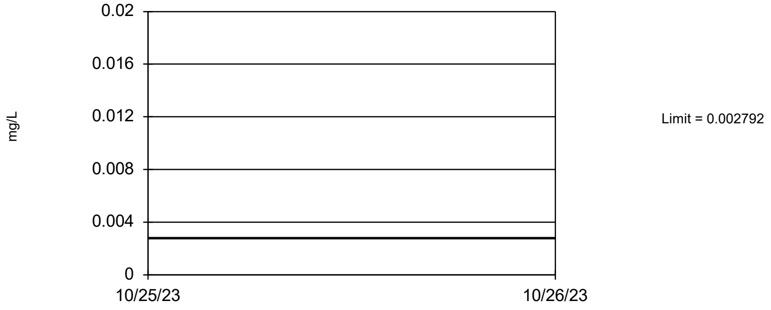
Tolerance Limit

Interwell Parametric



95% coverage. Background Data Summary (based on cube root transformation): Mean=0.09353, Std. Dev.=0.02457, n=100, 6% NDs. Normality test: Chi Squared @alpha = 0.01, calculated = 9.4, critical = 14.07.   Report alpha = 0.05.

Constituent: Molybdenum, total   Analysis Run 2/5/2024 11:38 AM   View: Appendix IV - UTLs
Mountaineer BAP   Data: Mountaineer BAP

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Tolerance Limit

Interwell Non-parametric

Non-parametric test used in lieu of parametric tolerance limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 100 background values. 2% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Selenium, total   Analysis Run 2/5/2024 11:38 AM   View: Appendix IV - UTLs
Mountaineer BAP   Data: Mountaineer BAP

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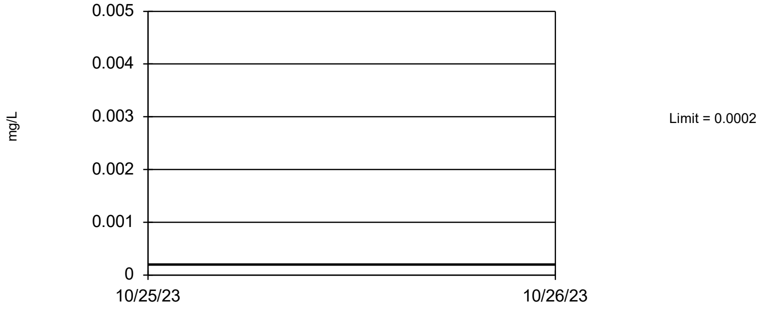
Tolerance Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 100 background values. 61% NDs. 95.51% coverage at alpha=0.01; 97.07% coverage at alpha=0.05; 99.41% coverage at alpha=0.5. Report alpha = 0.005921.

Constituent: Thallium, total   Analysis Run 2/5/2024 11:38 AM   View: Appendix IV - UTLs
Mountaineer BAP   Data: Mountaineer BAP

FIGURE E
GWPS

MOUNTAINEER BAP GWPS				
Constituent Name	**MCL**	**CCR Rule-Specified**	**Background Limit**	**GWPS**
Antimony, Total (mg/L)	0.006		0.00052	0.006
Arsenic, Total (mg/L)	0.01		0.00068	0.01
Barium, Total (mg/L)	2		0.068	2
Beryllium, Total (mg/L)	0.004		0.00005	0.004
Cadmium, Total (mg/L)	0.005		0.00005	0.005
Chromium, Total (mg/L)	0.1		0.00072	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.00053	0.006
Combined Radium, Total (pCi/L)	5		2.31	5
Fluoride, Total (mg/L)	4		0.3	4
Lead, Total (mg/L)	0.015		0.00088	0.015
Lithium, Total (mg/L)	n/a	0.04	0.03	0.04
Mercury, Total (mg/L)	0.002		0.000005	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0028	0.1
Selenium, Total (mg/L)	0.05		0.0043	0.05
Thallium, Total (mg/L)	0.002		0.0002	0.002

**GWPS = Groundwater Protection Standard*

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

FIGURE F

Confidence Intervals – Assessment

Confidence Interval Summary Table (Assessment Monitoring) - Significant Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 8/7/2024, 9:40 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Molybdenum, total (mg/L)	**MW-1921**	**0.4702**	**0.4029**	**0.1**	**Yes**	**16**	**0.4366**	**0.0517**	**0**	**None**	**No**	**0.01**	**Param.**

Confidence Interval Summary Table (Assessment Monitoring) - All Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 8/7/2024, 9:40 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	MW-1921	0.00011	0.00009	0.006	No	16	0.0001045	0.00002004	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1921	0.00159	0.00114	0.01	No	16	0.001364	0.0005531	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1921	0.06114	0.05421	2	No	16	0.05768	0.005325	0	None	No	0.01	Param.
Beryllium, total (mg/L)	MW-1921	0.00005	0.00002	0.004	No	14	0.00004493	0.00001307	85.71	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	MW-1921	0.00003523	0.00001463	0.005	No	16	0.00002556	0.00001464	37.5	Kaplan-Meier	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1921	0.0005189	0.0002075	0.1	No	16	0.0003845	0.0002674	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1921	0.000879	0.000588	0.006	No	16	0.0008203	0.0004987	0	None	No	0.01	NP (normality)
Combined Radium 226 + 228 (pCi/L)	MW-1921	1.483	0.6242	5	No	16	1.109	0.7557	0	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	MW-1921	1.088	0.9271	4	No	16	1.008	0.1236	0	None	No	0.01	Param.
Lead, total (mg/L)	MW-1921	0.0002193	0.00006827	0.015	No	16	0.0002349	0.0002344	18.75	Kaplan-Meier	ln(x)	0.01	Param.
Mercury, total (mg/L)	MW-1921	0.000005	0.000002	0.002	No	15	0.0000048	7.7e-7	93.33	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	**MW-1921**	**0.4702**	**0.4029**	**0.1**	**Yes**	**16**	**0.4366**	**0.0517**	**0**	**None**	**No**	**0.01**	**Param.**
Selenium, total (mg/L)	MW-1921	0.0002591	0.0001334	0.05	No	16	0.0001963	0.00009653	6.25	None	No	0.01	Param.
Thallium, total (mg/L)	MW-1921	0.0005	0.00005	0.002	No	16	0.000225	0.0002201	37.5	None	No	0.01	NP (normality)

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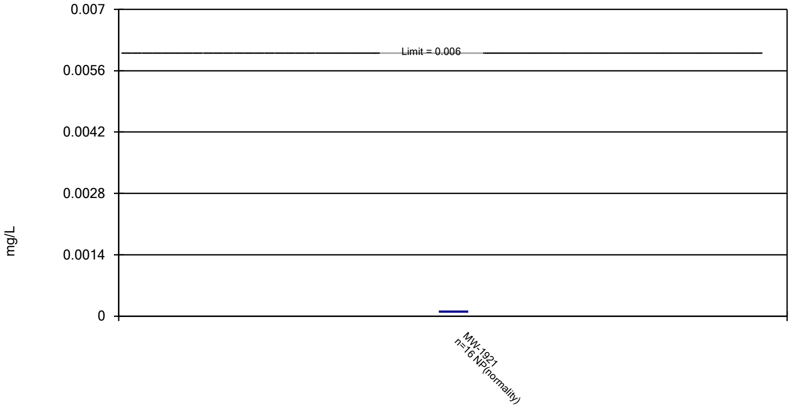
Non-Parametric Confidence Interval

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



Constituent: Antimony, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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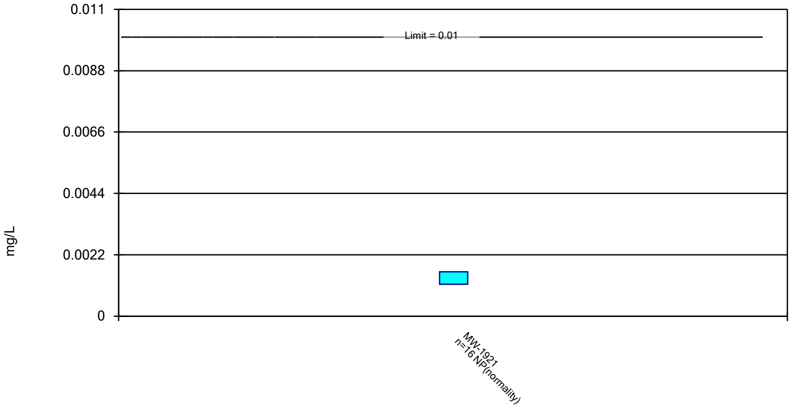
Non-Parametric Confidence Interval

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



Constituent: Arsenic, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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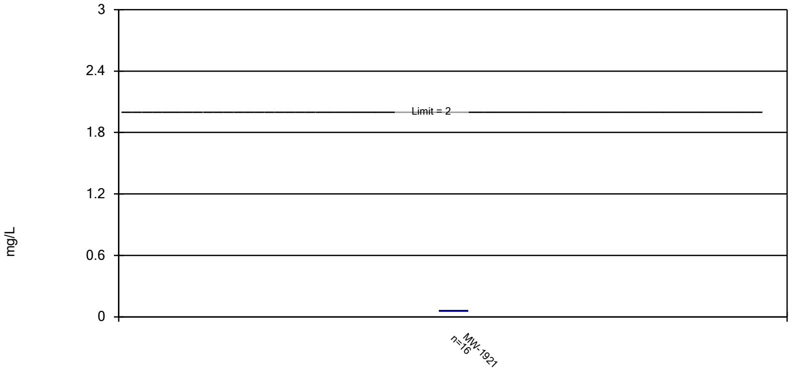
Parametric Confidence Interval

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



Constituent: Barium, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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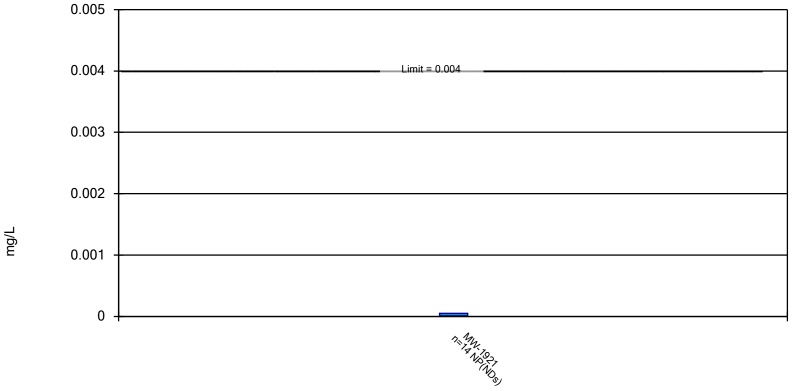
Non-Parametric Confidence Interval

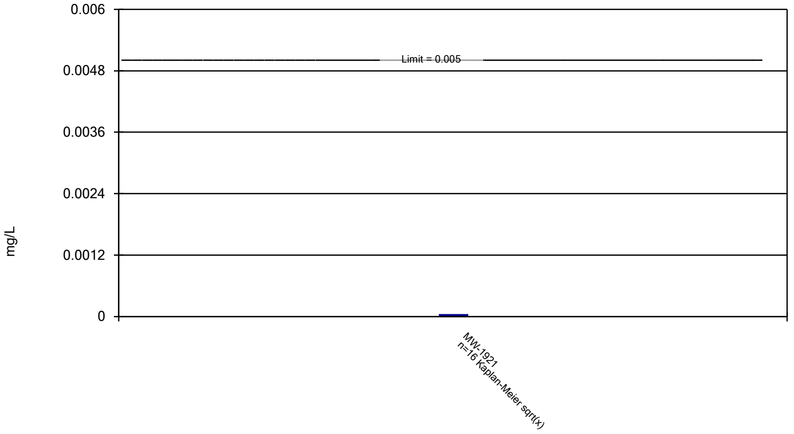
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Beryllium, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Parametric Confidence Interval

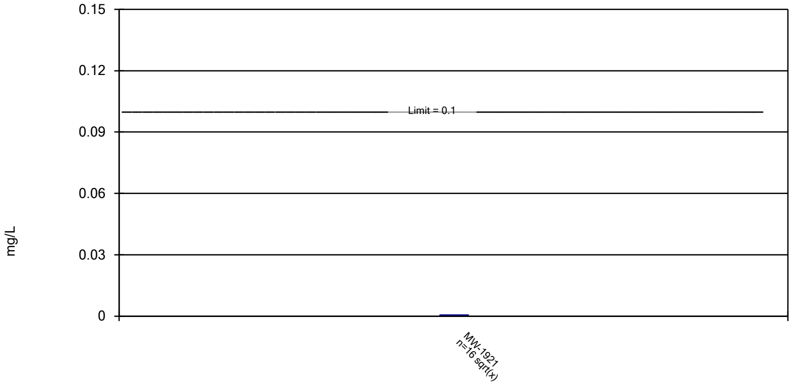
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Parametric Confidence Interval

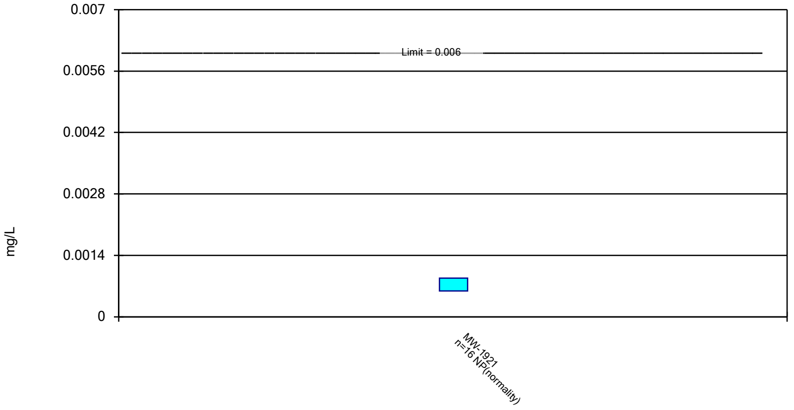
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Non-Parametric Confidence Interval

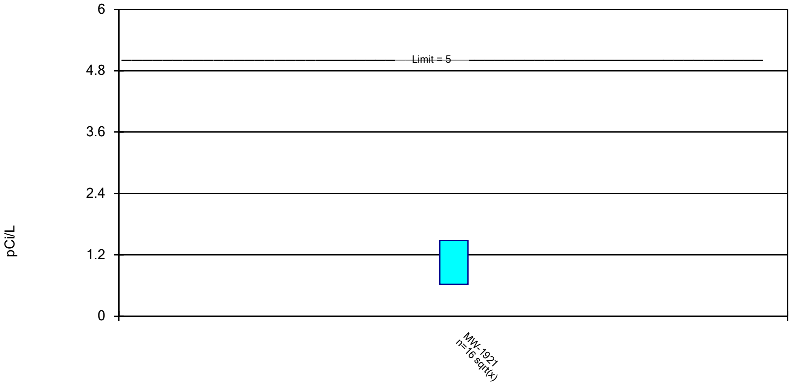
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cobalt, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Parametric Confidence Interval

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



Constituent: Combined Radium 226 + 228 Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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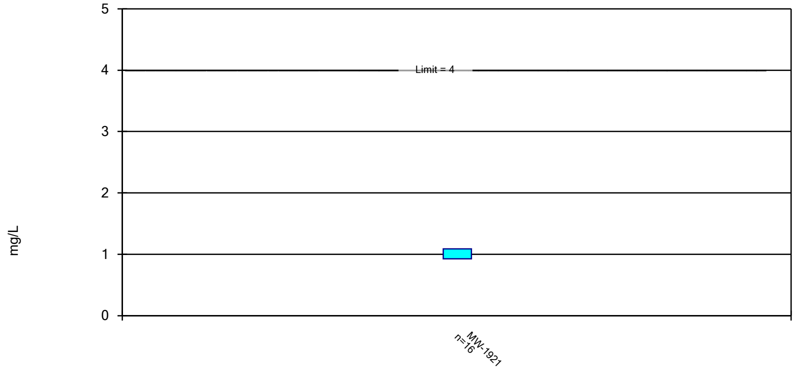
Parametric Confidence Interval

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



Constituent: Fluoride, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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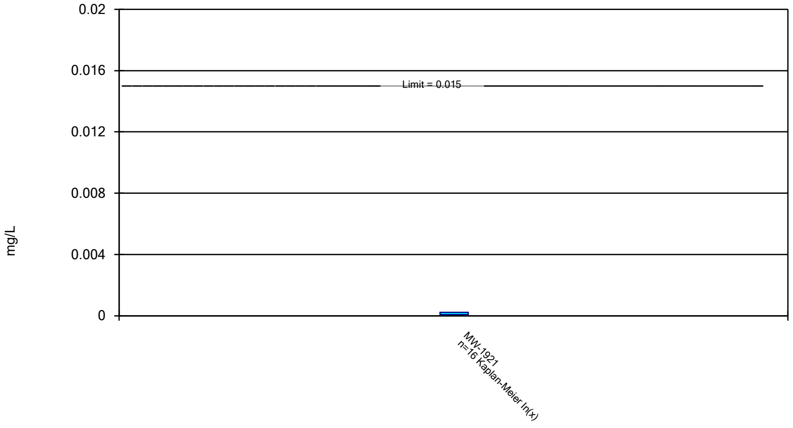
Parametric Confidence Interval

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

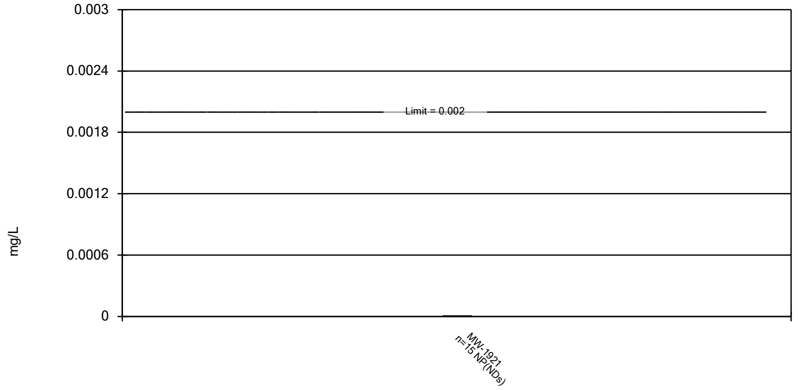


Constituent: Lead, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.20 Software licensed to Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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

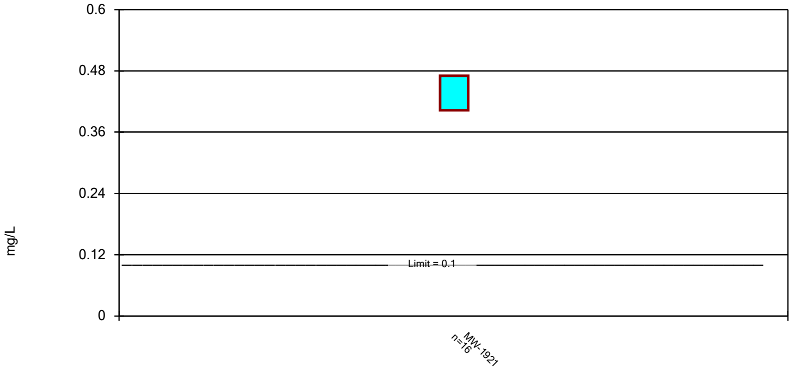


Constituent: Mercury, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.20 Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

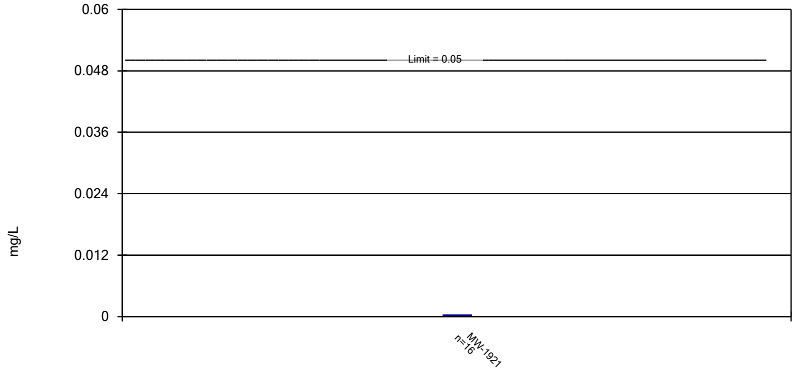


Constituent: Molybdenum, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.20 Software licensed to Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

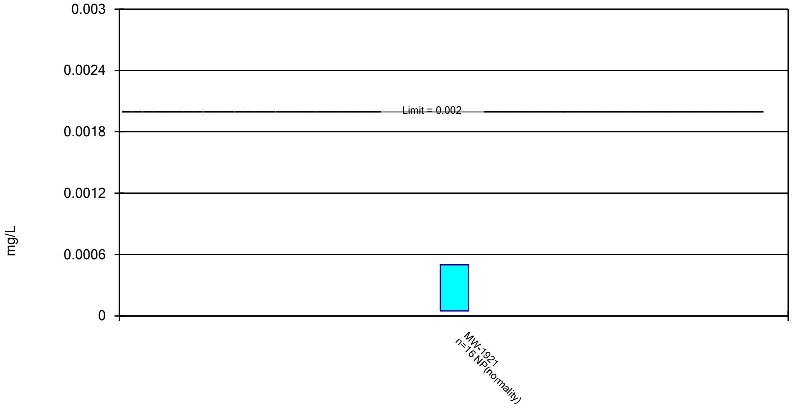


Constituent: Selenium, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.10.0.20 Software licensed to Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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



Constituent: Thallium, total Analysis Run 8/7/2024 9:39 AM View: Well MW-1921
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

FIGURE G

Confidence Intervals – Corrective Action

Confidence Interval Summary Table (Corrective Action) - All/Significant Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 8/7/2024, 9:43 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Lithium, total (mg/L)	**MW-1921**	**0.09577**	**0.08352**	**0.04**	**Yes**	**16**	**0.08934**	**0.009906**	**0**	**None**	**x^2**	**0.01**	**Param.**

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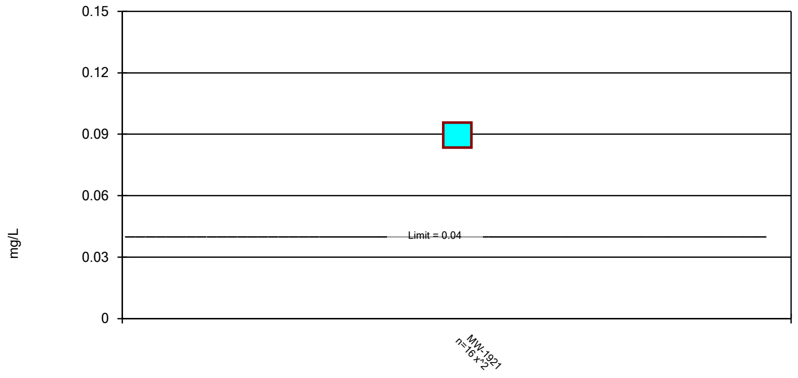
Parametric Confidence Interval, Corrective Action Mode

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



Constituent: Lithium, total   Analysis Run 8/7/2024 9:42 AM   View: Confidence Intervals - Lithium MW-1921

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

FIGURE H

Appendix IV Trend Tests

Trend Tests Appendix IV (MW-1921) - Significant Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/5/2024, 3:09 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Molybdenum, total (mg/L)	**MW-1921**	**-0.02413**	**-73**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**

Trend Tests Appendix IV (MW-1921) - All Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 8/5/2024, 3:09 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Lithium, total (mg/L)	MW-1921	0.001338	16	45	No	16	0	n/a	n/a	0.05	NP
Molybdenum, total (mg/L)	**MW-1921**	**-0.02413**	**-73**	**-45**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.05**	**NP**

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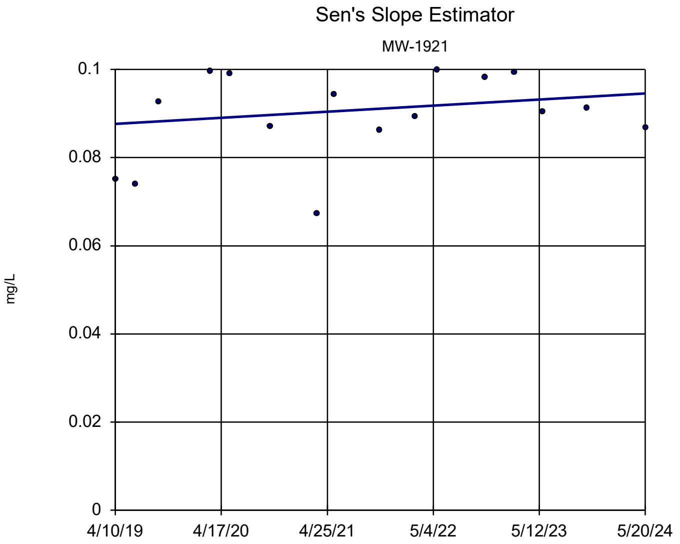


n = 16

Slope = 0.001338
units per year.

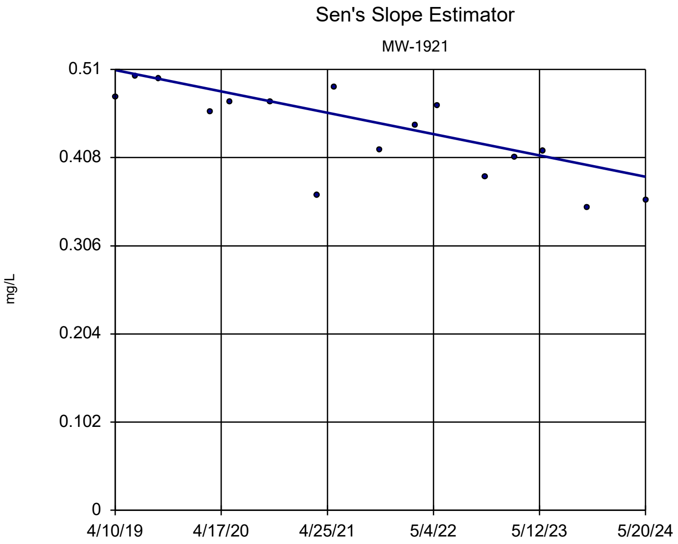
Mann-Kendall
statistic = 16
critical = 45

Trend not significant at 95%
confidence level
(α = 0.025 per
tail).

Constituent: Lithium, total   Analysis Run 8/5/2024 3:08 PM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.10.0.20 Software licensed to Groundwater Stats Consulting. UG



n = 16

Slope = -0.02413
units per year.

Mann-Kendall
statistic = -73
critical = -45

Decreasing trend
significant at 95%
confidence level
(α = 0.025 per
tail).

Constituent: Molybdenum, total   Analysis Run 8/5/2024 3:08 PM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Appendix 3

Alternate Source Demonstration completed this reporting period follows.

ALTERNATIVE SOURCE DEMONSTRATION REPORT

AEP Mountaineer Plant
Bottom Ash Ponds
Letart, West Virginia

Prepared for

American Electric Power
1 Riverside Plaza
Columbus, Ohio, 43215-2372

Prepared by

Geosyntec Consultants, Inc.
500 W. Wilson Bridge Rd, Suite 250
Worthington, Ohio 43085

Project: CHA8495B

June 2024

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ACRONYMS AND ABBREVIATIONS

ASD	Alternative Source Demonstration
BAP	bottom ash pond
bgs	below ground surface
CCR	coal combustion residuals
CFR	Code of Federal Regulations
EDX	energy-dispersive X-ray spectroscopy
EBAP	East Bottom Ash Pond
ft	feet
gpm	gallons per minute
GWPS	groundwater protection standard
LCL	lower confidence limit
mg/kg	milligrams per kilogram
µg/L	micrograms per liter
ORP	oxidation-reduction potential
QA/QC	quality assurance / quality control
redox	oxidation-reduction
SEM	scanning electron microscopy
SSL	statistically significant level
USEPA	United States Environmental Protection Agency
UCL	upper confidence limit
UTL	upper tolerance limit
WBAP	West Bottom Ash Pond
XRD	X-ray diffraction
XRF	X-ray fluorescence

1. INTRODUCTION AND SUMMARY

This Alternative Source Demonstration (ASD) report has been prepared to address statistically significant levels (SSLs) of arsenic in the groundwater monitoring network at the Mountaineer Power Plant's bottom ash ponds (BAPs) in New Haven, West Virginia.

This ASD follows the second semiannual corrective action monitoring event of 2023, which was conducted in October at the BAPs in accordance with Title 40, Section 257.98(a)(1) of the Code of Federal Regulations (CFR). The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. A confidence interval was constructed for each Appendix IV parameter at each compliance well, nature-and-extent well, and sentinel well. An SSL was attributed to a parameter if its lower confidence limit (LCL) or upper confidence limit (UCL) exceeded the groundwater protection standard (GWPS) (i.e., if the entire confidence interval exceeded the GWPS).

The GWPS was established as whichever was greater of: (1) the background concentration (determined via calculation of an upper tolerance limit [UTL]), or (2) the maximum contaminant level (MCL) and risk-based level specified in 40 CFR 257.95(h)(2). The following SSLs were identified at the Mountaineer BAPs (Geosyntec 2024):

- The LCL for arsenic exceeded the groundwater protection standard (GWPS) of 0.0100 milligrams per liter (mg/L) at nature and extent wells MW-1805 (0.0226 mg/L) and MW-1922D (0.411 mg/L), both of which are screened in the underlying Monongahela Formation bedrock.
- The UCL for lithium exceeded the GWPS of 0.0400 mg/L at MW-1605D (0.0652 mg/L), MW-1605S (0.0656 mg/L), MW-1606D (0.119 mg/L), MW-1606S (0.0967 mg/L), MW-1607D (0.0982 mg/L), MW-1607S (0.106 mg/L): nature and extent wells MW-1922S (0.0583 mg/L), MW-1923 (0.198 mg/L), MW-1924 (0.105 mg/L), and MW-1925 (0.0844 mg/L), all of which are screened in the sand and gravel aquifer.[1]

Corrective measures are currently being completed at the BAPs for identified lithium SSLs; therefore, alternative sources were not evaluated for lithium in this demonstration.

1.1 CCR Rule Requirements

In accordance with the United States Environmental Protection Agency (USEPA) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments, 40 CFR 257.95(g)(3)(ii) states the following:

> The owner or operator may demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any

---

[1] The LCL for lithium also exceeded the GWPS (0.0400 mg/L) at MW-1921 (0.0832 mg/L). It was previously noted that nature-and-extent well MW-1921 does not accurately represent groundwater conditions downgradient of the BAPs (Geosyntec 2023a). Statistical analyses were completed for groundwater data at this location to support corrective action monitoring and will not be addressed in this ASD.

demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified by a qualified professional engineer.

Pursuant to 40 CFR 257.95(g)(3)(ii), Geosyntec Consultants, Inc. (Geosyntec) has prepared this ASD report to document whether the SSLs identified for arsenic are from a source other than the BAPs.

1.2 Demonstration of Alternative Sources

An evaluation was completed to assess possible alternative sources of arsenic to which identified SSLs could be attributed. Alternative sources were identified among the following five types:

- ASD Type I: Sampling Causes
- ASD Type II: Laboratory Causes
- ASD Type III: Statistical Evaluation Causes
- ASD Type IV: Natural Variation
- ASD Type V: Anthropogenic Sources

A demonstration was conducted to assess whether the SSLs of arsenic at MW-1805 and MW-1922D were based on Type IV (Natural Variation) causes and not caused by a release from the BAPs.

2. SUMMARY OF SITE CONDITIONS

Brief descriptions of the site construction, geology, and hydrogeology are provided below.

2.1 Site Construction and Location

The BAPs CCR unit consisted of two ponds of roughly equal size (East BAP [EBAP] and West BAP [WBAP]) with a combined surface area of approximately 28 acres. The former WBAP had a normal pool area of 14.1 acres and the former EBAP had a normal pool area of 13.9 acres (Arcadis 2016). The BAPs were constructed between 1978 and 1980 with a 3-foot-thick clay liner. Removal of CCR and potentially impacted underlying soil from the BAPs to support closure was completed in May 2023. The former WBAP was repurposed as a settling pond and the former EBAP was repurposed as a settling pond and pyrite pond (AEP 2023). The selected groundwater remedy was initiated in 2023.

Several non-CCR-regulated ponds are located immediately south of the BAPs and, together with the BAPs, form the Site Pond Complex (**Figure 1**). An electrical substation is located northwest of the BAPs. A former Philip Sporn (Sporn) bituminous coal mining facility is located to the west of the BAPs. A 60-acre fly ash pond associated with the former Sporn Power Plant is located to the northeast of the BAPs (**Figure 1**).

2.2 Regional Geology

Beneath the clay liner, the former BAPs are immediately underlain by Quaternary alluvial deposits consisting of clay, silt, sand, and gravel. The unconsolidated alluvial deposits consist of the following two units (Sanborn Head 2020):

- Alternating horizons of clay and clayey silt, with thicknesses ranging from 0 to 30 feet (ft) below ground surface (bgs)
- Sand, generally medium-to-coarse-grained, with some gravel horizons, which generally coarsens with depth from about 15 to 100 ft bgs

The unconsolidated alluvial sand and gravel deposits are underlain by bedrock consisting of Pennsylvanian sandstones, shales, limestones, and coal of the Monongahela group (Arcadis 2016). The wells within the corrective action monitoring network are screened in the unconsolidated sand and gravel aquifer, except MW-1805 and MW-1922D, which are both screened in the underlying Monongahela group, which is shown in the boring logs as a combination of sandstone, coal, and shale (**Attachment A**).

2.3 Regional Hydrogeology

Five groundwater pumping wells were installed at the site in 2008 and are currently active (**Figure 1 and Attachment B**). The groundwater pumping wells are screened within the unconsolidated sand and gravel aquifer unit. Wells West 1 and East 1 provide cooling water and process water for the site and have pumping capacities of approximately 930 to 950 gallons per minute (gpm) and 550 to 575 gpm, respectively. Historically, wells 4, 5, and 6 are pumped at lower flow rates than West 1 and East 1 and are operated on an intermittent, as-needed basis.

The groundwater flow direction at the site is influenced by operation of the pumping wells. Extraction of groundwater from the production wells depresses groundwater elevations near the wells in the unconsolidated sand and gravel unit and affects the groundwater flow patterns in the vicinity of the BAPs. A groundwater modeling study, included as Appendix C of the Groundwater Monitoring Well Network Evaluation (Arcadis 2016), was completed to better understand the effect of the pumping wells on groundwater flow under normal conditions (i.e., consistent pumping at wells West 1 and East 1). A potentiometric map generated using these simulated conditions shows that flow is naturally directed toward the Ohio River but is influenced by a cone of depression resulting from operation of the pumping wells (**Attachment B**).

3. ALTERNATIVE SOURCE DEMONSTRATION

The proposed alternative sources for arsenic are described below.

3.1 Proposed Alternative Source

Described below are the ASD evaluation methods, the proposed alternative source of arsenic at nature and extent wells MW-1805 and MW-1922D, and the future groundwater sampling requirements.

An initial review of site geochemistry, site historical data, and laboratory quality assurance / quality control (QA/QC) data did not identify alternative sources for arsenic due to Type I (sampling), Type II (laboratory), or Type III (statistical evaluation) issues. A preliminary review of site geochemistry did not identify any Type V (anthropogenic) causes. Therefore, an evaluation was conducted to assess whether the arsenic SSLs can be attributed to natural variation, which is a Type IV cause.

3.1.1 Evidence: Arsenic Distribution

If concentrations of arsenic were higher at the former BAPs than in the wells of interest, it would indicate that the BAPs could be the source. However, the BAP liquids contain lower concentrations of arsenic than the groundwater at the wells of interest, making the former BAPs an unlikely source. In 2016 and 2021, the average arsenic concentrations in the BAP surface water samples were two orders of magnitude lower than the average concentration observed at MW-1922D and approximately one order of magnitude lower than the average concentration observed at MW-1805 (**Table 1**). These observed arsenic distributions indicate that a source other than the BAPs is responsible for the observed concentrations at the wells of interest.

Downgradient sand and gravel aquifer wells MW-1604S, MW-1604D, and nature and extent well MW-1922S are in the immediate vicinity of bedrock wells MW-1805 and MW-1922D (**Figure 1**). Reported arsenic concentrations in groundwater from these locations are consistently lower than they are in MW-1805 and MW-1922D groundwater (**Figure 2**). If elevated arsenic concentrations were a result of a release from the BAPs, we would expect arsenic concentrations to be higher at wells screened in the more permeable sand and gravel lithology below the BAPs than in the underlying bedrock (**Figure 3**). This assumption is supported by downward vertical gradients that are periodically observed from the sand and gravel aquifer into the underlying bedrock, which could permit groundwater flow from the unconsolidated material into the bedrock under downward gradient conditions (**Table 2**). The lack of elevated arsenic in shallow sand and gravel aquifer monitoring wells suggests that an alternative source of arsenic is impacting deeper bedrock wells MW-1805 and MW-1922D.

3.1.2 Evidence: Bedrock Sampling and Analyses

Analyses of bedrock samples from MW-1805 and MW-1922D indicate that arsenic is present in the solid phase of the screened interval of both wells. Mineralogical analyses of these samples revealed the presence of a suite of minerals known to be associated with arsenic. These aquifer materials represent an alternative natural source of arsenic to groundwater because groundwater must interact with these aquifer solids during the process of flowing towards the monitoring wells of interest.

Bedrock samples were collected on December 21, 2022, from cores collected during the prior installation of MW-1805 and MW-1922D. Four samples were collected from the screened interval of MW-1805 and two samples were collected from the screened interval of MW-1922D. The sample depths and associated lithologies, as documented in the boring logs (**Attachment A**) for each bedrock sample, are provided on **Table 3**. The samples were submitted for analyses of total arsenic; mineralogy analysis via X-ray diffraction (XRD); bulk geochemistry analysis via X-ray fluorescence (XRF); and scanning electron microscopy (SEM) analysis with energy-dispersive X-ray spectroscopy (EDX). The laboratory report for total arsenic analyses is provided as **Attachment C**. The laboratory analytical report for the XRD, XRF, and SEM-EDX analyses is provided as **Attachment D**.

Arsenic was detected in all bedrock samples analyzed, with reported concentrations ranging from 2.9 milligrams of arsenic per kilogram of rock (mg/kg) to 56 mg/kg (**Table 3**). Arsenic concentrations exceeding 50 mg/kg were found to be associated with shale and coal lithologies observed within the screened interval of MW-1805 (122 and 128 ft bgs, respectively). Therefore, groundwater enters these wells through aquifer material that contains appreciable arsenic concentrations within the solid phase.

Elevated arsenic concentrations in MW-1805 bedrock are attributed to the presence of coal and iron-bearing minerals that were identified within the bedrock solids via XRD and SEM analyses (**Table 4**). Arsenic is often associated with coal (Yudovich and Ketris 2005). Based on lithologic descriptions (**Attachment A**), coal comprises the amorphous component (84 percentage by weight [wt.%] of the total sample) of the MW-1805 sample collected from 128 ft bgs. Ferrous (Fe^{2+}) iron minerals pyrite and siderite were also observed in MW-1805 samples (**Table 4**). Pyrite is an iron-sulfide mineral known to be commonly associated with arsenic via co-precipitation processes (Brannon and Patrick 1987, Moore et al. 1988, O'Day et al. 2004). Pyrite was detected in every sample collected from MW-1805, at abundances up to 4 wt.% (**Table 4; Figure 4**). Siderite, an iron-carbonate mineral, was reported in three of the four samples collected from MW-1805 (**Table 4; Figure 5**).

Previous ASDs completed for arsenic at MW-1805 and MW-1922D proposed iron mineral thermodynamic instability and dissolution as a likely mechanism for elevated aqueous arsenic concentrations (Geosyntec 2022, Geosyntec 2023b, Geosyntec 2023c). Ferrous (Fe^{2+}) iron minerals such as sulfides (pyrite) and carbonates (siderite) are capable of sequestering arsenic through sorption and/or co-precipitation (Gross and Low 2013). Dissolution or alteration of these minerals due to changing oxidation-reduction (redox) conditions would trigger dissolution of adsorbed and/or co-precipitated arsenic. These hypotheses are supported by thermodynamic modeling, which indicates that MW-1805 groundwater typically plots near the stability boundaries between soluble iron and insoluble iron oxide ($Fe(OH)_3$), siderite, and pyrite (**Figure 6**). XRD and SEM-EDX findings verify the presence of both siderite and pyrite in MW-1805 samples, supporting the conclusion that dynamic equilibrium conditions exist within MW-1805 groundwater.

Under the dynamic equilibrium conditions described above, arsenic concentrations in MW-1805 groundwater would be expected to correlate strongly with dissolved iron concentrations because arsenic would mobilize from iron minerals as they dissolve or alter. While a dissolved iron sample was not collected during the second semiannual (October 2023) sampling event, historical total arsenic and dissolved iron concentrations have fluctuated in a similar manner, suggesting that this arsenic-iron relationship occurs at MW-1805 (**Figure 7**), and these parameters are strongly correlated (R^2 value of 0.93) (**Figure 8**). Furthermore, the arsenic concentration changes correlate strongly with changes in oxidation-reduction potential (ORP) (**Figure 9**). These relationships indicate that aqueous arsenic concentrations at MW-1805 are strongly linked to redox changes, and they support the proposed mechanism of arsenic association with iron minerals and subsequent mobilization of arsenic as iron minerals dissolve or alter.

While coal, pyrite, and siderite were not detected in the XRD or SEM analyses for MW-1922D, arsenic in MW-1922D bedrock is attributable to the presence of mica/clay minerals and iron oxyhydroxide minerals.

A potential source of arsenic to groundwater within the screened interval of MW-1922D is the chemical weathering of mica grains to clay minerals. Previous studies have shown that mica separates from sandstone samples may contain up to five times greater amounts of solid-phase arsenic than the remainder of the bulk sample (Dowling et al. 2002). Chemical weathering of mica grains to secondary clay mineral cements (a common diagenetic reaction in sandstones) would result in dissolution of arsenic from the crystal structure of micas and/or from sorption sites on mica surfaces.

These mechanisms have been invoked as processes responsible for high concentrations of aqueous arsenic sources in some aquifers (Dowling et al. 2002, Raju 2022). SEM imaging of the 104.5 ft bgs sample from MW-1922D revealed the presence of mica grains that appear to be frayed and experiencing exfoliation along layer planes (**Figure 10**), two common indicators of chemical weathering in micas.

Further support of chemically weathered mica is provided by the presence of secondary clay minerals (kaolinite), which are abundant throughout the sample and appear to be precipitating immediately adjacent to mica grains (**Figure 10**). Kaolinite is a known weathering product of mica and frequently precipitates immediately adjacent to mica grains (Singh and Gilkes 1991, Robertson and Eggleton 1991).

Another potential source of arsenic in MW-1922D bedrock is iron oxyhydroxide minerals. Iron-oxide and oxyhydroxide minerals hematite and goethite were both detected in the MW-1922D sample collected from 111 ft bgs (**Table 4**). Arsenic association with iron-oxide and oxyhydroxide minerals is well documented (Welch et al. 2000).

3.2 Sampling Requirements

This ASD indicates that the arsenic SSLs are not due to a release from the Mountaineer BAPs. Therefore, a corrective measures assessment for arsenic is not necessary. Groundwater monitoring at the unit will continue in accordance with the most recent Corrective Action Monitoring Plan (Sanborn Head 2023).

4. CONCLUSIONS AND RECOMMENDATIONS

The preceding information serves as the ASD prepared in accordance with 40 CFR 257.95(g)(3)(ii) and supports the position that the SSLs for arsenic identified during lithium corrective action monitoring in October 2023 were not due to a release from the BAPs. Instead, the arsenic SSLs should be attributed to natural variation in the underlying geology. Therefore, no further action for arsenic is warranted and the BAPs will continue corrective action groundwater monitoring due to the presence of elevated lithium concentrations, in accordance with 40 CFR 257.98(a)(1). Certification of this ASD by a qualified professional engineer is provided in **Attachment E**.

5. REFERENCES

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TABLES

Table 1 - Arsenic Groundwater and Pond Water Summary Table
Mountaineer Bottom Ash Ponds

Location	Sample ID	Sample Date	Total Arsenic (µg/L)	Average Arsenic (µg/L)
BAP (East)	EBAP	6/15/2016	1.69	1.8
	EBAP	6/21/2016	2.35	
	EBAP	8/24/2016	2.86	
	EBAP	12/7/2016	2.44	
	BAP (East)-20210329	3/29/2021	0.67	
	BAP (East)-20210518	5/18/2021	0.79	
BAP (West)	WBAP IN	6/15/2016	8.6	6.65
	WBAP MID	6/15/2016	5.49	
	WBAP Out	6/15/2016	5.27	
	WBAP IN	6/21/2016	8.47	
	WBAP MID	6/21/2016	5.9	
	WBAP OUT	6/21/2016	5.45	
	WBAP IN	8/24/2016	7.65	
	WBAP MID	8/24/2016	6.73	
	WBAP OUT	8/24/2016	5.81	
	WBAP IN	12/7/2016	8.43	
	WBAP MID	12/7/2016	8.25	
	WBAP OUT	12/7/2016	7.86	
	BAP (West)-20210329	3/29/2021	4.39	
	BAP (West)-20210518	5/18/2021	4.85	
MW-1805	MW-1805-20190410	4/10/2019	20.3	40.5
	MW-1805-20190619	6/19/2019	66.3	
	MW-1805-20190910	9/10/2019	70.4	
	MW-1805-20200310	3/10/2020	11.4	
	MW-1805-20200514	5/14/2020	56	
	MW-1805-20201009	10/9/2020	80.9	
	MW-1805-20210325	3/25/2021	74.2	
	MW-1805-20210519	5/19/2021	69.5	
	MW-1805-20211026	10/26/2021	37.3	
	MW-1805-20220302	3/2/2022	19.4	
	MW-1805-20220520	5/20/2022	10.9	
	MW-1805-20221104	11/4/2022	40.2	
	MW-1805-20230214	2/14/2023	15.2	
	MW-1805-20230522	5/22/2023	8.77	
	MW-1805-20231025	10/25/2023	27.4	
MW-1922D	MW-1922D-20190409	4/9/2019	323	585
	MW-1922D-20190619	6/19/2019	716	
	MW-1922D-20190910	9/10/2019	839	
	MW-1922D-20200311	3/11/2020	1240	
	MW-1922D-20200519	5/19/2020	522	
	MW-1922D-20201008	10/8/2020	1040	
	MW-1922D-20210325	3/25/2021	546	
	MW-1922D-20210520	5/20/2021	494	
	MW-1922D-20211027	10/27/2021	456	
	MW-1922D-20220303	3/3/2022	478	
	MW-1922D-20220523	5/23/2022	562	
	MW-1922D-20221104	11/4/2022	384	
	MW-1922D-20230215	2/15/2023	443	
	MW-1922D-20230522	5/22/2023	408	
	MW-1922D-20231026	10/25/2023	323	

Notes:

1. All results are shown in micrograms per liter (µg/L).

BAP - Bottom Ash Pond

Table 2 - Vertical Gradient Calculations
Mountaineer Bottom Ash Ponds

Date	Groundwater Elevation			MW-1922S to MW-1922D			MW-1922S to MW-1805		
	MW-1805	MW-1922D	MW-1922S	Head Change (ft)	Vertical Gradient		Head Change (ft)	Vertical Gradient	
4/8/2019	-	547.7	547.89	0.19	0.00634	down	-	-	-
6/17/2019	546.45	549	547.86	-1.14	-0.0381	up	1.41	0.0272	down
9/9/2019	545.02	477.42	507.82	-	-	-	-	-	-
3/9/2020	-	545.57	545.52	-0.05	-0.00167	up	-	-	-
5/12/2020	546.88	546.98	546.96	-0.02	-0.00067	up	0.08	0.0015	down
10/5/2020	544.85	544.96	544.99	0.03	0.00100	down	0.14	0.0027	down
3/18/2021	543.38	543.48	543.42	-0.06	-0.00200	up	0.04	0.0008	down
5/12/2021	533.27	543.31	543.31	0.00	0.00000	-	-	-	-
10/25/2021	542.33	542.21	542.3	0.09	0.00300	down	-0.03	-0.0006	up
2/28/2022	542.63	542.71	542.62	-0.09	-0.00300	up	-0.01	-0.0002	up
5/16/2022	544.53	544.57	544.44	-0.13	-0.00434	up	-0.09	-0.0017	up
10/31/2022	543.18	543.29	543.22	-0.07	-0.00234	up	0.04	0.0008	down
5/19/2023	542.92	542.96	542.83	-0.13	-0.00434	up	-0.09	-0.0017	up
10/24/2023	538.94	541.58	548.15	-	-	-	-	-	-
Top of Screen Elevation	469.049	491.016	520.972						
Middle of Screen Elevation	464.05	486.02	515.97						
Bottom of Screen Elevation	459.05	481.02	510.97						
Length to MW-1922S Screen	51.92	29.95	-						

Notes:

1. Anomalous groundwater elevations were excluded from calculations - MW-1922D and MW-1922S from September 2019, MW-1805 from May 2021, and MW-1922S from October 2023.

2. Groundwater elevation data was generated by Arcadis and provided to Geosyntec.

ft: feet

Table 3 - Bedrock Sampling Details and Arsenic Concentrations
Mountaineer Bottom Ash Ponds

Monitoring Well	Depth of Well	Screened Interval	Sample Depth	Arsenic (mg/kg)	Geologic Material Sampled
MW-1805	133.5	123.5-133.5	122	55 B	Dark grey laminated silty clay shale
			124.5	4.6 B	Light grey sandstone
			128	56 B	Black coal with pyritic clay-rich zones
			130.5	2.9 B	Dark grey fractured silty clay shale
MW-1922D	113.5	103.5-113.5	104.5	4.5 B	Grey sandstone
			111	5.2 B	Grey sandstone

Notes:

1. Samples were collected on December 21, 2022 from previously drilled core associated with monitoring well installation.
2. All depths are shown in units of feet below ground surface.
3. Geologic descriptions included in the table were taken from field boring logs and verified during sample collection in December 2022.

B: Compound was found in the blank and sample. Method blank detections were less than 10% of the reported sample values and are not expected to affect data quality.

mg/kg: milligrams per kilograms.

Table 4 - Summary of X-Ray Diffraction Results
Mountaineer Bottom Ash Ponds

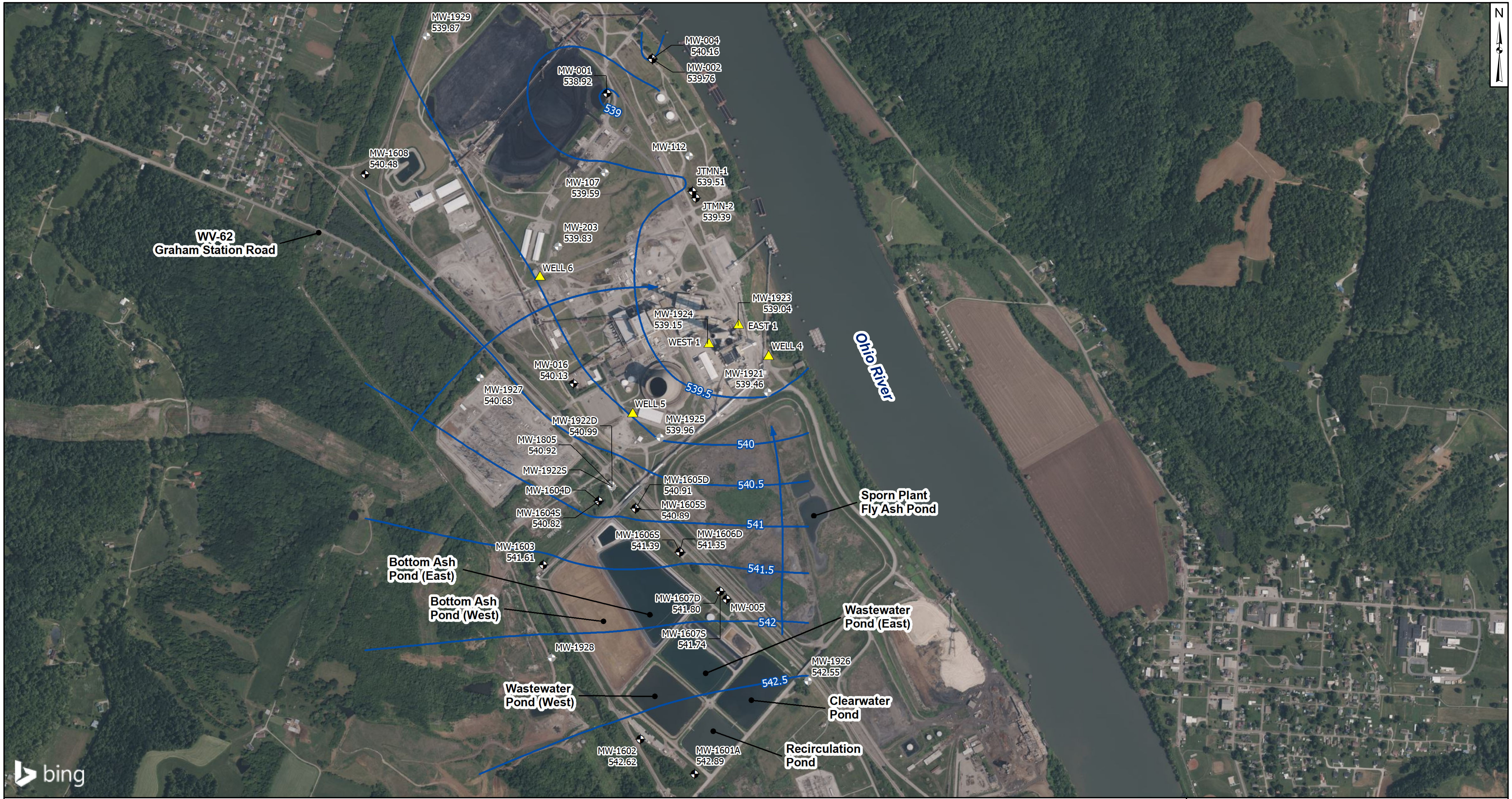
Well ID			**MW-1805**	**MW-1805**	**MW-1805**	**MW-1805**	**MW-1922D**	**MW-1922D**
Depth (ft bgs)			**122**	**124.5**	**128**	**130.5**	**104.5**	**111**
Boring Log Description			**Silty Clay Shale**	**Sandstone**	**Coal with clay-rich zones**	**Silty Clay Shale**	**Sandstone**	**Sandstone**
Mineral/Compound	**Formula**	**Mineral Type**	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)
Quartz	SiO_2	Silicate	24.0	73.0	4.0	32.0	86.0	85.0
Plagioclase	$(Na,Ca)AlSi_3O_8$	Feldspar	5.0	7.0	-	7.0	4.0	3.0
Potassium-Feldspar	$KAlSi_3O_8$	Feldspar	1.0	8.0	-	1.0	1.0	2.0
Calcite	$CaCO_3$	Carbonate	<0.5	<0.5	-	-	0.5	-
Siderite	$FeCO_3$	Carbonate	2.0	<0.5	-	1.5	-	-
Pyrite	FeS_2	Sulfide	2.0	<0.5	4.0	0.5	-	-
Kaolinite	$Al_2Si_2O_5(OH)_4$	Clay	11.0	7.5	6.0	10.0	6.0	6.0
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	Clay	16.0	0.5	-	14.0	-	<0.5
Illite/Mica	$KAl_2(AlSi_3O_{10})(OH)_2$	Clay/Mica	39.0	4.0	1.0	33.0	2.5	3.0
Mixed-Layer Illite/Smectite	$K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2$	Clay	2.0	-	1.0	1.0	<0.5	-
Goethite	$FeO(OH)$	Oxyhydroxide	-	-	-	-	-	0.5
Hematite	Fe_2O_3	Oxide	-	-	-	-	-	0.5
Amorphous Material			-	-	84.0	-	-	-
Clay & Mica Total			68	12	8	58	9	10

Notes

1. The weight percent quantities indicated have been normalized to a sum of 100%
2. Sample depths are shown in feet below ground surface (ft bgs).
3. Values shown with a less-than symbol indicate the mineral was detected below the quantification limit of 0.5 weight percentage (wt%).

-: Mineral was not detected above the detection limit

FIGURES



Legend

- ◆ CCR Network Monitoring Wells
- ◇ Nature and Extent Monitoring Wells
- △ AEP-Owned Pumping Well
- — Groundwater Elevation Contour
- → Approximate Groundwater Flow Direction

Notes

1. Monitoring well coordinates and water level data (collected on October 23 and 24, 2023) provided by AEP.
2. Wells MW-005 (543.75 ft MSL), MW-1604D (541.04 ft MSL), and MW-1922S (547.52 ft MSL) were not used for contouring due to anomalous readings.
3. Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis 2016) provided by AEP.
4. Groundwater elevation units are feet above mean sea level.
5. Only monitoring wells were used to generate groundwater contours. Water elevations were not collected for the pumping wells.
6. No groundwater was present at MW-1928 and MW-112 during the October 2023 sampling event.
7. Normal lower pool elevation of the Ohio River at Racine Lock and Dam is 539.5 ft amsl (USACE).
8. Intermittent use of AEP-owned pumping wells for plant activities impact water levels in the vicinity. In general, shallow groundwater beneath the plant flows northeast toward the Ohio River.
9. Aerial imagery provided by Bing.

CCR: Coal combustion residuals
USACE: United States Army Core of Engineers

Potentiometric Surface Map - Uppermost Aquifer
October 2023

Mountaineer Bottom Ash Ponds

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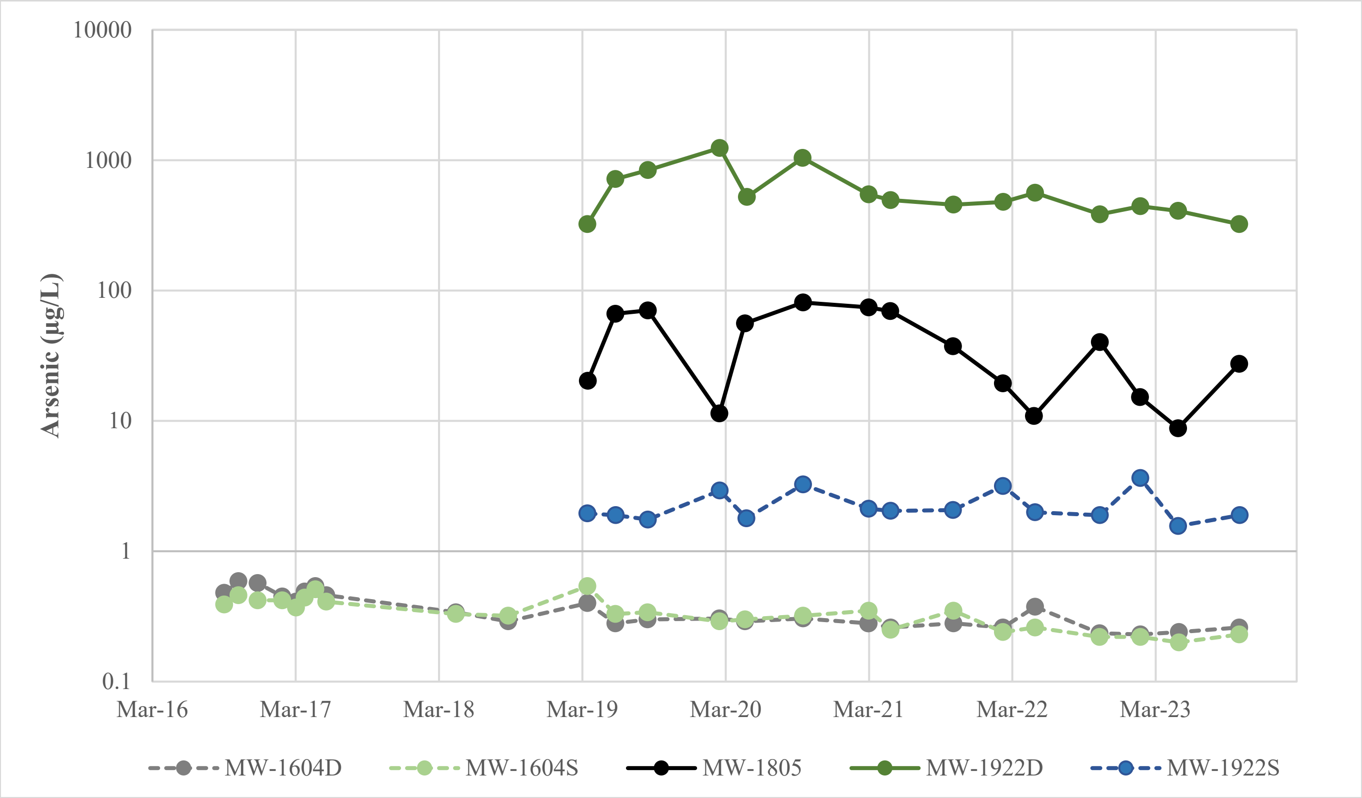
Columbus, Ohio

June 2024

Figure

1

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2023\AEP-Mountaineer_BAP_GW_2023-10.mxd. hduff. 5/31/2024. CHA8423/07/08.



Notes:

1. Wells screened in the unconsolidated sand and gravel lithology are shown with dashed lines.
2. Wells screened in bedrock are shown with solid lines.
3. Arsenic concentrations in micrograms per liter (µg/L) are shown on a log scale.

Arsenic Time Series Graph

Mountaineer Bottom Ash Ponds

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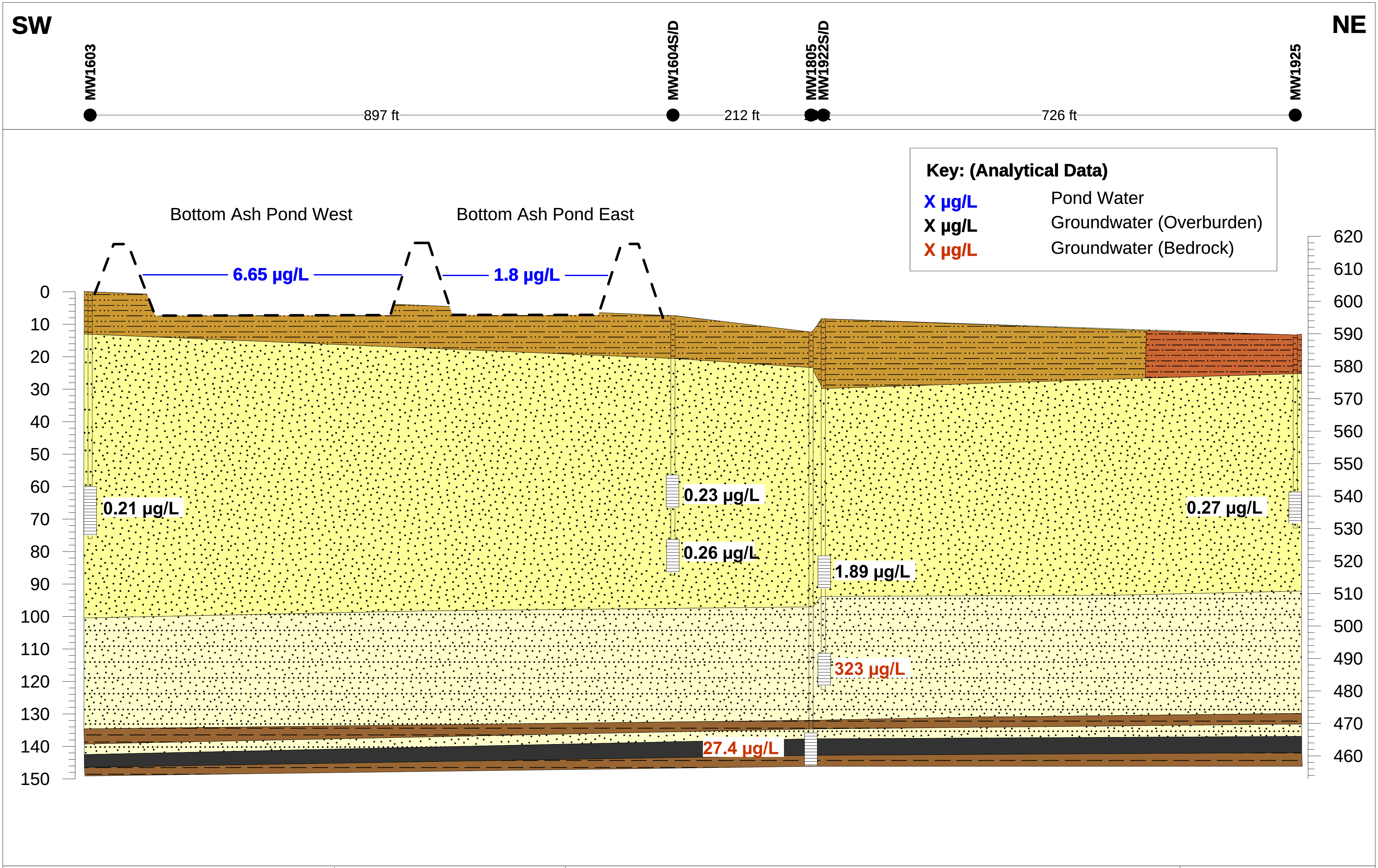
Figure 2

Columbus, Ohio

June 2024



Lithology

Overburden

▨ CLAY
▨ GRAVEL
▨ COAL
▨ SHALE

Bedrock

▨ SANDSTONE
▨ SILT
▨ SAND

Well Construction

▤ Screen
▯ Ash Pond Extent
— Ash Pond Water Level

Notes:

1. Scale is approximate; all units of length are in feet.
2. Vertical exaggeration is 5x.
3. This section was created using widely spaced boreholes; thus, all interpretation away from borehole locations should be considered an approximate representation.
4. Groundwater arsenic concentration values are from samples collected in October of 2023. Ash pond
5. extents and depths are approximate and projected from out of the plane of section. Extents do not represent constructed dimensions.
6. Pond water results are averaged from samples collected in 2016 and 2021.

Cross Section With Arsenic Concentrations Mountaineer Bottom Ash Ponds

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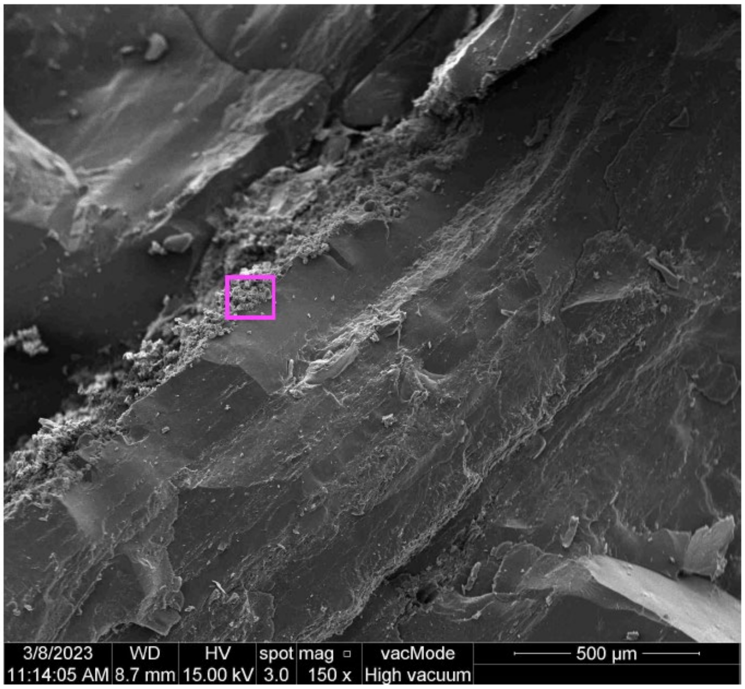
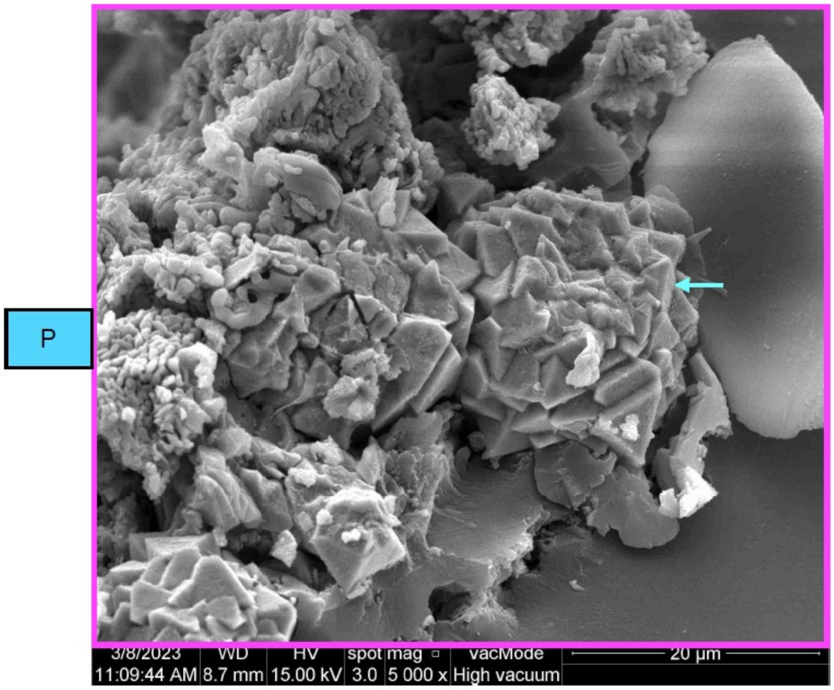
June 2024

Figure
3

23009-03C 150X



23009-03D 5000X



Notes:
1. Sample was collected from a depth of 128 feet below ground surface from MW-1805 core.
2. Scanning electron microscope (SEM) instrument settings are indicated at the bottom of each micrograph.
3. The lower micrograph displays a magnified image of the area within the purple box on the top micrograph.
4. Pyrite is denoted by the blue ‘P’ and blue arrow on the bottom micrograph.

Pyrite Occurrence in MW-1805 Bedrock

Mountaineer Bottom Ash Ponds

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Figure
4

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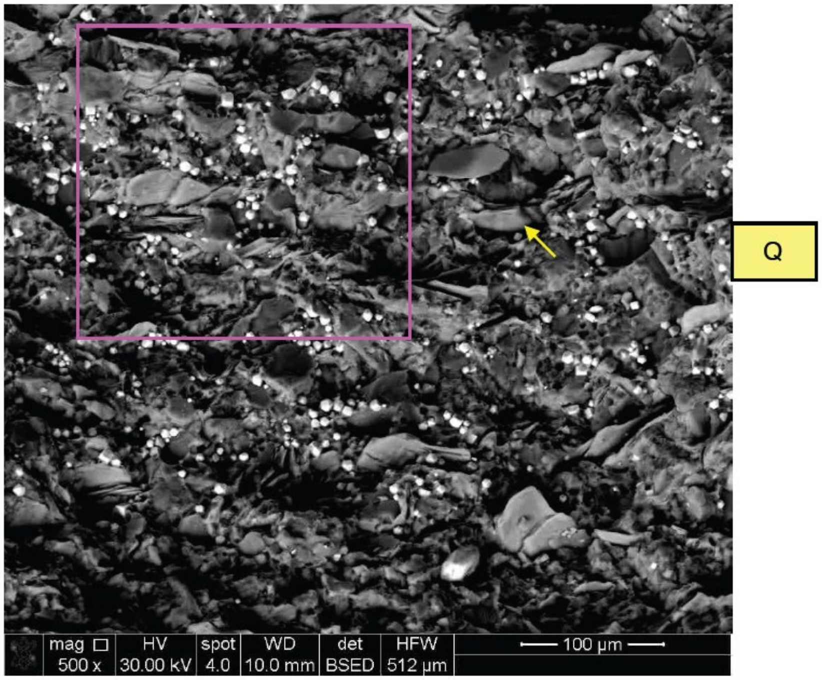
June 2024

23009-04B 500X



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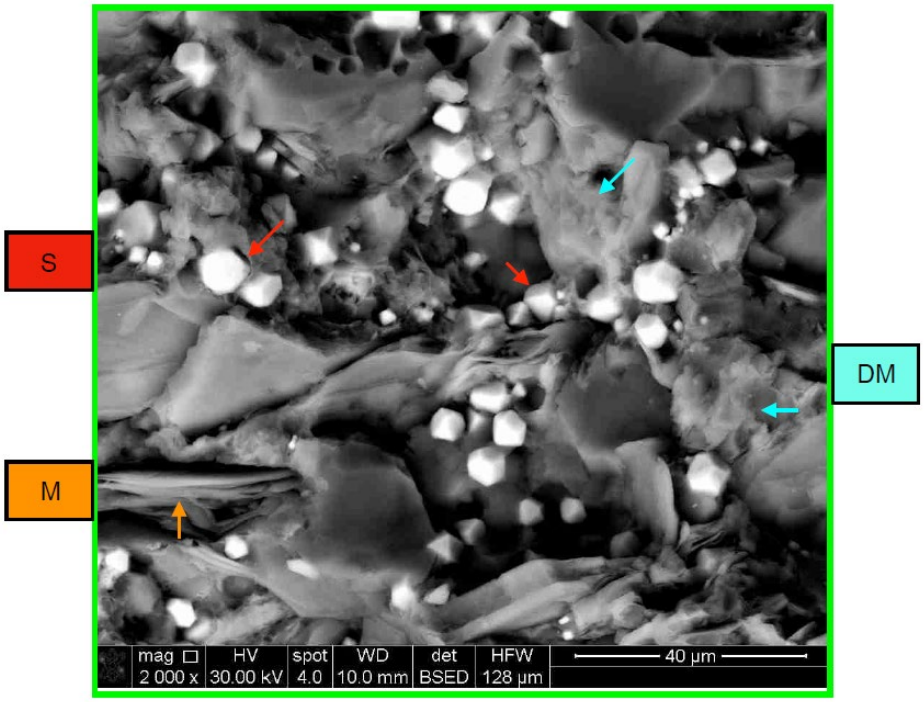

Notes:
1. Sample was collected from a depth of 130.5 feet below ground surface from MW-1805 core.
2. Scanning electron microscope (SEM) instrument settings are indicated at the bottom of each micrograph.
3. Siderite is denoted by the red 'S' and red arrows in the bottom micrograph and is evident in the top micrograph as high-contrast 'bright' crystals interspersed throughout the sample.
4. Mica is denoted by the orange 'M,' detrital clay matrix material is denoted by the green 'DM,' and quartz is denoted by the yellow 'Q.'

Siderite Occurrence in MW-1805 Bedrock

Mountaineer Bottom Ash Ponds

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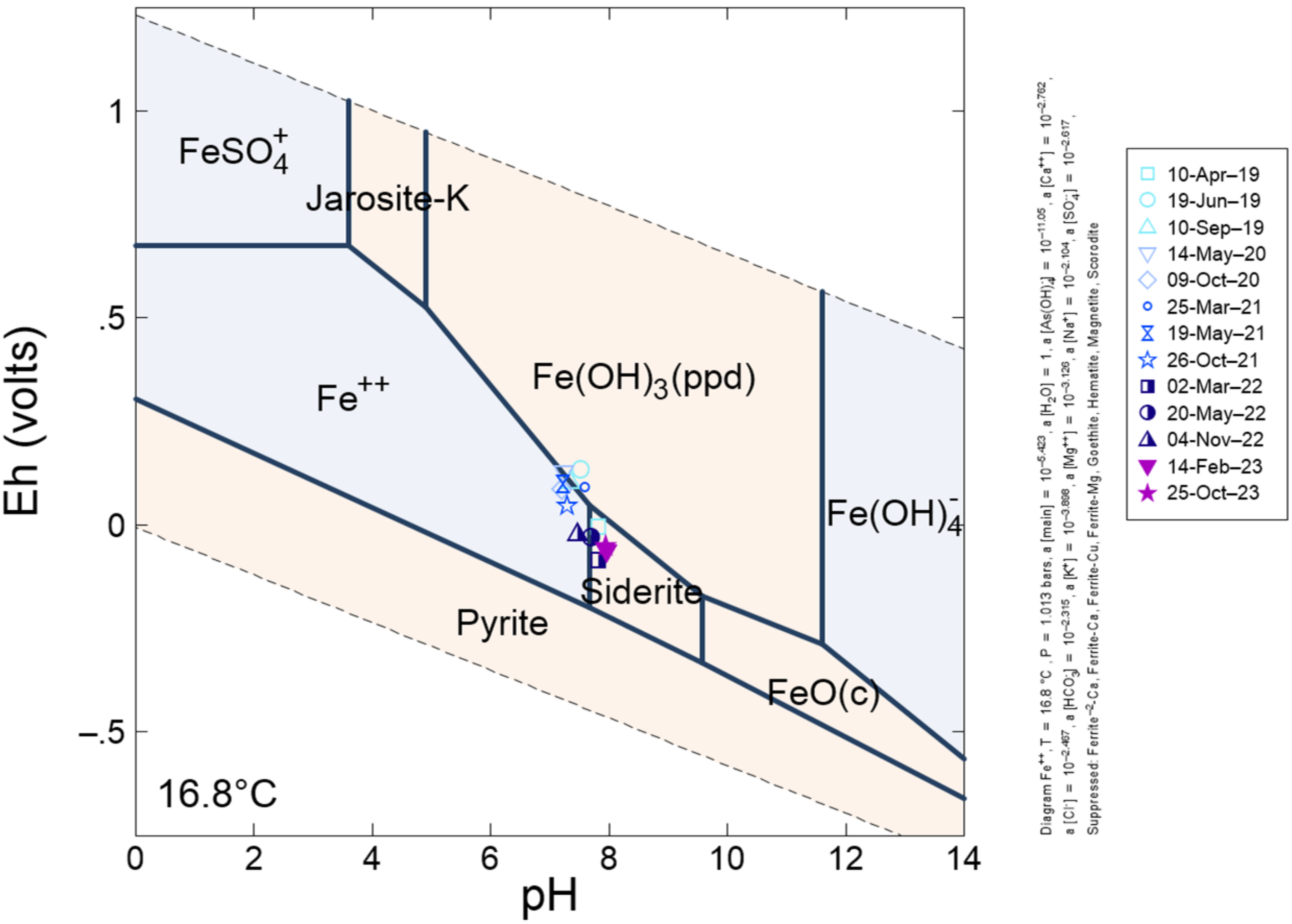
Figure
5

Columbus, Ohio

June 2024



Notes: Eh-pH diagram generated with averaged data from all MW-1805 sampling events, excluding March 2020, a verification resampling event, and May 2023, an outlier due to a field-measured oxidation-reduction potential value of 122.9 millivolts (Eh value of 0.33 volts).

MW-1805 Iron Eh-pH Diagram

Mountaineer Bottom Ash Ponds

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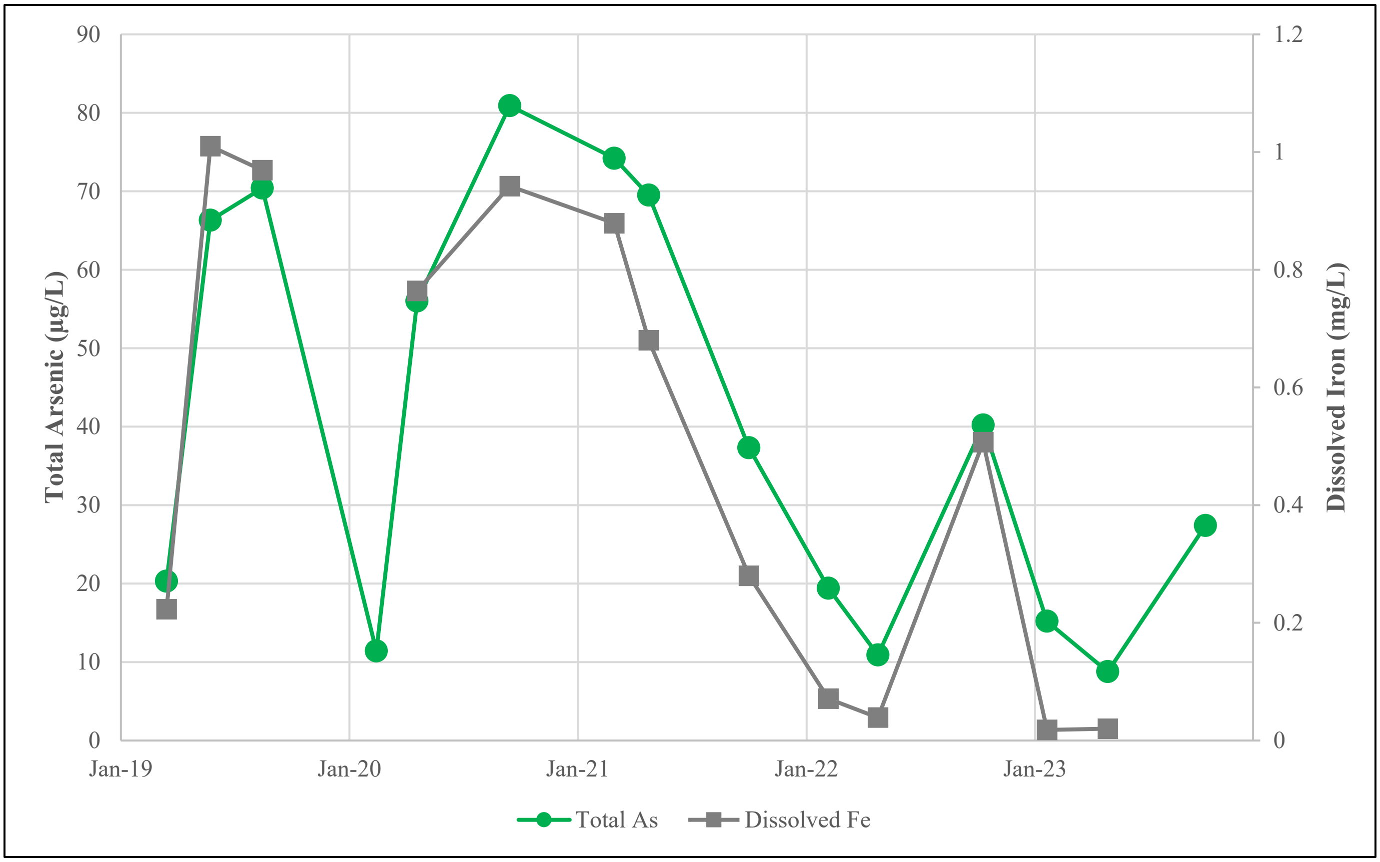
June 2024

Figure 6



Notes:
1. Samples submitted for arsenic analyses were not filtered.
2. Samples submitted for dissolved iron analyses were field filtered prior to sample collection.
3. A dissolved iron sample was not collected in October 2023.
4. Arsenic is shown in units of micrograms per liter (µg/L).
5. Dissolved iron is shown in units of milligrams per liter (mg/L).

MW-1805 Arsenic and Dissolved Iron Time Series Graph

Mountaineer Bottom Ash Ponds

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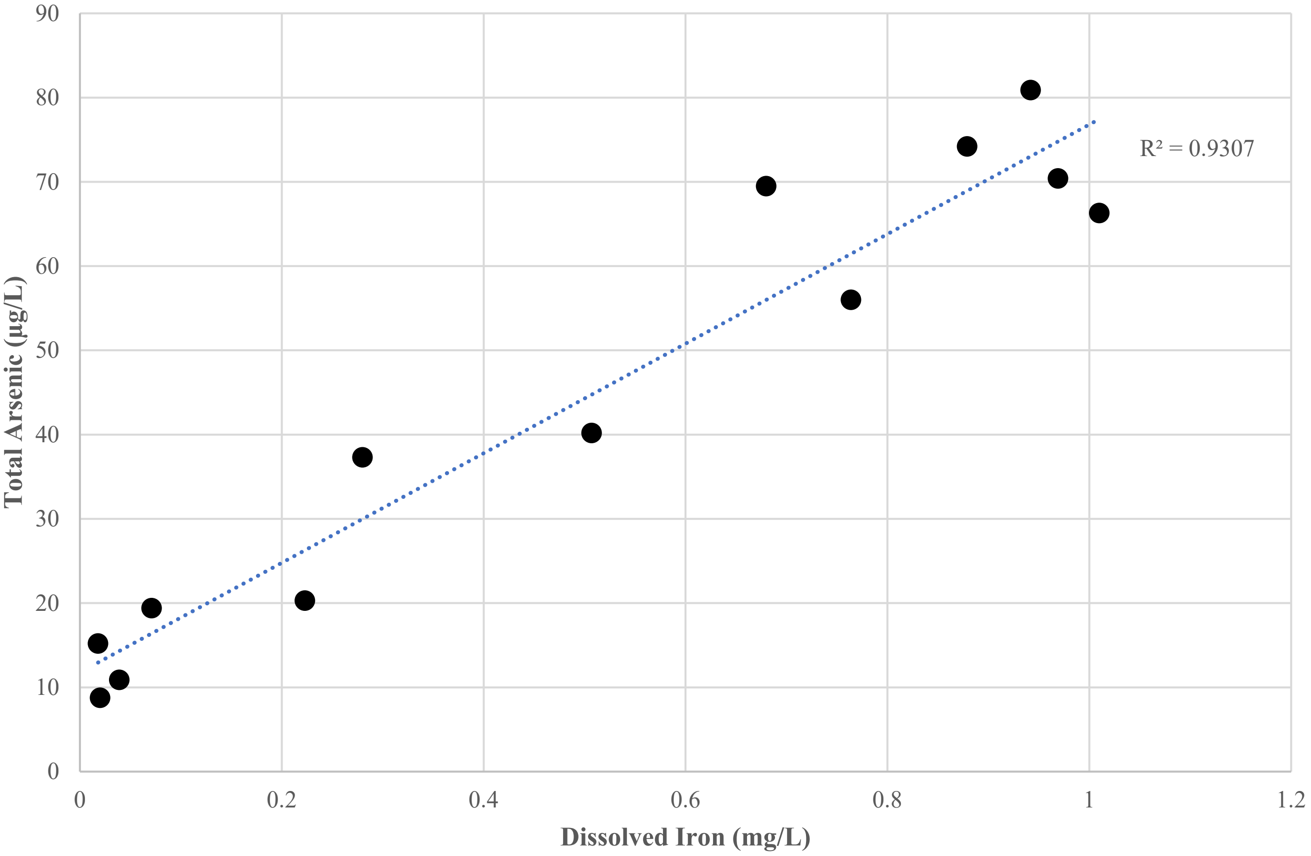
June 2024

Figure

7



Notes:
1. Samples submitted for arsenic analyses were not filtered.
2. Samples submitted for dissolved iron analyses were field filtered prior to sample collection.
3. No dissolved iron sample was collected in October 2023.
4. Arsenic is shown in units of micrograms per liter (µg/L).
5. Dissolved iron is shown in units of milligrams per liter (mg/L).

MW-1805 Arsenic and Dissolved Iron Scatterplot

Mountaineer Bottom Ash Ponds

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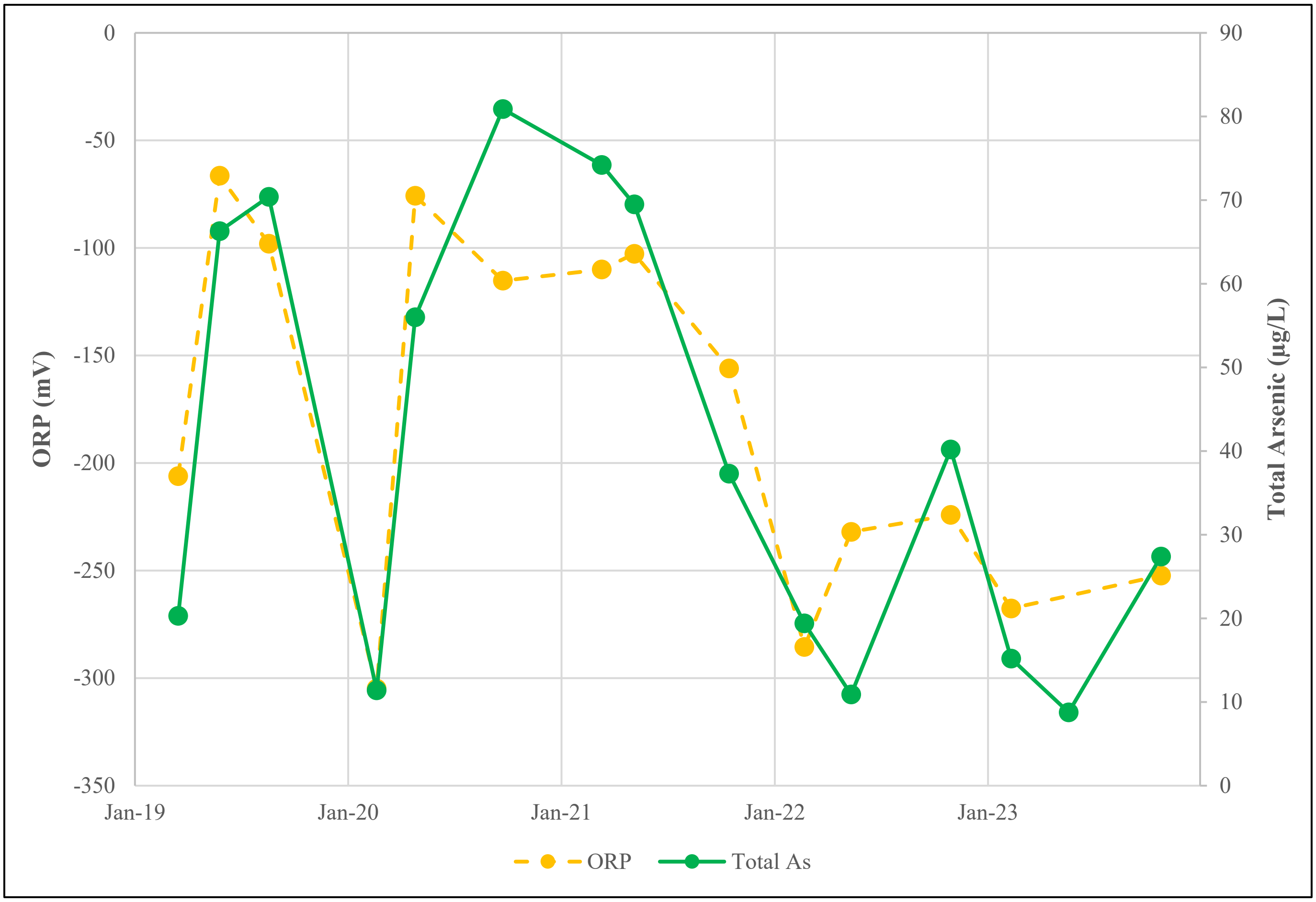
Columbus, Ohio

June 2024

Figure
8



Notes:
1. Oxidation-reduction potential (ORP) was measured in the field during sample collection.
2. Samples submitted for arsenic analyses were not filtered.
3. ORP is shown in units of millivolts (mV).
4. Arsenic concentrations are shown in units of micrograms per liter (µg/L).
5. May 2023 ORP value of 122.9 was excluded as an outlier.

MW-1805 Arsenic and ORP Time Series Graph

Mountaineer Bottom Ash Ponds

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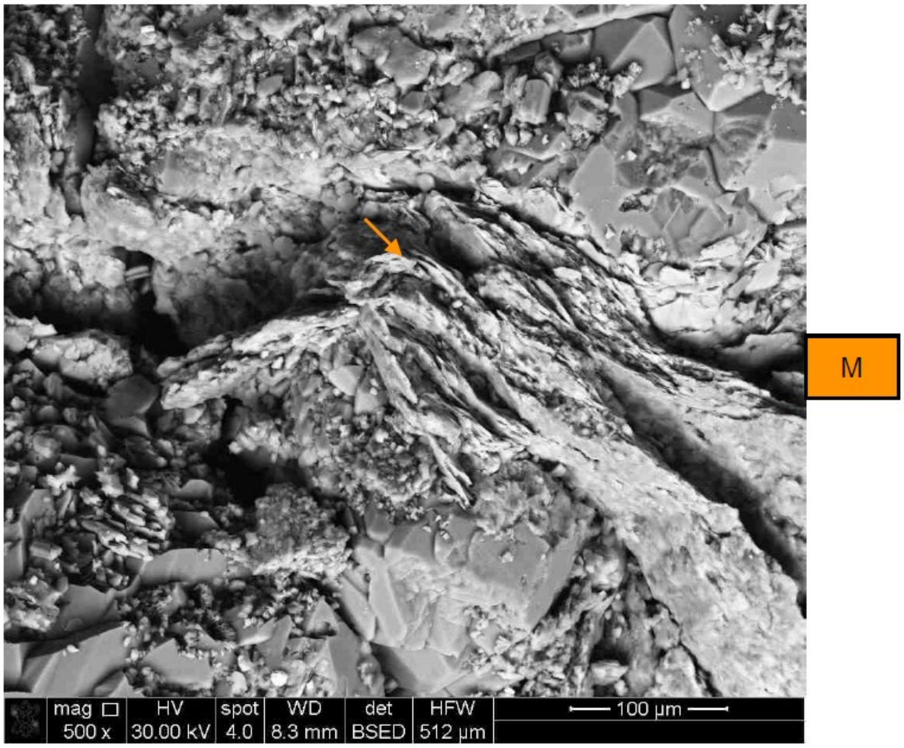
Columbus, Ohio

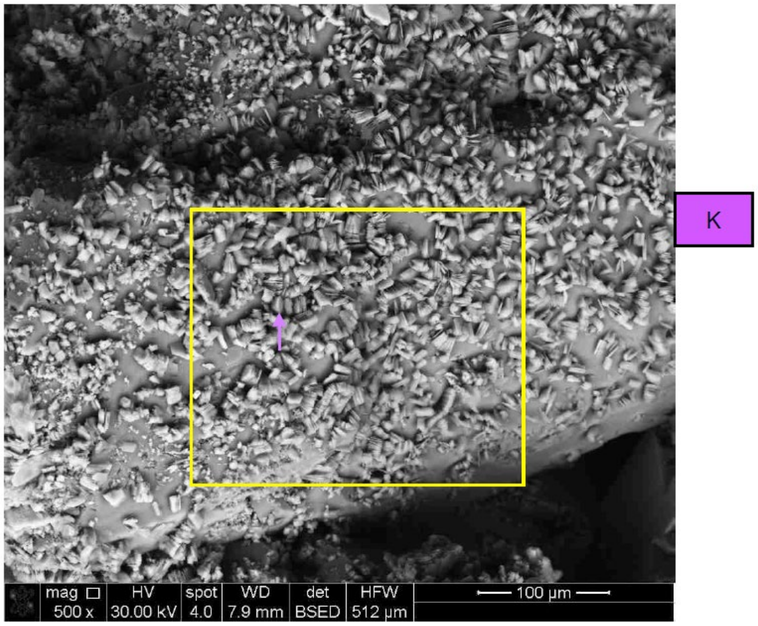
June 2024

Figure 9

23009-05C 500X



23009-05E 500X



Notes:
1. Sample was collected from a depth of 104.5 feet below ground surface from MW-1922D core.
2. Scanning electron microscope (SEM) instrument settings are indicated at the bottom of each micrograph.
3. Micaceous shale is indicated by the orange 'M' and orange arrow.
4. Partial exfoliation of the mica sheets as well as secondary clay mineral formation immediately adjacent to mica sheets suggests chemical weathering of mica to clays.
5. The bottom micrograph shows prevalent secondary clay mineral formation (kaolinite) within open pore space.

Mica Weathering in MW-1922D Bedrock

Mountaineer Bottom Ash Ponds

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Figure
10

Columbus, Ohio

June 2024

\\annarbor-01\Data\Projects\AEP\Legal Department - ASD Review\Turk\2021-11 State ASD\Figures

ATTACHMENT A

MW-1805 and MW-1922D Boring Logs

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel
Drilling Company: Terracon Consultants, Inc.
Foreman: N. Francis/K. Fowler
Date Started: 06/18/18
Date Finished: 06/21/18
Logged By: L. Corenthal
Checked By: A. Ashton

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133 8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
0								—0'—		
2										
4										
		S-01	5 - 6 5	2 2 3	18/18	PID: NM		SILT & CLAY	S-01 (5 to 6.5'): Medium stiff, reddish brown, SILT & CLAY, seam of fine Sand. Moist.	
6										
8										
10		S-02	10 - 11 5	2 2 4	18/18	PID: NM		—10'— CLAYEY SILT —11'—	S-02A (10 to 11'): Medium stiff, reddish brown, Clayey SILT. Moist. S-02B (11 to 11.5'): Loose, reddish brown, fine to coarse SAND, some Silt. Moist.	
12										
14										
		S-03	15 - 16.5	2 2 2	18/14	PID: NM			S-03 (15 to 16.5'): Very loose, brown, fine SAND, little Silt. Moist. Stratified at approximately 16 feet.	
16										
18								FINE TO COARSE SAND		
20		S-04	20 - 21.5	8 12 12	18/12	PID: NM			S-04 (20 to 21.5'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
22										
24										

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel
Drilling Company: Terracon Consultants, Inc.
Foreman: N. Francis/K. Fowler
Date Started: 06/18/18 **Date Finished: 06/21/18**
Logged By: L. Corenthal **Checked By: A. Ashton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
		S-05	25 - 26.5	4 7 8	18/10	PID: NM			S-05 (25 to 26.5'): Medium dense, brown fine to coarse SAND, little Gravel, trace Silt. Moist.	
26										
28										
30		S-06	30 - 31.5	4 15 10	18/11	PID: NM			S-06 (30 to 31.5'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
32										
34										
		S-07	35 - 36.5	4 4 7	18/9	PID: NM			S-07 (35 to 36.5'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
36										
		S-08	36.5 - 38.5	4 6 8 8	24/11	PID: NM		FINE TO COARSE SAND	S-08 (36.5 to 38.5'): Medium dense, brown/black, fine to coarse SAND, trace Silt. Moist.	
38										
		S-09	38.5 - 40.5	3 5 5 7	24/12	PID: NM			S-09 (38.5 to 40.5'): Loose, brown/black, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
40										
		S-10	40.5 - 42.5	3 6 5 7	24/13	PID: NM			S-10 (40.5 to 42.5'): Medium dense, brown/black, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
42										
		S-11	42.5 - 44.5	3 4 8 7	24/0	PID: NM			S-11 (42.5 to 44.5'): No recovery.	
44										
		S-12	44.5 - 46.5	7 6 3 8	24/4	PID: NM			S-12 (44.5 to 46.5'): Loose, brown, fine to medium SAND, trace Silt. Wet.	
46										
		S-13	46.5 - 48.5	2 3 6 8	24/11	PID: NM			S-13 (46.5 to 48.5'): Loose, brown, fine to coarse SAND, trace Silt. Wet.	
48										
		S-14	48.5 - 50.5	1 3 5 7	24/11	PID: NM			S-14 (48.5 to 50.5'): Loose, brown, fine to medium SAND, trace Silt. Wet.	
50										

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel
Drilling Company: Terracon Consultants, Inc.
Foreman: N. Francis/K. Fowler
Date Started: 06/18/18 **Date Finished:** 06/21/18
Logged By: L. Corenthal **Checked By:** A. Ashton

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
50		S-15	50.5 - 52	3 5 7	18/9	PID: NM			S-15 (50.5 to 52'): Medium dense, brown, fine to coarse SAND, little Silt. Wet.	At S-15 switch to 3 inch split spoon (18 inches long) from 2 inch split spoon (24 inches long) to increase sample volume.
52		S-16	52 - 53.5	1 3 5	18/0	PID: NM			S-16 (52 to 53.5'): No recovery.	
54		S-17	53.5 - 55	1 6 10	18/6	PID: NM			S-17 (53.5 to 55'): Medium dense, brown, fine to coarse SAND, trace Silt. Wet.	
		S-18	55 - 56.5	2 4 7	18/7	PID: NM			S-18 (55 to 56.5'): Medium dense, grayish brown, fine to coarse SAND, trace Silt. Wet.	
56		S-19	56.5 - 58	1 3 7	18/0	PID: NM			S-19 (56.5 to 58'): No recovery.	
58		S-20	58 - 59	NM	12/18	PID: NM			S-20 (58 to 59'): Brown, fine to coarse SAND, little Silt, trace Gravel. Wet.	S-20 sampled by Shelby tube, no recovery and refusal after 1 foot Then collected with 2 inch split spoon and switch to 2 inch split spoon after S-20.
		S-21	59 - 60.5	3 8 6	18/14	PID: NM			S-21 (59 to 60.5'): Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel. Wet. Seam black fine to medium SAND at 60 feet.	
60		S-22	60.5 - 62	6 7 11	18/22	PID: NM			S-22 (60.5 to 62'): Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel. Wet.	
62		S-23	62 - 63.5	2 6 9	18/13	PID: NM		FINE TO COARSE SAND	S-23 (62 to 63.5'): Medium dense, brown, fine to coarse SAND, trace Silt, trace Gravel Wet.	
64		S-24	63 5 - 65	3 5 7	18/12	PID: NM			S-24 (63.5 to 65'): Medium dense, brown, fine to coarse SAND, some Silt. Wet.	
		S-25	65 - 66.5	3 6 7	18/18	PID: NM			S-25 (65 to 66.5'): Medium dense, brown, fine to medium SAND, little Silt. Wet.	Start introducing Bentonite/water mix due to heaving sands
66		S-26	66 5 - 68	8 11 9	18/18	PID: NM			S-26 (66.5 to 68'): Medium dense, gray/brown, fine to coarse SAND, little Silt, trace Gravel. Wet.	
68		S-27	68 - 69.5	3 6 9	18/14	PID: NM			S-27 (68 to 69.5'): Medium dense, gray, fine to coarse SAND, little Silt, trace Gravel. Wet.	
70		S-28	69.5 - 71	10 11 15	18/15	PID: NM			S-28 (69.5 to 71'): Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt. Wet.	
		S-29	71 - 72.5	10 13 19	18/11	PID: NM			S-29 (71 to 72.5'): Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt. Wet.	
72		S-30	72.5 - 74	8 12 10	18/11	PID: NM			S-30 (72.5 to 74'): Medium dense, gray, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
74		S-31	74 - 75.5	11 13 14	18/10	PID: NM			S-31 (74 to 75.5'): Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt. Wet.	

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18 **Date Finished:** 06/21/18

Logged By: L. Corenthal **Checked By:** A. Ashton

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	36.7'	Ground Surface	0'	133.8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
76		S-32	75.5 - 77	8 12 15	18/13	PID: NM			S-32 (75.5 to 77'): Medium dense, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
78		S-33	77 - 78.5	7 10 14	18/11	PID: NM			S-33 (77 to 78.5'): Medium dense, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
		S-34	78.5 - 80	7 9 10	18/0	PID: NM		FINE TO COARSE SAND	S-34 (78.5 to 80'): No recovery.	
80		S-35	80 - 81.5	4 5 12	18/0	PID: NM			S-35 (80 to 81.5'): No recovery.	
82		S-36	81.5 - 83	19 18 17	18/10	PID: NM			S-36 (81.5 to 83'): Dense, brown, fine to coarse SAND, some Gravel, trace Silt. Wet.	
		S-37	83 - 83.9	17 50/5"	11/10	PID: NM			S-37 (83 to 83.9'): Very dense, brown, fine to coarse SAND, some Gravel, little Silt. Wet. Sandstone in tip.	
84	NM	S-38 C-01	84.5 - 84.7 84.7 - 89.3	50/2"	2/7 55/39	PID: NM		84.7'	S-38 (84.5 to 84.7'): Very dense, gray, fine to medium SAND. Wet. C-01 (84.7 to 89.3'): Medium hard, medium gray, fine to medium-grained, slightly micaceous Sandstone, with very thin to thin horizontal partings spaced 2 to 3 inches apart. Thin horizontal black lenses fine to medium grained carbonaceous Sandstone between 86 and 86.4 feet. Brown fine grained sandstone cobble in upper 0.2 feet.. Moderately fractured. REC=71%. RQD=0%.	Auger refusal at 84.7 ft. Begin PWL coring.
86										
88										
90	8	C-02	89.3 - 94.3		60/27				C-02 (89.3 to 94.3'): Medium hard to very soft, medium gray, fine to medium-grained, slightly micaceous Sandstone, with very thin to thin horizontal partings spaced 2 to 3 inches apart. Very soft, medium spaced Sandstone layers are 2 to 4 inches. Soft, medium spaced horizontal Silty Clay inclusions. Extremely fractured to sound. REC=45%. RQD=45%.	
92								SANDSTONE		
94	7	C-03	94.3 - 99.3		60/60				C-03 (94.3 to 99.3'): Medium hard to very soft, medium gray, fine to medium-grained, slightly micaceous Sandstone, with thin to medium partings spaced 1 inch to 13 inches apart. Thin horizontal layers of very soft fine to medium grained Sandstone from 94.3 to 96.9 feet. Moderately fractured. REC=100%. RQD=62%.	
96										
98										
100	6	C-04	99.3 - 104.3		60/60				C-04 (99.3 to 104.3'): Medium hard to very soft, gray, fine to medium-grained,	

SANBORN | HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18 **Date Finished:** 06/21/18

Logged By: L. Corenthal **Checked By:** A. Ashton

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
100									SANDSTONE, with very thin to thin partings spaced 1 inch to 11 inches apart. Thin horizontal layers of very soft fine to medium grained Sandstone between 100.5 and 101.5 feet.. Extremely fractured to sound. REC=100%. RQD=38%.	
102										
104	3	C-05	104.3 - 109.3		60/60				C-05 (104.3 to 109.3'): Medium hard to hard, gray, very fine to fine-grained, SANDSTONE, Medium spaced moderately dipping to low angle to low angle black fine grained Sandstone lenses from 104.3 to 108.3 feet. Very soft gray fine to medium-grained very thin to thin horizontal partings spaced 2 to 4 inches apart from 108.3 to 109.3 feet. Broken platy dark gray zone at 108.3 feet. Moderately fractured to sound. REC=100%. RQD=80%.	
106										
108	NM	C-06	109.3 - 114.3		60/60			SANDSTONE	C-06 (109.3 to 114.3'): Medium hard to soft, gray, very fine to medium-grained, SANDSTONE, very thin to thin horizontal low angle partings spaced less then 1inch to 3 inches apart. Black fine to medium-grained very thinly spaced Sandstone lenses from 109.3 to 109.9.. Extremely fractured. REC=100%. RQD=0%.	
110										
112										
114	5	C-07	114.3 - 119.3		60/60				C-07 (114.3 to 119.3'): Medium hard to soft, light medium gray, very fine to medium-grained, SANDSTONE, very thin to medium horizontal partings spaced 1 to 6 inches apart. Black fine to medium-grained very thin to medium spaced sandstone lenses from 114.3 to 117 feet. Extremely fractured to sound. REC=100%. RQD=52%.	
116										
118	4	C-08	119.3 - 124.3		60/60			119.6'	C-08 (119.3 to 124.3'): Medium hard to soft, light gray, very fine to medium-grained, SANDSTONE, with thin horizontal partings spaced 2 to 5 inches apart and very thinly spaced clack horizontal lenses. Bed of very soft to soft, dark gray, very fine grained Silty clay Shale with very thin to thinly partings spaced less than 1 inch to 5 inches apart. Shale from 119.6 to 122.3 feet.. Extremely fractured to slightly fractured. REC=100%. RQD=38%.	
120								SHALE		
122								122.3'		
								SANDSTONE		
124	8	C-09	124.3 - 129.3		60/53				C-09A (124.3 to 125.3'): Medium hard, light gray, very fine to medium-grained,	

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18 **Date Finished: 06/21/18**

Logged By: L. Corenthal **Checked By: A. Ashton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum Description
							SANDSTONE
							125.3'
126							
128							COAL
	NM	C-10	129.3 - 131.8		30/30		
130							130.4'
132	NM	C-11	131.8 - 133.8		24/20		SHALE
							133.8'
134							
136							
138							
140							
142							
144							
146							
148							
150							

Geologic Description

SANDSTONE, with very thin to thin black lenses. Sound.

REC=88%. RQD=65%.

C-09B (125.3 to 129.3'): Very soft to soft, black, very fine grained, COAL, with thinly spaced horizontal partings, very soft gray very fine grained horizontal Clay-rich zone from 125.5 to 125.8 feet, very thin to thin Clay lenses with Pyrite throughout. Vertical crack with calcite minderalization from 127.6 to 129.8 feet. Extremely to moderately fractured.

C-10A (129.3 to 130.4'): Very soft to soft, black, very fine grained, COAL, with thin to very thin horizontal partings. Vertical cracks with calcite mineralization from 129.2 to 129.8 feet and 130.0 to 130.3 feet. Extremely to moderately fractured.

REC=100%. RQD=37%.

C-10B (130.4 to 131.8'): Very soft to medium hard, dark gray, very fine grained, SILTY CLAY SHALE, with very thin to thin horizontal partings. Clay rich zone from 130.4 to 130.8 feet. Slight Organic sheen. Extremely fractured.

C-11 (131.8 to 133.8'): Very soft to medium hard, dark gray, very fine grained, SILTY CLAY SHALE, with very thin horizontal, bedding. slight Organic sheen. Extremely to moderately fractured. REC=83%. RQD=0%.

Boring terminated at 133.8 feet. No refusal encountered.

NOTES:

1. Approximately 5200 gallons of potable water was introduced during drilling upon completion of coring (approximately 3,200 gallons was used to advance to top of bedrock from a combination of potable wells and the plant fire suppression system; approximately 2,000 gallons of water from the plant fire suppression system was used during bedrock coring).
2. Continuous sampling started approximately 5 ft above the water table based on a water level measurement collected by Sanborn Head on 6/18/2018 at 15:20 at MW-1605S of 44.84 ft below Top of PVC Riser and at 15:34 at MW-1604S of 51.99 ft below Top of PVC Riser.
3. Advanced HWT casing to 29 ft bgs. Due to damage to casing advancer at 29 ft, advanced 3 1/4" ID hollow stem augers to 30 ft bgs to auger refusal at 84.7 ft bgs. Advanced HWT casing with roller bit advancer to 84.7 ft and began PWL coring at 84.7 ft.
4. Approximately 1 week following completion of sample collection, the borehole was completed as a monitoring well by Terracon Consultants, Inc. Monitoring well installation was not observed by Sanborn Head personnel.

Remarks

State of West Virginia
Department of Environmental Protection

Monitoring Well Construction
Well Number: WV00540-1805-18
Approved

Site Name/Physical Address:
Site: AEP Mountaineer Plant
Line 1: 1347 Graham Station Road
Line 2:
City: Letart
State: WV
Zip: 25253-
County: Mason

Well Registration No. WV00540-1805-18
Grid Location:
a. Latitude: 38 58 29 .0
b. Longitude: 81 56 18 .0
c. Method Used: Computer Mapped/Generated Coordinates

Company/Project Well No.:
MW-1805

Purpose of Monitoring Well:
to monitor the hydrologic conditions of a coal seam.

Well Owner (Name, Firm, Address):
Owner: Randall Brown
Line 1: American Electric Power - Mountaineer Plant
Line 2: 1347 Graham Station Road
City: Letart
State: WV
Zip: 25253-
Phone: 304-882-4024

Installed By (Name, Firm, Address):
Installer: Kenn Fowler
Line 1: Terracon Consultants, Inc.
Line 2: 912 Morris Street
City: Charleston
State: WV
Zip: 25301-
Phone: 304-344-0821

Date Well Installed:
07/06/2018

Driller's WV Cert No.
WV00540

Section B: (all number fields must be in decimal format)

1.Cap and Lock:	YES
2.Protective Cover:	Protective Cover Pipe
3.Monitoring Well Reference Point:	591 ft.
4.Borehole Diameter:	5 inches.

5.Ground Surface Seal:
a.Material: concrete
b.Installation Procedure: ASTM D5092

6.Surface Seal Bottom/Annular Space Top:	3 ft.

7.Well Riser: a.OD Well Riser: 2.38 inches. b.ID Well Riser: 2.05 inches.
c.Material: PVC
d.Installation Procedure: ASTM D5092

8.Annular Space Seal:
a.Material: high solids grout -
b.Installation Procedure: tremie pipe-pumped

9.Well Development Procedure: overpump -

10.Drilling Method Used: mud rotary -

11.Annular Space Seal Bottom/Filter Seal Top:	117.5 ft.

12.Drilling Fluid Used: Yes Source: Mud

13.Filter Pack Seal:
a.Material: bentonite pellet
b.Installation Procedure: Gravity Fed
c.Volume Added: 0.34 cubic feet

14.Bottom of Bentonite Seal/Filter Pack Top:	120.5 ft.
15.Depth to Top of Screen:	123.5 ft.

16.Screen:
a.Material: PVC
b.Installation Procedure: ASTM D5092
c.Slot Size: 0.01 inches. d.Screen Length: 10 ft.

17.Filter Pack:
a.Material: medium sand
b.Installation Procedure: gravity fed

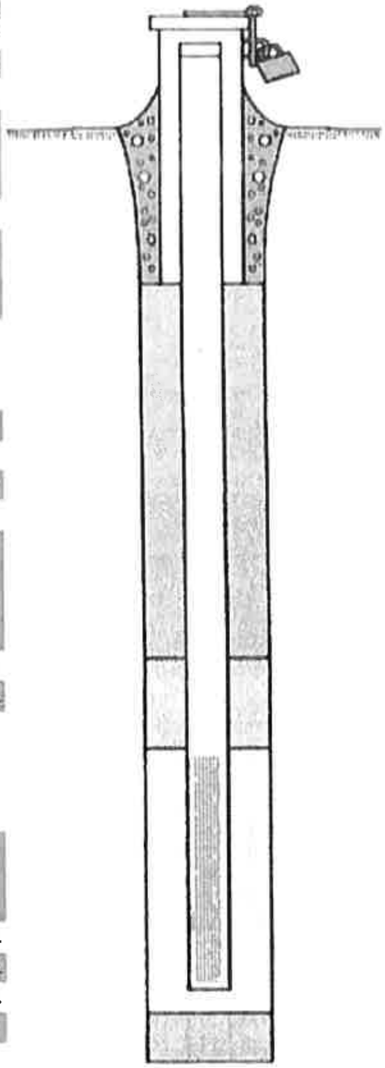
18.Well Depth:	133.5 ft.
19.Bottom of Filter Pack:	134 ft.
20.Bottom of Borehole:	134 ft.

21.Backfill Material (below filter pack): medium sand

22.Decontamination Procedures: water

23.Special Circumstances and Exceptions: No Variance Number:

24.WV Contractor License No.



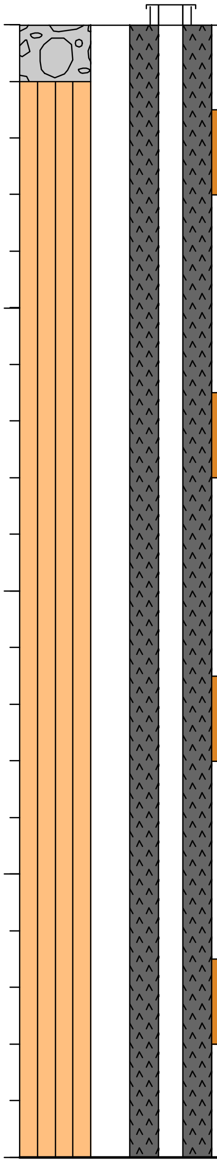
Geosyntec consultants
engineers | scientists | innovators

Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG

Well No. MW-1922D
Page: 1 of 6

Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT					SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft)
				Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)			
0									(0') Large stones.	Advanced hollow stem auger	0.0
				SS01		4 7 8	1.3		(1') Medium stiff to stiff, gray, CLAYEY SILT (ML); dry, low plasticity, few fine gravel, nonuniform. (2.5') Changes to dense and red-brown.		
5											5.0
				SS02		2 3 4	1.3		(6.5') Changes to damp, cohesive, trace fine sand.		
10											10.0
				SS03		2 4 4	0.8		(11.5') Loose, red-brown, SANDY SILT (ML); damp, nonplastic, noncohesive, trace clay, uniform.		
15											15.0
				SS04		2 2 2	1.2		(16.5') Loose to medium dense, red-brown, SANDY SILT (ML); damp, low plasticity, cohesive, with some clay, uniform.		
20											20.0

NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

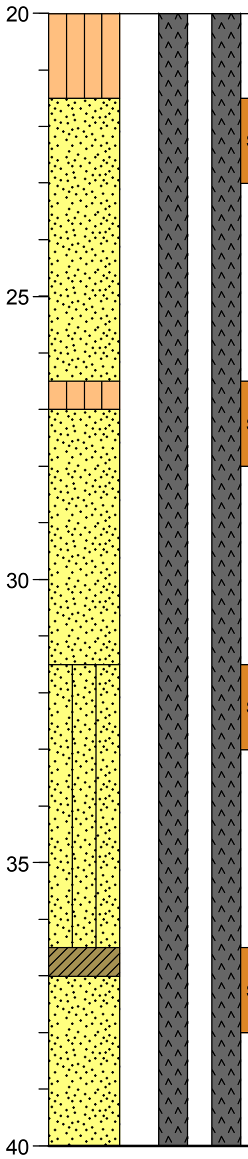
Geosyntec consultants
engineers | scientists | innovators

Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG

Well No. MW-1922D
Page: 2 of 6

Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**

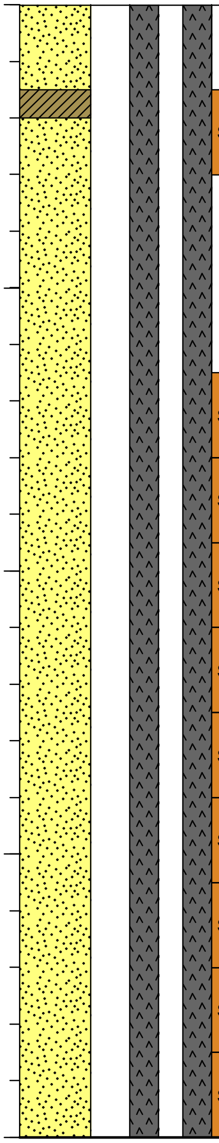


DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT					SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft)
				Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)			
20											20.0
				SS05		3 10 13	0.9		(21.5') Loose, brown SAND (SP); medium- to fine-grained, with trace coarse sand & gravel.		
25											25.0
				SS06		7 9 12	1.3		(26.5') Medium dense, gray-brown, CLAYEY SILT (ML); lens. (27') Loose, brown SAND (SP); damp, noncohesive, medium-grained sand, with few coarse sand and trace fine gravel.		
30											30.0
				SS07		5 6 7	0.3		(31.5') Loose, dark brown, SILTY and CLAYEY SAND (SM); damp, noncohesive, medium-grained sand with some fine rounded gravel, nonuniform.		
35											35.0
				SS08		4 5 8	1.3		(36.5') Loose, brown, SILTY CLAY (CL); damp, low plasticity, cohesive, lens. (37') Loose, brown SAND (SP); damp, noncohesive, medium-grained sand with few fine sand and gravel.		
40											40.0

NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

Client:	**American Electric Power**	**WELL LOG**	
Project:	**CHW8293**	**Well No.**	**MW-1922D**
Address:	**New Haven, WV**	**Page:**	**3 of 6**

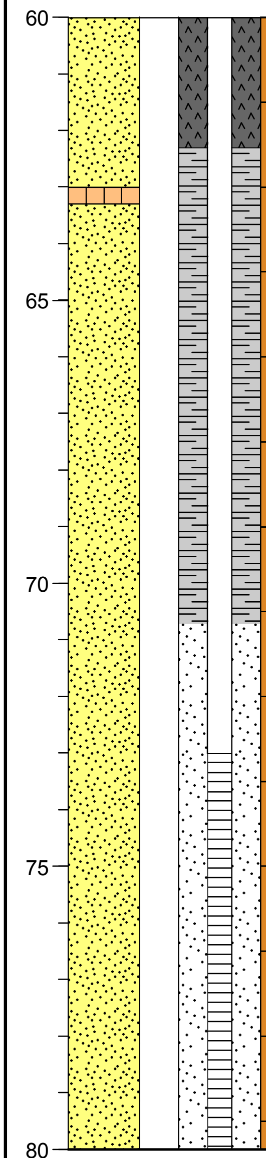
Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



DEPTH (ft)	COLLECT Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft)
40								40.0
	SS09		4 5 8	1.3		(41.5') Loose, brown, SILTY CLAY (CL); damp, low plasticity, cohesive, trace sand. (42') Loose, brown SAND (SP); damp, nonplastic, noncohesive, fine- to medium-grained sand, uniform.		
45								45.0
	SS10		4 6 7	1.5		(46.5') Changes to wet with few coarse sand and trace fine gravel.		
	SS11		9 6 8	1.3		(48.5') 2 inch dark gray clay lens at 48.5 feet.		
50	SS12		9 9 10	1.5		(49.5') Medium dense, brown SAND (SP); wet, nonplastic, noncohesive, medium- to fine-grained, uniform, with black partings throughout.		50.0
	SS13		4 6 9	1.3				
	SS14		4 7 8	1.2		(52.5') With few fine to coarse gravel.		
55	SS15		3 5 10	1.1				55.0
	SS16		6 8 9	0.9				
	SS17		4 7 8	1.0				
60	SS18		4 5 4	1.0				60.0

NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

Drilling Start Date:	**1/28/2019**
Drilling End Date:	**1/29/2019**
Drilling Company:	**AEP**
Drilling Method:	**Hollow Stem Auger**
Drilling Equipment:	**Truck-mounted rotary**
Driller:	**ZR/BH**
Logged By:	**C. Christenson**
Boring Depth (ft):	**114.2**
Boring Diameter (in):	**8.25**
Sampling Method(s):	**SPT; Core Barrel**
DTW After Drilling (ft):	
Ground Surface Elev. (ft):	**591.006**
Top of Casing Elev. (ft):	**594.016**
Location (X,Y):	**1,701,767.67, 720,390.93**
Well Depth (ft):	**83.5**
Well Diameter (in):	**2**
Screen Slot (in):	**0.010**
Riser Material:	**Sch 40 PVC**
Screen Material:	**Sch 40 PVC Slotted**
Seal Material(s):	**Grout, Bentonite**
Filter Pack:	**#5 Sand**



Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)
SS19		8 13 16	0.9	
SS20		8 12 13	1.1	
SS21		8 12 14	1.3	
SS22		8 13 18	0.8	
SS23		6 7 10	1.2	
SS24		8 11 16	1.1	
SS25		12 13 15	1.0	
SS26		7 16 22	1.1	
SS27		13 14 14	0.9	
SS28		11 13 20	1.1	
SS29		20 24 25	1.2	
SS30		12 11 13	1.2	
SS31		10 13 15	1.1	
SS32		20	1.3	

SOIL/ROCK VISUAL DESCRIPTION

(60') Loose to medium dense, brown SAND (SP); wet, some coarse sand, uniform.

(61.5') Loose, gray-brown SAND (SP); wet, medium- to coarse-grained with few fine rounded gravel, nonuniform.

(63') Medium dense, gray-brown, SANDY SILT (ML); wet.

(63.3') Medium dense, tan gray SAND (SP); wet, fine- to medium-grained, with some coarse sand, several black partings.

(67.5') Trace fine gravel.

(75') Some medium sand.

(77') Medium dense, gray SAND (SP); wet, nonplastic, noncohesive, uniform.

REMARKS

Silty sand at 79.5'

NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

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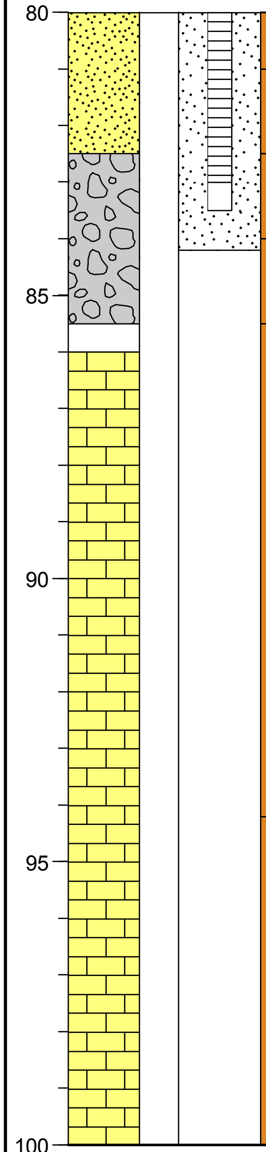
Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG
Well No. MW-1922D
Page: 5 of 6

Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Date & Time	COLLECT: Blow Counts	COLLECT: Recovery (ft)	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft)
80				SS32		18 14	1.3		(80') Medium dense, gray SAND with gravel (SP); wet, noncohesive, coarse-grained sand and fine-grained gravel with some coarse gravel and medium sand, nonuniform.		80.0
				SS33		12 11 19	1.0				
				SS34		24 38 25	1.1		(82.5') Dense, gray GRAVEL with sand (GP); wet, noncohesive, some coarse gravel and coarse sand and few medium sand, nonuniform.	Advanced using water rotary drilling	
				SS35		20 50/5	1.0		(84') Medium dense, brown gray GRAVEL with sand (GP); wet, fine-grained gravel and coarse-grained sand with some coarse gravel and clay lens at 84.0 feet.		
85									(85.5') Auger refusal at 85.0 feet.		85.0
				CB 1			8.2	91	(86') Moderately hard, fine- to medium-grained, light gray SANDSTONE with thin dark gray partings less that 1 inch apart, moderately fractured and fine-grained between 86.0-88.0 feet. (88') Sound and medium-grained below 88.0 feet.		
90											90.0
95				CB 2			9.6	98	(94.2') Moderately hard to moderately soft, light to medium gray, fine- to medium-grained SANDSTONE (very thin); dark gray, horizontal partings approximately 12 to 14 inches apart, lightly fractured to sound.		95.0
100											100.0

NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

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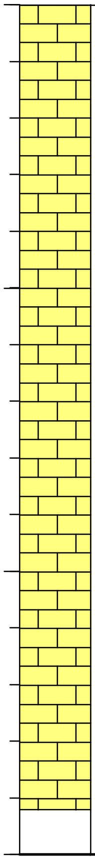
Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG

Well No. MW-1922D
Page: 6 of 6

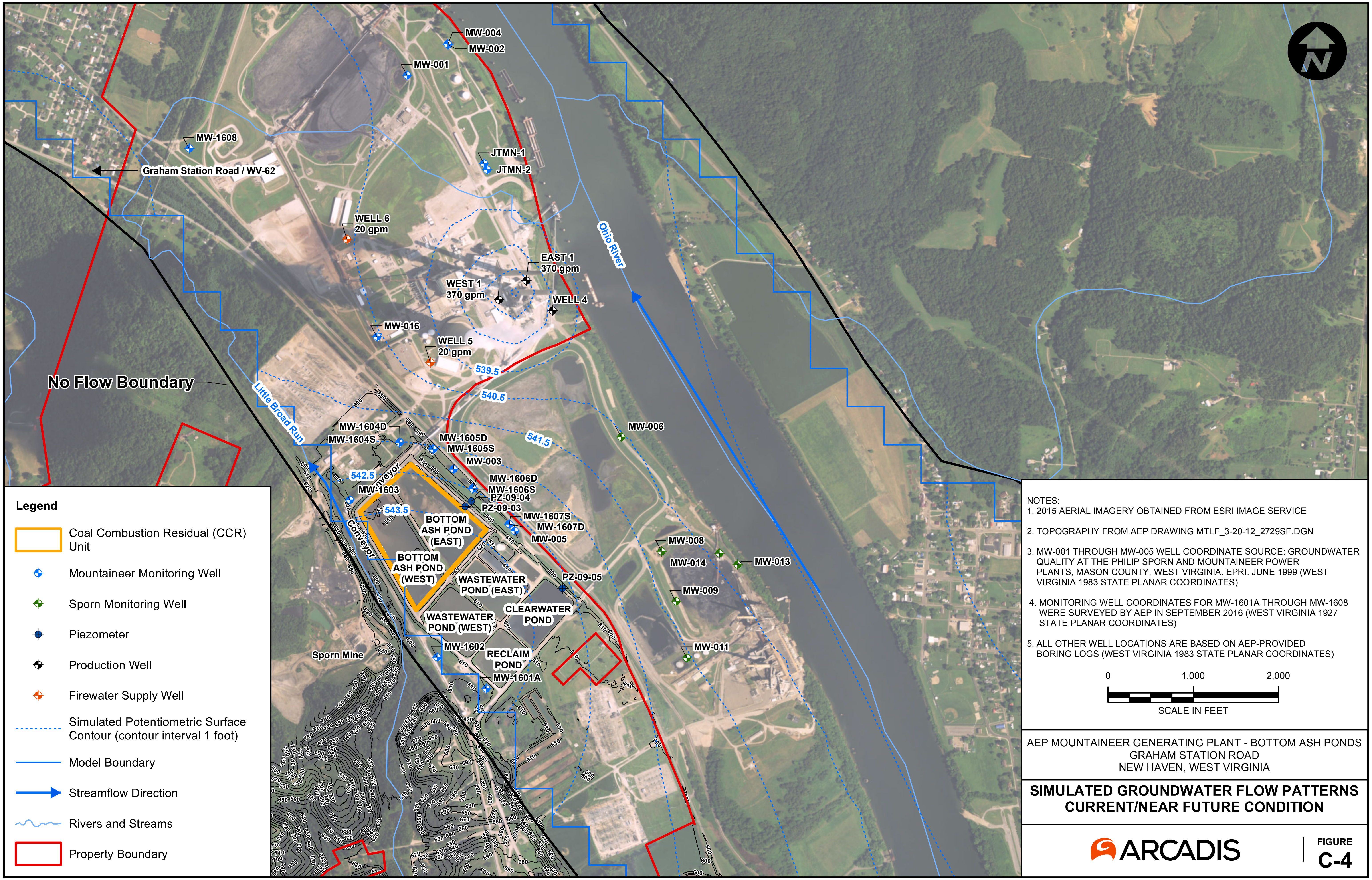
Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft)
100											100.0
				CB 2			9.6	98			
105									(104.2') Moderately hard to moderately soft, medium gray, medium- to fine-grained SANDSTONE (thin to horizontal); dark gray partings every 4 to 6 inches, lightly fractured, sound.		105.0
				CB 3			9.8	100			
110											110.0
									(114.2') Boring terminated.		
115											115.0

NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

ATTACHMENT B
Groundwater Flow Modeling Output



Legend

🟧 Coal Combustion Residual (CCR) Unit

⊕ Mountaineer Monitoring Well

⊕ Sporn Monitoring Well

● Piezometer

⊕ Production Well

⊕ Firewater Supply Well

┄ Simulated Potentiometric Surface Contour (contour interval 1 foot)

— Model Boundary

→ Streamflow Direction

〰 Rivers and Streams

🟥 Property Boundary

NOTES:
1. 2015 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE
2. TOPOGRAPHY FROM AEP DRAWING MTLF_3-20-12_2729SF.DGN
3. MW-001 THROUGH MW-005 WELL COORDINATE SOURCE: GROUNDWATER QUALITY AT THE PHILIP SPORN AND MOUNTAINEER POWER PLANTS, MASON COUNTY, WEST VIRGINIA. EPRI. JUNE 1999 (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)
4. MONITORING WELL COORDINATES FOR MW-1601A THROUGH MW-1608 WERE SURVEYED BY AEP IN SEPTEMBER 2016 (WEST VIRGINIA 1927 STATE PLANAR COORDINATES)
5. ALL OTHER WELL LOCATIONS ARE BASED ON AEP-PROVIDED BORING LOGS (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)

0 1,000 2,000
SCALE IN FEET

AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS
GRAHAM STATION ROAD
NEW HAVEN, WEST VIRGINIA

SIMULATED GROUNDWATER FLOW PATTERNS CURRENT/NEAR FUTURE CONDITION

ARCADIS

FIGURE
C-4

City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb
OH015976.0009.00001 (Mountaineer Ash Pond)
Z:\GISPROJECTS_ENV\AEP\Mountaineer\MXD\Ash Pond Report\Updated September 2016\C-4_ Mtnr Ash Pond Simulated GW Flow Patterns_Current_Future.mxd 10/7/2016 2:55:30 PM

ATTACHMENT C

Bedrock Sampling Analytical Report – Eurofins

1
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12
13

ANALYTICAL REPORT

PREPARED FOR

Attn: Allison Kreinberg
Geosyntec Consultants Inc
500 West Wilson Bridge Road
Suite 250
Worthington, Ohio 43085

Generated 4/18/2023 12:16:08 PM

JOB DESCRIPTION

MTR BAP

JOB NUMBER

240-183413-1

Eurofins Canton
180 S. Van Buren Avenue
Barberton OH 44203

See page two for job notes and contact information.

Job Notes

Authorization

Roxanne Cisneros

Generated
4/18/2023 12:16:08 PM

Authorized for release by
Roxanne Cisneros, Senior Project Manager
roxanne.cisneros@et.eurofinsus.com
(615)301-5761

Table of Contents

Definitions/Glossary

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Job ID: 240-183413-1

Laboratory: Eurofins Canton

Narrative

Job Narrative
240-183413-1

Comments

Run Total Metals - no leaching - per client email request.

Receipt

The samples were received on 4/12/2023 9:45 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 19.6º C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Method	Method Description	Protocol	Laboratory
6020B	Metals (ICP/MS)	SW846	EET CAN
3050B	Preparation, Metals	SW846	EET CAN
Part Size Red	Particle Size Reduction Preparation	None	EET CAN

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CAN = Eurofins Canton, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Sample Summary

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-183413-1	MW-1805-122	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-2	MW-1805-124.5	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-3	MW-1805-128	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-4	MW-1805-130.5	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-5	MW-1922D-104.5	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-6	MW-1922D-111	Solid	12/21/22 00:00	04/12/23 09:45

Detection Summary

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Client Sample ID: MW-1805-122 — Lab Sample ID: 240-183413-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	55	B	0.81	0.048	mg/Kg	2		6020B	Total/NA

Client Sample ID: MW-1805-124.5 — Lab Sample ID: 240-183413-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	4.6	B	0.71	0.043	mg/Kg	2		6020B	Total/NA

Client Sample ID: MW-1805-128 — Lab Sample ID: 240-183413-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	56	B	9.6	0.58	mg/Kg	20		6020B	Total/NA

Client Sample ID: MW-1805-130.5 — Lab Sample ID: 240-183413-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	2.9	B	0.87	0.052	mg/Kg	2		6020B	Total/NA

Client Sample ID: MW-1922D-104.5 — Lab Sample ID: 240-183413-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	4.5	B	0.88	0.053	mg/Kg	2		6020B	Total/NA

Client Sample ID: MW-1922D-111 — Lab Sample ID: 240-183413-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	5.2	B	0.77	0.046	mg/Kg	2		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client Sample ID: MW-1805-122
Lab Sample ID: 240-183413-1
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**55**	**B**	0.81	0.048	mg/Kg		04/13/23 14:00	04/14/23 16:54	2

Client Sample ID: MW-1805-124.5

Lab Sample ID: 240-183413-2

Date Collected: 12/21/22 00:00

Matrix: Solid

Date Received: 04/12/23 09:45

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.6**	**B**	0.71	0.043	mg/Kg		04/13/23 14:00	04/14/23 16:57	2

Client Sample Results

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Client Sample ID: MW-1805-128
Date Collected: 12/21/22 00:00
Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-3
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**56**	**B**	9.6	0.58	mg/Kg		04/13/23 14:00	04/14/23 17:00	20

Client Sample ID: MW-1805-130.5
Date Collected: 12/21/22 00:00
Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-4
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.9**	**B**	0.87	0.052	mg/Kg		04/13/23 14:00	04/14/23 17:02	2

Client Sample Results

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Client Sample ID: MW-1922D-104.5

Date Collected: 12/21/22 00:00
Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-5

Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.5**	**B**	0.88	0.053	mg/Kg		04/13/23 14:00	04/14/23 17:05	2

Client Sample ID: MW-1922D-111
Date Collected: 12/21/22 00:00
Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-6
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	5.2	B	0.77	0.046	mg/Kg		04/13/23 14:00	04/14/23 17:08	2

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 240-569247/1-A ^2
Matrix: Solid
Analysis Batch: 569539

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 569247

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0634	J	1.0	0.060	mg/Kg		04/13/23 14:00	04/14/23 15:49	2

Lab Sample ID: LCS 240-569247/2-A ^2
Matrix: Solid
Analysis Batch: 569539

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 569247

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	100	90.1		mg/Kg		90	80 - 120

Metals

Processed Batch: 569171

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-183413-1	MW-1805-122	Total/NA	Solid	Part Size Red	
240-183413-2	MW-1805-124.5	Total/NA	Solid	Part Size Red	
240-183413-3	MW-1805-128	Total/NA	Solid	Part Size Red	
240-183413-4	MW-1805-130.5	Total/NA	Solid	Part Size Red	
240-183413-5	MW-1922D-104.5	Total/NA	Solid	Part Size Red	
240-183413-6	MW-1922D-111	Total/NA	Solid	Part Size Red	

Prep Batch: 569247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-183413-1	MW-1805-122	Total/NA	Solid	3050B	569171
240-183413-2	MW-1805-124.5	Total/NA	Solid	3050B	569171
240-183413-3	MW-1805-128	Total/NA	Solid	3050B	569171
240-183413-4	MW-1805-130.5	Total/NA	Solid	3050B	569171
240-183413-5	MW-1922D-104.5	Total/NA	Solid	3050B	569171
240-183413-6	MW-1922D-111	Total/NA	Solid	3050B	569171
MB 240-569247/1-A ^2	Method Blank	Total/NA	Solid	3050B	
LCS 240-569247/2-A ^2	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 569539

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-183413-1	MW-1805-122	Total/NA	Solid	6020B	569247
240-183413-2	MW-1805-124.5	Total/NA	Solid	6020B	569247
240-183413-3	MW-1805-128	Total/NA	Solid	6020B	569247
240-183413-4	MW-1805-130.5	Total/NA	Solid	6020B	569247
240-183413-5	MW-1922D-104.5	Total/NA	Solid	6020B	569247
240-183413-6	MW-1922D-111	Total/NA	Solid	6020B	569247
MB 240-569247/1-A ^2	Method Blank	Total/NA	Solid	6020B	569247
LCS 240-569247/2-A ^2	Lab Control Sample	Total/NA	Solid	6020B	569247

Lab Chronicle

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Client Sample ID: MW-1805-122

Lab Sample ID: 240-183413-1
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 16:54

Client Sample ID: MW-1805-124.5

Lab Sample ID: 240-183413-2
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 16:57

Client Sample ID: MW-1805-128

Lab Sample ID: 240-183413-3
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		20	569539	RKT	EET CAN	04/14/23 17:00

Client Sample ID: MW-1805-130.5

Lab Sample ID: 240-183413-4
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 17:02

Client Sample ID: MW-1922D-104.5

Lab Sample ID: 240-183413-5
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 17:05

Client Sample ID: MW-1922D-111
Date Collected: 12/21/22 00:00
Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-6
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 17:08

Laboratory References:

EET CAN = Eurofins Canton, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Accreditation/Certification Summary

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Laboratory: Eurofins Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-27-23 *
Connecticut	State	PH-0590	06-29-23
Florida	NELAP	E87225	06-30-23
Georgia	State	4062	02-28-24
Illinois	NELAP	200004	07-31-23
Iowa	State	421	06-01-23
Kentucky (UST)	State	112225	02-27-23 *
Kentucky (WW)	State	KY98016	12-31-23
Michigan	State	9135	02-27-23 *
Minnesota	NELAP	039-999-348	12-31-23
Minnesota (Petrofund)	State	3506	08-01-23
New Jersey	NELAP	OH001	06-30-23
New York	NELAP	10975	04-01-24
Ohio	State	8303	02-27-24
Ohio VAP	State	ORELAP 4062	02-27-24
Oregon	NELAP	4062	02-28-24
Pennsylvania	NELAP	68-00340	08-31-23
Texas	NELAP	T104704517-22-17	08-31-23
Virginia	NELAP	460175	09-14-23
West Virginia DEP	State	210	12-31-23

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

urofins Canton
30 S. Van Buren Ave

arberton, OH 44203-3543
ione 330.497.9396 fax 330.497.0772

19.4/19.6

Chain of Custody Record

eurofins Environment Testing America

Regulatory Program:

Eurofins Environment Testing America

Client Contact	Project Manager: Allison Kreinberg	Site Contact:	Date: 4/6/2023
eosyntec Consultants	Email: Akreinberg@geosyntec.com	Lab Contact:	Carrier:
00 West Wilson Bridge Road, Suite 250	Tel/Fax: 614-468-0421		
orthington, OH 43085	Analysis Turnaround Time		
4-468-0421	TAT if different from Below		
xx) xxx-xxxx FAX			
oject Name: MTR BAP			
te: MTR			
O # CHA8495B/07			

COC No:
1 of 1 COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	am / Mtal Arse	Sample Specific Notes:
MW-1805-122	12/21/22		G	Rock	1	X	
MW-1805-124.5	12/21/22		G	Rock	1	X	Please complete DI water leach on all samples prior to analysis
MW-1805-128	12/21/22		G	Rock	1	X	
MW-1805-130.5	12/21/22		G	Rock	1	X	
MW-1922D-104.5	12/21/22		G	Rock	1	X	
MW-1922D-111	12/21/22		G	Rock	1	X	

240-183413 Chain of Custody

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

ossible Hazard Identification:
e any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments
ection if the lab is to dispose of the sample.

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

pecial Instructions/QC Requirements & Comments:

Custody Seals Intact:	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
elinquished by:	Company:	Date/Time:	Received by: Rachelle	Company: EETAC	Date/Time: 4/12/23 945
elinquished by:	Company: MINERALOGY	Date/Time: 04/11/23 1600	Received by:	Company:	Date/Time:
elinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

1

Eurofins - Canton Sample Receipt Form/Narrative **Login # :**________
Barberton Facility

Client Geosyntec Site Name________ Cooler unpacked by: Rochelle Haidet
Cooler Received on 4 12 23 Opened on 4 12 23
FedEx: 1st Grd [✓ Exp] UPS FAS Clipper Client Drop Off Eurofins Courier Other________

Receipt After-hours: Drop-off Date/Time________ Storage Location________

4/12/23 RH

Eurofins Cooler # EC Foam Box Client Cooler [✓ Box] Other________
Packing material used: Bubble Wrap Foam [✓ Plastic Bag] None Other________
COOLANT: Wet Ice Blue Ice Dry Ice Water [✓ None]

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
IR GUN # 13 (CF +2 °C) Observed Cooler Temp. 19.4 °C Corrected Cooler Temp. 19.6 °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity______ Yes [✓ No]
-Were the seals on the outside of the cooler(s) signed & dated? Yes No [✓ NA]
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes [✓ No]
-Were tamper/custody seals intact and uncompromised? Yes No [✓ NA]
3. Shippers' packing slip attached to the cooler(s)? [✓ Yes] No
4. Did custody papers accompany the sample(s)? [✓ Yes] No
5. Were the custody papers relinquished & signed in the appropriate place? [✓ Yes] No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes [✓ No]
7. Did all bottles arrive in good condition (Unbroken)? [✓ Yes] No
8. Could all bottle labels (ID/Date/Time) be reconciled with the COC? [✓ Yes] No
9. For each sample, does the COC specify preservatives ([✓ Y]/N), # of containers ([✓ Y]/N), and sample type of grab/comp ([✓ Y]/N)?
10. Were correct bottle(s) used for the test(s) indicated? [✓ Yes] No
11. Sufficient quantity received to perform indicated analyses? [✓ Yes] No
12. Are these work share samples and all listed on the COC? Yes [✓ No]
If yes, Questions 13-17 have been checked at the originating laboratory.
13. Were all preserved sample(s) at the correct pH upon receipt? Yes No [✓ NA] pH Strip Lot# **HC203864**
14. Were VOAs on the COC? Yes [✓ No]
15. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No [✓ NA]
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #________ Yes [✓ No]
17. Was a LL Hg or Me Hg trip blank present? ________ Yes [✓ No]

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM ________ Date ________ by ________ via Verbal Voice Mail Other

Concerning ________

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page

Samples processed by:

19. SAMPLE CONDITION
Sample(s) ________ were received after the recommended holding time had expired.
Sample(s) ________ were received in a broken container.
Sample(s) ________ were received with bubble >6 mm in diameter. (Notify PM)

20. SAMPLE PRESERVATION

Sample(s) ________ were further preserved in the laboratory.
Time preserved: ________ Preservative(s) added/Lot number(s): ________

VOA Sample Preservation - Date/Time VOAs Frozen: ________

WI-NC-099

ATTACHMENT D

Bedrock Sampling Analytical Report – Mineralogy, Inc.

Test Report

Client:	Geosyntec Consultants	MI#:	23009
Project:	Mountaineer ASD	Date:	03/16/23
Location:	New Haven, WV	P.O.#:	CHA0495/07/02

Client	Geosyntec		
	Attn: Allison Kreinberg		
Email	akreinberg@geosyntec.com	**Phone**	614-468-0421

Method(s)	**Timothy B. Murphy**
X-ray Diffraction (XRD) X-ray Fluorescence (XRF) Scanning Electron Microscopy (SEM)	Timothy B. Murphy

- Conditions & Qualifications
- X-ray Diffraction
- X-ray Fluorescence
- MW-1805-122
- MW-1805-124.5
- MW-1805-128
- MW-1805-130
- MW-1922D-104.5
- MW-1922D-111

CONDITIONS AND QUALIFICATIONS

Mineralogy, Inc. will endeavor to provide accurate and reliable laboratory measurements of the samples provided by the client. The results of any x-ray diffraction, petrographic or core analysis test are necessarily influenced by the condition and selection of the samples to be analyzed. It should be recognized that geological samples are commonly heterogeneous and lack uniform properties. Mineralogical, geochemical and/or petrographic data obtained for a specific sample provides compositional data pertinent to that specific sampling location. Such "site-specific data" may fail to provide adequate characterization of the range of compositional variability possible within a given project area, thus the "projection" of these laboratory findings and values to adjoining, "untested" areas of the formation or project area is inherently risky, and exceeds the scope of the laboratory work request. Hence, Mineralogy, Inc. shall not assume any liability risk or responsibility for any loss or potential failure associated with the application of "site or sample-specific laboratory data" to "untested" areas of the formation or project area. Unless otherwise directed, the samples selected for analysis will be chosen to reflect a visually representative portion of the bulk sample submitted for analysis. Where provided, the interpretation of x-ray diffraction, petrographic or core analysis results constitutes the best geological judgment of Mineralogy, Inc., and is subject to the sampling limitations described above, and the detection limits inherent to semi-quantitative and/or qualitative mineralogical and microscopic analysis. Mineralogy, Inc. assumes no responsibility nor offers any guarantee of the productivity, suitability or performance of any oil or gas well, hydrocarbon recovery process, dimension stone, and/or ore material based upon the data or conclusions presented in this report.

This report is to only be replicated in its entirety.

Sample Retention: Samples will be stored for a period of 30 days and thereafter discarded. If additional sample storage time and/or return shipping is required, appropriate charges will be billed to the client.

X-ray Diffraction

Table I.1

Client:	Geosyntec Consultants	MI#:	23009
Project:	Mountaineer ASD	P.O.#:	CHA0495/07/02
Location:	New Haven, WV	Method:	X-ray Diffraction

Mineral Constituent	Lab ID:	23009-01	23009-02	23009-03	23009-04
	Sample ID:	MW-1805 122’	MW-1805 124.5’	MW-1805 128’	MW-1805 130.5’
	Chemical Formula	Relative Abundance (%)			
Quartz	SiO_2	24	73	4	32
Plagioclase Feldspar	$(Na,Ca)AlSi_3O_8$	5	7		7
K-Feldspar	$KAlSi_3O_8$	1	8		1
Calcite	$CaCO_3$	<0.5	<0.5		
Siderite	$FeCO_3$	2	<0.5		1.5
Pyrite	FeS_2		<0.5	4	0.5
Kaolinite	$Al_2Si_2O_5(OH)_4$	11	7.5	6	10
Chlorite	$(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$	16	0.5		14
Illite / Mica	$KAl_2(Si_3AlO_{10})(OH)_2$	39	4	1	33
Mixed-Layered Illite/Smectite	$K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$	2		1	1
Amorphous				84	
Total		**100**	**100**	**100**	**100**
% Illite in ML I/S		*90%*		*BDL**	*80%*

**BDL = Below Detection Limit*

X-ray Diffraction

Table I.2

Client:	Geosyntec Consultants	MI#:	23009
Project:	Mountaineer ASD	P.O.#:	CHA0495/07/02
Location:	New Haven, WV	Method:	X-ray Diffraction

Mineral Constituent	Lab ID:	23009-05	23009-06
	Sample ID:	MW-1922D 104.5’	MW-1922D 111’
	Chemical Formula	Relative Abundance (%)	
Quartz	SiO_2	86	85
Plagioclase Feldspar	$(Na,Ca)AlSi_3O_8$	4	3
K-Feldspar	$KAlSi_3O_8$	1	2
Calcite	$CaCO_3$	0.5	
Goethite	alpha-FeOOH		0.5
Siderite	$FeCO_3$		
Pyrite	FeS_2		
Hematite	alpha-Fe_2O_3		0.5
Kaolinite	$Al_2Si_2O_5(OH)_4$	6	6
Chlorite	$(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$		<0.5
Illite / Mica	$KAl_2(Si_3AlO_{10})(OH)_2$	2.5	3
Mixed-Layered Illite/ Smectite	$K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$	<0.5	
Total		**100**	**100**
% Illite in ML I/S		*80%*	

**BDL = Below Detection Limit*

X-ray Fluorescence

Table II

Client:	Geosyntec Consultants	MI#:	23009
Project:	Mountaineer ASD	P.O.#:	CHA0495/07/02
Location:	New Haven, WV	Method:	X-ray Fluorescence

Lab ID:	**23009-01**	**23009-02**	**23009-03**	**23009-04**	**23009-05**	**23009-06**
Sample ID:	**MW-1805 122’**	**MW-1805 124.5’**	**MW-1805 128’**	**MW-1805 130.5’**	**MW-1922D 104.5’**	**MW-1922D 111’**
Elemental Phase	**Results (Mass %)**					
Na2O	0.6707	0.5154	0.1887	0.695	0.3969	0.515
MgO	1.9617	0.2376	0.1567	1.6714	0.2043	0.2466
Al2O3	25.3368	8.1773	12.5199	22.3427	6.1898	7.5659
SiO2	54.4381	86.849	20.9049	58.5764	90.4786	88.2277
P2O5	0.0935	0.0205	0.0895	0.0615	0.0277	0.0572
S	0.6678	0.181	14.7595	1.0398	0.1592	0.2296
Cl	0.0036	0.0038	0.1484	0.0132	0.0138	0.0055
K2O	4.3886	1.828	1.3919	3.4114	0.6282	1.0262
CaO	0.2795	0.0537	1.2244	0.1757	0.2123	0.1336
TiO2	1.6125	0.2621	1.0809	1.1403	0.1182	0.1589
Cr	0.0181	ND	ND	ND	ND	ND
MnO	0.0635	0.0115	0.0234	0.0461	0.0063	0.0065
Fe2O3	9.1735	1.5038	24.8472	9.0787	1.2773	1.4397
Zn	0.021	ND	ND	0.0205	ND	ND
As	ND	ND	0.1825	ND	ND	ND
Rb	0.0213	0.0071	ND	0.016	ND	ND
Sr	0.0189	0.0062	0.0952	0.0143	ND	ND
Y	0.005	ND	ND	0.0029	ND	ND
Zr	0.0607	0.0164	ND	0.0376	0.0115	0.011
BaO	0.1239	0.0483	0.217	0.077	0.0337	0.029

ND = Not Detected

Geosyntec Consultants
Mountaineer | New Haven, WV

MW-1805-122
MI#23009-01 - SEM

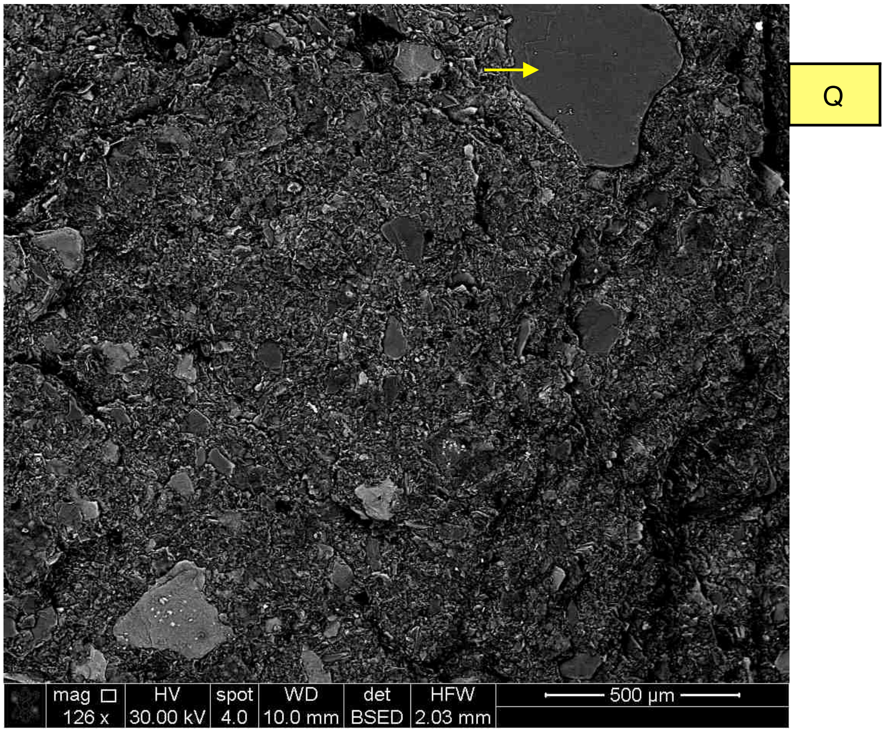
Summary: This core sample is characterized as a medium gray (N5), compact parallel-bedded, non-porous, micaceous, silty shale. The shale mineralogy is dominated by clay minerals and mica which together account for ~ 68% of the sample mass. The clay mineral suite is enriched with respect to illite/mica (~39%), chlorite (~16%), and kaolinite (~11%), coupled with relatively minor amounts of mixed-layered illite/smectite (~2%). The detrital silt and sand grains are moderately to poorly sorted, sub-rounded, and matrix-supported. The detrital grain assemblage includes quartz (~24%) plagioclase feldspar (~5%) and minor amounts of k-feldspar (~1%). Minor amounts of siderite (~2%) are also present in the silty shale. SEM Figures 1A through 1C provide backscatter & scanning electron views of a typical bedding plane surface. Traces of microporosity are locally present flanking the silt and sand grains. Figures 1D through 1F provide images of the shale fabric in cross section. The SEM images reveal the presence of scattered, lens-shaped macropores & micropores, preserved and sheltered by the propping effect of randomly distributed silt and sand grains.

23009-01 Photo Index:

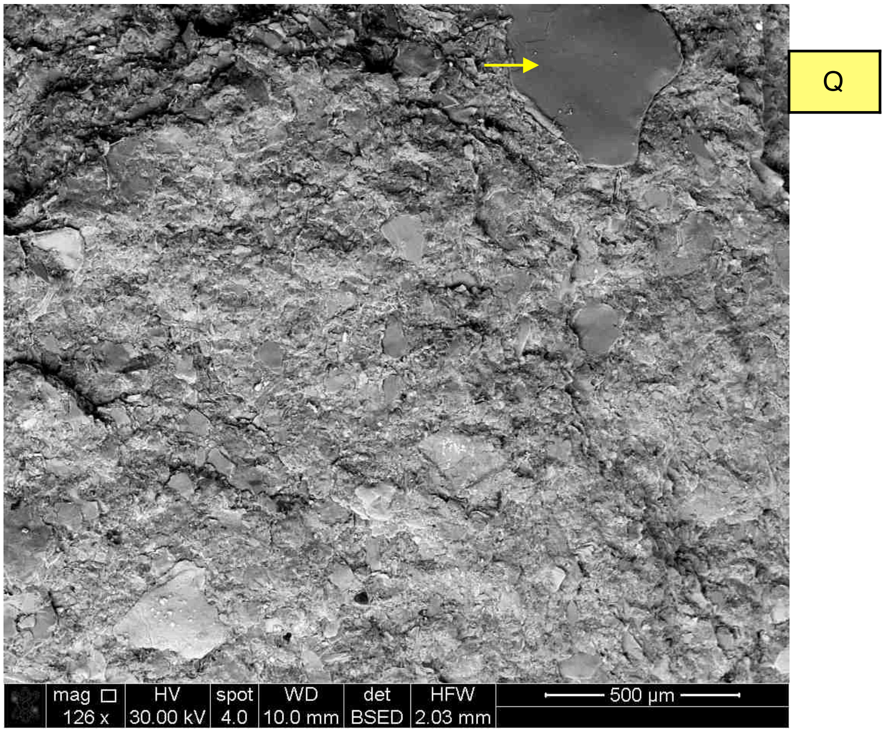
Sample ID	Magnification
23009-01A	126X
23009-01B	126X
23009-01C	500X
23009-01D	126X
23009-01E	1500X
23009-01F	6000X

Sheltered macro-porosity	BP
Detrital clay matrix	DM
Detrital quartz	Q
Intercrystalline microporosity	uP

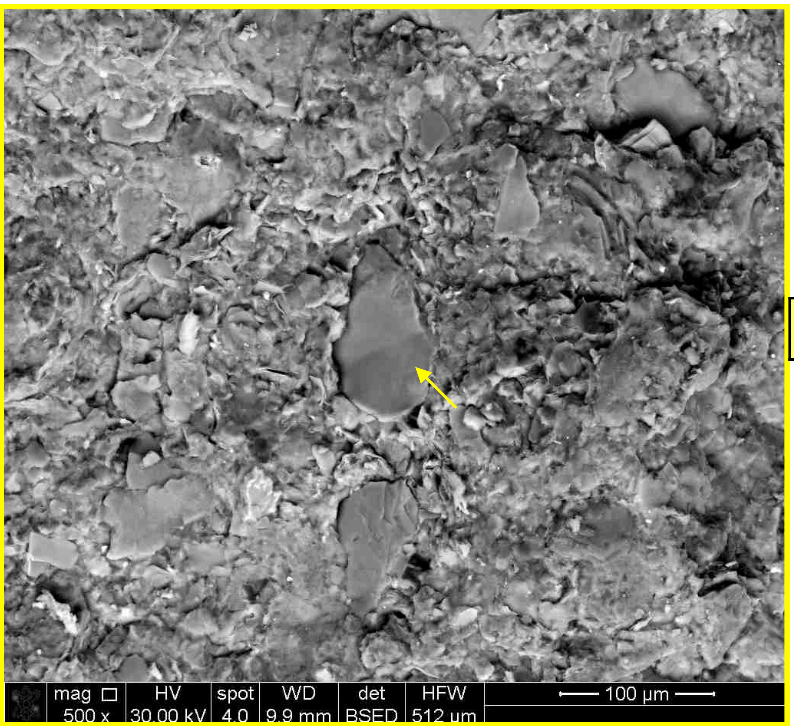
23009-01A 126X



23009-01B 126X

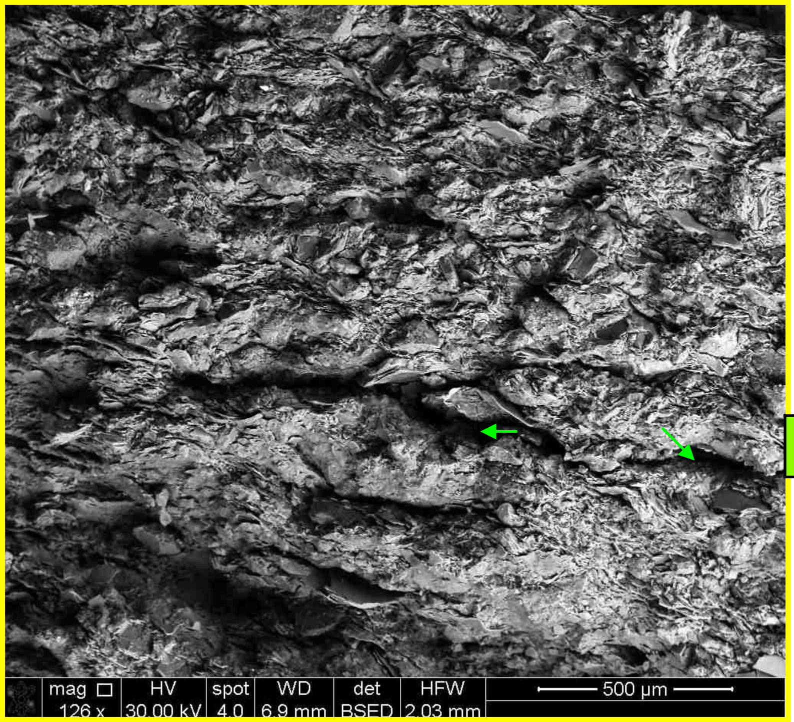


23009-01C 500X



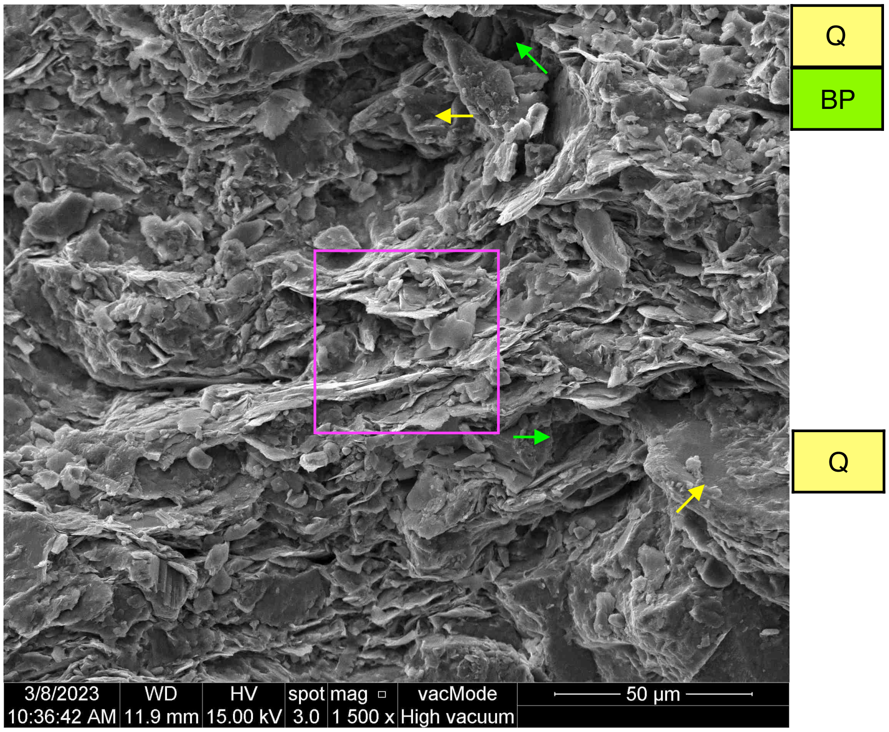
Q

23009-01D 126X

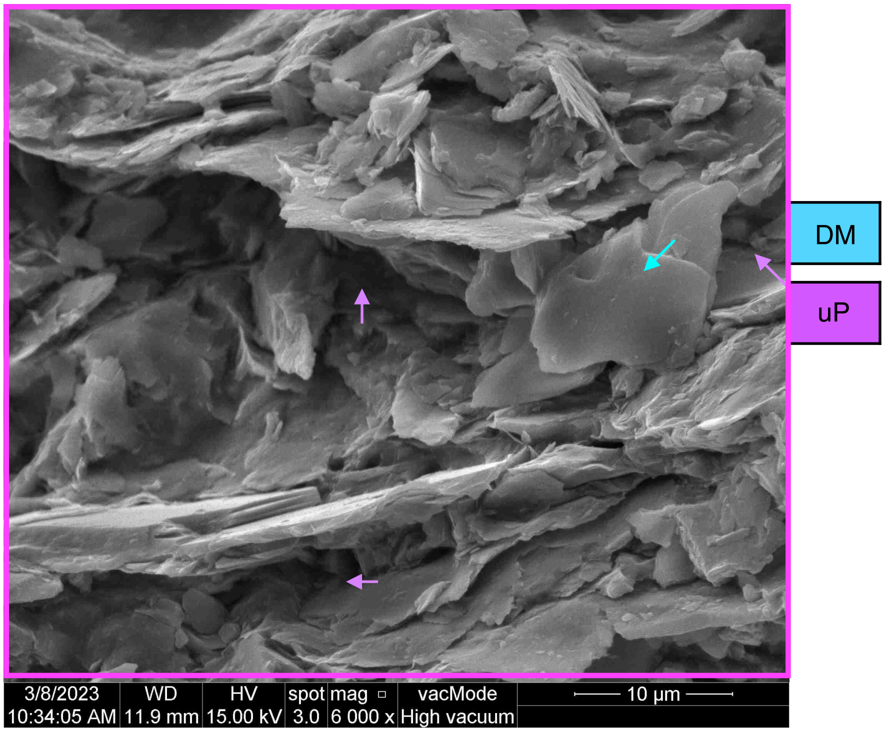


BP

23009-01E 1500X



23009-01F 6000X



Geosyntec Consultants
Mountaineer | New Haven, WV

MW-1805-124.5
MI#23009-02 - SEM

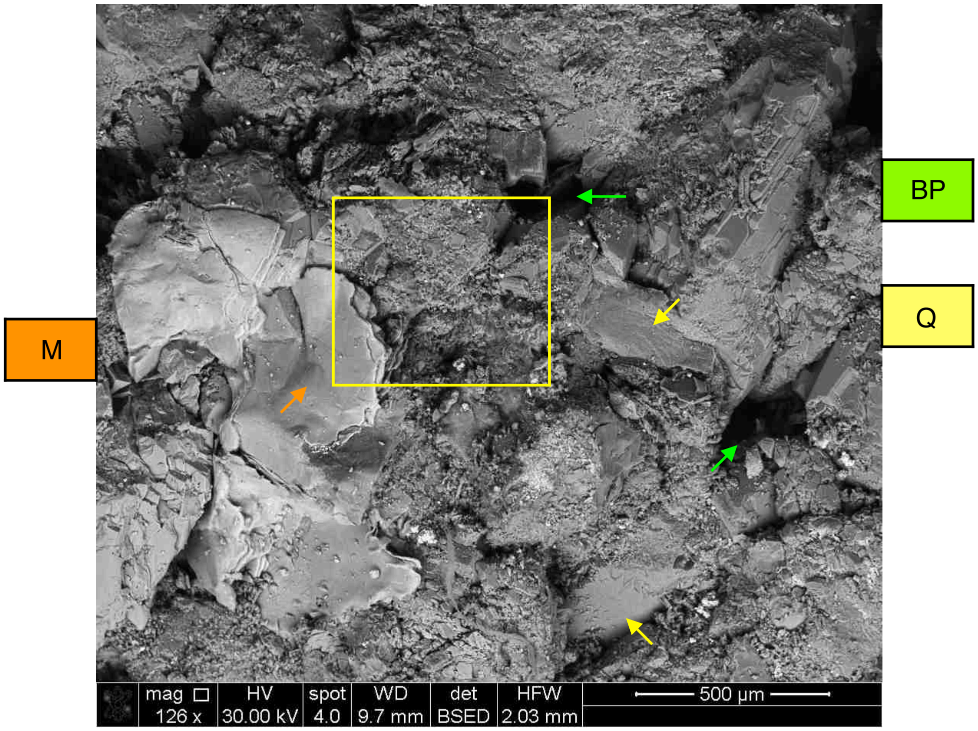
Summary: This core interval is comprised of light gray (N8), cross-bedded, medium-grained, well sorted, quartz-cemented, sub-arkosic sandstone. The sandstone fabric is well-cemented & moderately porous, with scattered intergranular macropores. Pore-filling authigenic kaolinite clay is scattered throughout the sandstone framework, occurring as vermicular stacks of clay platelets (see Figures 2E & 2F). The quartz-rich framework is well-cemented with authigenic quartz overgrowths. Total macroporosity for this sandstone is estimated to comprise ~ 6-9% of the sandstone bulk volume. The mineralogy of the sandstone is dominated by quartz (73%), feldspar [including plagioclase (7%) and k-feldspar (8%)], kaolinite (7.5%), illite / mica (4%), and scattered traces (i.e., <0.5%) of siderite, calcite, and pyrite.

23009-02 Photo Index:

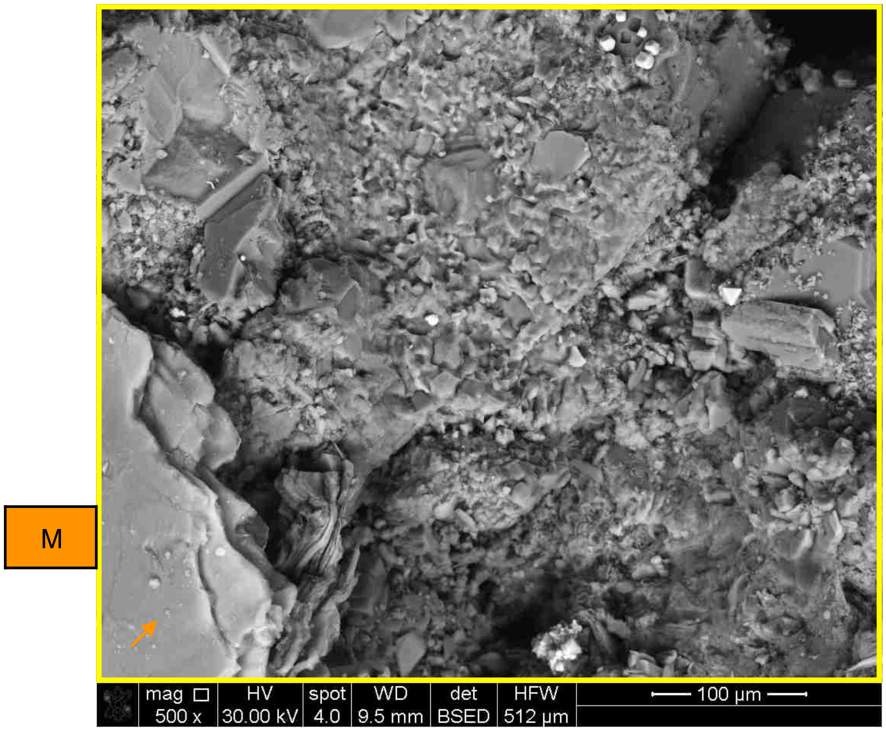
Sample ID	Magnification
23009-02A	126X
23009-02B	500X
23009-02C	500X
23009-02D	126X
23009-02E	1000X
23009-02F	8000X

Intergranular macro-porosity	BP
Detrital quartz	Q
Quartz overgrowth cement	OG
Authigenic Kaolinite	K
Mica	M

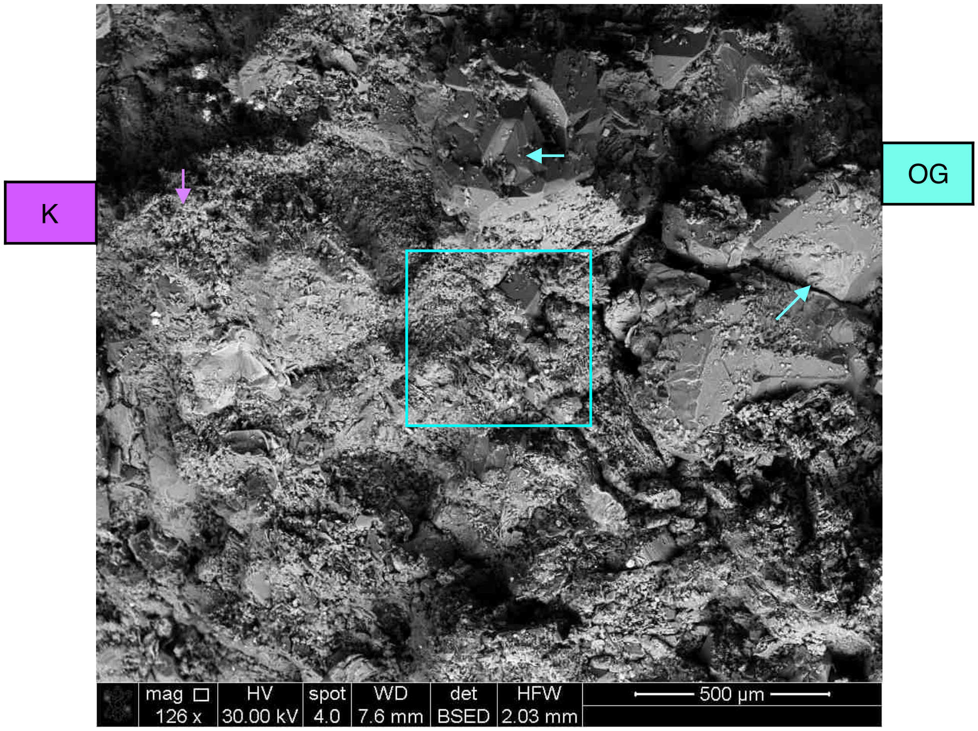
23009-02A 126X



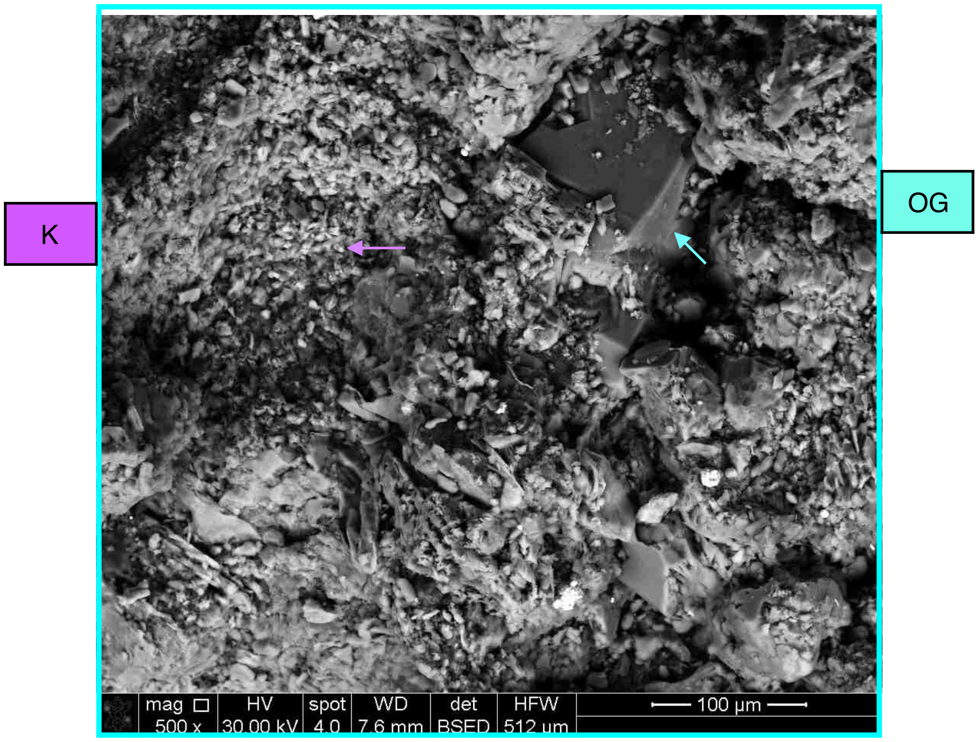
23009-02B 500X



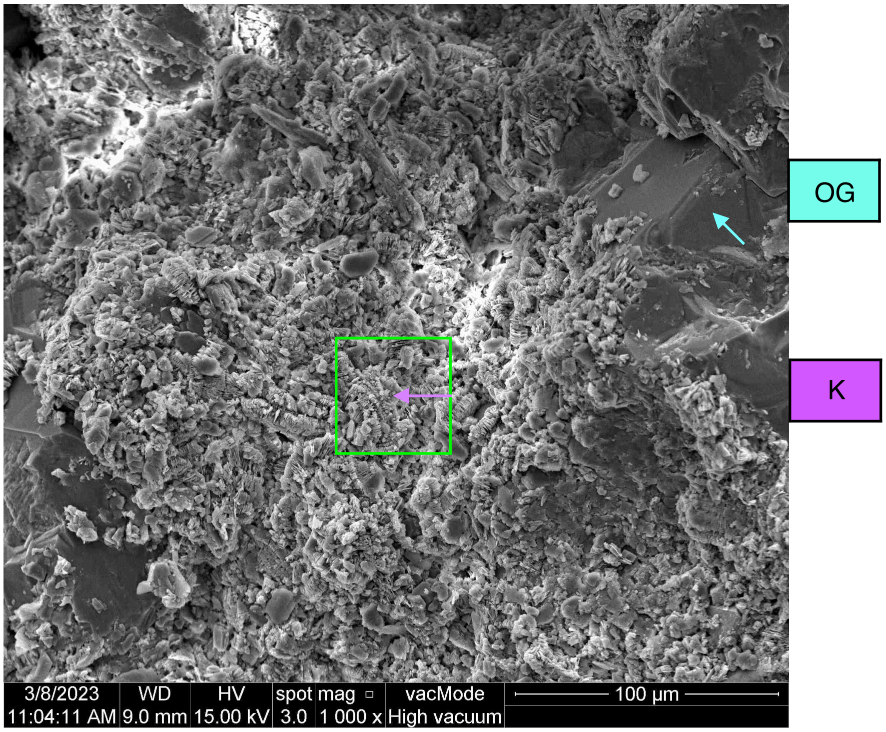
23009-02C 500X



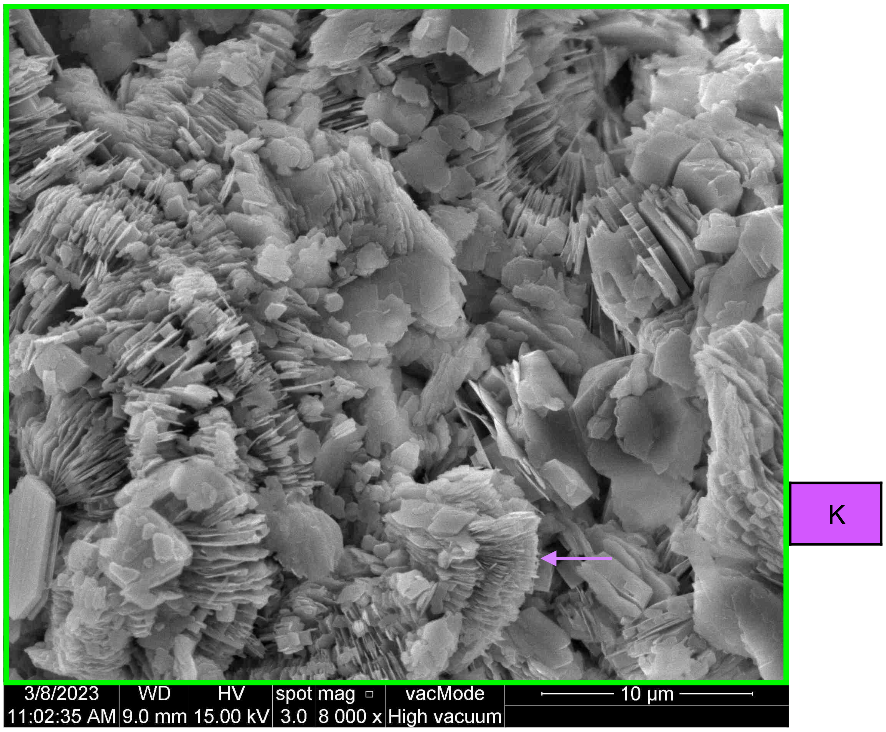
23009-02D 126X



23009-02E 1000X



23009-02F 8000X



Geosyntec Consultants
Mountaineer | New Haven, WV

MW-1805-128
MI#23009-03 - SEM

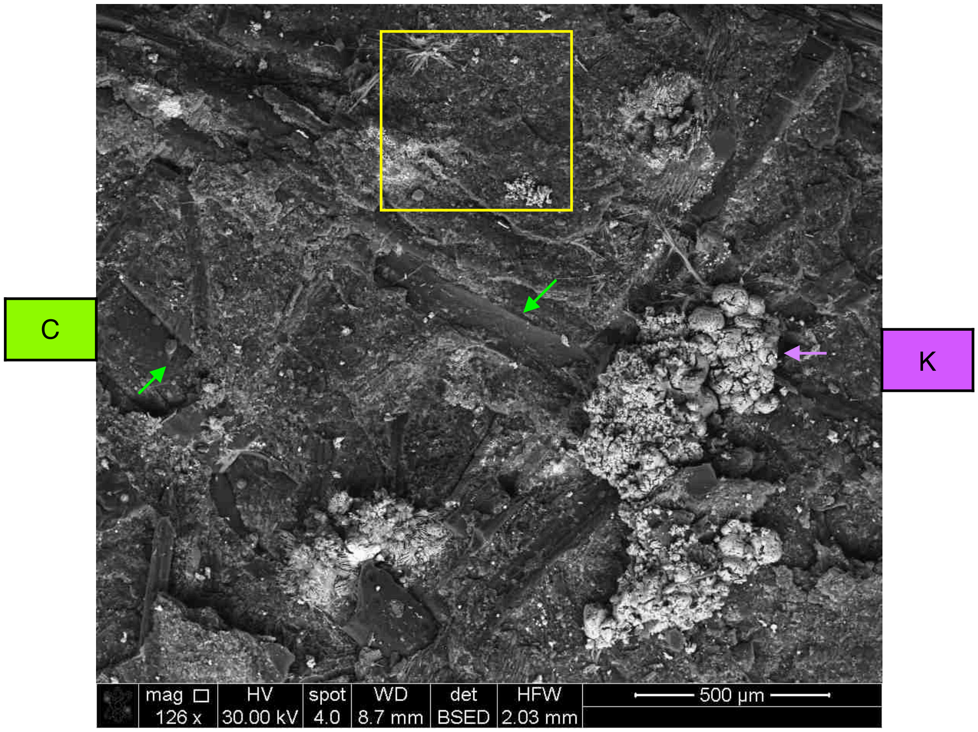
Summary: A compact, parallel bedded seam of coal is present at core depth 128’. Based on the x-ray diffraction pattern collected for this material, the organic matter is estimated to exhibit a maximum rank of medium to low volatile bituminous coal. The mineralogical analysis indicates that thermally altered organic matter (coal) comprises ~84% of the sample mass. The inorganic mineral fraction includes a mixture of clay matrix minerals (~8%), quartz (~4%), and pyrite (~4%). The clay mineral fraction is comprised of kaolinite coupled with minor amounts of illite & mixed-layered illite/smectite. The pyrite & clay minerals are typically present as authigenic minerals that have crystallized within fractures and dissolution voids contained within the coal.

23009-03 Photo Index:

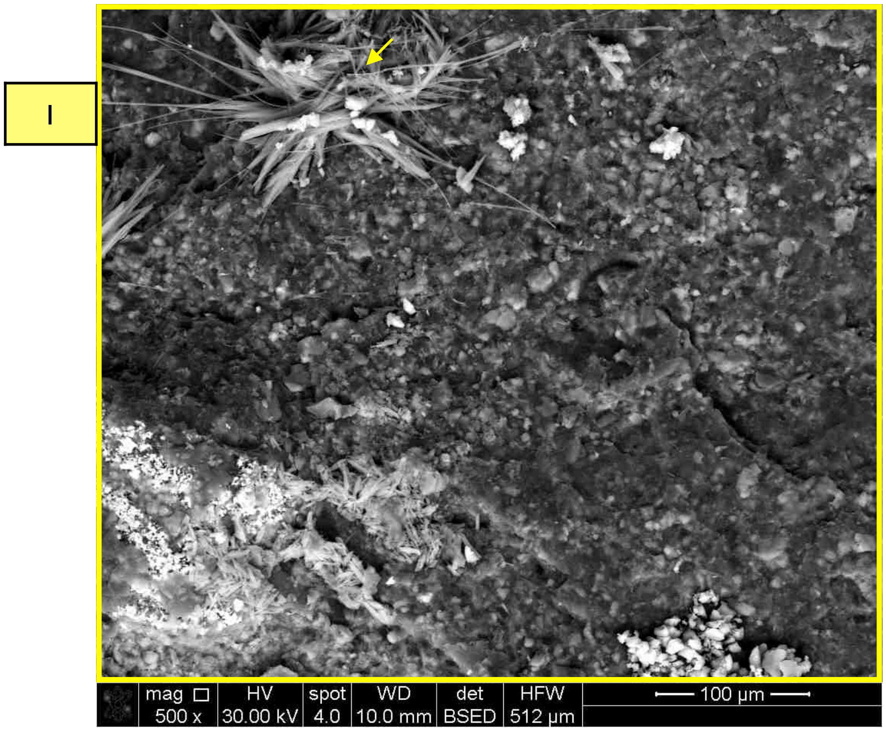
Sample ID	Magnification
23009-03A	126X
23009-03B	500X
23009-03C	150X
23009-03D	5000X

Coal maceral	C
Pyrite	P
Illite	I
Kaolinite	K

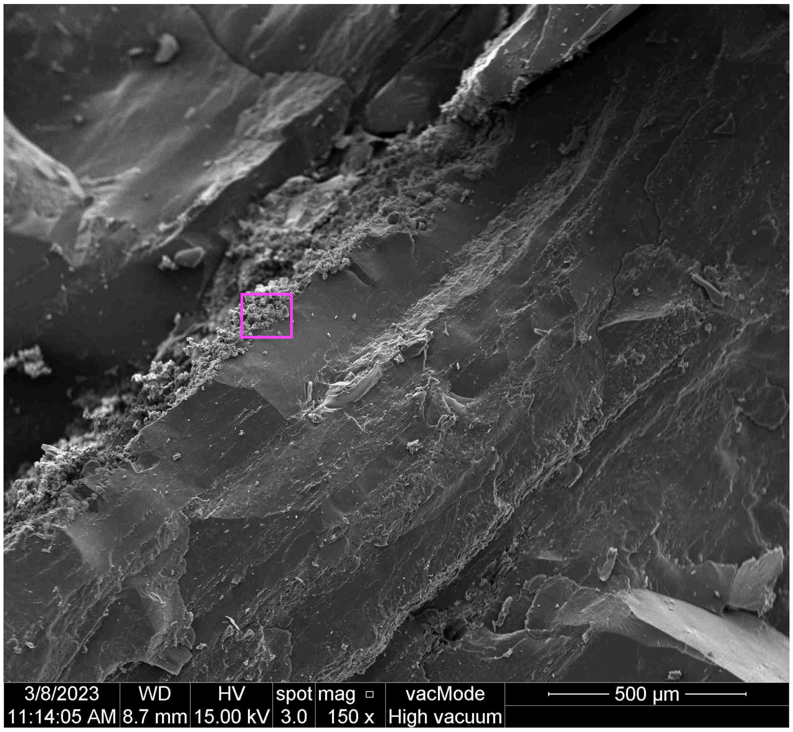
23009-03A 126X



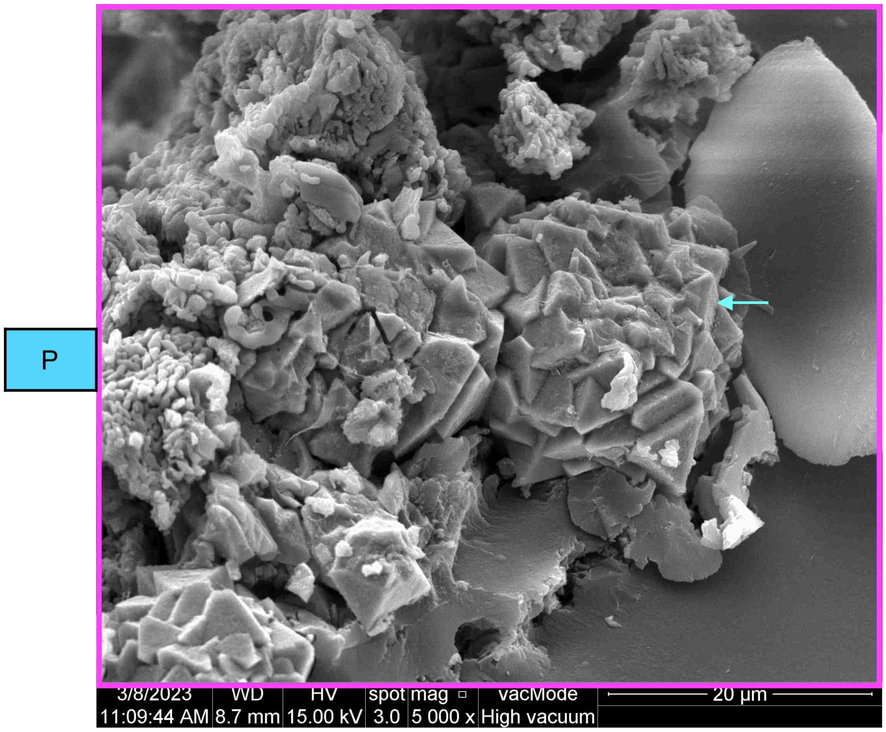
23009-03B 500X



23009-03C 150X



23009-03D 5000X



Geosyntec Consultants
Mountaineer | New Haven, WV

MW-1805-130.5
MI#23009-04 - SEM

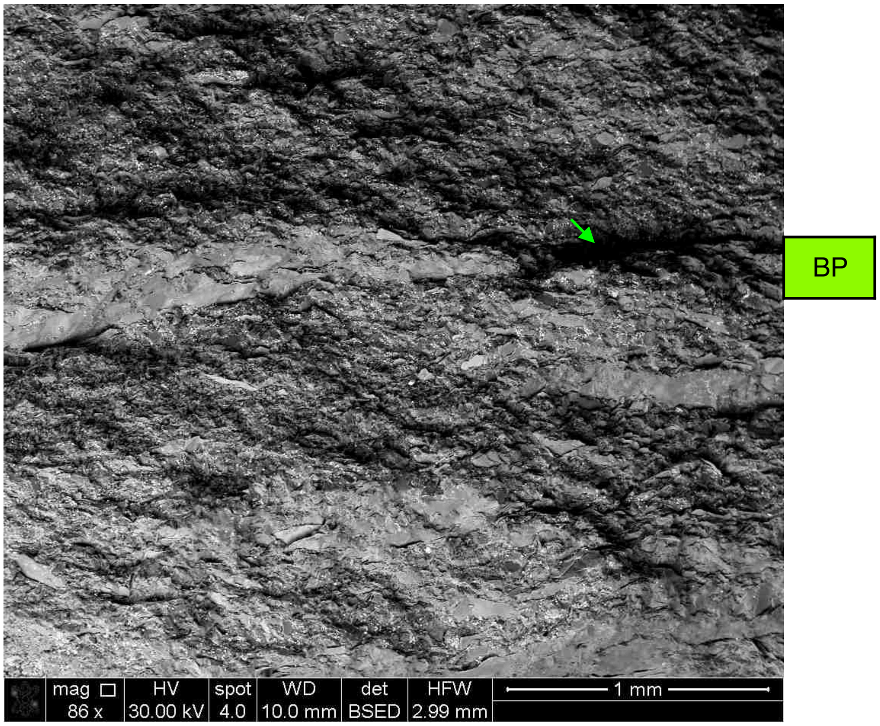
Summary: This core interval is comprised of medium light gray (N6), compact, parallel-bedded, non-porous, micaceous, silty shale / clay-rich siltstone. The silt-rich grain fraction is sub-arkosic, moderately sorted, and sub-rounded to sub-angular. The relative proportion of silt & clay matrix / mica is variable between individual bedding layers, with some interbeds characterized as clay-rich (grain-supported) siltstones. Minute mica laths are abundant throughout the sedimentary fabric. Based on the XRD mineralogical analysis, clay minerals account for ~ 58% of the mineral mass. The clay mineral suite includes illite / mica (~33%), chlorite (~14%), kaolinite (~10%), and mixed-layered illite/smectite (~1%). Silt grain materials are dominated by quartz (~32%) and feldspar [including plagioclase (~7%) and k-feldspar (~1%)]. Minor amounts of siderite cement (~1.5%) and pyrite (~0.5%) are also present, distributed as minute (~1-5 um diameter) crystals dispersed throughout the clay-rich groundmass. Total void space is estimated to account for <2% of the bulk volume. The sedimentary fabric includes small amounts of residual macroporosity & microporosity. The sheltered interparticle voids are locally preserved as minute, lens-shaped voids that appear isolated due to the pervasive distributions of detrital clay matrix.

23009-04 Photo Index:

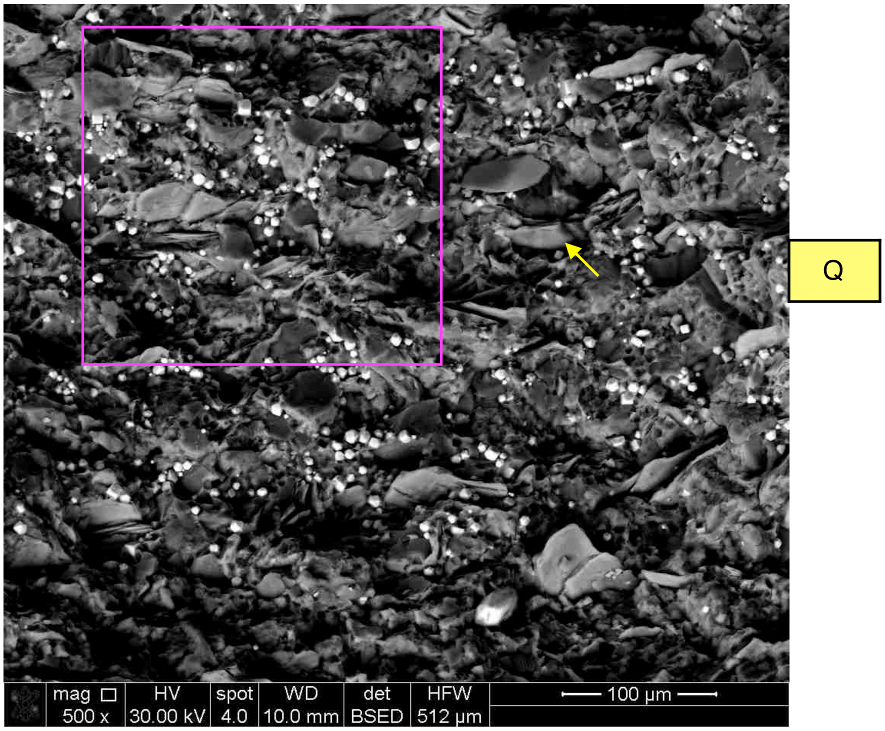
Sample ID	Magnification
23009-04A	86X
23009-04B	500X
23009-04C	2000X
23009-04D	1000X
23009-04E	126X

Intergranular micro + macro-porosity	BP
Siderite	S
Detrital clay matrix	DM
Quartz	Q
Mica	M

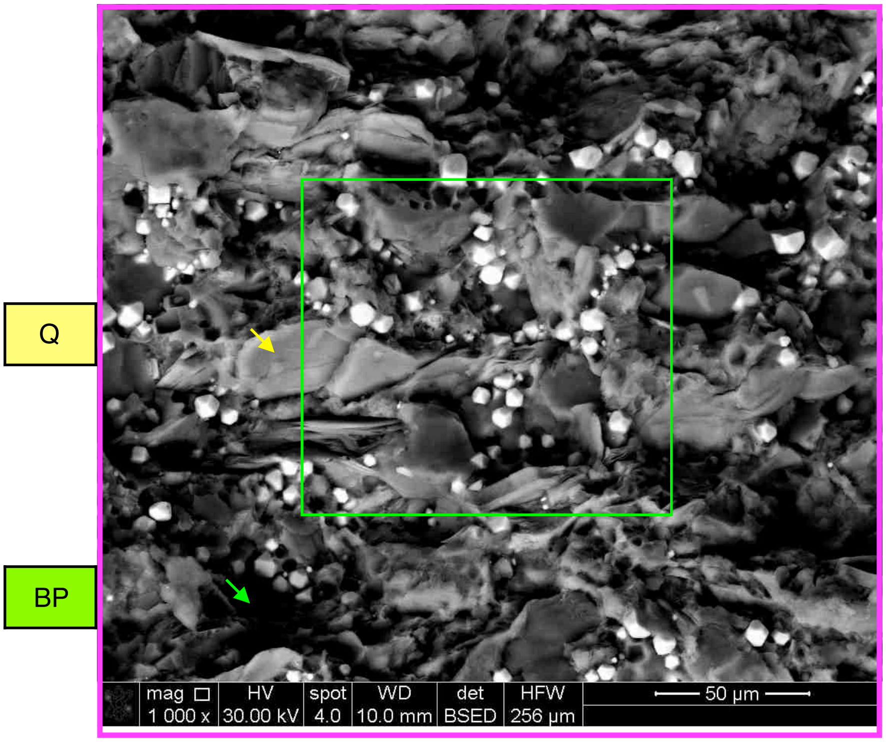
23009-04A 86X



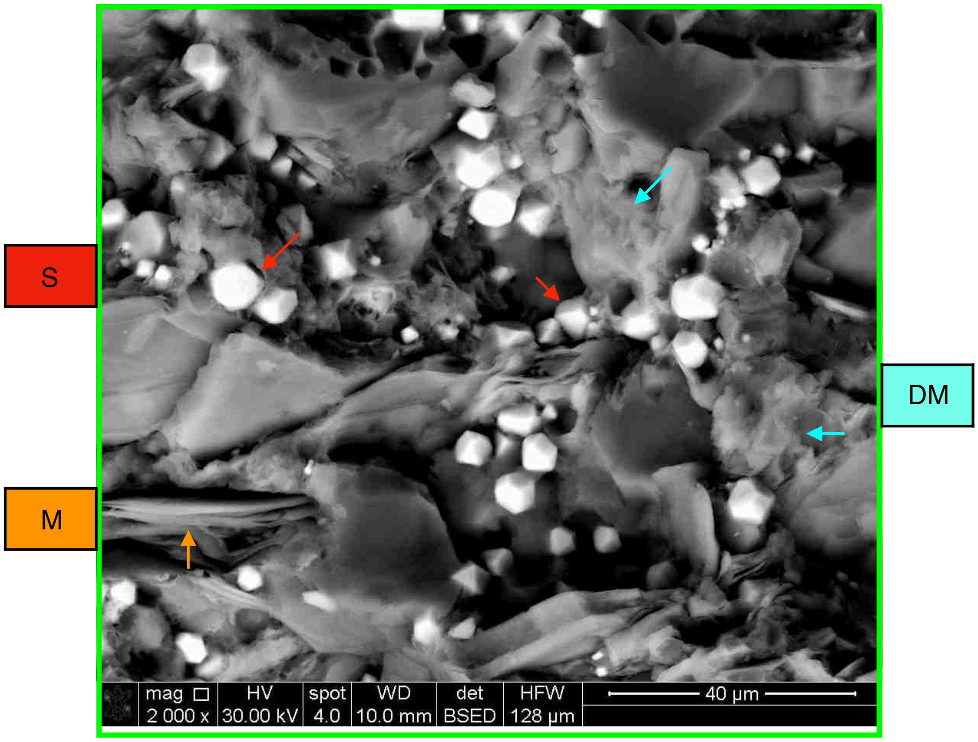
23009-04B 500X



23009-04C 2000X



23009-04D 1000X



Geosyntec Consultants
Mountaineer | New Haven, WV

MW-1922D-104.5
MI#23009-05 - SEM

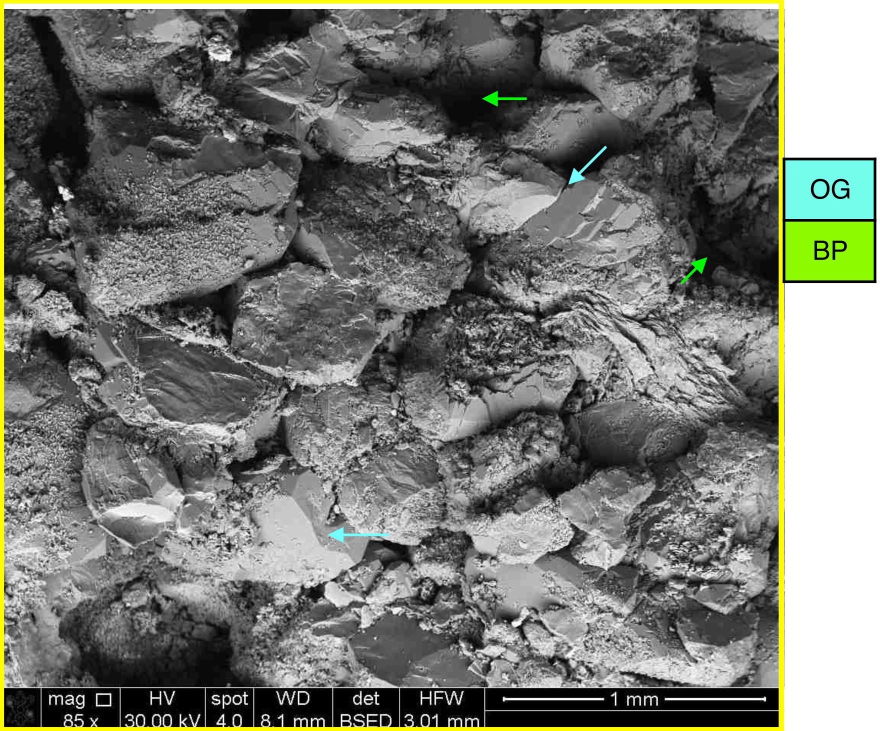
Summary: This core sample is characterized as a cross-bedded, medium-grained, well-sorted, quartz-cemented, moderately porous, sub-arkosic sandstone. The framework is compact and exhibits common point-to-point & elongated intergranular contacts. Rims of syntaxial quartz overgrowth cement are locally inter grown along contacts shared by adjoining quartz grains. Scattered feldspar grains exhibit indications of intra-particle corrosion and localized replacement with authigenic kaolinite. The mineralogy of the sandstone is comprised of quartz (~86%), plagioclase feldspar (~4%), k-feldspar (~1%), kaolinite (~6%), illite / mica (~2.5%), and traces of calcite (0.5%), and mixed-layered illite/smectite (<0.5%) [seeTable I]. Macroporosity is visually estimated to comprise ~ 8-10% of the sandstone bulk volume.

23009-05 Photo Index:

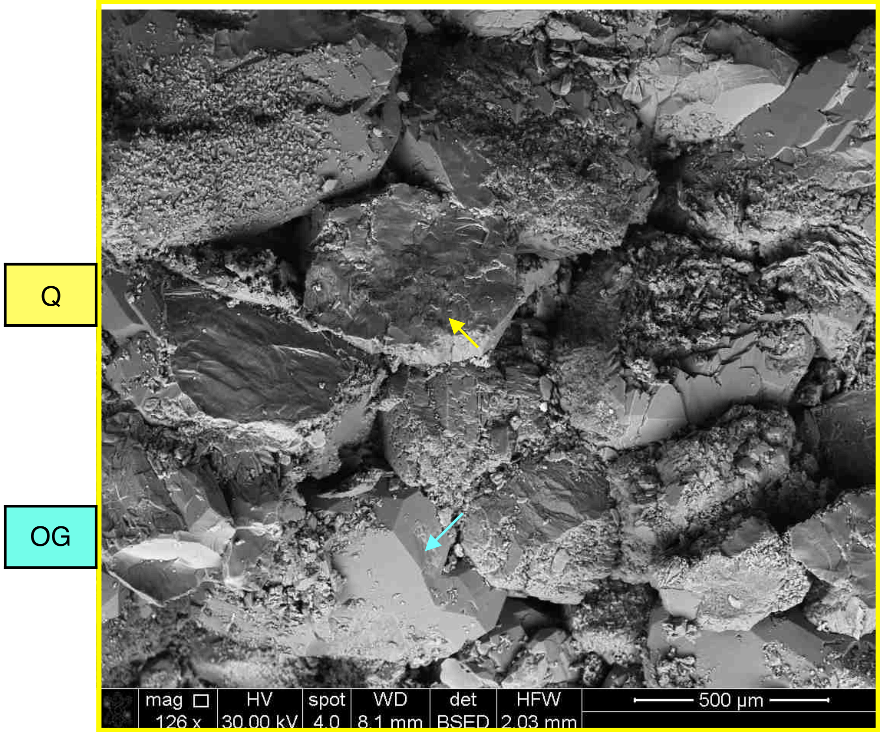
Sample ID	Magnification
23009-05A	126X
23009-05B	85X
23009-05C	500X
23009-05D	500X
23009-05E	500X
23009-05F	1000X

Intergranular macro-porosity	BP
Detrital quartz	Q
Quartz overgrowth cement	OG
Authigenic Kaolinite	K
Leached Feldspar	F
Micaceous shale RF	M

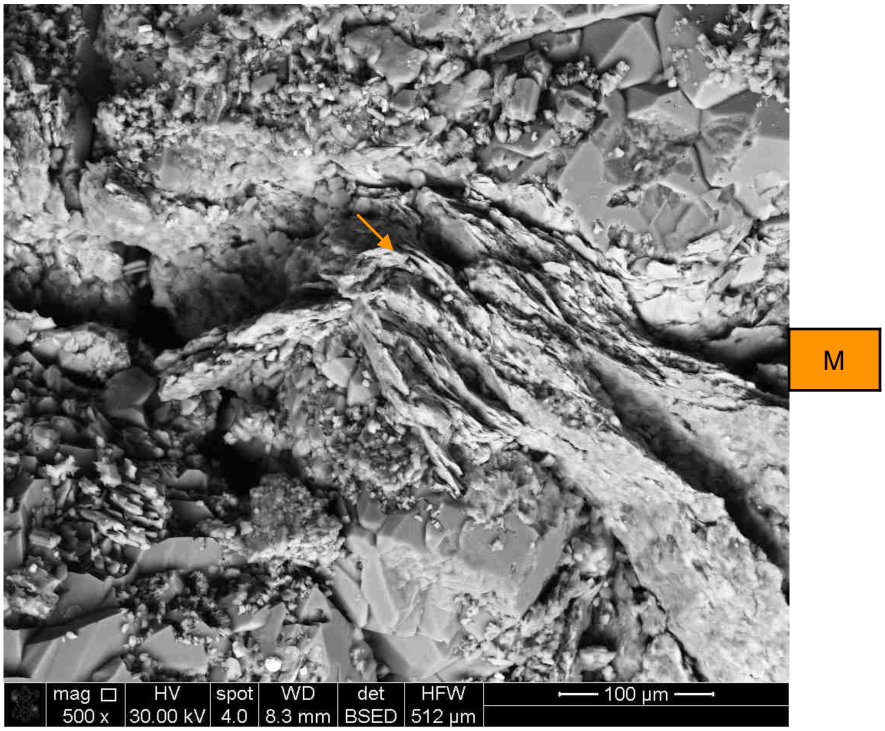
23009-05A 126X



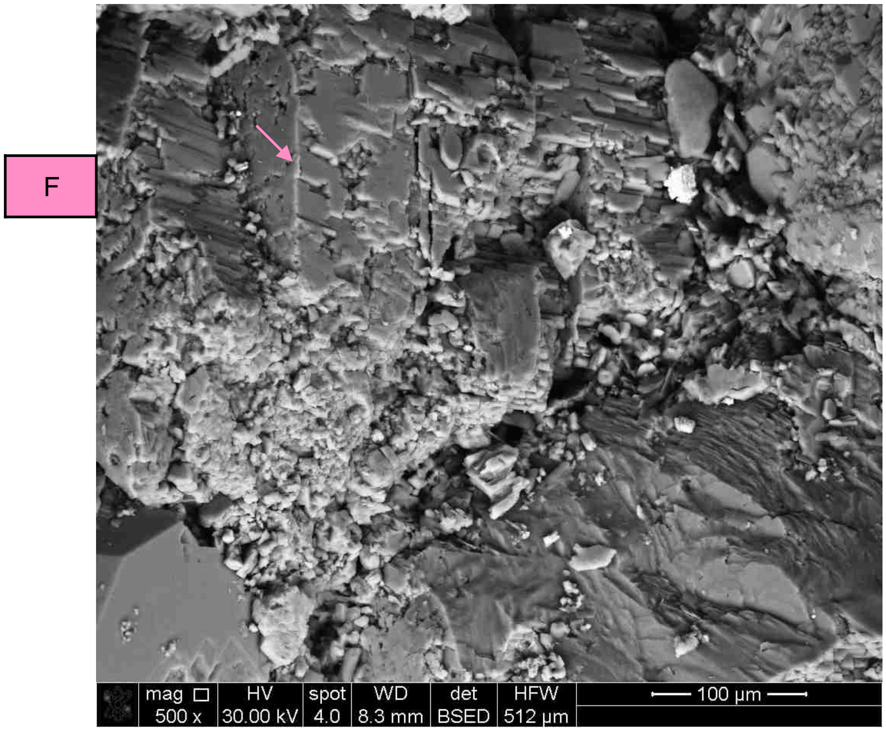
23009-05B 85X



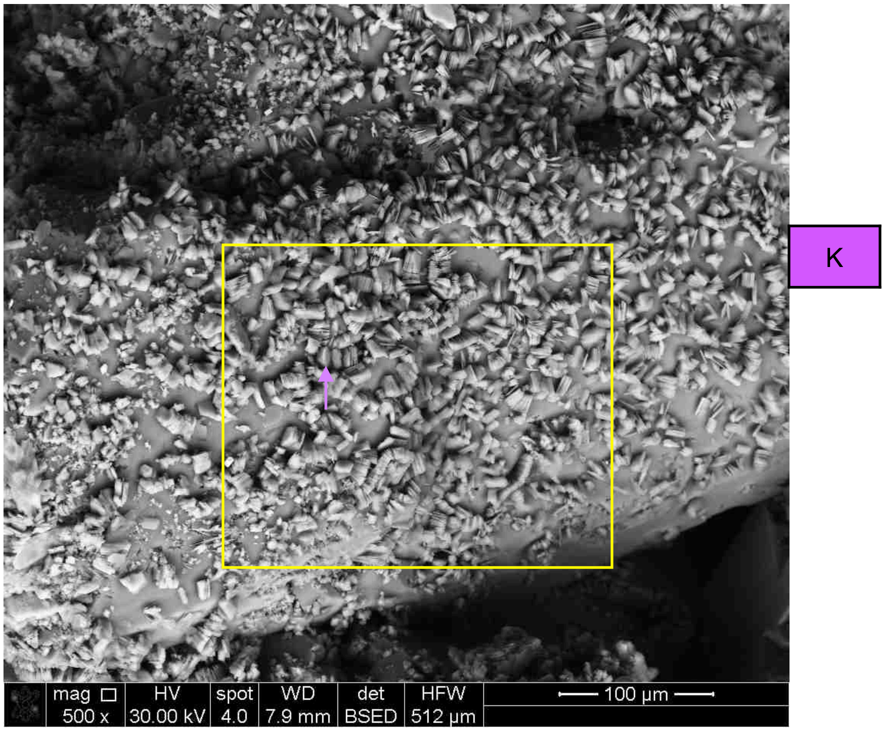
23009-05C 500X



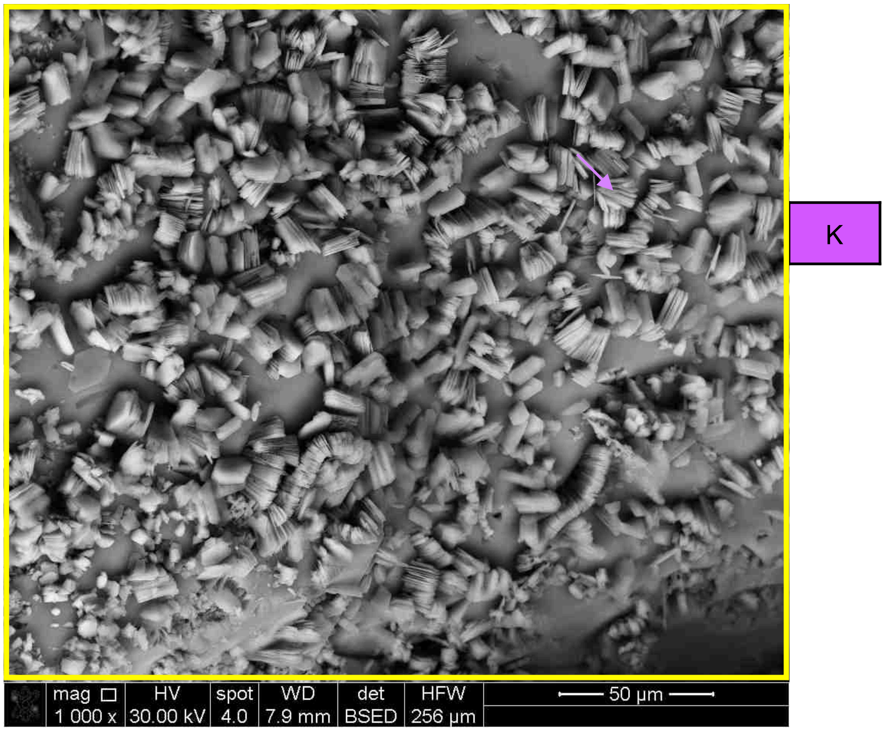
23009-05D 500X



23009-05E 500X



23009-05F 1000X



Geosyntec Consultants
Mountaineer | New Haven, WV

MW-1922D-111
MI#23009-06 - SEM

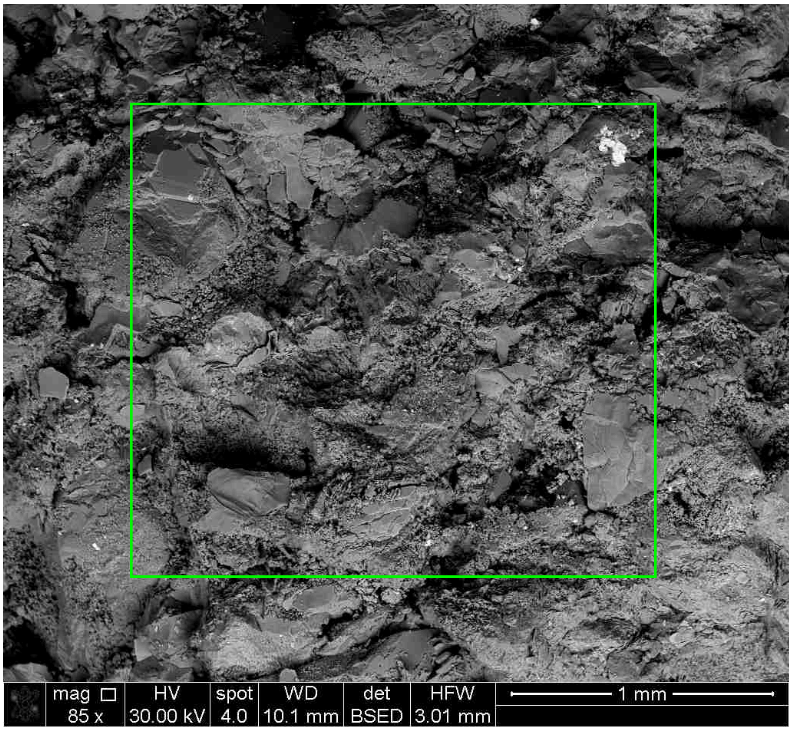
Summary: This core sample is similar to the core interval @ 104.5' (MI#23009-05) & is characterized as a cross-bedded, medium-grained, moderately-sorted, quartz-cemented, moderately porous, sub-arkosic sandstone. The framework is compact and exhibits common point-to-point & elongated intergranular contacts. Rims of syntaxial quartz overgrowth cement are locally inter grown along contacts shared by adjoining quartz grains. Scattered feldspar grains exhibit indications of intra-particle corrosion and localized replacement with authigenic kaolinite. The mineralogy of the sandstone is comprised of quartz (~85%), plagioclase feldspar (~3%), k-feldspar (~2%), kaolinite (~6%), illite / mica (~3%), and traces of goethite (0.5%), hematite (~0.5%) and chlorite (<0.5%) [seeTable I]. Macroporosity is visually estimated to comprise ~ 5-7% of the sandstone bulk volume.

23009-06 Photo Index:

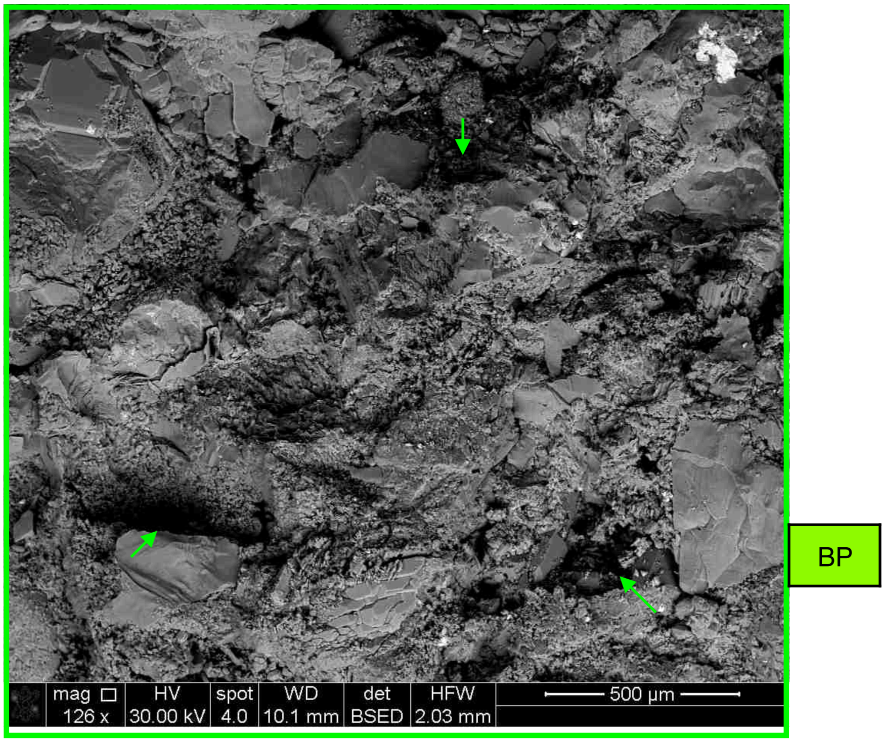
Sample ID	Magnification
23009-06A	85X
23009-06B	126X
23009-06C	1000X
23009-06D	8000X
23009-06E	1300X
23009-06F	5000X

Intergranular macro-porosity	BP
Detrital quartz	Q
Quartz overgrowth cement	OG
Authigenic Kaolinite	K
Leached Feldspar	F
Micaceous shale RF	M

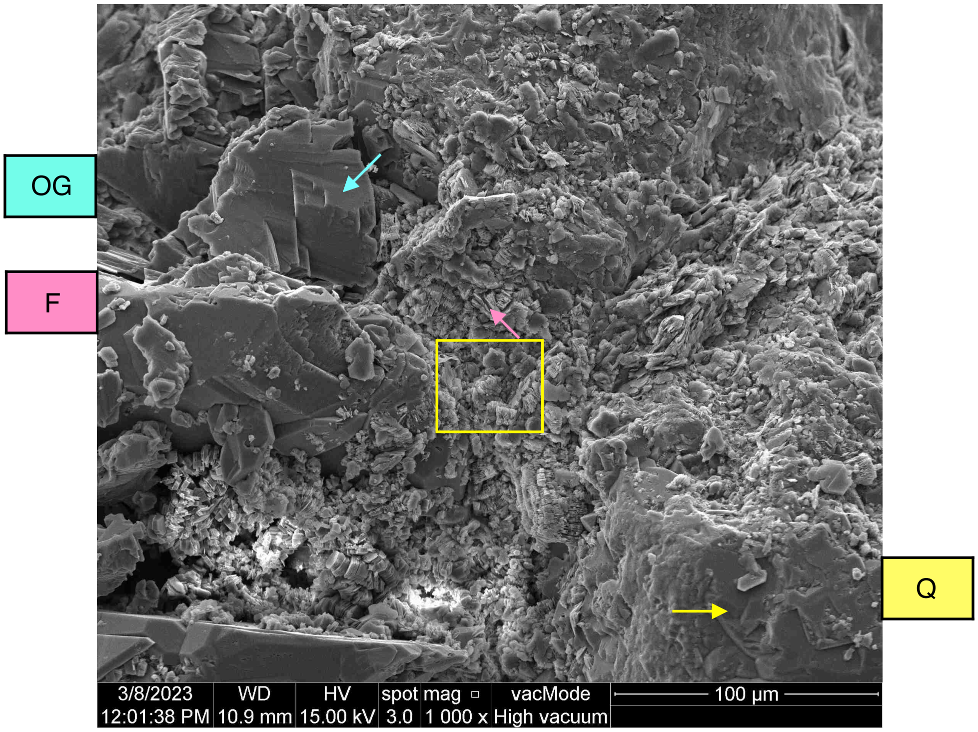
23009-06A 85X



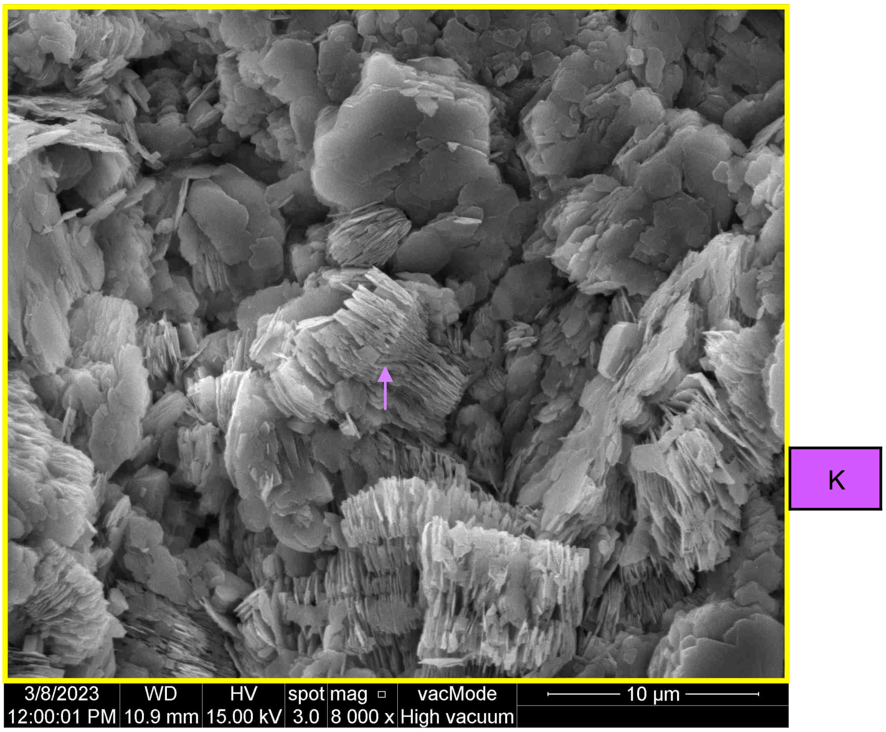
23009-06B 126X



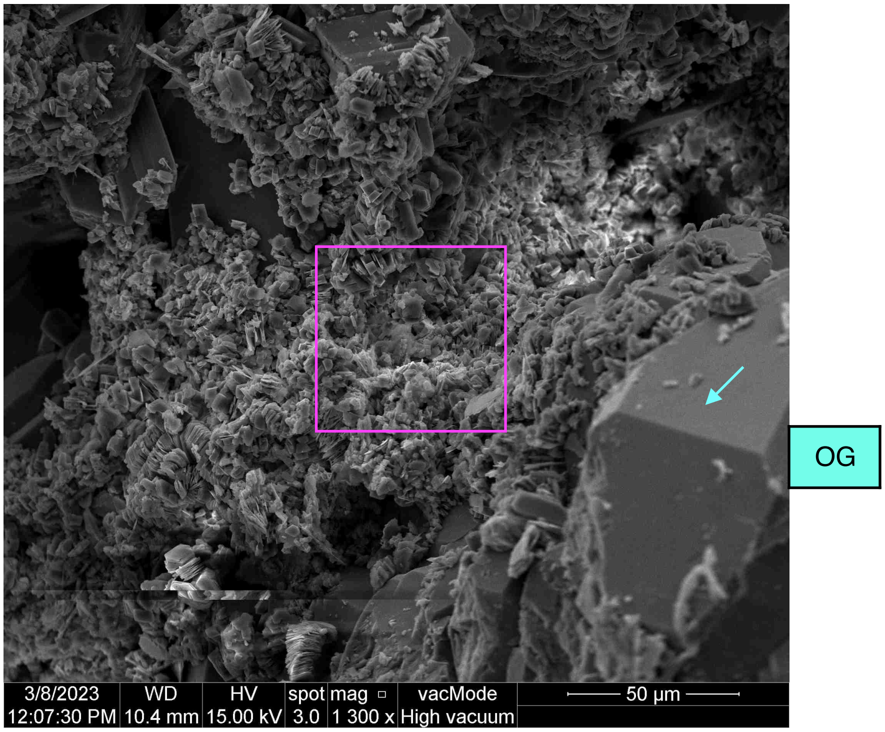
23009-06C 1000X



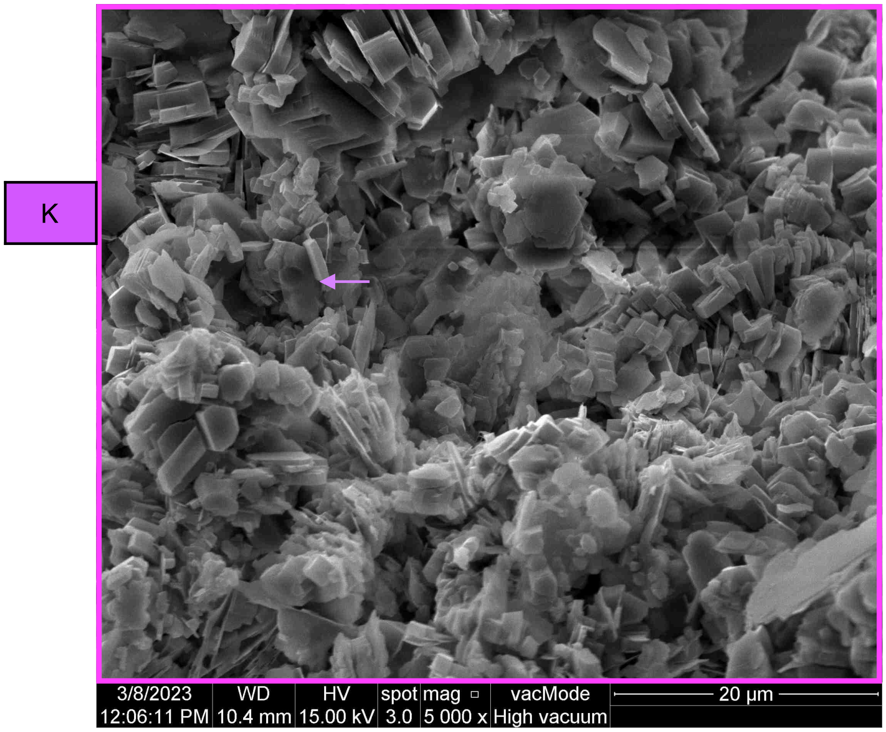
23009-06D 8000X



23009-06E 1300X



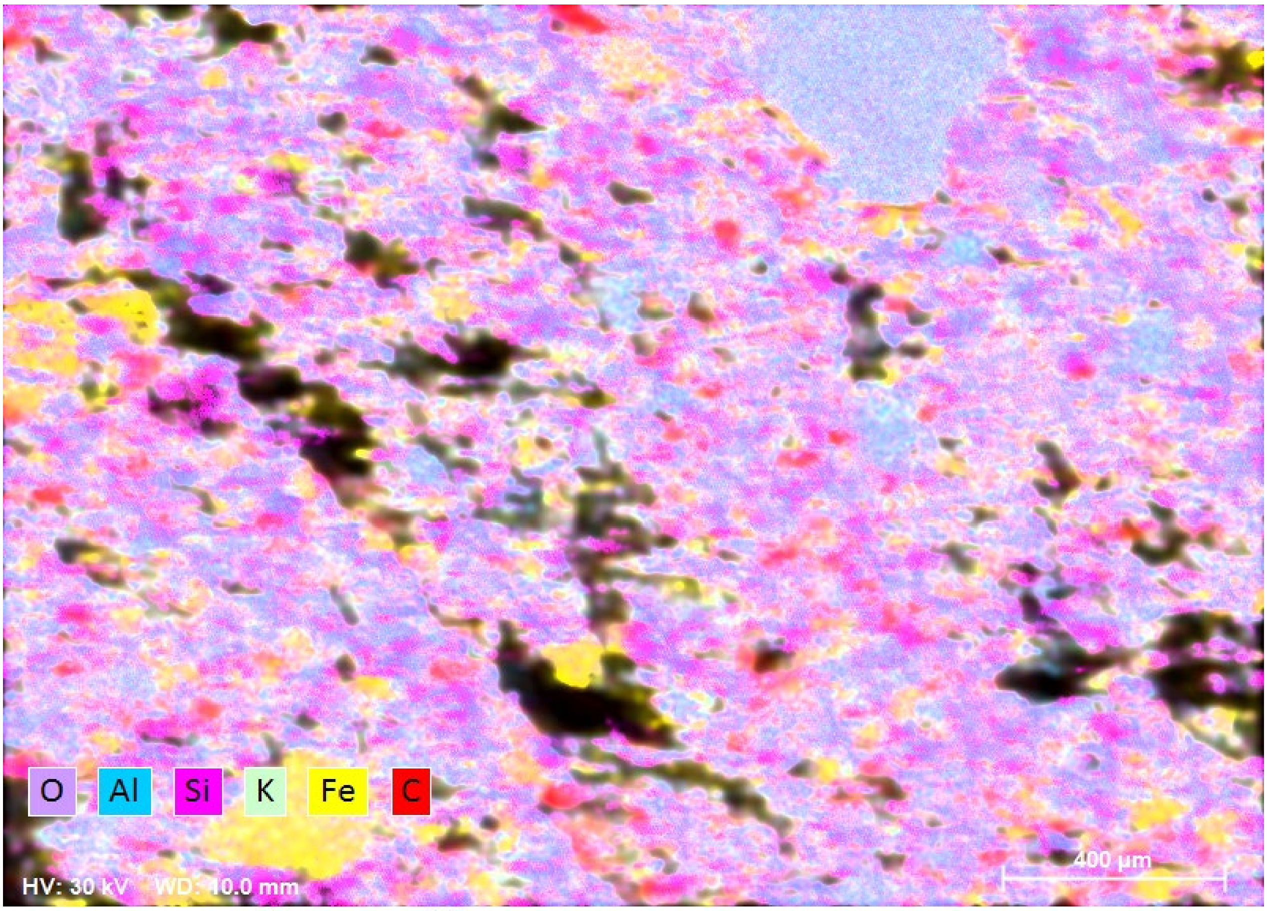
23009-06F 5000X



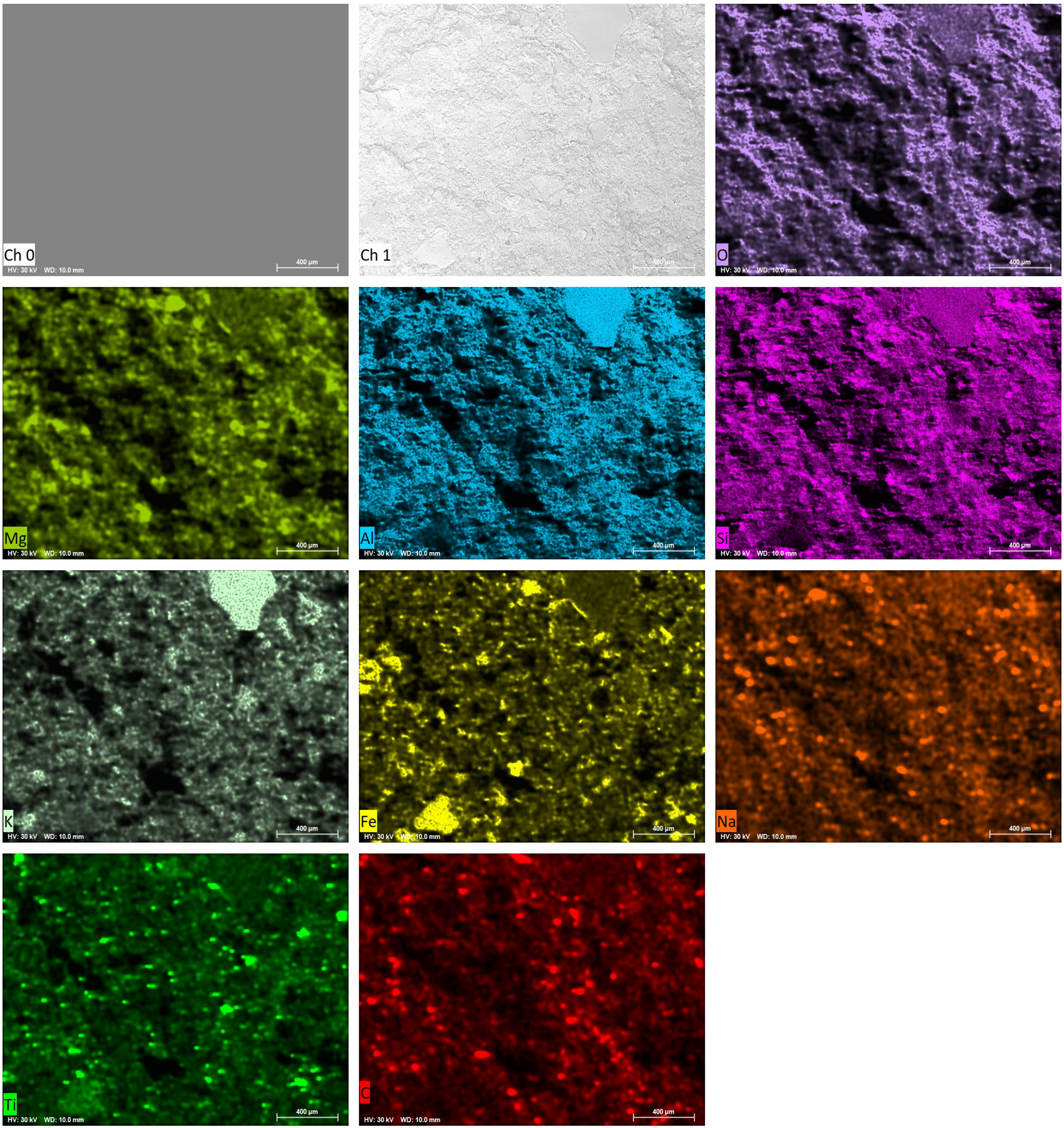
23009-01 Report

Oklahoma State University
Microscopy Laboratory
Established in 1977

Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/7/2023	3:34:57 PM	30.0 keV	126x	10.0 mm



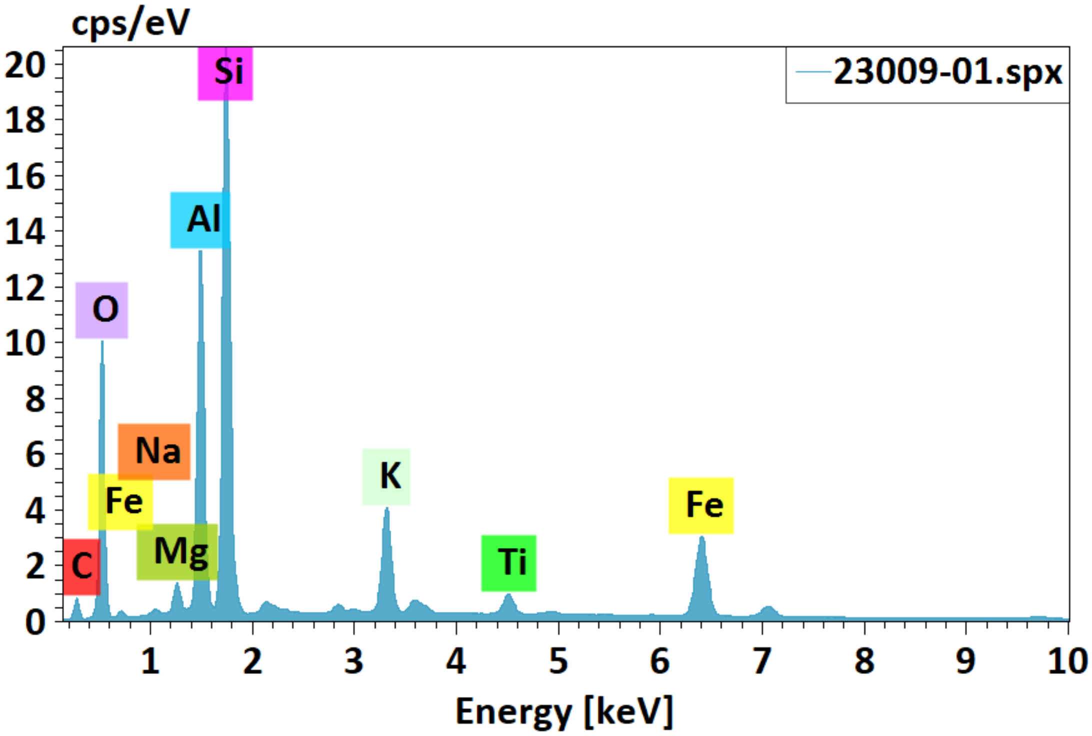
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:27:43 PM	30.0 keV	126x	10.0 mm



Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:27:43 PM	30.0 keV	126x	10.0 mm

EDS Report

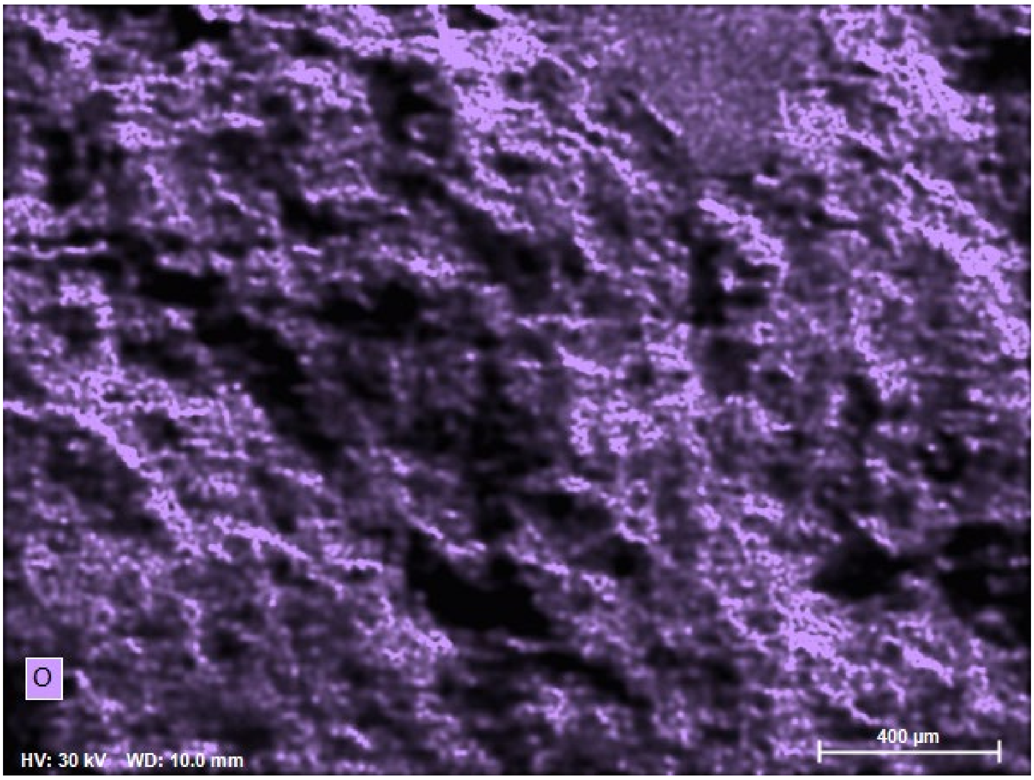
Company / Department

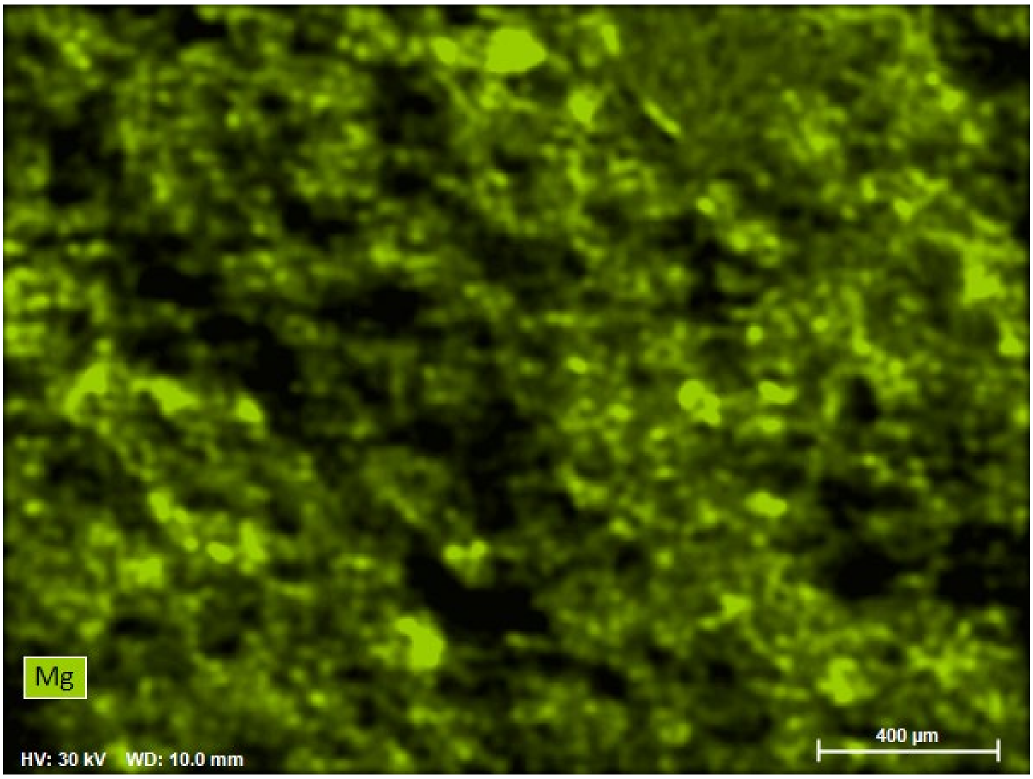


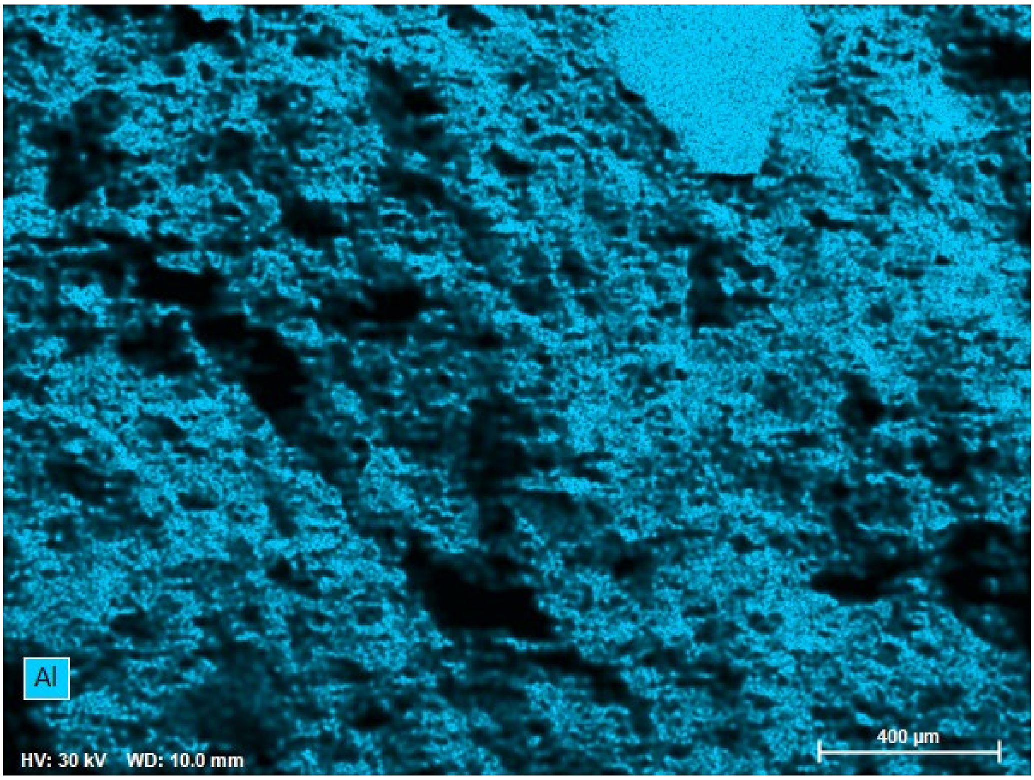
23009-01.spx

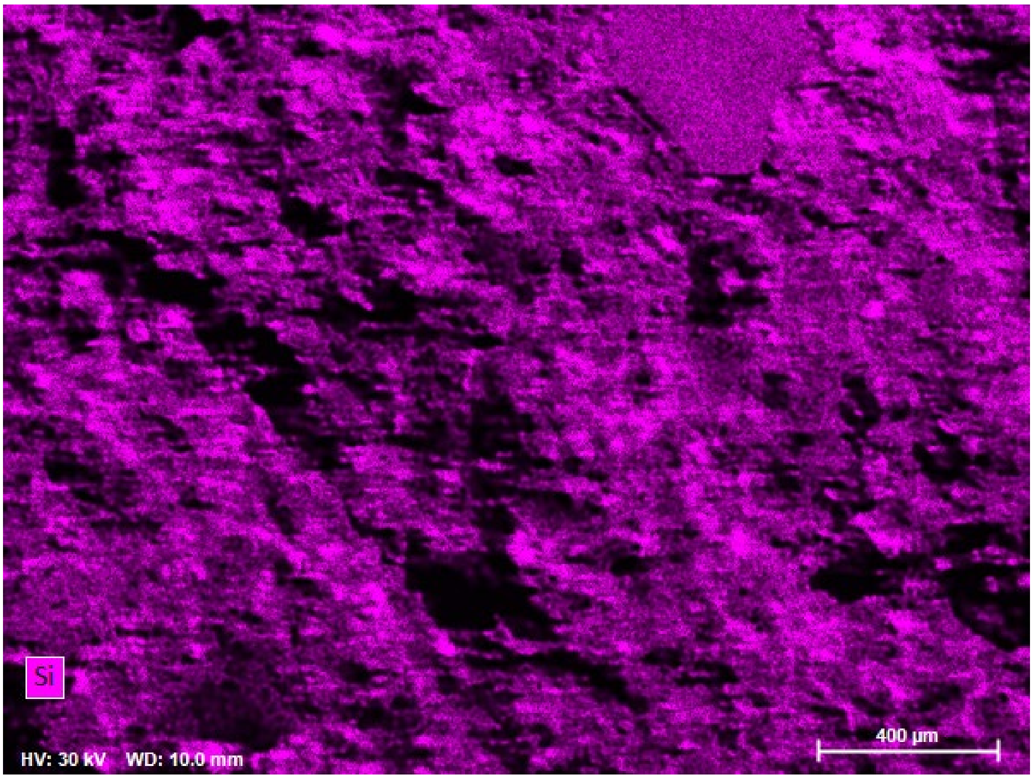
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	10.68	10.23	16.40
Oxygen	8	48.79	46.75	56.28
Sodium	11	0.53	0.51	0.42
Magnesium	12	1.33	1.28	1.01
Aluminium	13	12.15	11.65	8.31
Silicon	14	20.71	19.84	13.61
Potassium	19	3.86	3.70	1.82
Titanium	22	0.96	0.92	0.37
Iron	26	5.36	5.14	1.77
		104.37	**100.00**	**100.00**

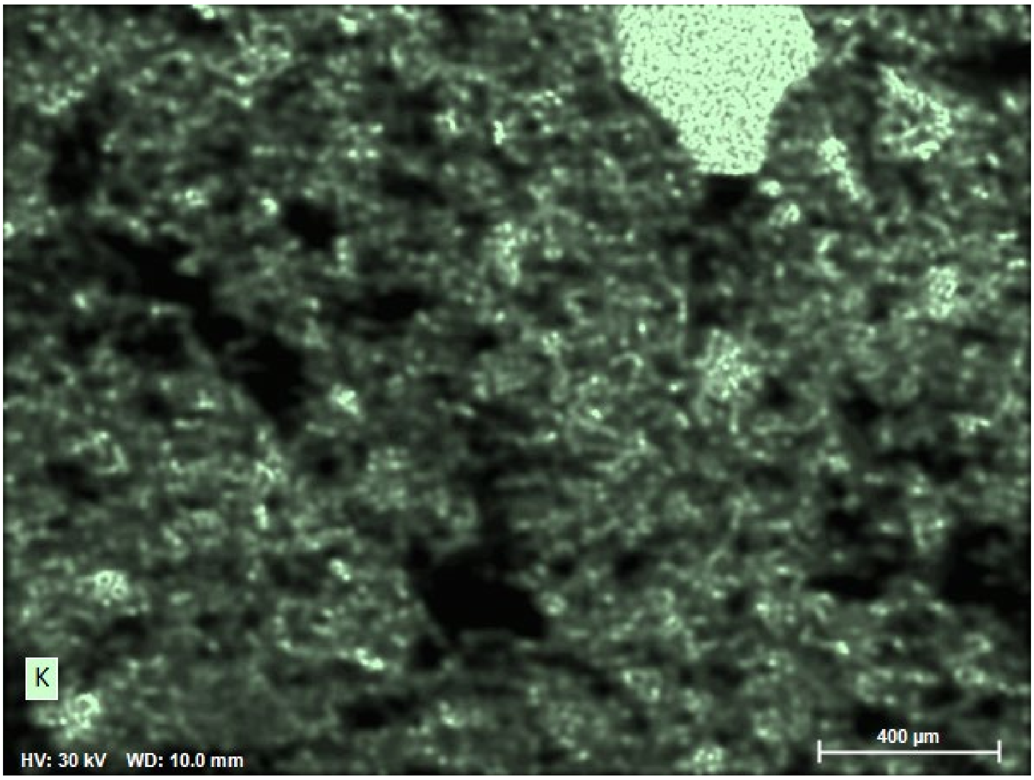

Ch 1
HV: 30 kV WD: 10.0 mm
400 µm

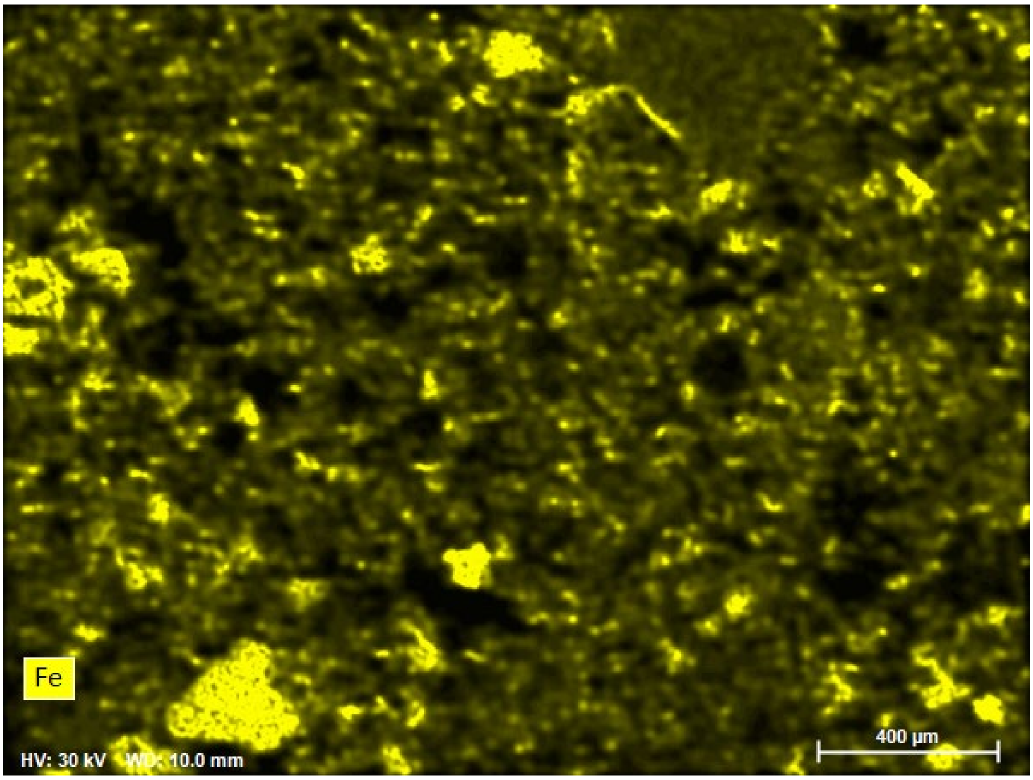

O
HV: 30 kV WD: 10.0 mm
400 µm


Mg
HV: 30 kV WD: 10.0 mm
400 µm

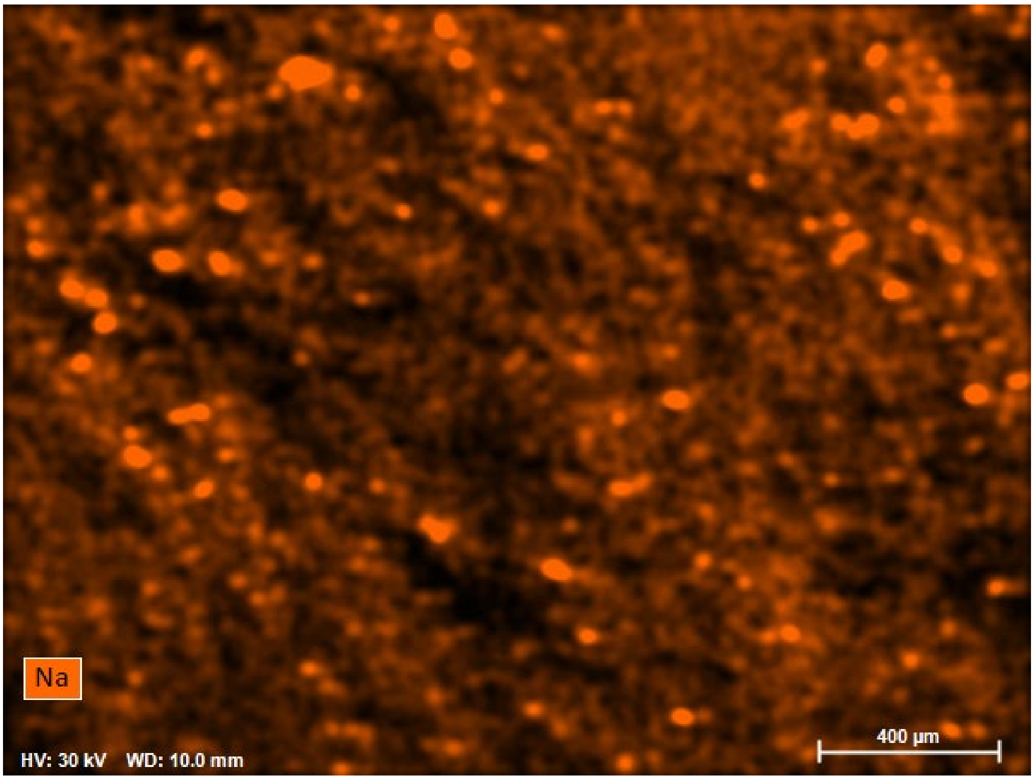

Al
HV: 30 kV WD: 10.0 mm
400 µm


Si
HV: 30 kV WD: 10.0 mm
400 µm

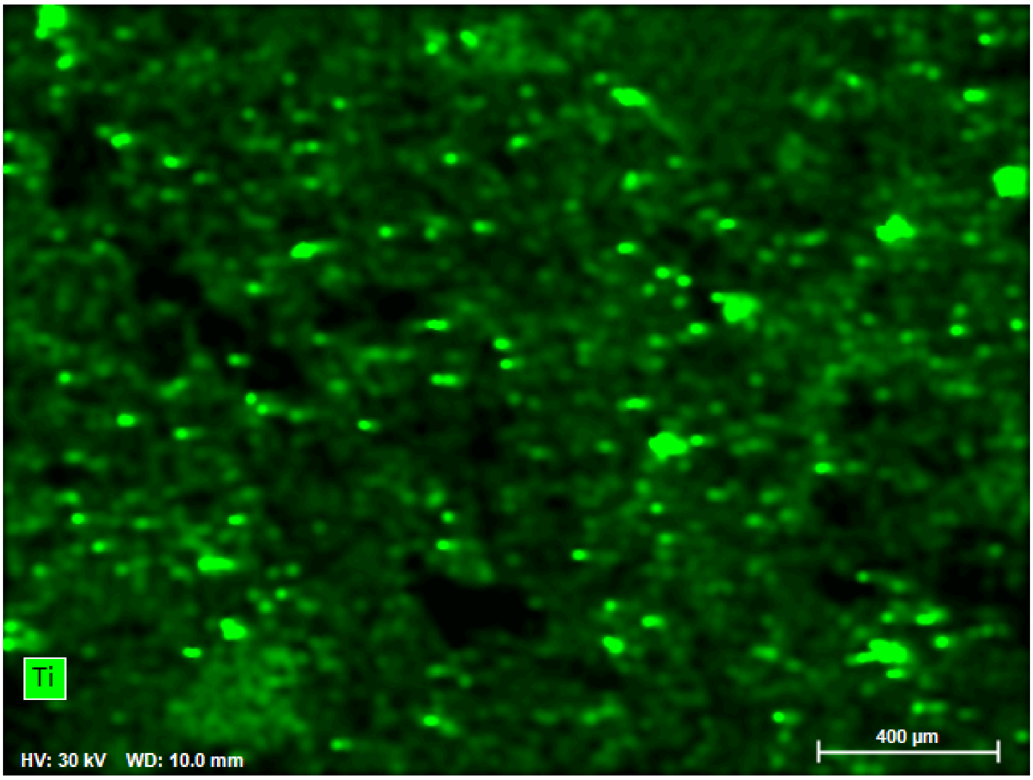

K
HV: 30 kV WD: 10.0 mm
400 µm

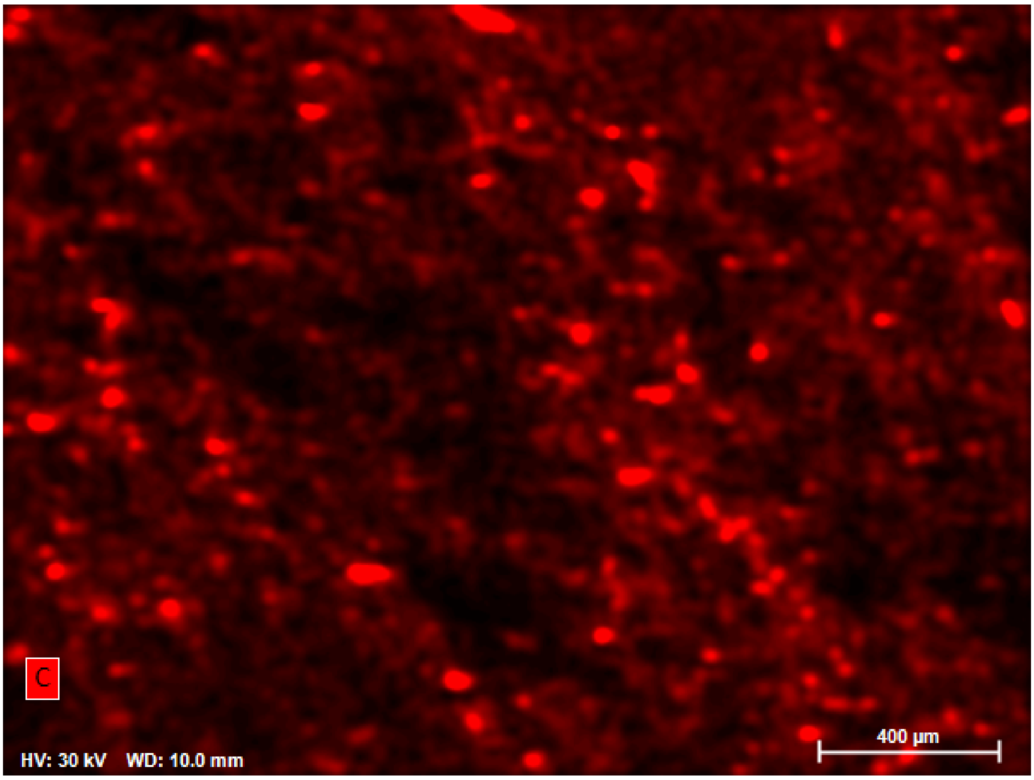


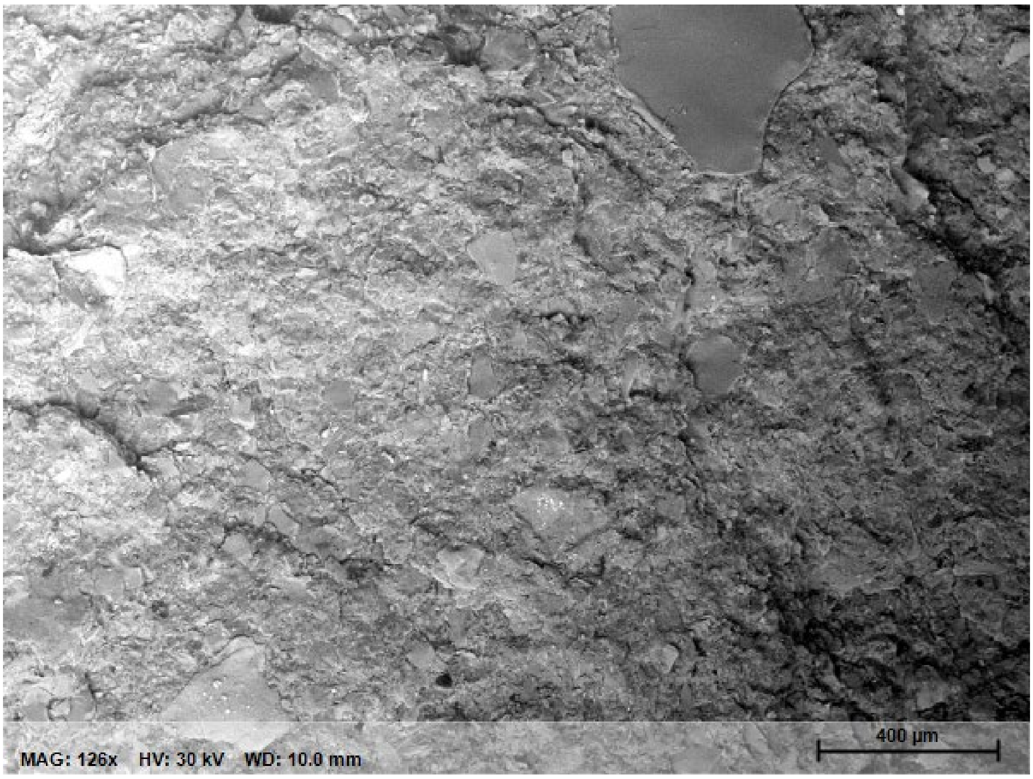
Fe
HV: 30 kV
WD: 10.0 mm
400 µm



Na
HV: 30 kV
WD: 10.0 mm
400 µm

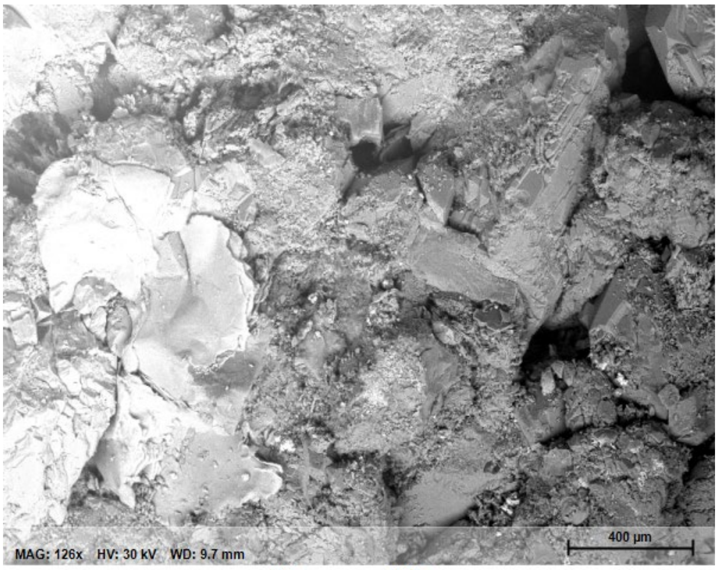

Ti
HV: 30 kV WD: 10.0 mm
400 µm


C
HV: 30 kV WD: 10.0 mm
400 µm

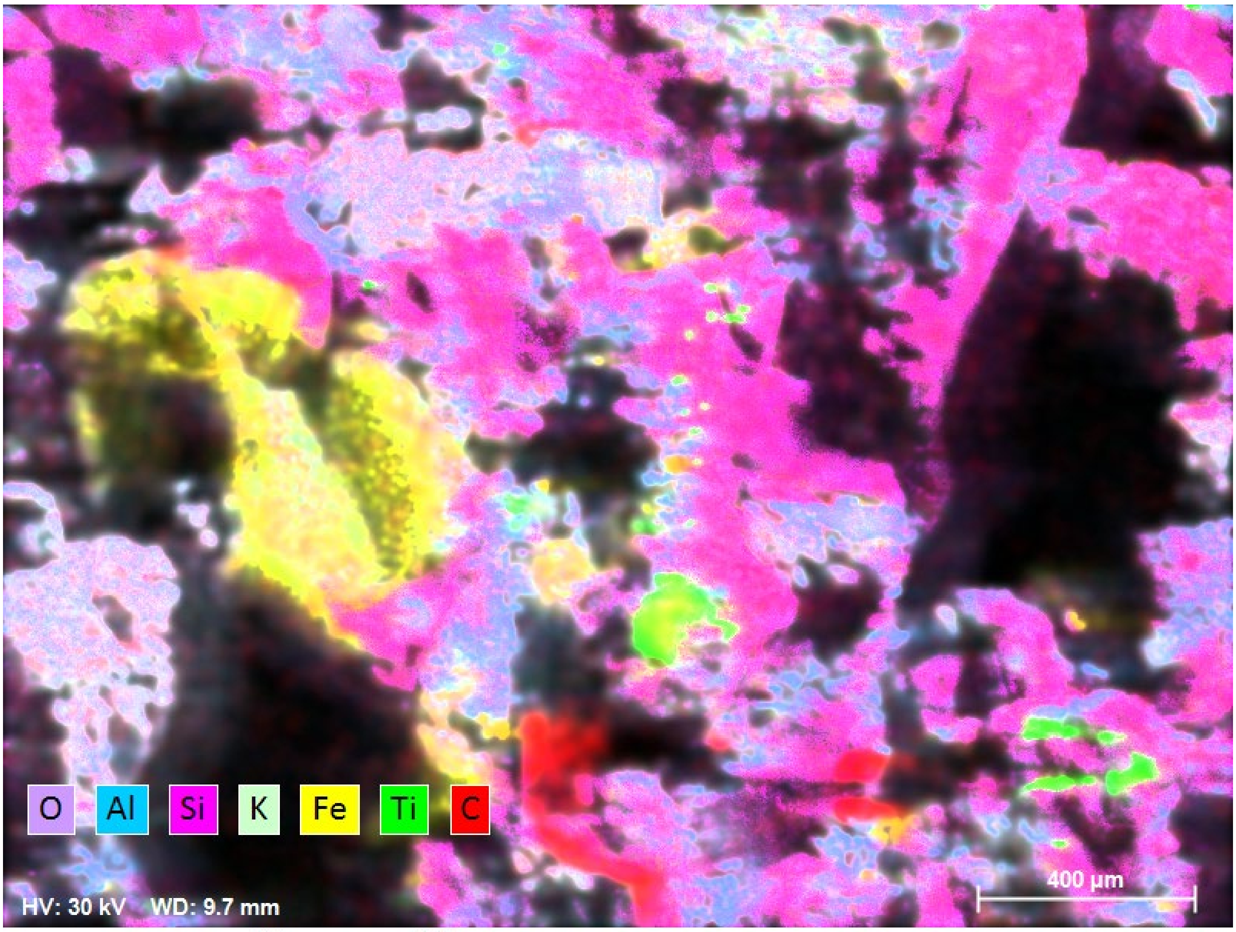


MAG: 126x HV: 30 kV WD: 10.0 mm
400 µm

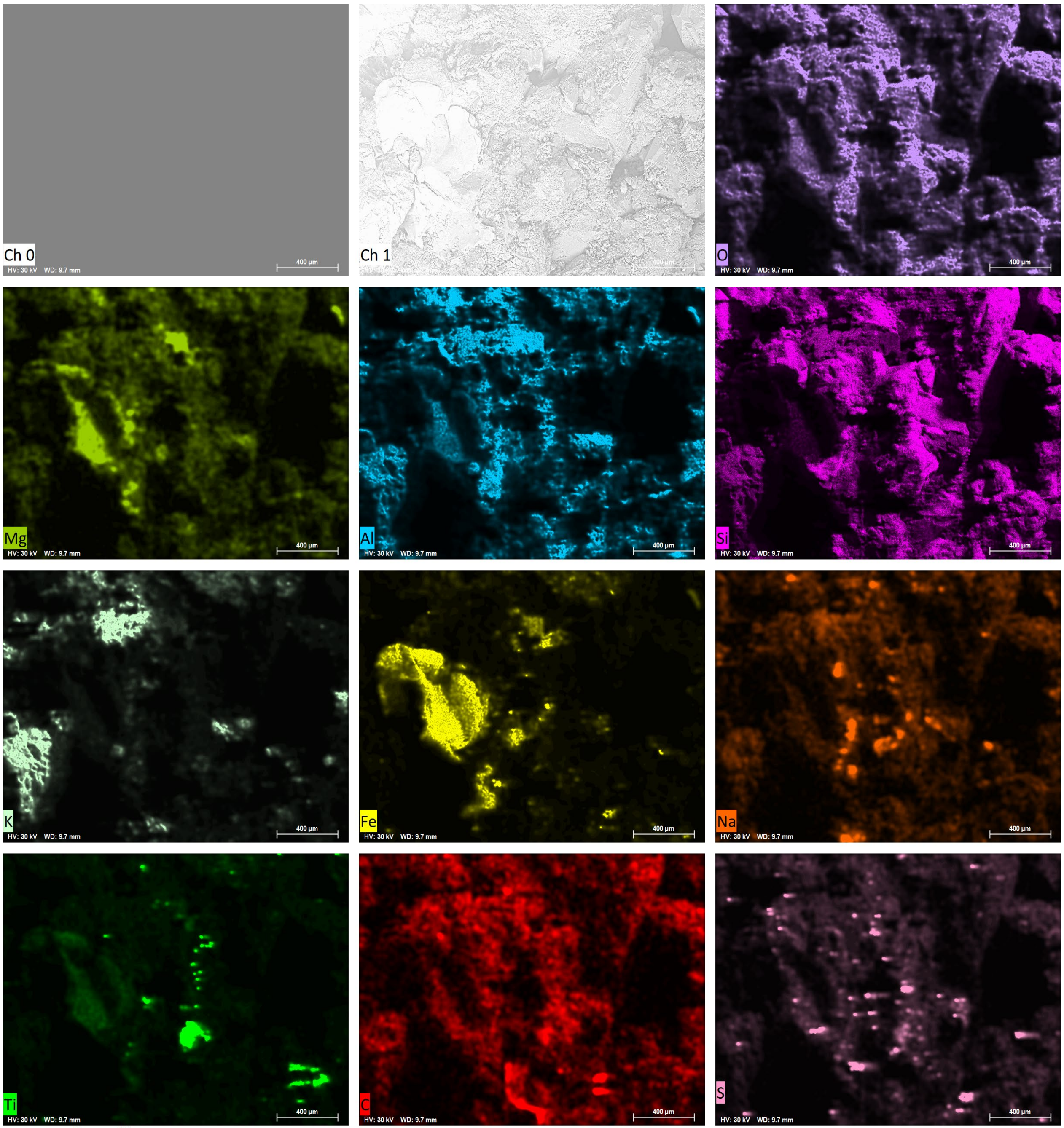
23009-02 Report



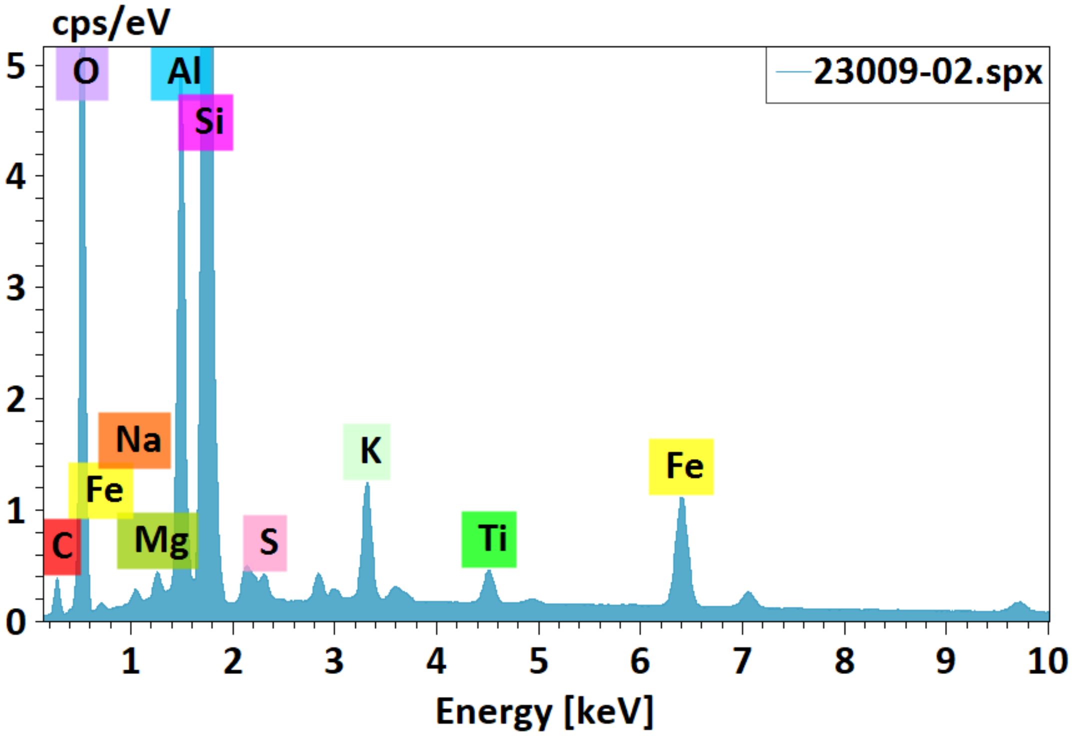
Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/7/2023	4:17:17 PM	30.0 keV	126x	9.7 mm



Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:36:58 PM	30.0 keV	126x	9.7 mm



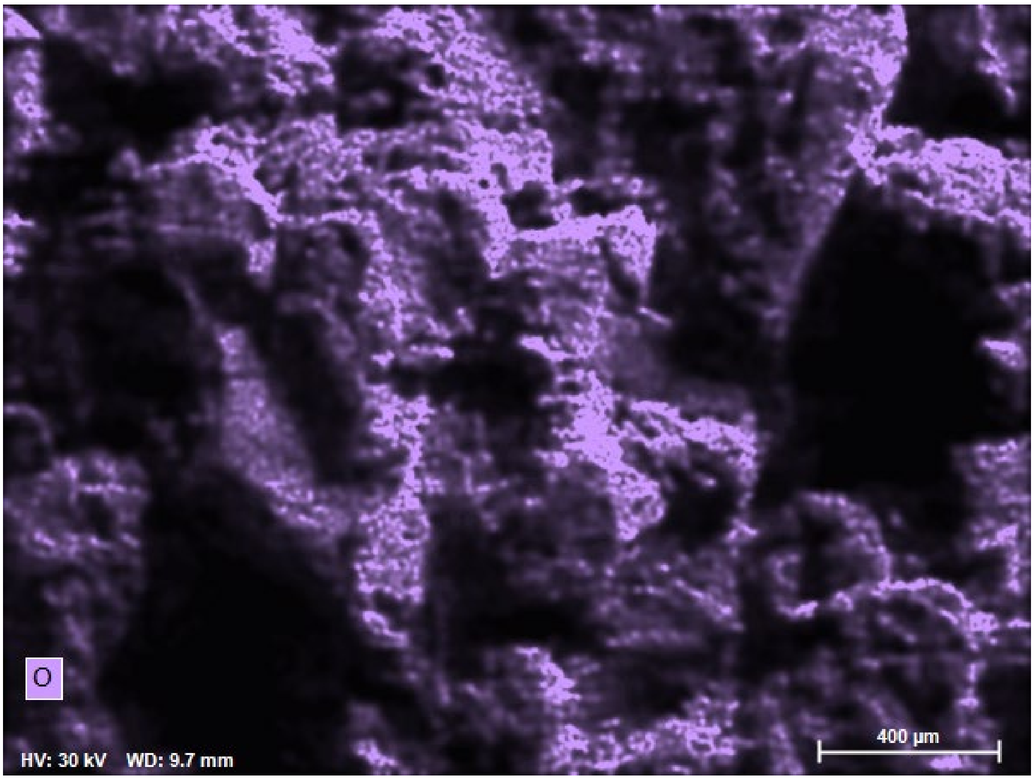
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:36:58 PM	30.0 keV	126x	9.7 mm

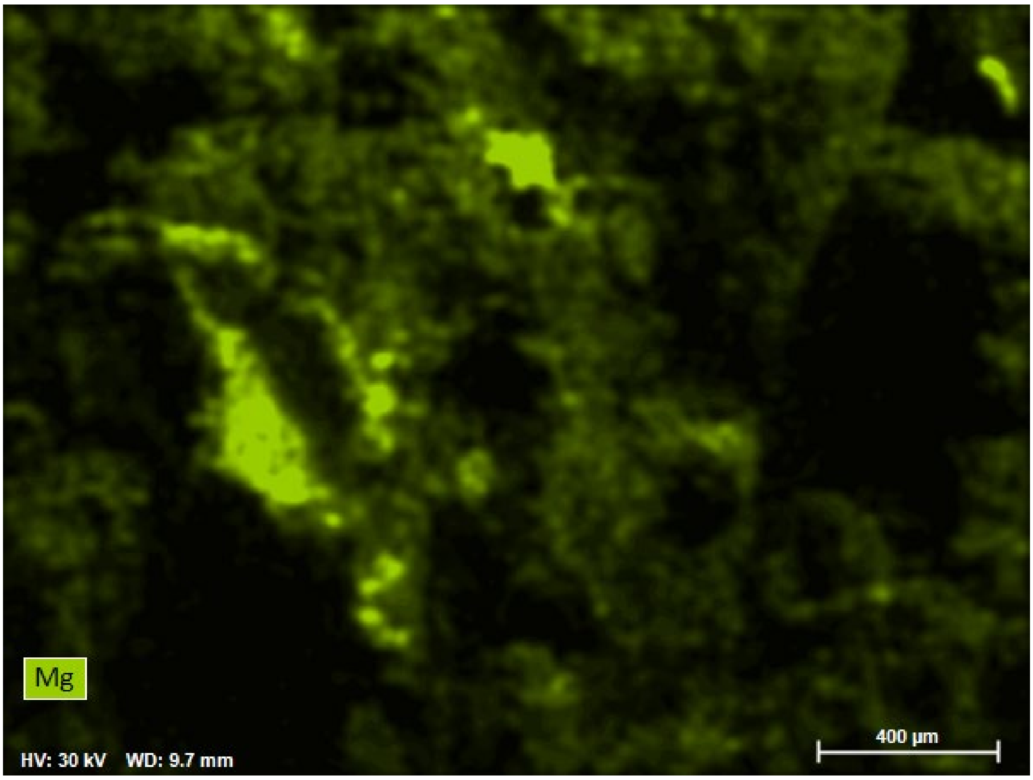


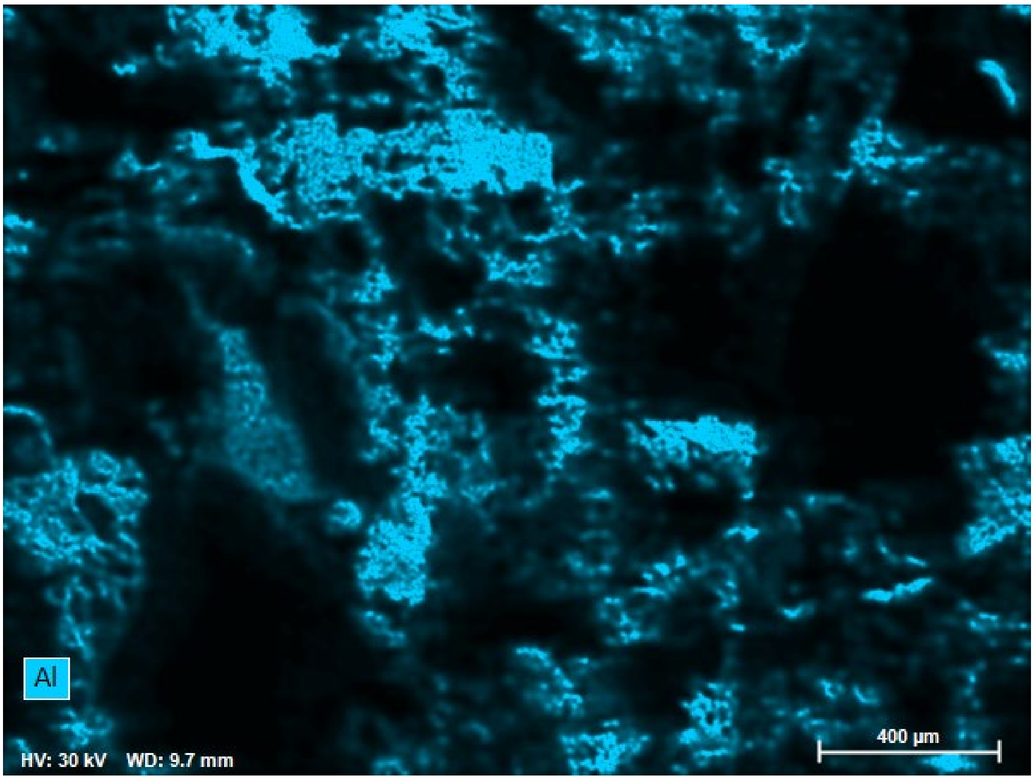
23009-02.spx

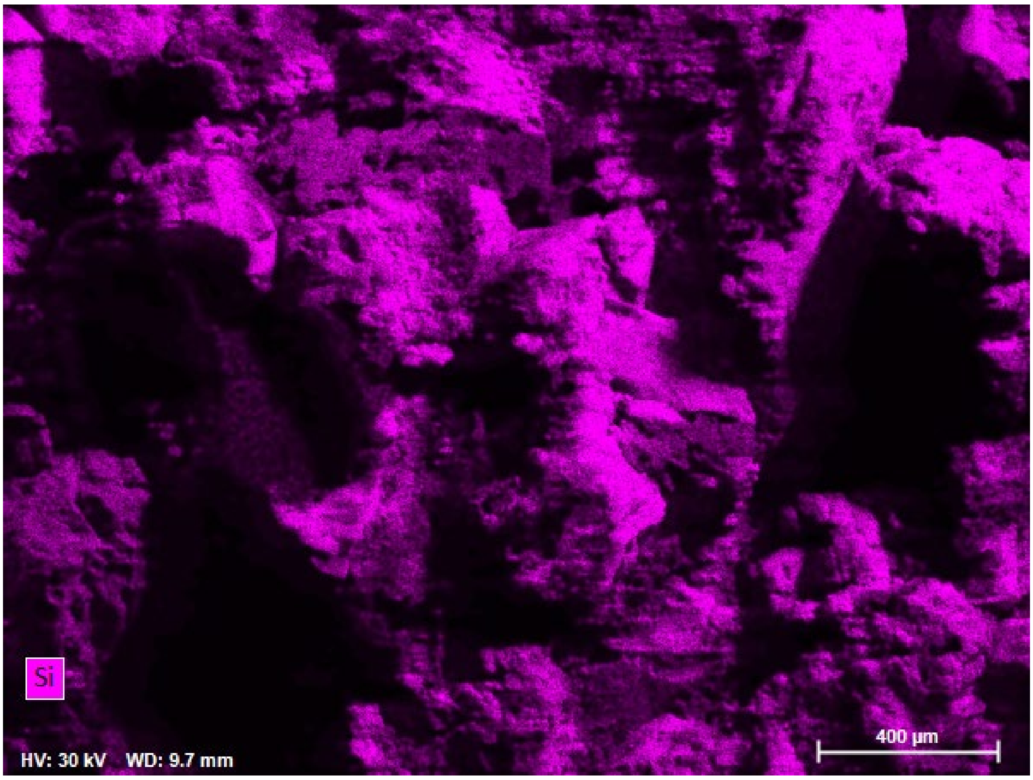
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	7.69	8.00	12.75
Oxygen	8	48.06	49.98	59.82
Sodium	11	0.42	0.43	0.36
Magnesium	12	0.39	0.40	0.32
Aluminium	13	6.02	6.26	4.45
Silicon	14	28.19	29.31	19.98
Sulfur	16	0.39	0.40	0.24
Potassium	19	1.71	1.78	0.87
Titanium	22	0.64	0.67	0.27
Iron	26	2.65	2.75	0.94
		96.16	**100.00**	**100.00**

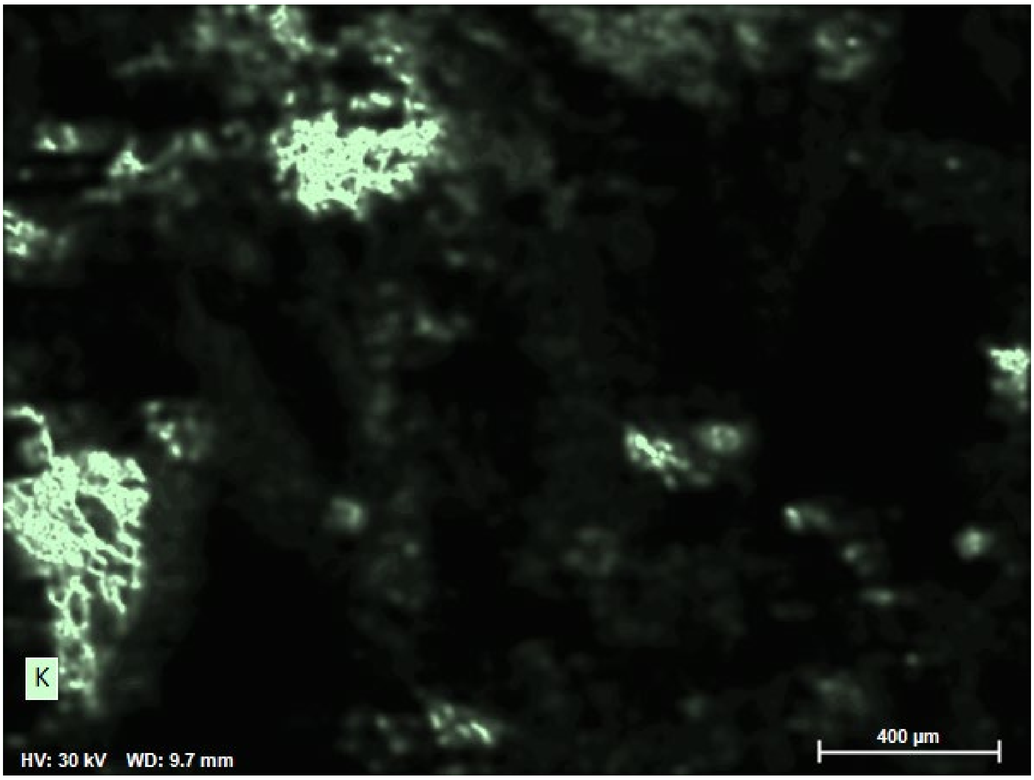

Ch 1
400 µm
HV: 30 kV WD: 9.7 mm

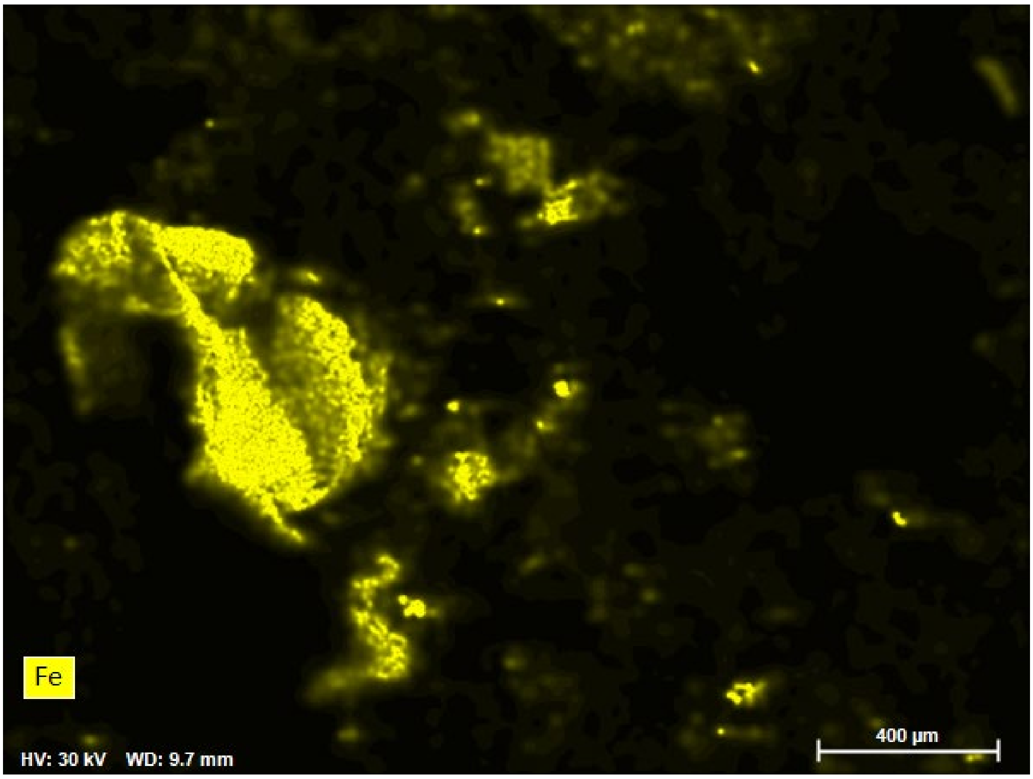

O
HV: 30 kV WD: 9.7 mm
400 µm

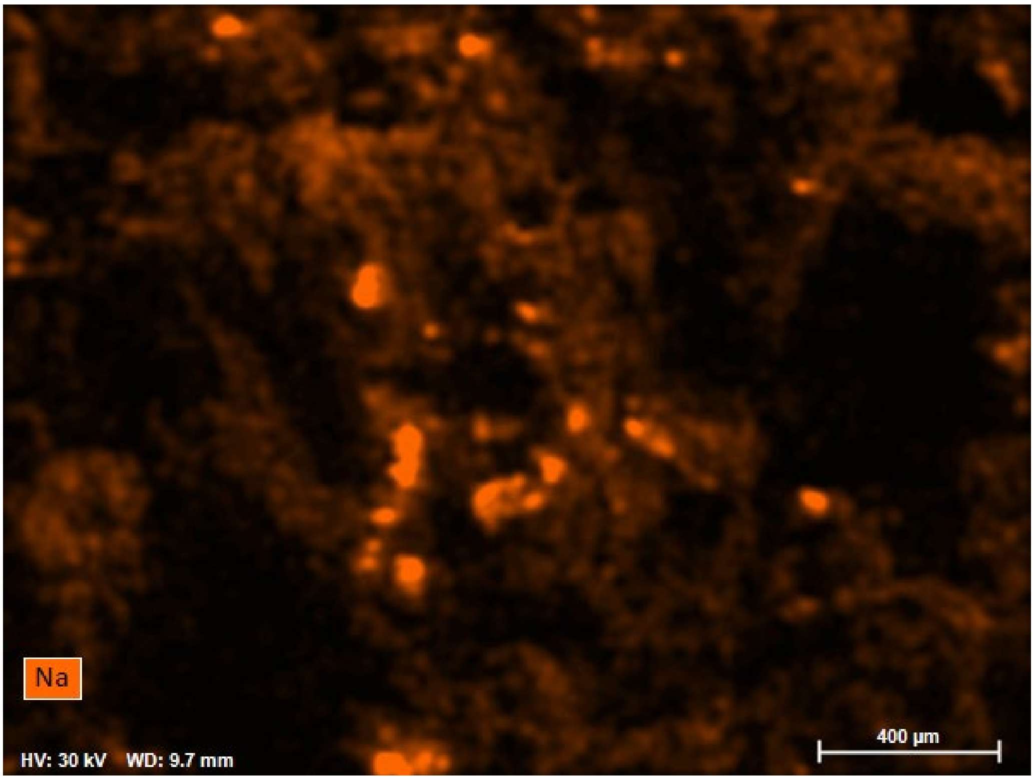

Mg
HV: 30 kV
WD: 9.7 mm
400 µm

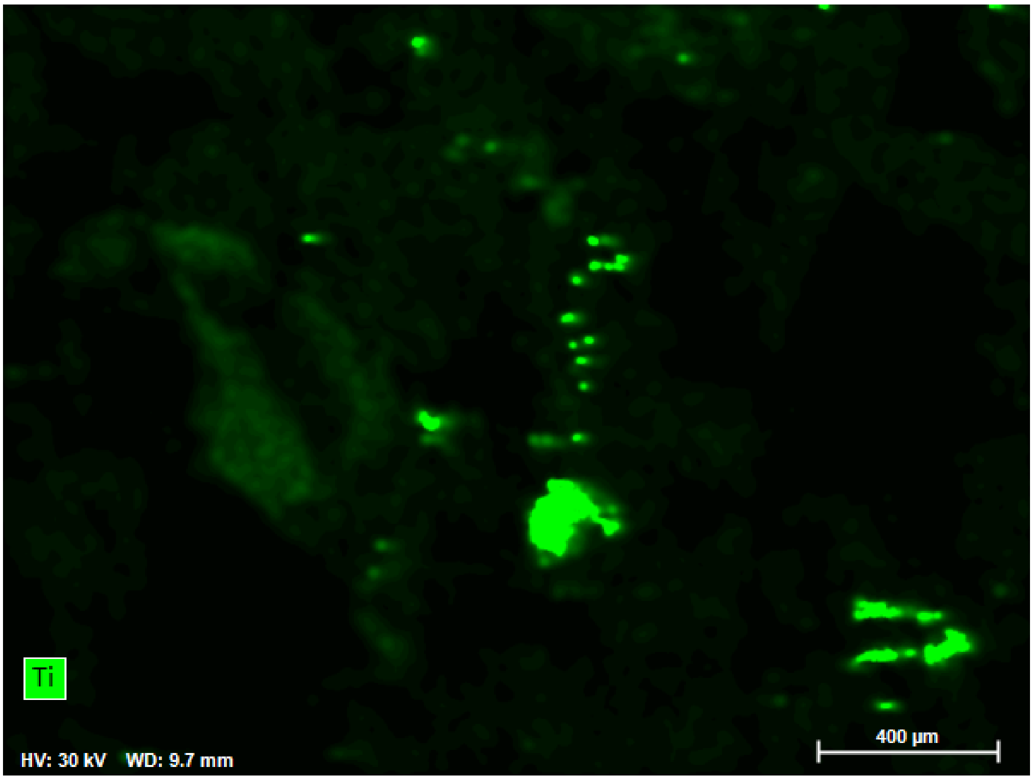

Al
HV: 30 kV
WD: 9.7 mm
400 µm

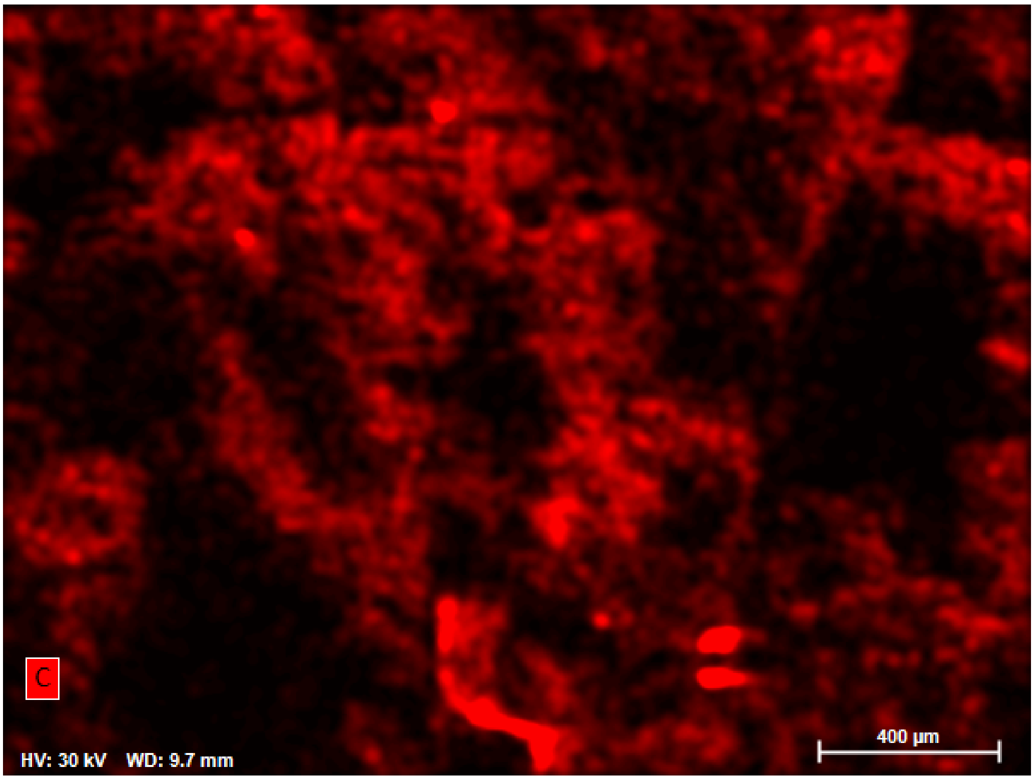

Si
HV: 30 kV WD: 9.7 mm
400 µm

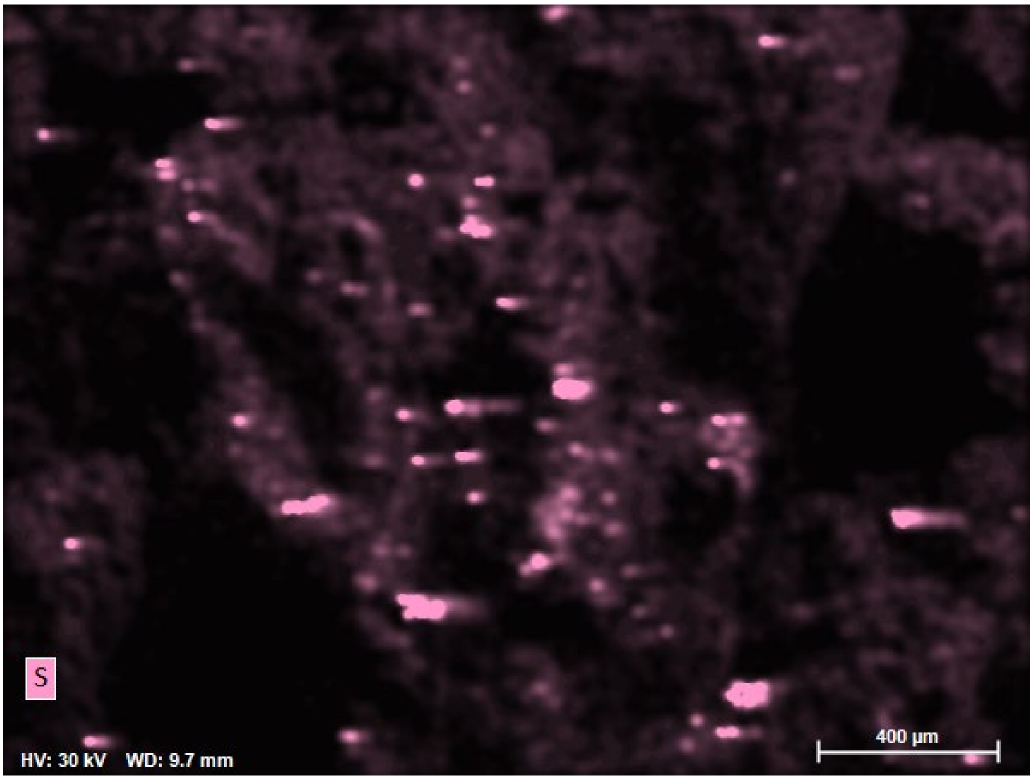

K
HV: 30 kV WD: 9.7 mm
400 µm


Fe
HV: 30 kV WD: 9.7 mm
400 µm

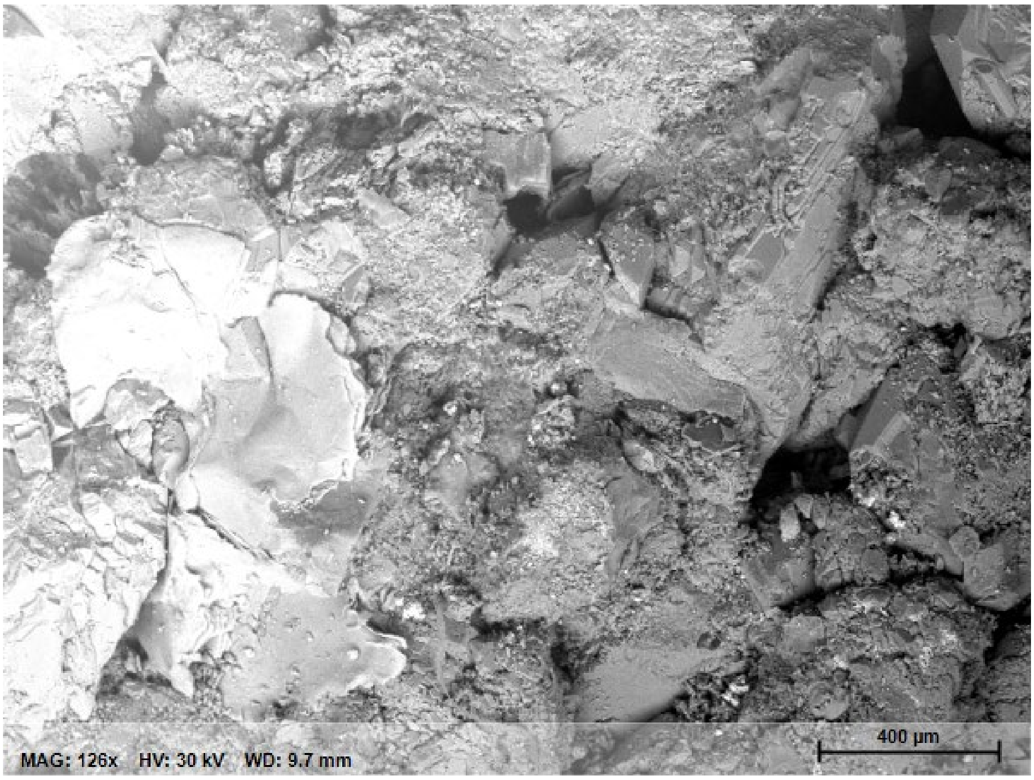

Na
HV: 30 kV WD: 9.7 mm
400 µm


Ti
HV: 30 kV WD: 9.7 mm
400 µm


C
HV: 30 kV WD: 9.7 mm
400 µm



S
HV: 30 kV WD: 9.7 mm
400 µm

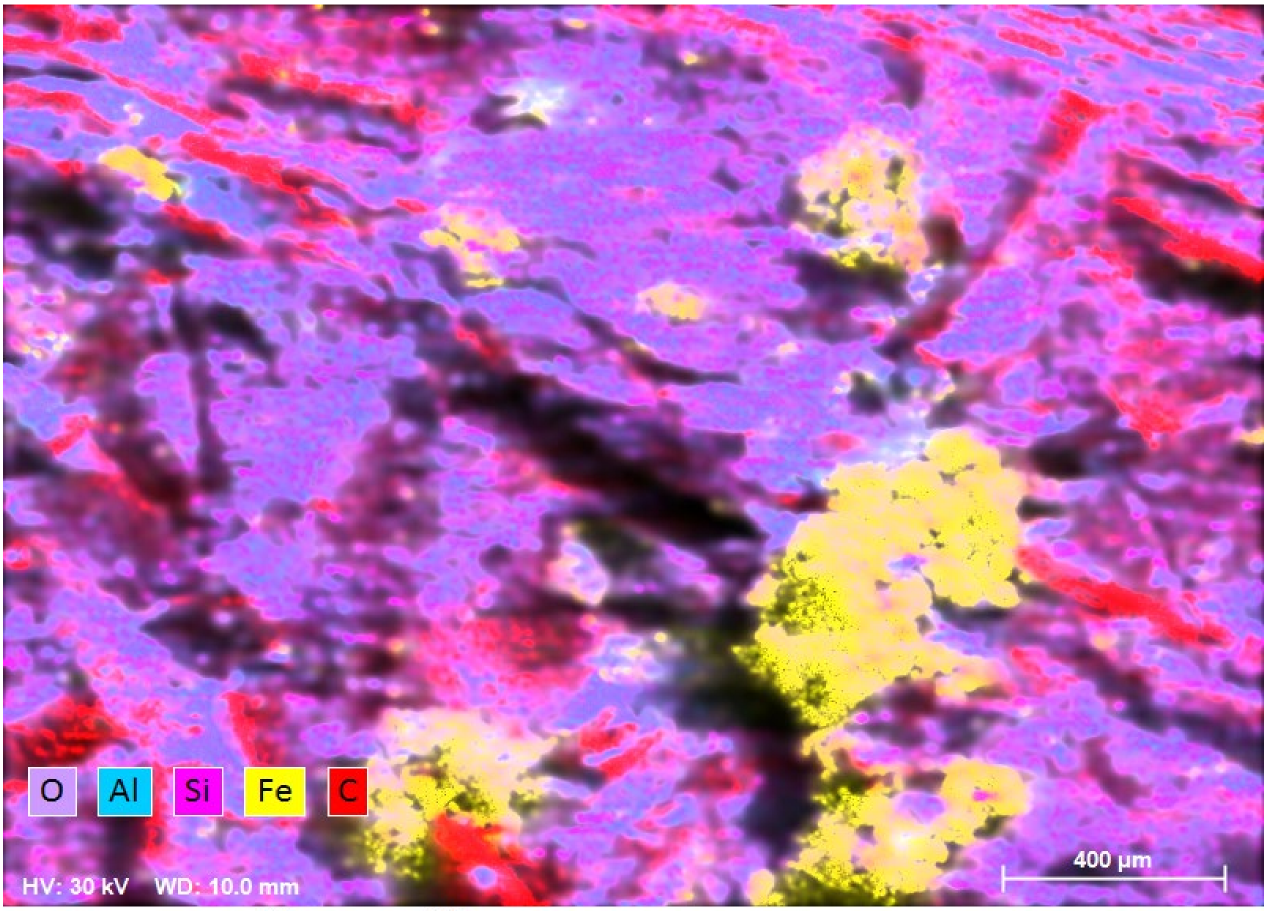


MAG: 126x HV: 30 kV WD: 9.7 mm
400 µm

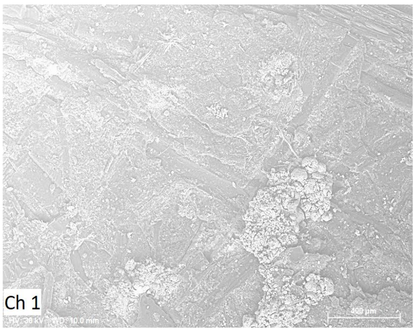
23009-03 Report

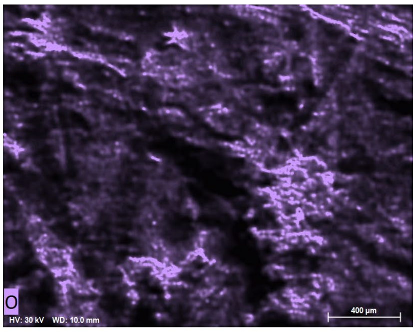
Oklahoma State University
Microscopy Laboratory
Established in 1977

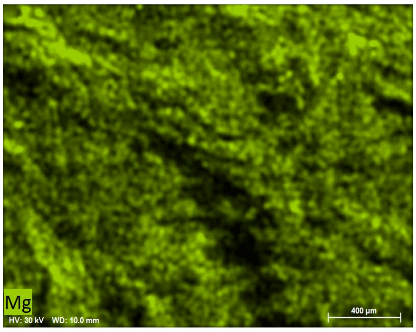
Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/8/2023	9:09:21 AM	30.0 keV	126x	10.0 mm

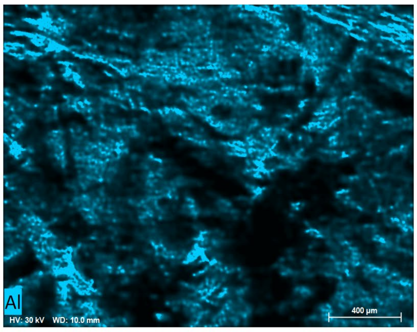


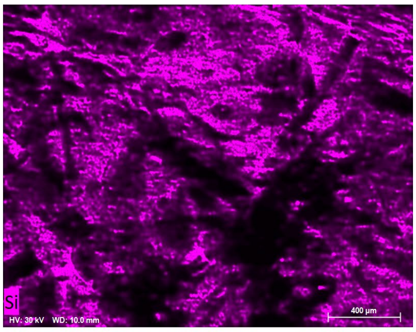
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:45:17 PM	30.0 keV	126x	10.0 mm

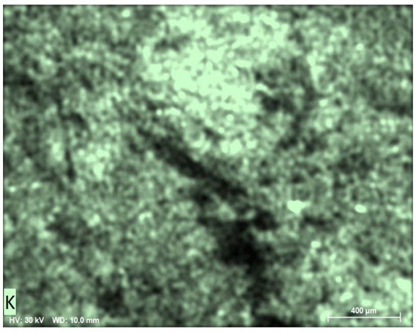


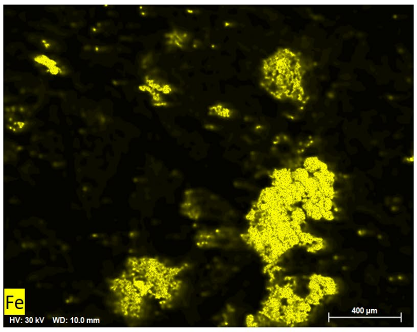


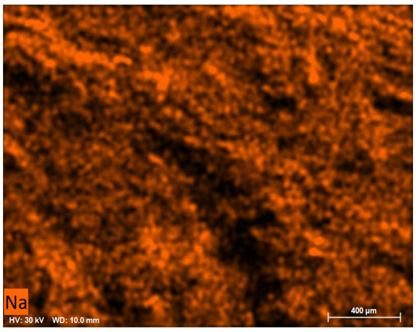


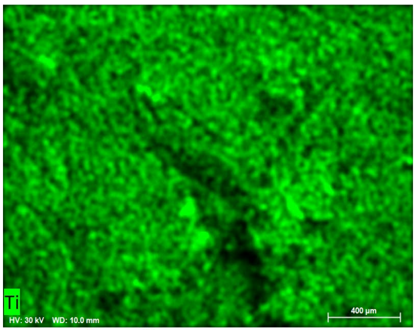


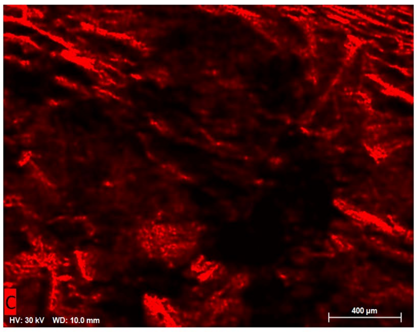


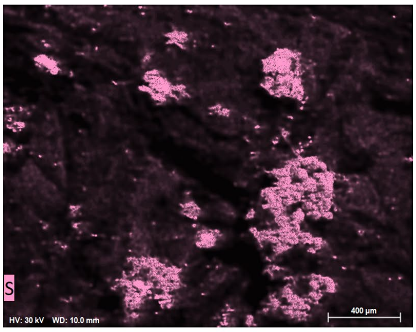








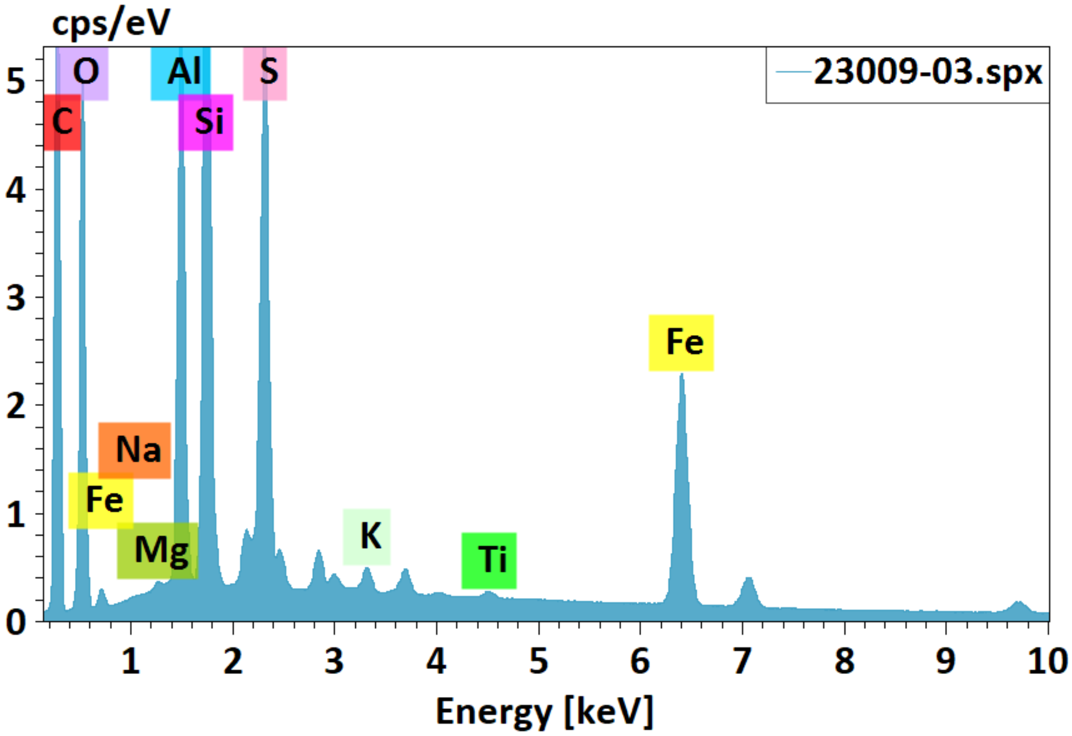




Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:45:17 PM	30.0 keV	126x	10.0 mm

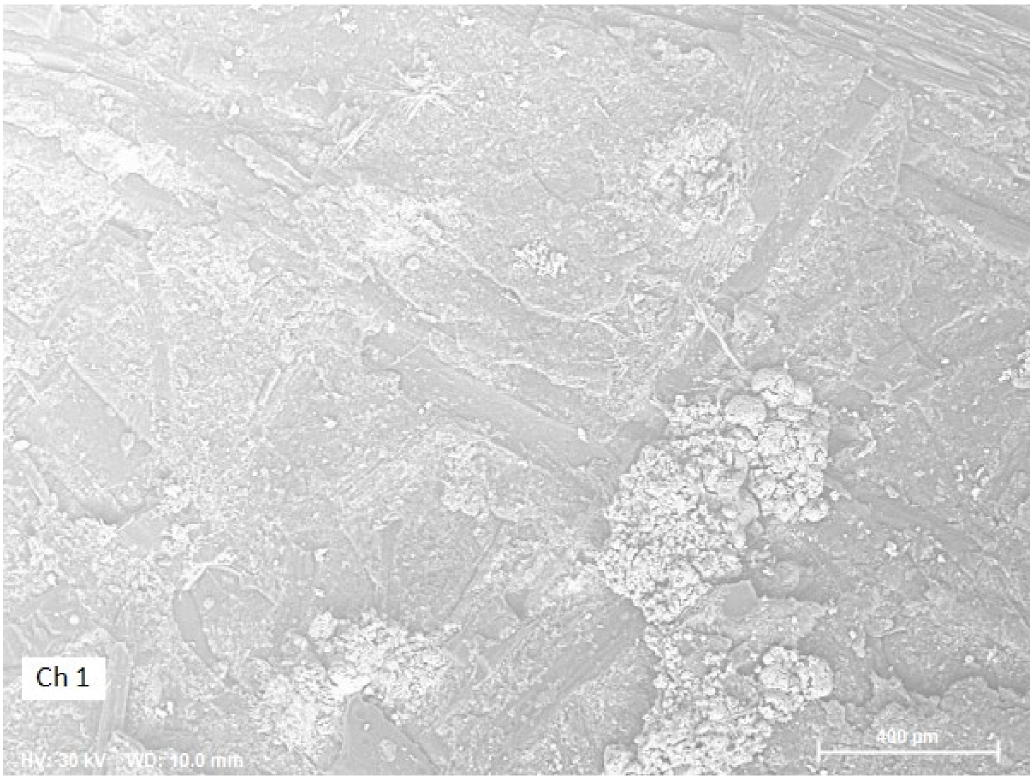
EDS Report

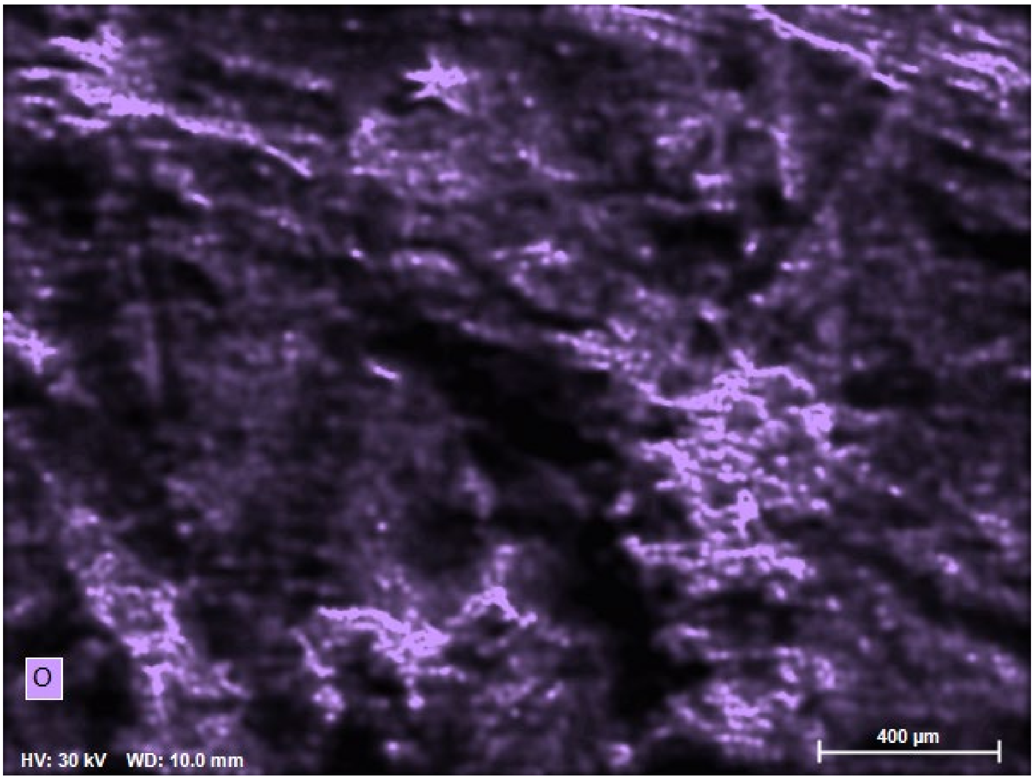
Company / Department

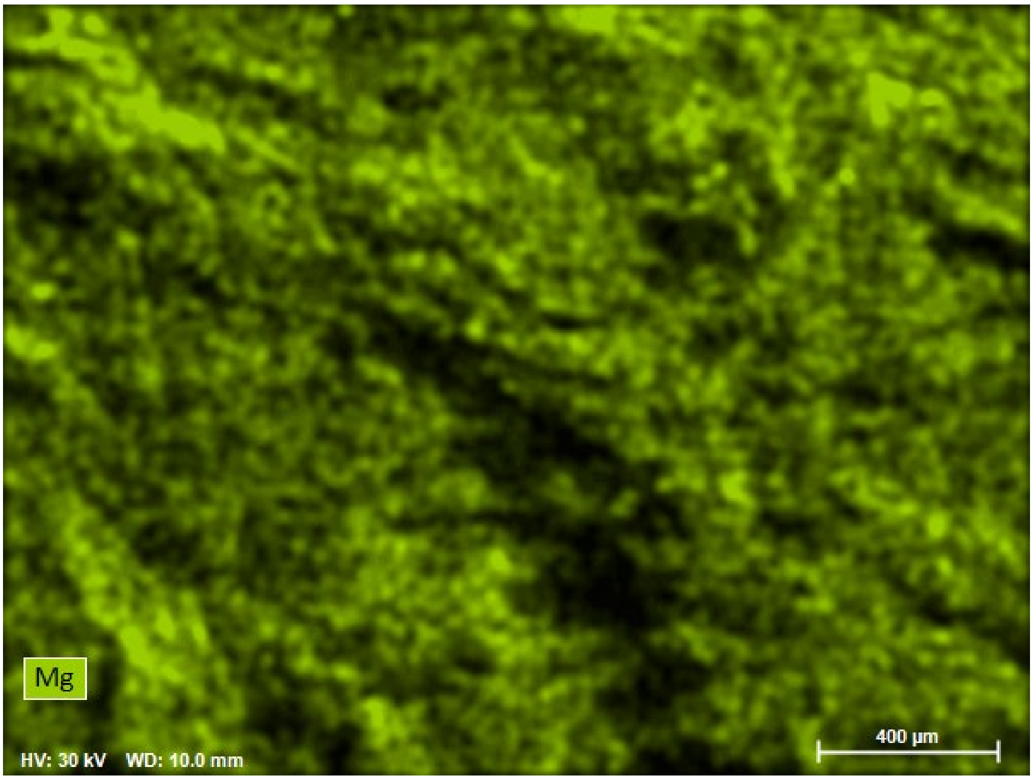


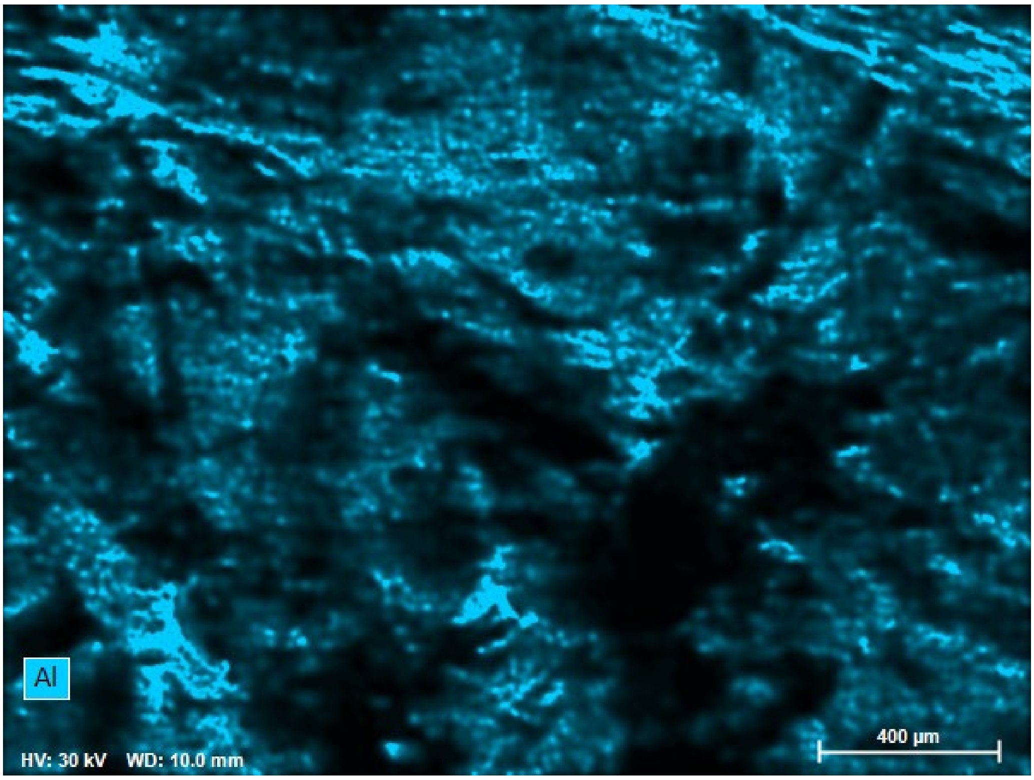
23009-03.spx

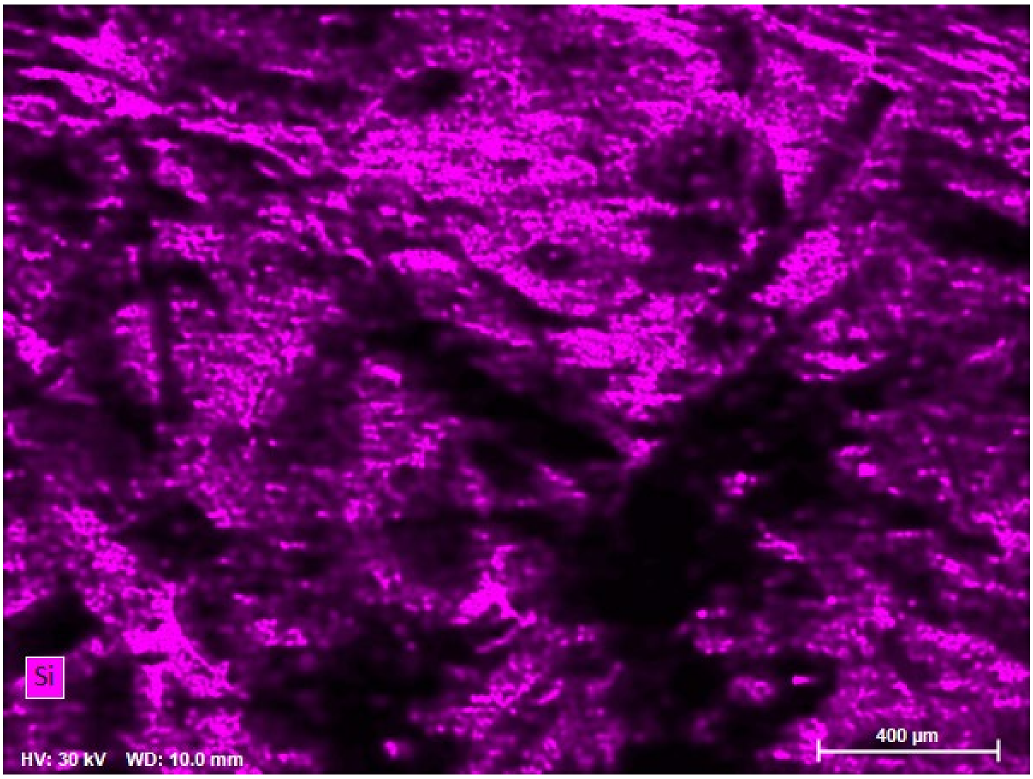
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	52.76	50.55	61.86
Oxygen	8	35.41	33.92	31.16
Sodium	11	0.06	0.05	0.03
Magnesium	12	0.04	0.04	0.03
Aluminium	13	3.81	3.65	1.99
Silicon	14	4.75	4.55	2.38
Sulfur	16	3.37	3.23	1.48
Potassium	19	0.13	0.12	0.05
Titanium	22	0.06	0.06	0.02
Iron	26	4.00	3.84	1.01
		104.38	**100.00**	**100.00**

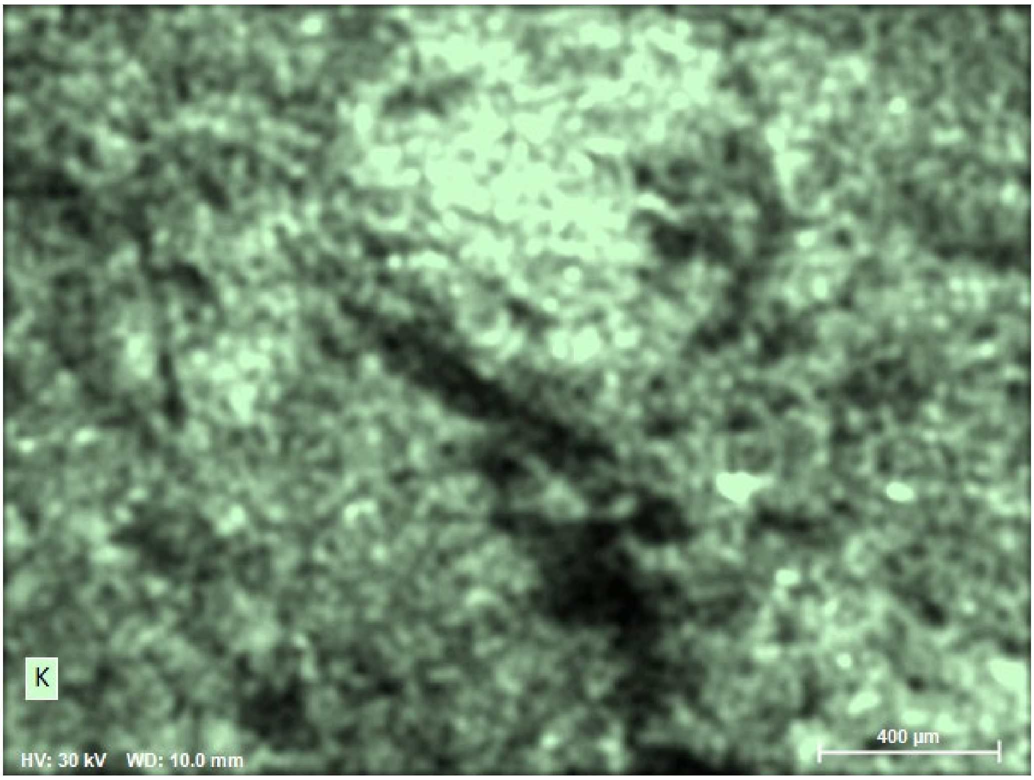

Ch 1
HV: 30 kV WD: 10.0 mm
400 µm

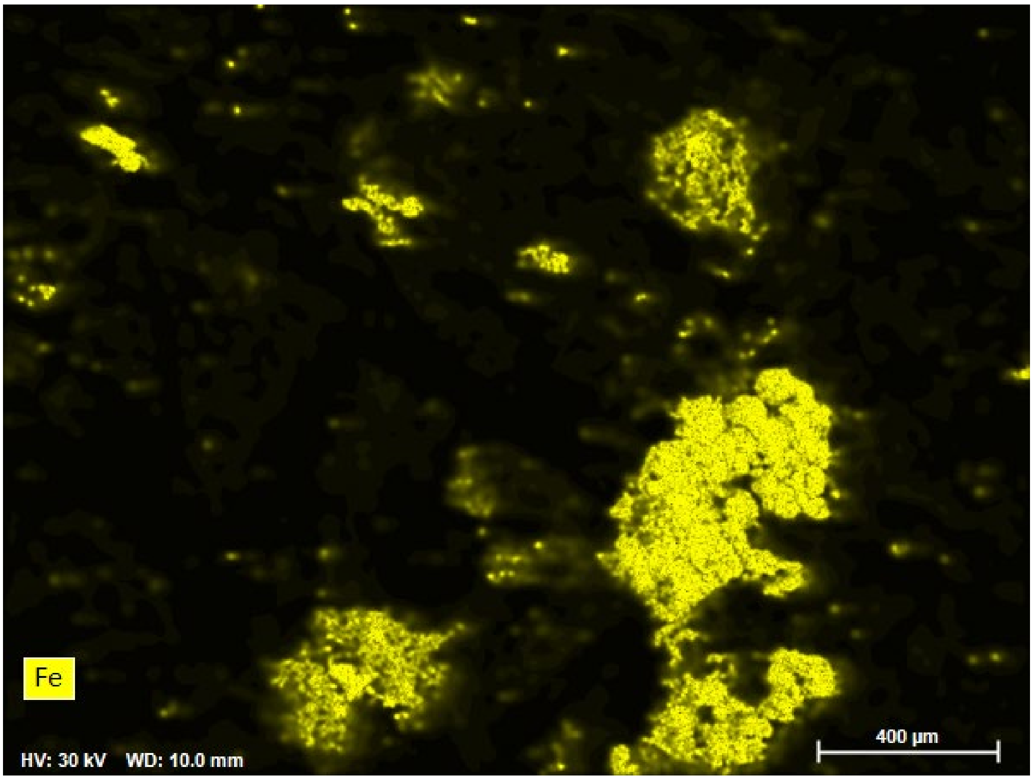

O
HV: 30 kV WD: 10.0 mm
400 µm

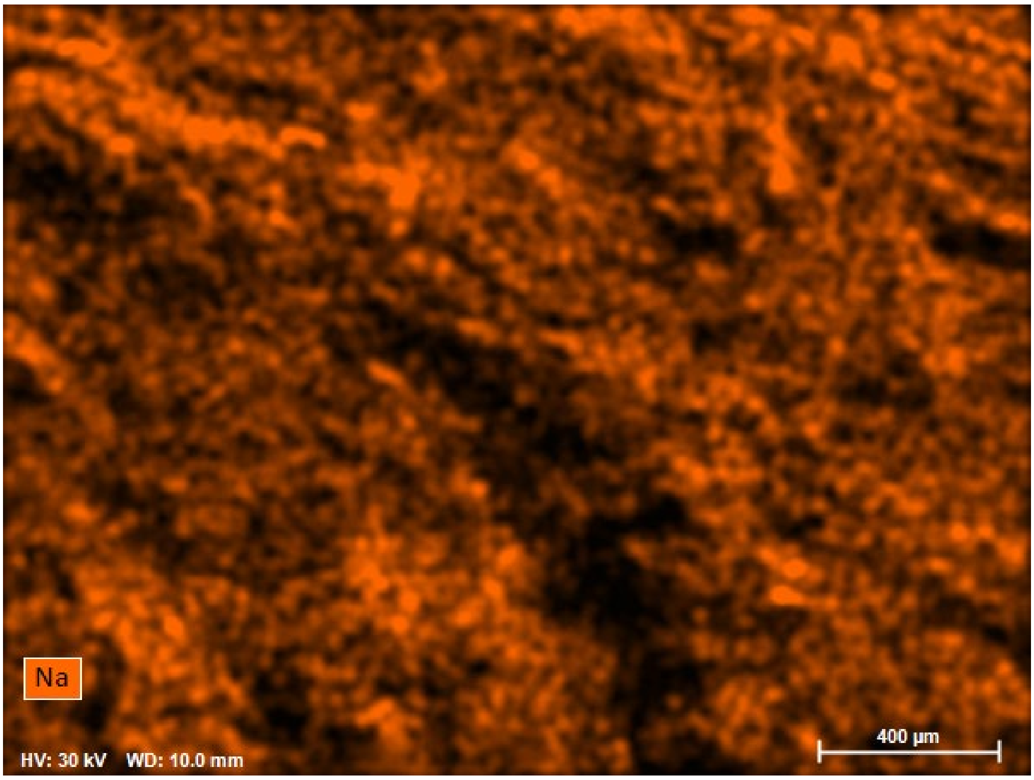

Mg
HV: 30 kV WD: 10.0 mm
400 µm

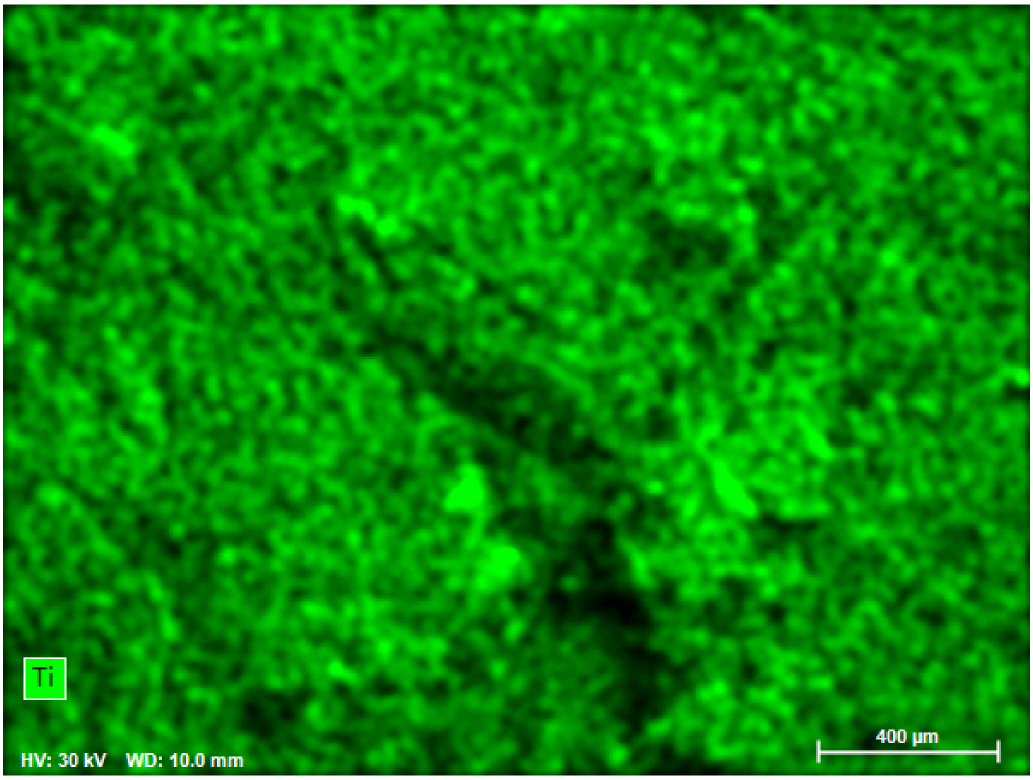

Al
HV: 30 kV WD: 10.0 mm
400 µm

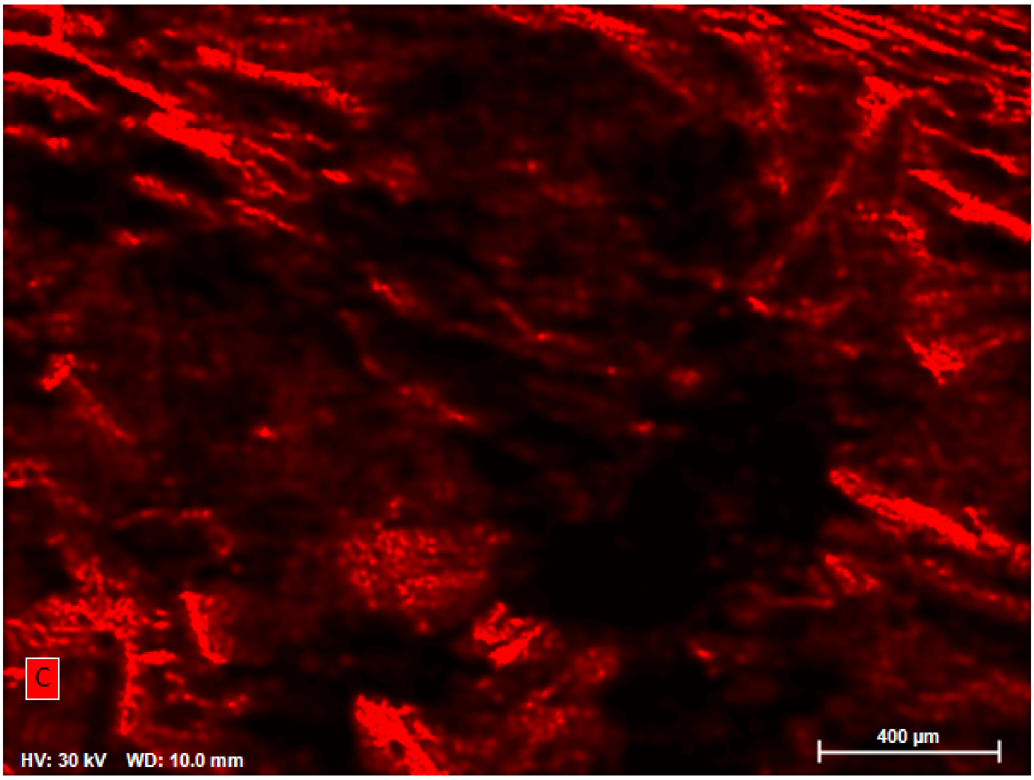

Si
HV: 30 kV WD: 10.0 mm
400 µm

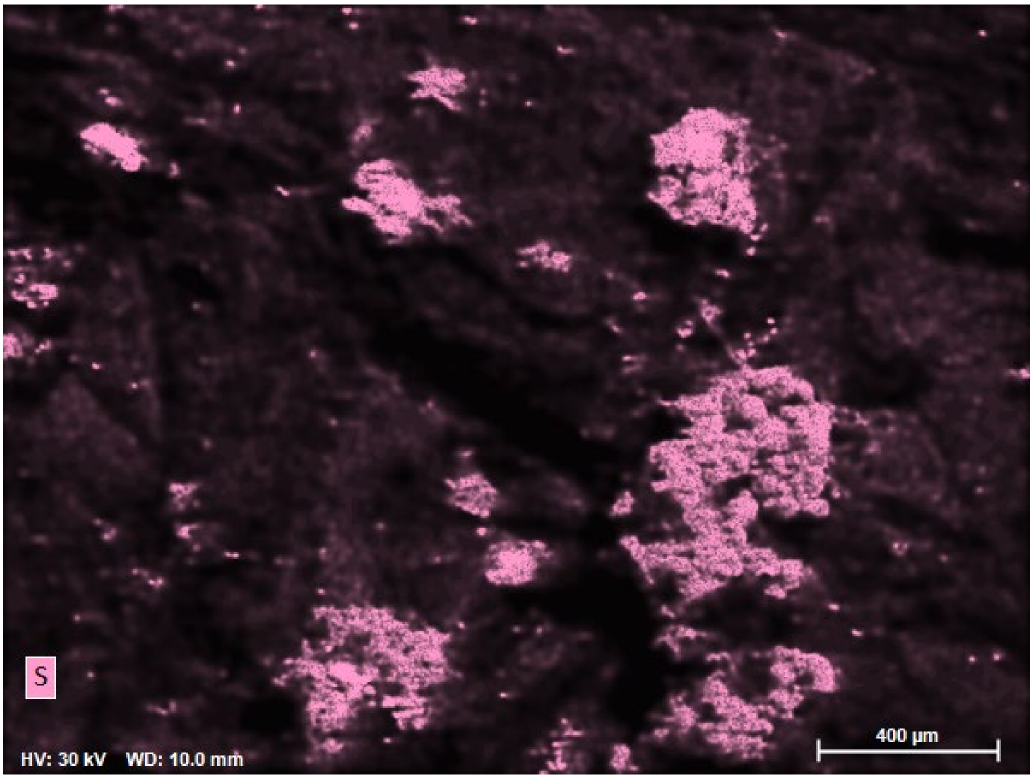

K
HV: 30 kV WD: 10.0 mm
400 µm


Fe
HV: 30 kV WD: 10.0 mm
400 µm


Na
HV: 30 kV WD: 10.0 mm
400 µm

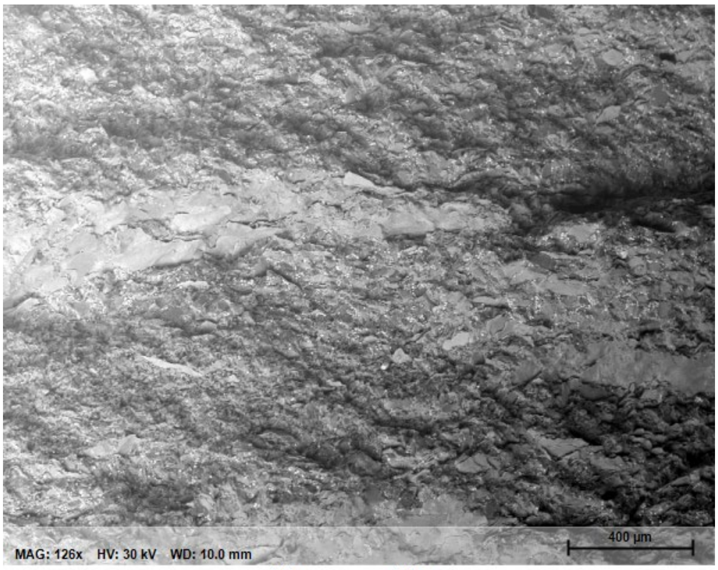

Ti
HV: 30 kV WD: 10.0 mm
400 µm


C
HV: 30 kV WD: 10.0 mm
400 µm

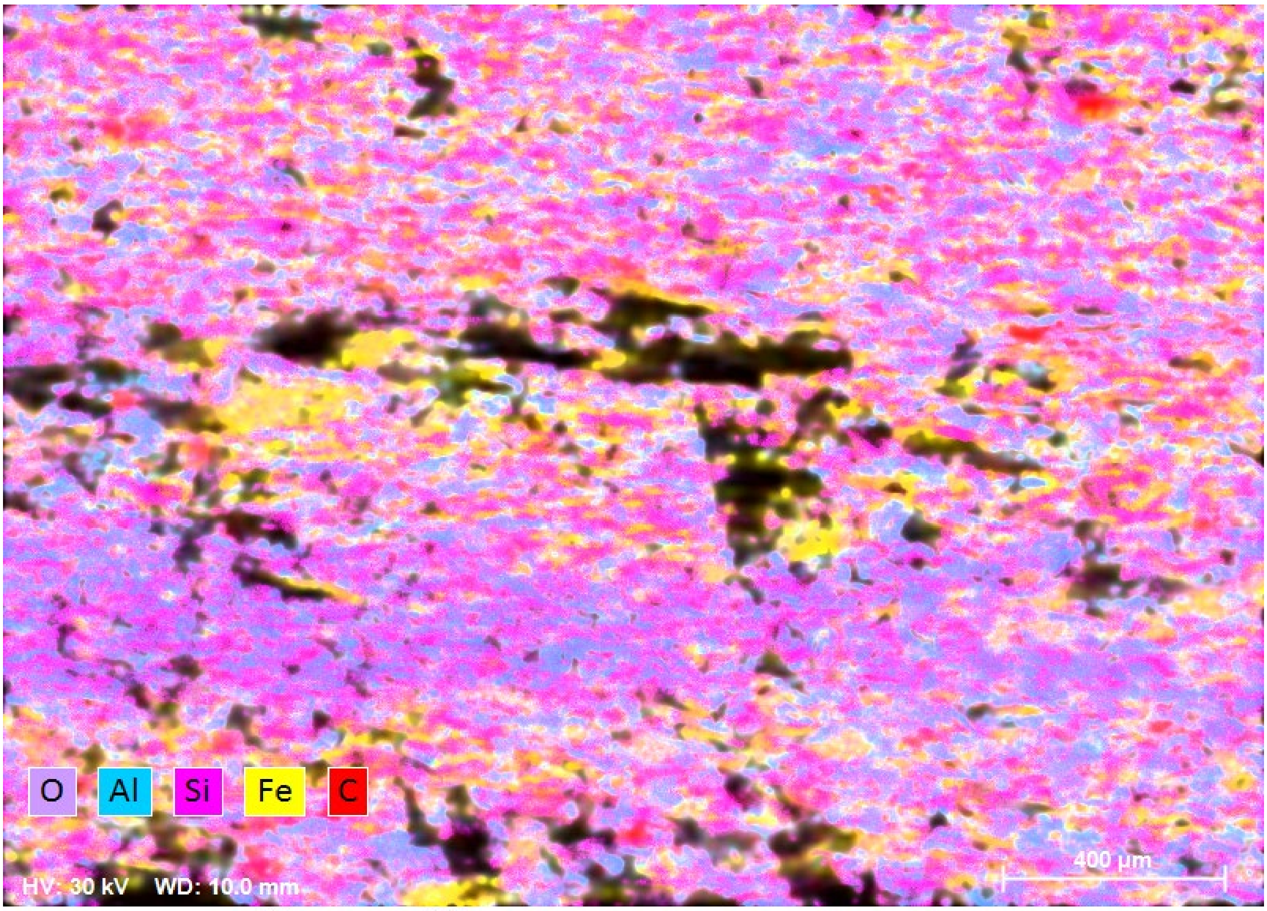

S
HV: 30 kV WD: 10.0 mm
400 µm


MAG: 126x HV: 30 kV WD: 10.0 mm
400 µm

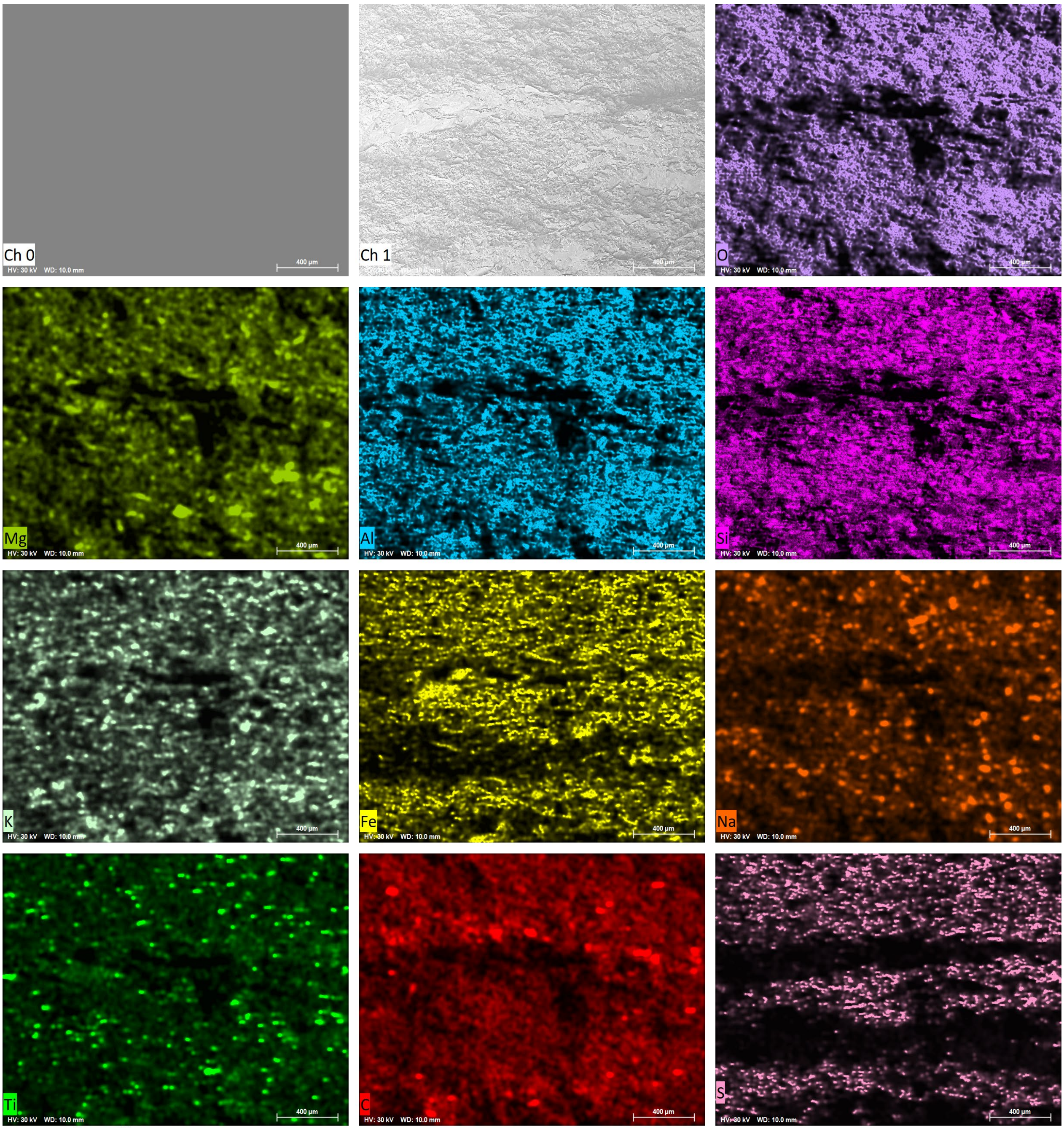
23009-04 Report



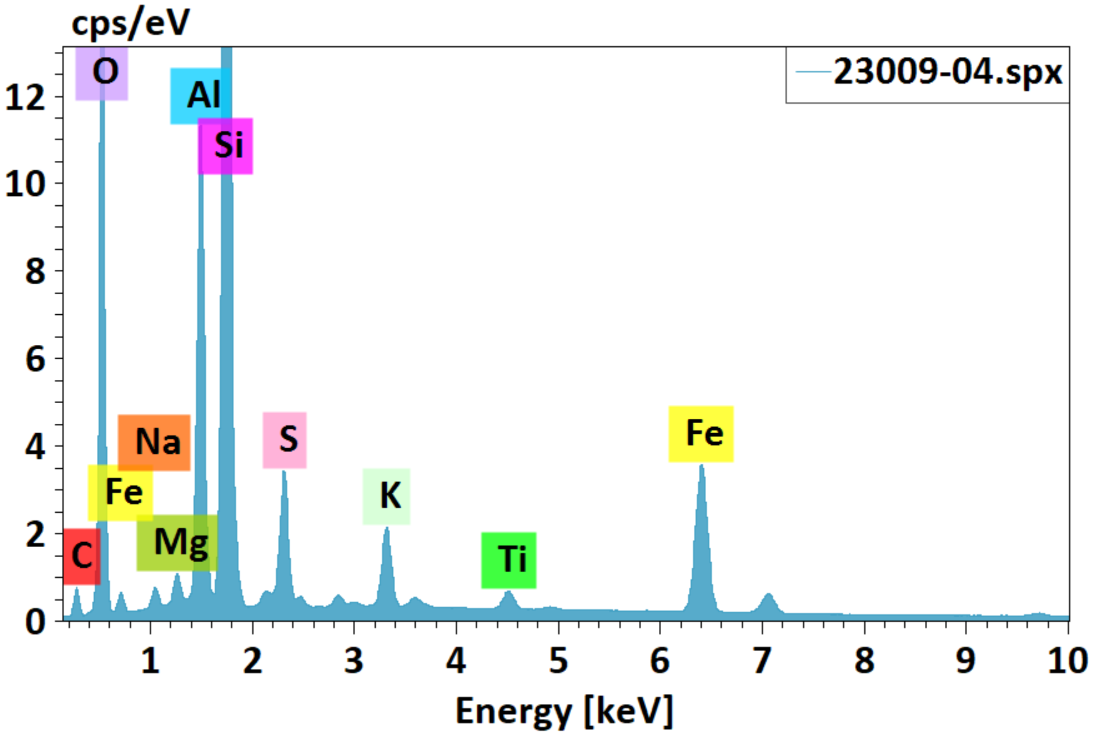
Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/8/2023	9:56:20 AM	30.0 keV	126x	10.0 mm



Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:58:46 PM	30.0 keV	126x	10.0 mm



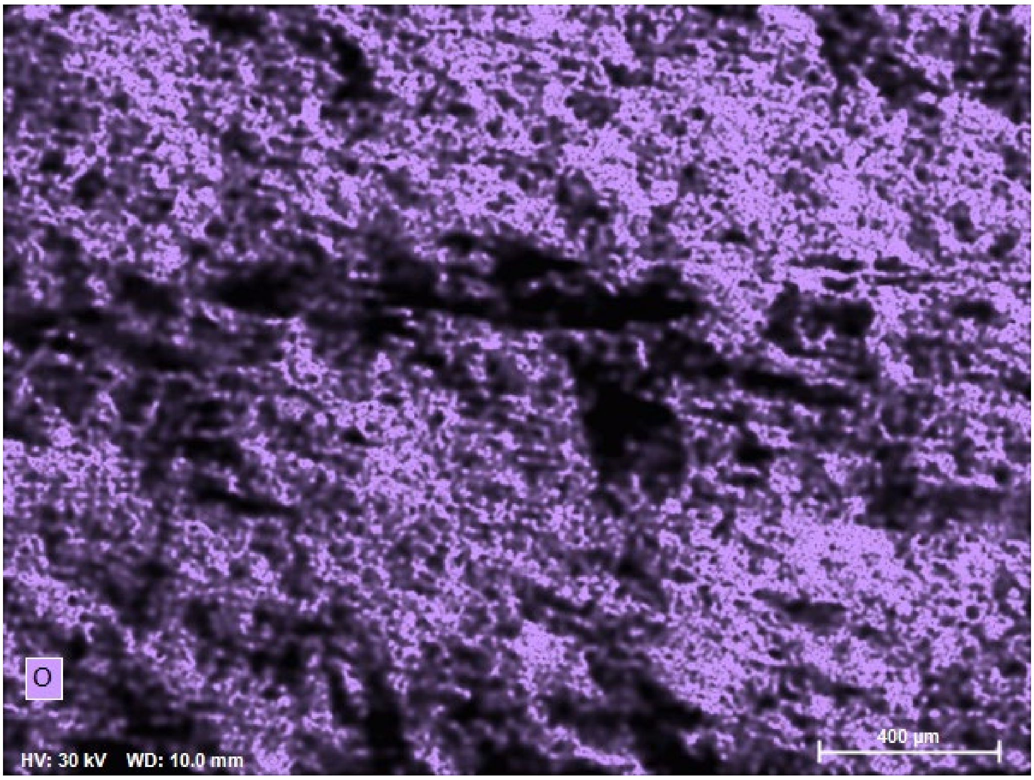
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:58:46 PM	30.0 keV	126x	10.0 mm



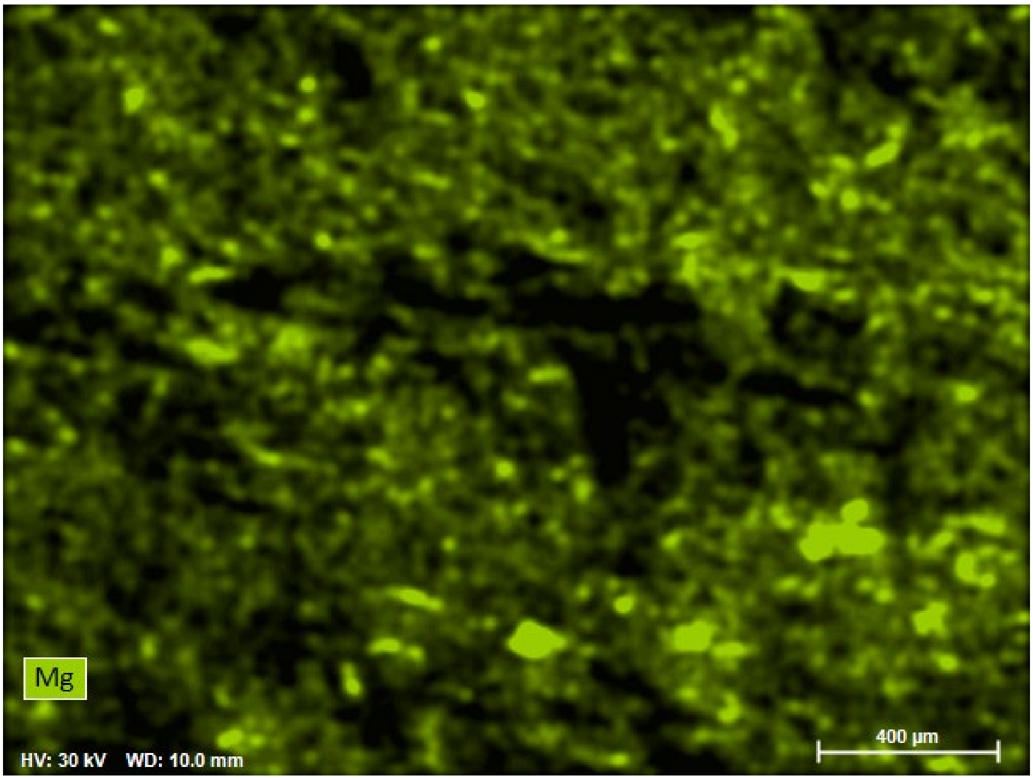
23009-04.spx

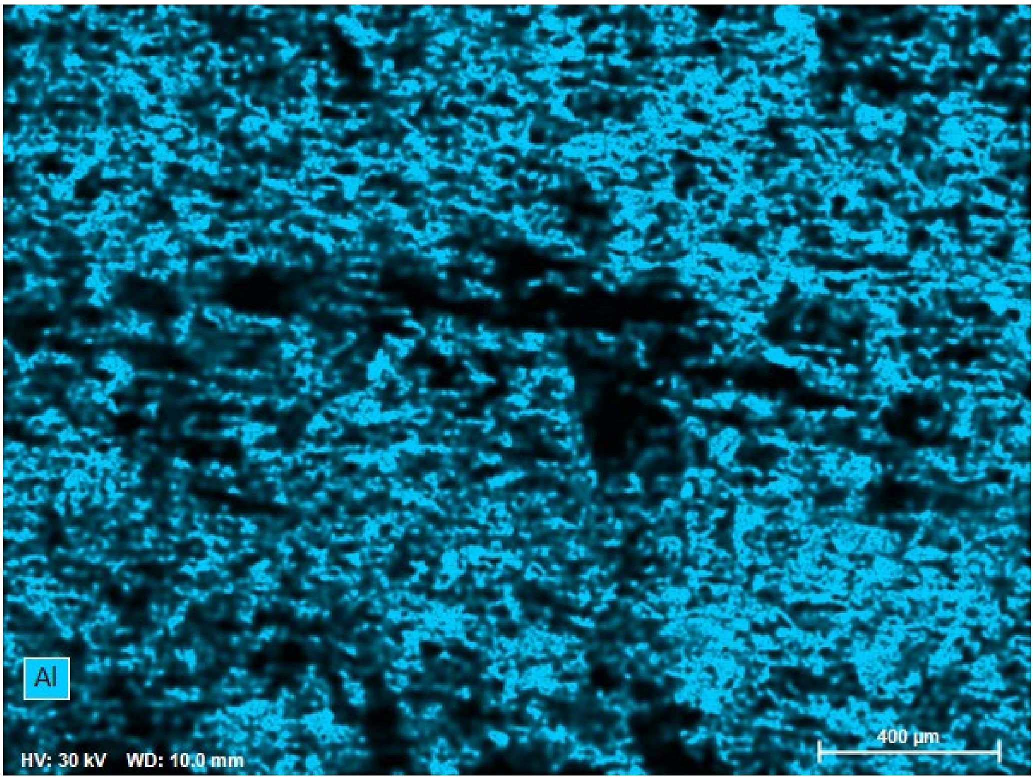
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	9.05	7.82	12.53
Oxygen	8	58.88	50.88	61.18
Sodium	11	1.07	0.93	0.78
Magnesium	12	0.86	0.74	0.59
Aluminium	13	9.16	7.92	5.65
Silicon	14	25.39	21.93	15.03
Sulfur	16	2.89	2.50	1.50
Potassium	19	1.76	1.52	0.75
Titanium	22	0.55	0.47	0.19
Iron	26	6.12	5.29	1.82
		115.73	**100.00**	**100.00**

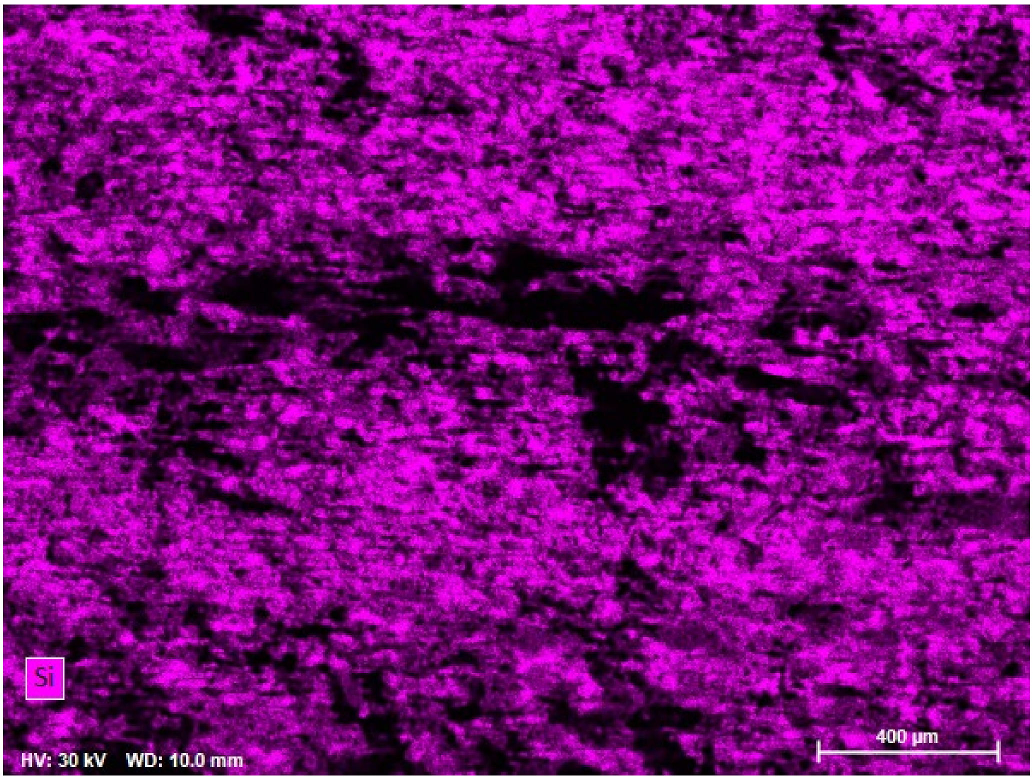
Ch 1
HV: 30 kV WD: 10.0 mm
400 µm

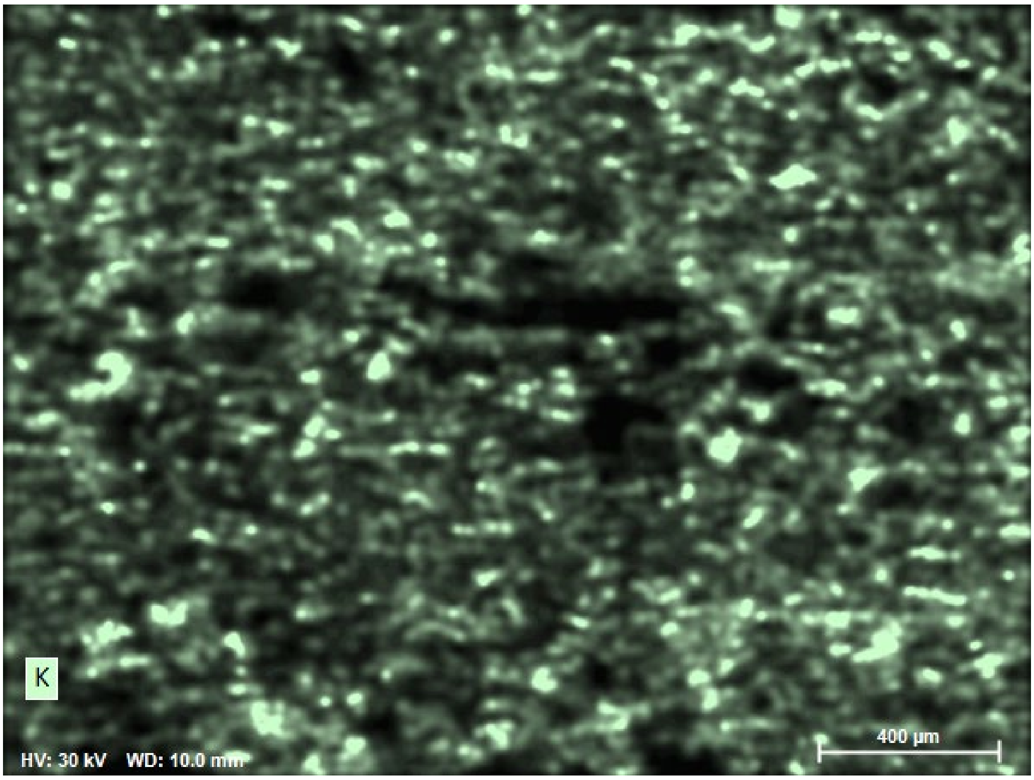


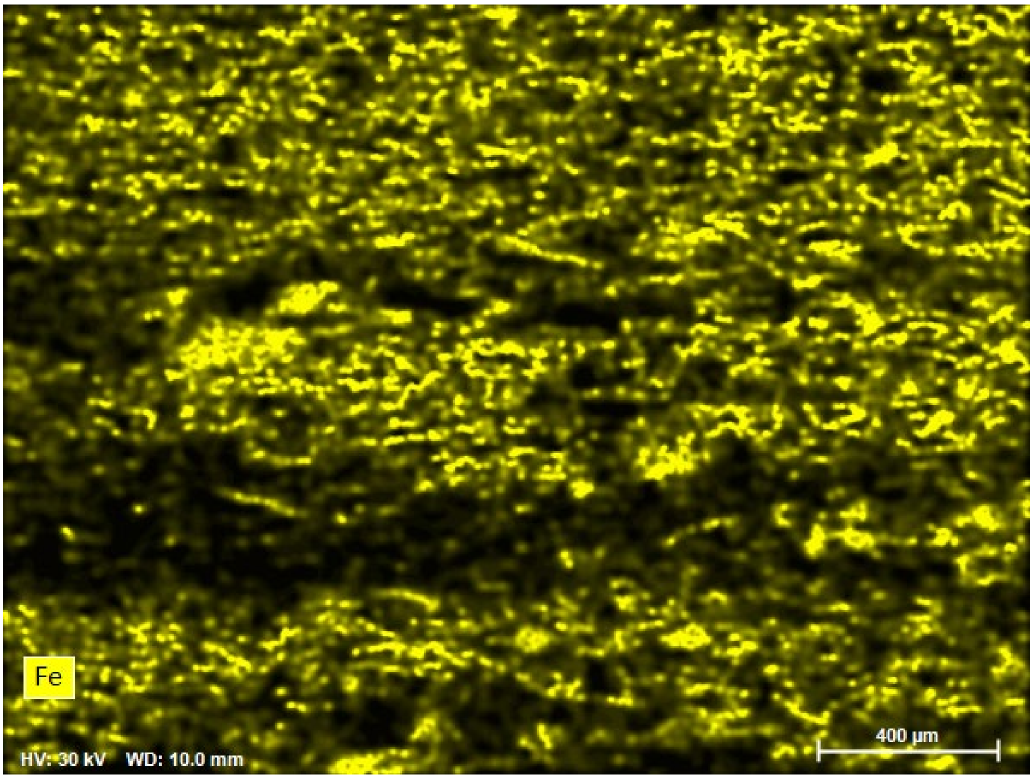
O
HV: 30 kV WD: 10.0 mm
400 µm

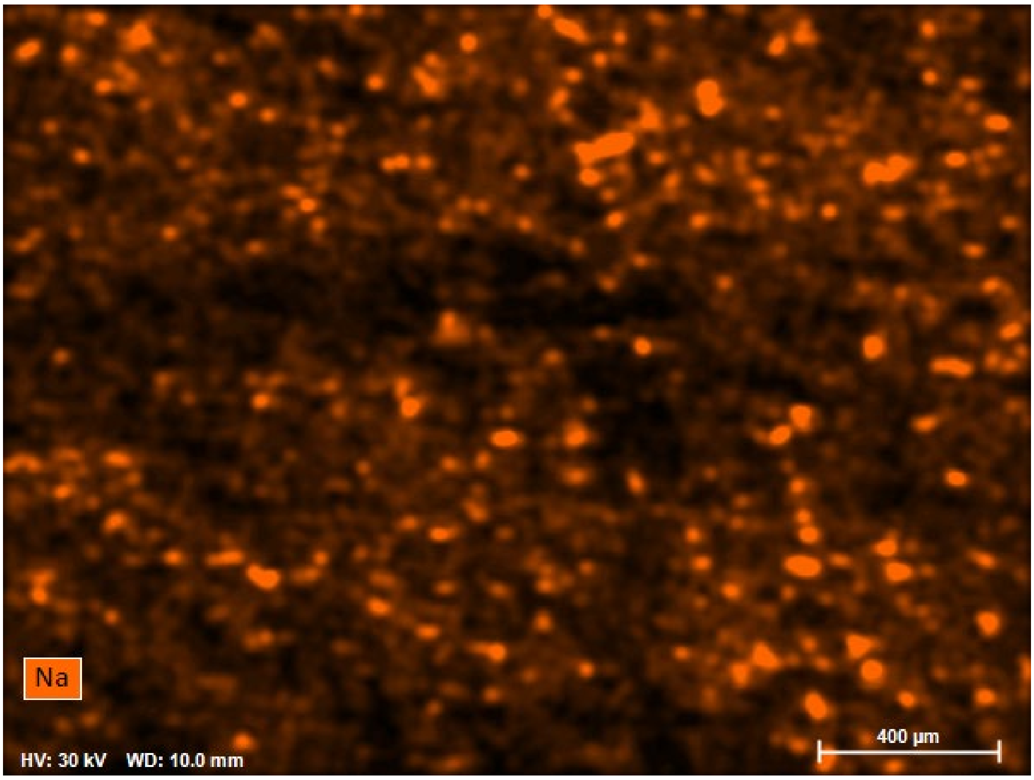

Mg
HV: 30 kV WD: 10.0 mm
400 µm

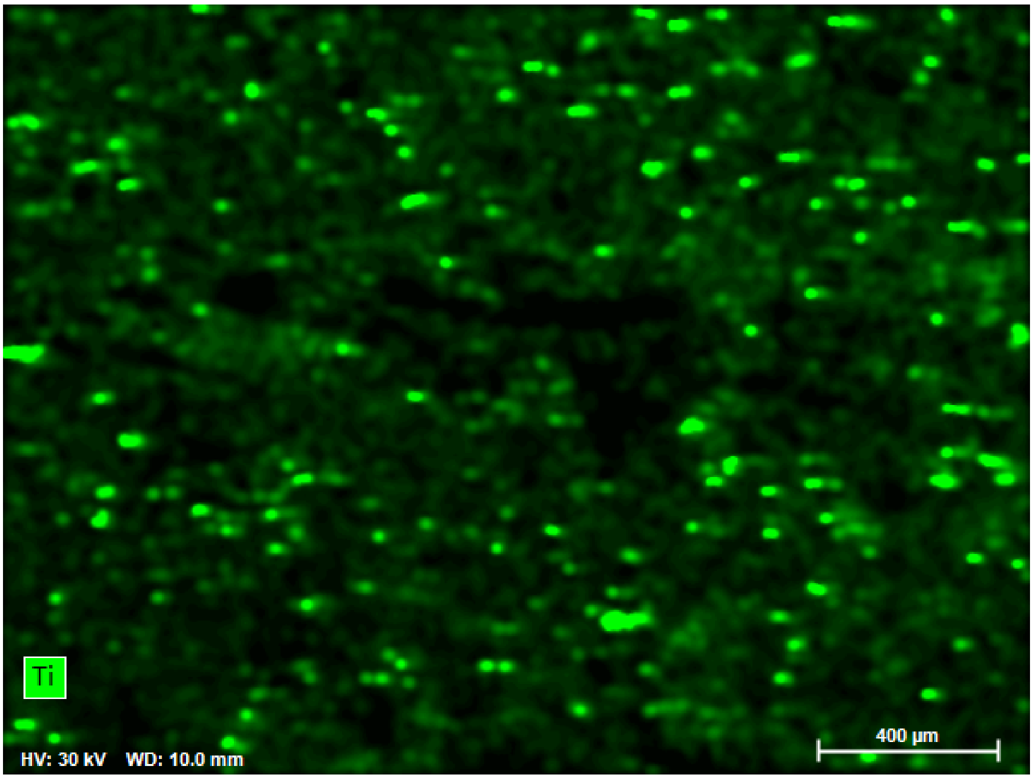

Al
HV: 30 kV WD: 10.0 mm
400 µm

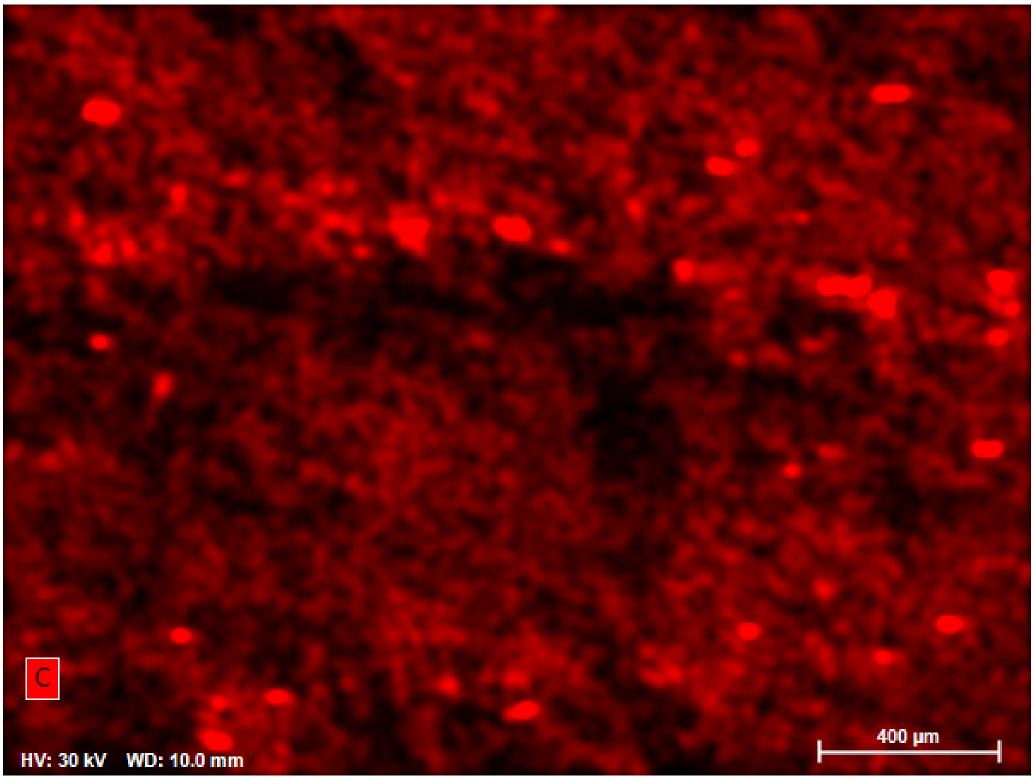

Si
HV: 30 kV WD: 10.0 mm
400 µm

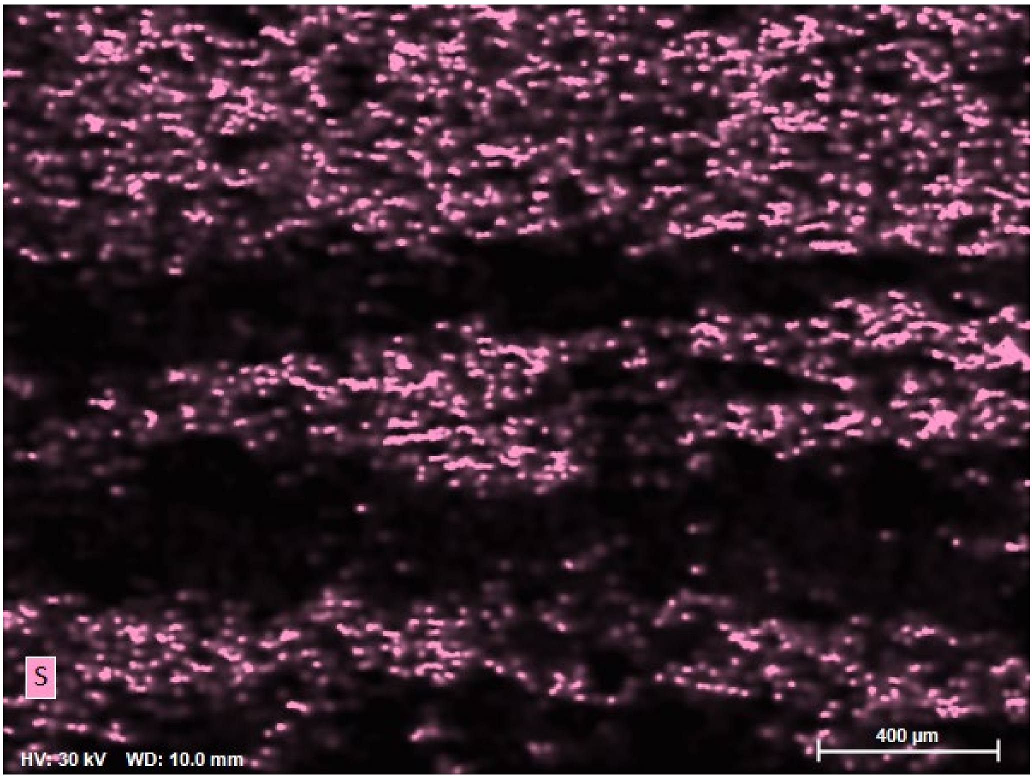

K
HV: 30 kV WD: 10.0 mm
400 µm

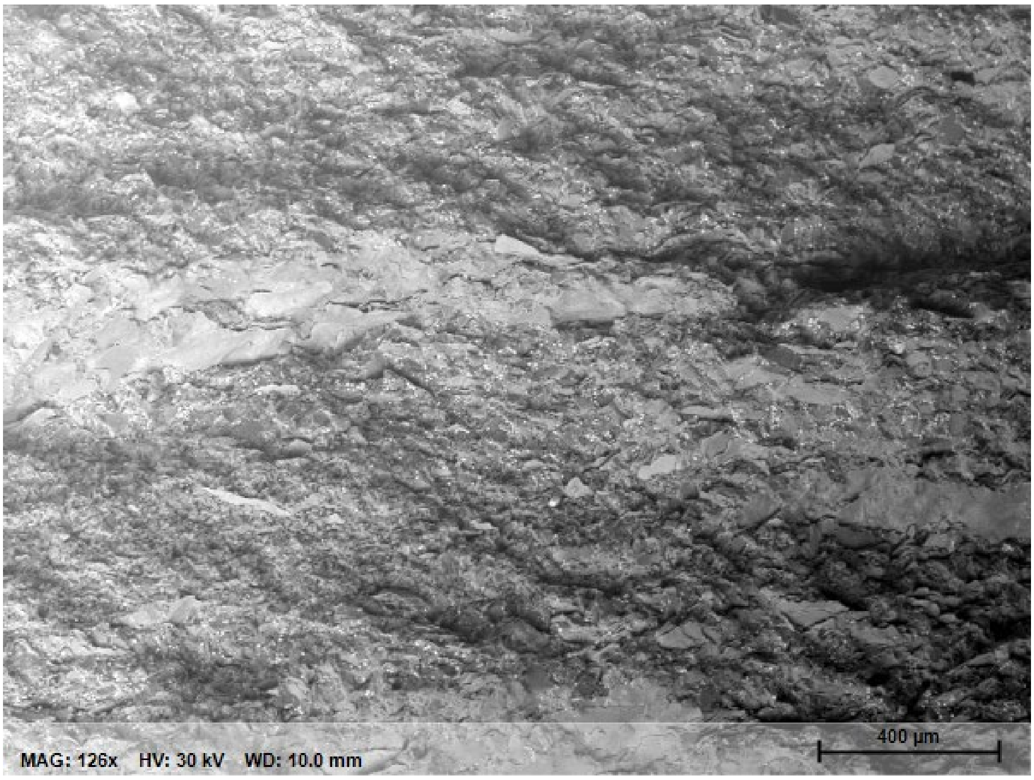

Fe
HV: 30 kV WD: 10.0 mm
400 µm


Na
HV: 30 kV WD: 10.0 mm
400 µm

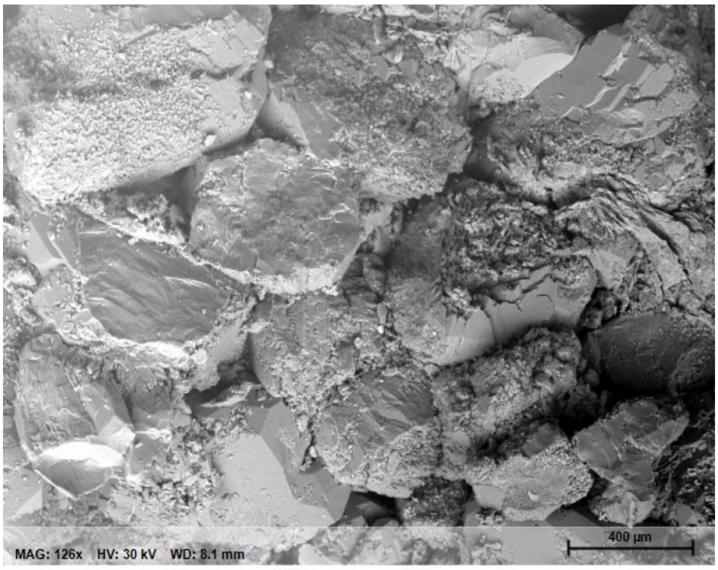

Ti
HV: 30 kV WD: 10.0 mm
400 µm


C
HV: 30 kV WD: 10.0 mm
400 µm

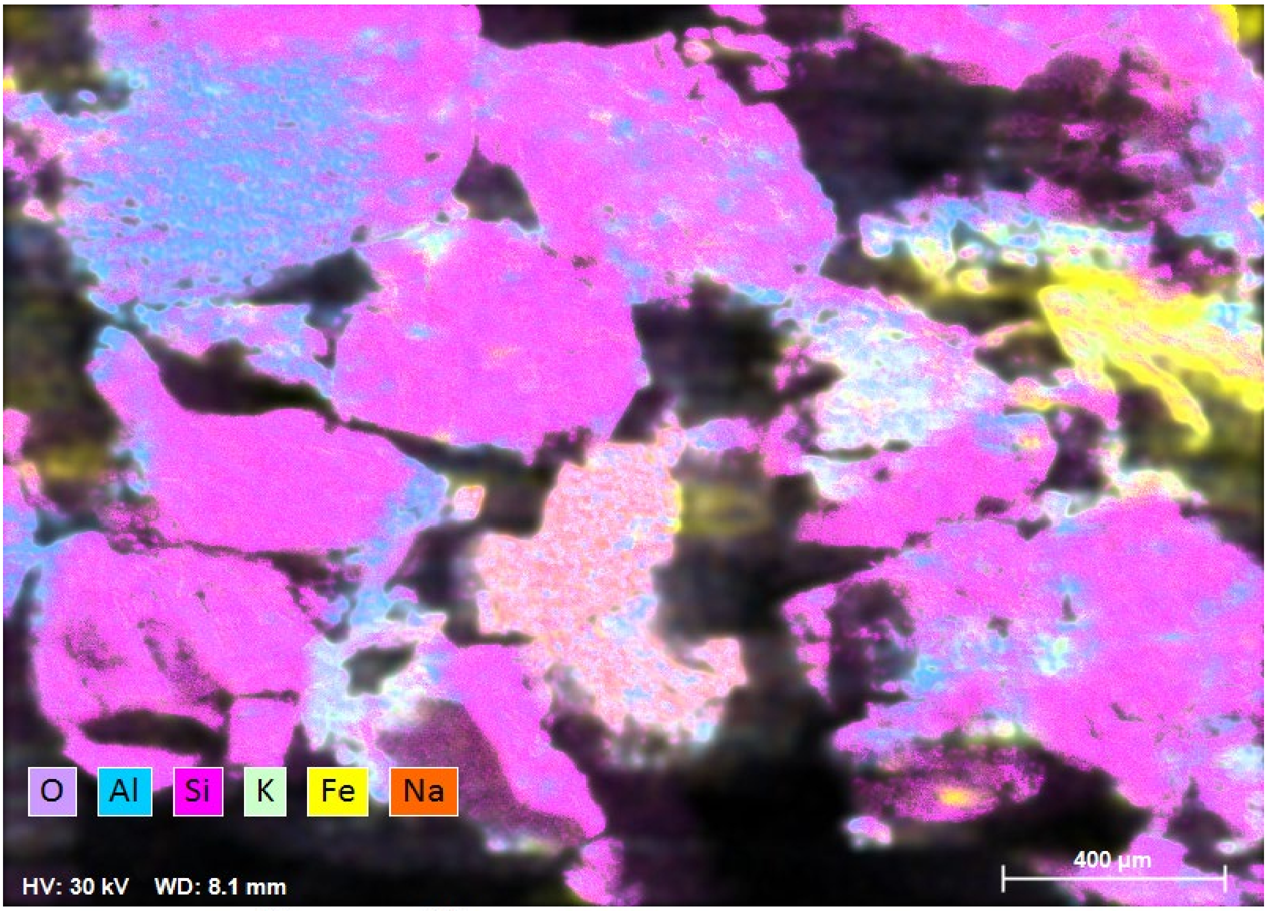

S
HV: 30 kV WD: 10.0 mm
400 µm


MAG: 126x HV: 30 kV WD: 10.0 mm
400 µm

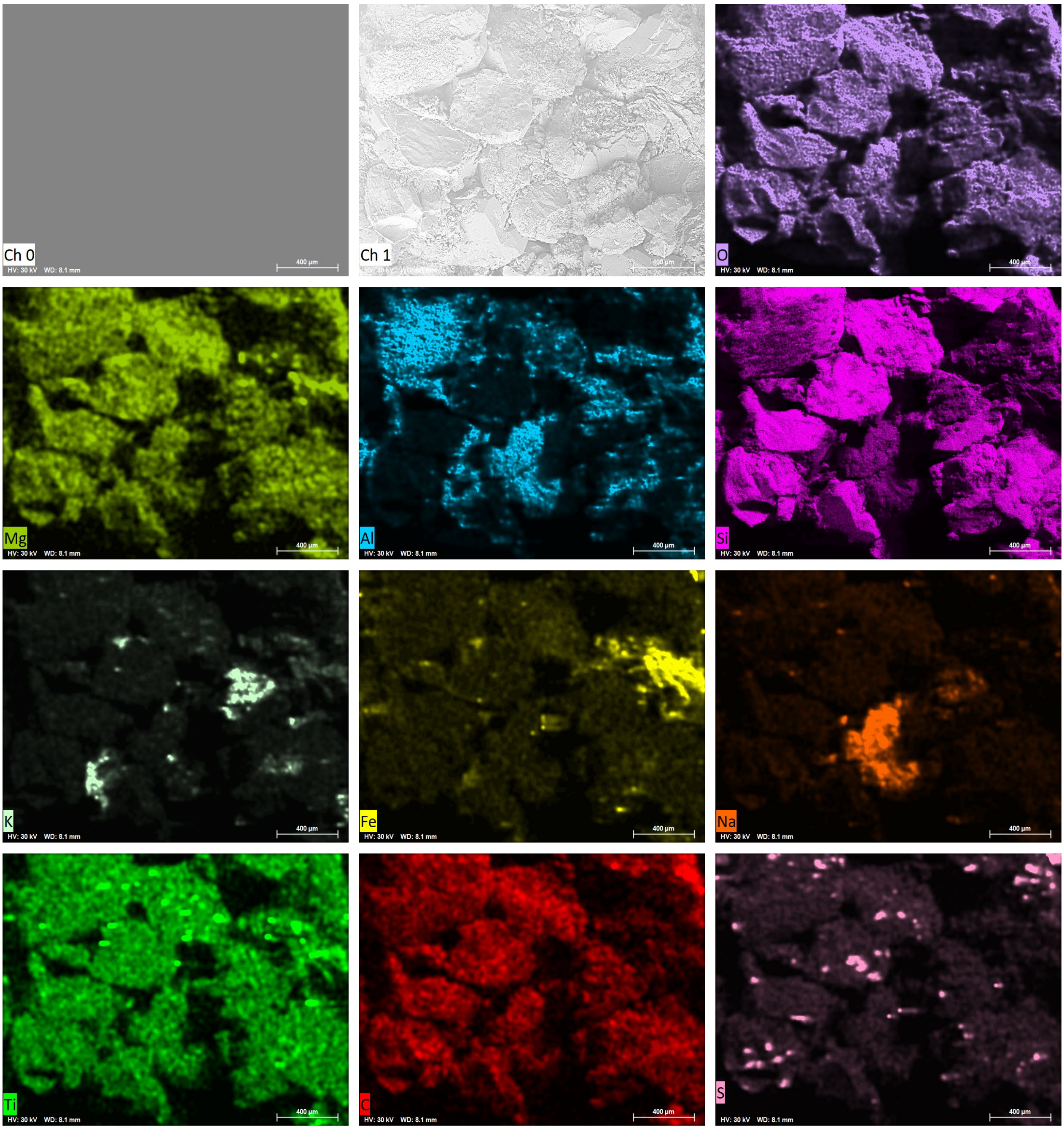
23009-05 Report



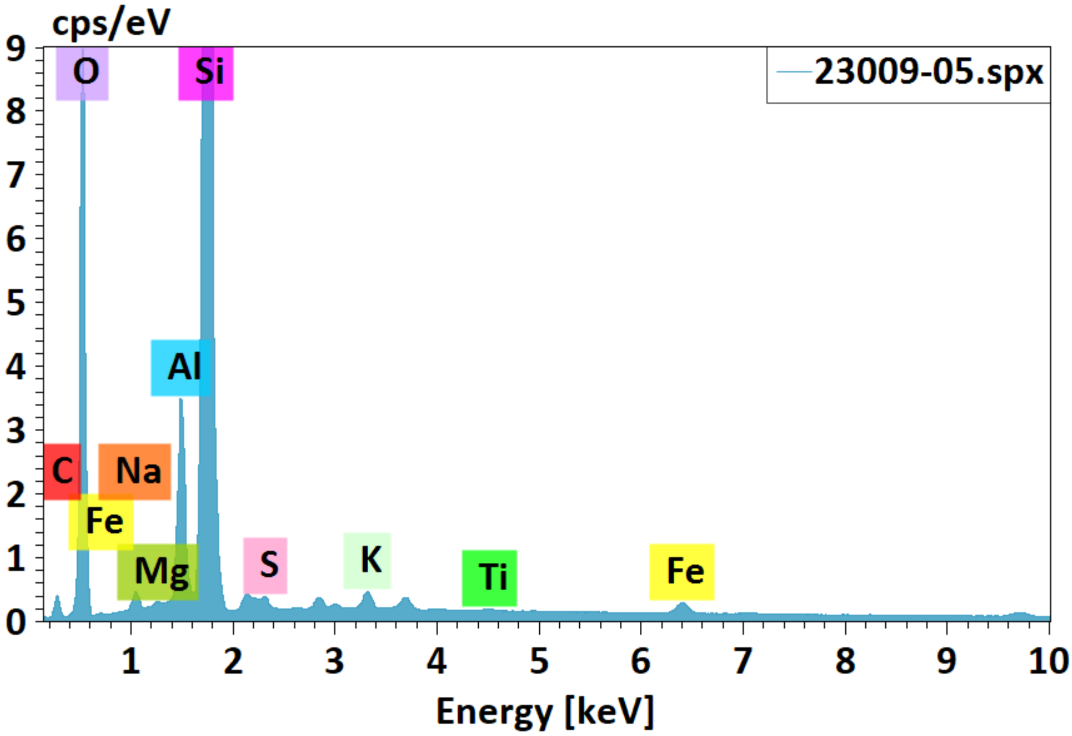
Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/8/2023	10:34:09 AM	30.0 keV	126x	8.1 mm



Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	2:07:53 PM	30.0 keV	126x	8.1 mm



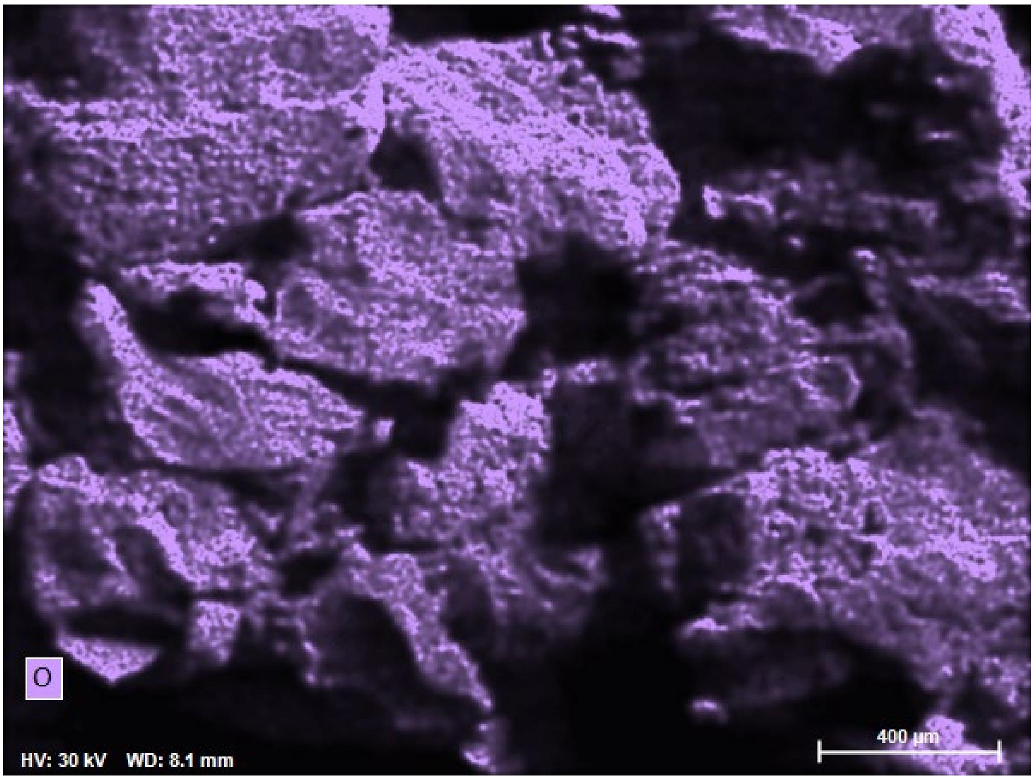
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	2:07:53 PM	30.0 keV	126x	8.1 mm

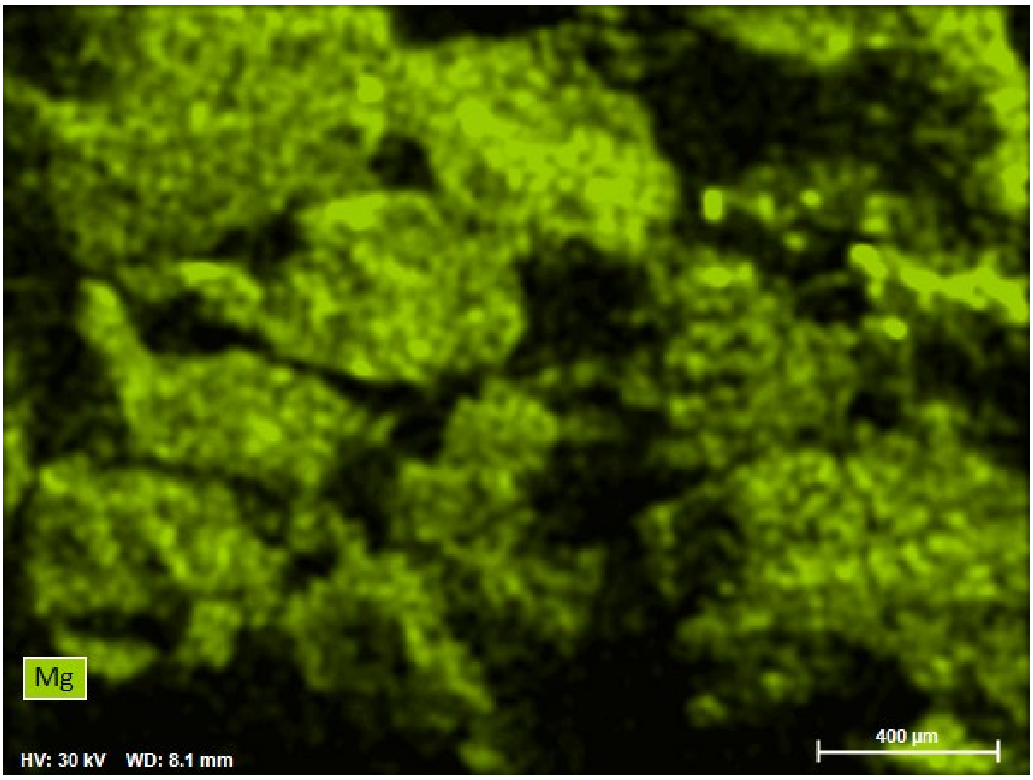


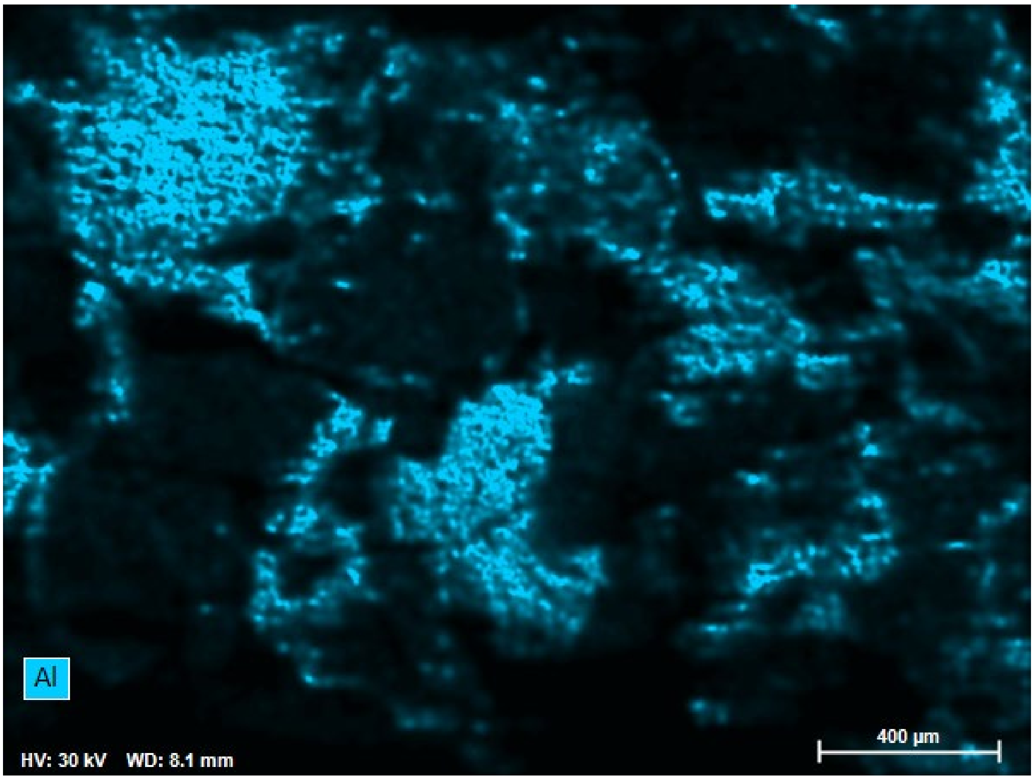
23009-05.spx

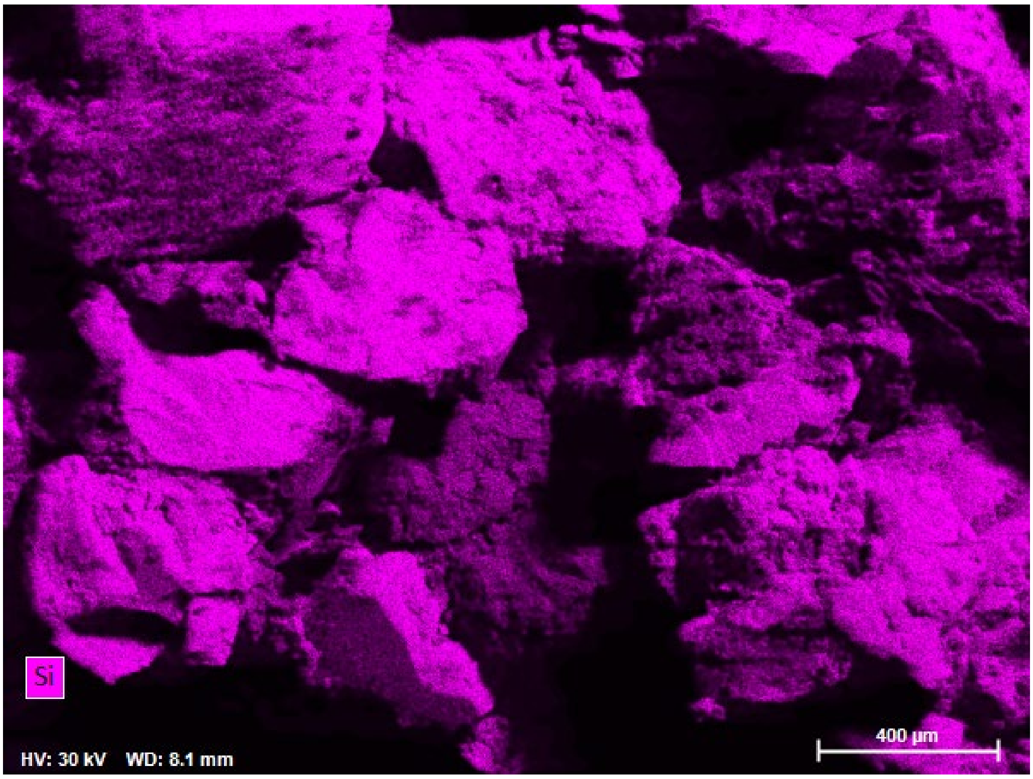
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	7.34	7.92	12.30
Oxygen	8	49.03	52.85	61.66
Sodium	11	0.69	0.74	0.60
Magnesium	12	0.05	0.06	0.04
Aluminium	13	3.31	3.57	2.47
Silicon	14	31.35	33.79	22.46
Sulfur	16	0.24	0.25	0.15
Potassium	19	0.31	0.33	0.16
Titanium	22	0.04	0.04	0.02
Iron	26	0.42	0.46	0.15
		92.78	**100.00**	**100.00**

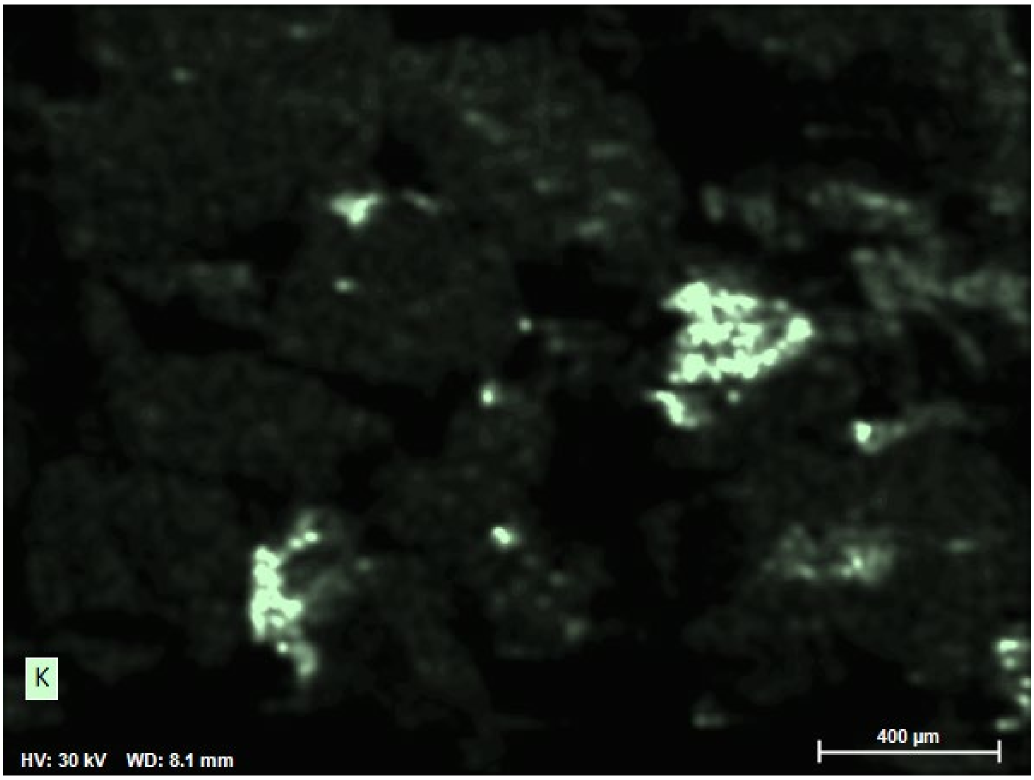

Ch 1
HV: 30 kV WD: 8.1 mm
400 µm

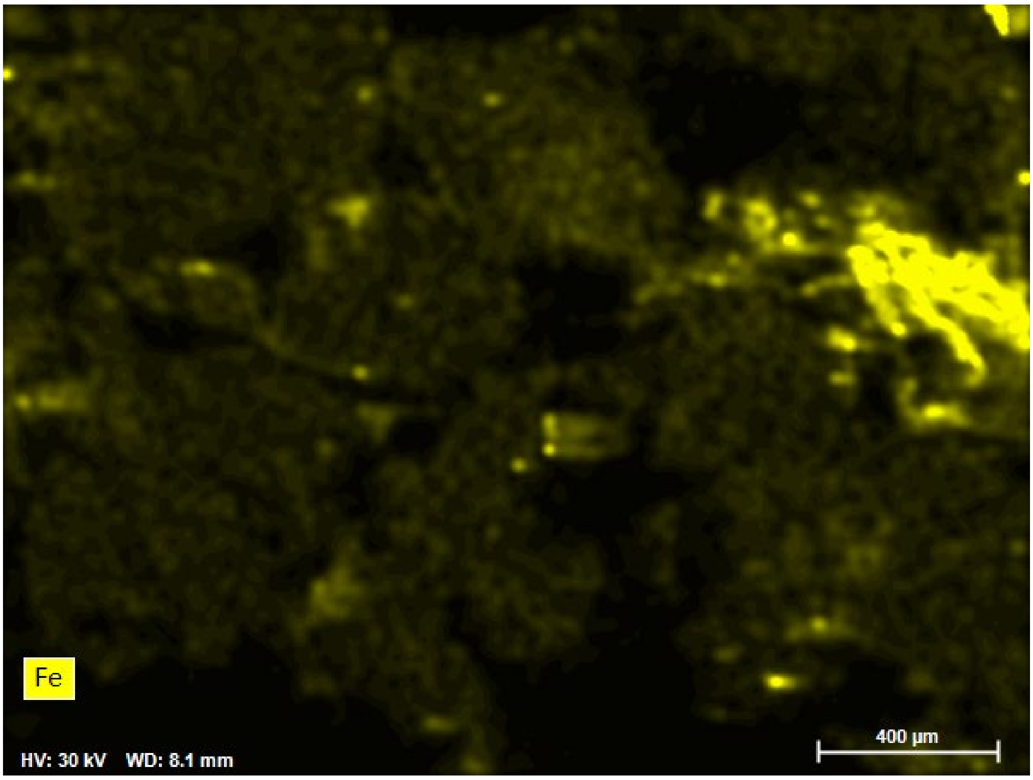

O
HV: 30 kV WD: 8.1 mm
400 µm


Mg
HV: 30 kV WD: 8.1 mm
400 µm

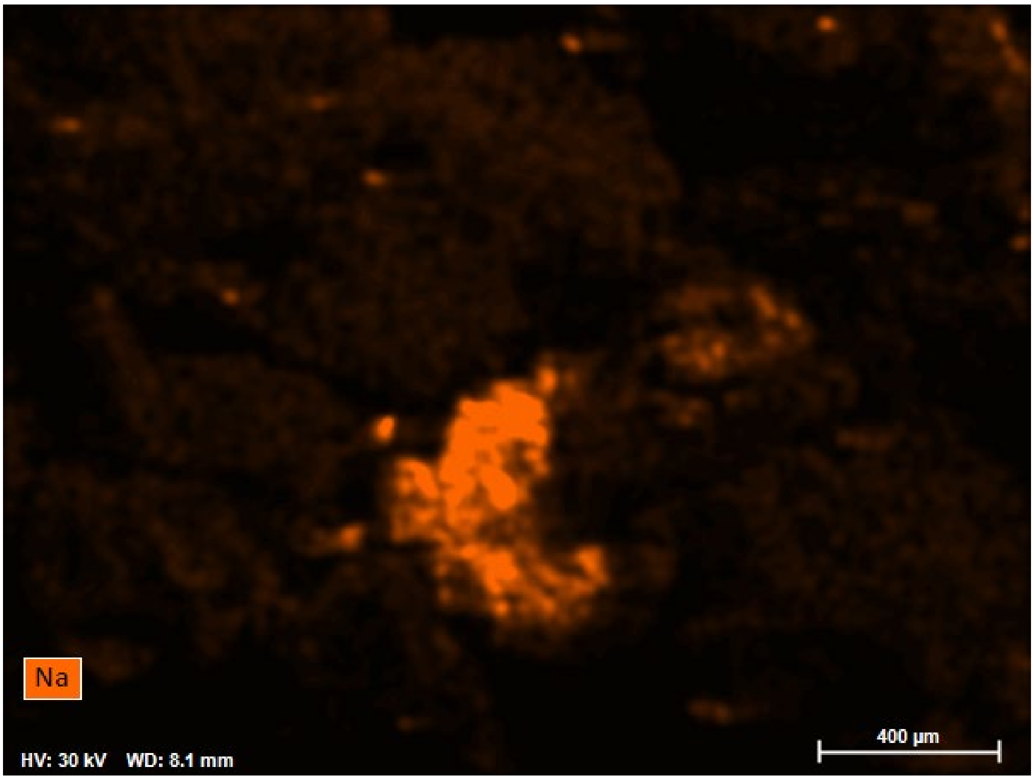

Al
HV: 30 kV WD: 8.1 mm
400 µm


Si
HV: 30 kV WD: 8.1 mm
400 µm

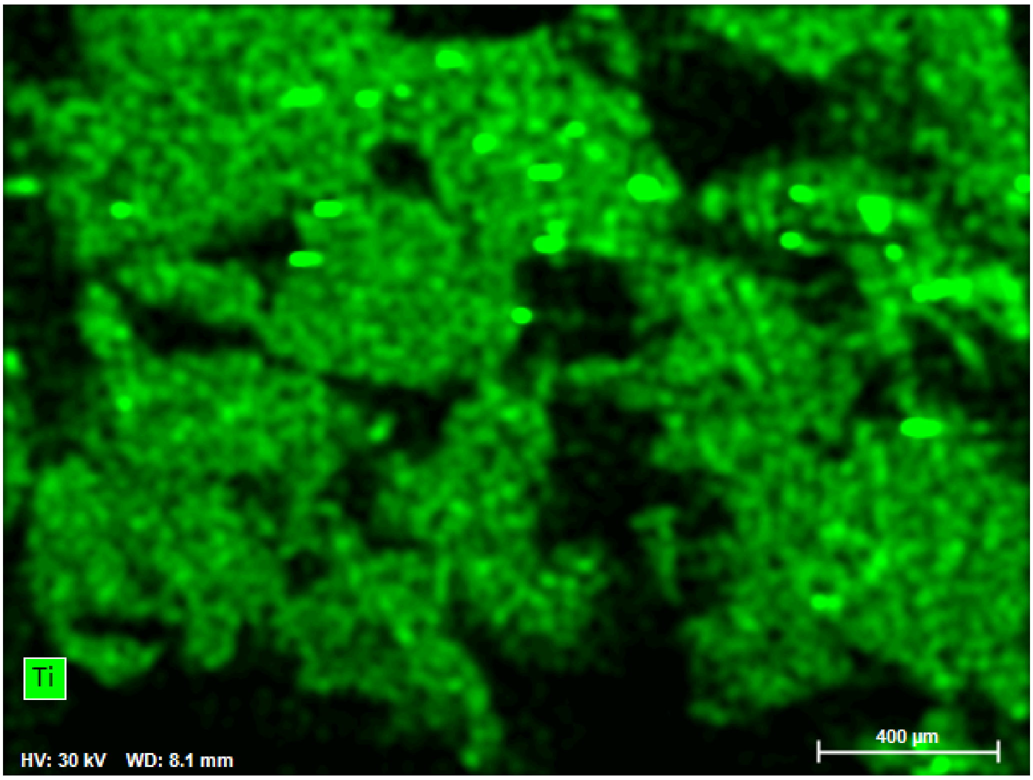

K
HV: 30 kV WD: 8.1 mm
400 µm

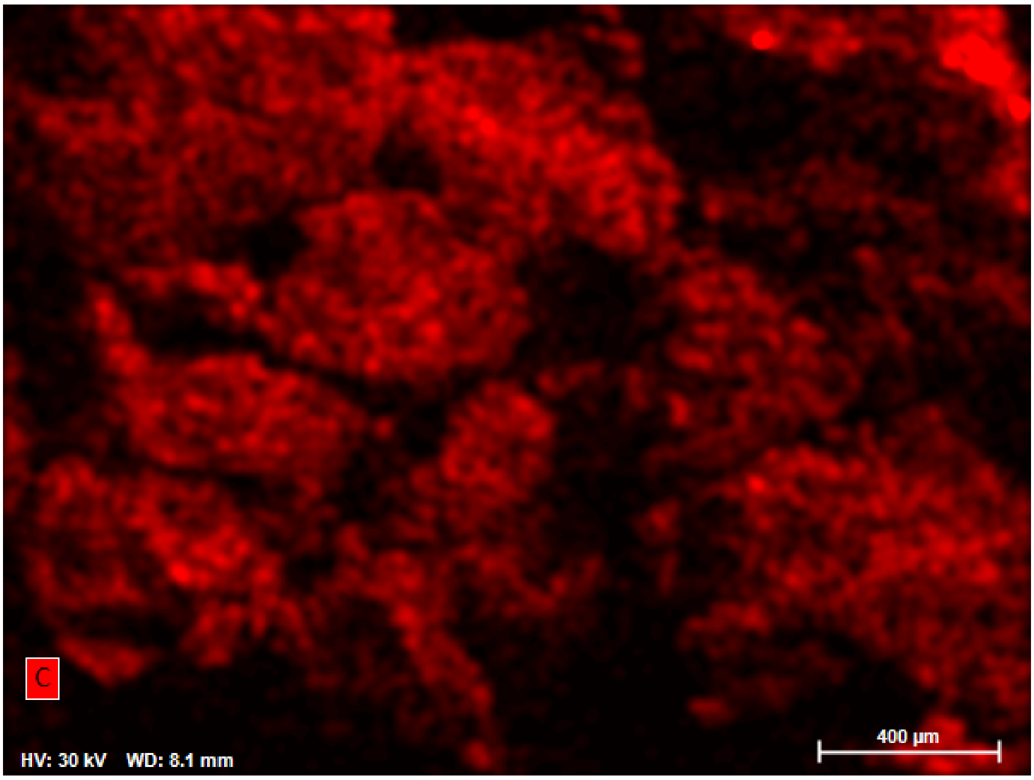


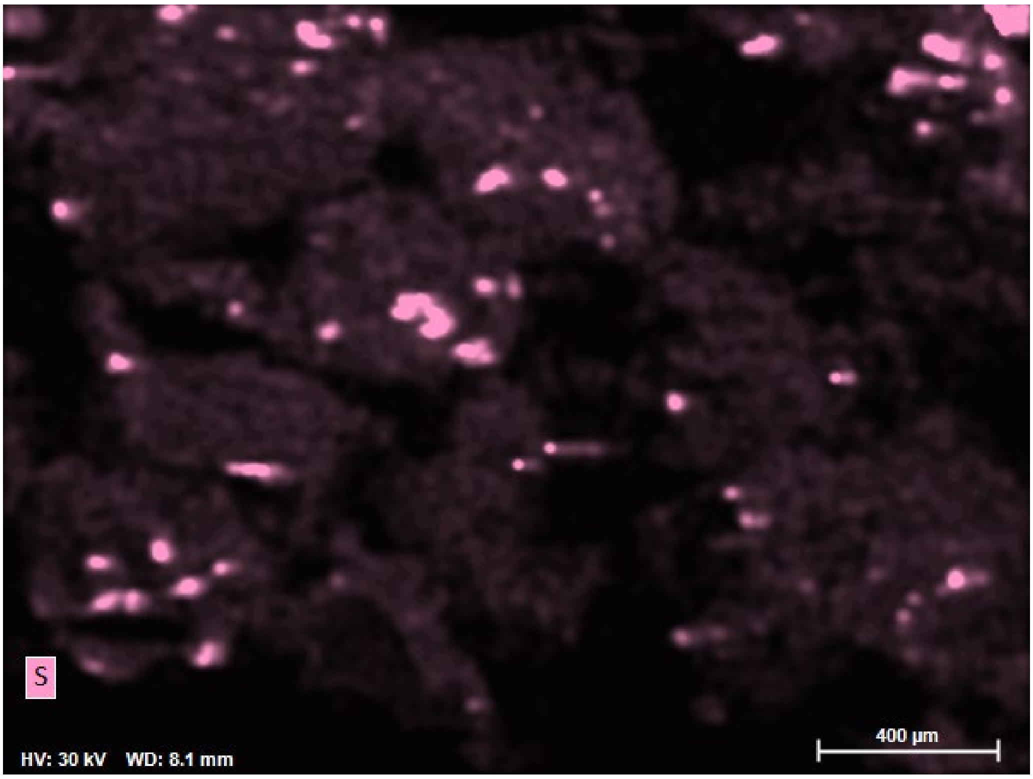
Fe
HV: 30 kV WD: 8.1 mm
400 µm

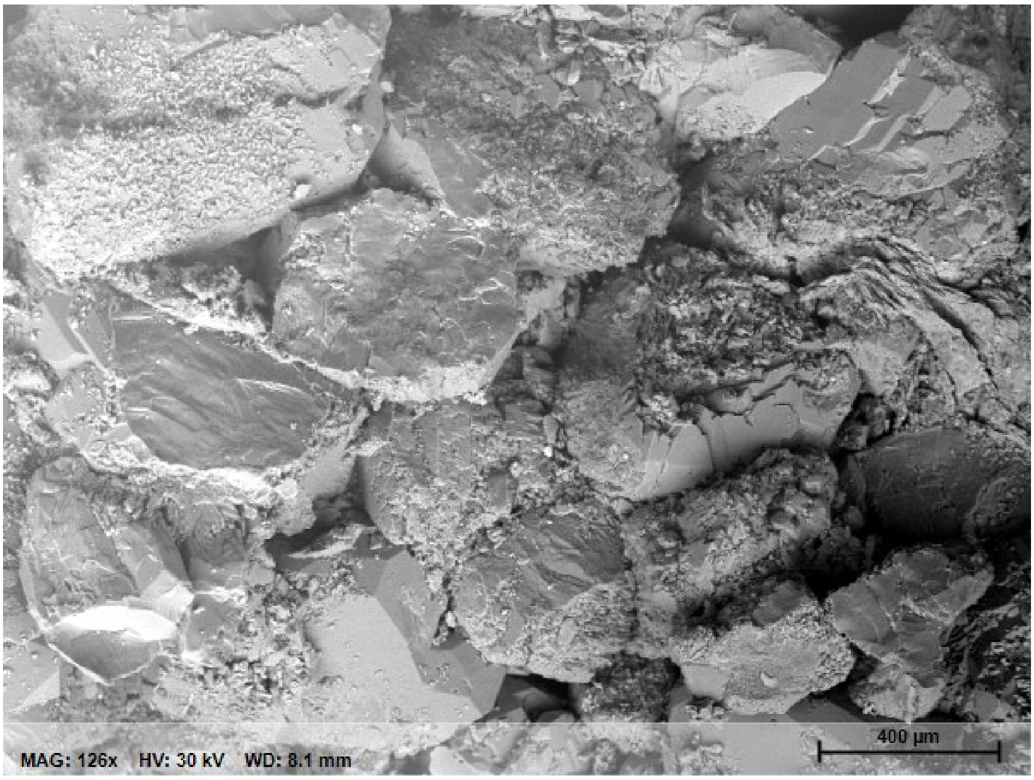


Na
HV: 30 kV WD: 8.1 mm
400 µm


Ti
HV: 30 kV WD: 8.1 mm
400 µm


C
HV: 30 kV WD: 8.1 mm
400 µm


S
HV: 30 kV
WD: 8.1 mm
400 µm


MAG: 126x
HV: 30 kV
WD: 8.1 mm
400 µm

23009-06 Report

Oklahoma State University
Microscopy Laboratory
Established in 1977

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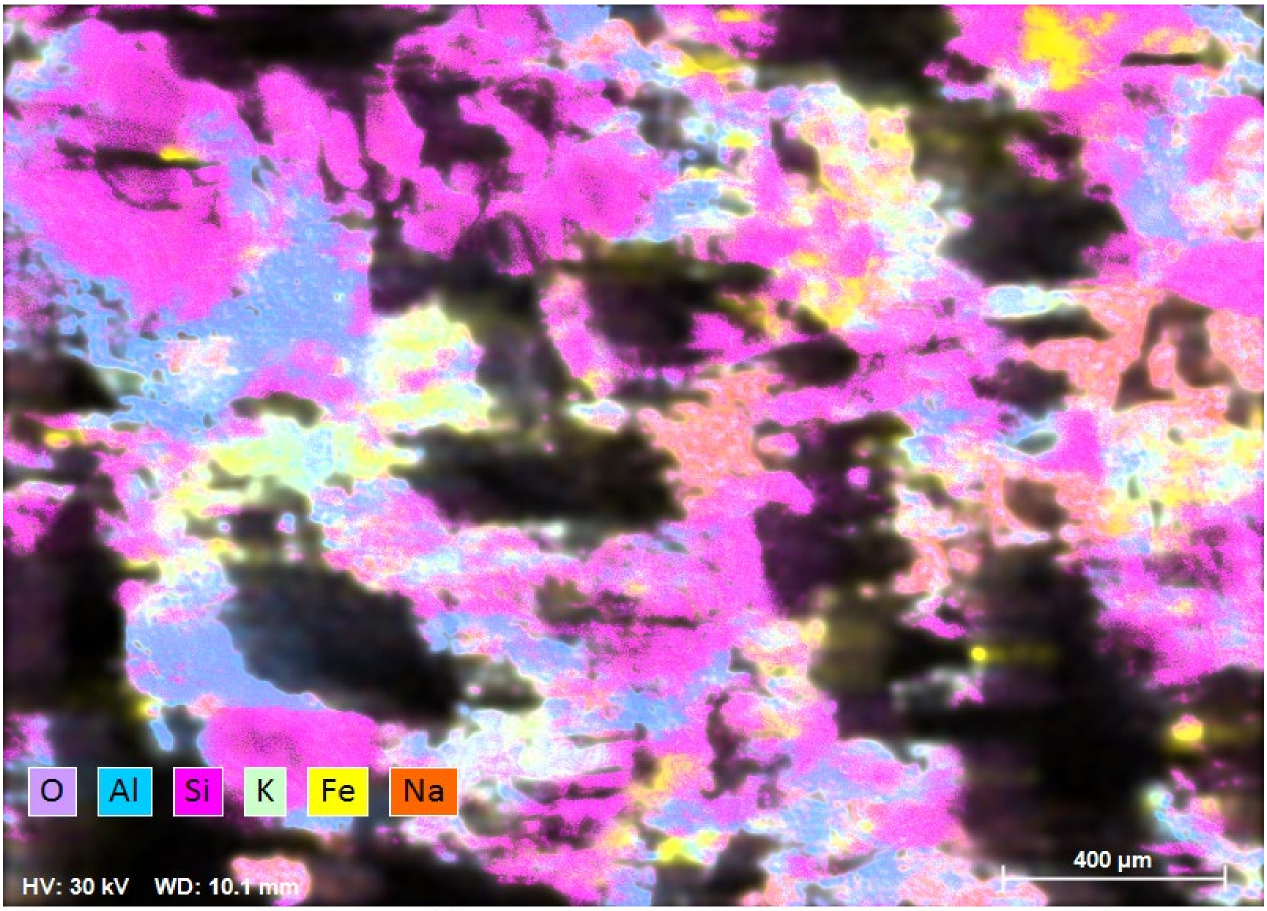

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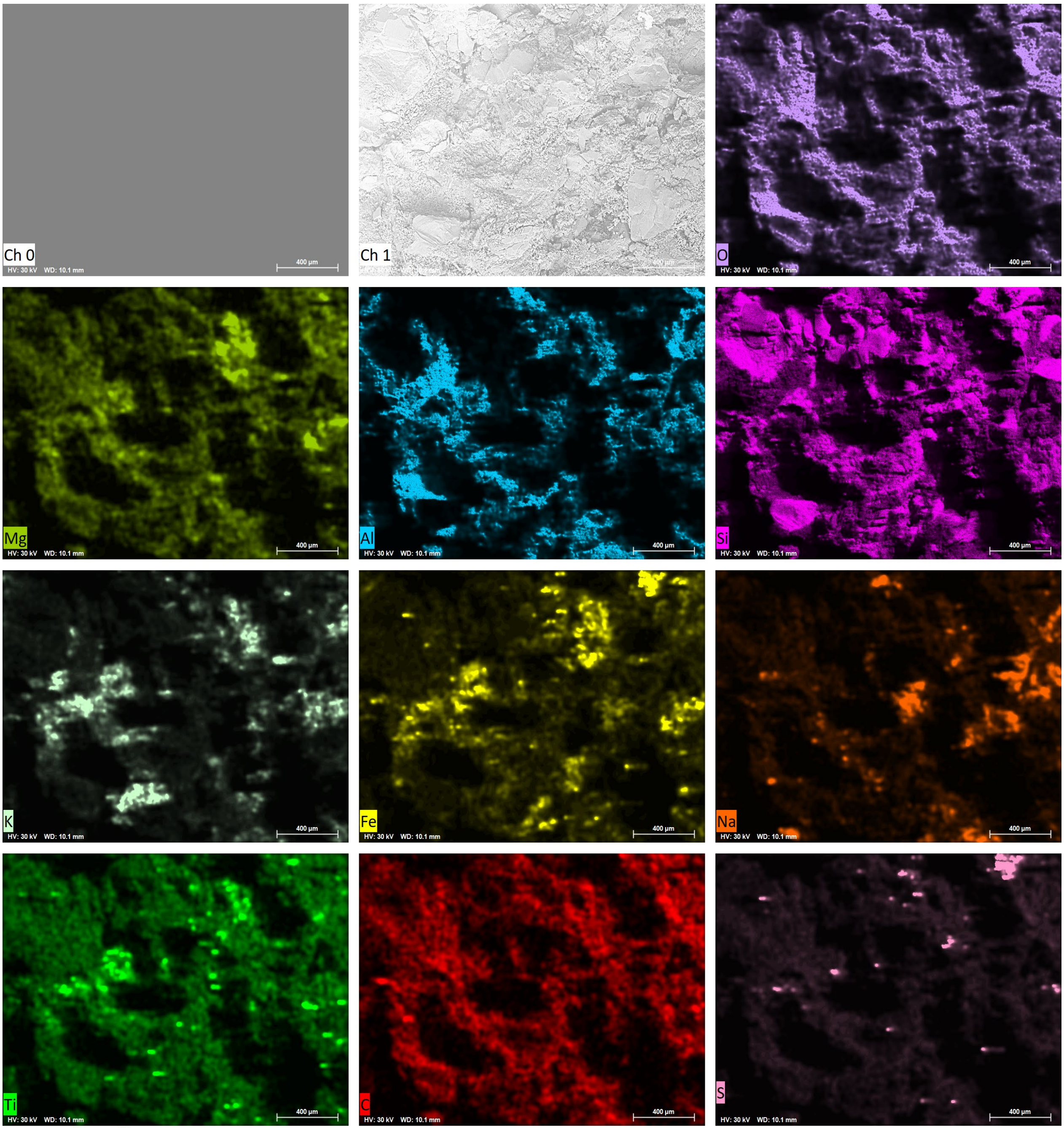

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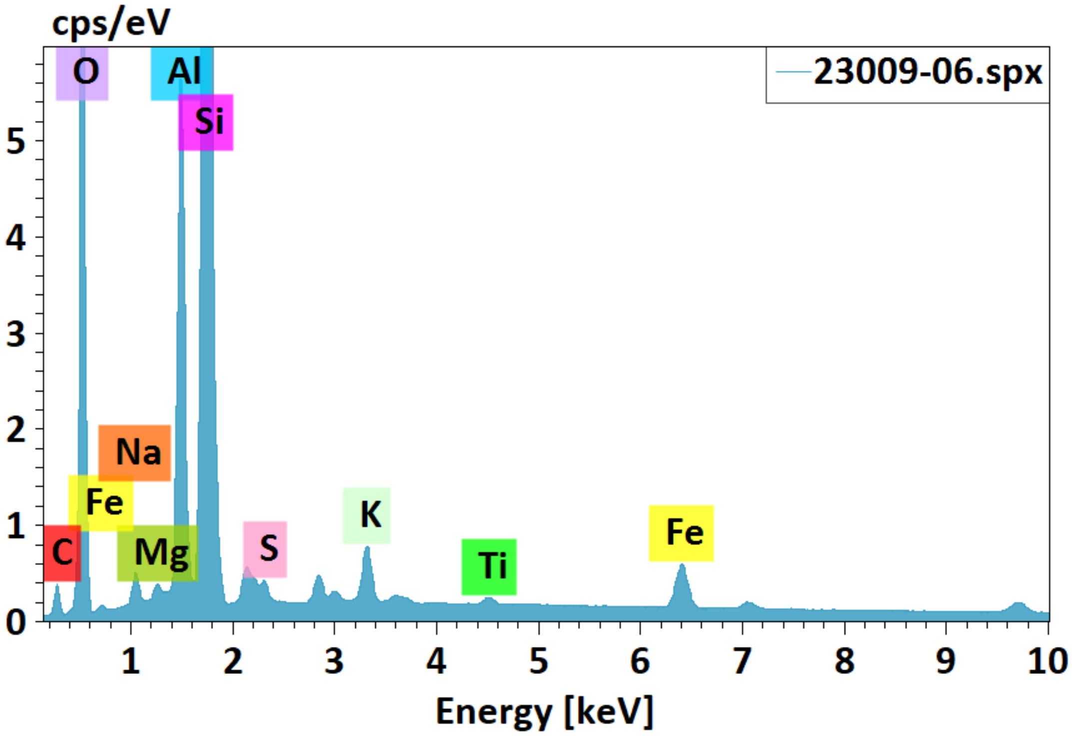

23009-06.spx

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Sodium	11	0.87	0.92	0.76
Magnesium	12	0.22	0.23	0.18
Aluminium	13	6.19	6.55	4.61
Silicon	14	29.84	31.57	21.34
Sulfur	16	0.35	0.37	0.22
Potassium	19	0.86	0.91	0.44
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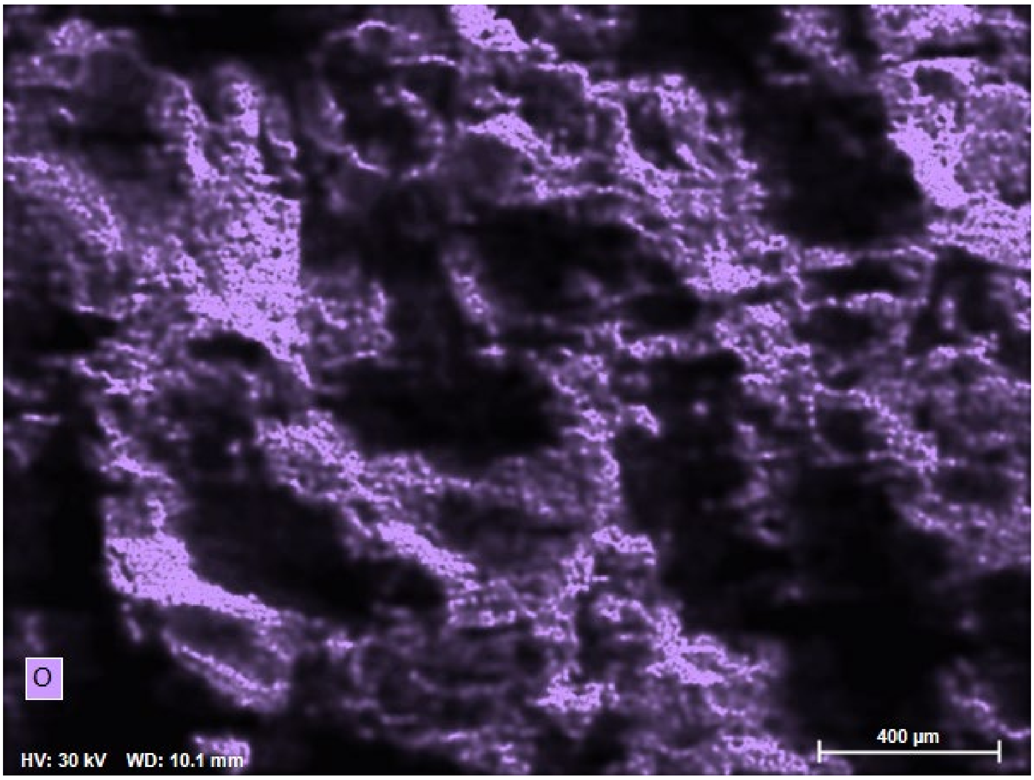

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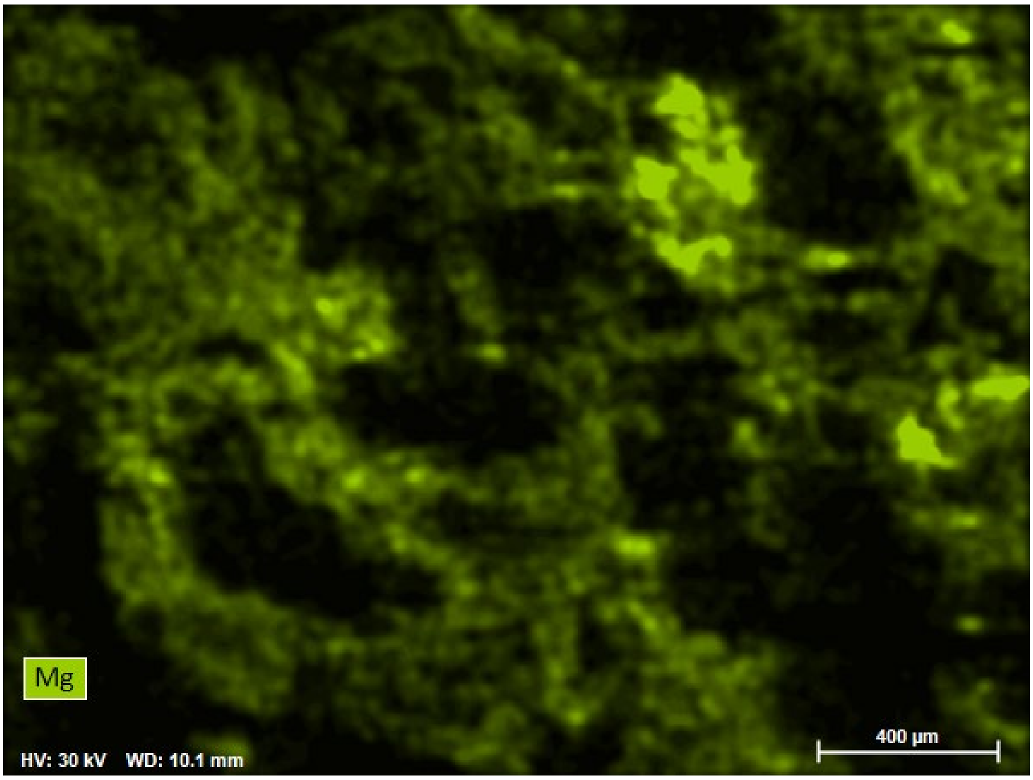
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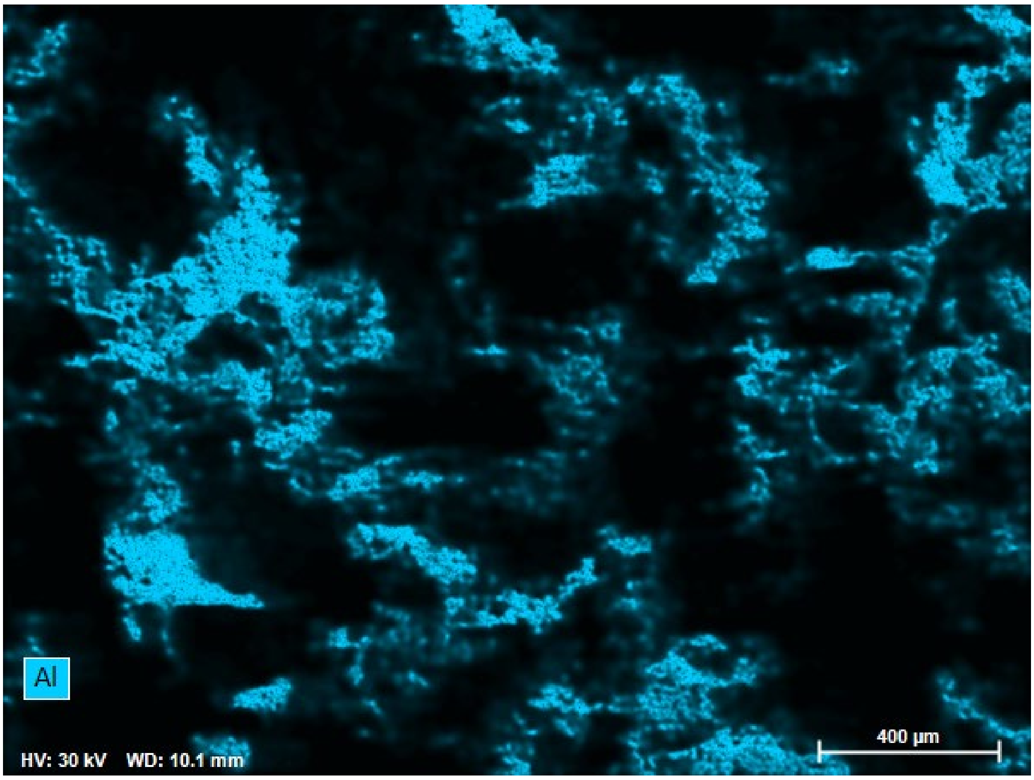
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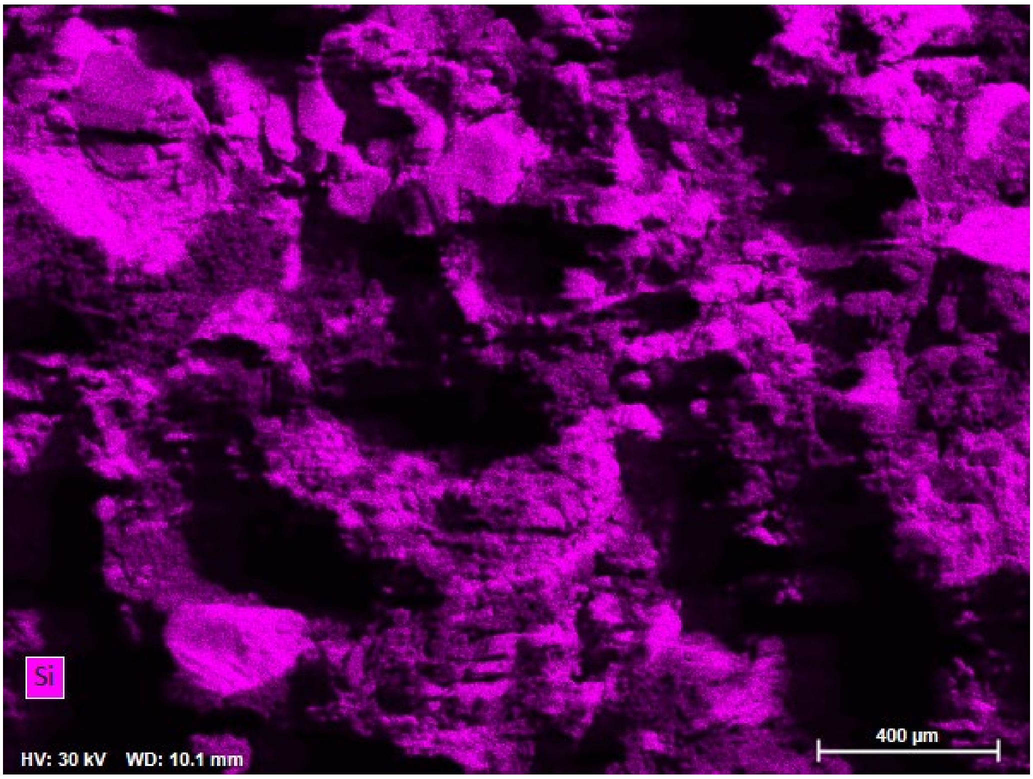
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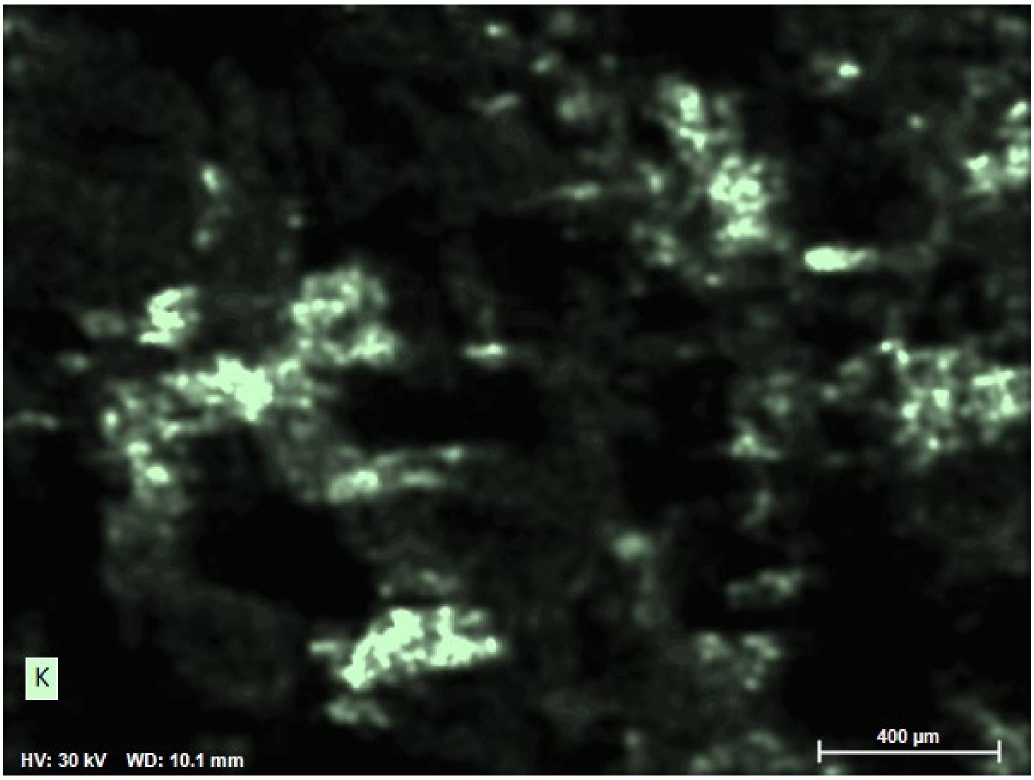
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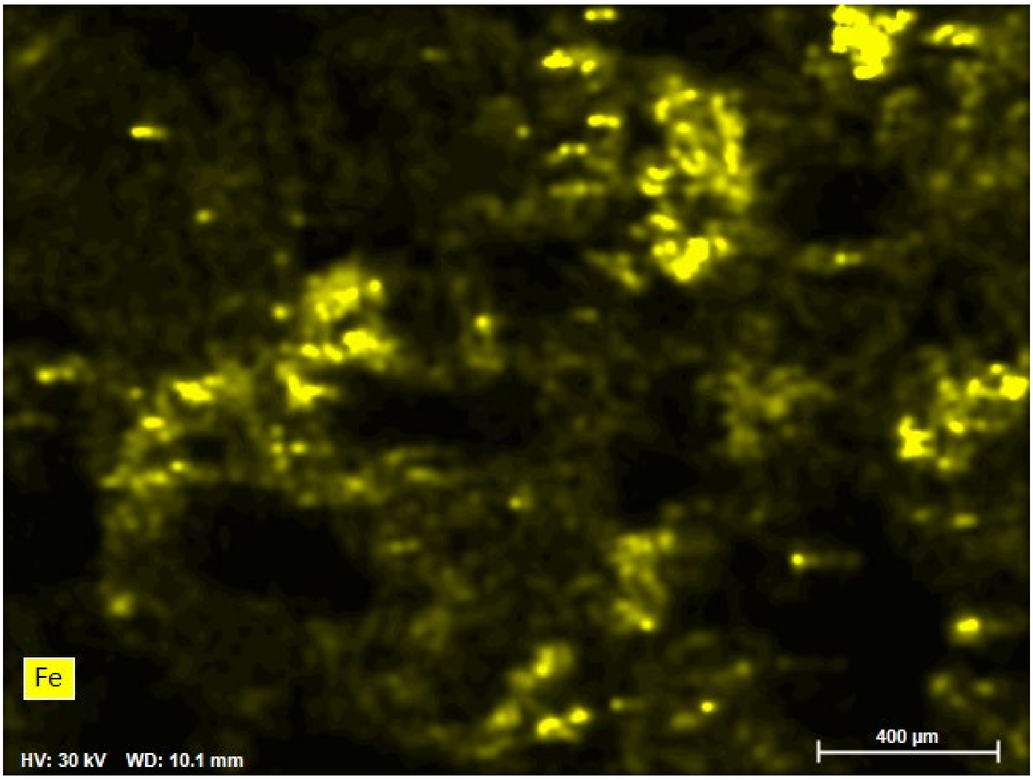

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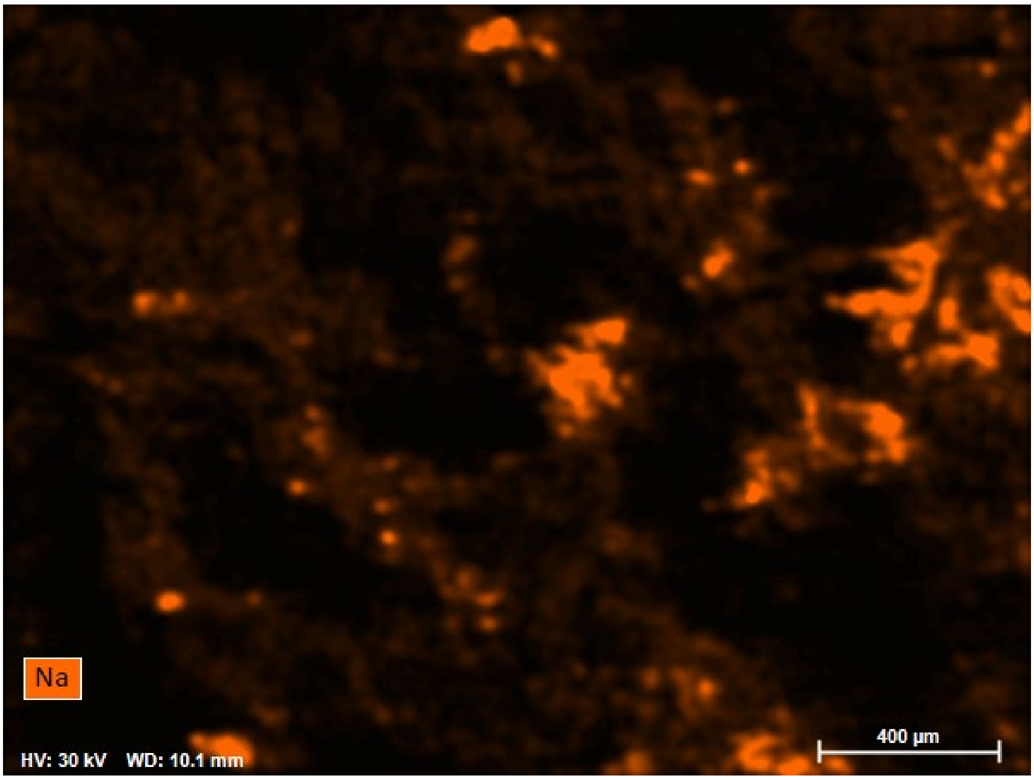

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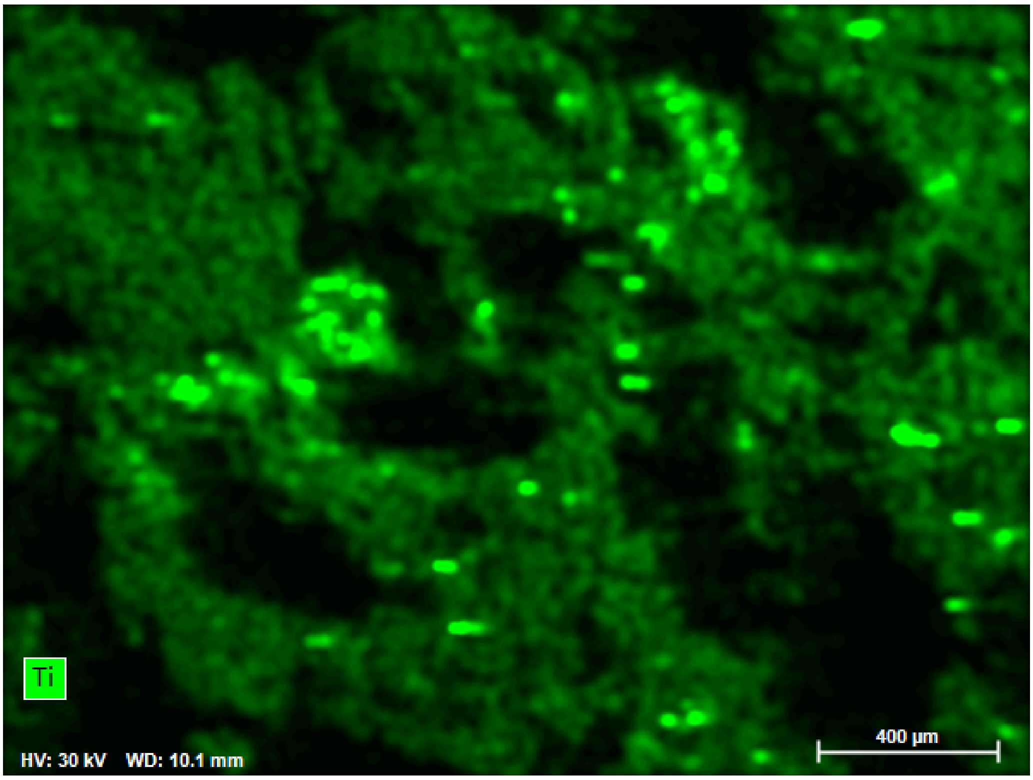

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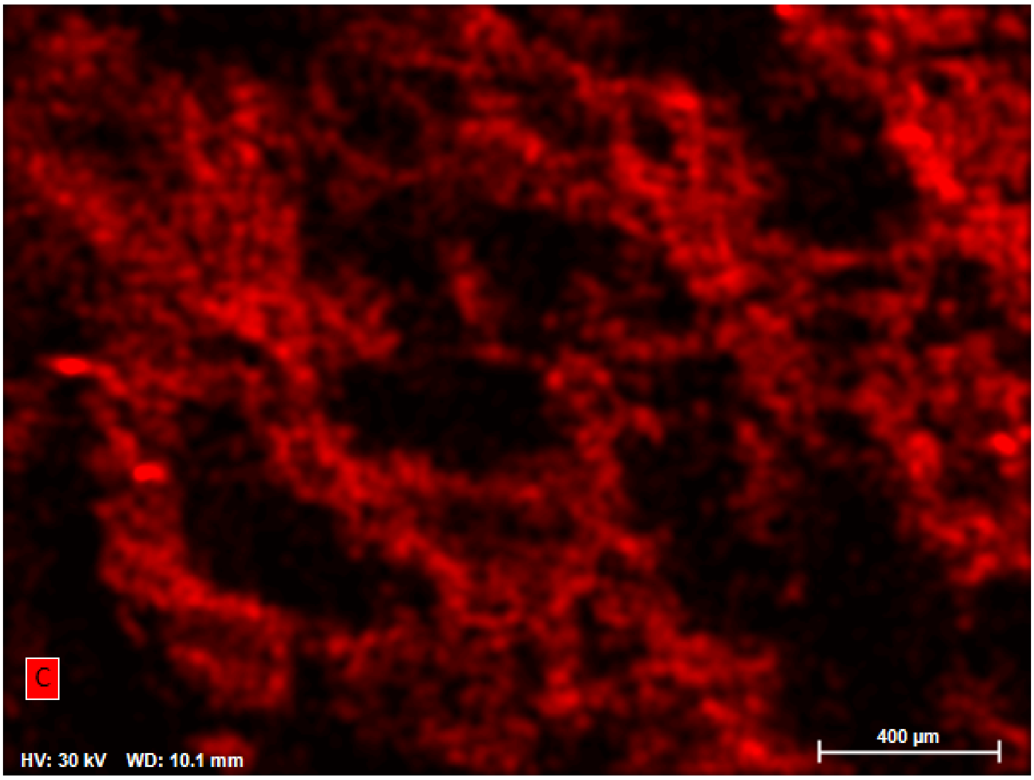

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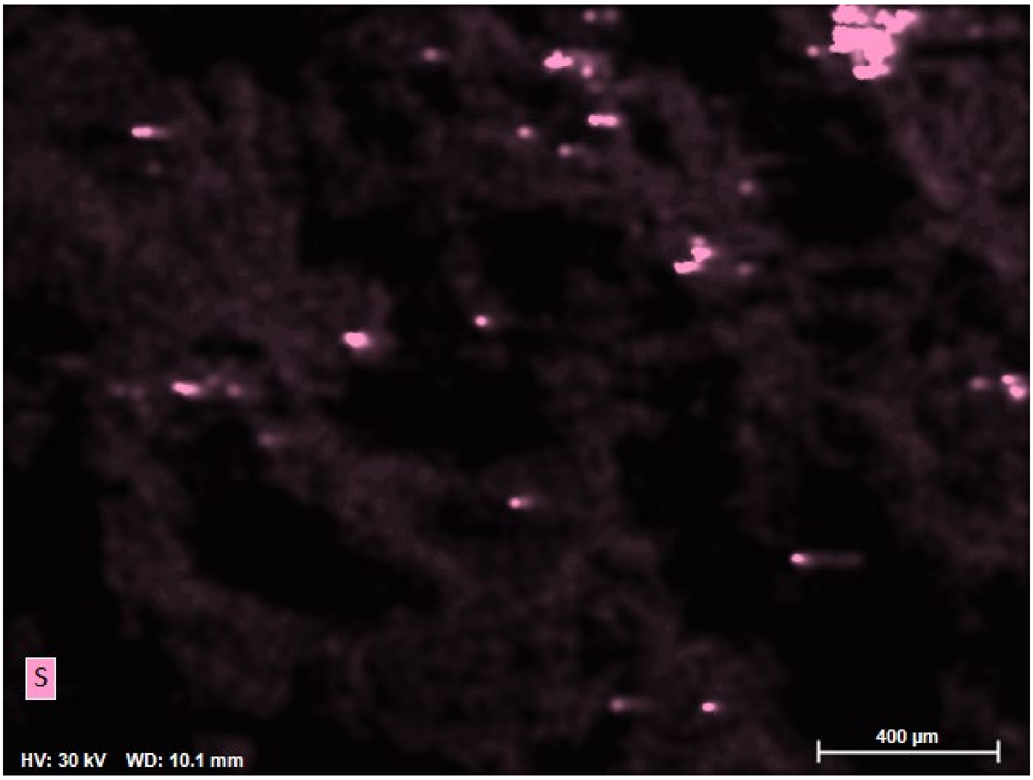
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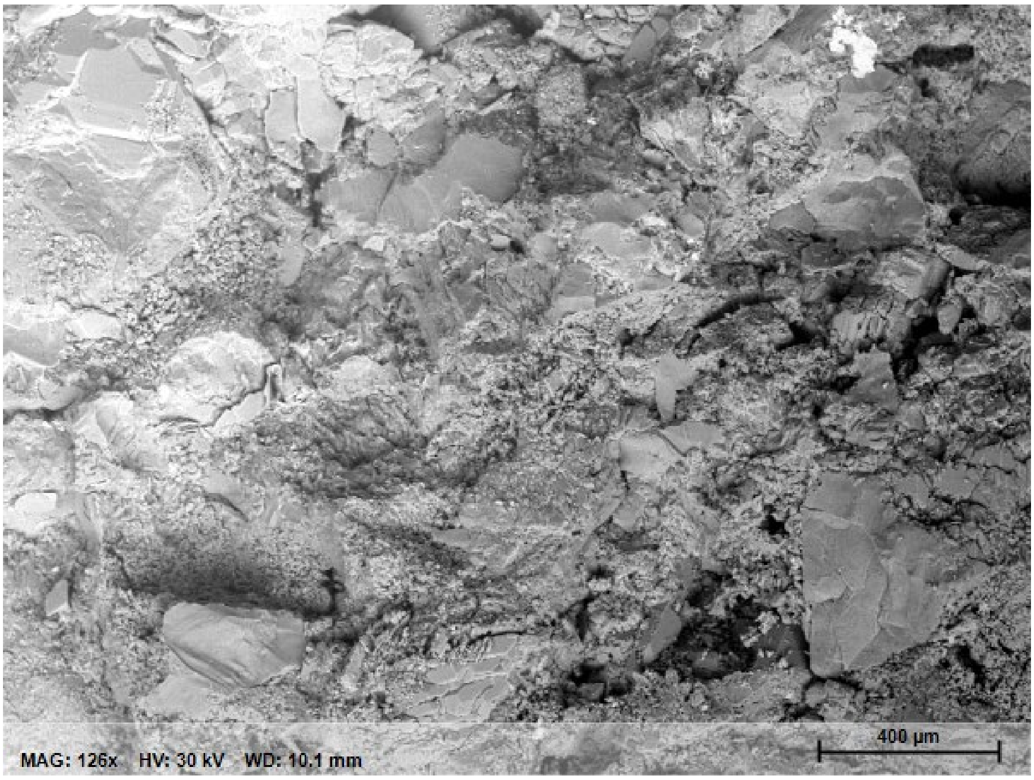
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ATTACHMENT E
Certification by a Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

I certify that this alternative source demonstration is appropriate for evaluating the groundwater monitoring data for the Mountaineer BAPs CCR management unit and that the requirements of 40 CFR 257.95(g)(3)(ii) have been met.

JOHN P. SEYMOUR
17091

John Seymour
Printed Name of Licensed Professional Engineer

John Seymour
Signature

017091
License Number

West Virginia
Licensing State

6/3/2024
Date

ALTERNATIVE SOURCE DEMONSTRATION REPORT

AEP Mountaineer Plant
Bottom Ash Ponds
Letart, West Virginia

Prepared for

American Electric Power
1 Riverside Plaza
Columbus, Ohio, 43215-2372

Prepared by

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

Project: CHA8495B

December 2024

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ACRONYMS AND ABBREVIATIONS

ASD	Alternative Source Demonstration
BAP	bottom ash pond
bgs	below ground surface
CCR	coal combustion residuals
CFR	Code of Federal Regulations
EDX	energy-dispersive X-ray spectroscopy
EBAP	East Bottom Ash Pond
ft	feet
gpm	gallons per minute
GWPS	groundwater protection standard
LCL	lower confidence limit
mg/kg	milligrams per kilogram
N&E	nature and extent
µg/L	micrograms per liter
ORP	oxidation-reduction potential
QA/QC	quality assurance / quality control
redox	oxidation-reduction
SEM	scanning electron microscopy
SSL	statistically significant level
USEPA	United States Environmental Protection Agency
UCL	upper confidence limit
UTL	upper tolerance limit
WBAP	West Bottom Ash Pond
XRD	X-ray diffraction
XRF	X-ray fluorescence

1. INTRODUCTION AND SUMMARY

This Alternative Source Demonstration (ASD) report has been prepared to address statistically significant levels (SSLs) of arsenic and molybdenum in the groundwater monitoring network at the Mountaineer Power Plant's former coal combustion residuals (CCR) bottom ash ponds (BAPs) in Letart, West Virginia.

This ASD follows the first semiannual corrective action monitoring event of 2024, which was conducted at the former BAPs in May in accordance with Title 40, Section 257.98(a)(1) of the Code of Federal Regulations (CFR). The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. A confidence interval was constructed for each Appendix IV parameter at each compliance well, nature-and-extent well, and sentinel well. An SSL was attributed to a parameter if either its lower confidence limit (LCL) or upper confidence limit (UCL) exceeded the groundwater protection standard (GWPS).

The GWPS was established as whichever was greater of: (1) the background concentration (determined via calculation of an upper tolerance limit [UTL]), or (2) the maximum contaminant level (MCL) and risk-based level specified in 40 CFR 257.95(h)(2). The following SSLs were identified at the Mountaineer BAPs (Geosyntec 2024a):

- The LCL for arsenic exceeded the GWPS of 0.0100 milligrams per liter (mg/L) at nature and extent (N&E) wells MW-1805 (0.0190 mg/L) and MW-1922D (0.430 mg/L), both of which are screened in the underlying Monongahela Formation bedrock;
- The UCL for lithium exceeded the GWPS of 0.0400 mg/L at MW-1605D (0.0635 mg/L), MW-1605S (0.0631 mg/L), MW-1606D (0.119 mg/L), MW-1606S (0.0938 mg/L), MW-1607D (0.0976 mg/L), MW-1607S (0.105 mg/L): N&E wells MW-1922S (0.0573 mg/L), MW-1923 (0.199 mg/L), MW-1924 (0.103 mg/L), and MW-1925 (0.0829 mg/L), all are screened in the sand and gravel aquifer;[1] and,
- The LCL for molybdenum exceeded the GWPS of 0.100 at N&E well MW-1923 (0.242 mg/L), which is also screened in the sand and gravel aquifer.

Corrective measures are currently being completed at the former BAPs for identified lithium SSLs; therefore, alternative sources were not evaluated for lithium in this demonstration.

1.1 CCR Rule Requirements

The United States Environmental Protection Agency (USEPA) regulations regarding the disposal of CCR in landfills and surface impoundments 40 CFR 257.95(g)(3)(ii), states the following:

> The owner or operator may demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any

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[1] The LCL for lithium also exceeded the GWPS (0.0400 mg/L) at MW-1921. It was previously noted that nature-and-extent well MW-1921 does not accurately represent groundwater conditions downgradient of the BAPs (Geosyntec 2023). Statistical analyses were completed for groundwater data at this location to support corrective action monitoring and will not be addressed in this ASD.

demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified by a qualified professional engineer.

Pursuant to 40 CFR 257.95(g)(3)(ii), Geosyntec Consultants, Inc. (Geosyntec) has prepared this ASD report to document whether the SSLs identified for arsenic and molybdenum are from a source other than the former BAPs.

1.2 Demonstration of Alternative Sources

An evaluation was completed to assess possible alternative sources of arsenic or molybdenum to which identified SSLs could be attributed among the following five types:

- ASD Type I: Sampling Causes
- ASD Type II: Laboratory Causes
- ASD Type III: Statistical Evaluation Causes
- ASD Type IV: Natural Variation
- ASD Type V: Anthropogenic Sources

A demonstration was conducted to assess whether the SSLs of arsenic at MW-1805 and MW-1922D and molybdenum at MW-1923 were based on Type IV or Type V causes (Natural Variation and Anthropogenic Sources, respectively) and not by a release from the former BAPs.

2. SUMMARY OF SITE CONDITIONS

Brief descriptions of the site construction, geology, and hydrogeology are provided below.

2.1 Site Construction and Location

The former BAPs CCR unit consisted of two ponds of roughly equal size (East BAP [EBAP] and West BAP [WBAP]) with a combined surface area of approximately 28 acres. The former WBAP had a normal pool area of 14.1 acres and the former EBAP had a normal pool area of 13.9 acres (Arcadis 2016). These BAPs were constructed between 1978 and 1980 with a 3-foot-thick clay liner. Removal of CCR and potentially impacted underlying soil from the BAPs to support closure by removal was completed in May 2023. The former WBAP and EBAP were repurposed as settling ponds (AEP 2023). The selected groundwater remedy for lithium was initiated in 2023.

Several non-CCR-regulated ponds are located immediately south of the former BAPs which form the Site Pond Complex (**Figure 1**). An electrical substation is located northwest of the Pond Complex. A former Philip Sporn (Sporn) bituminous coal mining facility is located to the west of the Complex. A 60-acre fly ash pond associated with the former Sporn Power Plant is located to the northeast of the Complex (**Figure 1**).

2.2 Regional Geology

The former BAPs are immediately underlain by Quaternary alluvial deposits consisting of clay, silt, sand, and gravel. The unconsolidated alluvial deposits consist of the following two units (Sanborn Head 2020):

- Alternating horizons of clay and clayey silt, with thicknesses ranging from 0 to 30 feet (ft) below ground surface (bgs)
- Sand, generally medium-to-coarse-grained, with some gravel horizons, which generally coarsens with depth from about 15 to 100 ft bgs

The unconsolidated alluvial sand and gravel deposits are underlain by bedrock consisting of Pennsylvanian sandstones, shales, limestones, and coal of the Monongahela group (Arcadis 2016). The wells within the corrective action monitoring network are screened in the unconsolidated sand and gravel aquifer, except MW-1805 and MW-1922D, which are both screened in the underlying Monongahela group, as shown in the boring logs as a combination of sandstone, coal, and shale (**Attachment A**).

2.3 Regional Hydrogeology

Five groundwater pumping wells were installed at the site in 2008 and are currently active (**Figure 1 and Attachment B**). The groundwater pumping wells are screened within the unconsolidated sand and gravel aquifer unit. Wells West 1 and East 1 provide cooling water and process water for the site and have pumping capacities of approximately 930 to 950 gallons per minute (gpm) and 550 to 575 gpm, respectively. Historically, wells 4, 5, and 6 are pumped at lower flow rates than West 1 and East 1 and are operated on an intermittent, as-needed basis.

The groundwater flow direction at the site is influenced by operation of the pumping wells. Extraction of groundwater from the production wells depresses groundwater elevations near the wells in the unconsolidated sand and gravel unit and affects the groundwater flow patterns in the vicinity of the former BAPs. A groundwater modeling study, included as Appendix C of the Groundwater Monitoring Well Network Evaluation (Arcadis 2016), was completed to better understand the effect of the pumping wells on groundwater flow under normal conditions (i.e., consistent pumping at wells West 1 and East 1). A potentiometric map generated using these simulated conditions shows that flow is naturally directed toward the Ohio River but is influenced by a cone of depression resulting from operation of the pumping wells (**Attachment B**).

3. ALTERNATIVE SOURCE DEMONSTRATION

The proposed alternative sources for arsenic and molybdenum are described below.

3.1 Proposed Alternative Source

The ASD evaluation methods, the proposed alternative source of arsenic at N&E wells MW-1805 and MW-1922D, the proposed alternative source of molybdenum at MW-1923, and the future groundwater sampling requirements are described below.

3.1.1 Arsenic

A review of site geochemistry, site historical data, and laboratory quality assurance / quality control (QA/QC) data did not identify alternative sources for arsenic due to Type I (sampling), Type II (laboratory), or Type III (statistical evaluation) issues. A review of site geochemistry did not identify any Type V (anthropogenic) causes. Therefore, an evaluation was conducted to assess whether the arsenic SSLs can be attributed to natural variation, which is a Type IV cause.

3.1.1.1 Evidence: Arsenic Spatial Distribution

The former BAP liquids contained lower concentrations of arsenic than the groundwater at the wells of interest, making the former BAPs an unlikely source. In 2016 and 2021, the average arsenic concentrations in the former BAP surface water samples were two orders of magnitude lower than the average concentration observed at MW-1922D and approximately one order of magnitude lower than the average concentration observed at MW-1805 (**Table 1**). These observed arsenic distributions indicate that a source other than the former BAPs is responsible for the observed concentrations at the wells of interest.

Downgradient sand and gravel aquifer wells MW-1604S, MW-1604D, and N&E well MW-1922S are in the immediate vicinity of bedrock wells MW-1805 and MW-1922D (**Figure 1**). Arsenic concentrations in groundwater from these locations are consistently lower than they are in the groundwater at MW-1805 and MW-1922D (**Figure 2**). If elevated arsenic concentrations were a result of a release from the former BAPs, we would expect arsenic concentrations to be higher at wells screened in the more permeable sand and gravel lithology below the former BAPs than in the underlying bedrock (**Figure 3**). The lack of elevated arsenic in shallow sand and gravel aquifer monitoring wells suggests that an alternative source of arsenic is impacting deeper bedrock wells MW-1805 and MW-1922D.

3.1.1.2 Evidence: Bedrock Sampling and Analyses

Analyses of bedrock samples from MW-1805 and MW-1922D indicate that arsenic is present in the solid phase of the screened interval of both wells. Mineralogical analyses of these samples revealed the presence of a suite of minerals known to be associated with arsenic. These aquifer materials represent an alternative natural source of arsenic to groundwater because groundwater must interact with these aquifer solids during the process of flowing towards the monitoring wells of interest.

Bedrock samples were collected on December 21, 2022, from cores collected during the prior installation of MW-1805 and MW-1922D. Four samples were collected from the screened interval of MW-1805 and two samples were collected from the screened interval of MW-1922D. The sample depths and associated lithologies, as documented in the boring logs (**Attachment A**) for each bedrock sample, are provided on **Table 2**. The samples were submitted for analyses of total arsenic, mineralogy analysis via X-ray diffraction (XRD), bulk geochemistry analysis via X-ray fluorescence (XRF), and scanning electron microscopy (SEM) analysis with energy-dispersive X-ray spectroscopy (EDX). The laboratory report for total arsenic analyses is provided as **Attachment C**. The laboratory analytical report for the XRD, XRF, and SEM-EDX analyses is provided as **Attachment D**.

Arsenic was detected in all bedrock samples, with reported concentrations ranging from 2.9 milligrams of arsenic per kilogram of rock (mg/kg) to 56 mg/kg (**Table 2**). Arsenic concentrations exceeding 50 mg/kg were found to be associated with shale and coal lithologies observed within the screened interval of MW-1805 (122 and 128 ft bgs, respectively). Therefore, groundwater enters these wells through aquifer material that contains appreciable arsenic concentrations within the solid phase.

Elevated arsenic concentrations in MW-1805 bedrock are attributed to the presence of coal and iron-bearing minerals that were identified within the bedrock solids via XRD and SEM analyses (**Table 3**). Arsenic is often associated with coal (Yudovich and Ketris 2005). Based on lithologic descriptions (**Attachment A**), coal comprises the amorphous component (84 percentage by weight [wt.%] of the total sample) of the MW-1805 sample collected from 128 ft bgs. Ferrous (Fe^{2+}) iron minerals pyrite and siderite were also observed in MW-1805 samples (**Table 3**). Pyrite is an iron-sulfide mineral known to be commonly associated with arsenic via co-precipitation processes (Brannon and Patrick 1987; Moore et al. 1988; O'Day et al. 2004). Pyrite was detected in every sample collected from MW-1805, at abundances up to 4 wt.% (**Table 3; Figure 4**). Siderite, an iron-carbonate mineral, was reported in three of the four samples collected from MW-1805 (**Table 3; Figure 5**).

Previous ASDs completed for arsenic at MW-1805 and MW-1922D proposed iron mineral thermodynamic instability and dissolution as a mechanism for elevated aqueous arsenic concentrations (Geosyntec 2022, Geosyntec 2023a, Geosyntec 2023b, Geosyntec 2024b). Ferrous (Fe^{2+}) iron minerals such as sulfides (pyrite) and carbonates (siderite) are capable of sequestering arsenic through sorption and/or co-precipitation (Gross and Low 2013). Dissolution or alteration of these minerals due to observed changing oxidation-reduction (redox) conditions would trigger dissolution of adsorbed and/or co-precipitated arsenic. These hypotheses are supported by thermodynamic modeling, which indicates that MW-1805 groundwater typically plots near the stability boundaries between soluble iron, insoluble iron oxide ($Fe(OH)_3$), and siderite (iron carbonate), with pyrite not thermodynamically stable (**Figure 6**). XRD and SEM-EDX findings verify the presence of both siderite and pyrite in MW-1805 samples, supporting the conclusion that dynamic equilibrium (i.e., equilibrium along multiple phase stability boundaries which allows for forward and backward reaction progress) conditions exist within MW-1805 groundwater.

Under the dynamic equilibrium conditions described above, geogenic arsenic concentrations in MW-1805 groundwater would be expected to correlate strongly with dissolved iron concentrations because arsenic would mobilize from iron minerals as they dissolve or alter. Historical total arsenic and dissolved iron concentrations have fluctuated in a similar manner, suggesting that this arsenic-iron relationship occurs at MW-1805 (**Figure 7**), and these parameters are strongly correlated (R^2 value of 0.94) (**Figure 8**). Furthermore, the arsenic concentration changes historically correlate strongly with observed changes in oxidation-reduction potential (ORP) at MW-1805 (**Figure 9**). These relationships indicate that aqueous arsenic concentrations at MW-1805 are strongly linked to the redox changes, and they support the proposed mechanism of arsenic association with iron minerals and subsequent mobilization of arsenic as iron minerals dissolve or are altered.

While coal, pyrite, and siderite were not detected in the XRD or SEM analyses for MW-1922D, arsenic in MW-1922D bedrock groundwater is attributable to the presence of mica/clay minerals and iron oxyhydroxide minerals.

A potential source of arsenic to groundwater within the screened interval of MW-1922D is the chemical weathering of mica grains to clay minerals. Academic studies have shown that mica separates from sandstone samples and may contain up to five times greater amounts of solid-phase arsenic than the remainder of the bulk sample (Dowling et al. 2002). Chemical weathering of mica grains to secondary clay mineral cements (a common diagenetic reaction in sandstones) would result in dissolution of arsenic from the crystal structure of micas and/or from sorption sites on mica surfaces.

These mechanisms have been cited as processes responsible for high concentrations of aqueous arsenic sources in some aquifers (Dowling et al. 2002, Raju 2022). SEM imaging of the 104.5 ft bgs sample from MW-1922D revealed the presence of mica grains that appear to be frayed and experiencing exfoliation along layer planes (**Figure 10**), two common indicators of chemical weathering in micas. Further support of chemically weathered mica is provided by the presence of secondary clay minerals (kaolinite), which are abundant throughout the sample and appear to be precipitating immediately adjacent to mica grains (**Figure 10**). Kaolinite is a known weathering product of mica and frequently precipitates immediately adjacent to mica grains (Singh and Gilkes 1991, Robertson and Eggleton 1991).

Another potential source of arsenic in MW-1922D bedrock is iron oxyhydroxide minerals. Iron-oxide and oxyhydroxide minerals hematite and goethite were both detected in the MW-1922D sample collected from 111 ft bgs (**Table 3**). Arsenic association with iron-oxide and oxyhydroxide minerals is well documented (Welch et al. 2000).

3.1.2 Molybdenum

A review of site geochemistry, site historical data, and laboratory QA/QC data did not identify alternative sources for molybdenum due to Type I (sampling), Type II (laboratory), or Type III (statistical evaluation) issues. A review of site geochemistry did not identify any Type IV (natural variation) causes. Therefore, an evaluation was conducted to assess whether the molybdenum SSL can be attributed to an anthropogenic Alternative Source, which is a Type V cause.

3.1.2.1 Evidence: Limited Molybdenum in the BAPs

The former BAPs liquids have lower average concentrations of molybdenum than groundwater at MW-1922D, making the former BAPs unlikely sources. Surface water samples collected from the BAPs in 2016 and 2021 contained lower average concentrations of molybdenum than the concentrations historically measured at MW-1923 (**Table 4**), particularly after the implementation of the groundwater extraction system which was selected as a remedy for Corrective Measures at the Site (Sanborn Head 2021).

3.1.2.2 Evidence: Molybdenum Spatial Distribution

MW-1923 had the second highest reported molybdenum concentration during the May 2024 groundwater sampling event after MW-1921, a well which had previous molybdenum GWPS exceedances attributed to the effects of the Sporn Fly Ash Pond (a Type V [anthropogenic] alternative source; Geosyntec 2022) (**Figure 11**). Both wells contained higher molybdenum concentrations than compliance monitoring wells located immediately downgradient of former BAP East (**Figure 12**). If the molybdenum exceedance at MW-1923 were a result of a release from the former BAPs, elevated concentrations would be expected at wells immediately downgradient of the waste boundary, between the former BAP East and MW-1923. However, groundwater networking monitoring wells located immediately downgradient of the former BAPs do not display elevated concentrations and have never had SSLs of molybdenum since monitoring began.

MW-1923 is located approximately 2,400 ft downgradient of the waste boundary of the former East BAP. The molybdenum concentrations in MW-1923 are higher than all the downgradient monitoring wells that are within 100 ft downgradient of the waste boundary of the former East BAP. Because the concentrations in MW-1923 are higher than wells closer to the waste boundary, an alternate source is expected between the waste boundary and MW-1923.

Based on recent potentiometric flow maps (**Figure 1**) and groundwater flow simulations (**Attachment B**), groundwater on the northeast side of the former BAPs migrates beneath the former Sporn Fly Ash Pond and towards production wells West 1 and East 1 during regular operational conditions. Production well East 1 is located immediately adjacent to MW-1923. The increase in molybdenum concentrations between the monitoring wells at the immediate downgradient waste boundary of the former BAPs (i.e., the MW-1604S/D, MW-1605S/D, MW-1606S/D, and MW-1607S/D) and farther downgradient wells MW-1921 and MW-1923 suggests that the former Sporn fly ash pond is the alternative source of molybdenum to groundwater at MW-1923.

A statistical evaluation was completed to compare molybdenum concentrations at MW-1923, located downgradient of the Sporn fly ash pond and adjacent to pumping well East 1, to wells upgradient of the Sporn fly ash ponds and downgradient of the former Mountaineer BAPs (MW-1605S/D, MW-1606S/D, and MW-1607S/D). Molybdenum results to date from wells MW-1605S/D, MW-1606S/D, and MW-1607S/D were pooled to generate an upper tolerance limit (UTL) of 0.097 mg/L, which is representative of groundwater conditions immediately downgradient of the former Mountaineer BAPs and upgradient of the Sporn fly ash pond (**Attachment E**). The calculated LCL for MW-1923 was 0.242 mg/L, which exceeds the calculated molybdenum UTL for wells downgradient of the former Mountaineer BAPs. This statistically significant result provides further evidence that the former Sporn fly ash pond is the alternative source of molybdenum to groundwater at MW-1923.

3.2 Sampling Requirements

This ASD indicates that the arsenic and molybdenum SSLs are not due to a release from the former Mountaineer BAPs. Therefore, a corrective measures assessment for arsenic and molybdenum is not necessary. Groundwater monitoring at the unit will continue in accordance with the most recent Corrective Action Monitoring Plan (Sanborn Head 2022).

4. CONCLUSIONS AND RECOMMENDATIONS

This ASD was prepared in accordance with 40 CFR 257.95(g)(3)(ii) and supports the conclusion that the SSLs for arsenic and molybdenum identified during lithium corrective action monitoring in May 2024 were not due to a release from the former BAPs. Instead:

- The arsenic SSLs are attributed to natural chemistry variation in the underlying geology.
- The molybdenum SSL is attributed to groundwater beneath the Sporn Plant Fly Ash Pond, an adjacent anthropogenic source.

Therefore, no further action for arsenic and molybdenum is warranted and the former BAPs will continue corrective action groundwater monitoring due to the SSLs of lithium , in accordance with 40 CFR 257.98(a)(1). Certification of this ASD by a qualified professional engineer is provided in **Attachment F**.

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TABLES

Table 1 - Arsenic Groundwater and Pond Water Summary Table
Mountaineer Bottom Ash Ponds

Location	Sample ID	Sample Date	Total Arsenic (µg/L)	Average Arsenic (µg/L)
BAP (East)	EBAP	6/15/2016	1.69	1.8
	EBAP	6/21/2016	2.35	
	EBAP	8/24/2016	2.86	
	EBAP	12/7/2016	2.44	
	BAP (East)-20210329	3/29/2021	0.67	
	BAP (East)-20210518	5/18/2021	0.79	
BAP (West)	WBAP IN	6/15/2016	8.6	6.65
	WBAP MID	6/15/2016	5.49	
	WBAP Out	6/15/2016	5.27	
	WBAP IN	6/21/2016	8.47	
	WBAP MID	6/21/2016	5.9	
	WBAP OUT	6/21/2016	5.45	
	WBAP IN	8/24/2016	7.65	
	WBAP MID	8/24/2016	6.73	
	WBAP OUT	8/24/2016	5.81	
	WBAP IN	12/7/2016	8.43	
	WBAP MID	12/7/2016	8.25	
	WBAP OUT	12/7/2016	7.86	
	BAP (West)-20210329	3/29/2021	4.39	
	BAP (West)-20210518	5/18/2021	4.85	
MW-1805	MW-1805-20190410	4/10/2019	20.3	38.6
	MW-1805-20190619	6/19/2019	66.3	
	MW-1805-20190910	9/10/2019	70.4	
	MW-1805-20200310	3/10/2020	11.4	
	MW-1805-20200514	5/14/2020	56	
	MW-1805-20201009	10/9/2020	80.9	
	MW-1805-20210325	3/25/2021	74.2	
	MW-1805-20210519	5/19/2021	69.5	
	MW-1805-20211026	10/26/2021	37.3	
	MW-1805-20220302	3/2/2022	19.4	
	MW-1805-20220520	5/20/2022	10.9	
	MW-1805-20221104	11/4/2022	40.2	
	MW-1805-20230214	2/14/2023	15.2	
	MW-1805-20230522	5/22/2023	8.77	
	MW-1805-20231025	10/25/2023	27.4	
	MW-1805-20240521	5/21/2024	9.3	
MW-1922D	MW-1922D-20190409	4/9/2019	323	602
	MW-1922D-20190619	6/19/2019	716	
	MW-1922D-20190910	9/10/2019	839	
	MW-1922D-20200311	3/11/2020	1240	
	MW-1922D-20200519	5/19/2020	522	
	MW-1922D-20201008	10/8/2020	1040	
	MW-1922D-20210325	3/25/2021	546	
	MW-1922D-20210520	5/20/2021	494	
	MW-1922D-20211027	10/27/2021	456	
	MW-1922D-20220303	3/3/2022	478	
	MW-1922D-20220523	5/23/2022	562	
	MW-1922D-20221104	11/4/2022	384	
	MW-1922D-20230215	2/15/2023	443	
	MW-1922D-20230522	5/22/2023	408	
	MW-1922D-20231026	10/25/2023	323	
	MW-1922D-20240516	5/16/2024	861	

Notes:
1. All results are shown in micrograms per liter (µg/L).
BAP - Bottom Ash Pond

Table 2 - Bedrock Sampling Details and Arsenic Concentrations
Mountaineer Bottom Ash Ponds

Monitoring Well	Depth of Well	Screened Interval	Sample Depth	Arsenic (mg/kg)	Geologic Material Sampled
MW-1805	133.5	123.5-133.5	122	55 B	Dark grey laminated silty clay shale
			124.5	4.6 B	Light grey sandstone
			128	56 B	Black coal with pyritic clay-rich zones
			130.5	2.9 B	Dark grey fractured silty clay shale
MW-1922D	113.5	103.5-113.5	104.5	4.5 B	Grey sandstone
			111	5.2 B	Grey sandstone

Notes:

1. Samples were collected on December 21, 2022 from previously drilled core associated with monitoring well installation.
2. All depths are shown in units of feet below ground surface.
3. Geologic descriptions included in the table were taken from field boring logs and verified during sample collection in December 2022.

B: Compound was found in the blank and sample. Method blank detections were less than 10% of the reported sample values and are not expected to affect data quality.

mg/kg: milligrams per kilograms.

Table 3 - Summary of X-Ray Diffraction Results
Mountaineer Bottom Ash Ponds

Well ID			**MW-1805**	**MW-1805**	**MW-1805**	**MW-1805**	**MW-1922D**	**MW-1922D**
Depth (ft bgs)			**122**	**124.5**	**128**	**130.5**	**104.5**	**111**
Boring Log Description			**Silty Clay Shale**	**Sandstone**	**Coal with clay-rich zones**	**Silty Clay Shale**	**Sandstone**	**Sandstone**
Mineral/Compound	**Formula**	**Mineral Type**	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)
Quartz	SiO_2	Silicate	24.0	73.0	4.0	32.0	86.0	85.0
Plagioclase	$(Na,Ca)AlSi_3O_8$	Feldspar	5.0	7.0	-	7.0	4.0	3.0
Potassium-Feldspar	$KAlSi_3O_8$	Feldspar	1.0	8.0	-	1.0	1.0	2.0
Calcite	$CaCO_3$	Carbonate	<0.5	<0.5	-	-	0.5	-
Siderite	$FeCO_3$	Carbonate	2.0	<0.5	-	1.5	-	-
Pyrite	FeS_2	Sulfide	2.0	<0.5	4.0	0.5	-	-
Kaolinite	$Al_2Si_2O_5(OH)_4$	Clay	11.0	7.5	6.0	10.0	6.0	6.0
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	Clay	16.0	0.5	-	14.0	-	<0.5
Illite/Mica	$KAl_2(AlSi_3O_{10})(OH)_2$	Clay/Mica	39.0	4.0	1.0	33.0	2.5	3.0
Mixed-Layer Illite/Smectite	$K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2$	Clay	2.0	-	1.0	1.0	<0.5	-
Goethite	$FeO(OH)$	Oxyhydroxide	-	-	-	-	-	0.5
Hematite	Fe_2O_3	Oxide	-	-	-	-	-	0.5
Amorphous Material			-	-	84.0	-	-	-
Clay & Mica Total			68	12	8	58	9	10

Notes

1. The weight percent quantities indicated have been normalized to a sum of 100%
2. Sample depths are shown in feet below ground surface (ft bgs).
3. Values shown with a less-than symbol indicate the mineral was detected below the quantification limit of 0.5 weight percentage (wt%).

-: Mineral was not detected above the detection limit

Table 4 - Molybdenum Groundwater and Pond Water Summary Table
Mountaineer Bottom Ash Ponds

Location	Sample ID	Sample Date	Total Molybdenum (µg/L)	Average Molybdenum (µg/L)
BAP (East)	EBAP	6/15/2016	279	204
	EBAP	6/21/2016	296	
	EBAP	8/24/2016	285	
	EBAP	12/7/2016	362	
	BAP (East)-20210329	3/29/2021	2	
	BAP (East)-20210518	5/18/2021	2.1	
BAP (West)	WBAP IN	6/15/2016	19.1	30.0
	WBAP MID	6/15/2016	15.1	
	WBAP Out	6/15/2016	15.5	
	WBAP IN	6/21/2016	29.8	
	WBAP MID	6/21/2016	26.1	
	WBAP OUT	6/21/2016	22.2	
	WBAP IN	8/24/2016	27.2	
	WBAP MID	8/24/2016	26.4	
	WBAP OUT	8/24/2016	24.1	
	WBAP IN	12/7/2016	21.1	
	WBAP MID	12/7/2016	20.6	
	WBAP OUT	12/7/2016	18.4	
	BAP (West)-20210329	3/29/2021	117	
	BAP (West)-20210518	5/18/2021	37.8	
MW-1923	MW-1923-20190410	4/10/2019	*160*	311
	MW-1923-20190618	6/18/2019	*101*	
	MW-1923-20190911	9/11/2019	*84.2*	
	MW-1923-20200312	3/12/2020	*70.1*	
	MW-1923-20200514	5/14/2020	*70.9*	
	MW-1923-20201006	10/6/2020	*98*	
	MW-1923-20210324	3/24/2021	*308*	
	MW-1923-20210520	5/20/2021	*344*	
	MW-1923-20211028	10/28/2021	*319*	
	MW-1923-20220303	3/3/2022	353	
	MW-1923-20220519	5/19/2022	334	
	MW-1923-20221101	11/1/2022	315	
	MW-1923-20230216	2/16/2023	293	
	MW-1923-20230525	5/25/2023	284	
	MW-1923-20231030	10/30/2023	303	
	MW-1923-20240521	5/21/2024	297	

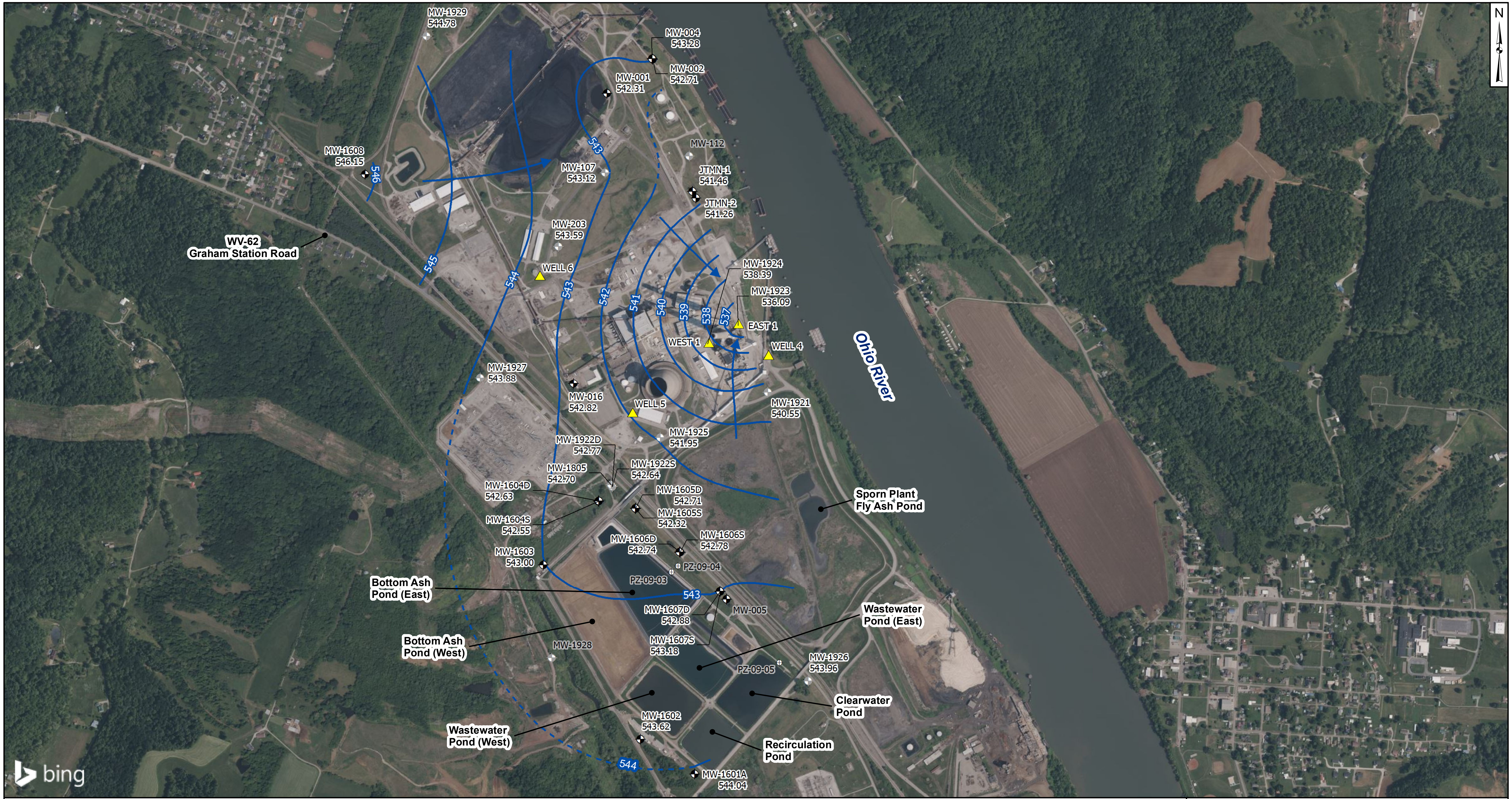
Notes:

All results are shown in micrograms per liter (µg/L).

Events shaded gray were before the implementation of the Remedy (Groundwater Extraction System), and were not used in the calculation of average.

BAP - Bottom Ash Pond.

FIGURES



Legend

- ⯐ CCR Network Monitoring Wells
- ⯐ Nature and Extent Monitoring Wells
- ⊕ Piezometer
- △ AEP-Owned Pumping Well
- ── Groundwater Elevation Contour
- - - Groundwater Elevation Contour (Inferred)
- → Approximate Groundwater Flow Direction

Notes

1. Monitoring well coordinates and water level data (collected on May 15, 2024) provided by AEP.
2. MW-005, MW-112, MW-1928, PZ-09-03, PZ-09-04, and PZ-09-05 were dry during the May 2024 event.
3. Wells not used for contouring are highlighted in gray.
4. Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis 2016) provided by AEP.
5. Groundwater elevation units are feet above mean sea level (ft amsl).
6. Only monitoring wells were used to generate groundwater contours. Water elevations were not collected for the pumping wells.
7. Intermittent use of AEP-owned pumping wells for plant activities impact water levels in the vicinity. In general, shallow groundwater beneath the plant flows northeast toward the Ohio River.
8. Aerial imagery provided by Bing.
9. MW-1923 and MW-1924 are located adjacent to pumping wells East 1 and West 1, respectively.

AEP: American Electric Power
CCR: Coal combustion residuals

Potentiometric Surface Map - Uppermost Aquifer
May 2024

Mountaineer Former Bottom Ash Ponds
Letart, West Virginia

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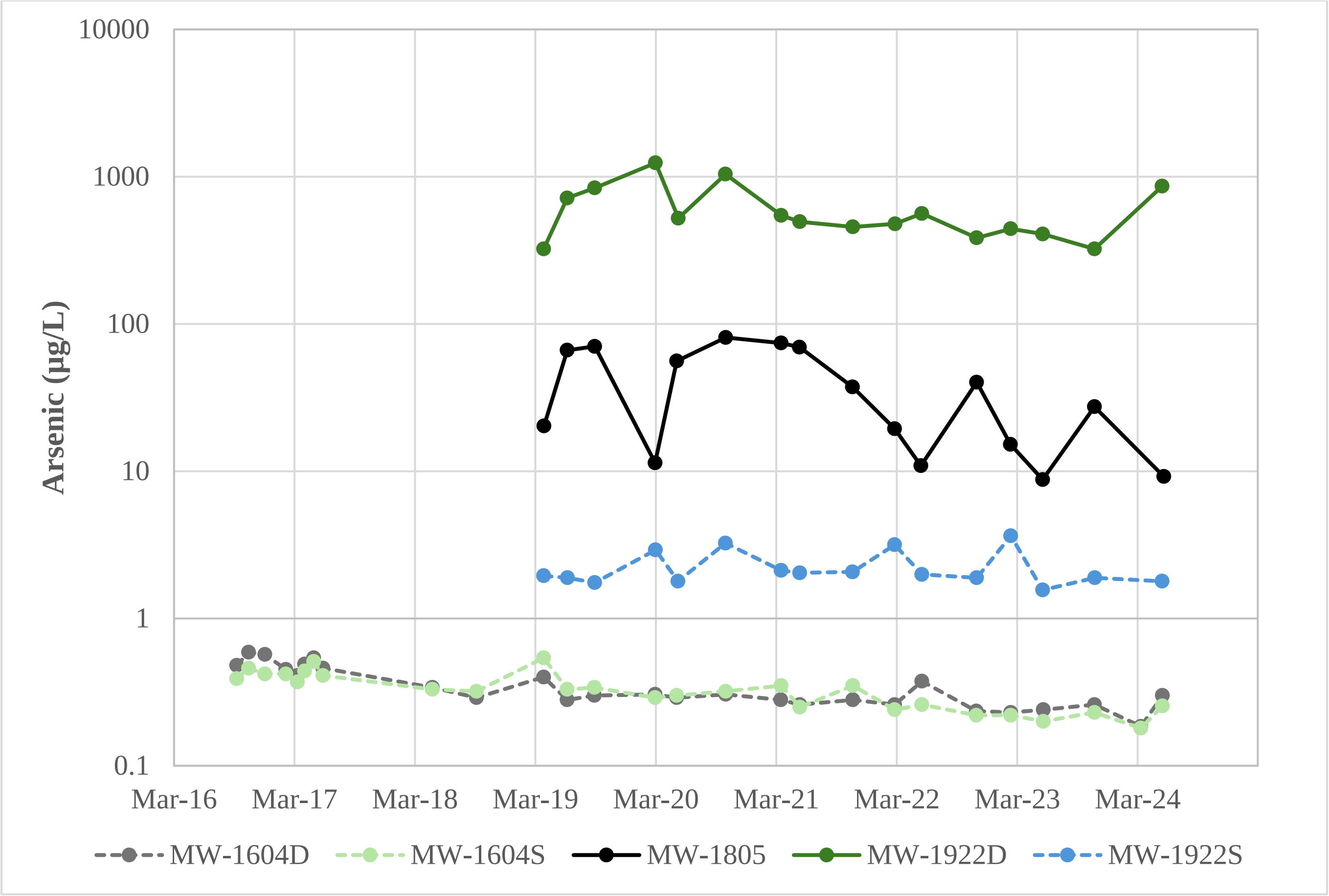
Figure
1

Columbus, Ohio
December 2024

A:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2024\AEP-Mountaineer_BAP_GW_2024-05_v2.mxd. Okiemute.Commander. 10/2/2024. CHA8423/07/08.



Notes:
1. Wells screened in the unconsolidated sand and gravel lithology are shown with dashed lines.
2. Wells screened in bedrock are shown with solid lines.
3. Arsenic concentrations in micrograms per liter (µg/L) are shown on a log scale.

Arsenic Time Series Graph

Mountaineer Bottom Ash Ponds

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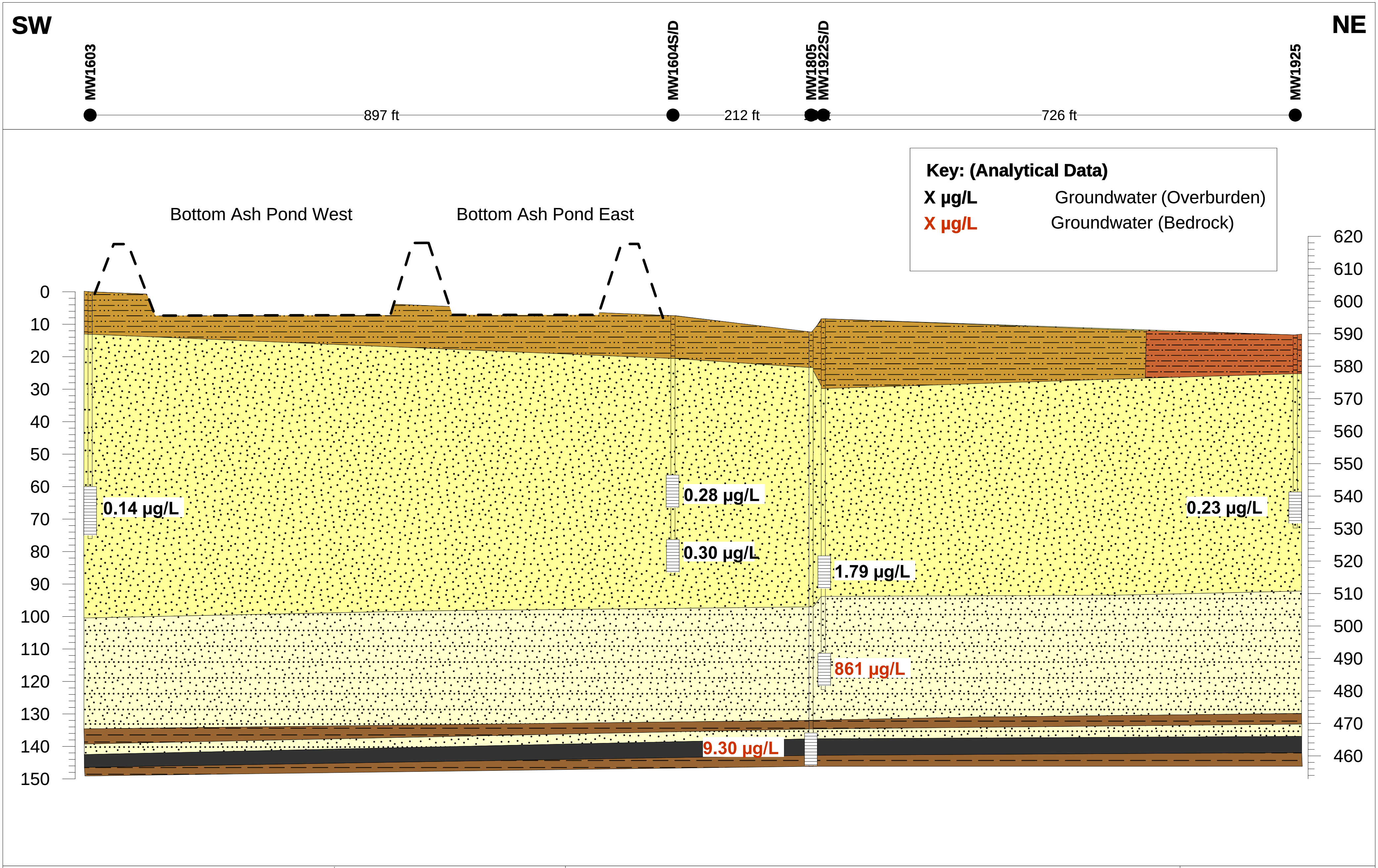
Columbus, Ohio

December 2024

Figure 2



Lithology

Overburden **Bedrock**

▨	CLAY	▨	SANDSTONE
▨	GRAVEL	▨	SILT
■	COAL	▨	SAND
▨	SHALE		

Well Construction

▤ Screen

⌜ ⌟ Former Ash Pond Extent

Notes:
1. Scale is approximate; all units of length are in feet.
2. Vertical exaggeration is 5x.
3. This section was created using widely spaced boreholes; thus, all interpretation away from borehole locations should be considered an approximate representation.
4. Groundwater arsenic concentration values are from samples collected in May 2024.
5. Former Ash pond extents and depths are approximate and projected from out of the plane of section. Extents do not represent constructed dimensions.
6. Pond water results are averaged from samples collected in 2016 and 2021.

Cross Section With Arsenic Concentrations Mountaineer Bottom Ash Ponds

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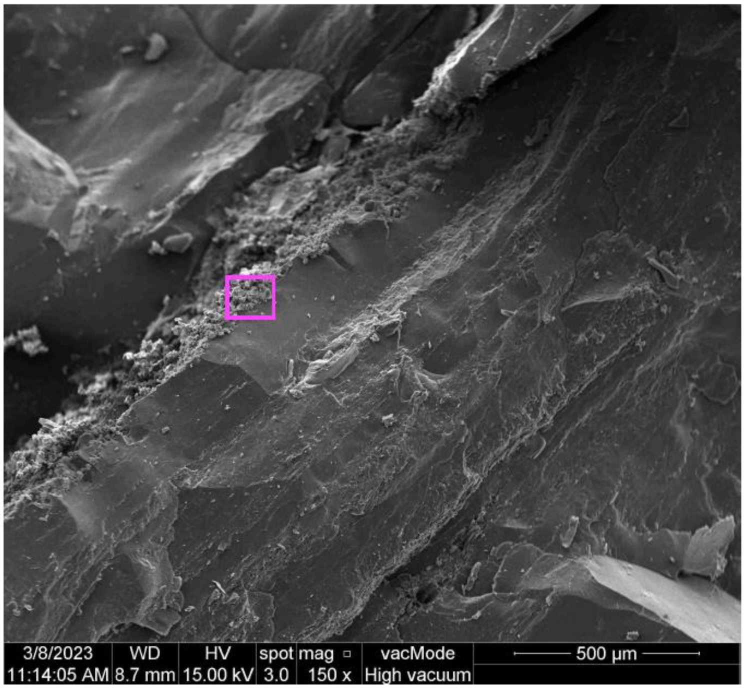
Columbus, OH

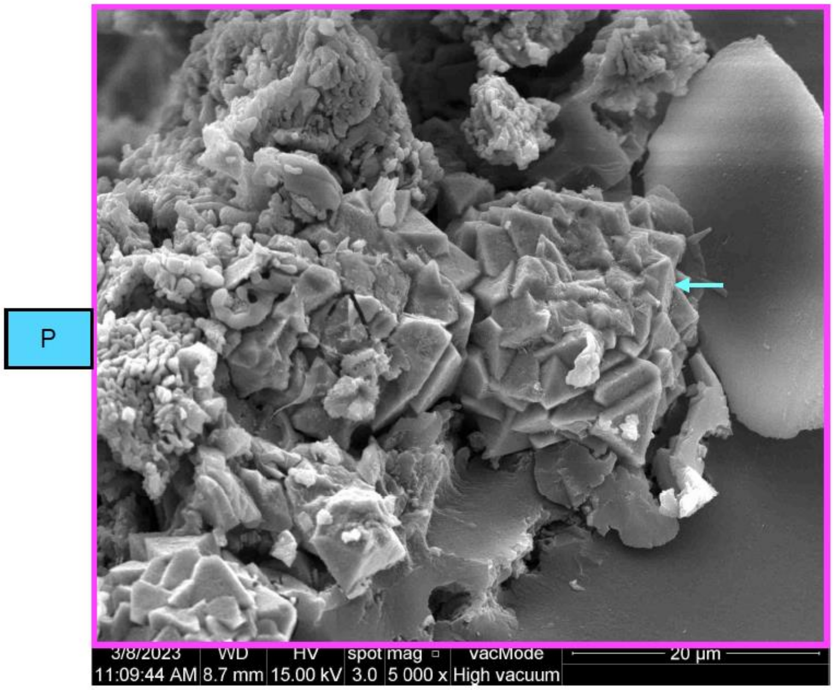
December 2024

Figure
3

23009-03C 150X



23009-03D 5000X



Notes:
1. Sample was collected from a depth of 128 feet below ground surface from MW-1805 core.
2. Scanning electron microscope (SEM) instrument settings are indicated at the bottom of each micrograph.
3. The lower micrograph displays a magnified image of the area within the purple box on the top micrograph.
4. Pyrite is denoted by the blue ‘P’ and blue arrow on the bottom micrograph.

Pyrite Occurrence in MW-1805 Bedrock

Mountaineer Bottom Ash Ponds

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Figure

4

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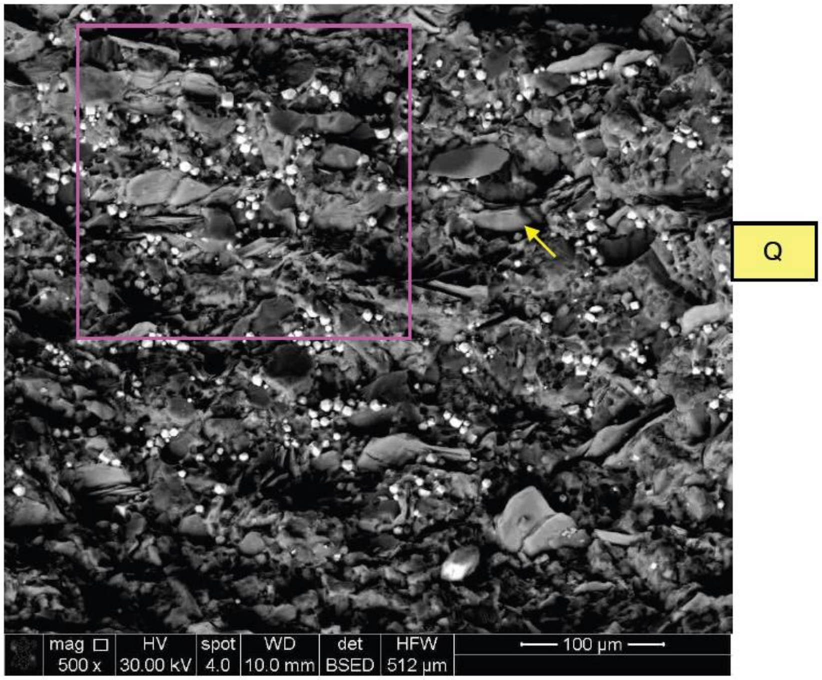
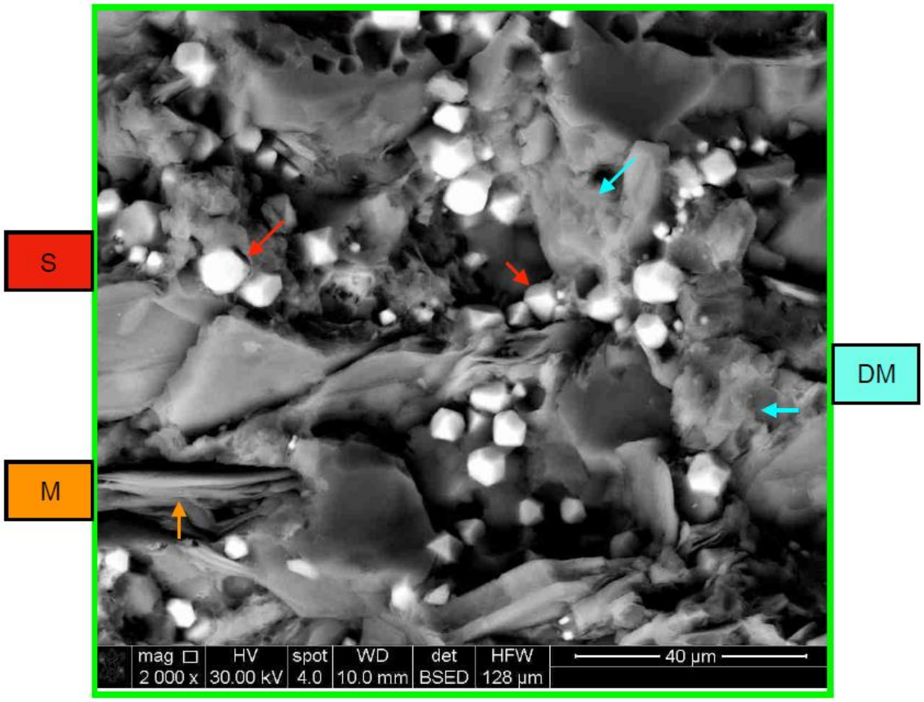
December 2024

23009-04B 500X



23009-04D 1000X



Notes:
1. Sample was collected from a depth of 130.5 feet below ground surface from MW-1805 core.
2. Scanning electron microscope (SEM) instrument settings are indicated at the bottom of each micrograph.
3. Siderite is denoted by the red 'S' and red arrows in the bottom micrograph and is evident in the top micrograph as high-contrast 'bright' crystals interspersed throughout the sample.
4. Mica is denoted by the orange 'M,' detrital clay matrix material is denoted by the green 'DM,' and quartz is denoted by the yellow 'Q.'

Siderite Occurrence in MW-1805 Bedrock

Mountaineer Bottom Ash Ponds

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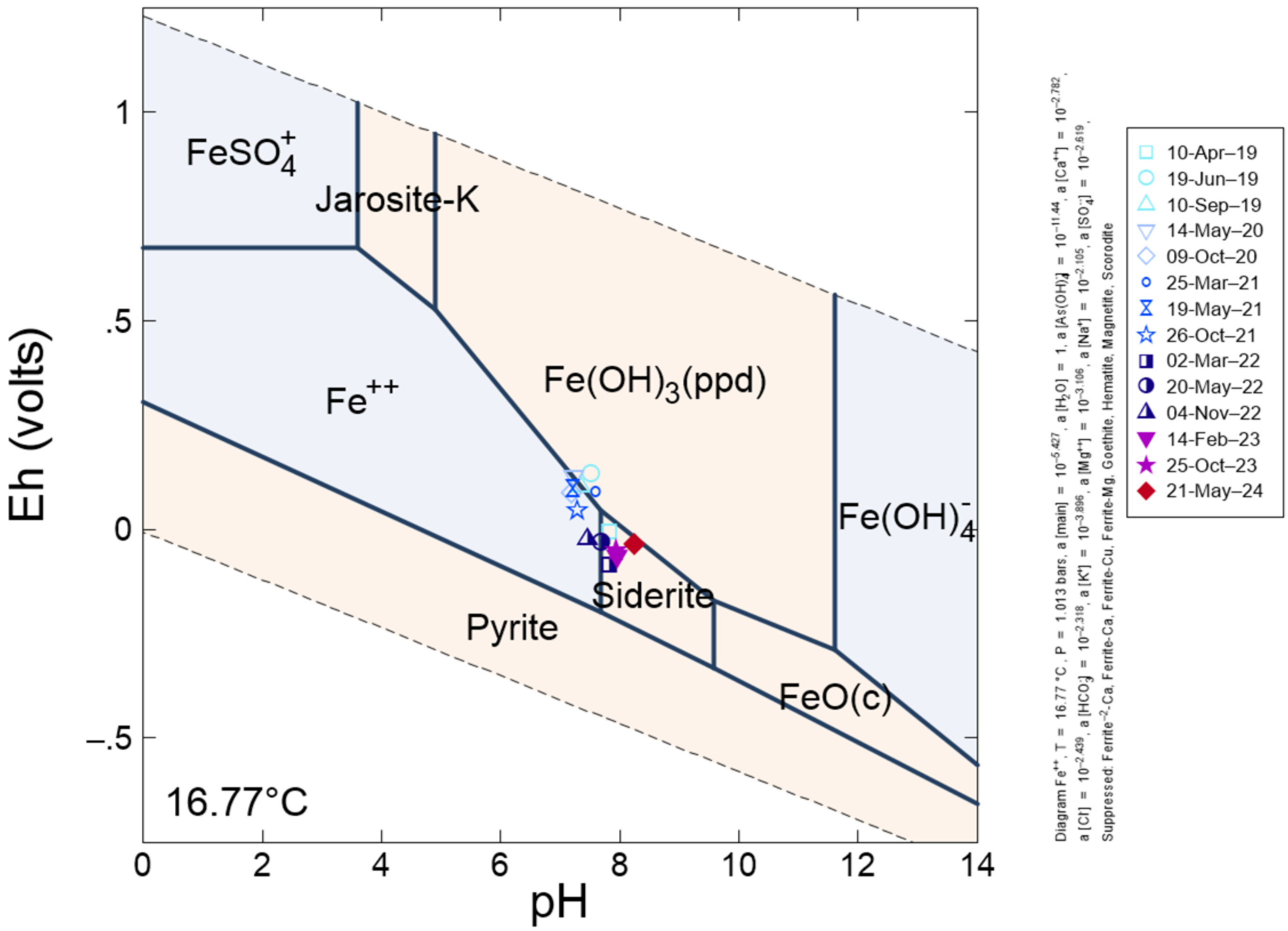
December 2024

Figure
5



Notes: Eh-pH diagram generated with averaged data from all MW-1805 sampling events, excluding March 2020, a verification resampling event, and May 2023, an outlier due to a field-measured oxidation-reduction potential value of 122.9 millivolts (Eh value of 0.33 volts).

MW-1805 Iron Eh-pH Diagram

Mountaineer Bottom Ash Ponds

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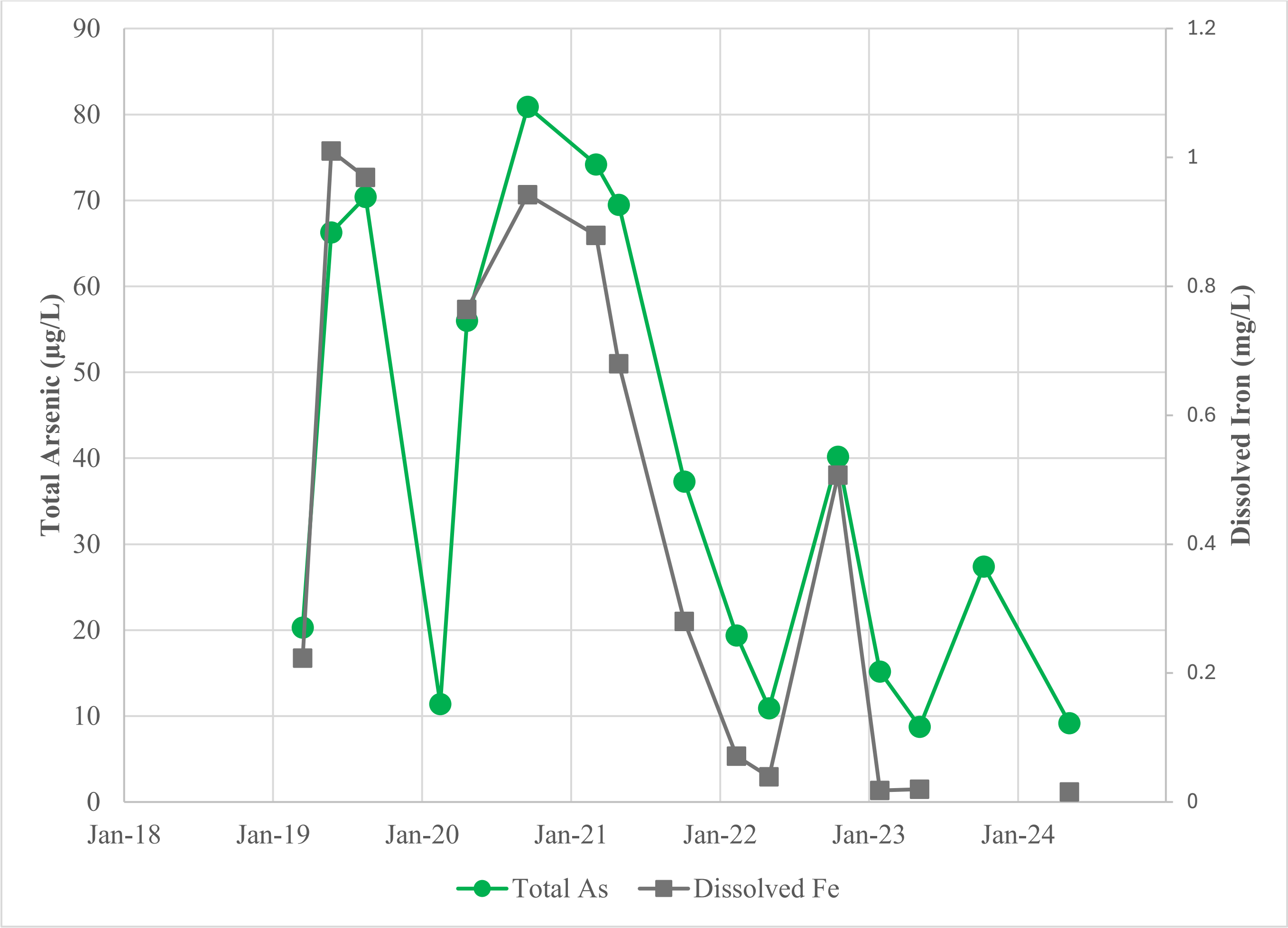
December 2024

Figure
6



Notes:

1. Samples submitted for total arsenic analyses were not filtered.
2. Samples submitted for dissolved iron analyses were field filtered prior to sample collection.
3. A dissolved iron sample was not collected in October 2023.
4. Arsenic is shown in units of micrograms per liter (µg/L). 5. Dissolved iron is shown in units of milligrams per liter (mg/L).

MW-1805 Arsenic and Dissolved Iron Time Series Graph

Mountaineer Bottom Ash Ponds

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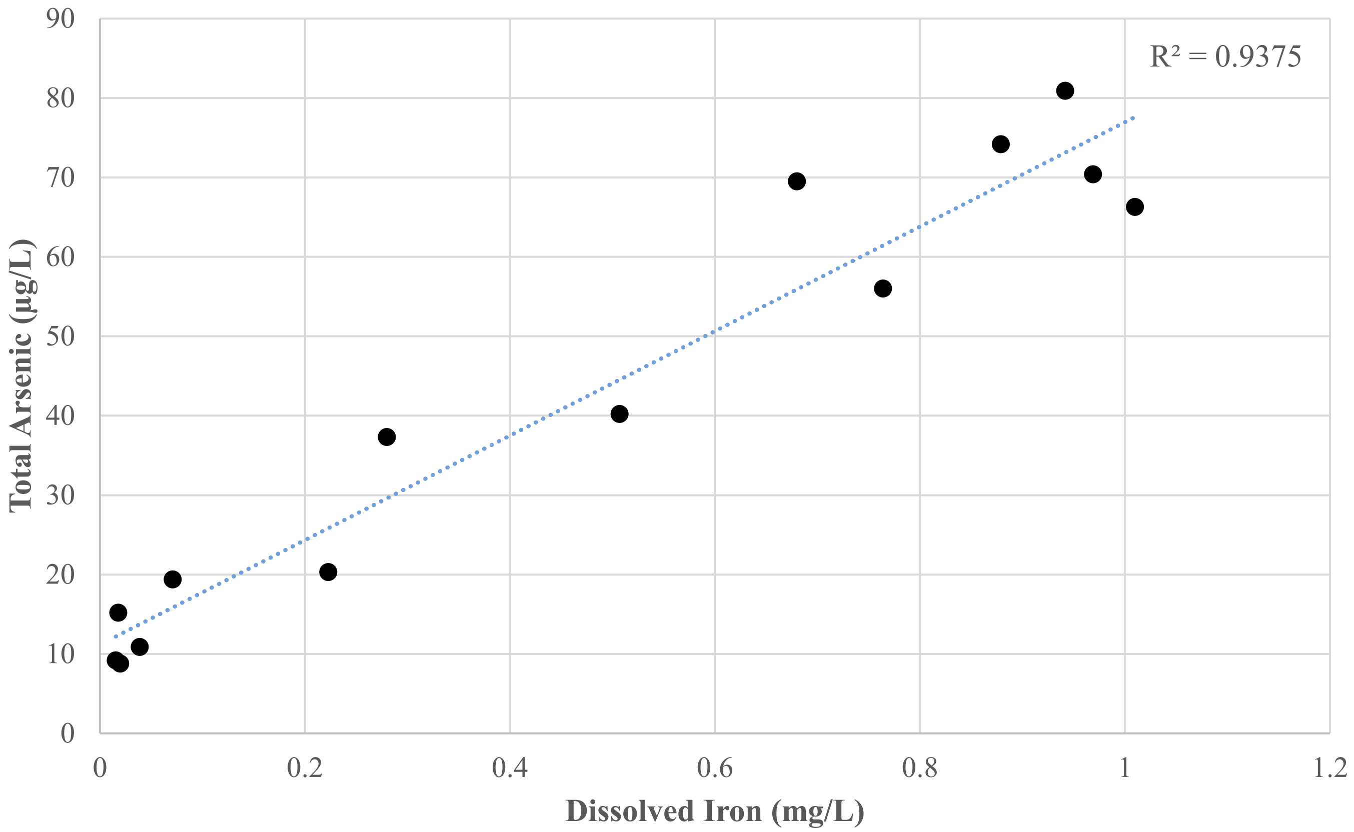
December 2024

Figure

7



Notes:

1. Samples submitted for total arsenic analyses were not filtered.
2. Samples submitted for dissolved iron analyses were field filtered prior to sample collection.
3. No dissolved iron sample was collected in October 2023.
4. Arsenic is shown in units of micrograms per liter (µg/L).
5. Dissolved iron is shown in units of milligrams per liter (mg/L).

MW-1805 Arsenic and Dissolved Iron Scatterplot

Mountaineer Bottom Ash Ponds

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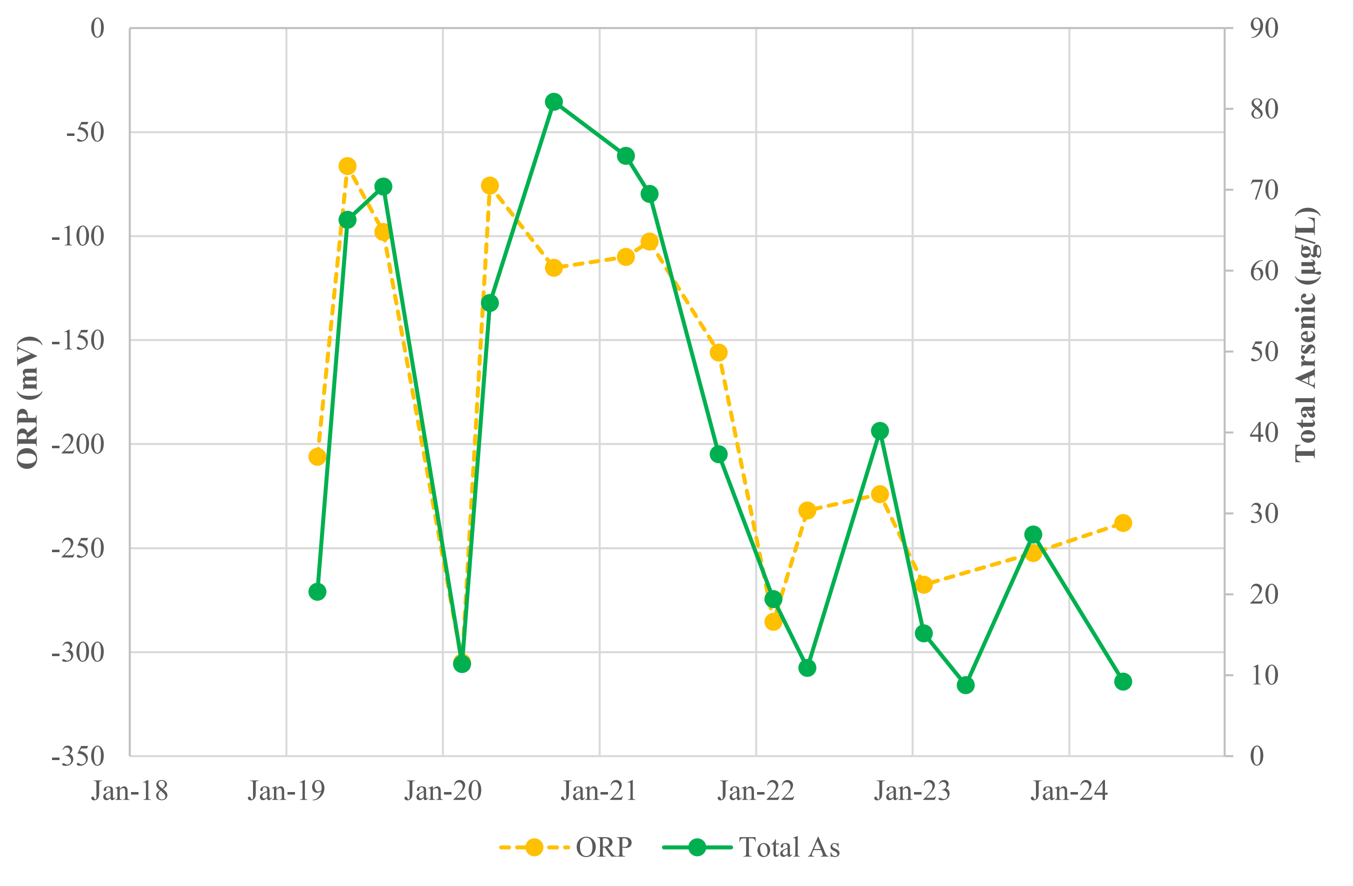
December 2024

Figure

8



Notes:
1. Oxidation-reduction potential (ORP) was measured in the field during sample collection.
2. Samples submitted for total arsenic analyses were not filtered.
3. ORP is shown in units of millivolts (mV).
4. Arsenic concentrations are shown in units of micrograms per liter (µg/L).
5. May 2023 ORP value of 122.9 was excluded as an outlier.

MW-1805 Arsenic and ORP Time Series Graph

Mountaineer Bottom Ash Ponds

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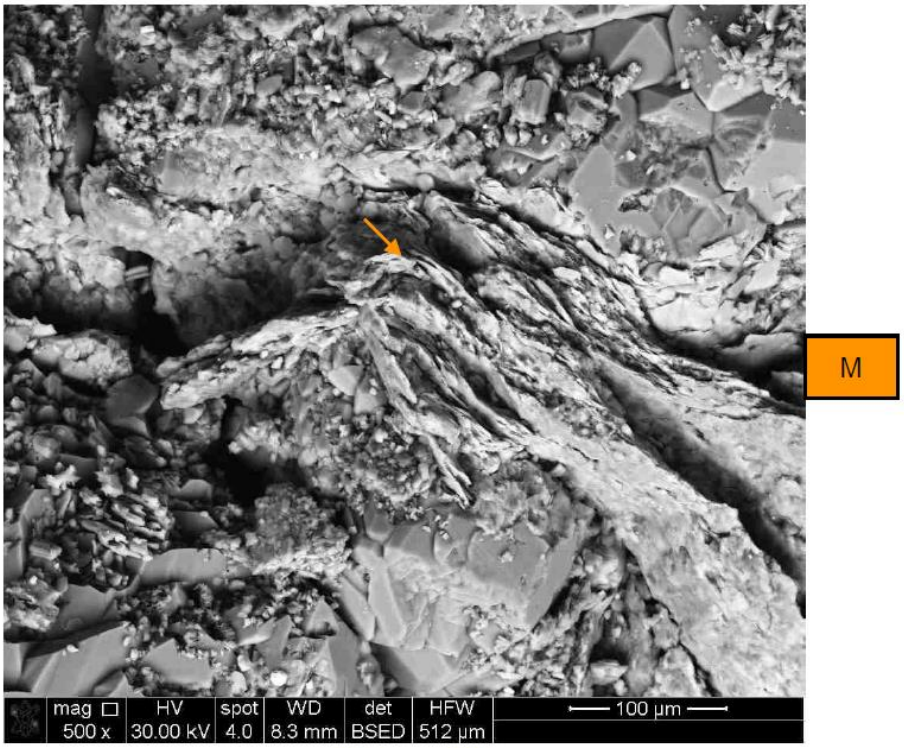
Figure
9

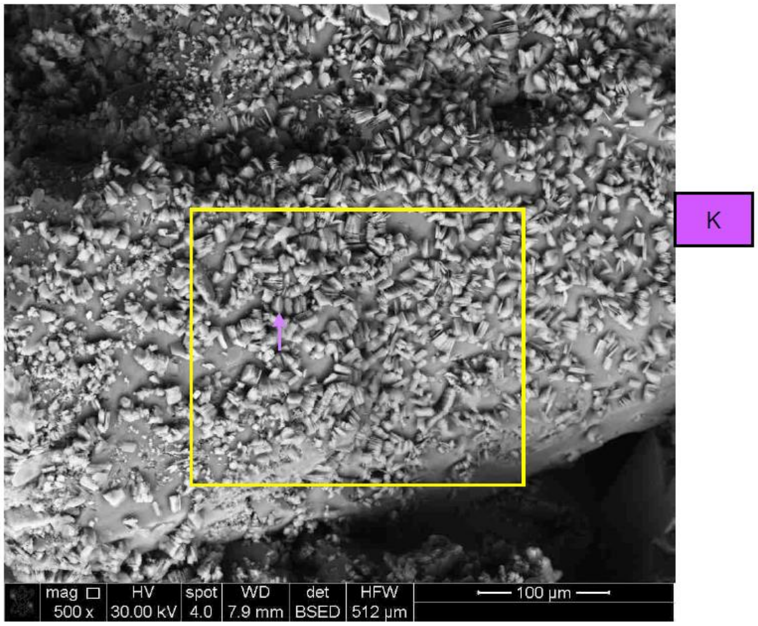
Columbus, Ohio

December 2024

23009-05C 500X



23009-05E 500X



Notes:
1. Sample was collected from a depth of 104.5 feet below ground surface from MW-1922D core.
2. Scanning electron microscope (SEM) instrument settings are indicated at the bottom of each micrograph.
3. Micaceous shale is indicated by the orange ‘M’ and orange arrow.
4. Partial exfoliation of the mica sheets as well as secondary clay mineral formation immediately adjacent to mica sheets suggests chemical weathering of mica to clays.
5. The bottom micrograph shows prevalent secondary clay mineral formation (kaolinite) within open pore space.

Mica Weathering in MW-1922D Bedrock

Mountaineer Bottom Ash Ponds

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Columbus, Ohio

December 2024

Figure
10

Legend

⌖ Piezometer

▲ AEP-Owned Pumping Well

▭ CCR Unit Boundary

Molybdenum Concentration (mg/L)

● < 0.05

● 0.05 - 0.1

● 0.1 - 0.5

Notes

- Bottom Ash Pond molybdenum concentrations represent average of 2016 and 2021 samples.
- Molybdenum concentrations are shown in mg/L.
- Molybdenum concentrations greater than the Groundwater Protection Standard (0.100 mg/L) are shown in purple.
- Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.
- CCR: Coal Combustion Residuals
- mg/L: milligrams per liter

Molybdenum Analytical Results Spatial Distribution

AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia

Geosyntec
consultants

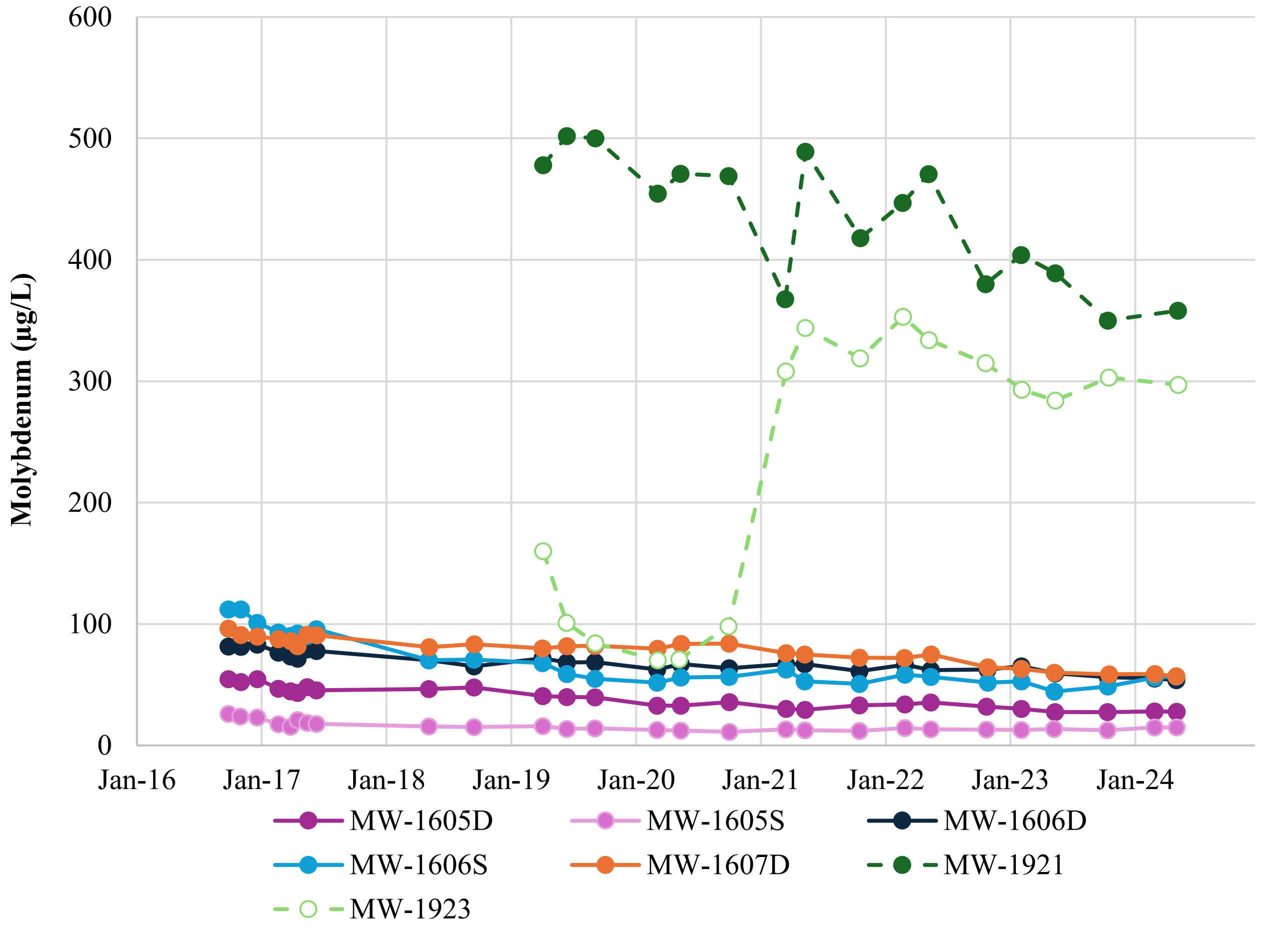
Columbus, Ohio

December 2024

Figure

11

\\annarbor-01\Data\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2024\AEP-Mountaineer_BAP_Molybdenum Analytical Results_2024-05.mxd. ASoltero. 12/9/2024. CHA8423/07/08.



Notes:

1. Groundwater data collected as part of federal groundwater monitoring requirements.
2. Molybdenum concentrations in micrograms per liter (µg/L).
3. MW-1605S/D, MW-1606S/D, and MW-1607S/D are located immediately downgradient of the Mountaineer bottom ash ponds (BAPs).
4. Wells with current or former molybdenum SSLs are shown with dashed lines.

Molybdenum Time Series Graph

Mountaineer Bottom Ash Ponds

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Figure 12

Columbus, Ohio

December 2024

\\annarbor-01\Data\Projects\AEP\Legal Department - ASD Review\Turk\2021-11 State ASD\Figures

ATTACHMENT A
MW-1805 and MW-1922D Boring Logs

SANBORN ||| HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel
Drilling Company: Terracon Consultants, Inc.
Foreman: N. Francis/K. Fowler
Date Started: 06/18/18
Date Finished: 06/21/18
Logged By: L. Corenthal
Checked By: A. Ashton

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133 8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
0								—0'—		
2							▨			
4							▨			
		S-01	5 - 6 5	2 2 3	18/18	PID: NM	▨	SILT & CLAY	S-01 (5 to 6.5'): Medium stiff, reddish brown, SILT & CLAY, seam of fine Sand. Moist.	
6							▨			
8							▨			
10		S-02	10 - 11.5	2 2 4	18/18	PID: NM	▥	—10'— CLAYEY SILT	S-02A (10 to 11'): Medium stiff, reddish brown, Clayey SILT. Moist.	
							░	—11'—	S-02B (11 to 11.5'): Loose, reddish brown, fine to coarse SAND, some Silt. Moist.	
12							░			
14							░			
		S-03	15 - 16.5	2 2 2	18/14	PID: NM	░		S-03 (15 to 16.5'): Very loose, brown, fine SAND, little Silt. Moist. Stratified at approximately 16 feet.	
16							░			
18							░	FINE TO COARSE SAND		
20		S-04	20 - 21.5	8 12 12	18/12	PID: NM	░		S-04 (20 to 21.5'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
22							░			
24							░			

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18 **Date Finished:** 06/21/18

Logged By: L. Corenthal **Checked By:** A. Ashton

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Stratum Description	Geologic Description	Remarks
		S-05	25 - 26.5	4 7 8	18/10	PID: NM			S-05 (25 to 26.5'): Medium dense, brown fine to coarse SAND, little Gravel, trace Silt. Moist.	
26										
28										
30		S-06	30 - 31.5	4 15 10	18/11	PID: NM			S-06 (30 to 31.5'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
32										
34										
		S-07	35 - 36.5	4 4 7	18/9	PID: NM			S-07 (35 to 36.5'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
36										
		S-08	36.5 - 38.5	4 6 8 8	24/11	PID: NM		FINE TO COARSE SAND	S-08 (36.5 to 38.5'): Medium dense, brown/black, fine to coarse SAND, trace Silt. Moist.	
38										
		S-09	38.5 - 40.5	3 5 5 7	24/12	PID: NM			S-09 (38.5 to 40.5'): Loose, brown/black, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
40										
		S-10	40.5 - 42.5	3 6 5 7	24/13	PID: NM			S-10 (40.5 to 42.5'): Medium dense, brown/black, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
42										
		S-11	42.5 - 44.5	3 4 8 7	24/0	PID: NM			S-11 (42.5 to 44.5'): No recovery.	
44										
		S-12	44.5 - 46.5	7 6 3 8	24/4	PID: NM			S-12 (44.5 to 46.5'): Loose, brown, fine to medium SAND, trace Silt. Wet.	
46										
		S-13	46.5 - 48.5	2 3 6 8	24/11	PID: NM			S-13 (46.5 to 48.5'): Loose, brown, fine to coarse SAND, trace Silt. Wet.	
48										
		S-14	48.5 - 50.5	1 3 5 7	24/11	PID: NM			S-14 (48.5 to 50.5'): Loose, brown, fine to medium SAND, trace Silt. Wet.	
50										

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18 **Date Finished:** 06/21/18

Logged By: L. Corenthal **Checked By:** A. Ashton

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
50		S-15	50.5 - 52	3 5 7	18/9	PID: NM			S-15 (50.5 to 52'): Medium dense, brown, fine to coarse SAND, little Silt. Wet.	At S-15 switch to 3 inch split spoon (18 inches long) from 2 inch split spoon (24 inches long) to increase sample volume.
52		S-16	52 - 53.5	1 3 5	18/0	PID: NM			S-16 (52 to 53.5'): No recovery.	
54		S-17	53.5 - 55	1 6 10	18/6	PID: NM			S-17 (53.5 to 55'): Medium dense, brown, fine to coarse SAND, trace Silt. Wet.	
56		S-18	55 - 56.5	2 4 7	18/7	PID: NM			S-18 (55 to 56.5'): Medium dense, grayish brown, fine to coarse SAND, trace Silt. Wet.	
		S-19	56.5 - 58	1 3 7	18/0	PID: NM			S-19 (56.5 to 58'): No recovery.	
58		S-20	58 - 59	NM	12/18	PID: NM			S-20 (58 to 59'): Brown, fine to coarse SAND, little Silt, trace Gravel. Wet.	S-20 sampled by Shelby tube, no recovery and refusal after 1 foot Then collected with 2 inch split spoon and switch to 2 inch split spoon after S-20.
60		S-21	59 - 60.5	3 8 6	18/14	PID: NM			S-21 (59 to 60.5'): Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel. Wet. Seam black fine to medium SAND at 60 feet.	
		S-22	60.5 - 62	6 7 11	18/22	PID: NM			S-22 (60.5 to 62'): Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel. Wet.	
62		S-23	62 - 63.5	2 6 9	18/13	PID: NM		FINE TO COARSE SAND	S-23 (62 to 63.5'): Medium dense, brown, fine to coarse SAND, trace Silt, trace Gravel Wet.	
64		S-24	63 5 - 65	3 5 7	18/12	PID: NM			S-24 (63.5 to 65'): Medium dense, brown, fine to coarse SAND, some Silt. Wet.	
		S-25	65 - 66.5	3 6 7	18/18	PID: NM			S-25 (65 to 66.5'): Medium dense, brown, fine to medium SAND, little Silt. Wet.	Start introducing Bentonite/water mix due to heaving sands
66		S-26	66 5 - 68	8 11 9	18/18	PID: NM			S-26 (66.5 to 68'): Medium dense, gray/brown, fine to coarse SAND, little Silt, trace Gravel. Wet.	
68		S-27	68 - 69.5	3 6 9	18/14	PID: NM			S-27 (68 to 69.5'): Medium dense, gray, fine to coarse SAND, little Silt, trace Gravel. Wet.	
70		S-28	69.5 - 71	10 11 15	18/15	PID: NM			S-28 (69.5 to 71'): Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt. Wet.	
		S-29	71 - 72.5	10 13 19	18/11	PID: NM			S-29 (71 to 72.5'): Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt. Wet.	
72		S-30	72.5 - 74	8 12 10	18/11	PID: NM			S-30 (72.5 to 74'): Medium dense, gray, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
74		S-31	74 - 75.5	11 13 14	18/10	PID: NM			S-31 (74 to 75.5'): Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt. Wet.	

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18 **Date Finished: 06/21/18**

Logged By: L. Corenthal **Checked By: A. Ashton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
76		S-32	75.5 - 77	8 12 15	18/13	PID: NM			S-32 (75.5 to 77'): Medium dense, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
78		S-33	77 - 78.5	7 10 14	18/11	PID: NM			S-33 (77 to 78.5'): Medium dense, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
		S-34	78.5 - 80	7 9 10	18/0	PID: NM		FINE TO COARSE SAND	S-34 (78.5 to 80'): No recovery.	
80		S-35	80 - 81.5	4 5 12	18/0	PID: NM			S-35 (80 to 81.5'): No recovery.	
82		S-36	81.5 - 83	19 18 17	18/10	PID: NM			S-36 (81.5 to 83'): Dense, brown, fine to coarse SAND, some Gravel, trace Silt. Wet.	
84		S-37	83 - 83.9	17 50/5"	11/10	PID: NM			S-37 (83 to 83.9'): Very dense, brown, fine to coarse SAND, some Gravel, little Silt. Wet. Sandstone in tip.	
	NM	S-38 C-01	84.5 - 84.7 84.7 - 89.3	50/2"	2/7 55/39	PID: NM		84.7'	S-38 (84.5 to 84.7'): Very dense, gray, fine to medium SAND. Wet.	Auger refusal at 84.7 ft. Begin PWL coring.
86 88									C-01 (84.7 to 89.3'): Medium hard, medium gray, fine to medium-grained, slightly micaceous Sandstone, with very thin to thin horizontal partings spaced 2 to 3 inches apart. Thin horizontal black lenses fine to medium grained carbonaceous Sandstone between 86 and 86.4 feet. Brown fine grained sandstone cobble in upper 0.2 feet.. Moderately fractured. REC=71%. RQD=0%.	
90 92	8	C-02	89.3 - 94.3		60/27			SANDSTONE	C-02 (89.3 to 94.3'): Medium hard to very soft, medium gray, fine to medium-grained, slightly micaceous Sandstone, with very thin to thin horizontal partings spaced 2 to 3 inches apart. Very soft, medium spaced Sandstone layers are 2 to 4 inches. Soft, medium spaced horizontal Silty Clay inclusions. Extremely fractured to sound. REC=45%. RQD=45%.	
94 96 98	7	C-03	94.3 - 99.3		60/60				C-03 (94.3 to 99.3'): Medium hard to very soft, medium gray, fine to medium-grained, slightly micaceous Sandstone, with thin to medium partings spaced 1 inch to 13 inches apart. Thin horizontal layers of very soft fine to medium grained Sandstone from 94.3 to 96.9 feet. Moderately fractured. REC=100%. RQD=62%.	
100	6	C-04	99.3 - 104.3		60/60				C-04 (99.3 to 104.3'): Medium hard to very soft, gray, fine to medium-grained,	

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345 00 LOGS GPJ 2017 SANBORN HEAD V1 GLB 2017 SANBORN HEAD V1.GDT 12/7/18

SANBORN | HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

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Date Started: 06/18/18 **Date Finished:** 06/21/18

Logged By: L. Corenthal **Checked By:** A. Ashton

Groundwater Readings

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Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
100									SANDSTONE, with very thin to thin partings spaced 1 inch to 11 inches apart. Thin horizontal layers of very soft fine to medium grained Sandstone between 100.5 and 101.5 feet.. Extremely fractured to sound. REC=100%. RQD=38%.	
102										
104	3	C-05	104.3 - 109.3		60/60				C-05 (104.3 to 109.3'): Medium hard to hard, gray, very fine to fine-grained, SANDSTONE, Medium spaced moderately dipping to low angle to low angle black fine grained Sandstone lenses from 104.3 to 108.3 feet. Very soft gray fine to medium-grained very thin to thin horizontal partings spaced 2 to 4 inches apart from 108.3 to 109.3 feet. Broken platy dark gray zone at 108.3 feet. Moderately fractured to sound. REC=100%. RQD=80%.	
106										
108	NM	C-06	109.3 - 114.3		60/60			SANDSTONE	C-06 (109.3 to 114.3'): Medium hard to soft, gray, very fine to medium-grained, SANDSTONE, very thin to thin horizontal low angle partings spaced less then 1inch to 3 inches apart. Black fine to medium-grained very thinly spaced Sandstone lenses from 109.3 to 109.9.. Extremely fractured. REC=100%. RQD=0%.	
110										
112										
114	5	C-07	114.3 - 119.3		60/60				C-07 (114.3 to 119.3'): Medium hard to soft, light medium gray, very fine to medium-grained, SANDSTONE, very thin to medium horizontal partings spaced 1 to 6 inches apart. Black fine to medium-grained very thin to medium spaced sandstone lenses from 114.3 to 117 feet. Extremely fractured to sound. REC=100%. RQD=52%.	
116										
118	4	C-08	119.3 - 124.3		60/60			119.6' SHALE 122.3'	C-08 (119.3 to 124.3'): Medium hard to soft, light gray, very fine to medium-grained, SANDSTONE, with thin horizontal partings spaced 2 to 5 inches apart and very thinly spaced clack horizontal lenses. Bed of very soft to soft, dark gray, very fine grained Silty clay Shale with very thin to thinly partings spaced less than 1 inch to 5 inches apart. Shale from 119.6 to 122.3 feet.. Extremely fractured to slightly fractured. REC=100%. RQD=38%.	
120										
122								SANDSTONE		
124	8	C-09	124.3 - 129.3		60/53				C-09A (124.3 to 125.3'): Medium hard, light gray, very fine to medium-grained,	

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: AEP Mountaineer
Location: New Haven, WV
Project No.: 4345.00

Log of Boring SB-1805

Ground Elevation: Not Available

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18 **Date Finished:** 06/21/18

Logged By: L. Corenthal **Checked By:** A. Ashton

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

Depth (ft)	Drill Rate (min/ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
								SANDSTONE 125.3'	SANDSTONE, with very thin to thin black lenses. Sound. REC=88%. RQD=65%.	
126									C-09B (125.3 to 129.3'): Very soft to soft, black, very fine grained, COAL, with thinly spaced horizontal partings, very soft gray very fine grained horizontal Clay-rich zone from 125.5 to 125.8 feet, very thin to thin Clay lenses with Pyrite throughout. Vertical crack with calcite minderalization from 127.6 to 129.8 feet. Extremely to moderately fractured.	
128								COAL		
	NM	C-10	129.3 - 131.8		30/30				C-10A (129.3 to 130.4'): Very soft to soft, black, very fine grained, COAL, with thin to very thin horizontal partings. Vertical cracks with calcite mineralization from 129.2 to 129.8 feet and 130.0 to 130.3 feet. Extremely to moderately fractured. REC=100%. RQD=37%.	
130								130.4'		
132	NM	C-11	131.8 - 133.8		24/20			SHALE	C-10B (130.4 to 131.8'): Very soft to medium hard, dark gray, very fine grained, SILTY CLAY SHALE, with very thin to thin horizontal partings. Clay rich zone from 130.4 to 130.8 feet. Slight Organic sheen. Extremely fractured.	
134								133.8'	C-11 (131.8 to 133.8'): Very soft to medium hard, dark gray, very fine grained, SILTY CLAY SHALE, with very thin horizontal, bedding. slight Organic sheen. Extremely to moderately fractured. REC=83%. RQD=0%.	
136									Boring terminated at 133.8 feet. No refusal encountered.	
138										
140										
142										
144										
146										
148										
150										

NOTES:

1. Approximately 5200 gallons of potable water was introduced during drilling upon completion of coring (approximately 3,200 gallons was used to advance to top of bedrock from a combination of potable wells and the plant fire suppression system; approximately 2,000 gallons of water from the plant fire suppression system was used during bedrock coring).

2. Continuous sampling started approximately 5 ft above the water table based on a water level measurement collected by Sanborn Head on 6/18/2018 at 15:20 at MW-1605S of 44.84 ft below Top of PVC Riser and at 15:34 at MW-1604S of 51.99 ft below Top of PVC Riser.

3. Advanced HWT casing to 29 ft bgs. Due to damage to casing advancer at 29 ft, advanced 3 1/4" ID hollow stem augers to 30 ft bgs to auger refusal at 84.7 ft bgs. Advanced HWT casing with roller bit advancer to 84.7 ft and began PWL coring at 84.7 ft.

4. Approximately 1 week following completion of sample collection, the borehole was completed as a monitoring well by Terracon Consultants, Inc. Monitoring well installation was not observed by Sanborn Head personnel.

State of West Virginia
Department of Environmental Protection

Monitoring Well Construction
Well Number: WV00540-1805-18
Approved

Site Name/Physical Address:
Site: AEP Mountaineer Plant
Line 1: 1347 Graham Station Road
Line 2:
City: Letart
State: WV
Zip: 25253-
County: Mason

Well Registration No. WV00540-1805-18
Grid Location:
a. Latitude: 38 58 29 .0
b. Longitude: 81 56 18 .0
c. Method Used: Computer Mapped/Generated Coordinates

Company/Project Well No.:
MW-1805

Purpose of Monitoring Well:
to monitor the hydrologic conditions of a coal seam.

Well Owner (Name, Firm, Address):
Owner: Randall Brown
Line 1: American Electric Power - Mountaineer Plant
Line 2: 1347 Graham Station Road
City: Letart
State: WV
Zip: 25253-
Phone: 304-882-4024

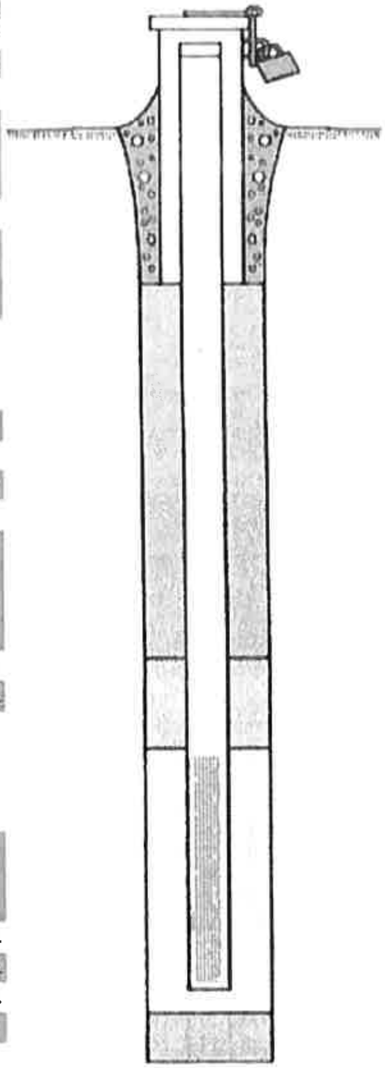
Installed By (Name, Firm, Address):
Installer: Kenn Fowler
Line 1: Terracon Consultants, Inc.
Line 2: 912 Morris Street
City: Charleston
State: WV
Zip: 25301-
Phone: 304-344-0821

Date Well Installed:
07/06/2018

Driller's WV Cert No.
WV00540

Section B: (all number fields must be in decimal format)

1.Cap and Lock: YES
2.Protective Cover: Protective Cover Pipe
3.Monitoring Well Reference Point: 591 ft.
4.Borehole Diameter: 5 inches.
5.Ground Surface Seal:
a.Material: concrete
b.Installation Procedure: ASTM D5092
6.Surface Seal Bottom/Annular Space Top: 3 ft.
7.Well Riser: a.OD Well Riser: 2.38 inches. b.ID Well Riser: 2.05 inches.
c.Material: PVC
d.Installation Procedure: ASTM D5092
8.Annular Space Seal:
a.Material: high solids grout -
b.Installation Procedure: tremie pipe-pumped
9.Well Development Procedure: overpump -
10.Drilling Method Used: mud rotary -
11.Annular Space Seal Bottom/Filter Seal Top: 117.5 ft.
12.Drilling Fluid Used: Yes Source: Mud
13.Filter Pack Seal:
a.Material: bentonite pellet
b.Installation Procedure: Gravity Fed
c.Volume Added: 0.34 cubic feet
14.Bottom of Bentonite Seal/Filter Pack Top: 120.5 ft.
15.Depth to Top of Screen: 123.5 ft.
16.Screen:
a.Material: PVC
b.Installation Procedure: ASTM D5092
c.Slot Size: 0.01 inches. d.Screen Length: 10 ft.
17.Filter Pack:
a.Material: medium sand
b.Installation Procedure: gravity fed
18.Well Depth: 133.5 ft.
19.Bottom of Filter Pack: 134 ft.
20.Bottom of Borehole: 134 ft.
21.Backfill Material (below filter pack): medium sand
22.Decontamination Procedures: water
23.Special Circumstances and Exceptions: No Variance Number:
24.WV Contractor License No.



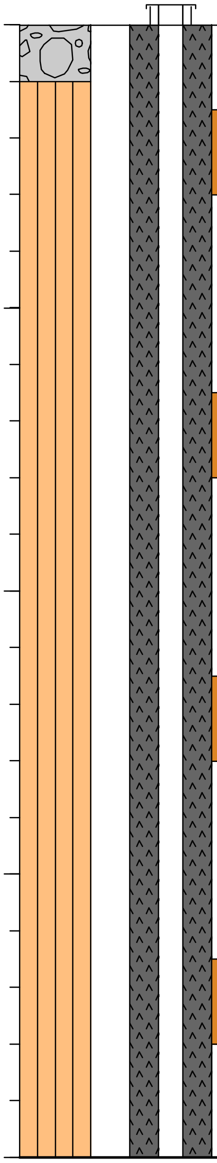
Geosyntec consultants
engineers | scientists | innovators

Client:	**American Electric Power**
Project:	**CHW8293**
Address:	**New Haven, WV**

WELL LOG

Well No. **MW-1922D**
Page: **1 of 6**

Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



DEPTH (ft)	COLLECT Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft)
0						(0') Large stones.	Advanced hollow stem auger	0.0
						(1') Medium stiff to stiff, gray, CLAYEY SILT (ML); dry, low plasticity, few fine gravel, nonuniform.		
	SS01		4 7 8	1.3		(2.5') Changes to dense and red-brown.		
5								5.0
	SS02		2 3 4	1.3		(6.5') Changes to damp, cohesive, trace fine sand.		
10								10.0
	SS03		2 4 4	0.8		(11.5') Loose, red-brown, SANDY SILT (ML); damp, nonplastic, noncohesive, trace clay, uniform.		
15								15.0
	SS04		2 2 2	1.2		(16.5') Loose to medium dense, red-brown, SANDY SILT (ML); damp, low plasticity, cohesive, with some clay, uniform.		
20								20.0

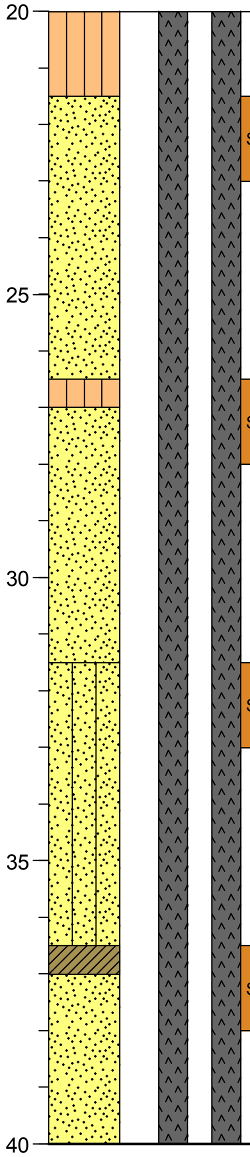
NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG

Well No. MW-1922D
Page: 2 of 6

Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



DEPTH (ft)	COLLECT: Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft)
20								20.0
	SS05		3 10 13	0.9		(21.5') Loose, brown SAND (SP); medium- to fine-grained, with trace coarse sand & gravel.		
25								25.0
	SS06		7 9 12	1.3		(26.5') Medium dense, gray-brown, CLAYEY SILT (ML); lens. (27') Loose, brown SAND (SP); damp, noncohesive, medium-grained sand, with few coarse sand and trace fine gravel.		
30								30.0
	SS07		5 6 7	0.3		(31.5') Loose, dark brown, SILTY and CLAYEY SAND (SM); damp, noncohesive, medium-grained sand with some fine rounded gravel, nonuniform.		
35								35.0
	SS08		4 5 8	1.3		(36.5') Loose, brown, SILTY CLAY (CL); damp, low plasticity, cohesive, lens. (37') Loose, brown SAND (SP); damp, noncohesive, medium-grained sand with few fine sand and gravel.		
40								40.0

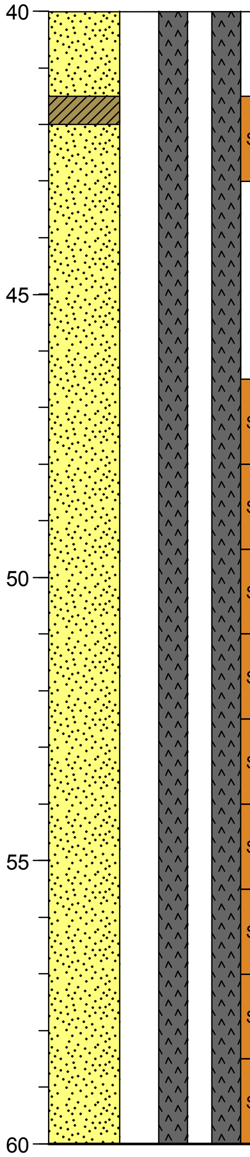
NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG

Well No. MW-1922D
Page: 3 of 6

Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)
SS09		4 5 8	1.3	
SS10		4 6 7	1.5	
SS11		9 6 8	1.3	
SS12		9 9 10	1.5	
SS13		4 6 9	1.3	
SS14		4 7 8	1.2	
SS15		3 5 10	1.1	
SS16		6 8 9	0.9	
SS17		4 7 8	1.0	
SS18		4 5 4	1.0	

SOIL/ROCK VISUAL DESCRIPTION

(41.5') Loose, brown, SILTY CLAY (CL); damp, low plasticity, cohesive, trace sand.

(42') Loose, brown SAND (SP); damp, nonplastic, noncohesive, fine- to medium-grained sand, uniform.

(46.5') Changes to wet with few coarse sand and trace fine gravel.

(48.5') 2 inch dark gray clay lens at 48.5 feet.

(49.5') Medium dense, brown SAND (SP); wet, nonplastic, noncohesive, medium- to fine-grained, uniform, with black partings throughout.

(52.5') With few fine to coarse gravel.

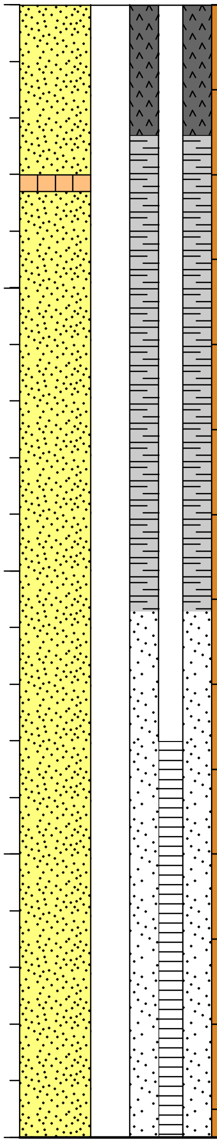
REMARKS

DEPTH (ft): 40.0, 45.0, 50.0, 55.0, 60.0

NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

Geosyntec consultants engineers | scientists | innovators	**Client:** American Electric Power **Project:** CHW8293 **Address:** New Haven, WV	**WELL LOG** **Well No.** MW-1922D **Page:** 4 of 6

Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



DEPTH (ft)	COLLECT Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft)
60	SS19		8 13 16	0.9		(60') Loose to medium dense, brown SAND (SP); wet, some coarse sand, uniform.		60.0
	SS20		8 12 13	1.1		(61.5') Loose, gray-brown SAND (SP); wet, medium- to coarse-grained with few fine rounded gravel, nonuniform.		
	SS21		8 12 14	1.3		(63') Medium dense, gray-brown, SANDY SILT (ML); wet. (63.3') Medium dense, tan gray SAND (SP); wet, fine- to medium-grained, with some coarse sand, several black partings.		
65	SS22		8 13 18	0.8				65.0
	SS23		6 7 10	1.2				
	SS24		8 11 16	1.1		(67.5') Trace fine gravel.		
70	SS25		12 13 15	1.0				70.0
	SS26		7 16 22	1.1				
	SS27		13 14 14	0.9				
	SS28		11 13 20	1.1				
75	SS29		20 24 25	1.2		(75') Some medium sand.		75.0
	SS30		12 11 13	1.2		(77') Medium dense, gray SAND (SP); wet, nonplastic, noncohesive, uniform.		
	SS31		10 13 15	1.1				
	SS32		20	1.3			Silty sand at 79.5'	
80								80.0

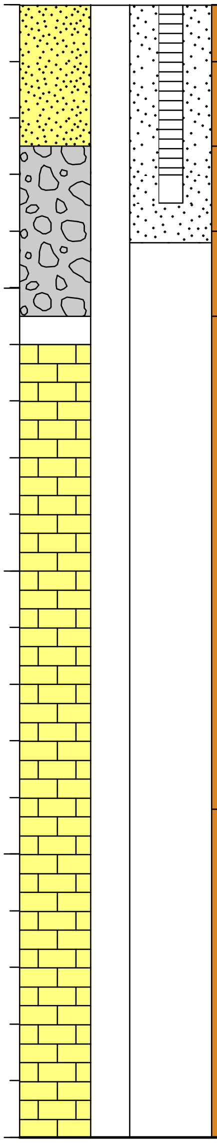
NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG

Well No. MW-1922D
Page: 5 of 6

Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT					SOIL/ROCK VISUAL DESCRIPTION	REMARKS	DEPTH (ft)
				Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)			
80				SS32		18 14	1.3		(80') Medium dense, gray SAND with gravel (SP); wet, noncohesive, coarse-grained sand and fine-grained gravel with some coarse gravel and medium sand, nonuniform.		80.0
				SS33		12 11 19	1.0				
				SS34		24 38 25	1.1		(82.5') Dense, gray GRAVEL with sand (GP); wet, noncohesive, some coarse gravel and coarse sand and few medium sand, nonuniform.	Advanced using water rotary drilling	
85				SS35		20 50/5	1.0		(84') Medium dense, brown gray GRAVEL with sand (GP); wet, fine-grained gravel and coarse-grained sand with some coarse gravel and clay lens at 84.0 feet. (85.5') Auger refusal at 85.0 feet.		85.0
									(86') Moderately hard, fine- to medium-grained, light gray SANDSTONE with thin dark gray partings less that 1 inch apart, moderately fractured and fine-grained between 86.0-88.0 feet. (88') Sound and medium-grained below 88.0 feet.		
90				CB 1			8.2	91			90.0
95									(94.2') Moderately hard to moderately soft, light to medium gray, fine- to medium-grained SANDSTONE (very thin); dark gray, horizontal partings approximately 12 to 14 inches apart, lightly fractured to sound.		95.0
				CB 2			9.6	98			
100											100.0

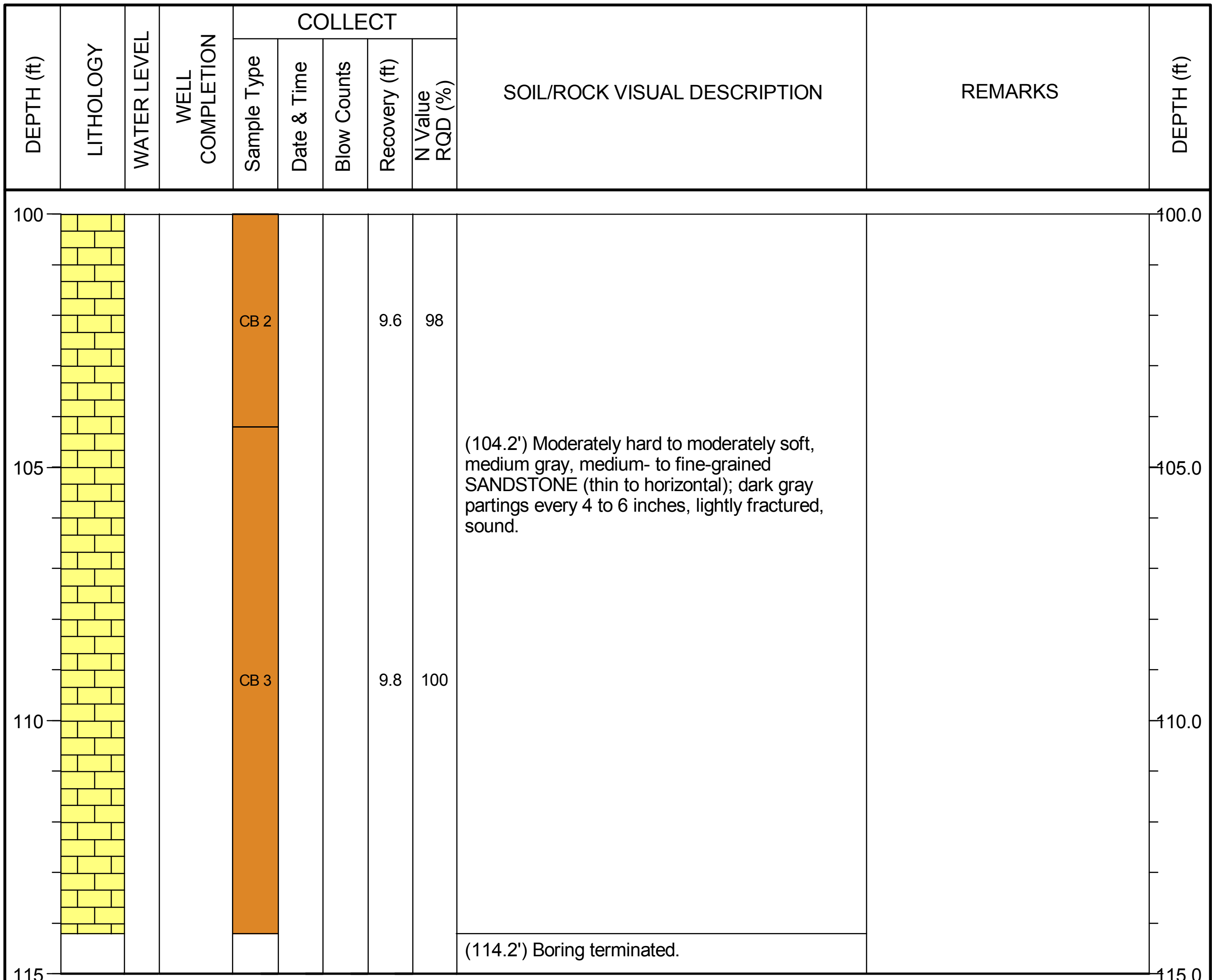
NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG

Well No. MW-1922D
Page: 6 of 6

Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):		Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**Truck-mounted rotary**	Ground Surface Elev. (ft):	**591.006**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**ZR/BH**	Top of Casing Elev. (ft):	**594.016**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**C. Christenson**	Location (X,Y):	**1,701,767.67, 720,390.93**	Filter Pack:	**#5 Sand**



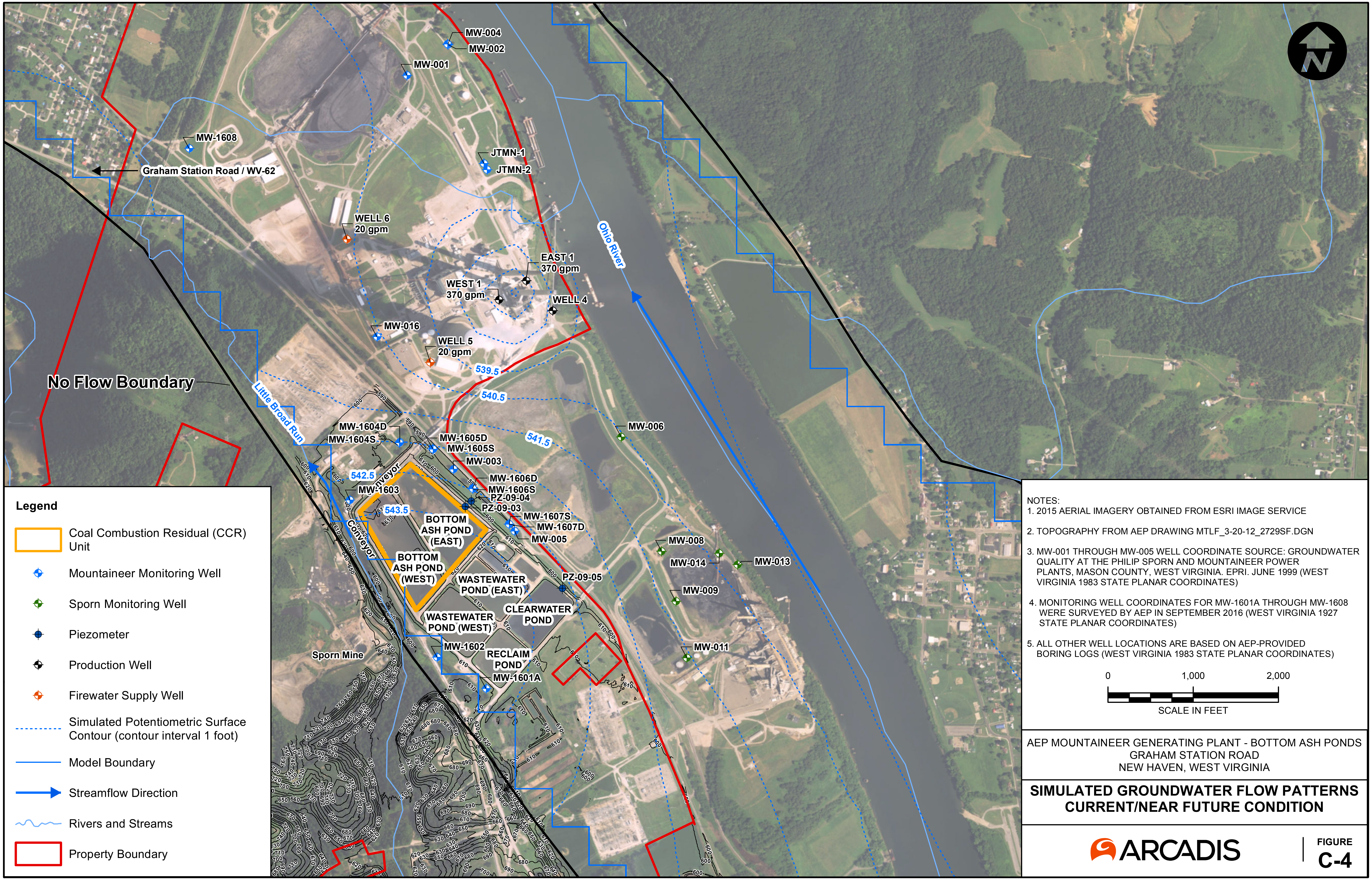
(104.2') Moderately hard to moderately soft, medium gray, medium- to fine-grained SANDSTONE (thin to horizontal); dark gray partings every 4 to 6 inches, lightly fractured, sound.

(114.2') Boring terminated.

NOTES: Boring sampled with 2 in OD split spoon to 85 ft and wireline NQ to 115 ft.
Well was constructed with approximately 3ft of casing stick up and well cover.
The monitoring well screened interval is shown for MW-1922S. MW-1922D is screened from 103.5 ft to 113.5 ft.

ATTACHMENT B

Groundwater Flow Modeling Output



Legend

🟧	Coal Combustion Residual (CCR) Unit
⊕	Mountaineer Monitoring Well
⊕	Sporn Monitoring Well
⊕	Piezometer
⊕	Production Well
⊕	Firewater Supply Well
------	Simulated Potentiometric Surface Contour (contour interval 1 foot)
——	Model Boundary
→	Streamflow Direction
~~	Rivers and Streams
🟥	Property Boundary

NOTES:
1. 2015 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE
2. TOPOGRAPHY FROM AEP DRAWING MTLF_3-20-12_2729SF.DGN
3. MW-001 THROUGH MW-005 WELL COORDINATE SOURCE: GROUNDWATER QUALITY AT THE PHILIP SPORN AND MOUNTAINEER POWER PLANTS, MASON COUNTY, WEST VIRGINIA. EPRI. JUNE 1999 (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)
4. MONITORING WELL COORDINATES FOR MW-1601A THROUGH MW-1608 WERE SURVEYED BY AEP IN SEPTEMBER 2016 (WEST VIRGINIA 1927 STATE PLANAR COORDINATES)
5. ALL OTHER WELL LOCATIONS ARE BASED ON AEP-PROVIDED BORING LOGS (WEST VIRGINIA 1983 STATE PLANAR COORDINATES)

0 1,000 2,000
SCALE IN FEET

AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS
GRAHAM STATION ROAD
NEW HAVEN, WEST VIRGINIA

SIMULATED GROUNDWATER FLOW PATTERNS CURRENT/NEAR FUTURE CONDITION

ARCADIS

FIGURE
C-4

City: CITRIX Div/Group: IM/DV Created By: K.Ives Last Saved By: webb
OH015976.0009.00001 (Mountaineer Ash Pond)
Z:\GISPROJECTS_ENV\AEP\Mountaineer\MXD\Ash Pond Report\Updated September 2016\C-4_ Mtr Ash Pond Simulated GW Flow Patterns_Current_Future.mxd 10/7/2016 2:55:30 PM

ATTACHMENT C

Bedrock Sampling Analytical Report – Eurofins

eurofins | Environment Testing

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ANALYTICAL REPORT

PREPARED FOR

Attn: Allison Kreinberg
Geosyntec Consultants Inc
500 West Wilson Bridge Road
Suite 250
Worthington, Ohio 43085

Generated 4/18/2023 12:16:08 PM

JOB DESCRIPTION

MTR BAP

JOB NUMBER

240-183413-1

Eurofins Canton
180 S. Van Buren Avenue
Barberton OH 44203

See page two for job notes and contact information.

my EOL

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization

Roxanne Cisneros

Generated
4/18/2023 12:16:08 PM

Authorized for release by
Roxanne Cisneros, Senior Project Manager
roxanne.cisneros@et.eurofinsus.com
(615)301-5761

Table of Contents

Definitions/Glossary

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Job ID: 240-183413-1

Laboratory: Eurofins Canton

Narrative

Job Narrative
240-183413-1

Comments

Run Total Metals - no leaching - per client email request.

Receipt

The samples were received on 4/12/2023 9:45 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 19.6º C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Method	Method Description	Protocol	Laboratory
6020B	Metals (ICP/MS)	SW846	EET CAN
3050B	Preparation, Metals	SW846	EET CAN
Part Size Red	Particle Size Reduction Preparation	None	EET CAN

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CAN = Eurofins Canton, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Sample Summary

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-183413-1	MW-1805-122	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-2	MW-1805-124.5	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-3	MW-1805-128	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-4	MW-1805-130.5	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-5	MW-1922D-104.5	Solid	12/21/22 00:00	04/12/23 09:45
240-183413-6	MW-1922D-111	Solid	12/21/22 00:00	04/12/23 09:45

Detection Summary

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Client Sample ID: MW-1805-122 Lab Sample ID: 240-183413-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	55	B	0.81	0.048	mg/Kg	2		6020B	Total/NA

Client Sample ID: MW-1805-124.5 Lab Sample ID: 240-183413-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	4.6	B	0.71	0.043	mg/Kg	2		6020B	Total/NA

Client Sample ID: MW-1805-128 Lab Sample ID: 240-183413-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	56	B	9.6	0.58	mg/Kg	20		6020B	Total/NA

Client Sample ID: MW-1805-130.5 Lab Sample ID: 240-183413-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	2.9	B	0.87	0.052	mg/Kg	2		6020B	Total/NA

Client Sample ID: MW-1922D-104.5 Lab Sample ID: 240-183413-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	4.5	B	0.88	0.053	mg/Kg	2		6020B	Total/NA

Client Sample ID: MW-1922D-111 Lab Sample ID: 240-183413-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	5.2	B	0.77	0.046	mg/Kg	2		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client Sample ID: MW-1805-122
Date Collected: 12/21/22 00:00
Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-1
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**55**	**B**	0.81	0.048	mg/Kg		04/13/23 14:00	04/14/23 16:54	2

Client Sample Results

Client Sample ID: MW-1805-124.5
Date Collected: 12/21/22 00:00
Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-2
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.6**	**B**	0.71	0.043	mg/Kg		04/13/23 14:00	04/14/23 16:57	2

Client Sample Results

Client Sample ID: MW-1805-128
Date Collected: 12/21/22 00:00
Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-3
Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**56**	**B**	9.6	0.58	mg/Kg		04/13/23 14:00	04/14/23 17:00	20

Client Sample ID: MW-1805-130.5

Date Collected: 12/21/22 00:00
Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-4

Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.9**	**B**	0.87	0.052	mg/Kg		04/13/23 14:00	04/14/23 17:02	2

Client Sample Results

Client Sample ID: MW-1922D-104.5

Lab Sample ID: 240-183413-5

Date Collected: 12/21/22 00:00

Matrix: Solid

Date Received: 04/12/23 09:45

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.5**	**B**	0.88	0.053	mg/Kg		04/13/23 14:00	04/14/23 17:05	2

Client Sample Results

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Client Sample ID: MW-1922D-111

Date Collected: 12/21/22 00:00

Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-6

Matrix: Solid

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**5.2**	**B**	0.77	0.046	mg/Kg		04/13/23 14:00	04/14/23 17:08	2

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 240-569247/1-A ^2
Matrix: Solid
Analysis Batch: 569539

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 569247

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0634	J	1.0	0.060	mg/Kg		04/13/23 14:00	04/14/23 15:49	2

Lab Sample ID: LCS 240-569247/2-A ^2
Matrix: Solid
Analysis Batch: 569539

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 569247

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	100	90.1		mg/Kg		90	80 - 120

Metals

Processed Batch: 569171

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-183413-1	MW-1805-122	Total/NA	Solid	Part Size Red	
240-183413-2	MW-1805-124.5	Total/NA	Solid	Part Size Red	
240-183413-3	MW-1805-128	Total/NA	Solid	Part Size Red	
240-183413-4	MW-1805-130.5	Total/NA	Solid	Part Size Red	
240-183413-5	MW-1922D-104.5	Total/NA	Solid	Part Size Red	
240-183413-6	MW-1922D-111	Total/NA	Solid	Part Size Red	

Prep Batch: 569247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-183413-1	MW-1805-122	Total/NA	Solid	3050B	569171
240-183413-2	MW-1805-124.5	Total/NA	Solid	3050B	569171
240-183413-3	MW-1805-128	Total/NA	Solid	3050B	569171
240-183413-4	MW-1805-130.5	Total/NA	Solid	3050B	569171
240-183413-5	MW-1922D-104.5	Total/NA	Solid	3050B	569171
240-183413-6	MW-1922D-111	Total/NA	Solid	3050B	569171
MB 240-569247/1-A ^2	Method Blank	Total/NA	Solid	3050B	
LCS 240-569247/2-A ^2	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 569539

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-183413-1	MW-1805-122	Total/NA	Solid	6020B	569247
240-183413-2	MW-1805-124.5	Total/NA	Solid	6020B	569247
240-183413-3	MW-1805-128	Total/NA	Solid	6020B	569247
240-183413-4	MW-1805-130.5	Total/NA	Solid	6020B	569247
240-183413-5	MW-1922D-104.5	Total/NA	Solid	6020B	569247
240-183413-6	MW-1922D-111	Total/NA	Solid	6020B	569247
MB 240-569247/1-A ^2	Method Blank	Total/NA	Solid	6020B	569247
LCS 240-569247/2-A ^2	Lab Control Sample	Total/NA	Solid	6020B	569247

Lab Chronicle

Client: Geosyntec Consultants Inc
Job ID: 240-183413-1
Project/Site: MTR BAP

Client Sample ID: MW-1805-122
Lab Sample ID: 240-183413-1
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 16:54

Client Sample ID: MW-1805-124.5
Lab Sample ID: 240-183413-2
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 16:57

Client Sample ID: MW-1805-128
Lab Sample ID: 240-183413-3
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		20	569539	RKT	EET CAN	04/14/23 17:00

Client Sample ID: MW-1805-130.5
Lab Sample ID: 240-183413-4
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 17:02

Client Sample ID: MW-1922D-104.5
Lab Sample ID: 240-183413-5
Date Collected: 12/21/22 00:00
Matrix: Solid
Date Received: 04/12/23 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 17:05

Lab Chronicle

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Client Sample ID: MW-1922D-111

Date Collected: 12/21/22 00:00

Date Received: 04/12/23 09:45

Lab Sample ID: 240-183413-6

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Processed	Part Size Red			569171	POP	EET CAN	04/13/23 07:24
Total/NA	Prep	3050B			569247	DEE	EET CAN	04/13/23 14:00
Total/NA	Analysis	6020B		2	569539	RKT	EET CAN	04/14/23 17:08

Laboratory References:

EET CAN = Eurofins Canton, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Accreditation/Certification Summary

Client: Geosyntec Consultants Inc
Project/Site: MTR BAP

Job ID: 240-183413-1

Laboratory: Eurofins Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-27-23 *
Connecticut	State	PH-0590	06-29-23
Florida	NELAP	E87225	06-30-23
Georgia	State	4062	02-28-24
Illinois	NELAP	200004	07-31-23
Iowa	State	421	06-01-23
Kentucky (UST)	State	112225	02-27-23 *
Kentucky (WW)	State	KY98016	12-31-23
Michigan	State	9135	02-27-23 *
Minnesota	NELAP	039-999-348	12-31-23
Minnesota (Petrofund)	State	3506	08-01-23
New Jersey	NELAP	OH001	06-30-23
New York	NELAP	10975	04-01-24
Ohio	State	8303	02-27-24
Ohio VAP	State	ORELAP 4062	02-27-24
Oregon	NELAP	4062	02-28-24
Pennsylvania	NELAP	68-00340	08-31-23
Texas	NELAP	T104704517-22-17	08-31-23
Virginia	NELAP	460175	09-14-23
West Virginia DEP	State	210	12-31-23

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

urofins Canton
30 S. Van Buren Ave

arberton, OH 44203-3543
ione 330.497.9396 fax 330.497.0772

194/19.6

Chain of Custody Record

eurofins Environment Testing America

Regulatory Program:

Eurofins Environment Testing America

Client Contact				
	Project Manager: Allison Kreinberg			COC No:
Client Contact	Email: Akreinberg@geosyntec.com	Site Contact:	Date: 4/6/2023	1 of 1 COCs
eosyntec Consultants	Tel/Fax: 614-468-0421	Lab Contact:	Carrier:	TALS Project #:
0 West Wilson Bridge Road, Suite 250	Analysis Turnaround Time			Sampler:
orthington, OH 43085				For Lab Use Only:
4-468-0421	TAT if different from Below ______			Walk-in Client:
xx) xxx-xxxx FAX				Lab Sampling:
oject Name: MTR BAP				
te: MTR				Job / SDG No.:
O # CHA8495B/07				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	am / Metal Arse	Sample Specific Notes:
MW-1805-122	12/21/22		G	Rock	1	X	
MW-1805-124.5	12/21/22		G	Rock	1	X	Please complete DI water leach on all samples prior to analysis
MW-1805-128	12/21/22		G	Rock	1	X	
MW-1805-130.5	12/21/22		G	Rock	1	X	
MW-1922D-104.5	12/21/22		G	Rock	1	X	
MW-1922D-111	12/21/22		G	Rock	1	X	

240-183413 Chain of Custody

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

ossible Hazard Identification:

e any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments
ection if the lab is to dispose of the sample.

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

pecial Instructions/QC Requirements & Comments:

Custody Seals Intact:	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
elinquished by:	Company:	Date/Time:	Received by:	Company: GETNC	Date/Time: 4/12/23 945
elinquished by:	Company: MINERALOGY	Date/Time: 04/11/23 1600	Received by:	Company:	Date/Time:
elinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

1

Eurofins - Canton Sample Receipt Form/Narrative **Login # :**________
Barberton Facility

Client Geosyntec Site Name________ Cooler unpacked by: Rochelle Haidet
Cooler Received on 4 12 23 Opened on 4 12 23
FedEx: 1st Grd [✓ Exp] UPS FAS Clipper Client Drop Off Eurofins Courier Other________

Receipt After-hours: Drop-off Date/Time________ Storage Location________

Eurofins Cooler # EC Foam Box Client Cooler [✓ Box] Other________
4/12/23 RH Packing material used: Bubble Wrap Foam [✓ Plastic Bag] None Other________
COOLANT: Wet Ice Blue Ice Dry Ice Water [✓ None]

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
IR GUN # 13 (CF +2 °C) Observed Cooler Temp. 19.4 °C Corrected Cooler Temp. 19.6 °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity______ Yes [✓ No]
-Were the seals on the outside of the cooler(s) signed & dated? Yes No [✓ NA]
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes [✓ No]
-Were tamper/custody seals intact and uncompromised? Yes No [✓ NA]
3. Shippers' packing slip attached to the cooler(s)? [✓ Yes] No
4. Did custody papers accompany the sample(s)? [✓ Yes] No
5. Were the custody papers relinquished & signed in the appropriate place? [✓ Yes] No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes [✓ No]
7. Did all bottles arrive in good condition (Unbroken)? [✓ Yes] No
8. Could all bottle labels (ID/Date/Time) be reconciled with the COC? [✓ Yes] No
9. For each sample, does the COC specify preservatives ([✓ Y]/N), # of containers ([✓ Y]/N), and sample type of grab/comp ([✓ Y]/N)?
10. Were correct bottle(s) used for the test(s) indicated? [✓ Yes] No
11. Sufficient quantity received to perform indicated analyses? [✓ Yes] No
12. Are these work share samples and all listed on the COC? Yes [✓ No]
If yes, Questions 13-17 have been checked at the originating laboratory.
13. Were all preserved sample(s) at the correct pH upon receipt? Yes No [✓ NA] pH Strip Lot# **HC203864**
14. Were VOAs on the COC? Yes [✓ No]
15. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes No [✓ NA]
16. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #________ Yes [✓ No]
17. Was a LL Hg or Me Hg trip blank present? ________ Yes [✓ No]

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM ________ Date ________ by ________ via Verbal Voice Mail Other

Concerning ________

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page

Samples processed by:

19. SAMPLE CONDITION
Sample(s) ________ were received after the recommended holding time had expired.
Sample(s) ________ were received in a broken container.
Sample(s) ________ were received with bubble >6 mm in diameter. (Notify PM)

20. SAMPLE PRESERVATION

Sample(s) ________ were further preserved in the laboratory.
Time preserved: ________ Preservative(s) added/Lot number(s): ________

VOA Sample Preservation - Date/Time VOAs Frozen: ________

WI-NC-099

ATTACHMENT D

Bedrock Sampling Analytical Report – Mineralogy, Inc.

Test Report

Client:	Geosyntec Consultants	MI#:	23009
Project:	Mountaineer ASD	Date:	03/16/23
Location:	New Haven, WV	P.O.#:	CHA0495/07/02

Client	Geosyntec		
	Attn: Allison Kreinberg		
Email	akreinberg@geosyntec.com	**Phone**	614-468-0421

Method(s)	Timothy B. Murphy
X-ray Diffraction (XRD) X-ray Fluorescence (XRF) Scanning Electron Microscopy (SEM)	Timothy B. Murphy

CONDITIONS AND QUALIFICATIONS

Mineralogy, Inc. will endeavor to provide accurate and reliable laboratory measurements of the samples provided by the client. The results of any x-ray diffraction, petrographic or core analysis test are necessarily influenced by the condition and selection of the samples to be analyzed. It should be recognized that geological samples are commonly heterogeneous and lack uniform properties. Mineralogical, geochemical and/or petrographic data obtained for a specific sample provides compositional data pertinent to that specific sampling location. Such "site-specific data" may fail to provide adequate characterization of the range of compositional variability possible within a given project area, thus the "projection" of these laboratory findings and values to adjoining, "untested" areas of the formation or project area is inherently risky, and exceeds the scope of the laboratory work request. Hence, Mineralogy, Inc. shall not assume any liability risk or responsibility for any loss or potential failure associated with the application of "site or sample-specific laboratory data" to "untested" areas of the formation or project area. Unless otherwise directed, the samples selected for analysis will be chosen to reflect a visually representative portion of the bulk sample submitted for analysis. Where provided, the interpretation of x-ray diffraction, petrographic or core analysis results constitutes the best geological judgment of Mineralogy, Inc., and is subject to the sampling limitations described above, and the detection limits inherent to semi-quantitative and/or qualitative mineralogical and microscopic analysis. Mineralogy, Inc. assumes no responsibility nor offers any guarantee of the productivity, suitability or performance of any oil or gas well, hydrocarbon recovery process, dimension stone, and/or ore material based upon the data or conclusions presented in this report.

This report is to only be replicated in its entirety.

Sample Retention: Samples will be stored for a period of 30 days and thereafter discarded. If additional sample storage time and/or return shipping is required, appropriate charges will be billed to the client.

X-ray Diffraction

Table I.1

Client:	Geosyntec Consultants	MI#:	23009
Project:	Mountaineer ASD	P.O.#:	CHA0495/07/02
Location:	New Haven, WV	Method:	X-ray Diffraction

Mineral Constituent	**Lab ID:**	**23009-01**	**23009-02**	**23009-03**	**23009-04**
	Sample ID:	**MW-1805 122’**	**MW-1805 124.5’**	**MW-1805 128’**	**MW-1805 130.5’**
	Chemical Formula	**Relative Abundance (%)**			
Quartz	SiO_2	24	73	4	32
Plagioclase Feldspar	$(Na,Ca)AlSi_3O_8$	5	7		7
K-Feldspar	$KAlSi_3O_8$	1	8		1
Calcite	$CaCO_3$	<0.5	<0.5		
Siderite	$FeCO_3$	2	<0.5		1.5
Pyrite	FeS_2		<0.5	4	0.5
Kaolinite	$Al_2Si_2O_5(OH)_4$	11	7.5	6	10
Chlorite	$(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$	16	0.5		14
Illite / Mica	$KAl_2(Si_3AlO_{10})(OH)_2$	39	4	1	33
Mixed-Layered Illite/Smectite	$K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$	2		1	1
Amorphous				84	
Total		**100**	**100**	**100**	**100**
% Illite in ML I/S		*90%*		*BDL**	*80%*

**BDL = Below Detection Limit*

X-ray Diffraction

Table I.2

Client:	Geosyntec Consultants	MI#:	23009
Project:	Mountaineer ASD	P.O.#:	CHA0495/07/02
Location:	New Haven, WV	Method:	X-ray Diffraction

	Lab ID:	**23009-05**	**23009-06**
	Sample ID:	**MW-1922D 104.5'**	**MW-1922D 111'**
Mineral Constituent	**Chemical Formula**	**Relative Abundance (%)**	
Quartz	SiO_2	86	85
Plagioclase Feldspar	$(Na,Ca)AlSi_3O_8$	4	3
K-Feldspar	$KAlSi_3O_8$	1	2
Calcite	$CaCO_3$	0.5	
Goethite	alpha-FeOOH		0.5
Siderite	$FeCO_3$		
Pyrite	FeS_2		
Hematite	alpha-Fe_2O_3		0.5
Kaolinite	$Al_2Si_2O_5(OH)_4$	6	6
Chlorite	$(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$		<0.5
Illite / Mica	$KAl_2(Si_3AlO_{10})(OH)_2$	2.5	3
Mixed-Layered Illite/ Smectite	$K_{0.5}Al_2(Si,Al)_4O_{10}(OH)_2 \cdot 2H_2O$	<0.5	
Total		**100**	**100**
% Illite in ML I/S		*80%*	

**BDL = Below Detection Limit*

X-ray Fluorescence

Table II

Client:	Geosyntec Consultants	MI#:	23009
Project:	Mountaineer ASD	P.O.#:	CHA0495/07/02
Location:	New Haven, WV	Method:	X-ray Fluorescence

Lab ID:	**23009-01**	**23009-02**	**23009-03**	**23009-04**	**23009-05**	**23009-06**
Sample ID:	**MW-1805 122’**	**MW-1805 124.5’**	**MW-1805 128’**	**MW-1805 130.5’**	**MW-1922D 104.5’**	**MW-1922D 111’**
Elemental Phase	**Results (Mass %)**					
Na2O	0.6707	0.5154	0.1887	0.695	0.3969	0.515
MgO	1.9617	0.2376	0.1567	1.6714	0.2043	0.2466
Al2O3	25.3368	8.1773	12.5199	22.3427	6.1898	7.5659
SiO2	54.4381	86.849	20.9049	58.5764	90.4786	88.2277
P2O5	0.0935	0.0205	0.0895	0.0615	0.0277	0.0572
S	0.6678	0.181	14.7595	1.0398	0.1592	0.2296
Cl	0.0036	0.0038	0.1484	0.0132	0.0138	0.0055
K2O	4.3886	1.828	1.3919	3.4114	0.6282	1.0262
CaO	0.2795	0.0537	1.2244	0.1757	0.2123	0.1336
TiO2	1.6125	0.2621	1.0809	1.1403	0.1182	0.1589
Cr	0.0181	ND	ND	ND	ND	ND
MnO	0.0635	0.0115	0.0234	0.0461	0.0063	0.0065
Fe2O3	9.1735	1.5038	24.8472	9.0787	1.2773	1.4397
Zn	0.021	ND	ND	0.0205	ND	ND
As	ND	ND	0.1825	ND	ND	ND
Rb	0.0213	0.0071	ND	0.016	ND	ND
Sr	0.0189	0.0062	0.0952	0.0143	ND	ND
Y	0.005	ND	ND	0.0029	ND	ND
Zr	0.0607	0.0164	ND	0.0376	0.0115	0.011
BaO	0.1239	0.0483	0.217	0.077	0.0337	0.029

ND = Not Detected

Geosyntec Consultants
Mountaineer | New Haven, WV

MW-1805-122
MI#23009-01 - SEM

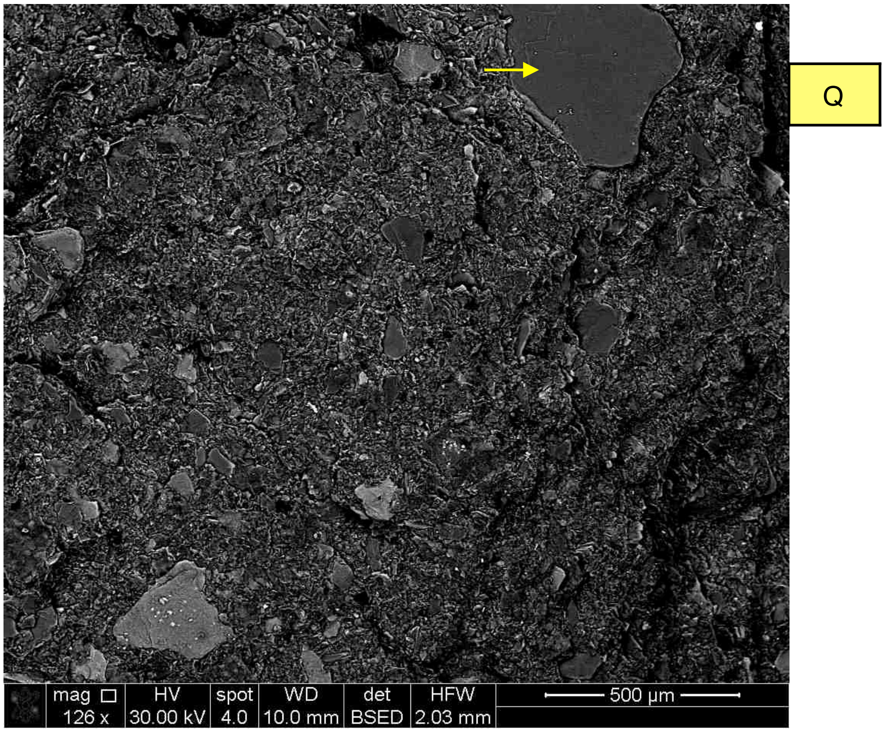
Summary: This core sample is characterized as a medium gray (N5), compact parallel-bedded, non-porous, micaceous, silty shale. The shale mineralogy is dominated by clay minerals and mica which together account for ~ 68% of the sample mass. The clay mineral suite is enriched with respect to illite/mica (~39%), chlorite (~16%), and kaolinite (~11%), coupled with relatively minor amounts of mixed-layered illite/smectite (~2%). The detrital silt and sand grains are moderately to poorly sorted, sub-rounded, and matrix-supported. The detrital grain assemblage includes quartz (~24%) plagioclase feldspar (~5%) and minor amounts of k-feldspar (~1%). Minor amounts of siderite (~2%) are also present in the silty shale. SEM Figures 1A through 1C provide backscatter & scanning electron views of a typical bedding plane surface. Traces of microporosity are locally present flanking the silt and sand grains. Figures 1D through 1F provide images of the shale fabric in cross section. The SEM images reveal the presence of scattered, lens-shaped macropores & micropores, preserved and sheltered by the propping effect of randomly distributed silt and sand grains.

23009-01 Photo Index:

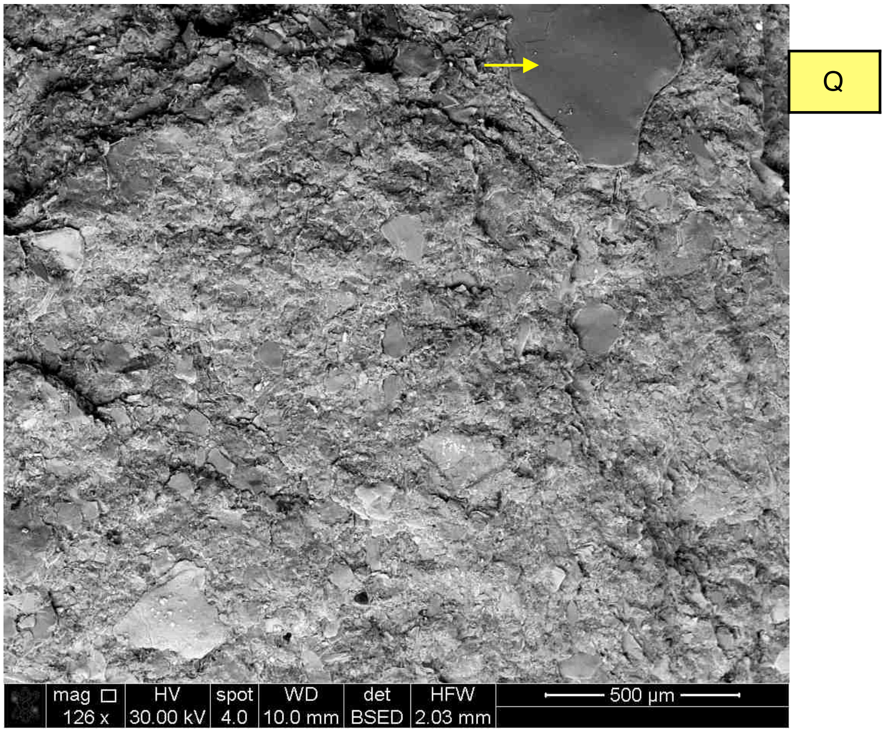
Sample ID	Magnification
23009-01A	126X
23009-01B	126X
23009-01C	500X
23009-01D	126X
23009-01E	1500X
23009-01F	6000X

Sheltered macro-porosity	BP
Detrital clay matrix	DM
Detrital quartz	Q
Intercrystalline microporosity	uP

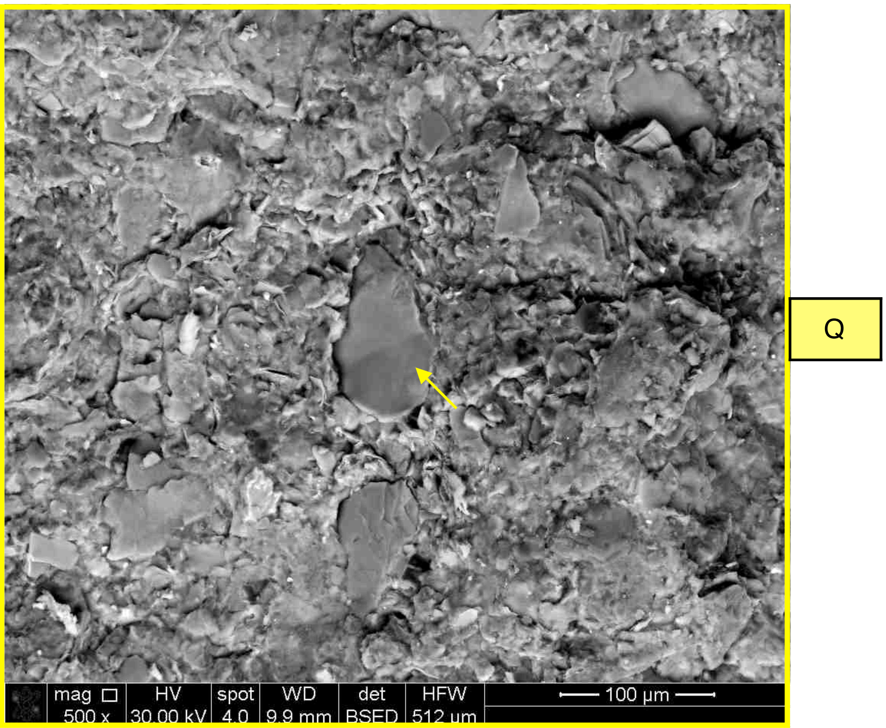
23009-01A 126X



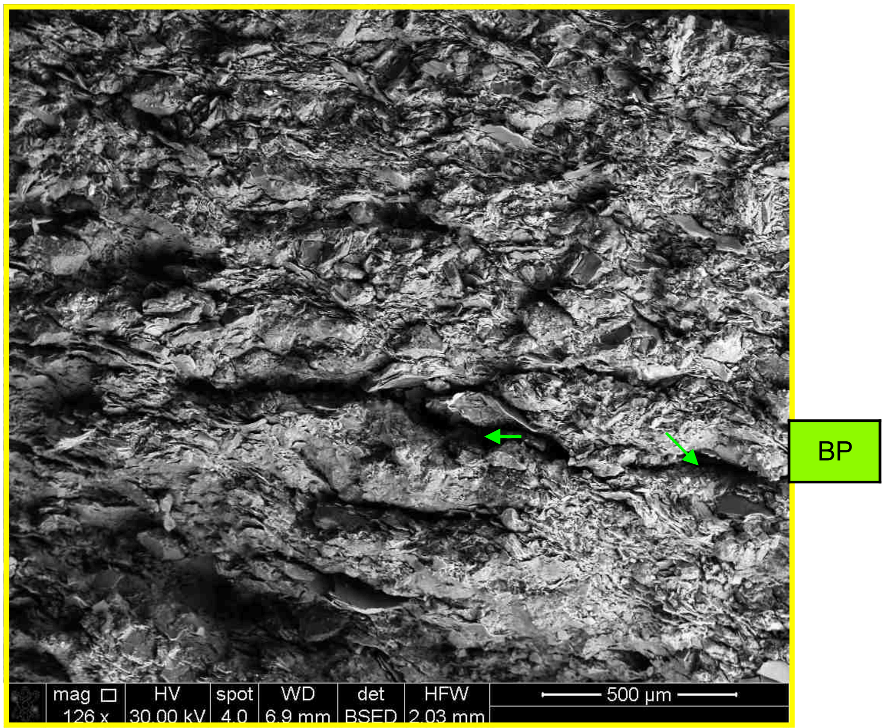
23009-01B 126X



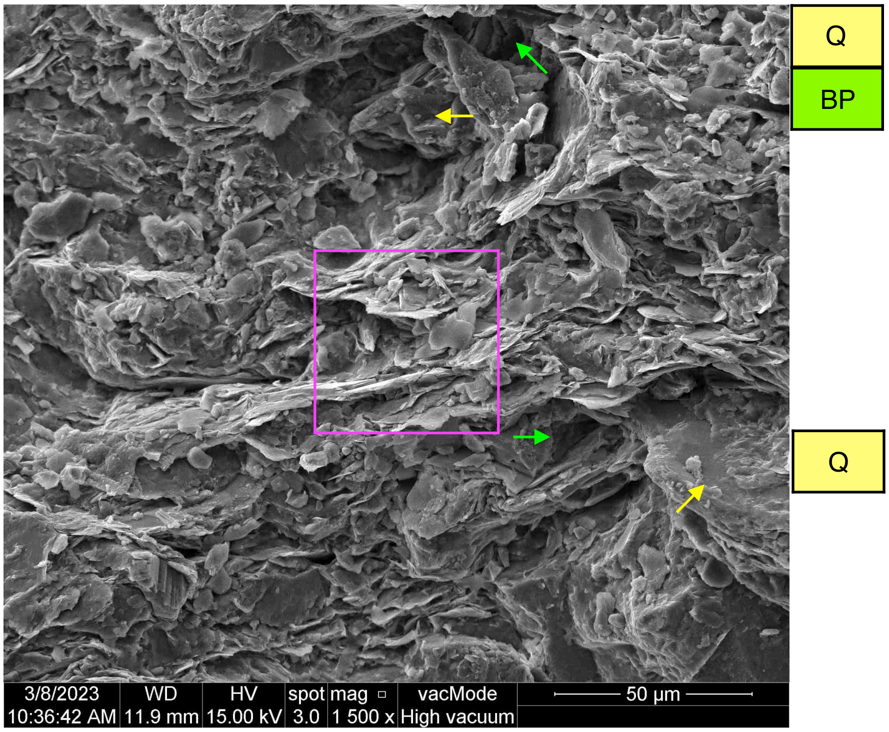
23009-01C 500X



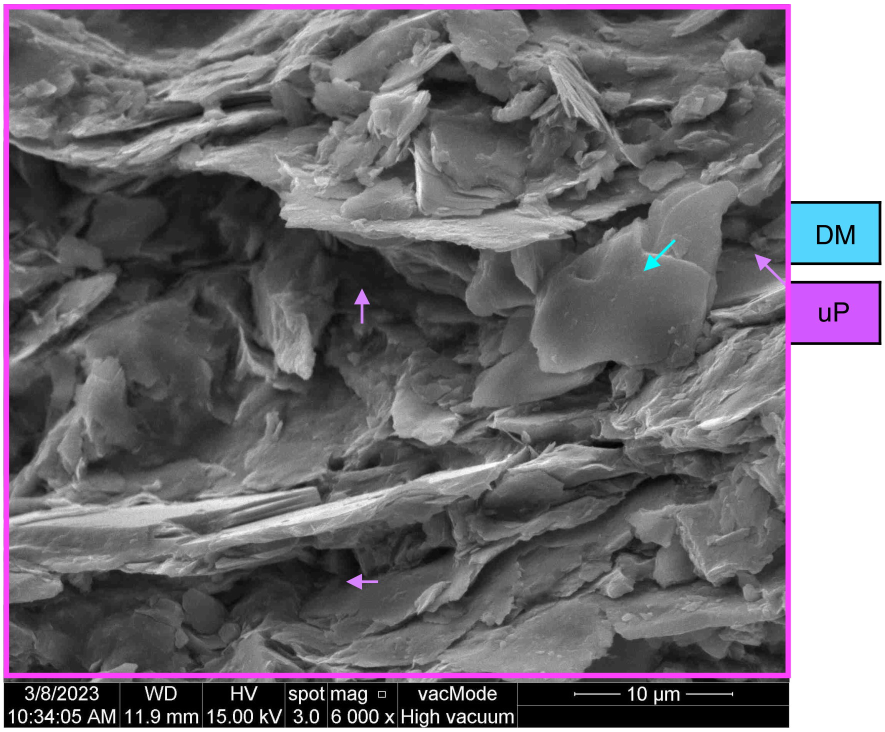
23009-01D 126X



23009-01E 1500X



23009-01F 6000X



Geosyntec Consultants
Mountaineer | New Haven, WV

MW-1805-124.5
MI#23009-02 - SEM

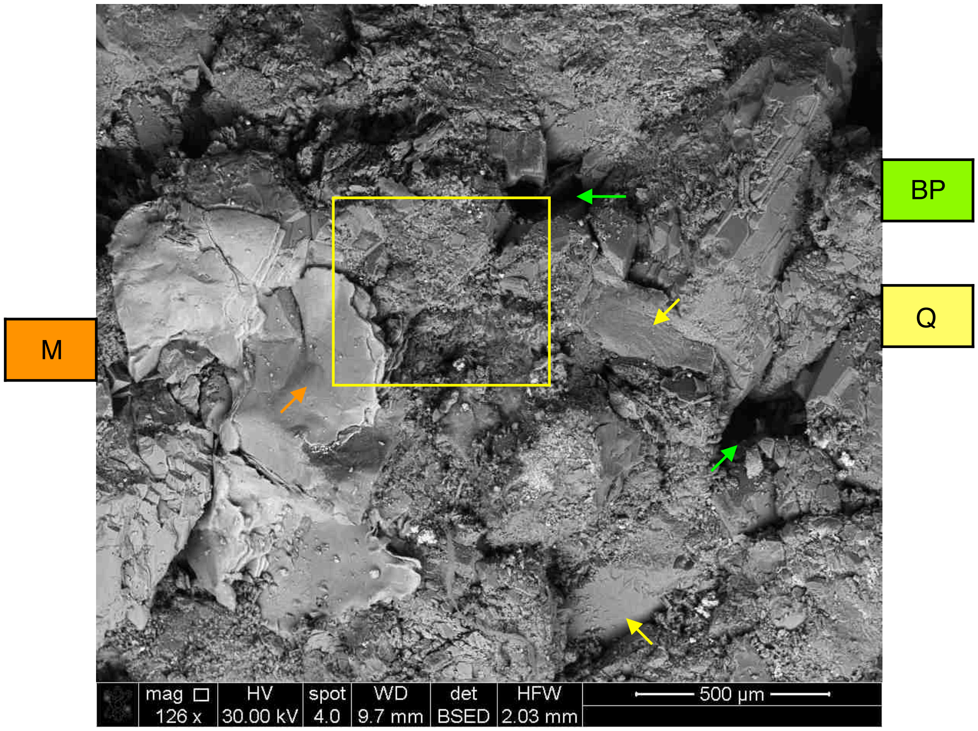
Summary: This core interval is comprised of light gray (N8), cross-bedded, medium-grained, well sorted, quartz-cemented, sub-arkosic sandstone. The sandstone fabric is well-cemented & moderately porous, with scattered intergranular macropores. Pore-filling authigenic kaolinite clay is scattered throughout the sandstone framework, occurring as vermicular stacks of clay platelets (see Figures 2E & 2F). The quartz-rich framework is well-cemented with authigenic quartz overgrowths. Total macroporosity for this sandstone is estimated to comprise ~ 6-9% of the sandstone bulk volume. The mineralogy of the sandstone is dominated by quartz (73%), feldspar [including plagioclase (7%) and k-feldspar (8%)], kaolinite (7.5%), illite / mica (4%), and scattered traces (i.e., <0.5%) of siderite, calcite, and pyrite.

23009-02 Photo Index:

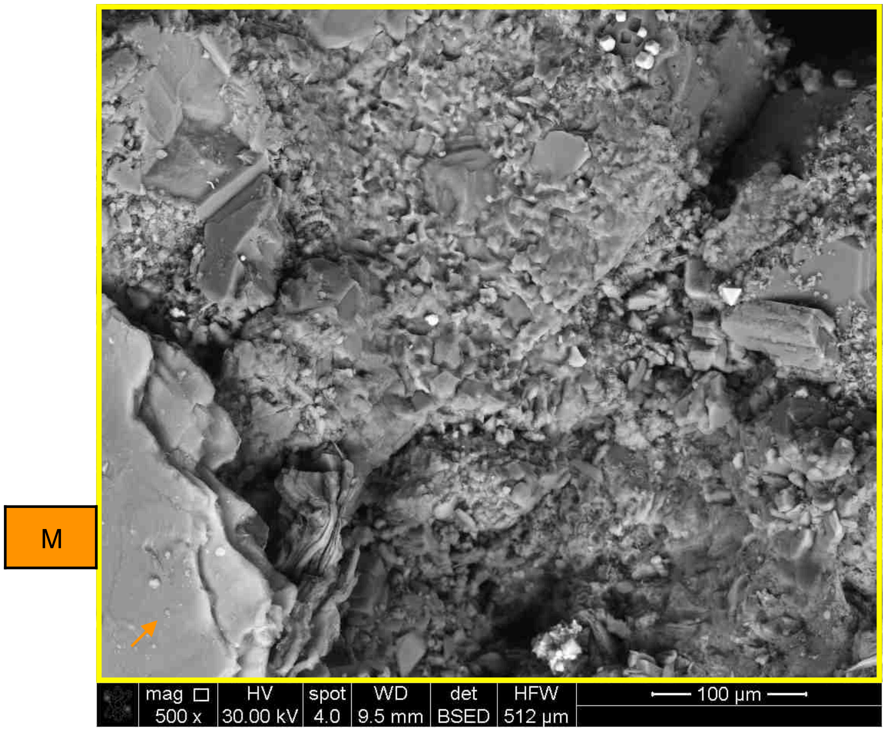
Sample ID	Magnification
23009-02A	126X
23009-02B	500X
23009-02C	500X
23009-02D	126X
23009-02E	1000X
23009-02F	8000X

Intergranular macro-porosity	BP
Detrital quartz	Q
Quartz overgrowth cement	OG
Authigenic Kaolinite	K
Mica	M

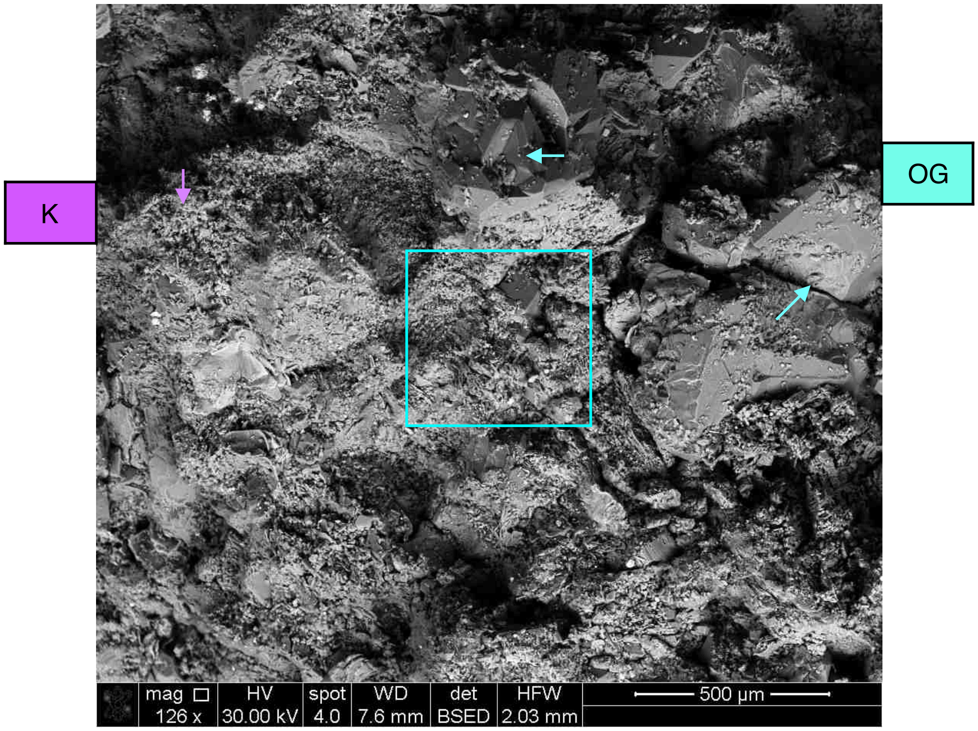
23009-02A 126X



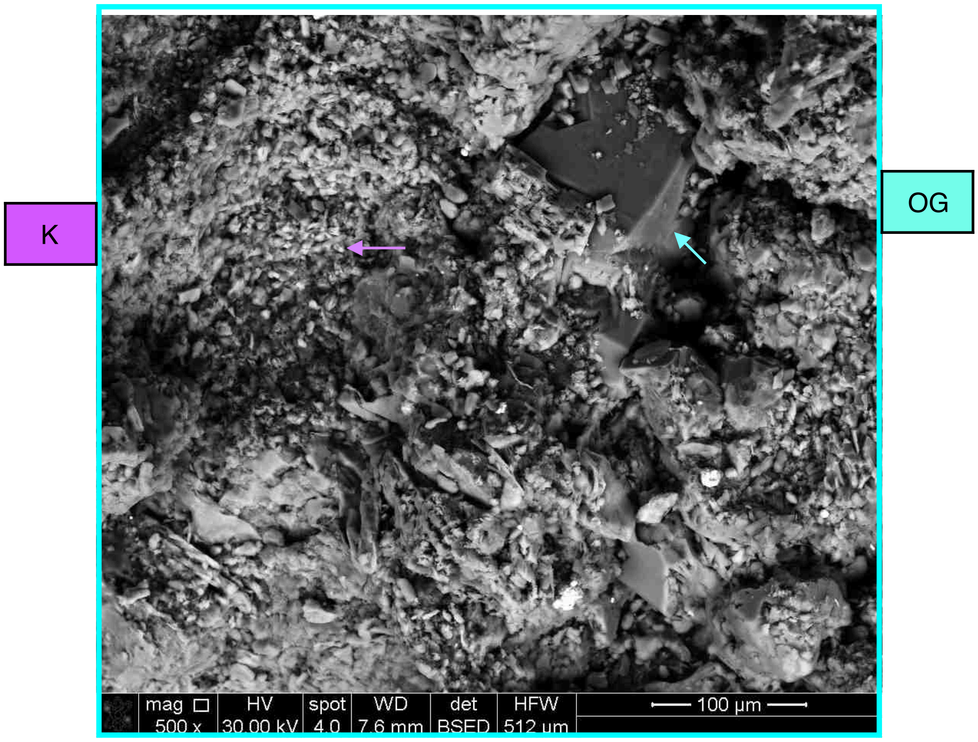
23009-02B 500X



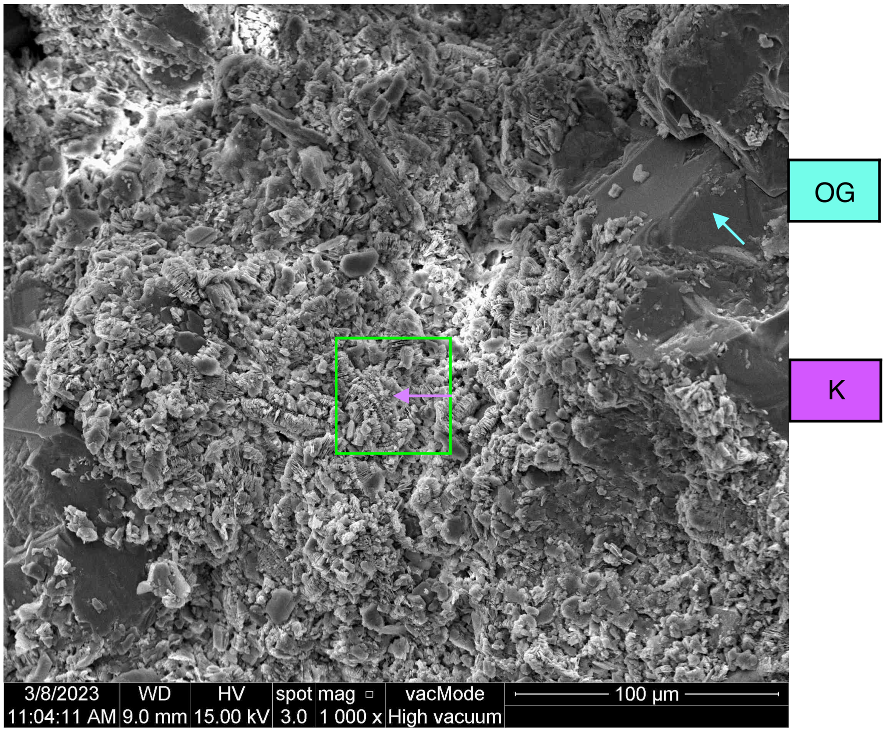
23009-02C 500X



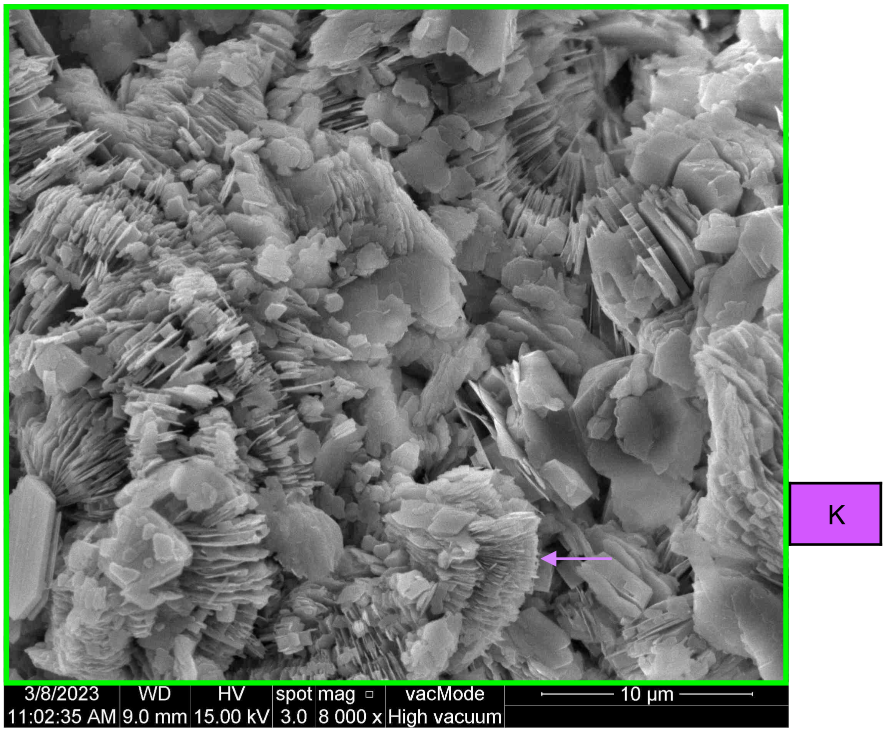
23009-02D 126X



23009-02E 1000X



23009-02F 8000X



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Mountaineer | New Haven, WV

MW-1805-128
MI#23009-03 - SEM

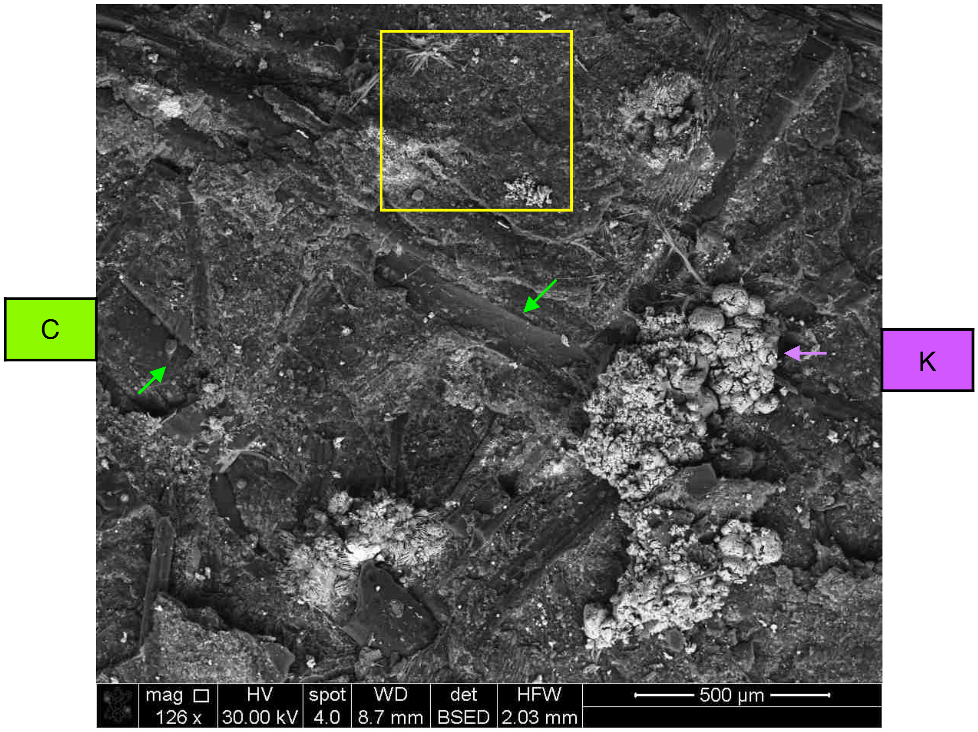
Summary: A compact, parallel bedded seam of coal is present at core depth 128’. Based on the x-ray diffraction pattern collected for this material, the organic matter is estimated to exhibit a maximum rank of medium to low volatile bituminous coal. The mineralogical analysis indicates that thermally altered organic matter (coal) comprises ~84% of the sample mass. The inorganic mineral fraction includes a mixture of clay matrix minerals (~8%), quartz (~4%), and pyrite (~4%). The clay mineral fraction is comprised of kaolinite coupled with minor amounts of illite & mixed-layered illite/smectite. The pyrite & clay minerals are typically present as authigenic minerals that have crystallized within fractures and dissolution voids contained within the coal.

23009-03 Photo Index:

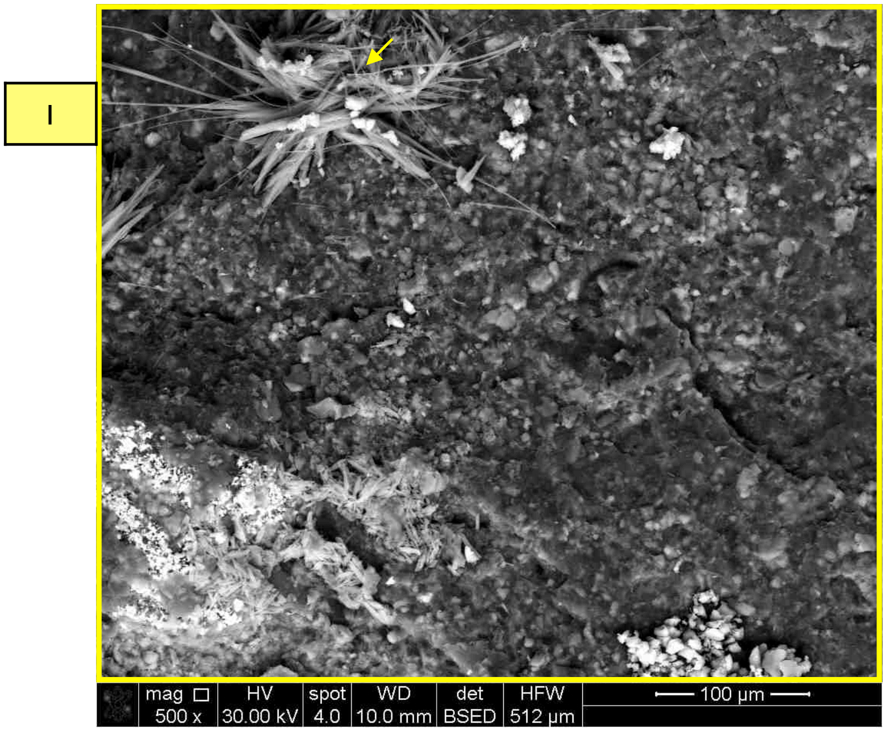
Sample ID	Magnification
23009-03A	126X
23009-03B	500X
23009-03C	150X
23009-03D	5000X

Coal maceral	C
Pyrite	P
Illite	I
Kaolinite	K

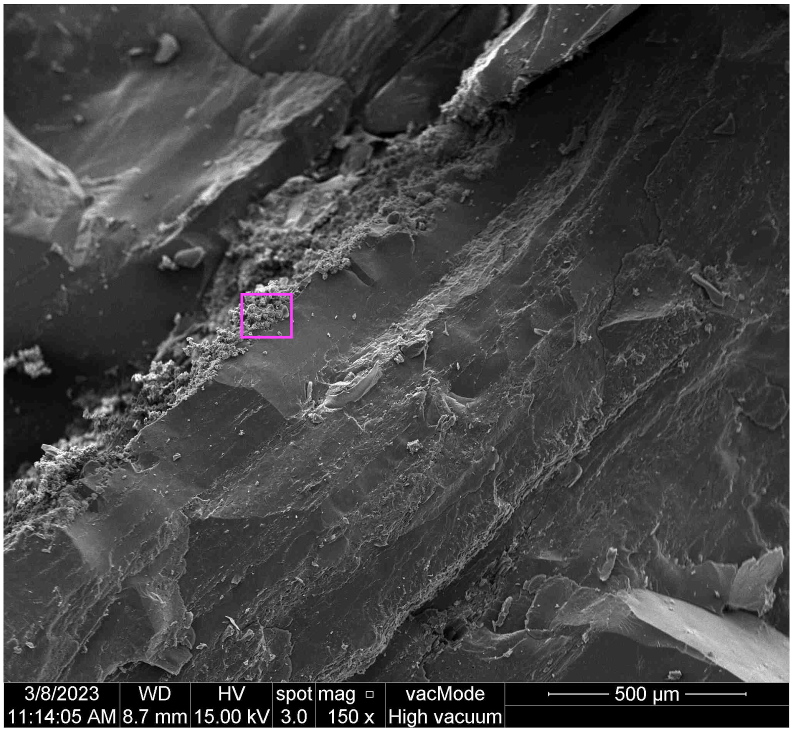
23009-03A 126X



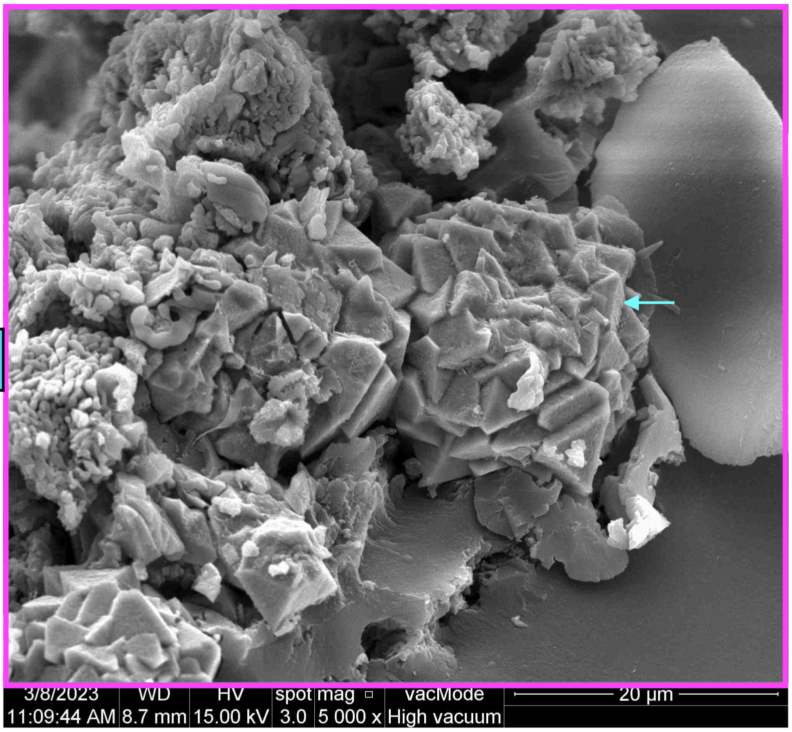
23009-03B 500X



23009-03C 150X



23009-03D 5000X



P

Geosyntec Consultants
Mountaineer | New Haven, WV

MW-1805-130.5
MI#23009-04 - SEM

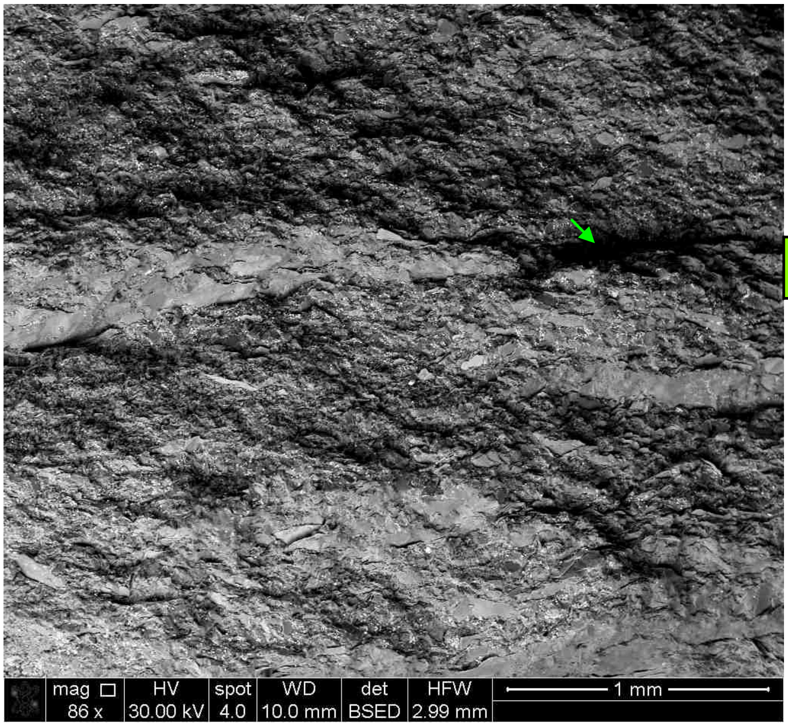
Summary: This core interval is comprised of medium light gray (N6), compact, parallel-bedded, non-porous, micaceous, silty shale / clay-rich siltstone. The silt-rich grain fraction is sub-arkosic, moderately sorted, and sub-rounded to sub-angular. The relative proportion of silt & clay matrix / mica is variable between individual bedding layers, with some interbeds characterized as clay-rich (grain-supported) siltstones. Minute mica laths are abundant throughout the sedimentary fabric. Based on the XRD mineralogical analysis, clay minerals account for ~ 58% of the mineral mass. The clay mineral suite includes illite / mica (~33%), chlorite (~14%), kaolinite (~10%), and mixed-layered illite/smectite (~1%). Silt grain materials are dominated by quartz (~32%) and feldspar [including plagioclase (~7%) and k-feldspar (~1%)]. Minor amounts of siderite cement (~1.5%) and pyrite (~0.5%) are also present, distributed as minute (~1-5 um diameter) crystals dispersed throughout the clay-rich groundmass. Total void space is estimated to account for <2% of the bulk volume. The sedimentary fabric includes small amounts of residual macroporosity & microporosity. The sheltered interparticle voids are locally preserved as minute, lens-shaped voids that appear isolated due to the pervasive distributions of detrital clay matrix.

23009-04 Photo Index:

Sample ID	Magnification
23009-04A	86X
23009-04B	500X
23009-04C	2000X
23009-04D	1000X
23009-04E	126X

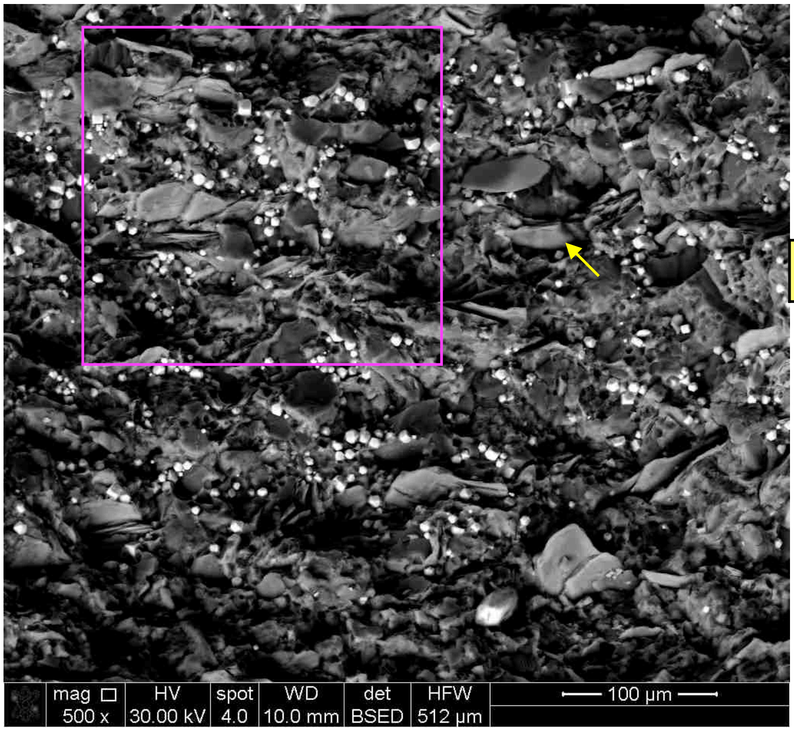
Intergranular micro + macro-porosity	BP
Siderite	S
Detrital clay matrix	DM
Quartz	Q
Mica	M

23009-04A 86X



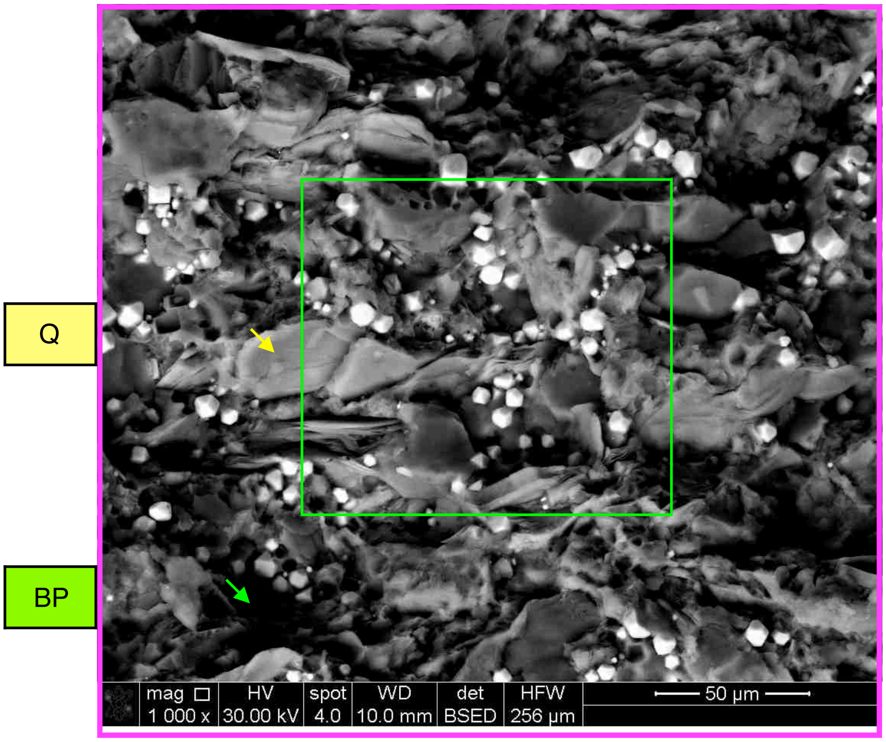
BP

23009-04B 500X

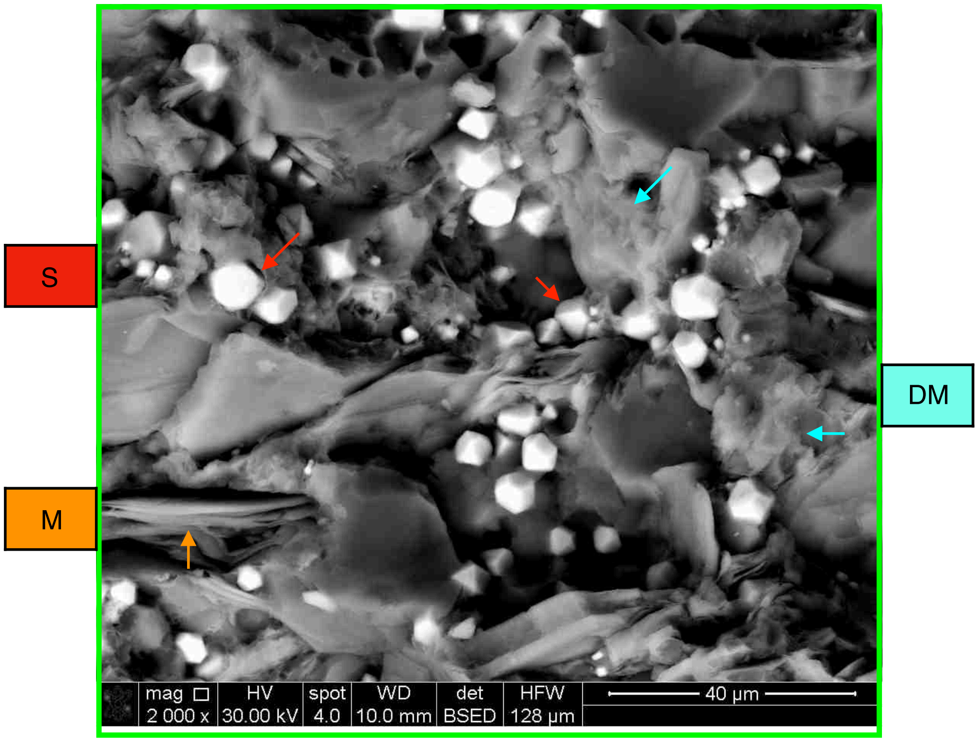


Q

23009-04C 2000X



23009-04D 1000X



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MW-1922D-104.5
MI#23009-05 - SEM

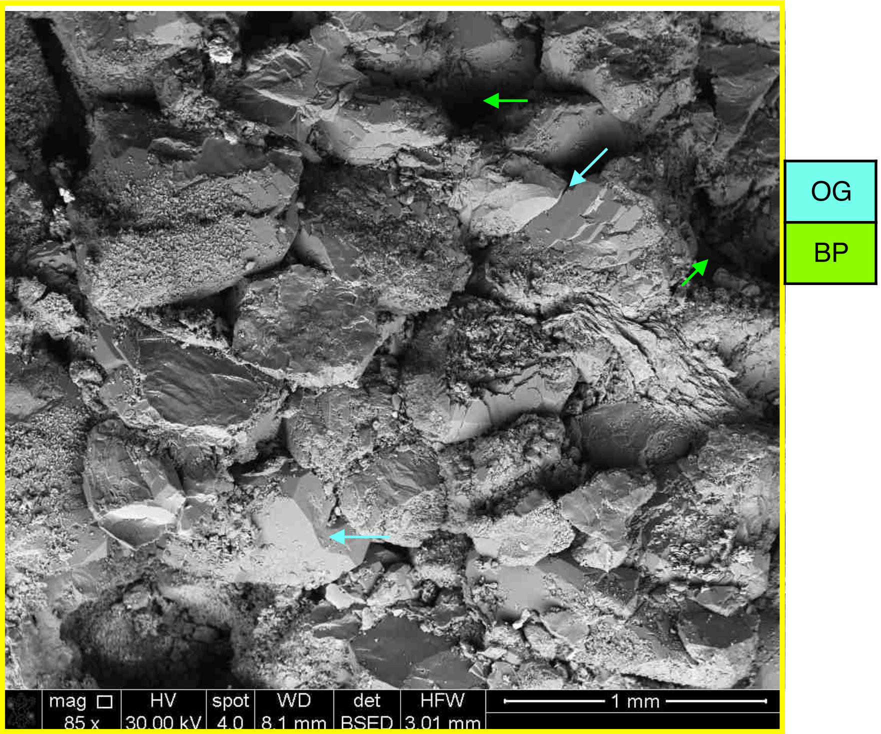
Summary: This core sample is characterized as a cross-bedded, medium-grained, well-sorted, quartz-cemented, moderately porous, sub-arkosic sandstone. The framework is compact and exhibits common point-to-point & elongated intergranular contacts. Rims of syntaxial quartz overgrowth cement are locally inter grown along contacts shared by adjoining quartz grains. Scattered feldspar grains exhibit indications of intra-particle corrosion and localized replacement with authigenic kaolinite. The mineralogy of the sandstone is comprised of quartz (~86%), plagioclase feldspar (~4%), k-feldspar (~1%), kaolinite (~6%), illite / mica (~2.5%), and traces of calcite (0.5%), and mixed-layered illite/smectite (<0.5%) [seeTable I]. Macroporosity is visually estimated to comprise ~ 8-10% of the sandstone bulk volume.

23009-05 Photo Index:

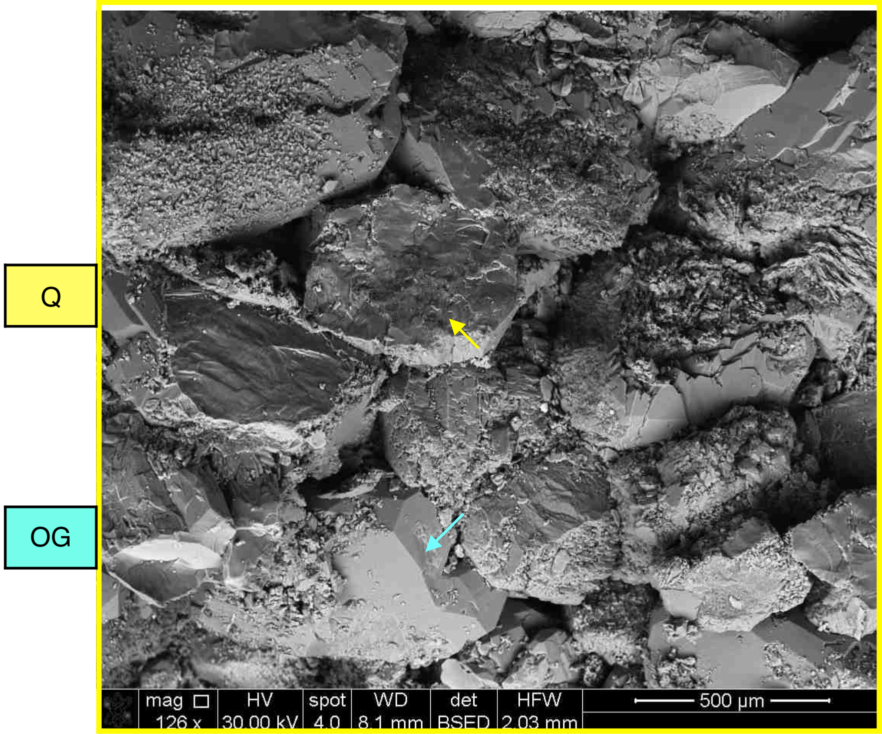
Sample ID	Magnification
23009-05A	126X
23009-05B	85X
23009-05C	500X
23009-05D	500X
23009-05E	500X
23009-05F	1000X

Intergranular macro-porosity	BP
Detrital quartz	Q
Quartz overgrowth cement	OG
Authigenic Kaolinite	K
Leached Feldspar	F
Micaceous shale RF	M

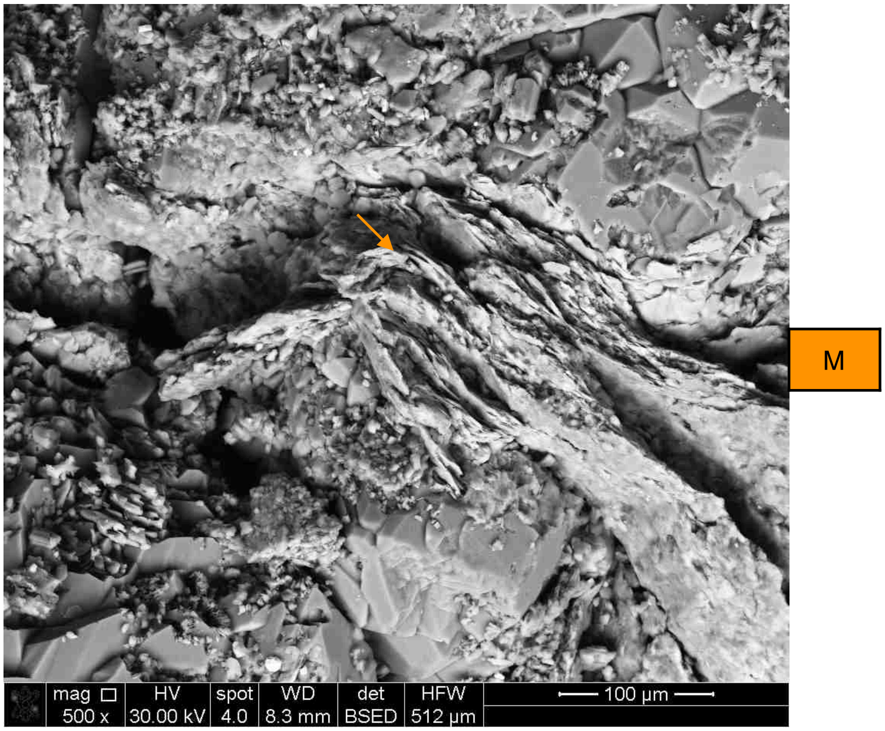
23009-05A 126X



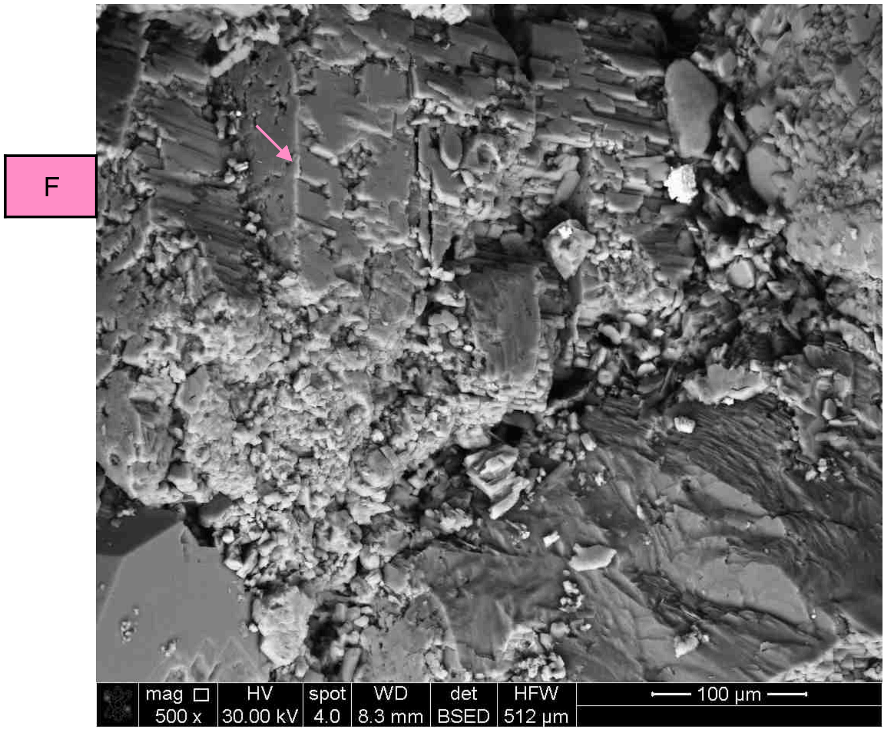
23009-05B 85X



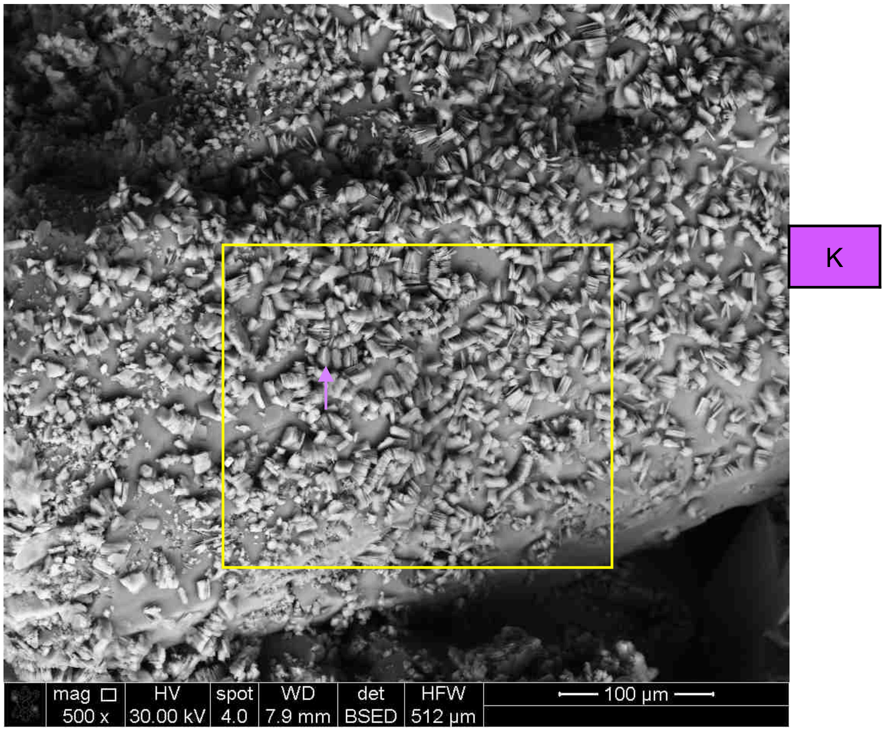
23009-05C 500X



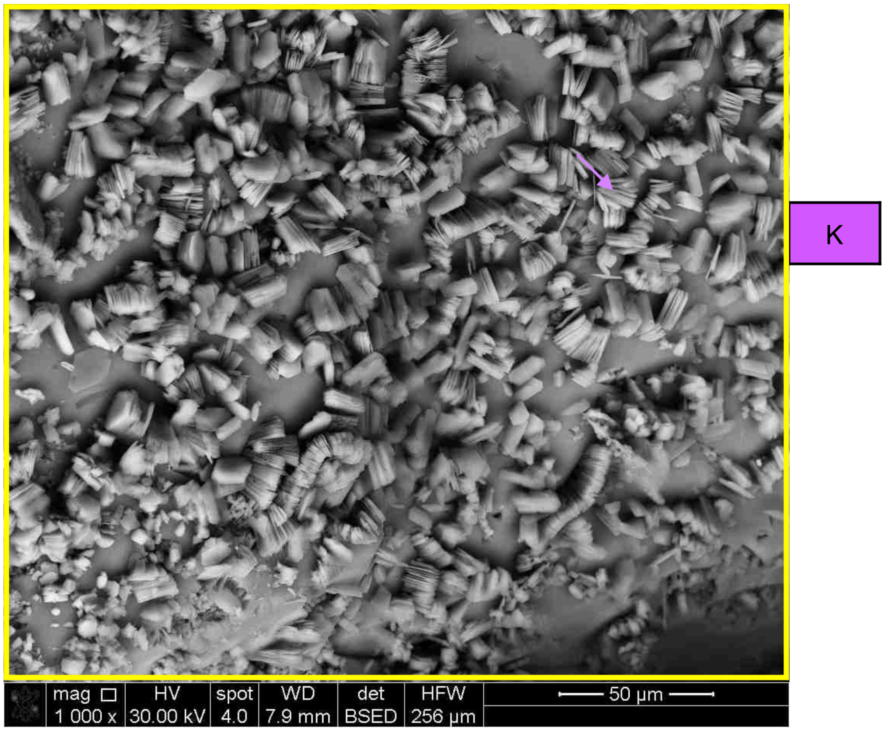
23009-05D 500X



23009-05E 500X



23009-05F 1000X



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Mountaineer | New Haven, WV

MW-1922D-111
MI#23009-06 - SEM

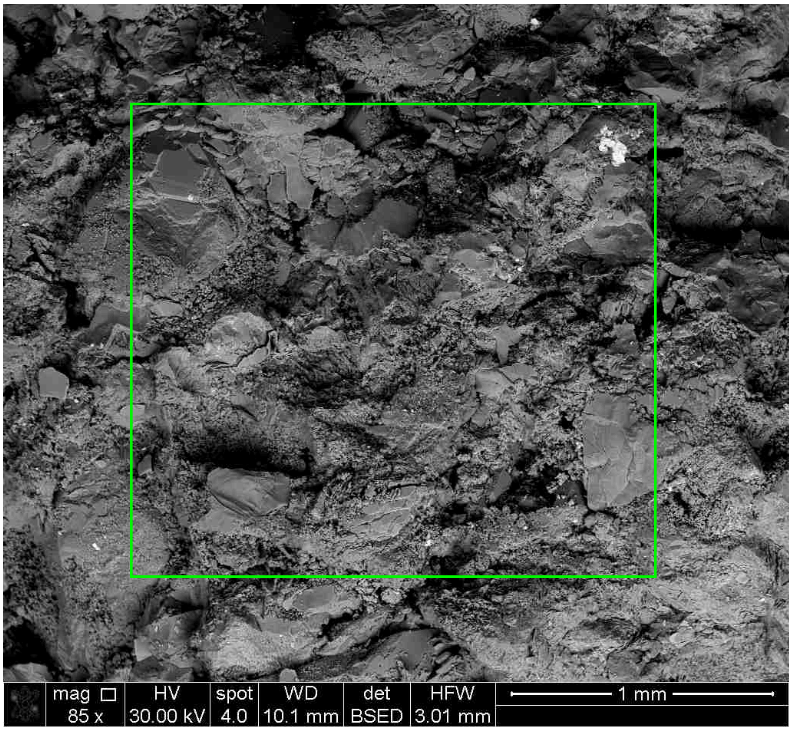
Summary: This core sample is similar to the core interval @ 104.5' (MI#23009-05) & is characterized as a cross-bedded, medium-grained, moderately-sorted, quartz-cemented, moderately porous, sub-arkosic sandstone. The framework is compact and exhibits common point-to-point & elongated intergranular contacts. Rims of syntaxial quartz overgrowth cement are locally inter grown along contacts shared by adjoining quartz grains. Scattered feldspar grains exhibit indications of intra-particle corrosion and localized replacement with authigenic kaolinite. The mineralogy of the sandstone is comprised of quartz (~85%), plagioclase feldspar (~3%), k-feldspar (~2%), kaolinite (~6%), illite / mica (~3%), and traces of goethite (0.5%), hematite (~0.5%) and chlorite (<0.5%) [seeTable I]. Macroporosity is visually estimated to comprise ~ 5-7% of the sandstone bulk volume.

23009-06 Photo Index:

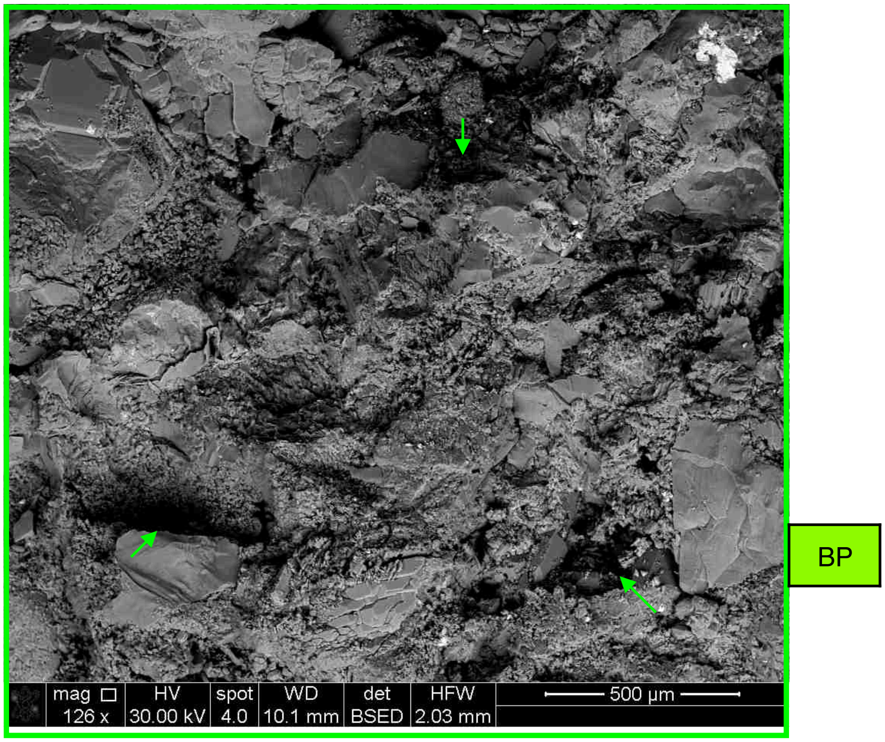
Sample ID	Magnification
23009-06A	85X
23009-06B	126X
23009-06C	1000X
23009-06D	8000X
23009-06E	1300X
23009-06F	5000X

Intergranular macro-porosity	BP
Detrital quartz	Q
Quartz overgrowth cement	OG
Authigenic Kaolinite	K
Leached Feldspar	F
Micaceous shale RF	M

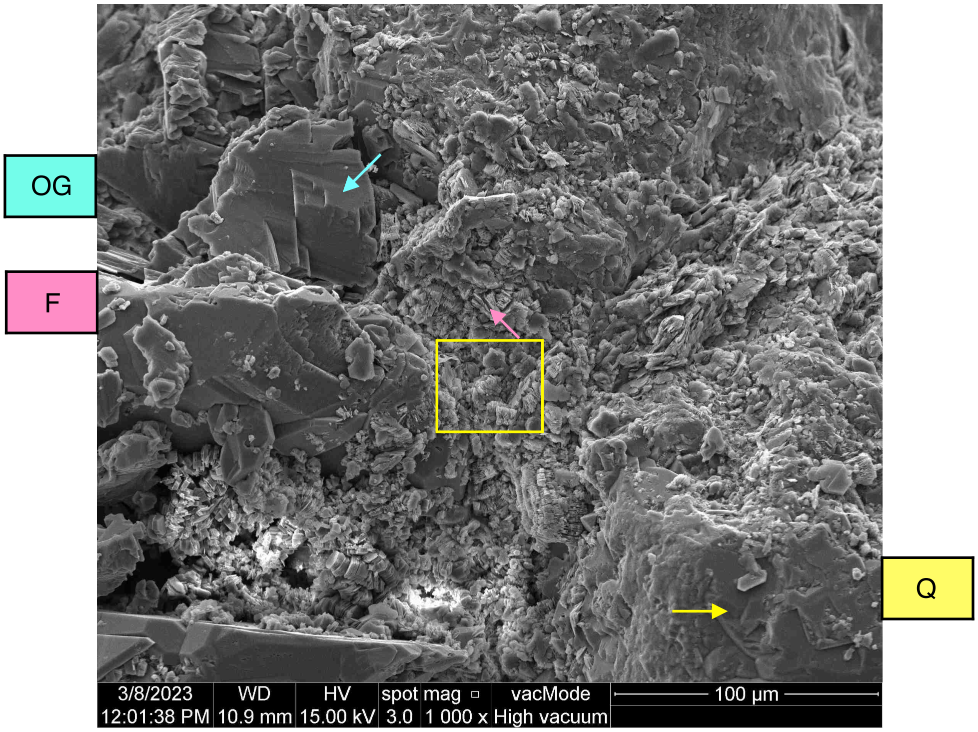
23009-06A 85X



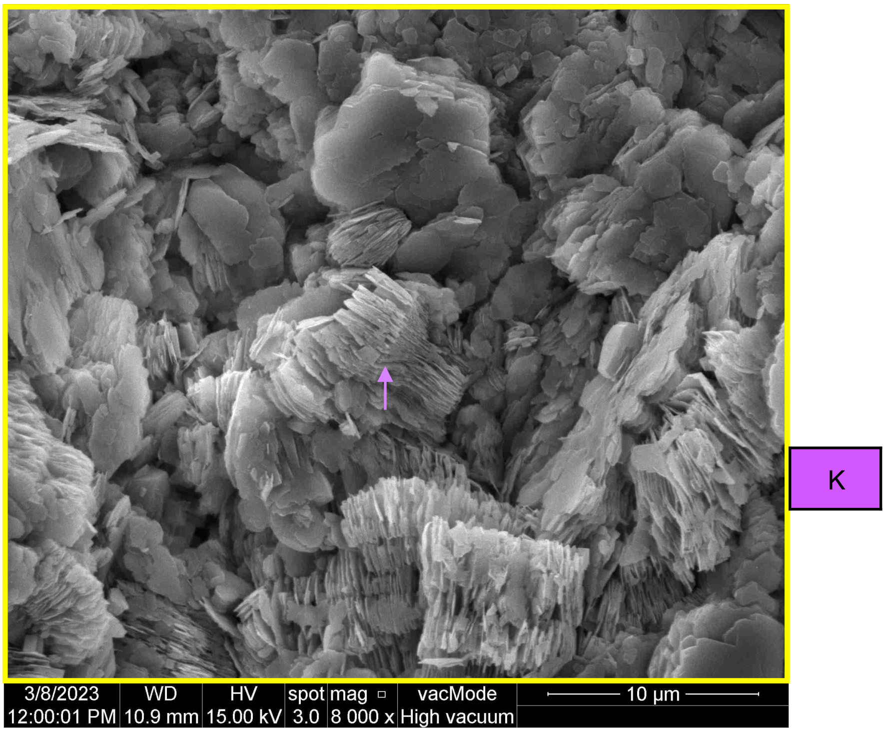
23009-06B 126X



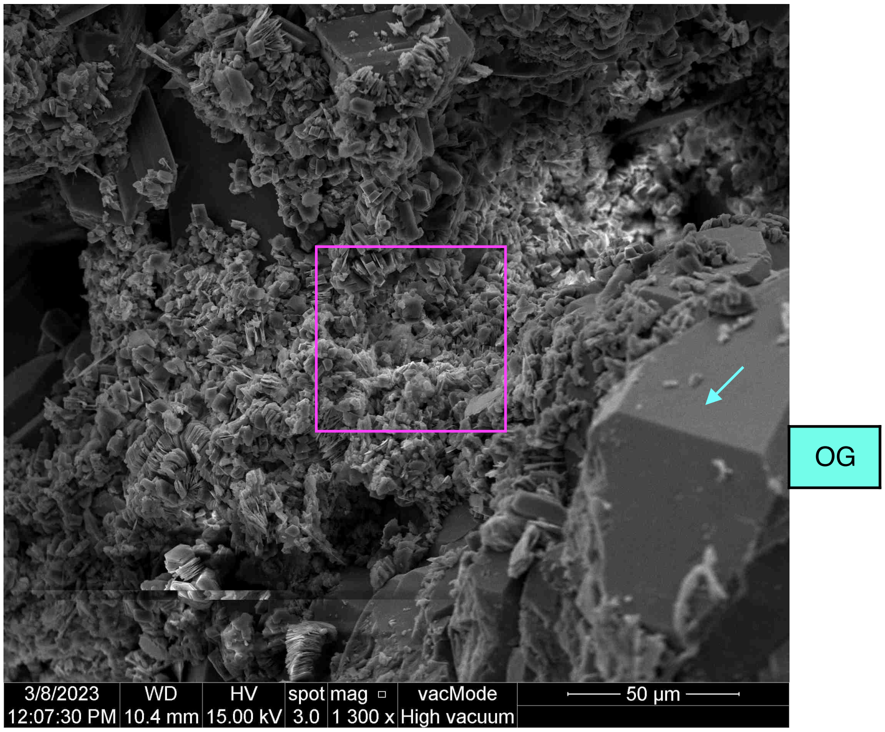
23009-06C 1000X



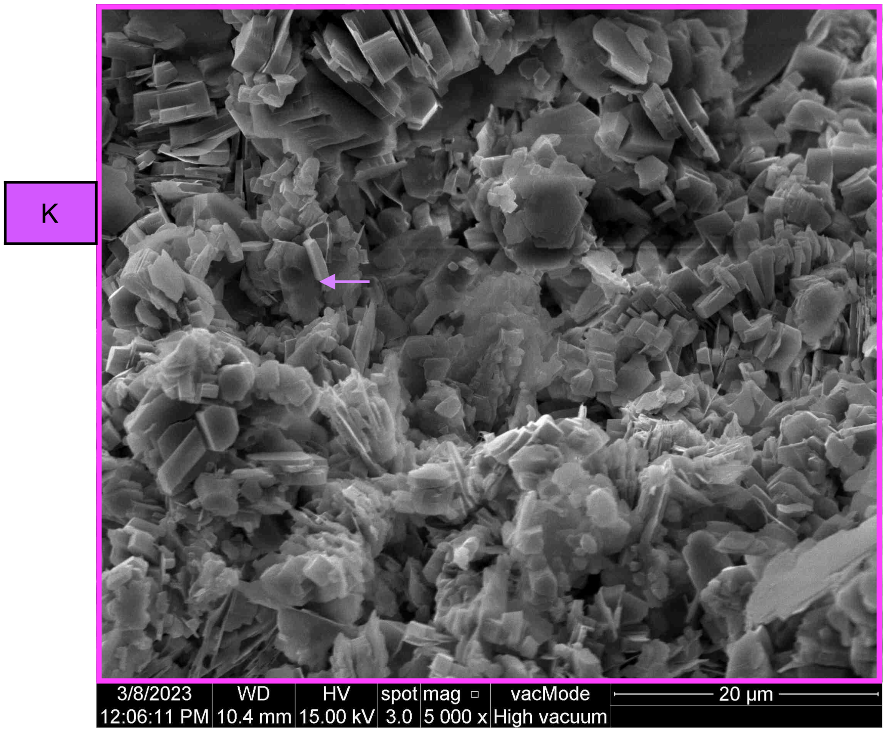
23009-06D 8000X



23009-06E 1300X



23009-06F 5000X



23009-01 Report

Name	Date	Time	HV [kV]	Mag	WD [mm]
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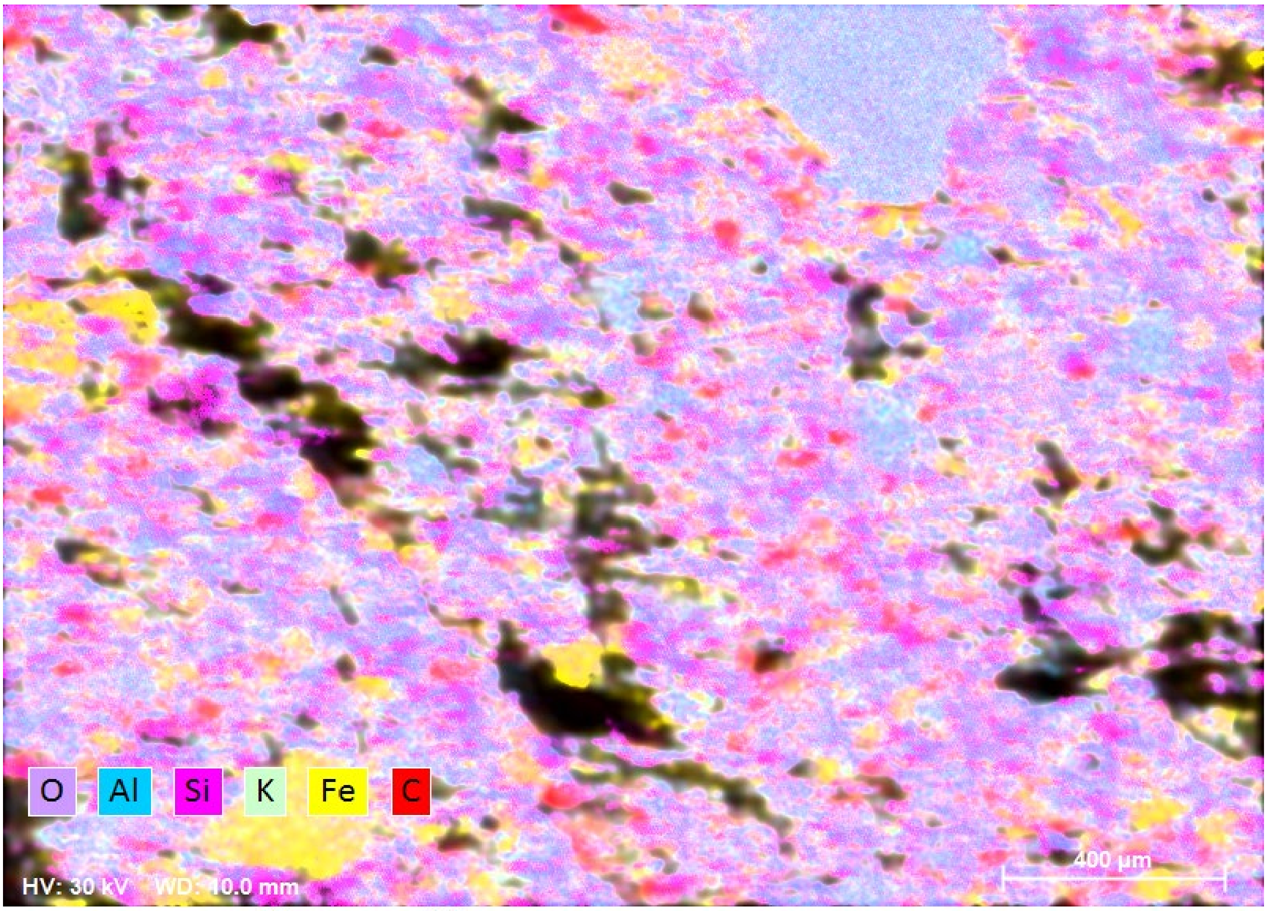
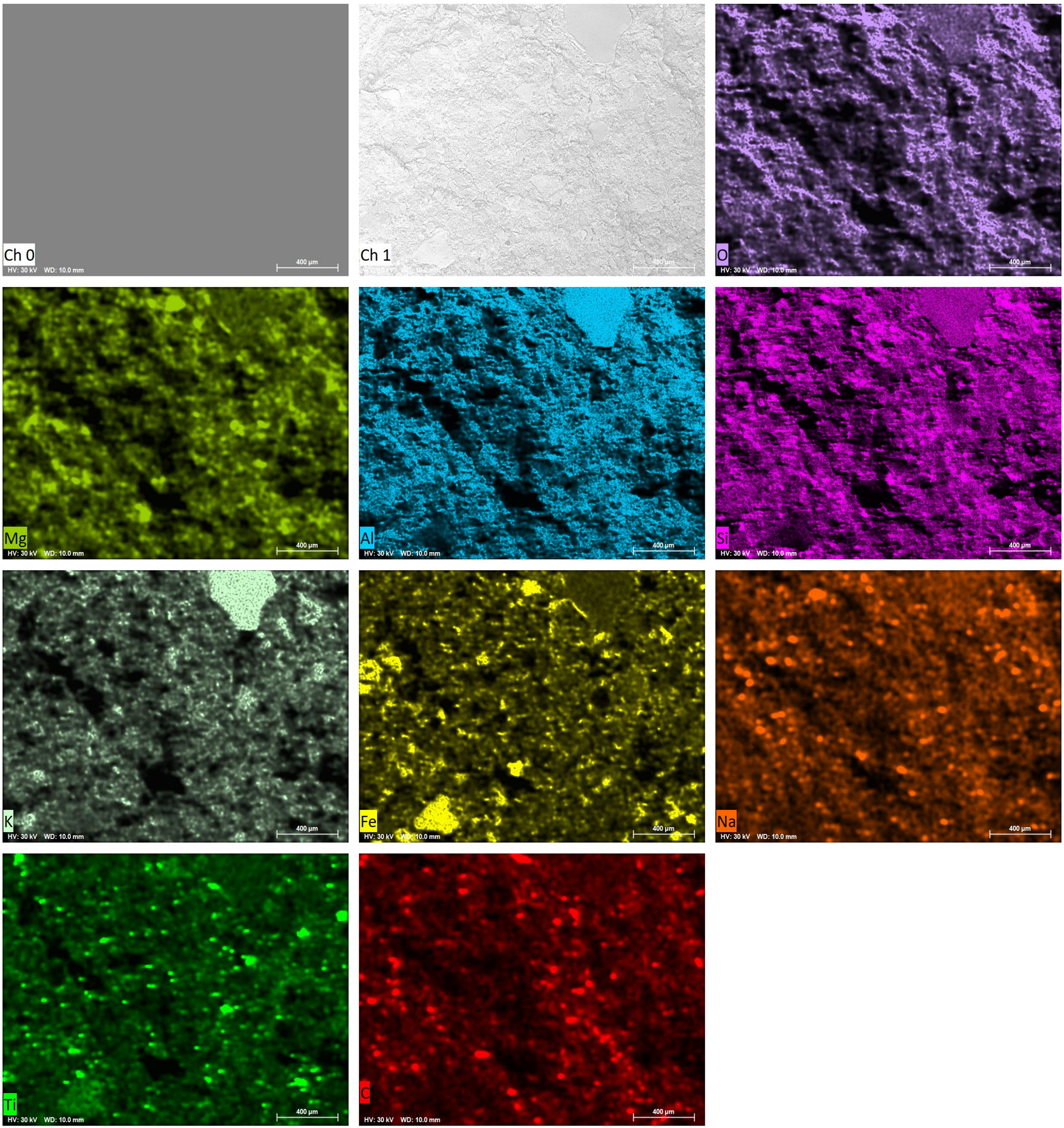
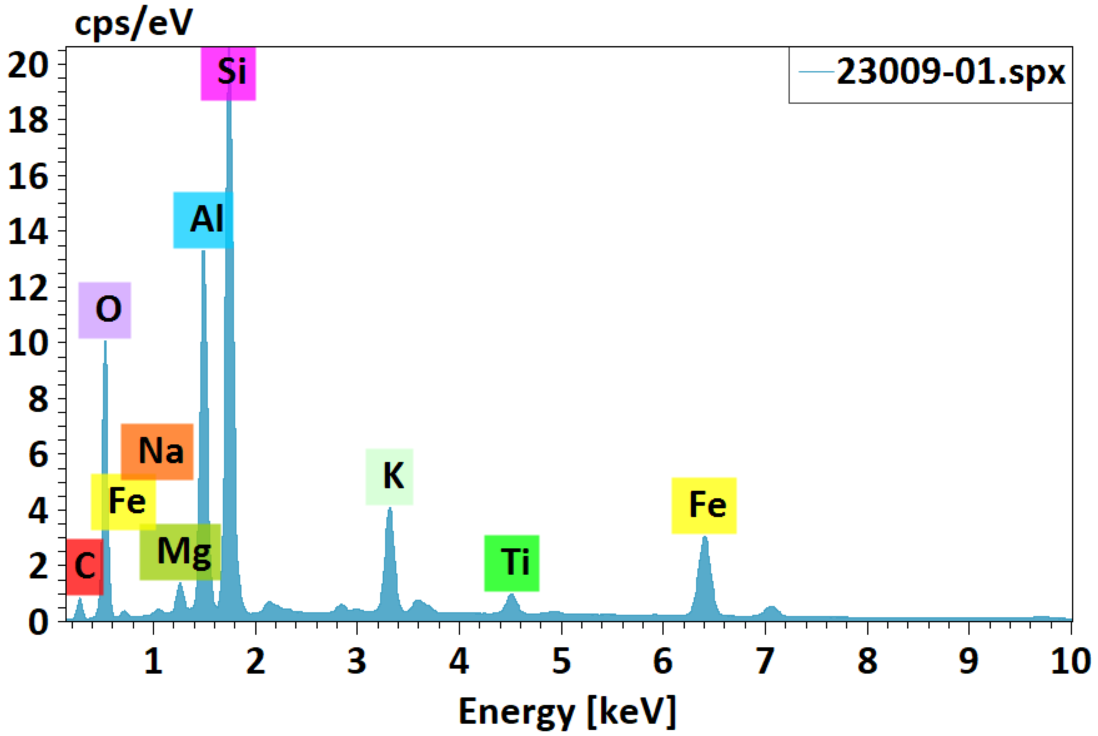


Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:27:43 PM	30.0 keV	126x	10.0 mm



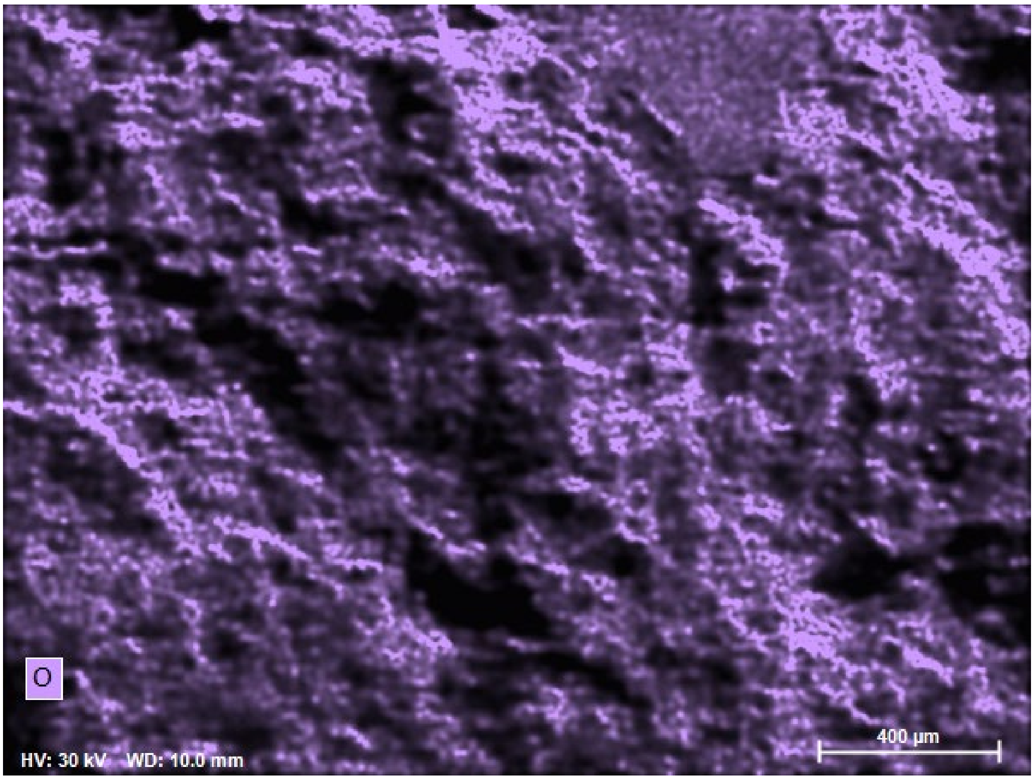
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:27:43 PM	30.0 keV	126x	10.0 mm

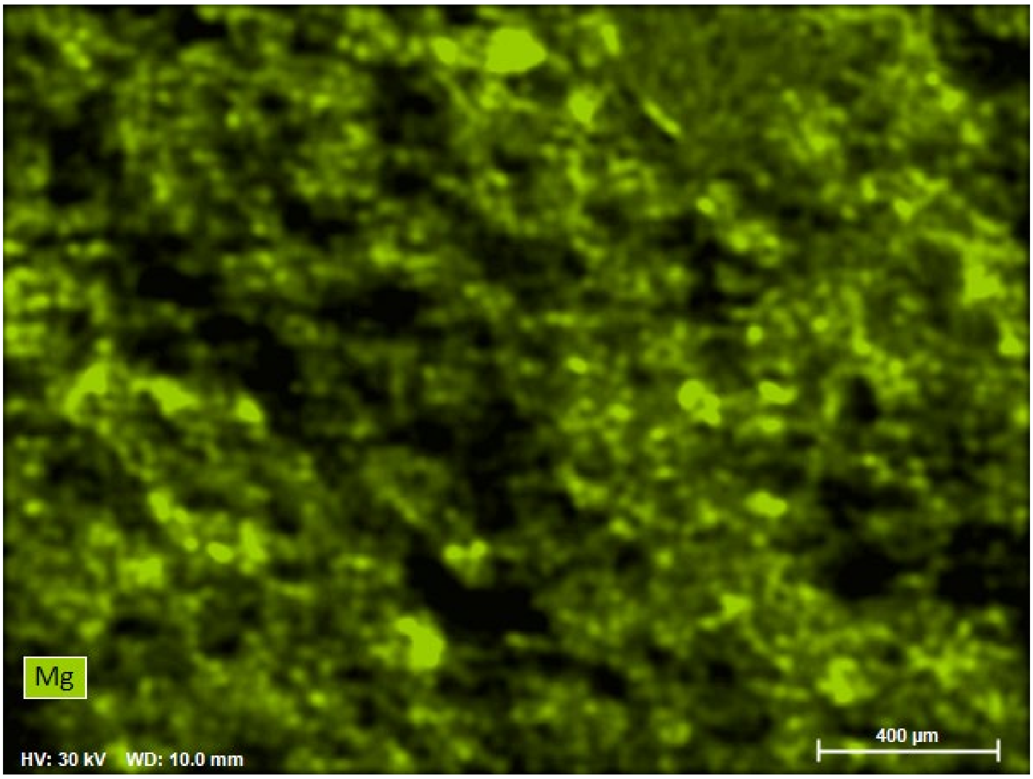


23009-01.spx

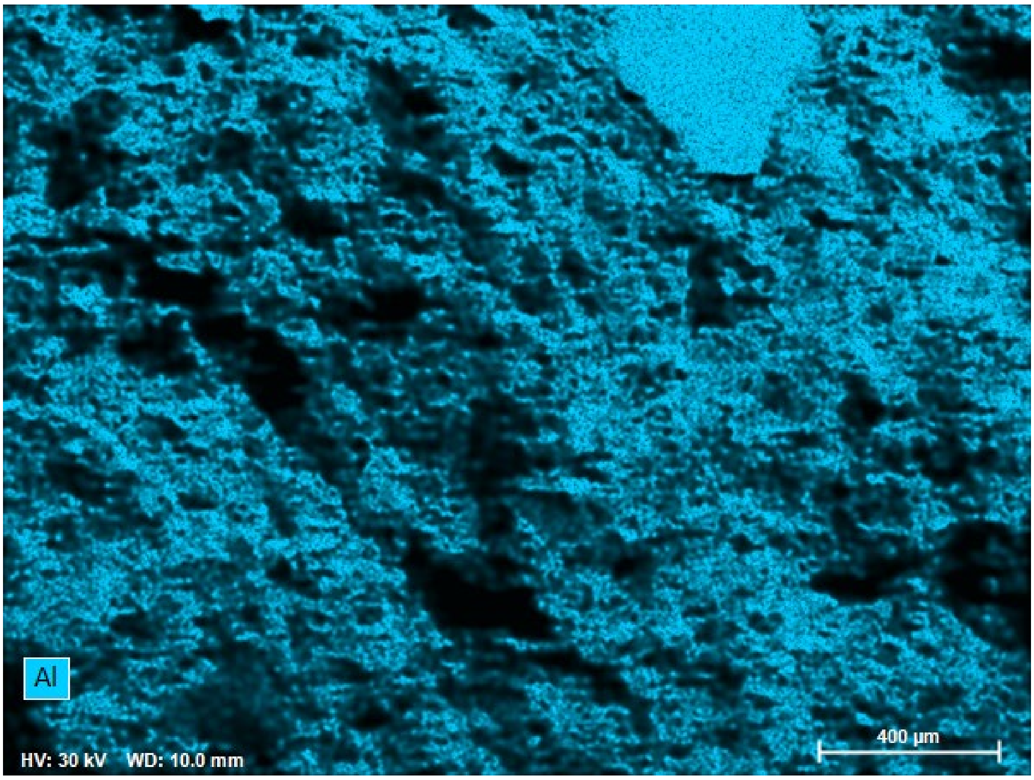
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	10.68	10.23	16.40
Oxygen	8	48.79	46.75	56.28
Sodium	11	0.53	0.51	0.42
Magnesium	12	1.33	1.28	1.01
Aluminium	13	12.15	11.65	8.31
Silicon	14	20.71	19.84	13.61
Potassium	19	3.86	3.70	1.82
Titanium	22	0.96	0.92	0.37
Iron	26	5.36	5.14	1.77
		104.37	**100.00**	**100.00**


Ch 1
HV: 30 kV WD: 10.0 mm
400 µm

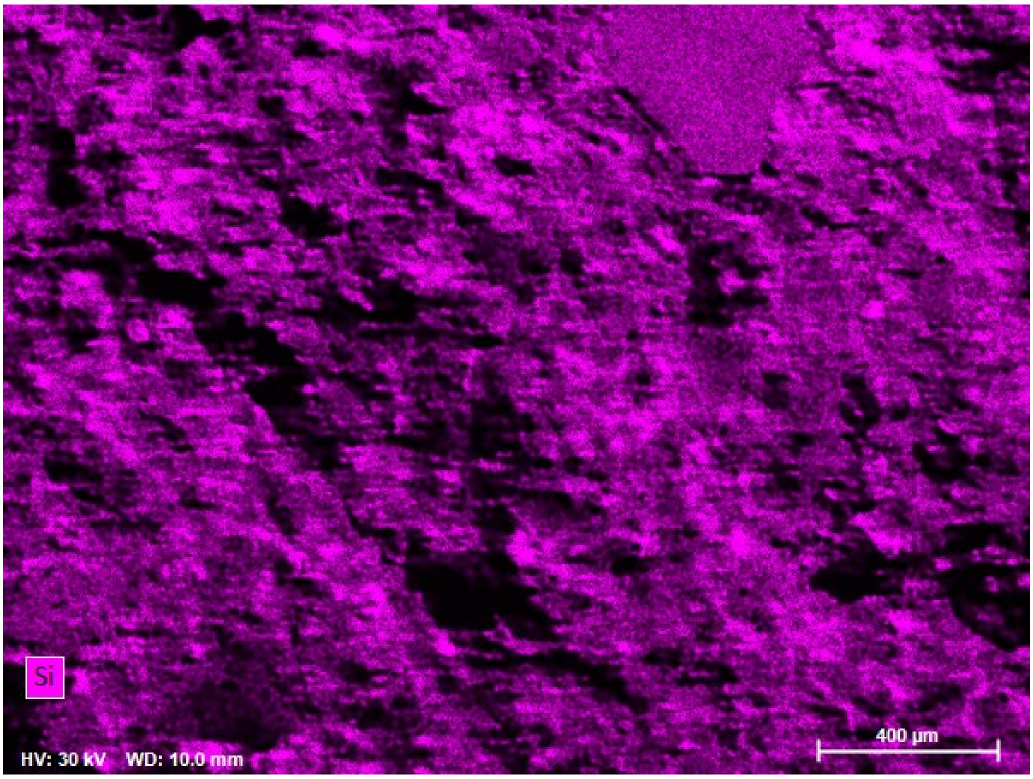

O
HV: 30 kV WD: 10.0 mm
400 µm

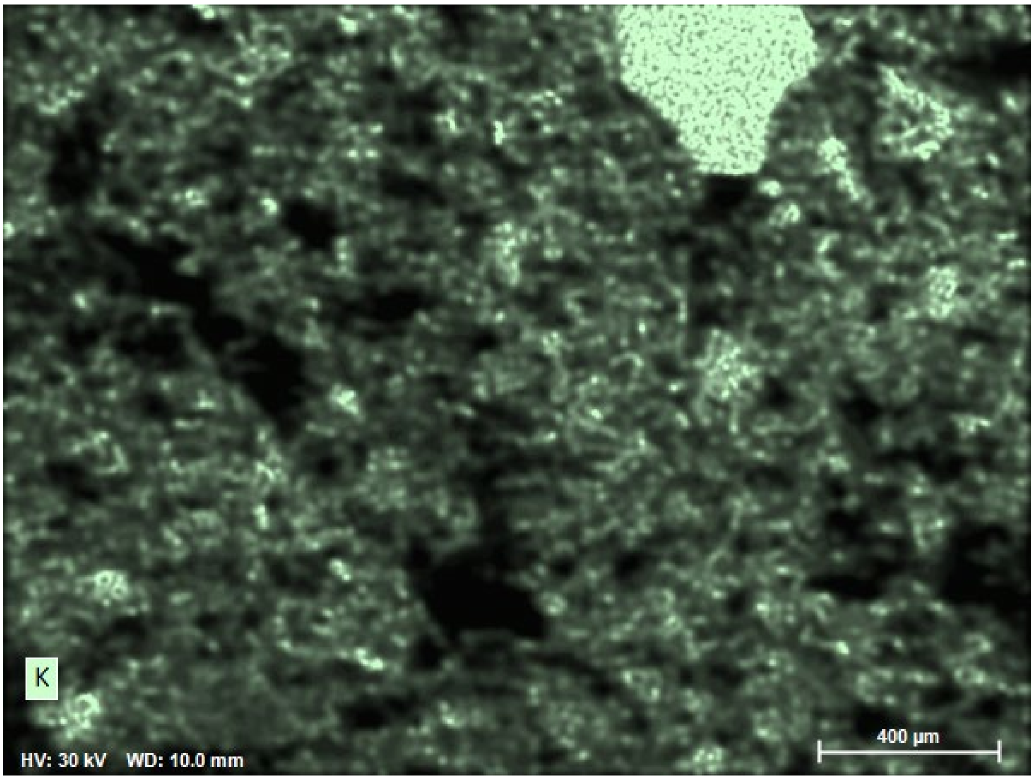


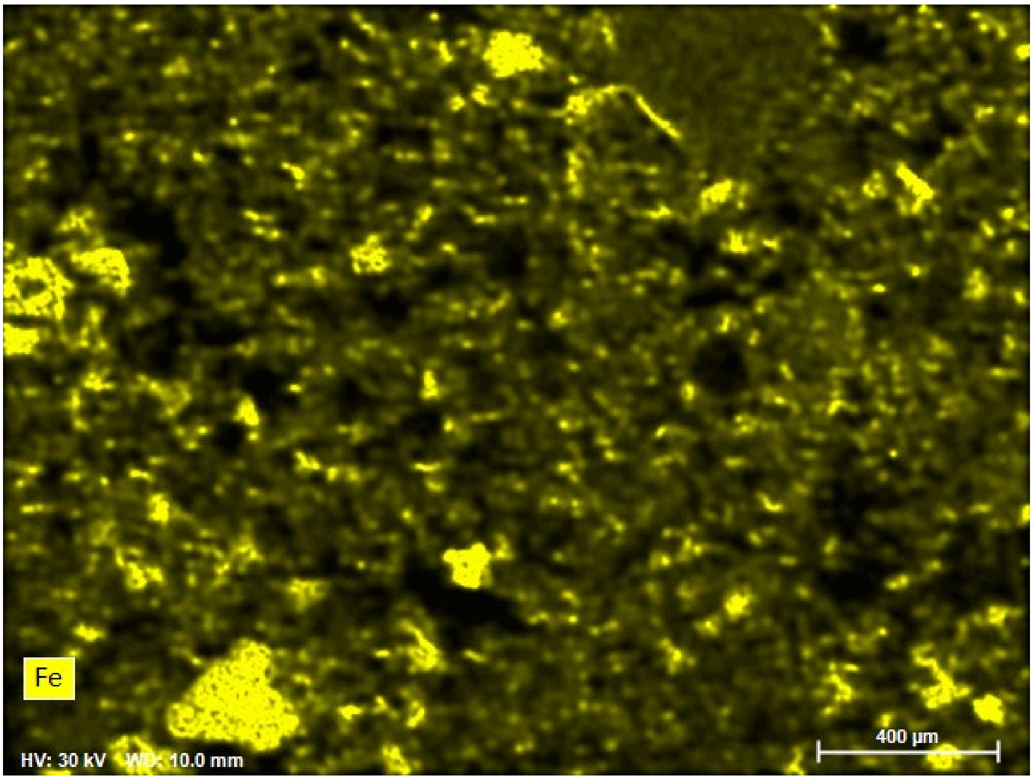
Mg
HV: 30 kV WD: 10.0 mm
400 µm

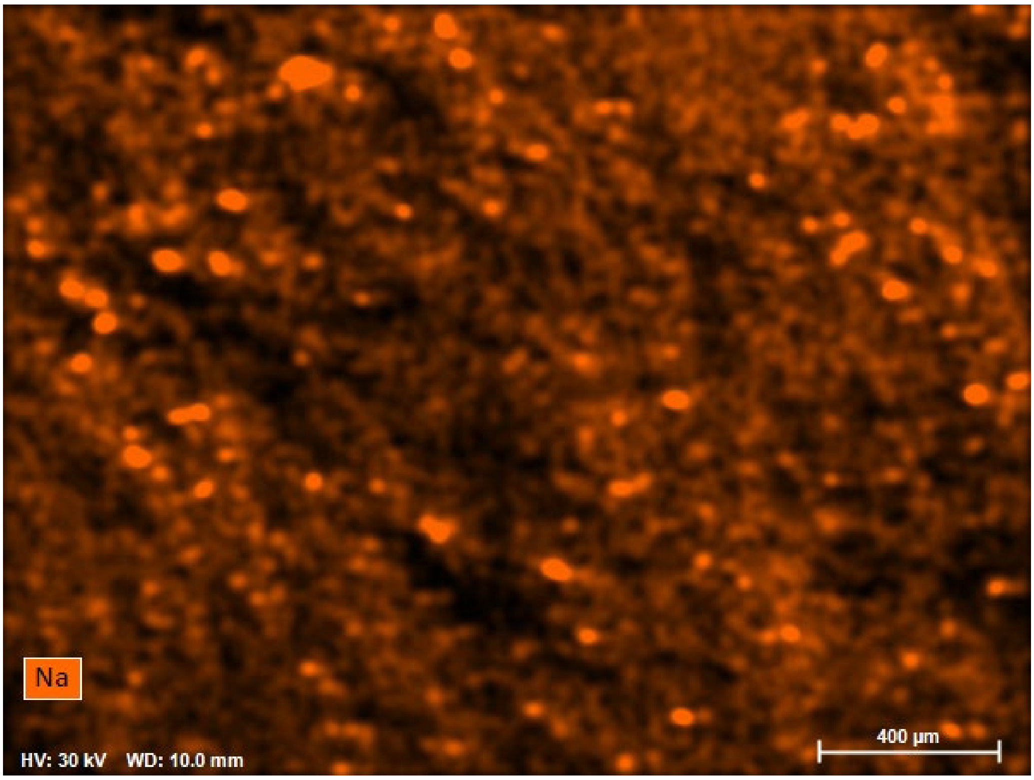


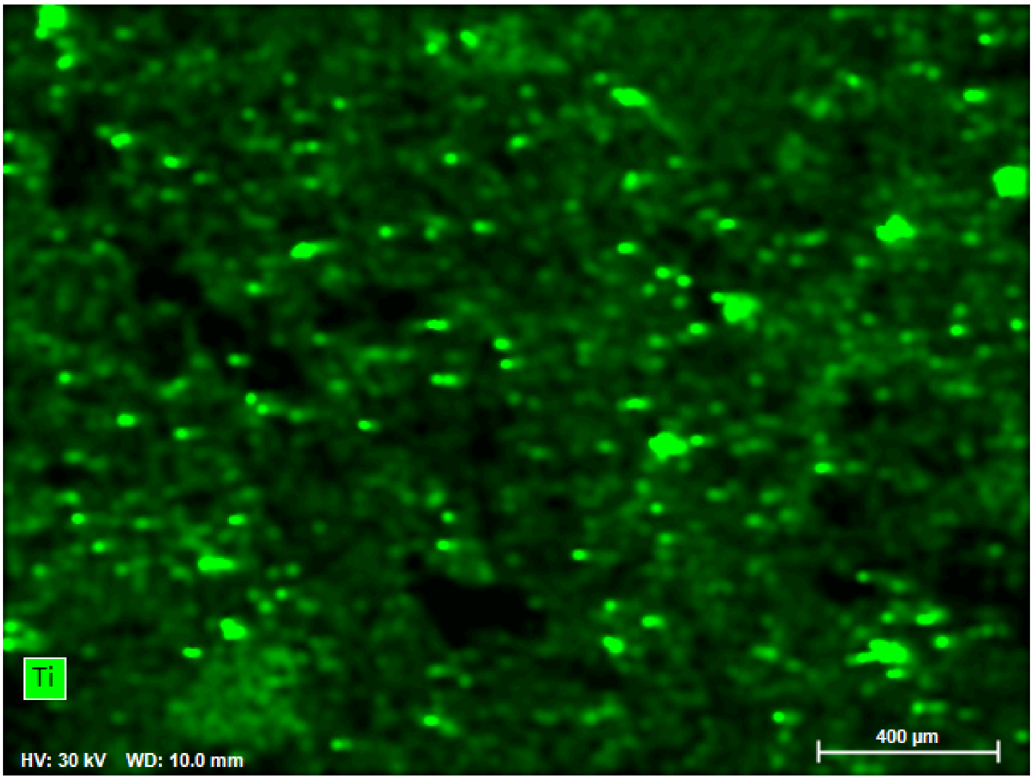
Al
HV: 30 kV WD: 10.0 mm
400 µm

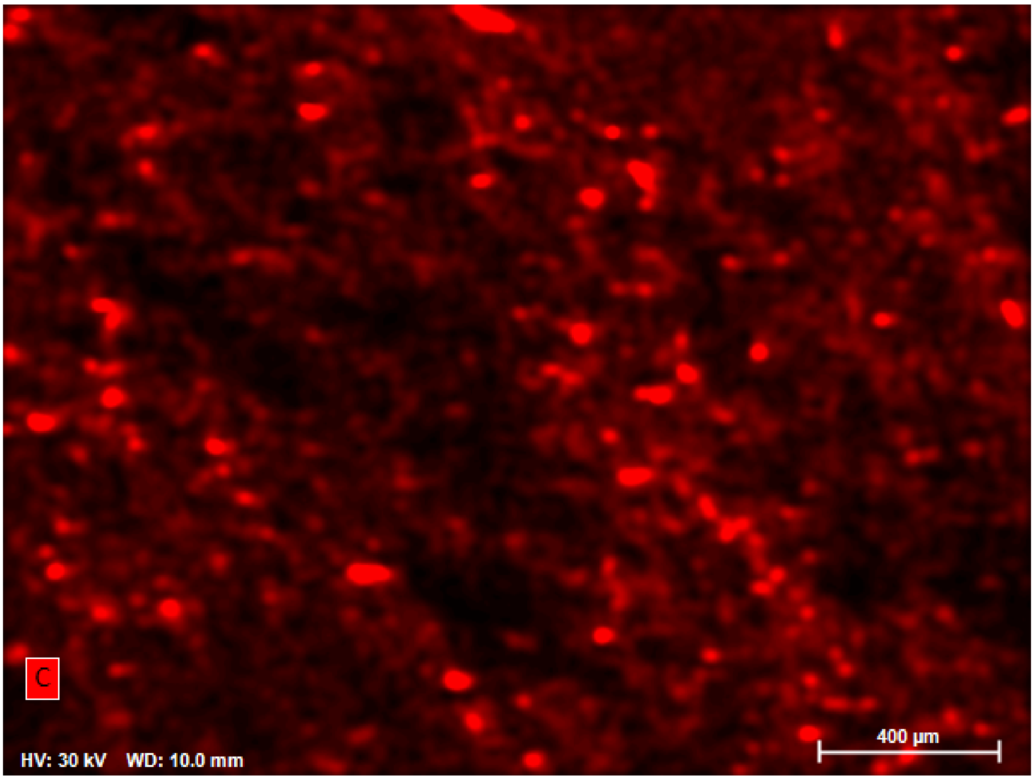

Si
HV: 30 kV WD: 10.0 mm
400 µm

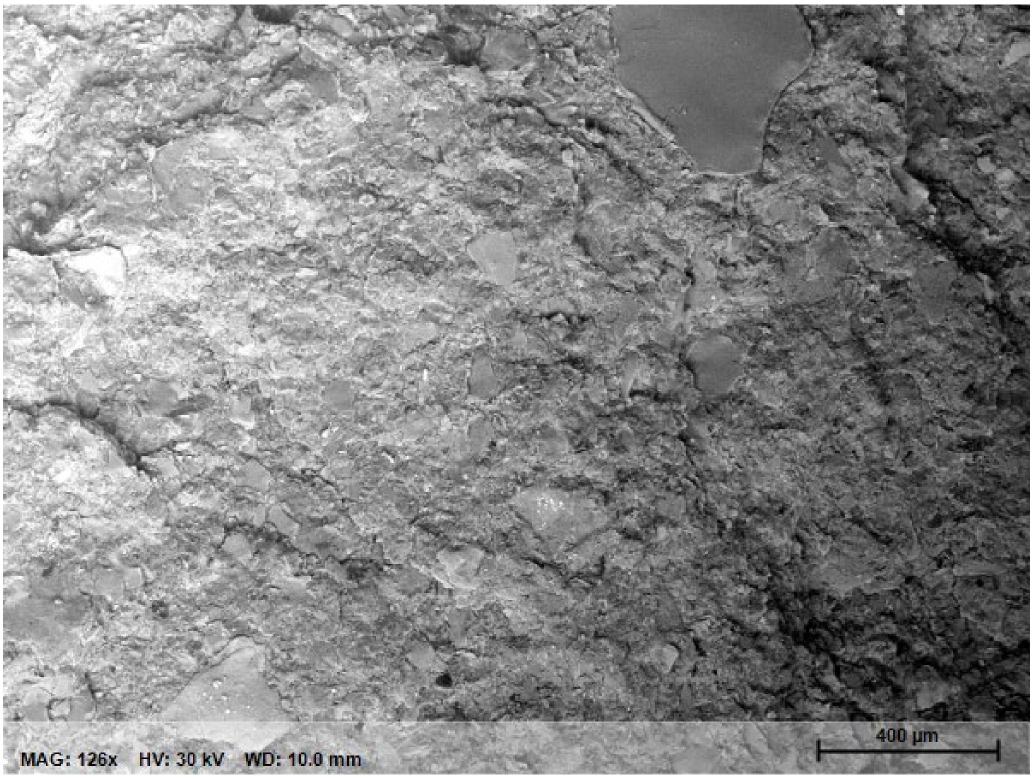

K
HV: 30 kV WD: 10.0 mm
400 µm


Fe
HV: 30 kV WD: 10.0 mm
400 µm

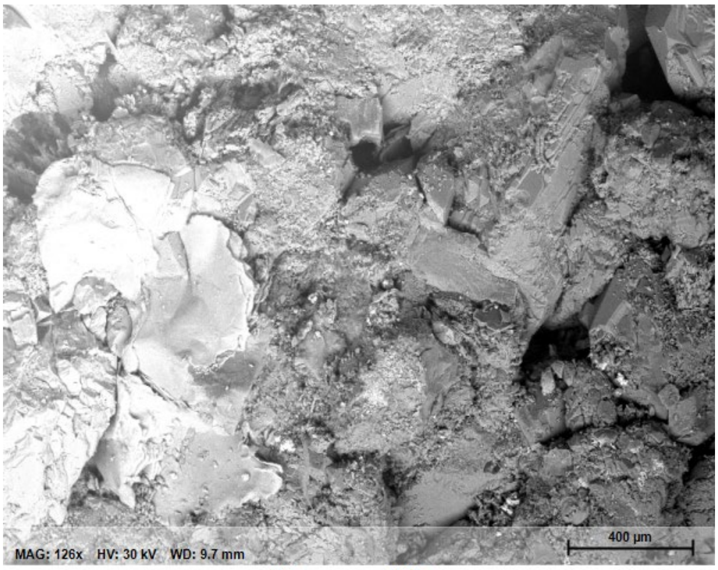

Na
HV: 30 kV WD: 10.0 mm
400 µm


Ti
HV: 30 kV WD: 10.0 mm
400 µm

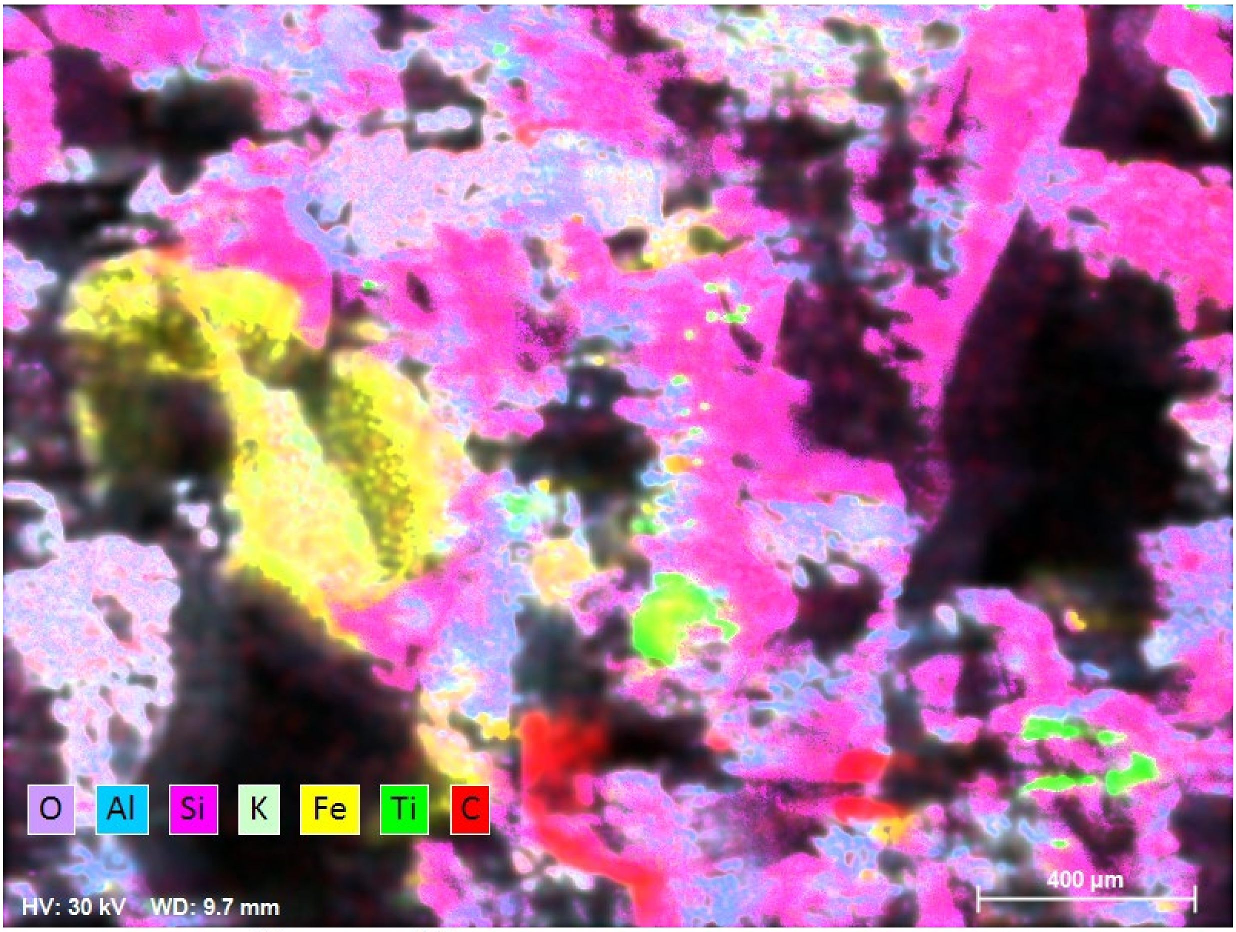

C
HV: 30 kV WD: 10.0 mm
400 µm


MAG: 126x HV: 30 kV WD: 10.0 mm
400 µm

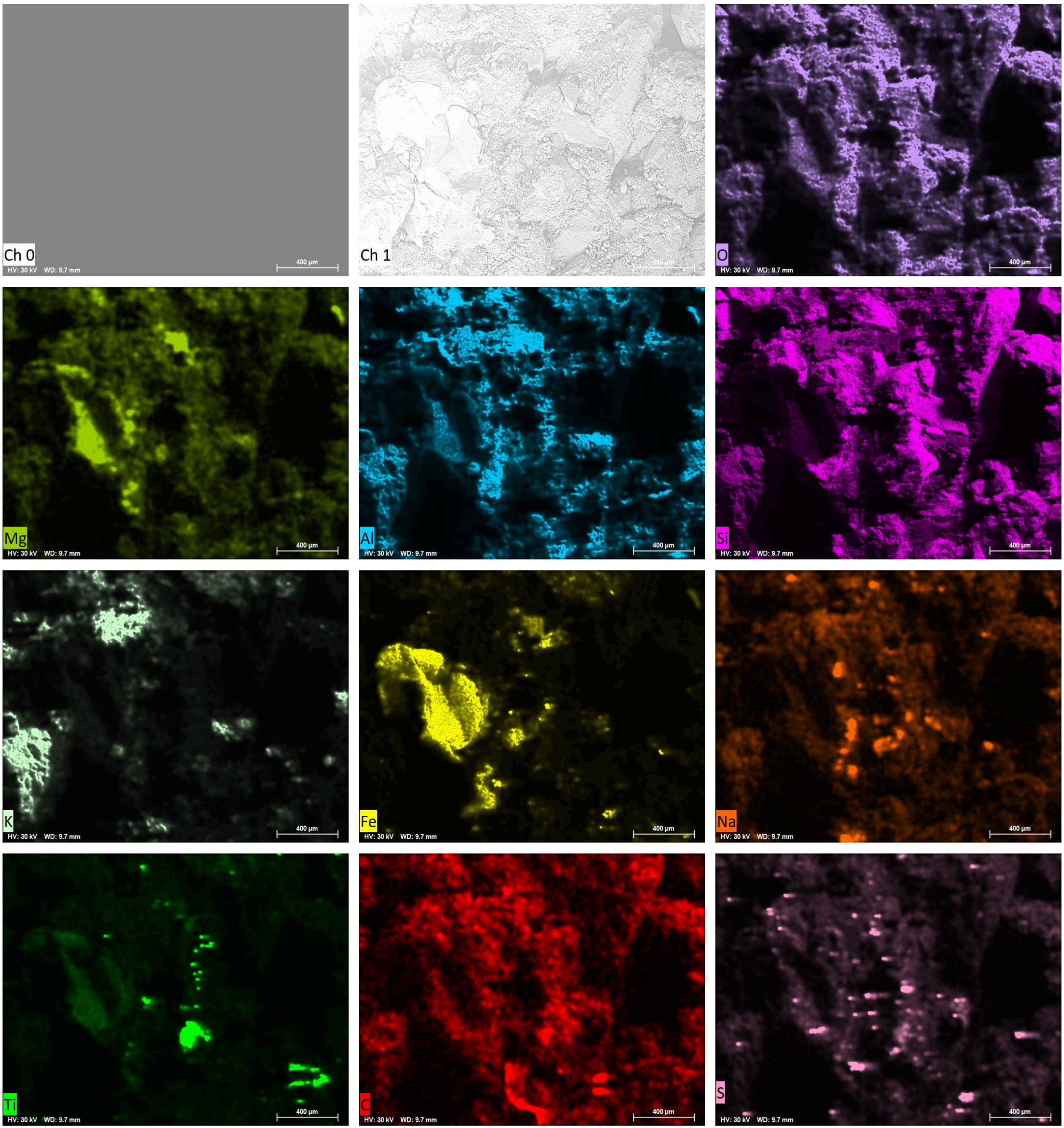
23009-02 Report



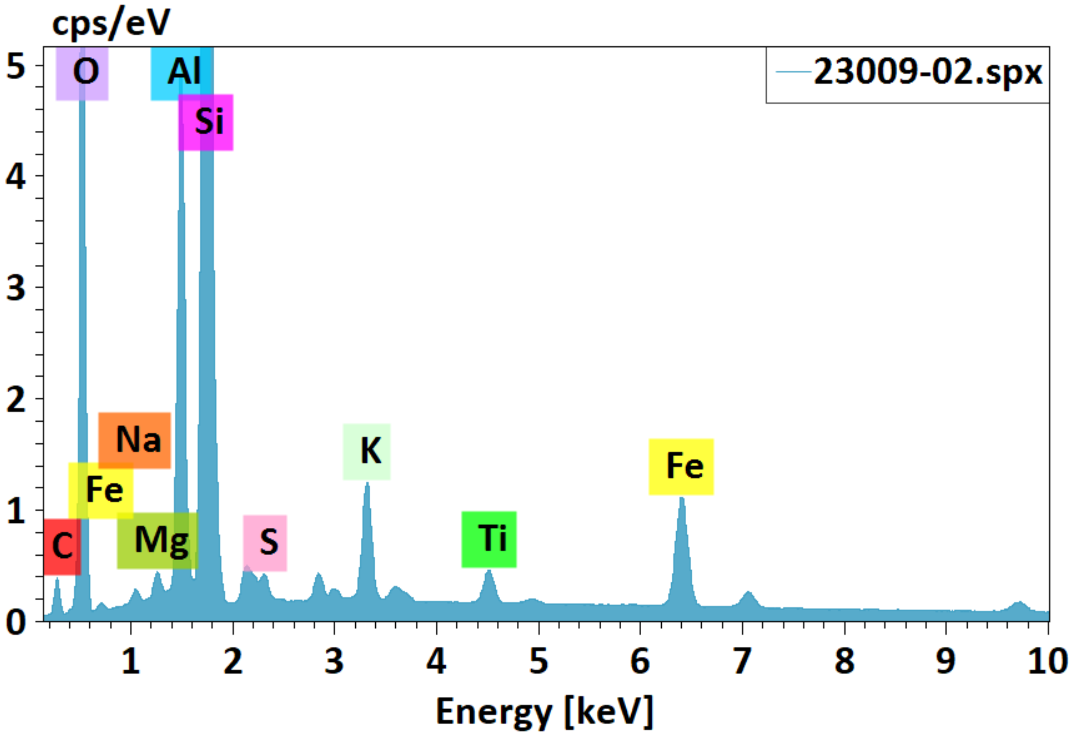
Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/7/2023	4:17:17 PM	30.0 keV	126x	9.7 mm



Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:36:58 PM	30.0 keV	126x	9.7 mm



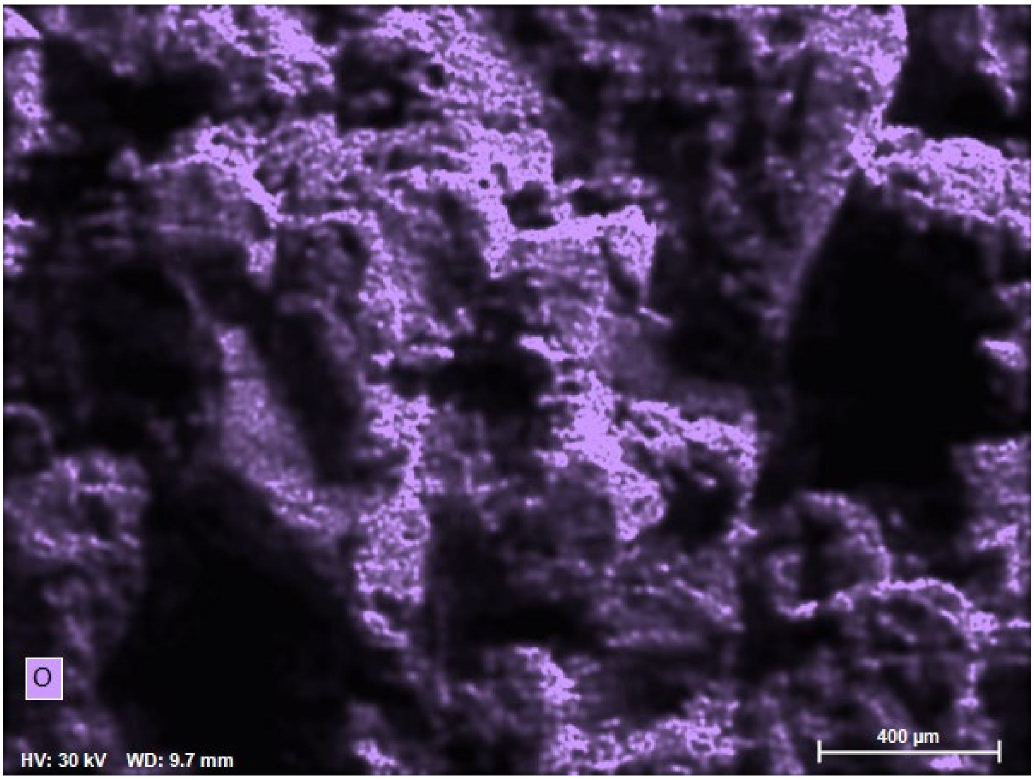
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:36:58 PM	30.0 keV	126x	9.7 mm



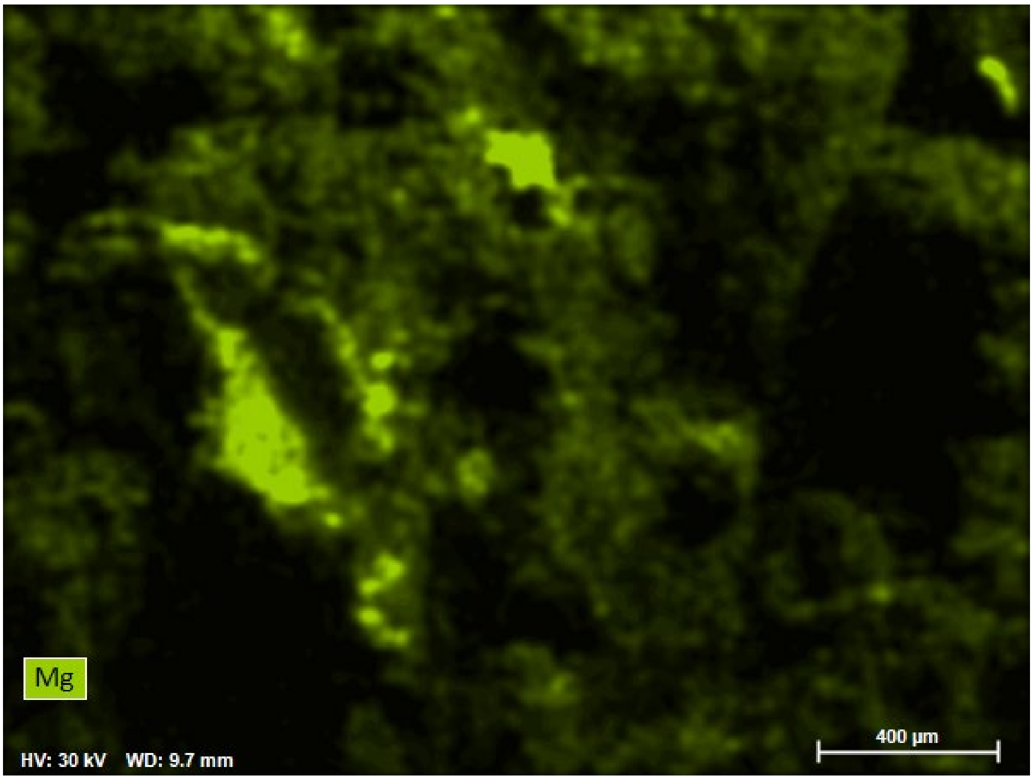
23009-02.spx

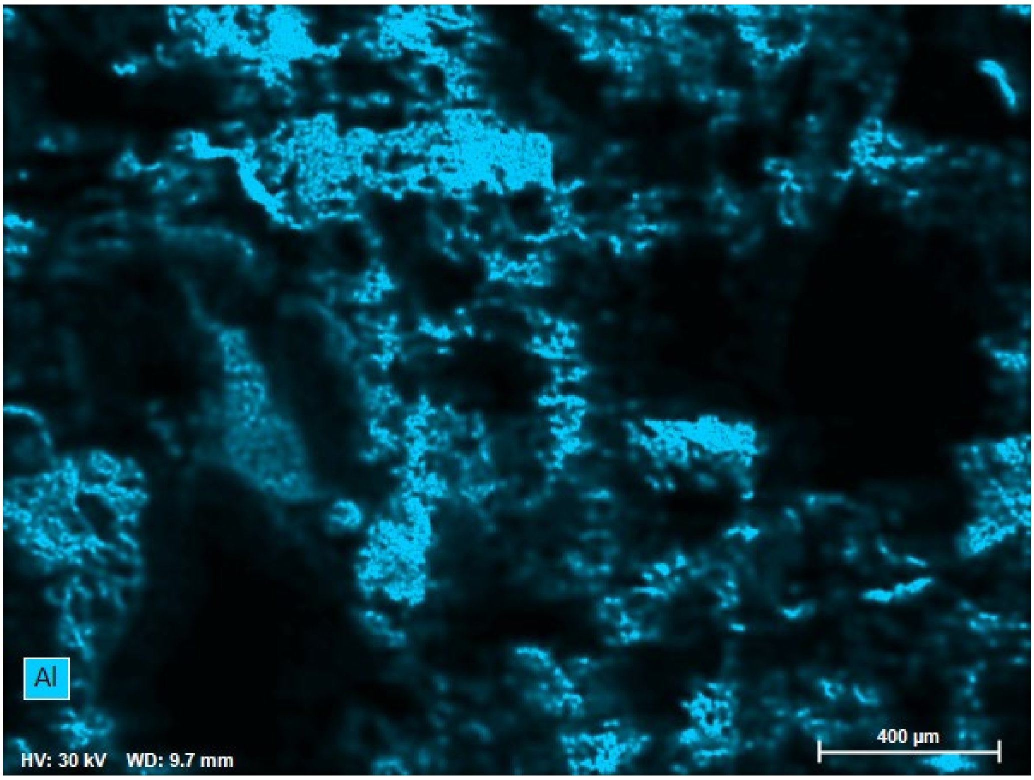
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	7.69	8.00	12.75
Oxygen	8	48.06	49.98	59.82
Sodium	11	0.42	0.43	0.36
Magnesium	12	0.39	0.40	0.32
Aluminium	13	6.02	6.26	4.45
Silicon	14	28.19	29.31	19.98
Sulfur	16	0.39	0.40	0.24
Potassium	19	1.71	1.78	0.87
Titanium	22	0.64	0.67	0.27
Iron	26	2.65	2.75	0.94
		96.16	**100.00**	**100.00**

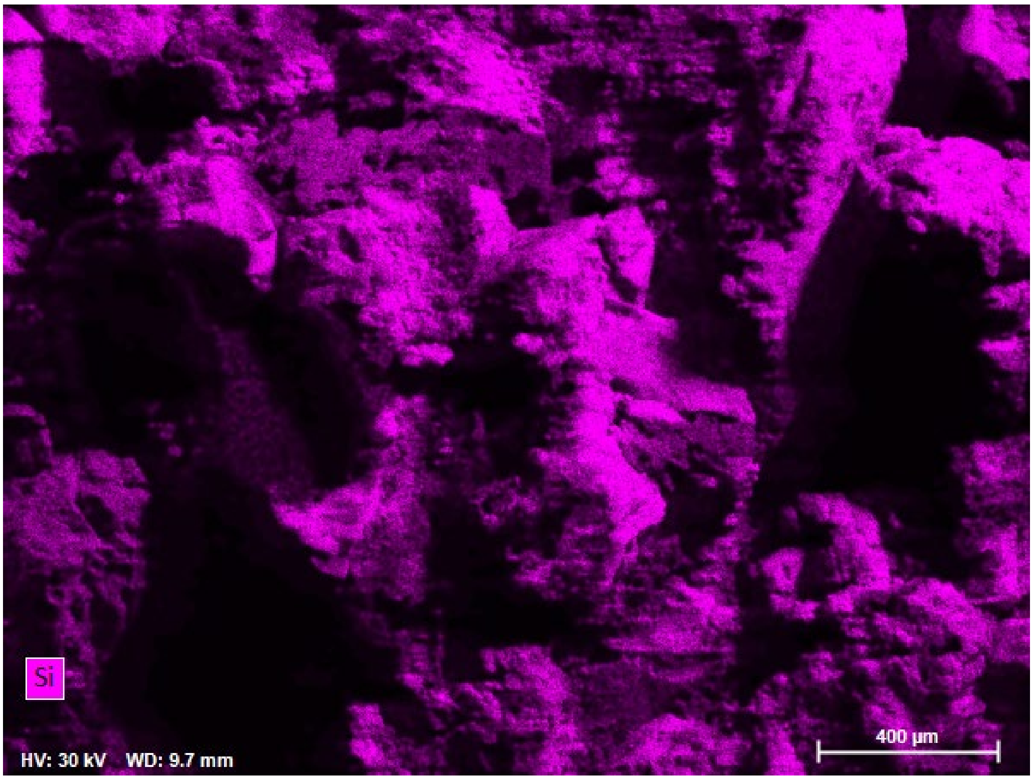
Ch 1
400 µm

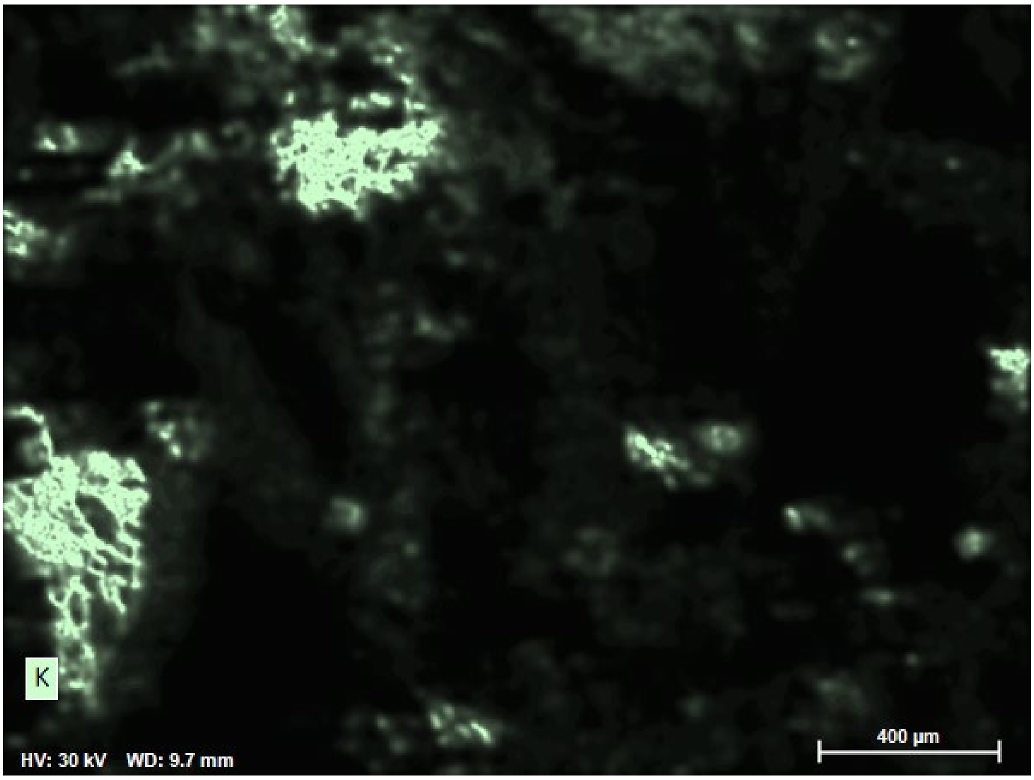


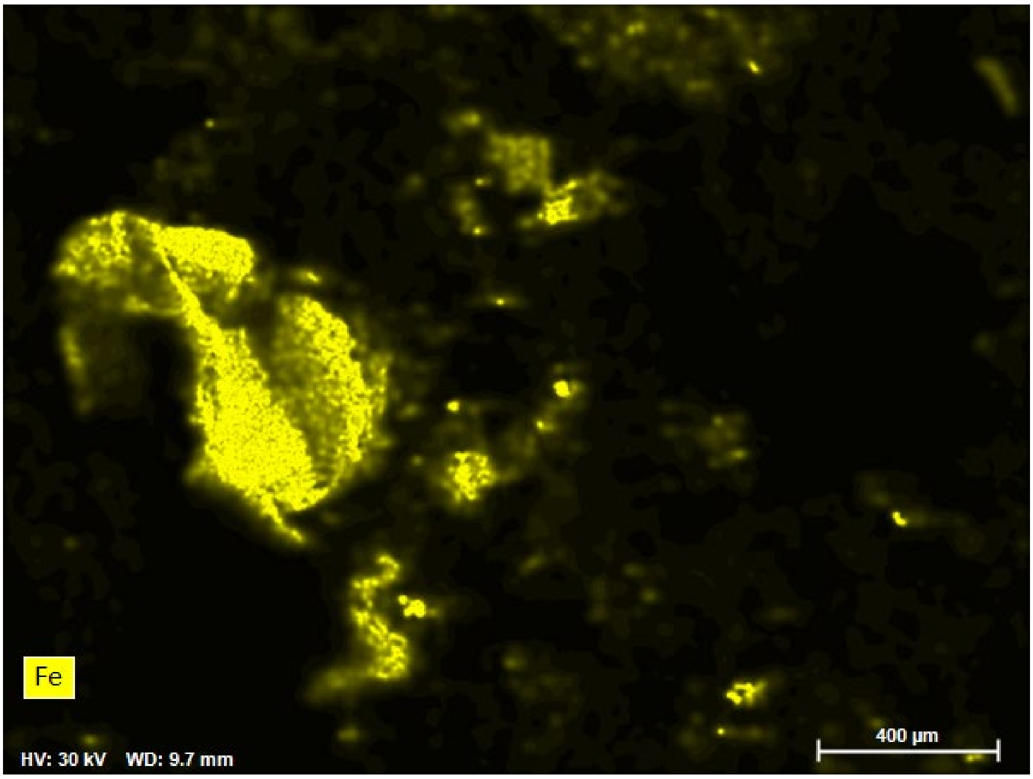
O
HV: 30 kV WD: 9.7 mm
400 µm

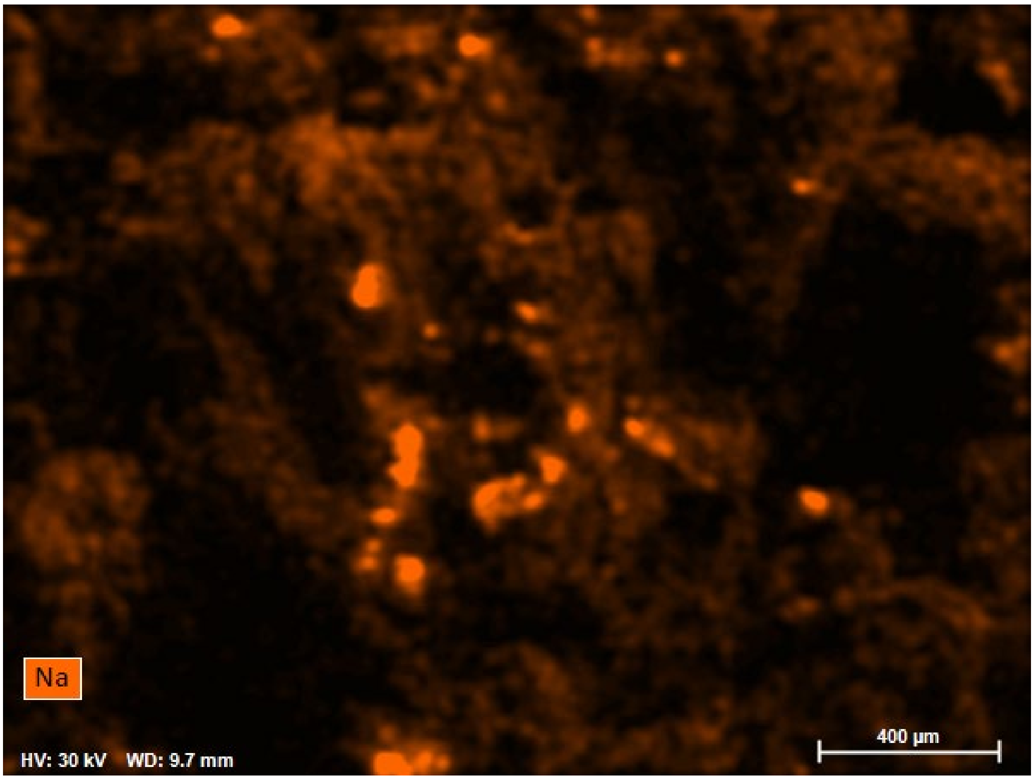

Mg
HV: 30 kV WD: 9.7 mm
400 µm

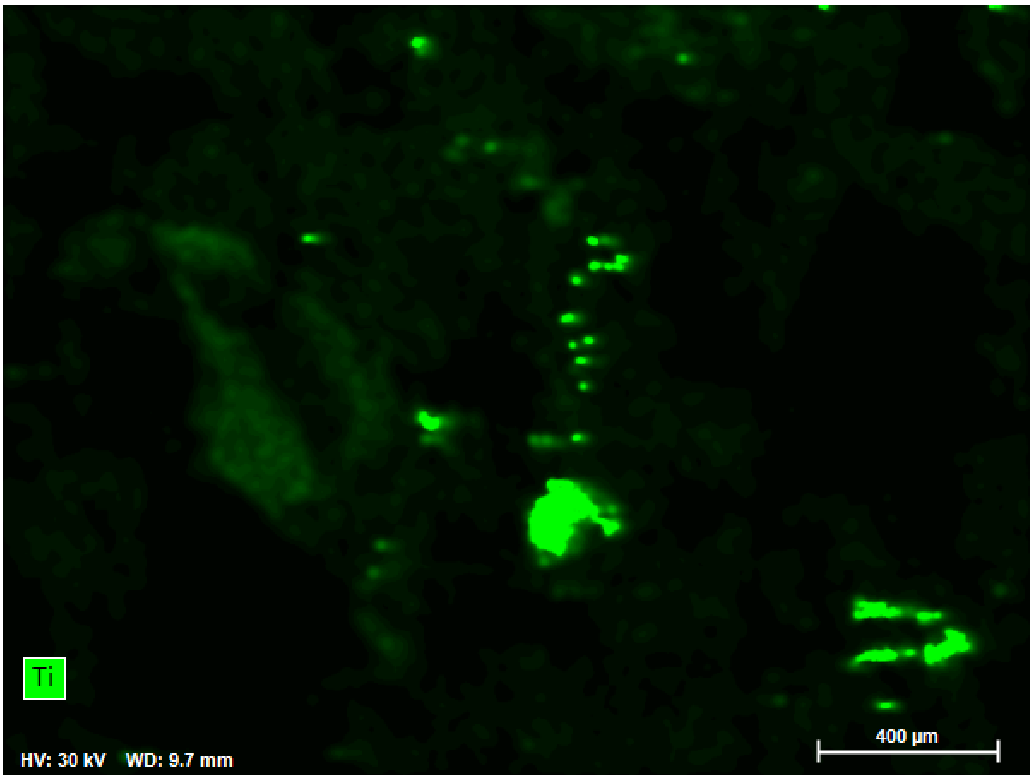

Al
HV: 30 kV WD: 9.7 mm
400 µm

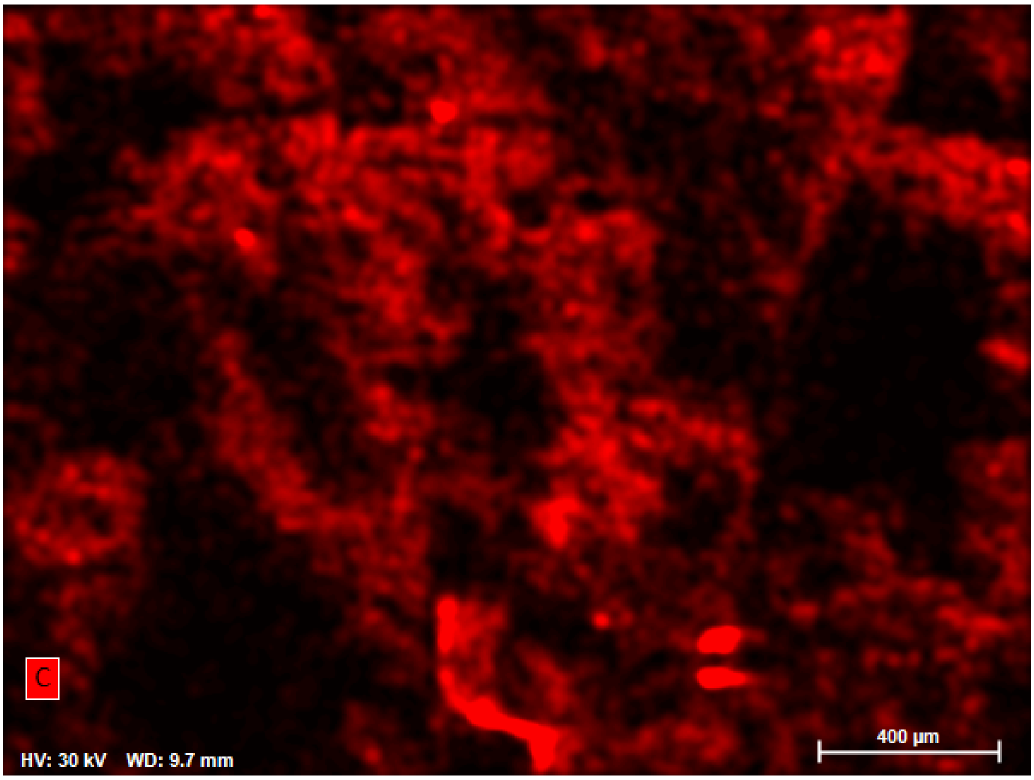

Si
HV: 30 kV WD: 9.7 mm
400 µm

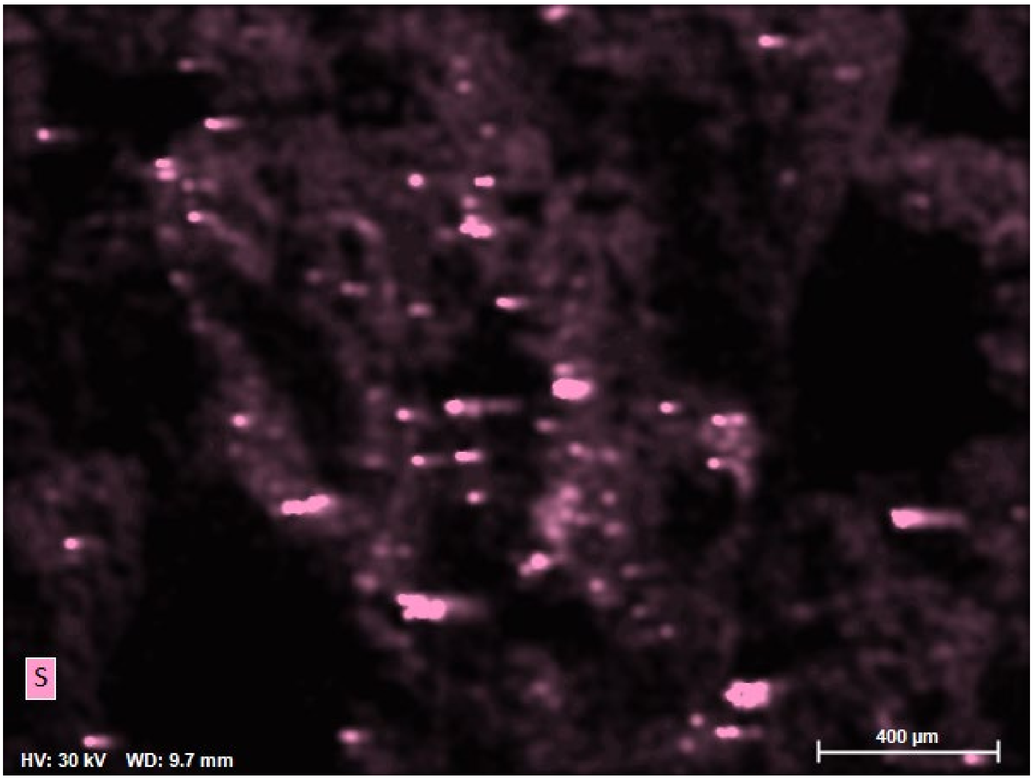

K
HV: 30 kV WD: 9.7 mm
400 µm

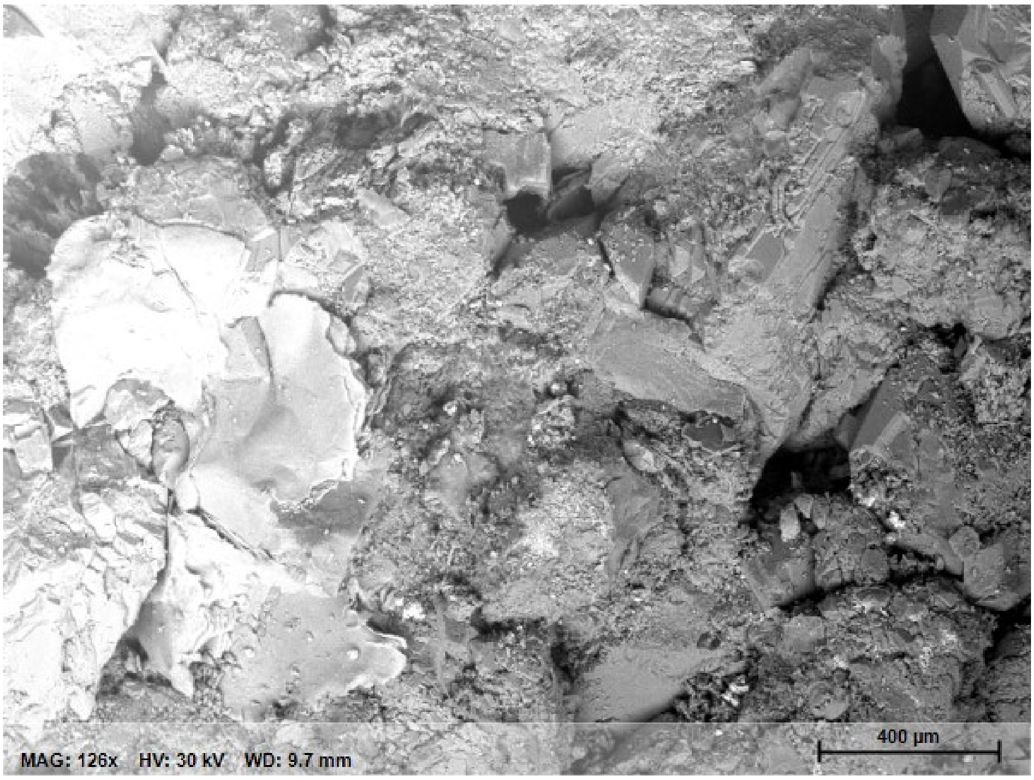

Fe
HV: 30 kV WD: 9.7 mm
400 µm


Na
HV: 30 kV WD: 9.7 mm
400 µm


Ti
HV: 30 kV WD: 9.7 mm
400 µm

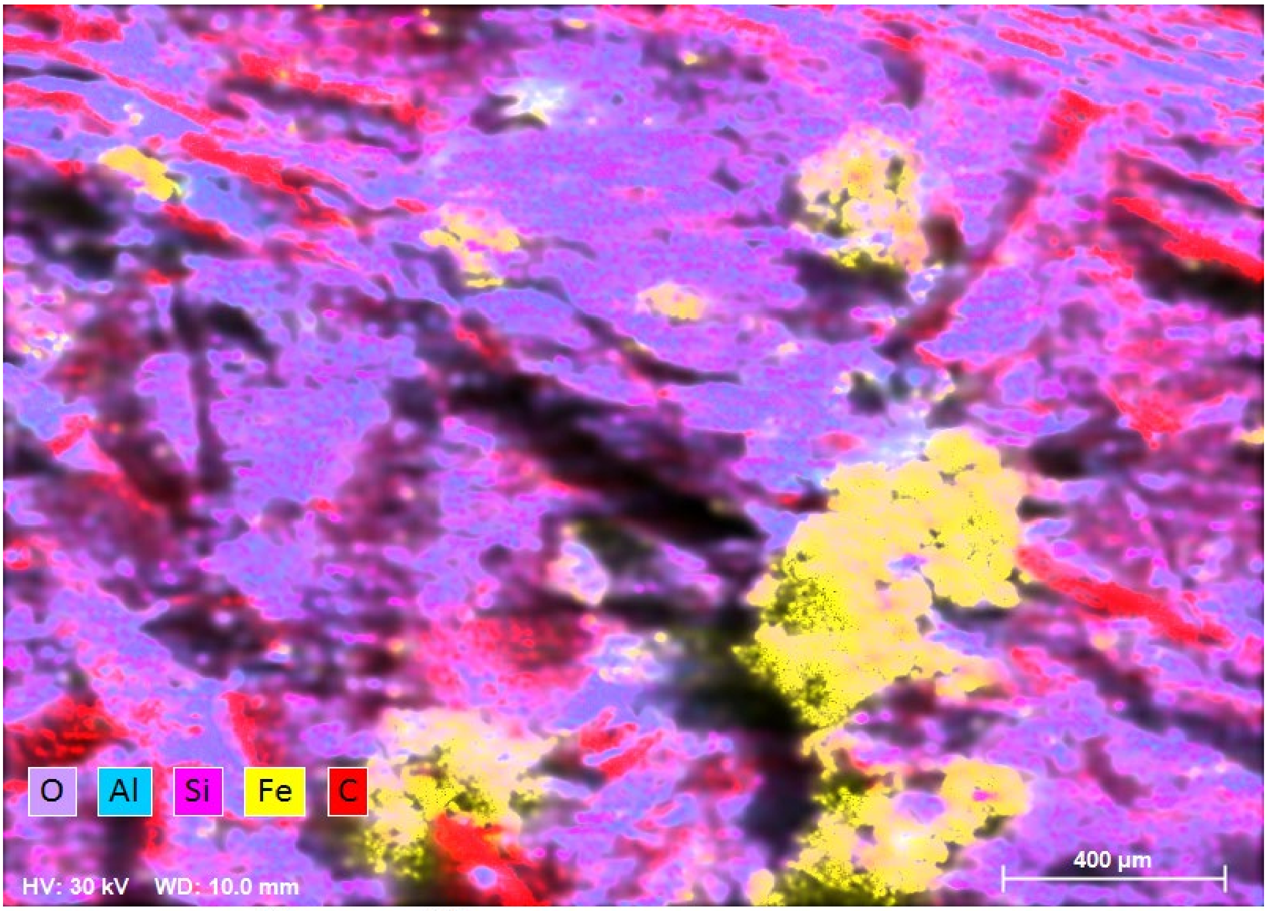

C
HV: 30 kV WD: 9.7 mm
400 µm


S
HV: 30 kV WD: 9.7 mm
400 µm

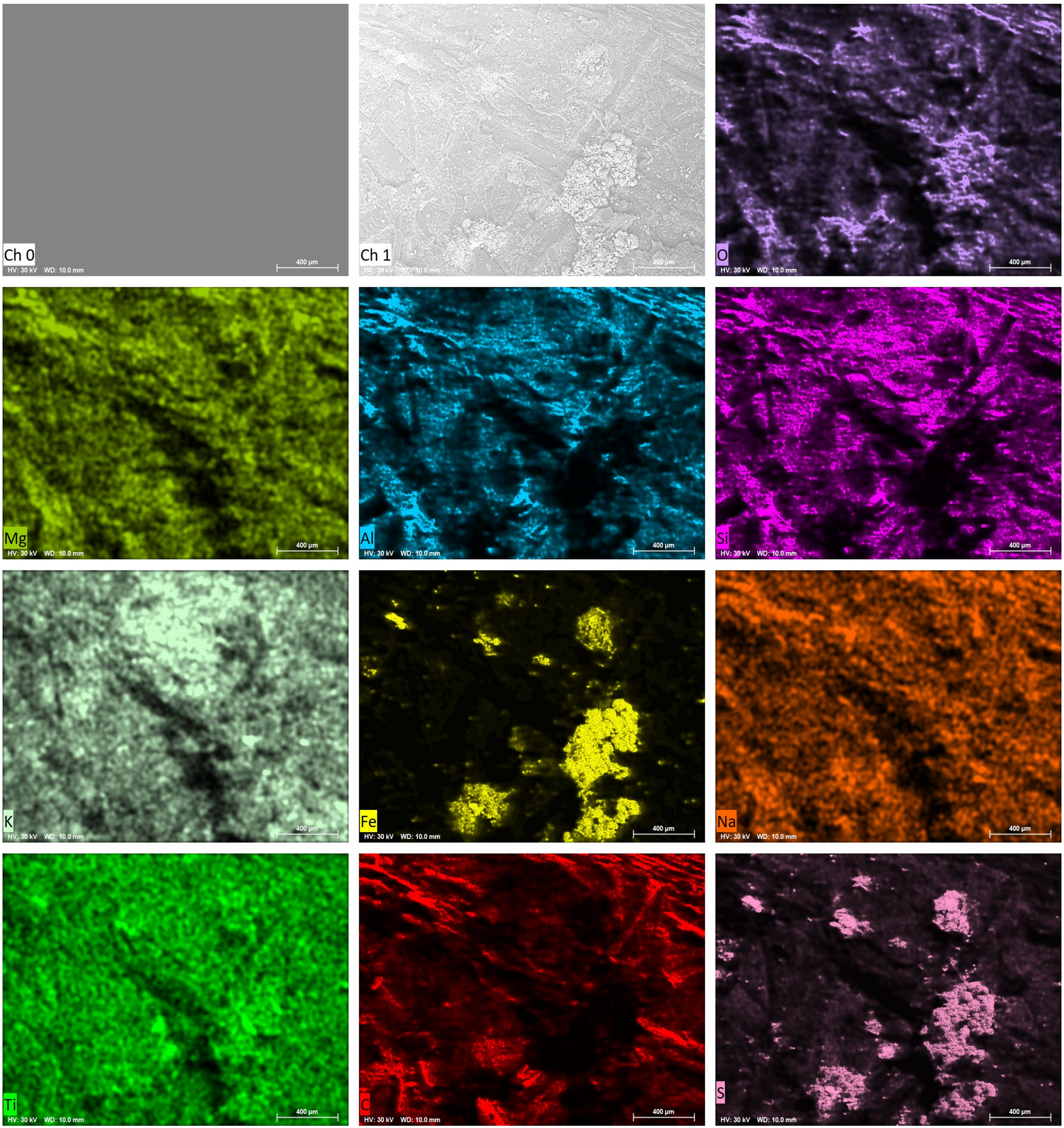

MAG: 126x HV: 30 kV WD: 9.7 mm
400 µm

23009-03 Report

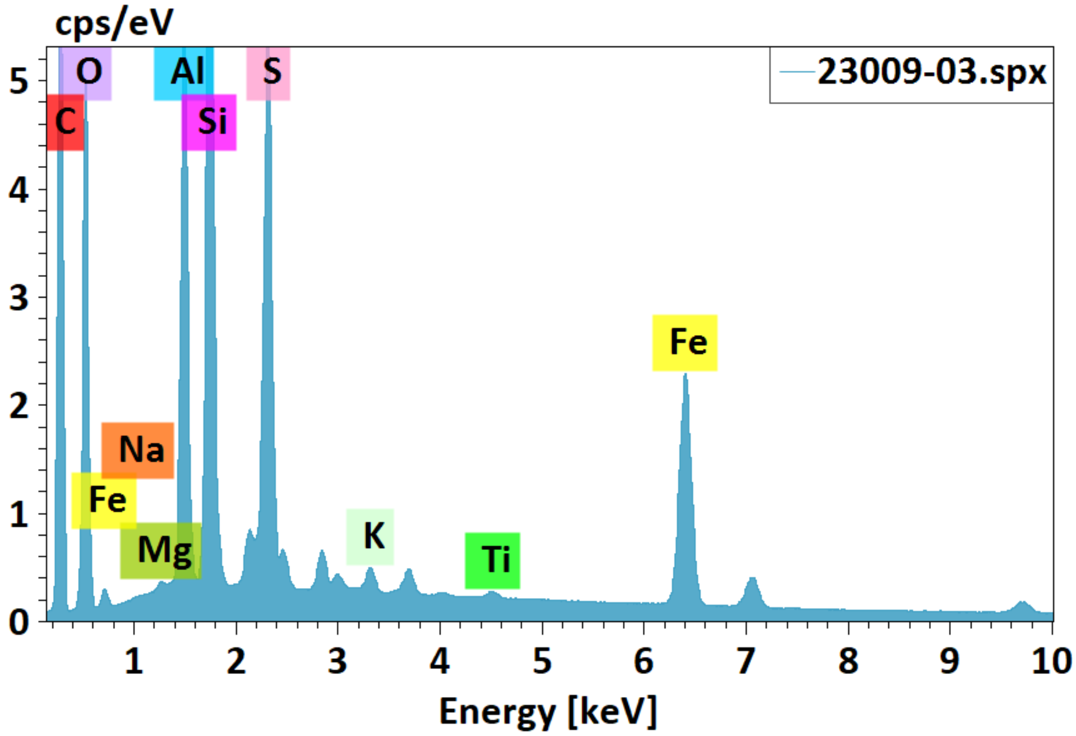
Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/8/2023	9:09:21 AM	30.0 keV	126x	10.0 mm



Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:45:17 PM	30.0 keV	126x	10.0 mm

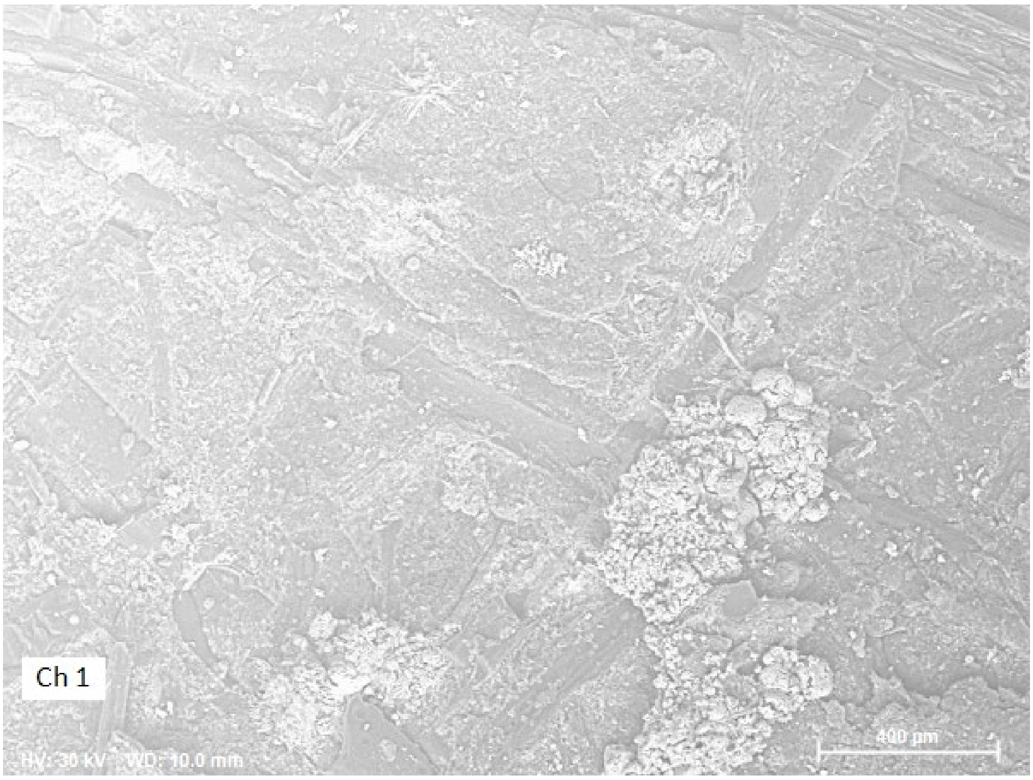


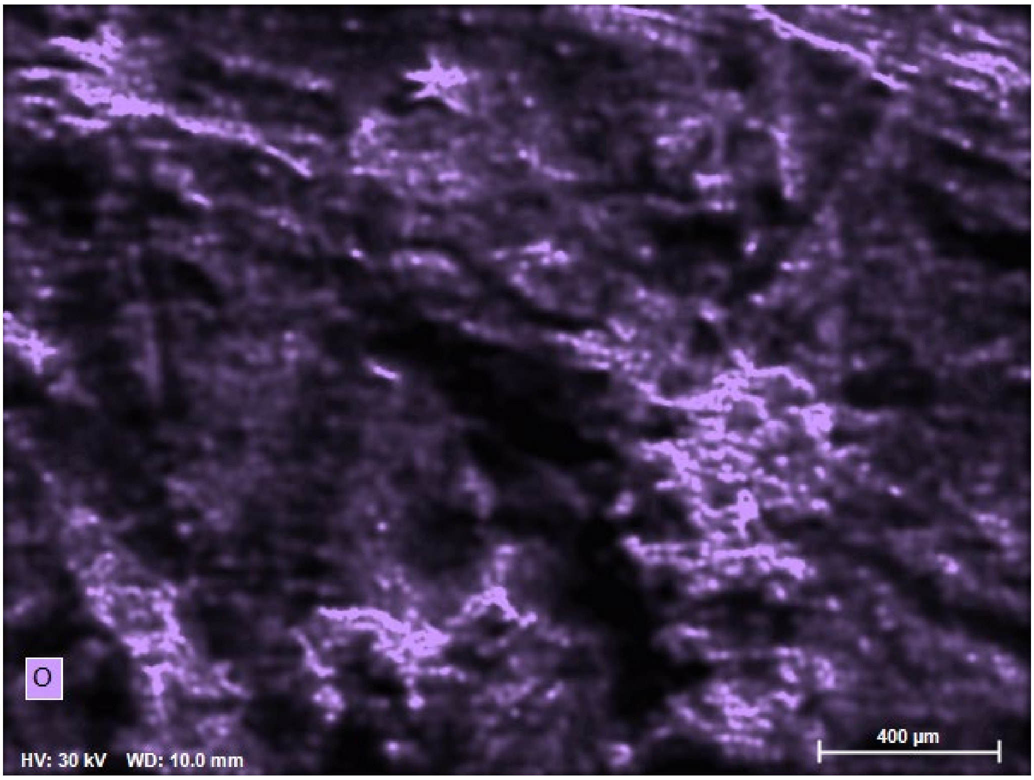
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:45:17 PM	30.0 keV	126x	10.0 mm

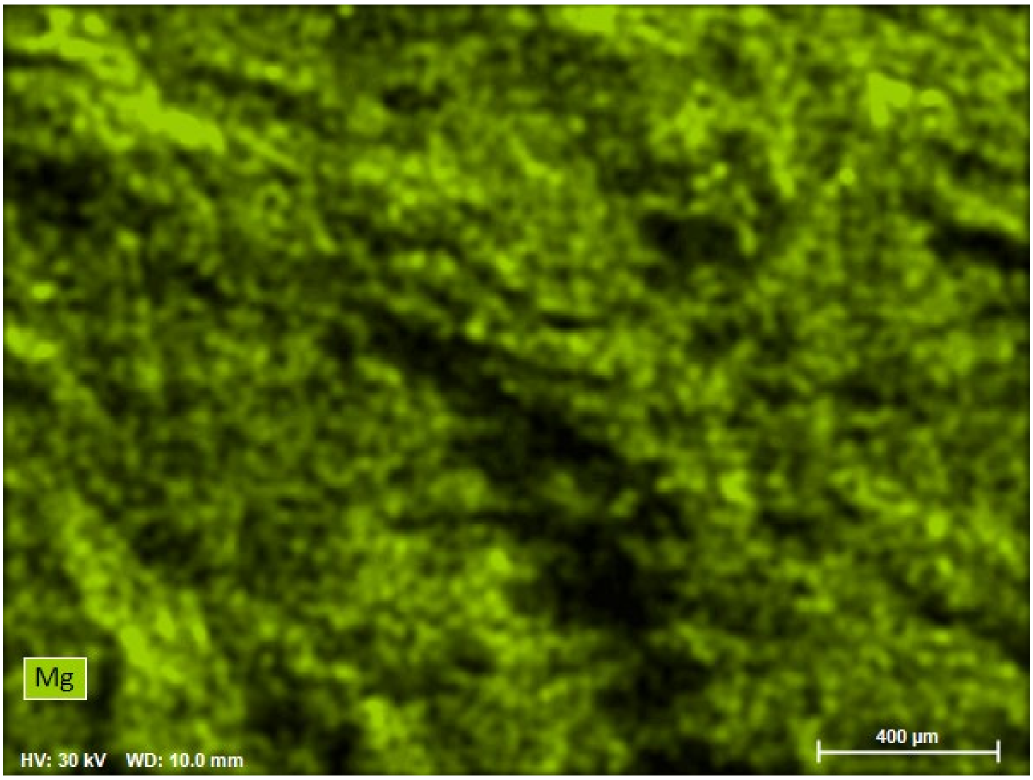


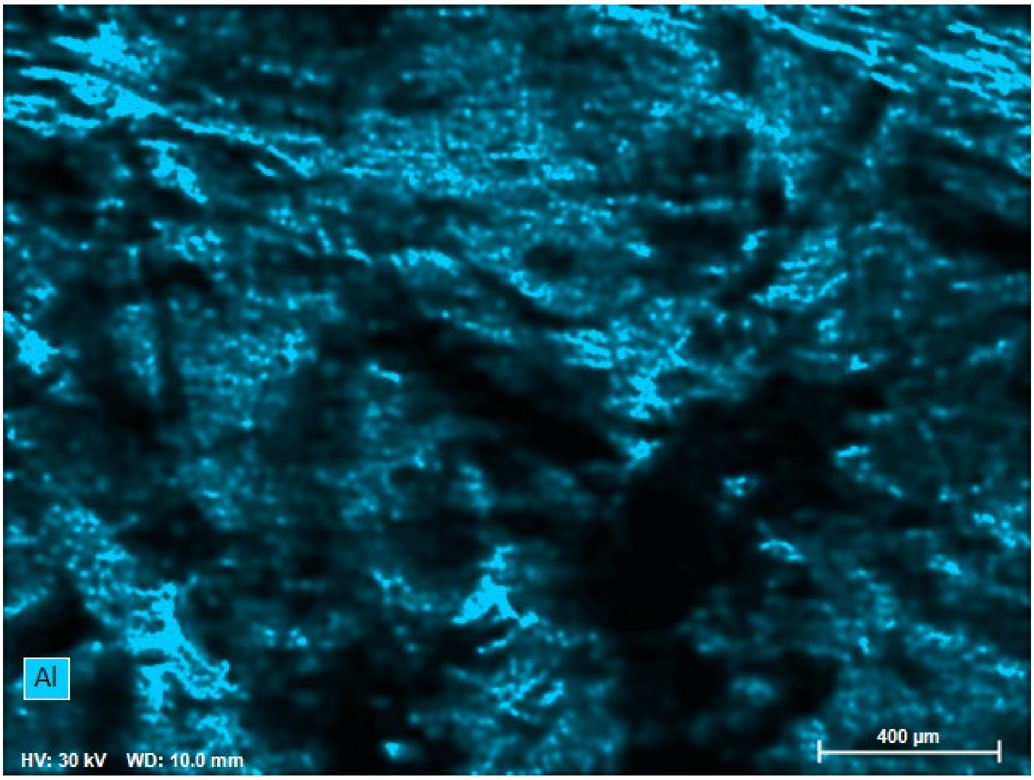
23009-03.spx

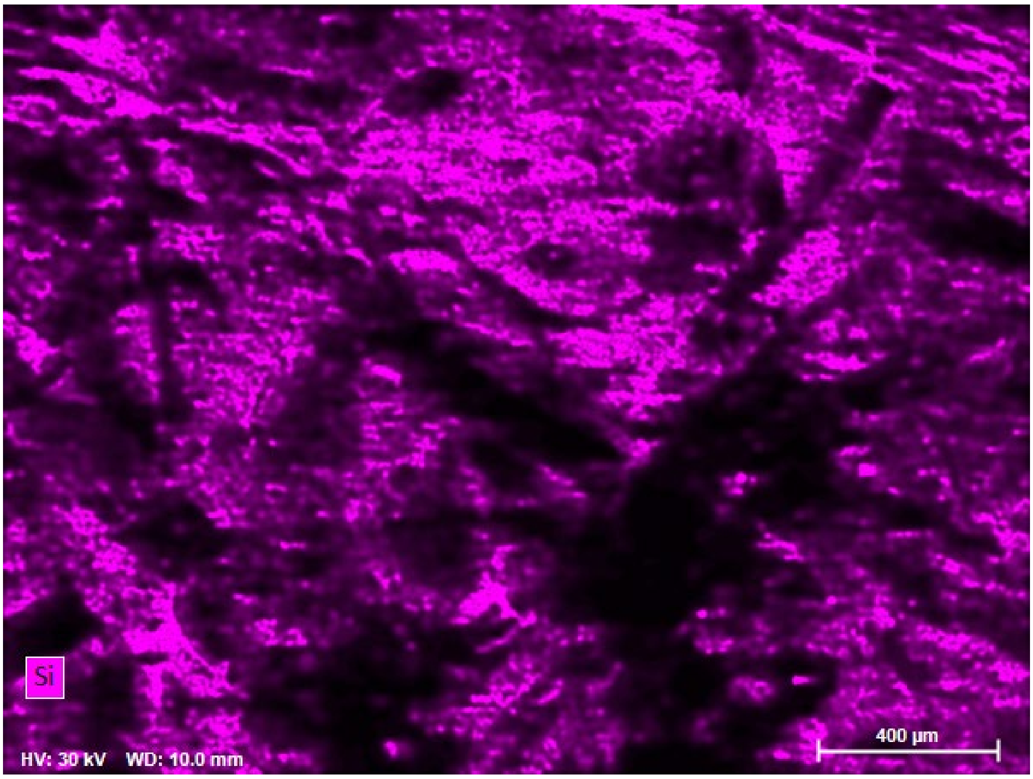
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	52.76	50.55	61.86
Oxygen	8	35.41	33.92	31.16
Sodium	11	0.06	0.05	0.03
Magnesium	12	0.04	0.04	0.03
Aluminium	13	3.81	3.65	1.99
Silicon	14	4.75	4.55	2.38
Sulfur	16	3.37	3.23	1.48
Potassium	19	0.13	0.12	0.05
Titanium	22	0.06	0.06	0.02
Iron	26	4.00	3.84	1.01
		104.38	**100.00**	**100.00**

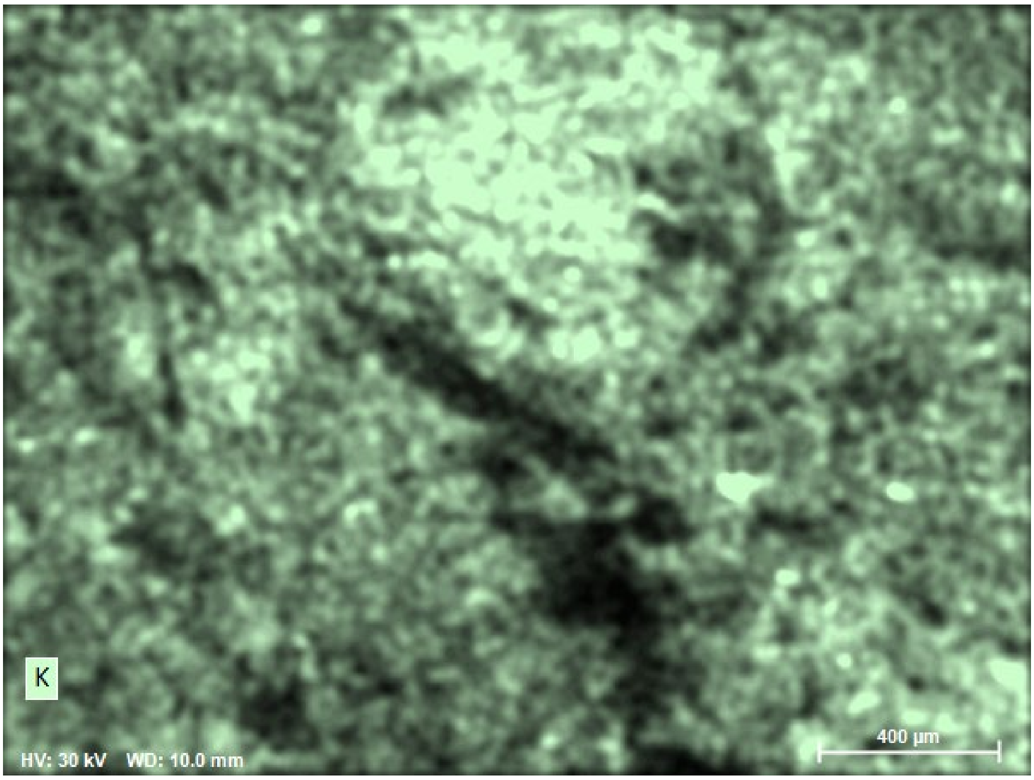

Ch 1
HV: 30 kV WD: 10.0 mm
400 µm

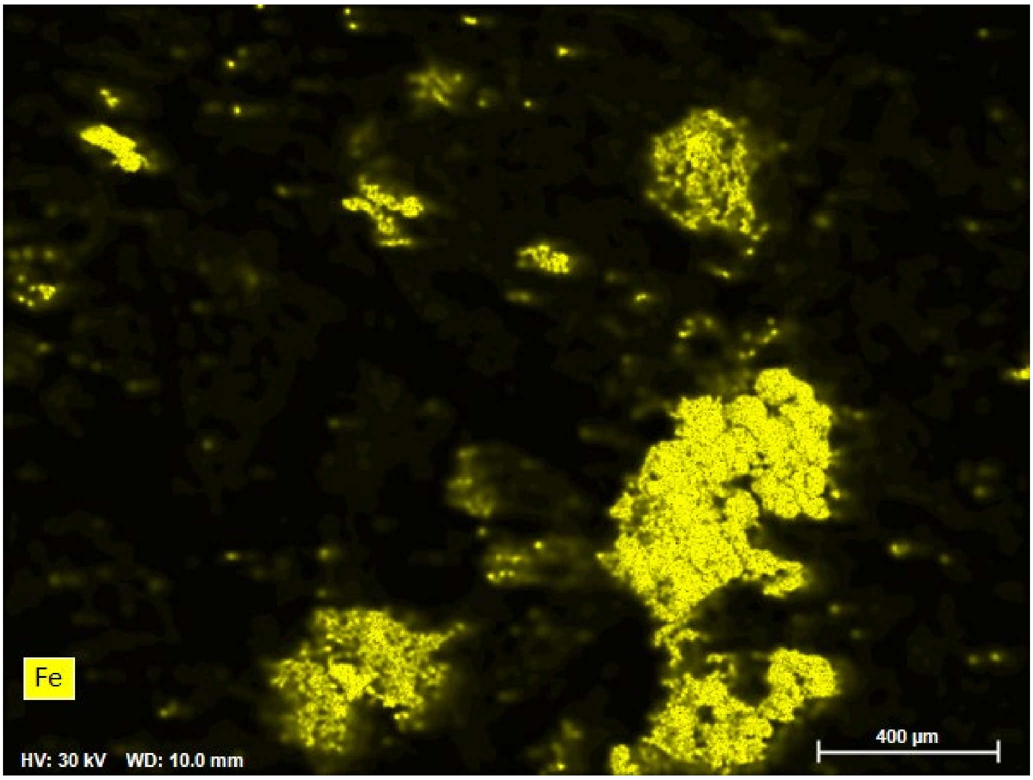

O
HV: 30 kV WD: 10.0 mm
400 µm

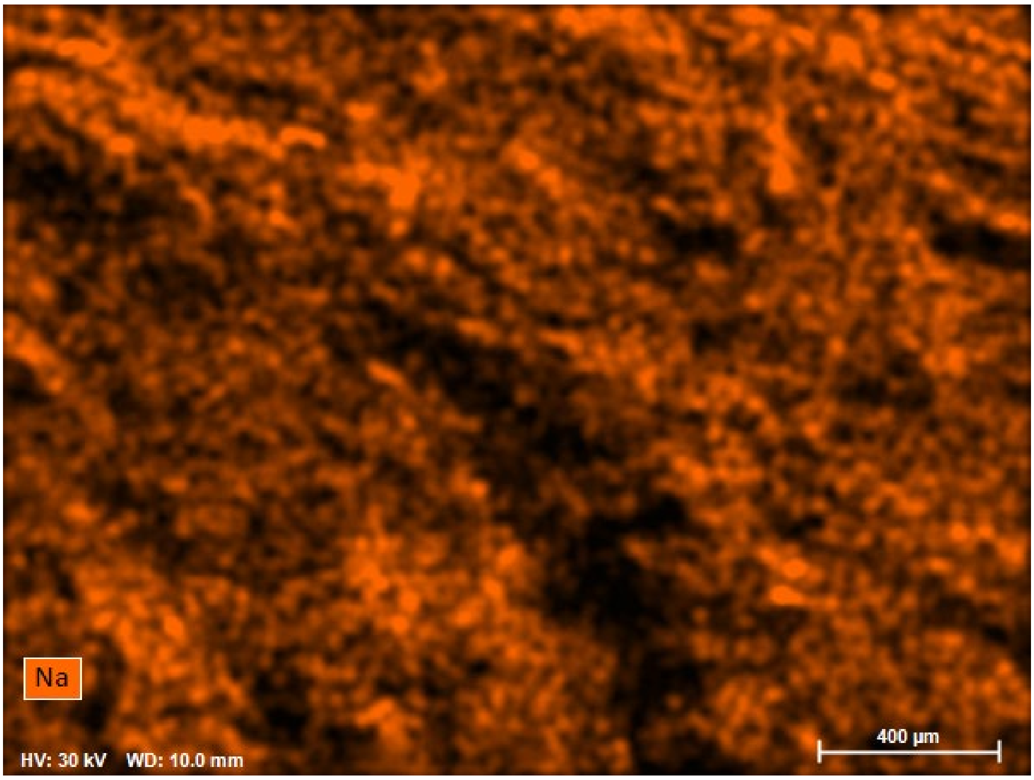

Mg
HV: 30 kV WD: 10.0 mm
400 µm

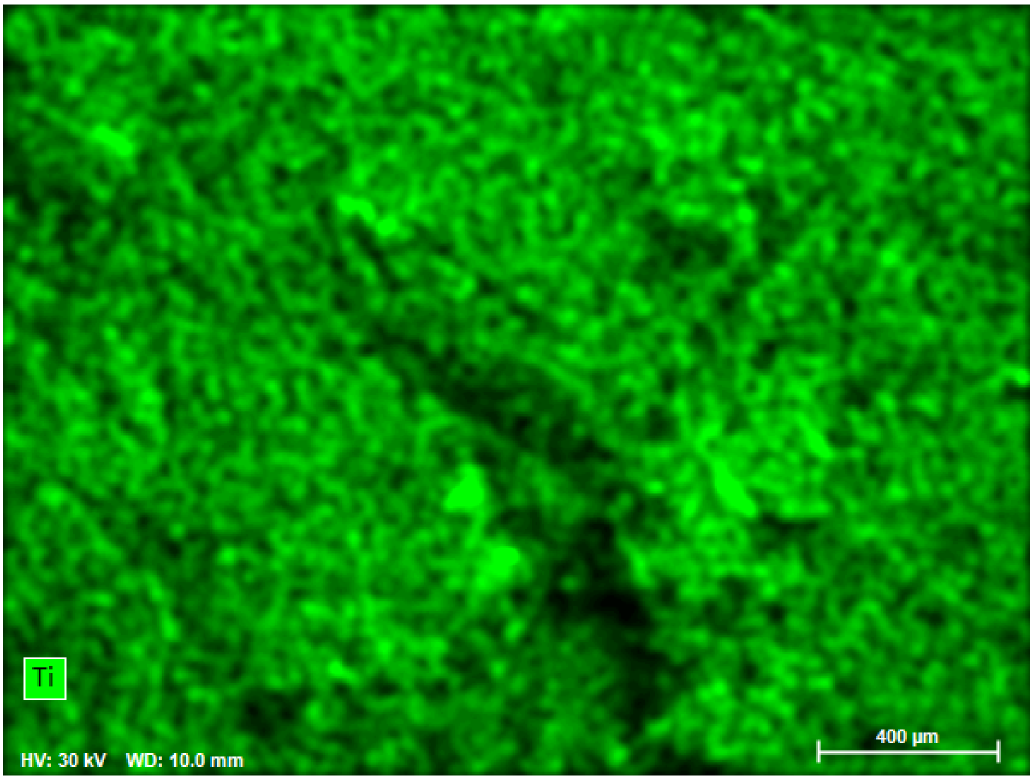

Al
HV: 30 kV WD: 10.0 mm
400 µm

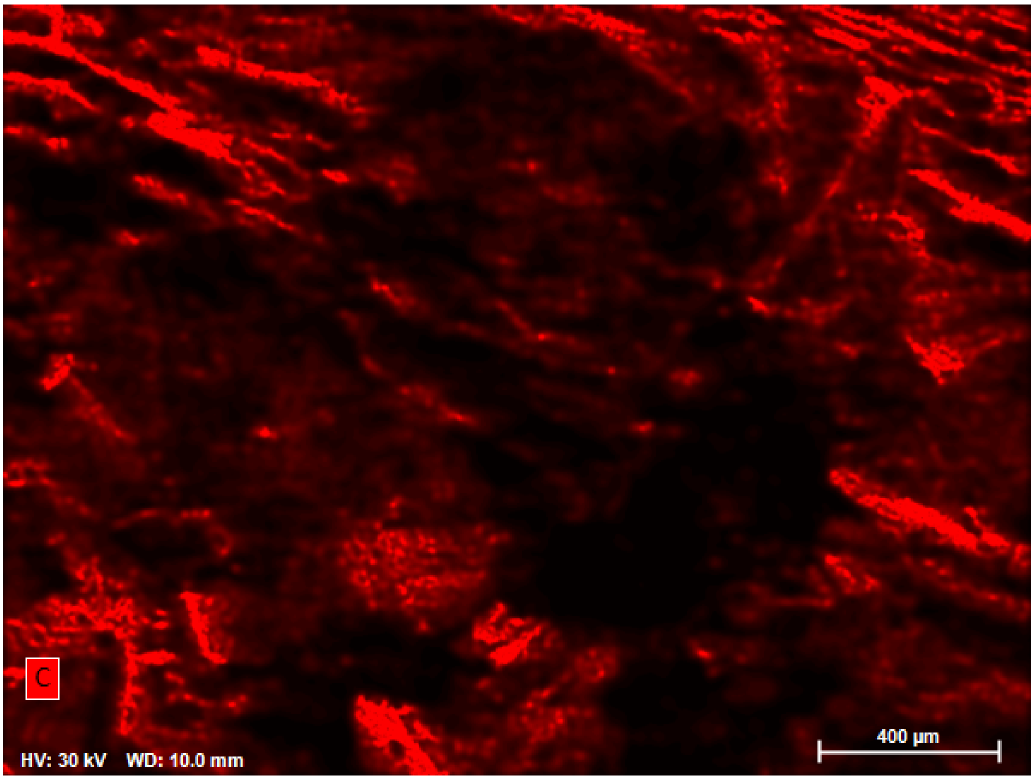

Si
HV: 30 kV WD: 10.0 mm
400 µm

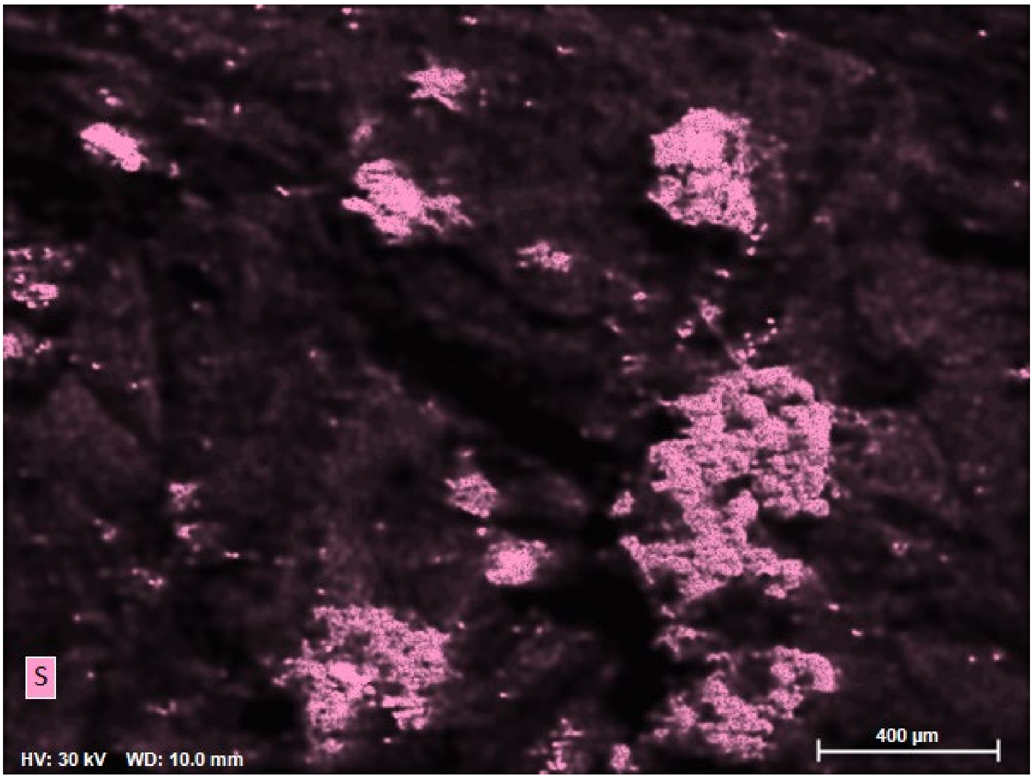

K
HV: 30 kV WD: 10.0 mm
400 µm


Fe
HV: 30 kV
WD: 10.0 mm
400 µm


Na
HV: 30 kV
WD: 10.0 mm
400 µm

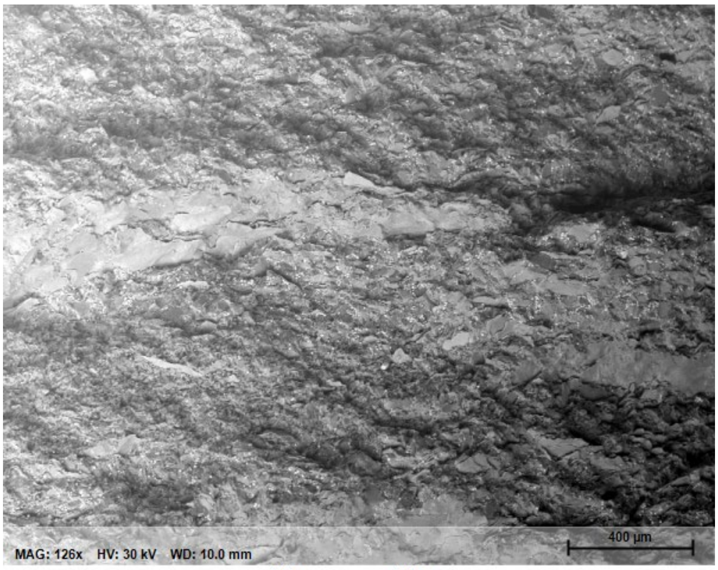

Ti
HV: 30 kV WD: 10.0 mm
400 µm


C
HV: 30 kV WD: 10.0 mm
400 µm

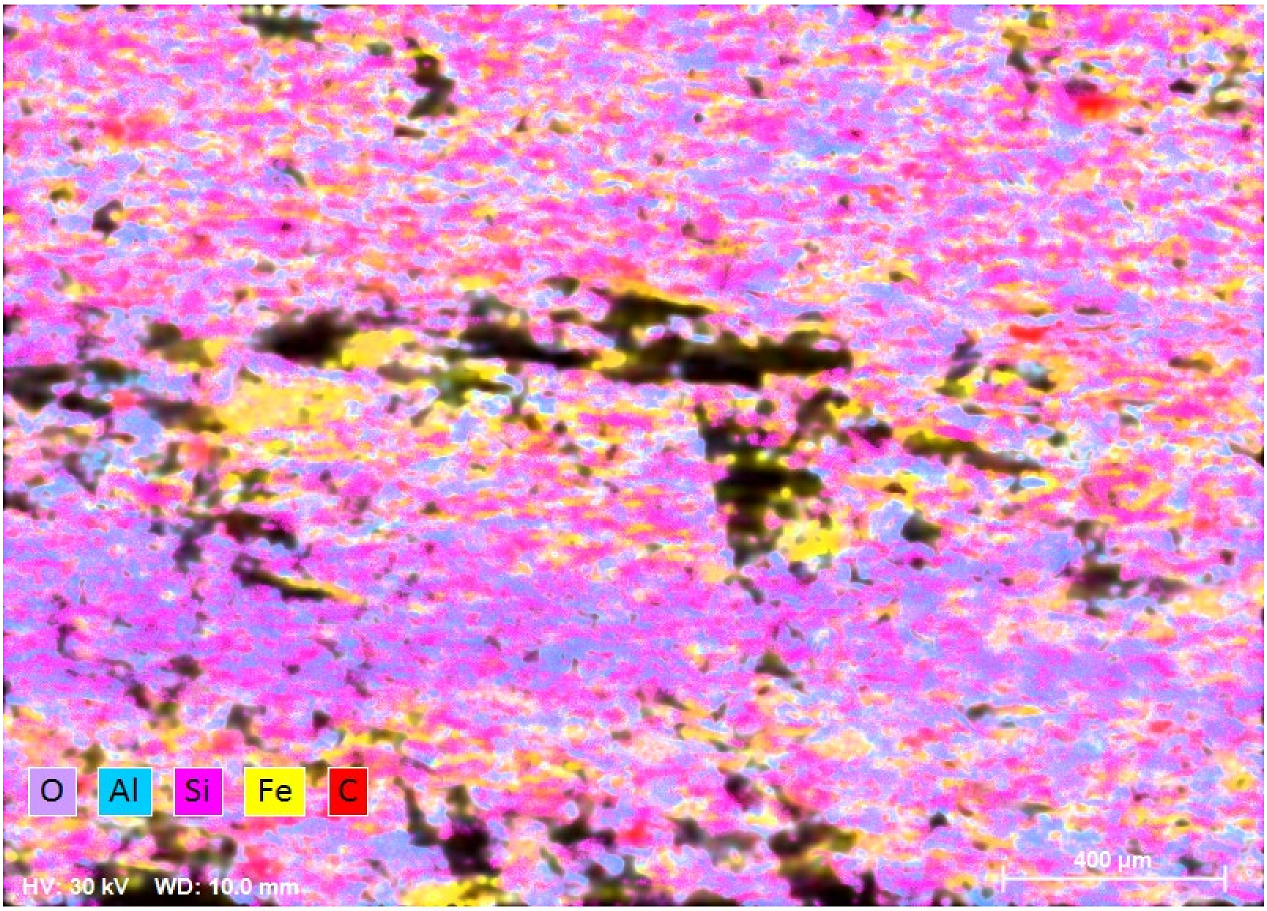

S
HV: 30 kV WD: 10.0 mm
400 µm


MAG: 126x HV: 30 kV WD: 10.0 mm
400 µm

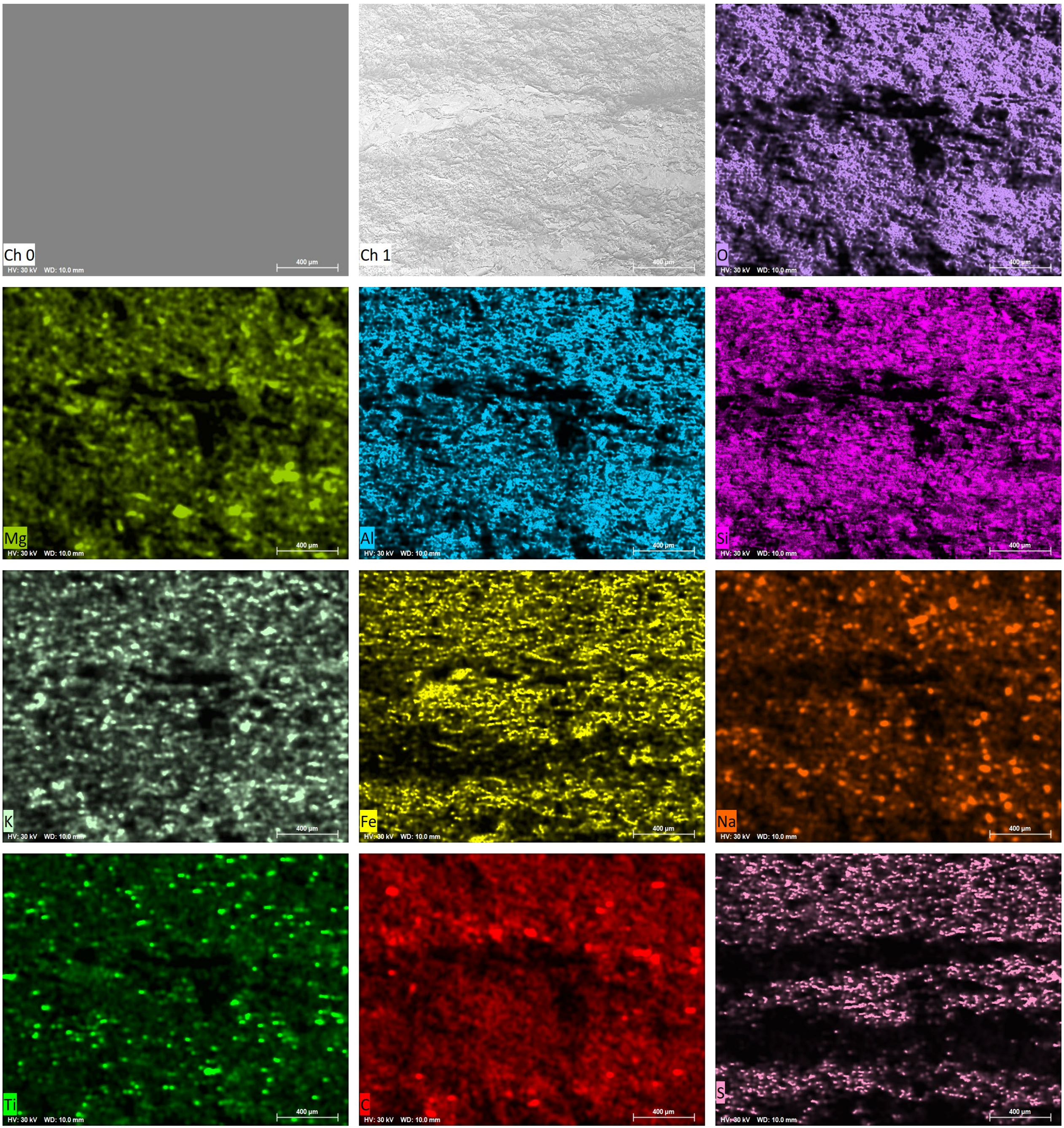
23009-04 Report



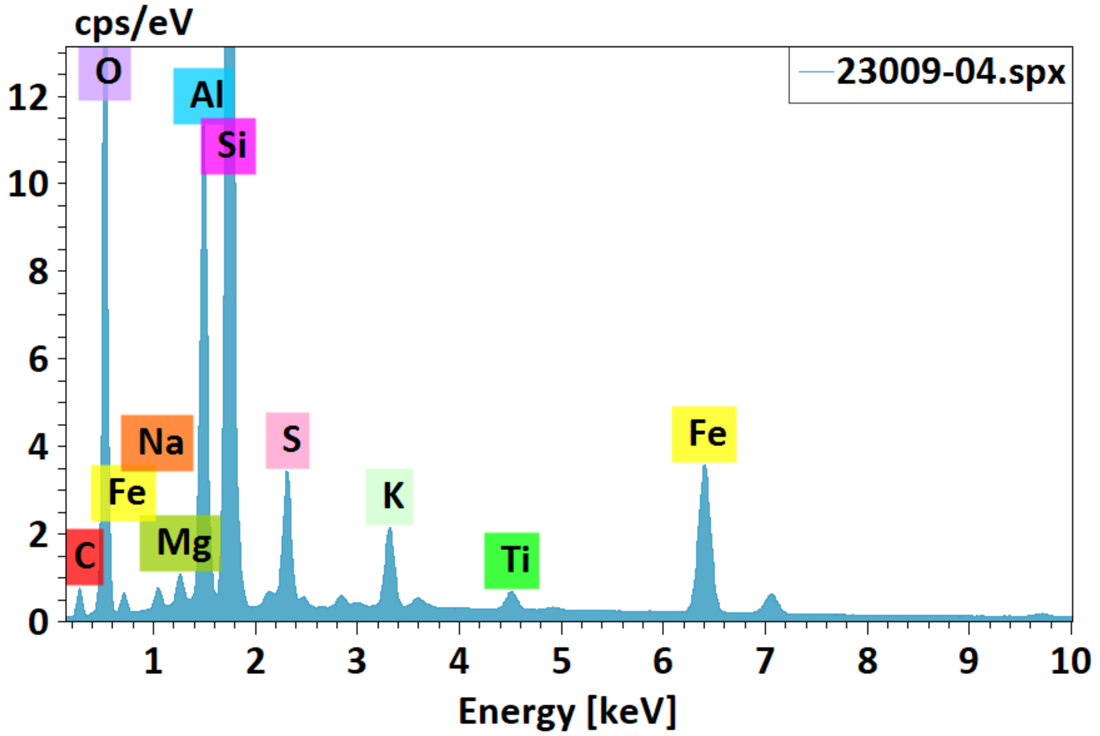
Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/8/2023	9:56:20 AM	30.0 keV	126x	10.0 mm



Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:58:46 PM	30.0 keV	126x	10.0 mm



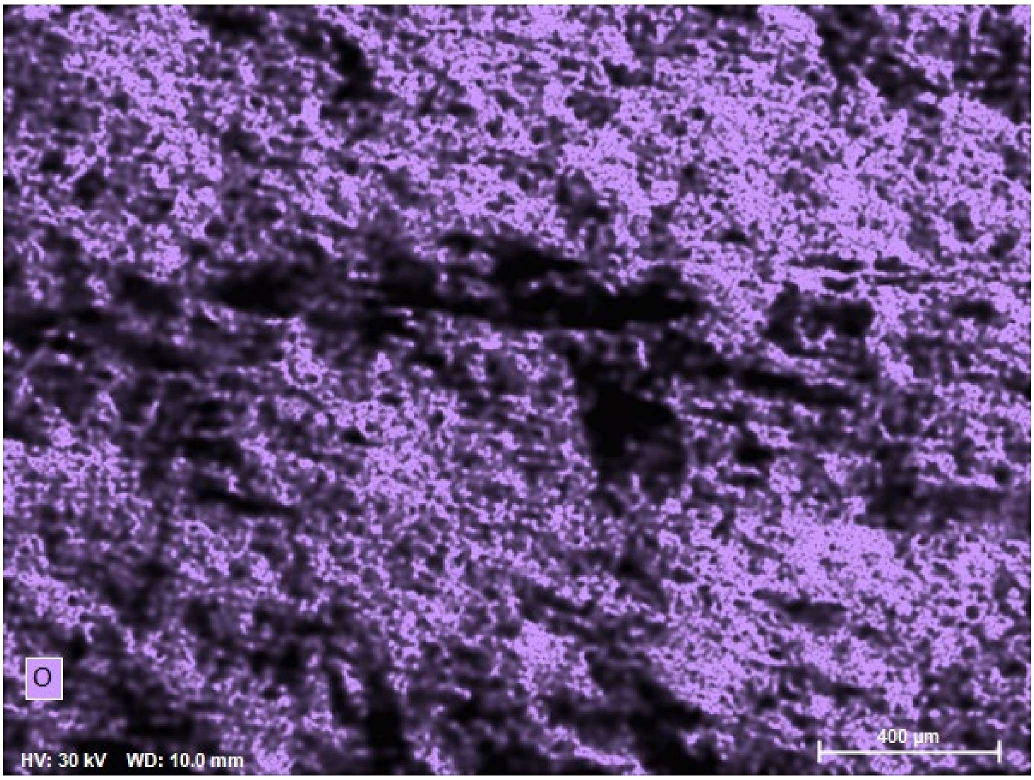
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	1:58:46 PM	30.0 keV	126x	10.0 mm

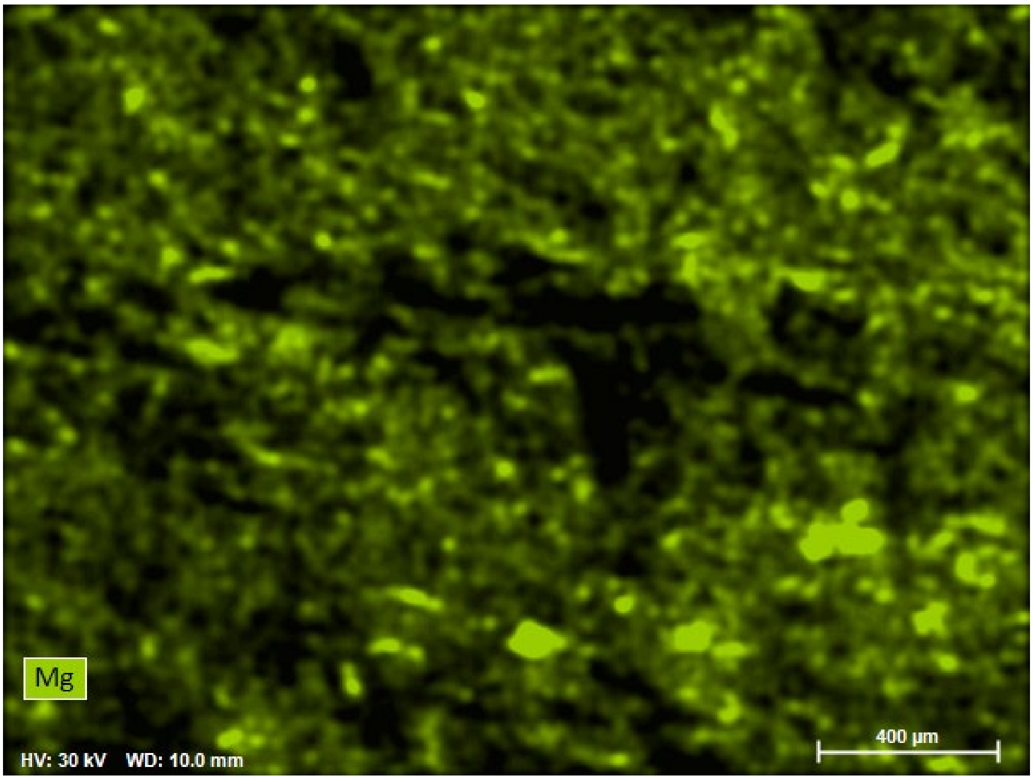


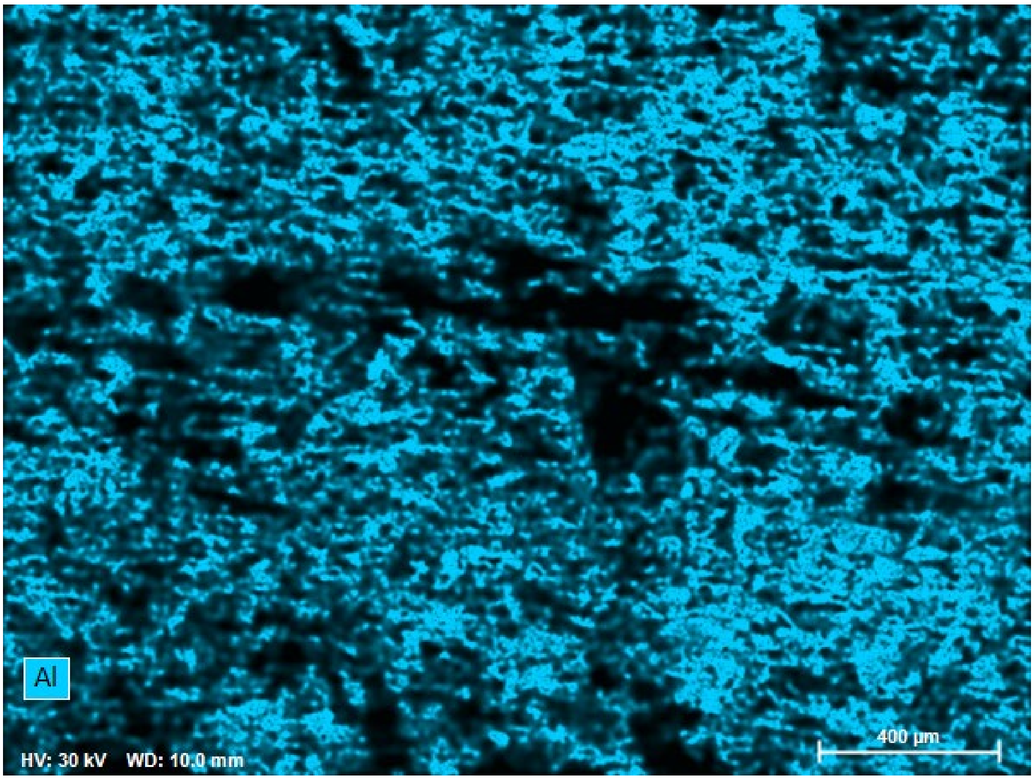
23009-04.spx

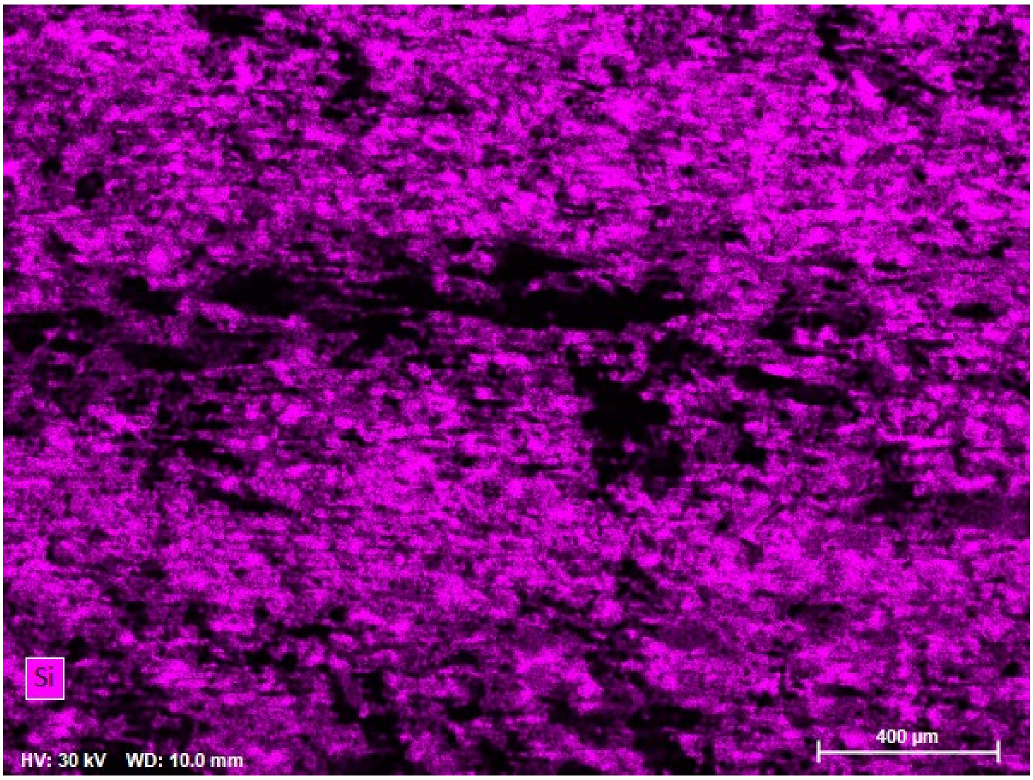
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	9.05	7.82	12.53
Oxygen	8	58.88	50.88	61.18
Sodium	11	1.07	0.93	0.78
Magnesium	12	0.86	0.74	0.59
Aluminium	13	9.16	7.92	5.65
Silicon	14	25.39	21.93	15.03
Sulfur	16	2.89	2.50	1.50
Potassium	19	1.76	1.52	0.75
Titanium	22	0.55	0.47	0.19
Iron	26	6.12	5.29	1.82
		115.73	**100.00**	**100.00**

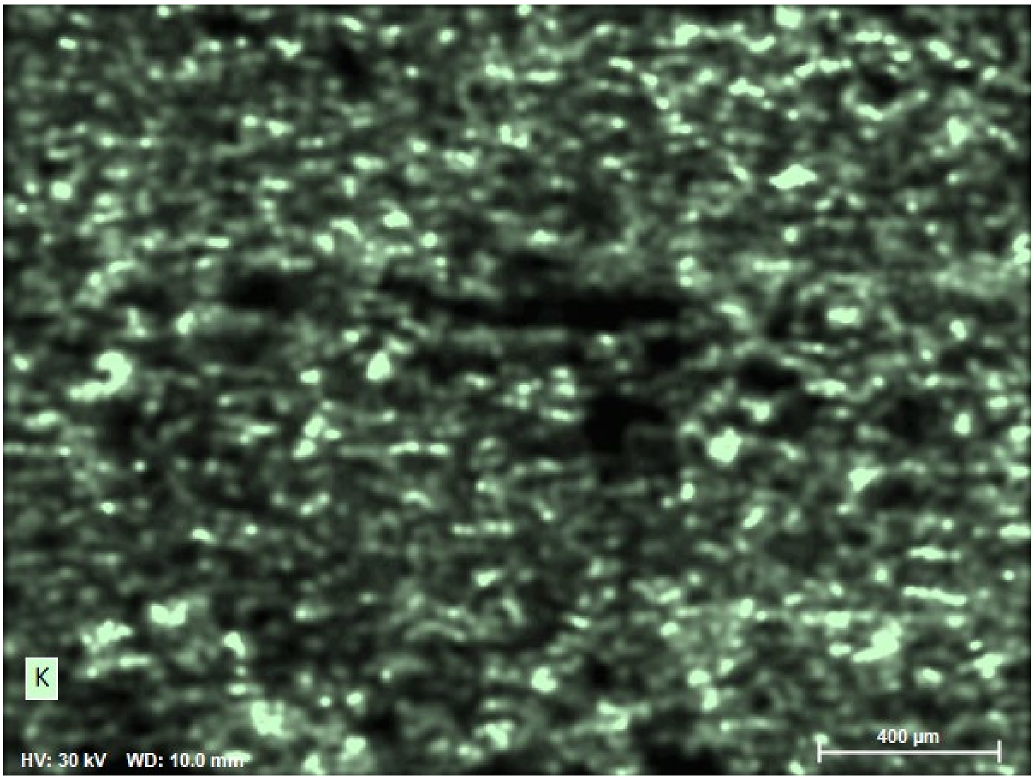

Ch 1
HV: 30 kV WD: 10.0 mm
400 µm

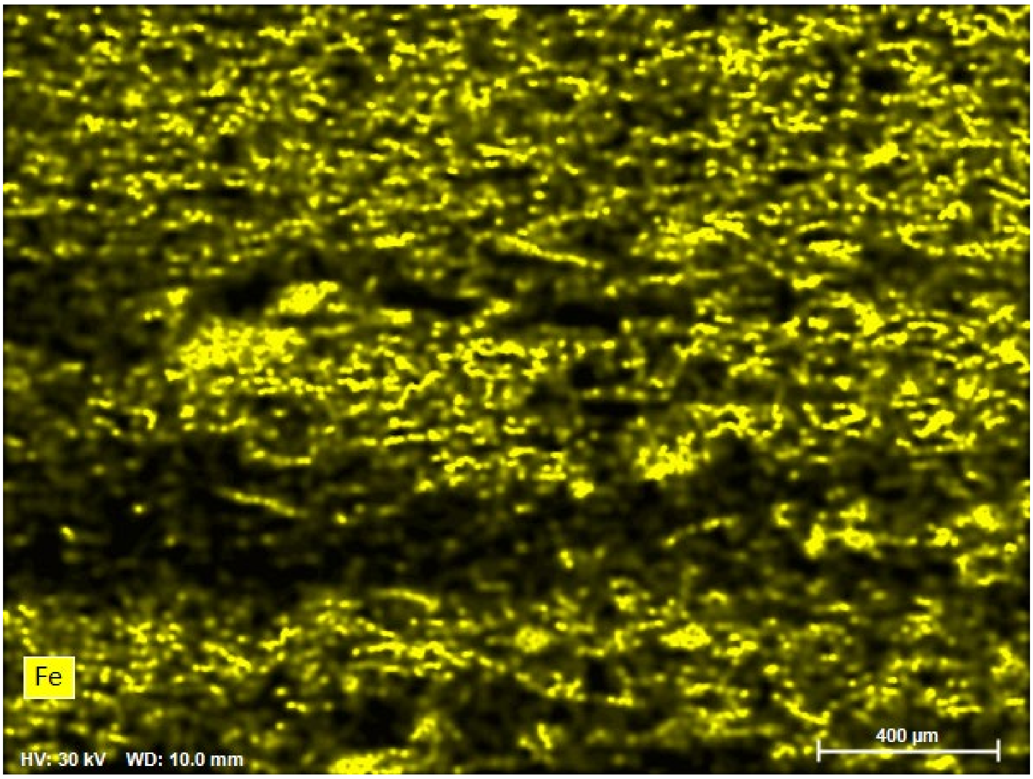

O
HV: 30 kV WD: 10.0 mm
400 µm


Mg
HV: 30 kV WD: 10.0 mm
400 µm

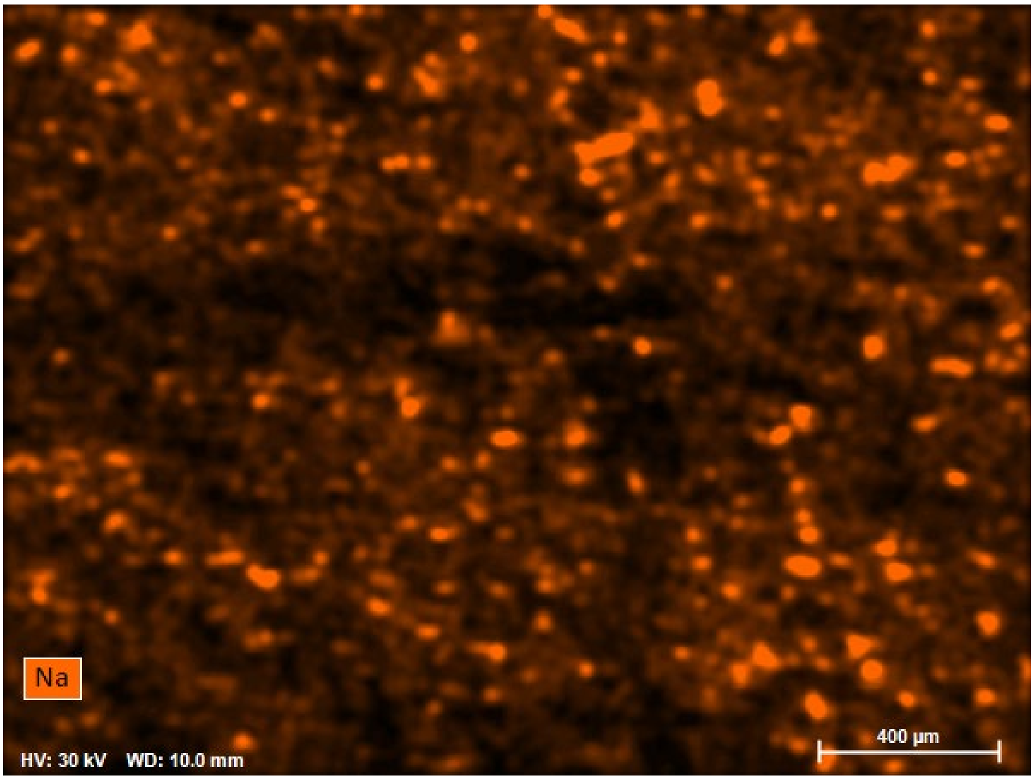

Al
HV: 30 kV WD: 10.0 mm
400 µm


Si
HV: 30 kV WD: 10.0 mm
400 µm

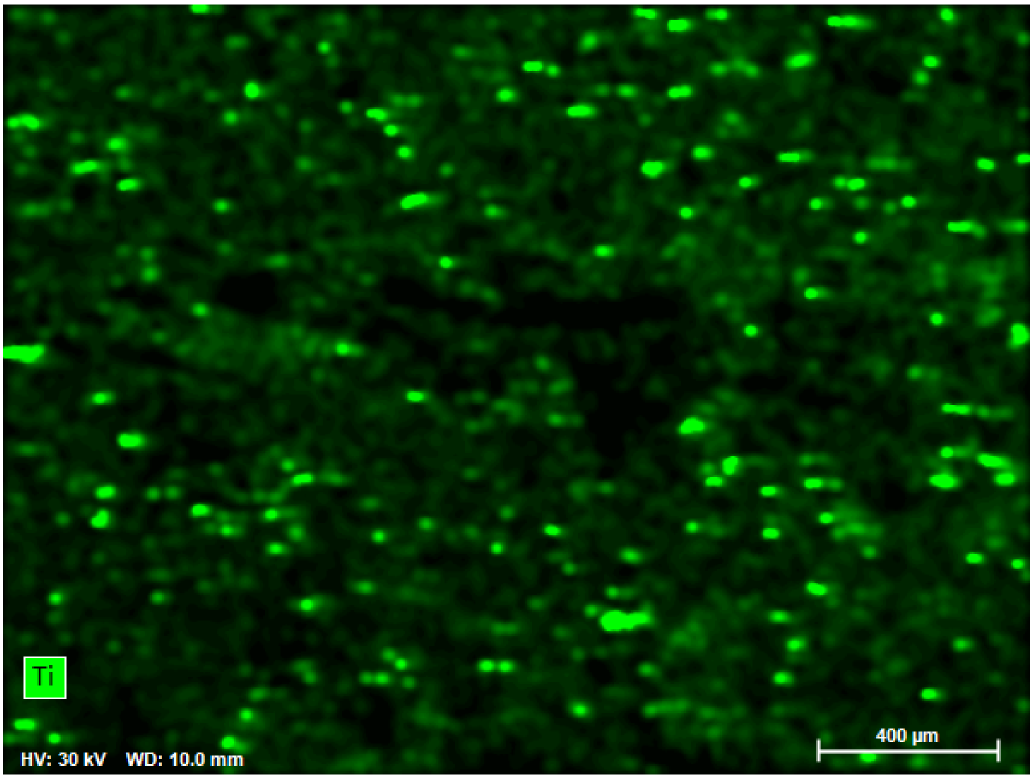

K
HV: 30 kV WD: 10.0 mm
400 µm

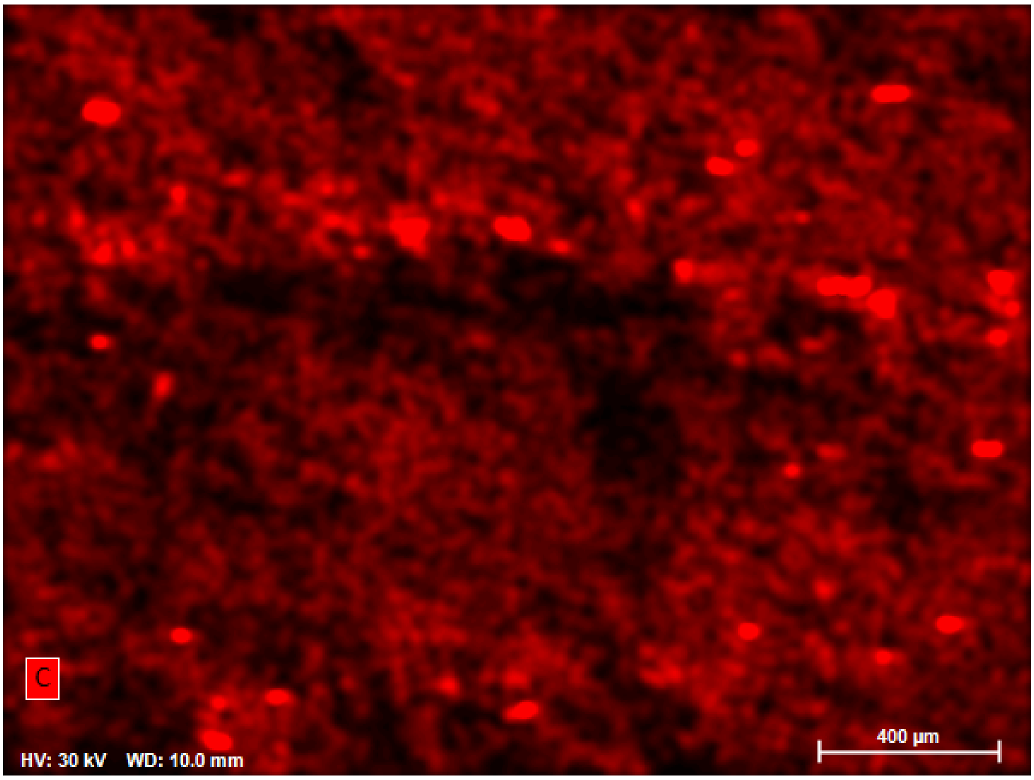


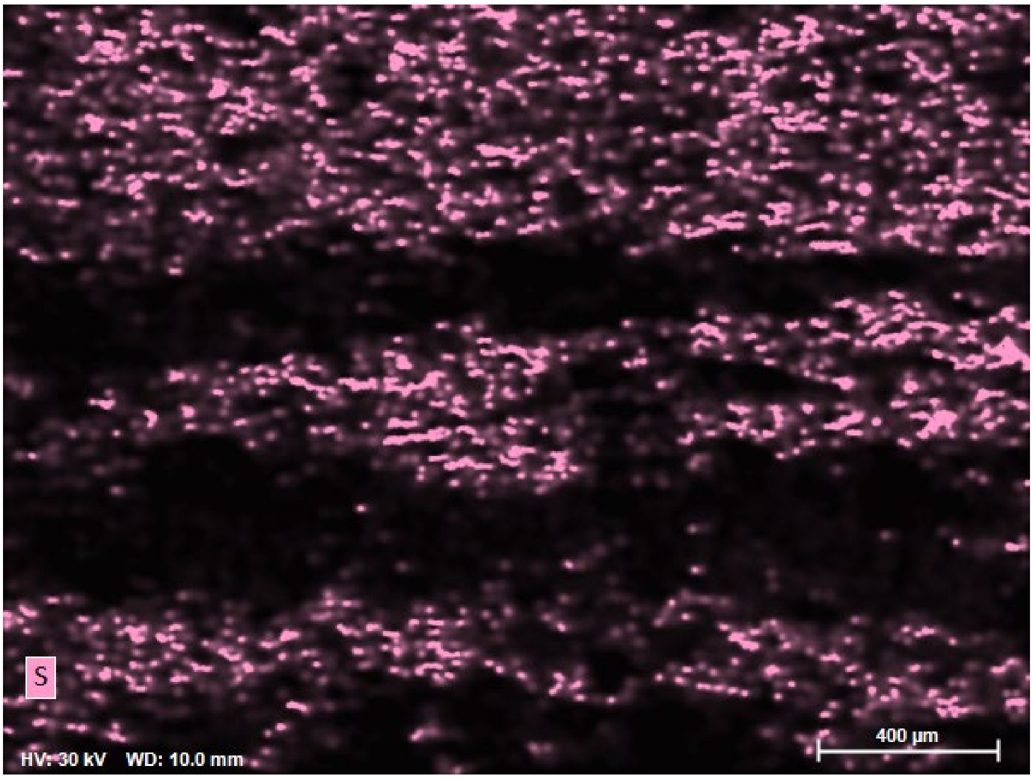
Fe
HV: 30 kV WD: 10.0 mm
400 µm

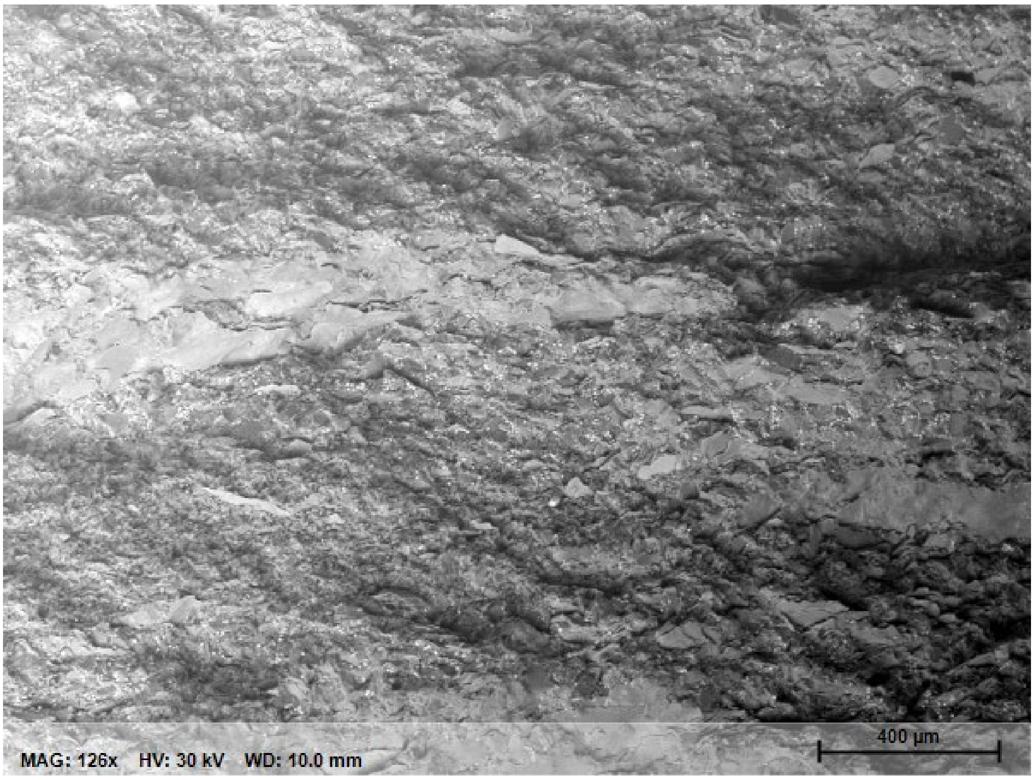


Na
HV: 30 kV WD: 10.0 mm
400 µm

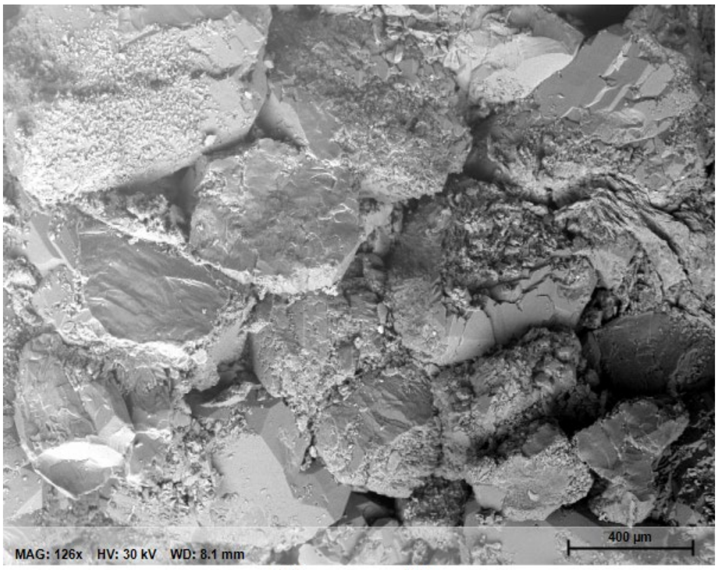

Ti
HV: 30 kV WD: 10.0 mm
400 µm


C
HV: 30 kV WD: 10.0 mm
400 µm

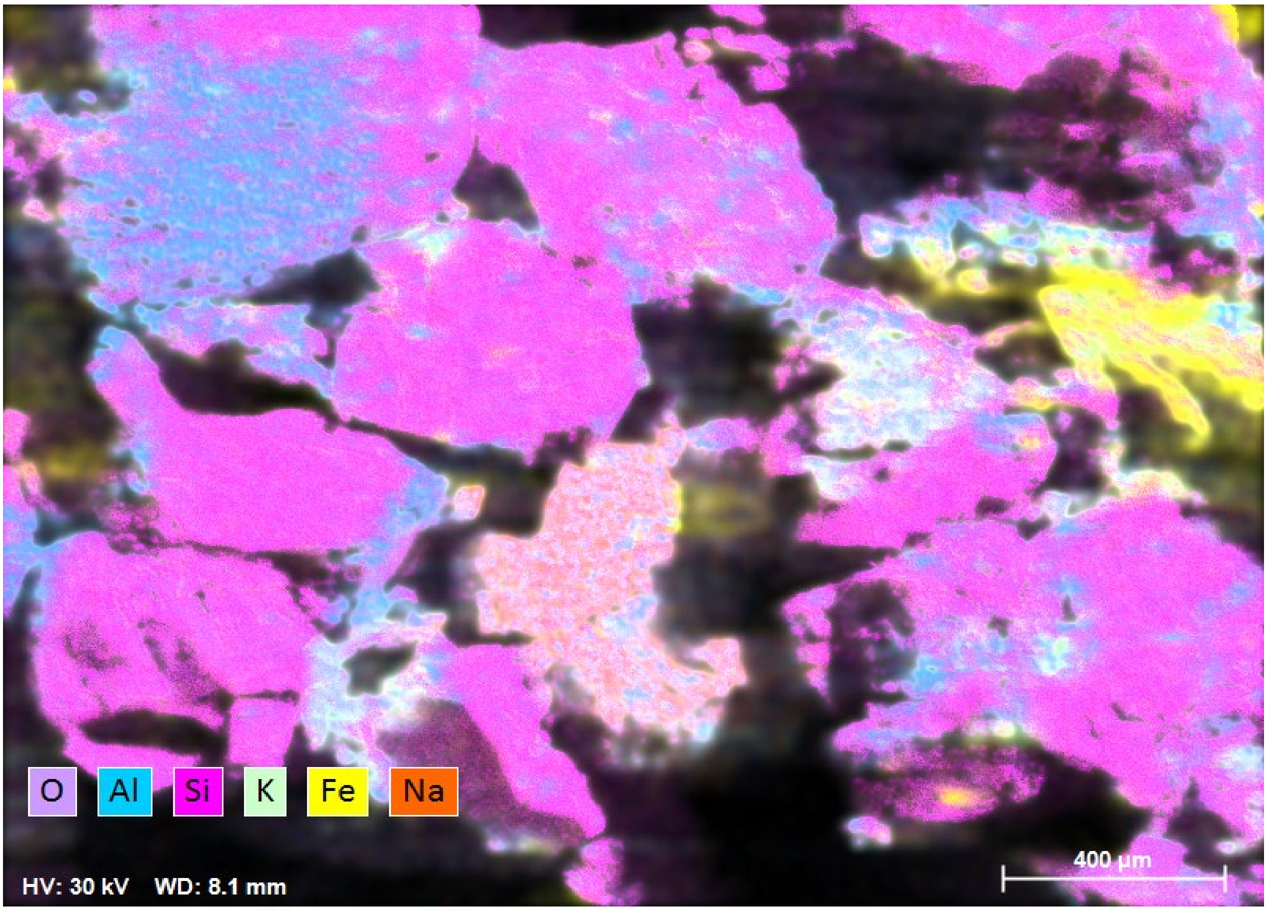

S
HV: 30 kV
WD: 10.0 mm
400 µm


MAG: 126x
HV: 30 kV
WD: 10.0 mm
400 µm

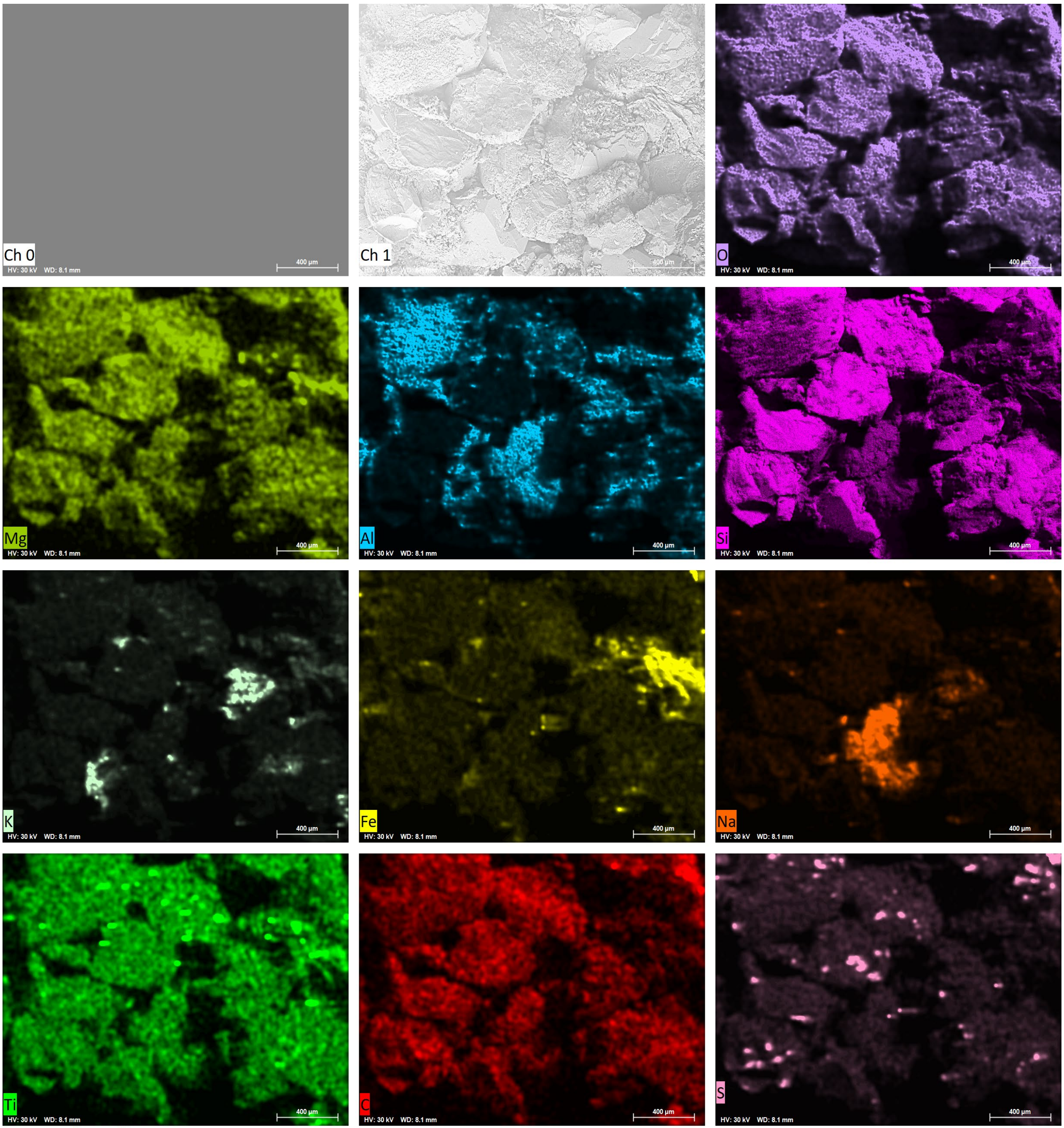
23009-05 Report



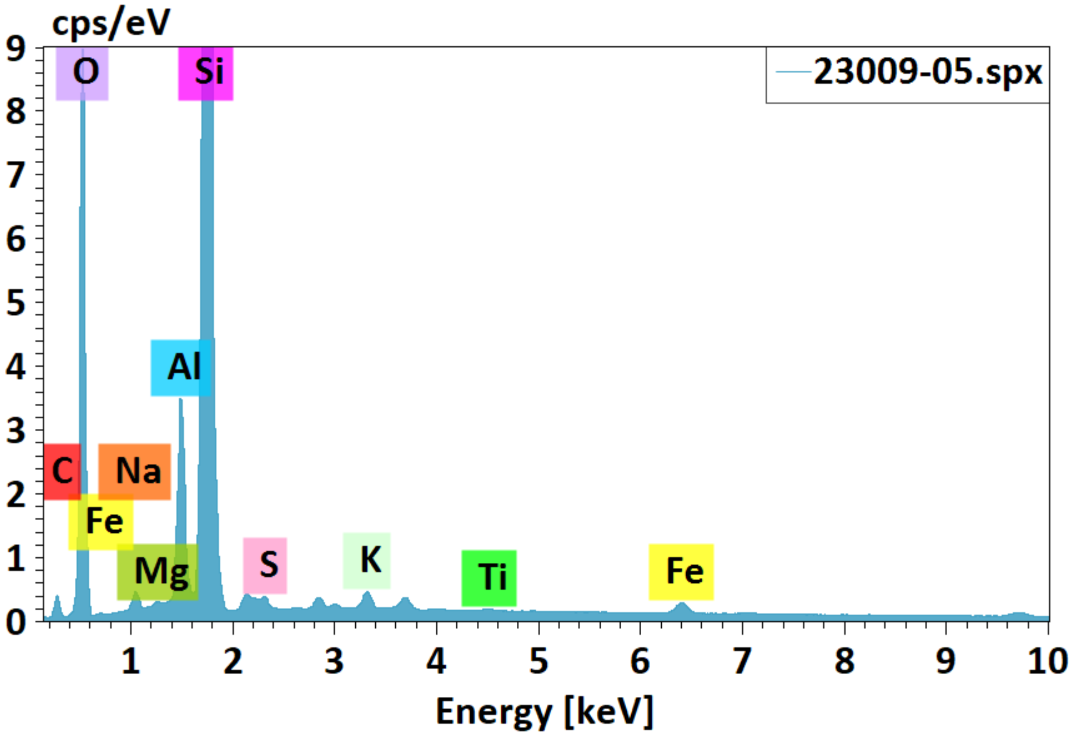
Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/8/2023	10:34:09 AM	30.0 keV	126x	8.1 mm



Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	2:07:53 PM	30.0 keV	126x	8.1 mm



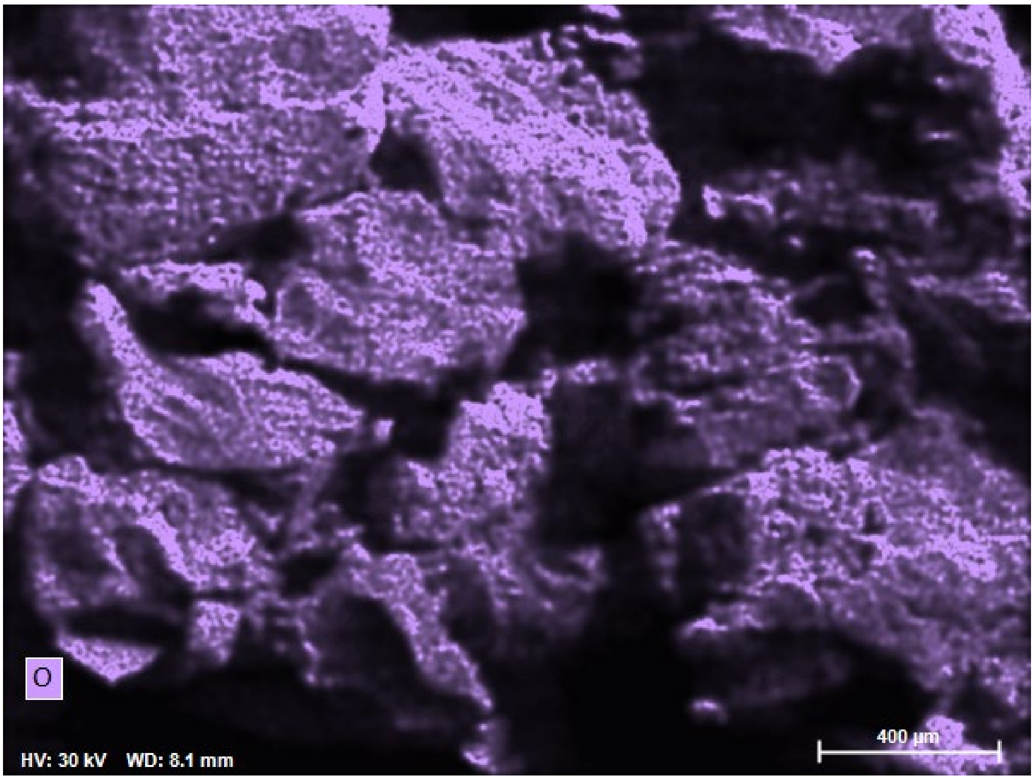
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	2:07:53 PM	30.0 keV	126x	8.1 mm

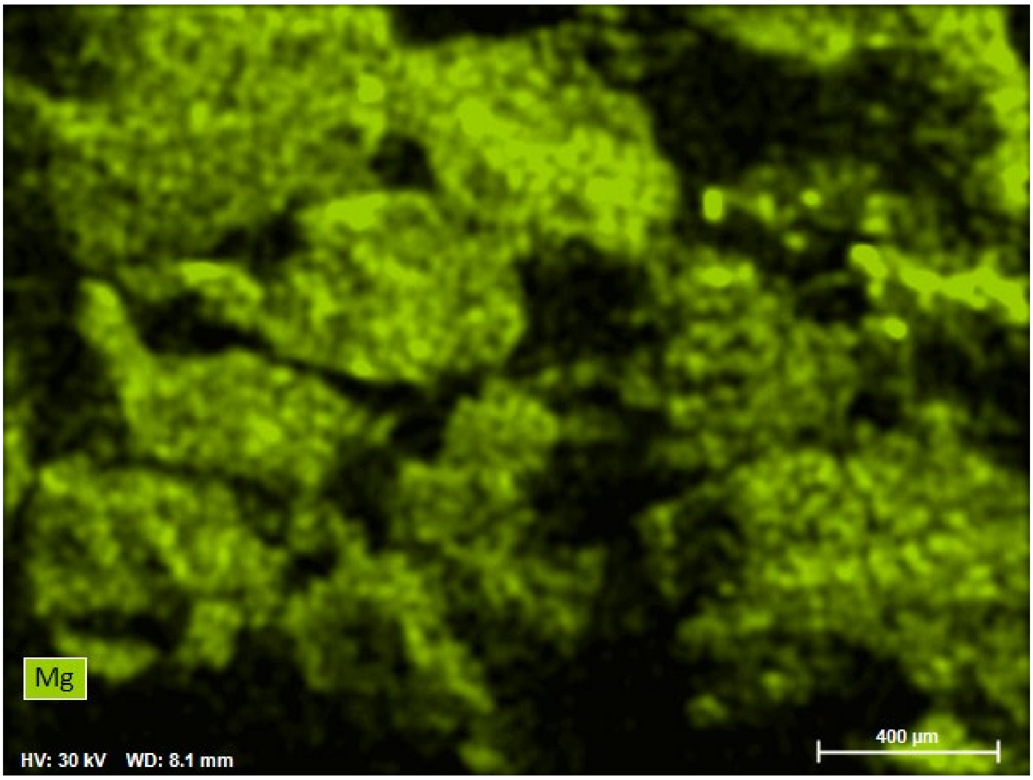


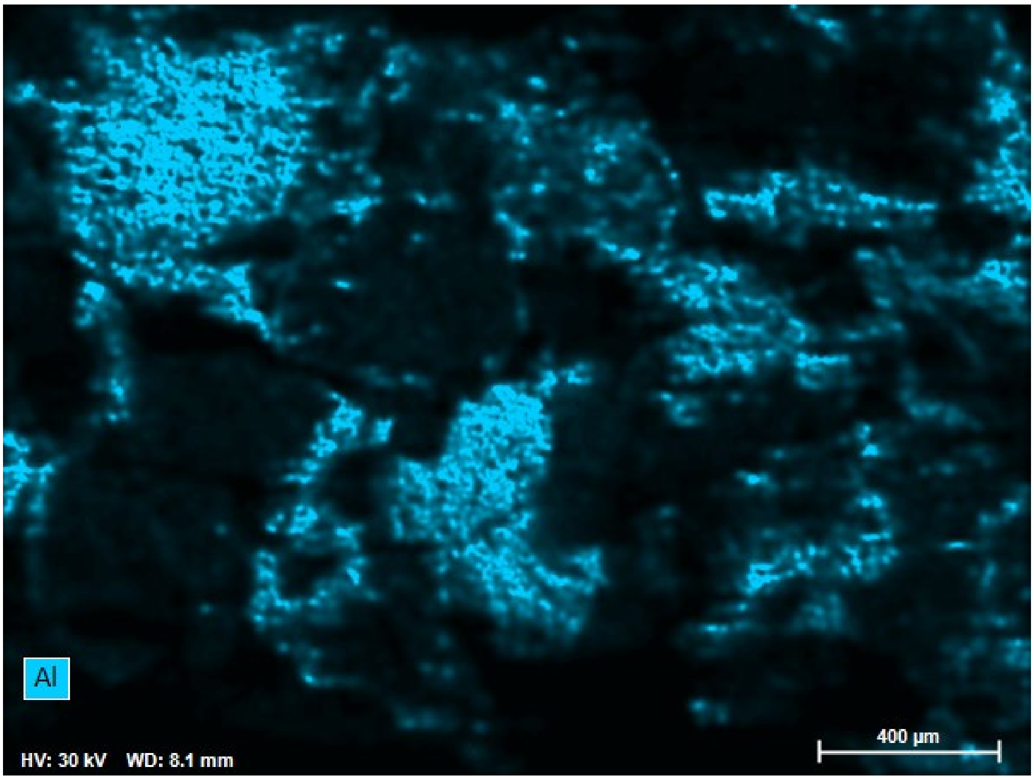
23009-05.spx

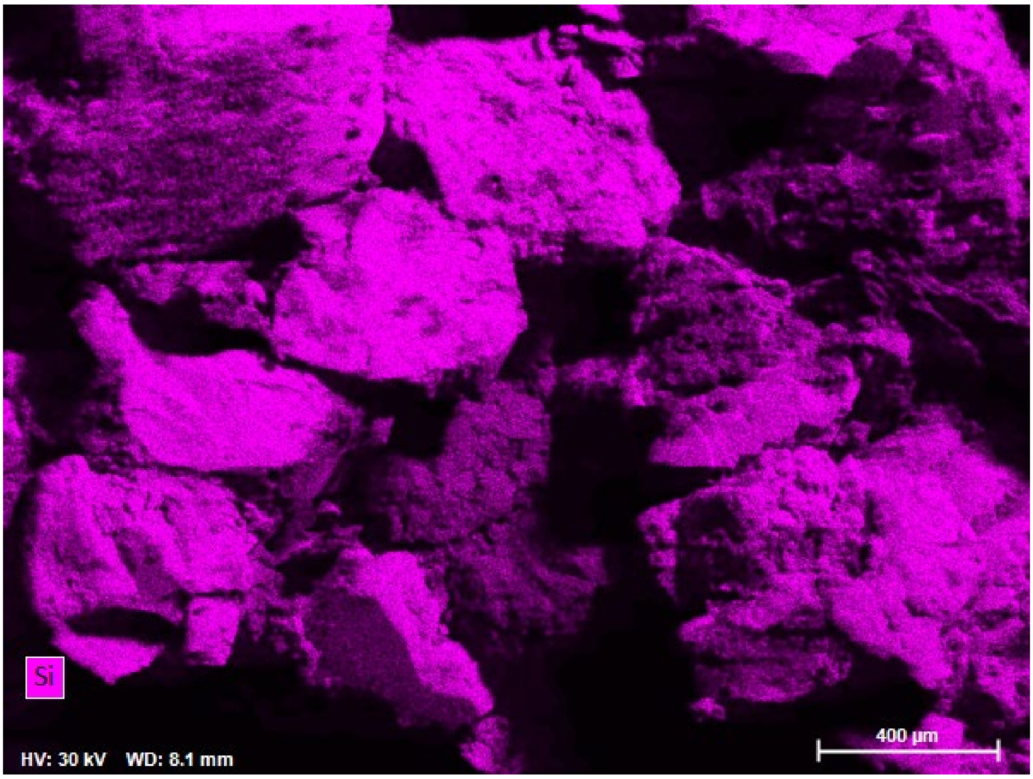
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	7.34	7.92	12.30
Oxygen	8	49.03	52.85	61.66
Sodium	11	0.69	0.74	0.60
Magnesium	12	0.05	0.06	0.04
Aluminium	13	3.31	3.57	2.47
Silicon	14	31.35	33.79	22.46
Sulfur	16	0.24	0.25	0.15
Potassium	19	0.31	0.33	0.16
Titanium	22	0.04	0.04	0.02
Iron	26	0.42	0.46	0.15
		92.78	**100.00**	**100.00**

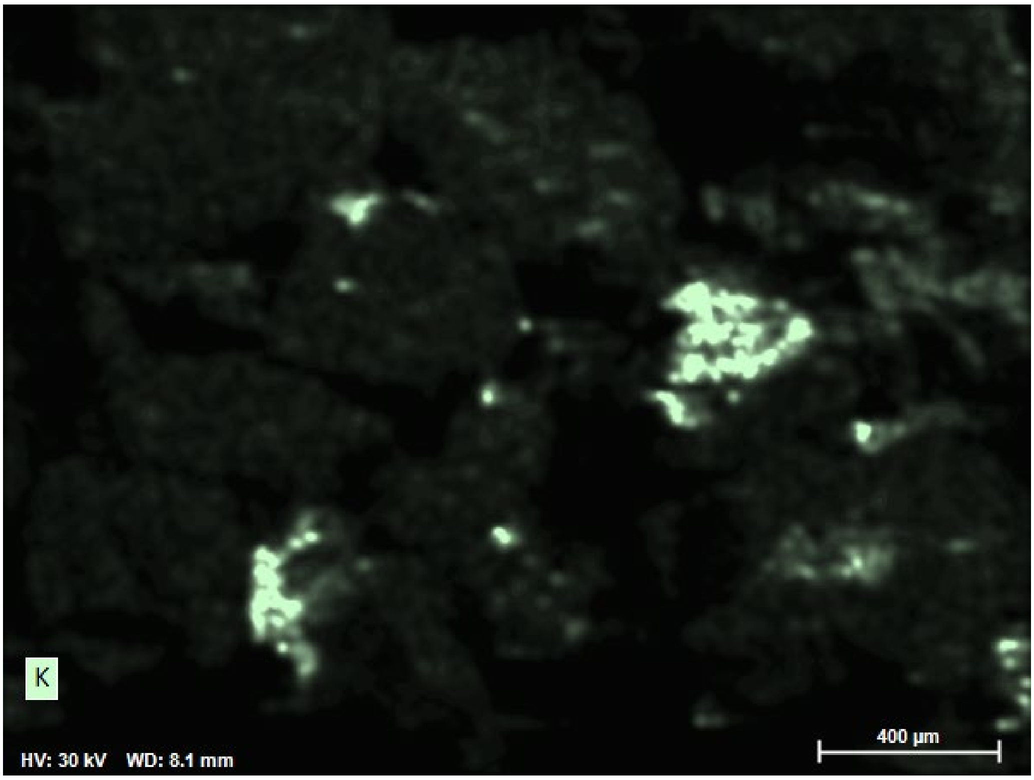

Ch 1
400 µm
HV: 30 kV WD: 8.1 mm

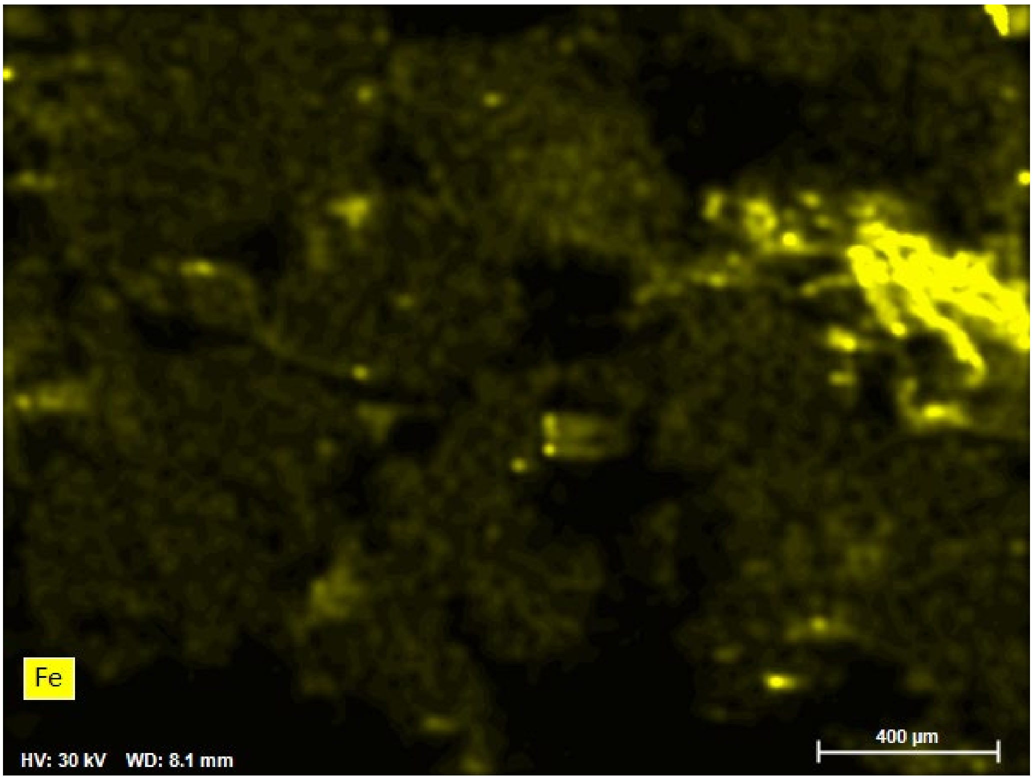

O
HV: 30 kV WD: 8.1 mm
400 µm

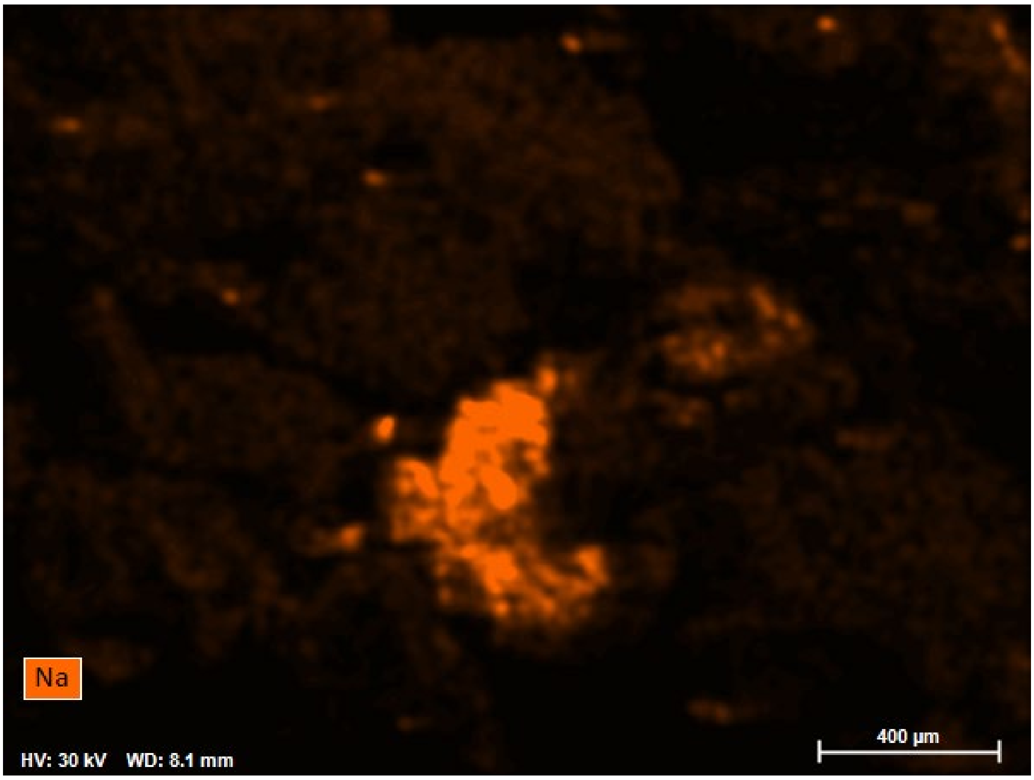

Mg
HV: 30 kV WD: 8.1 mm
400 µm

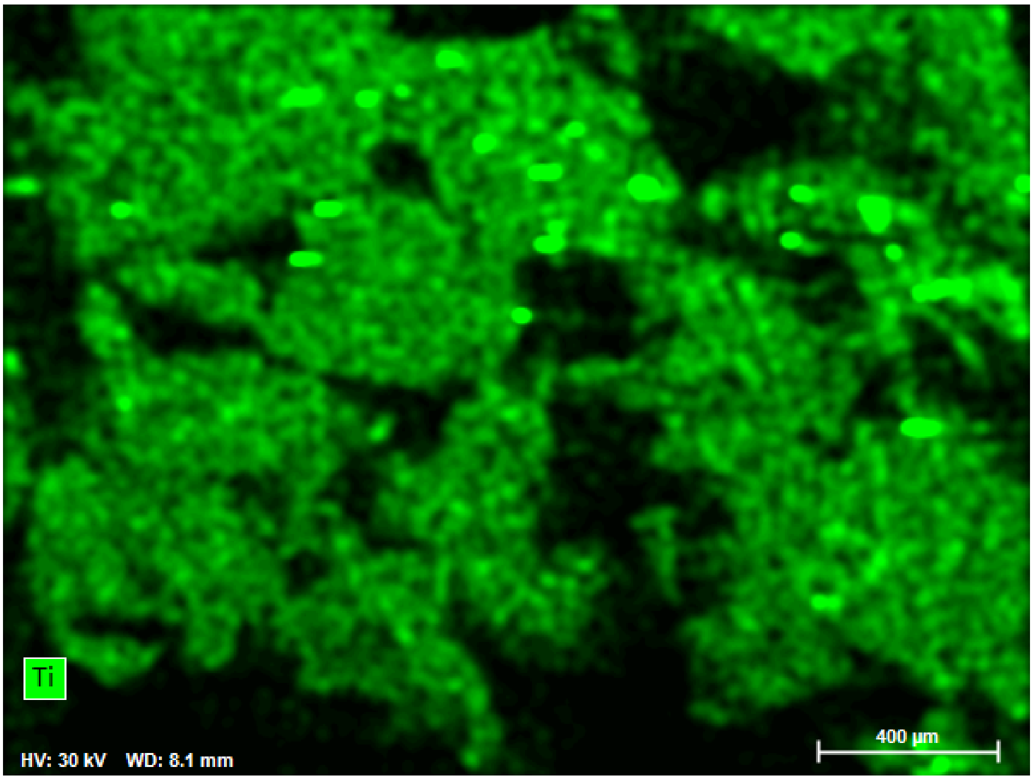

Al
HV: 30 kV WD: 8.1 mm
400 µm

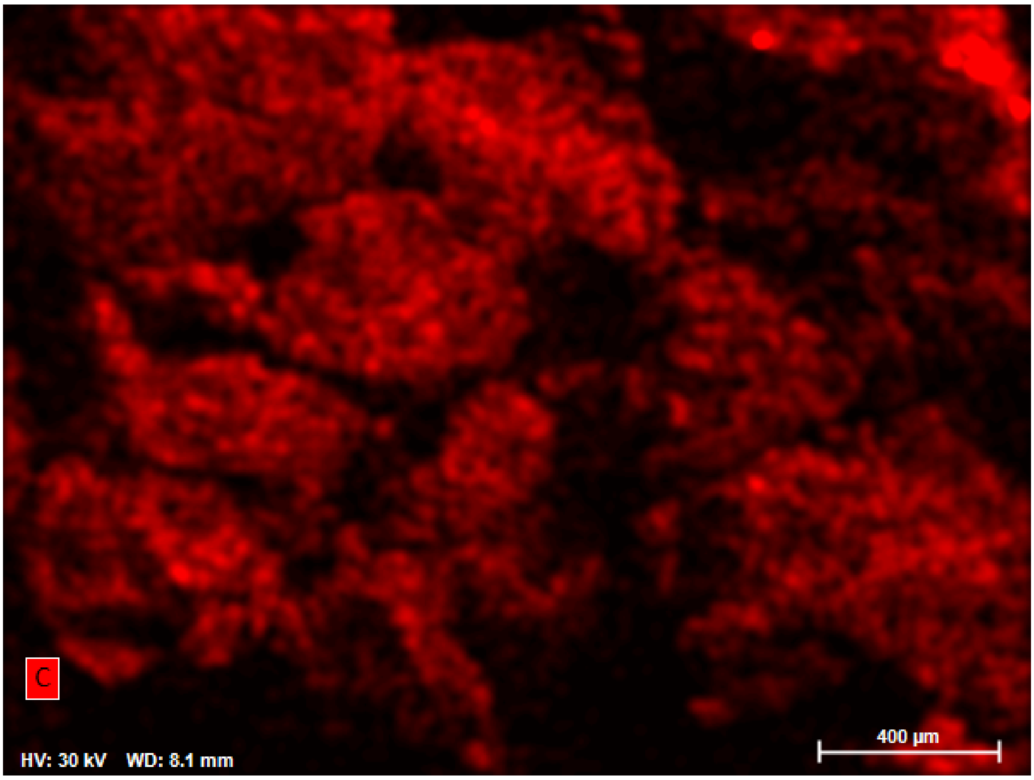

Si
HV: 30 kV WD: 8.1 mm
400 µm

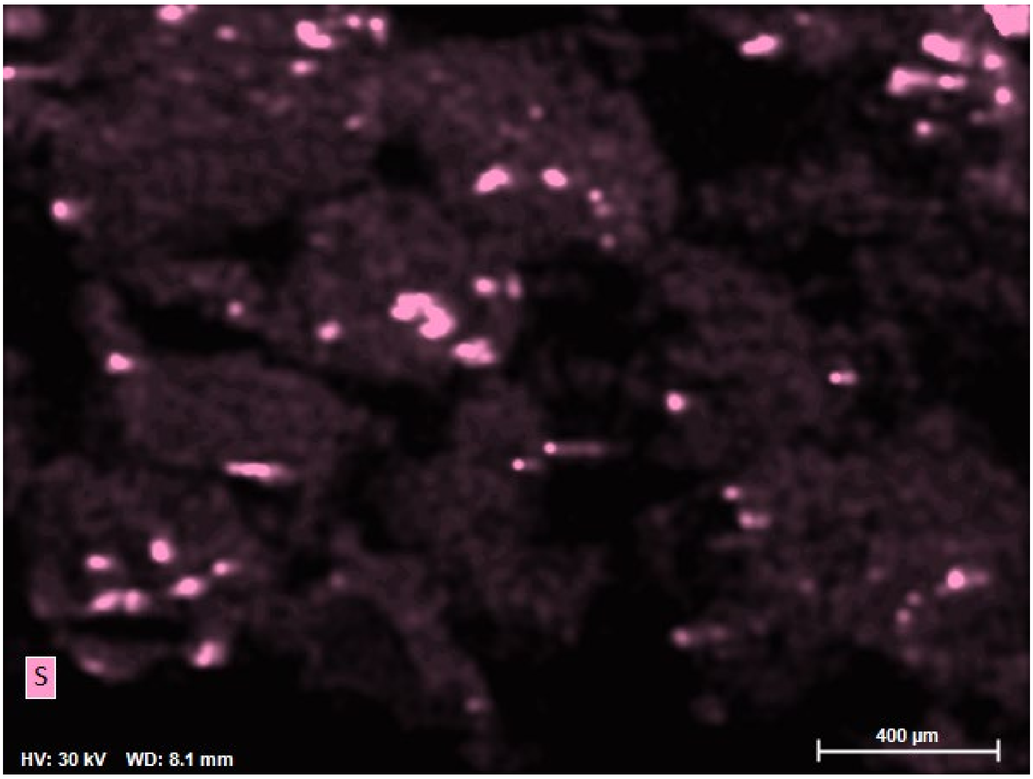

K
HV: 30 kV WD: 8.1 mm
400 µm

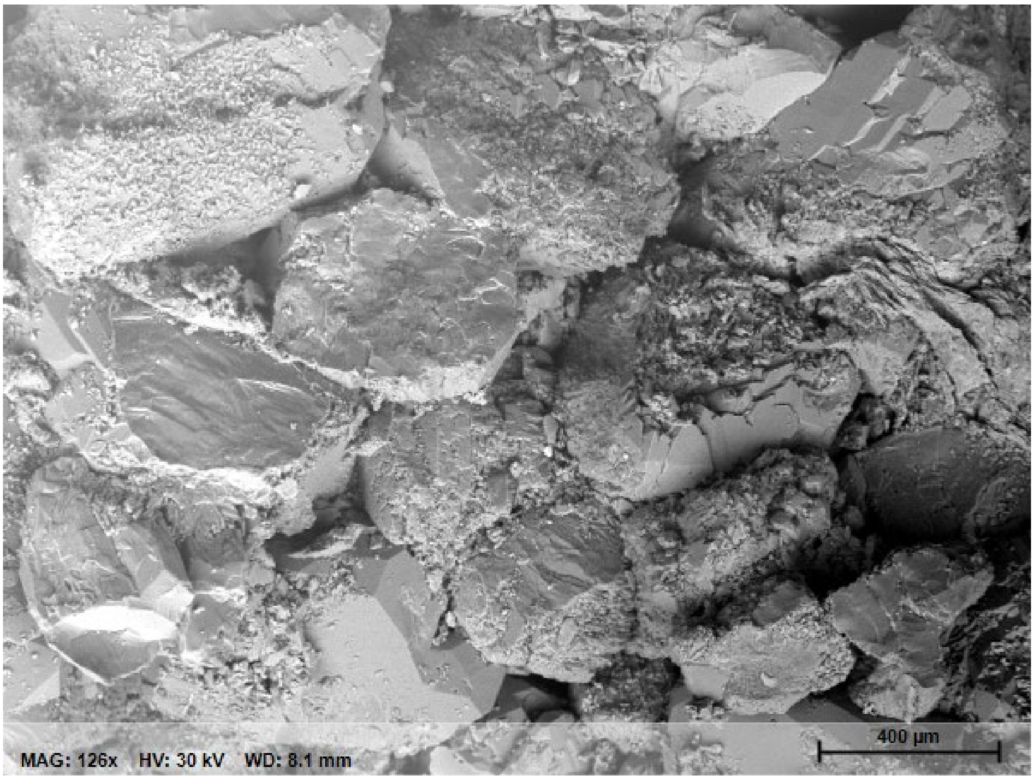

Fe
HV: 30 kV WD: 8.1 mm
400 µm


Na
HV: 30 kV WD: 8.1 mm
400 µm


Ti
400 µm
HV: 30 kV WD: 8.1 mm

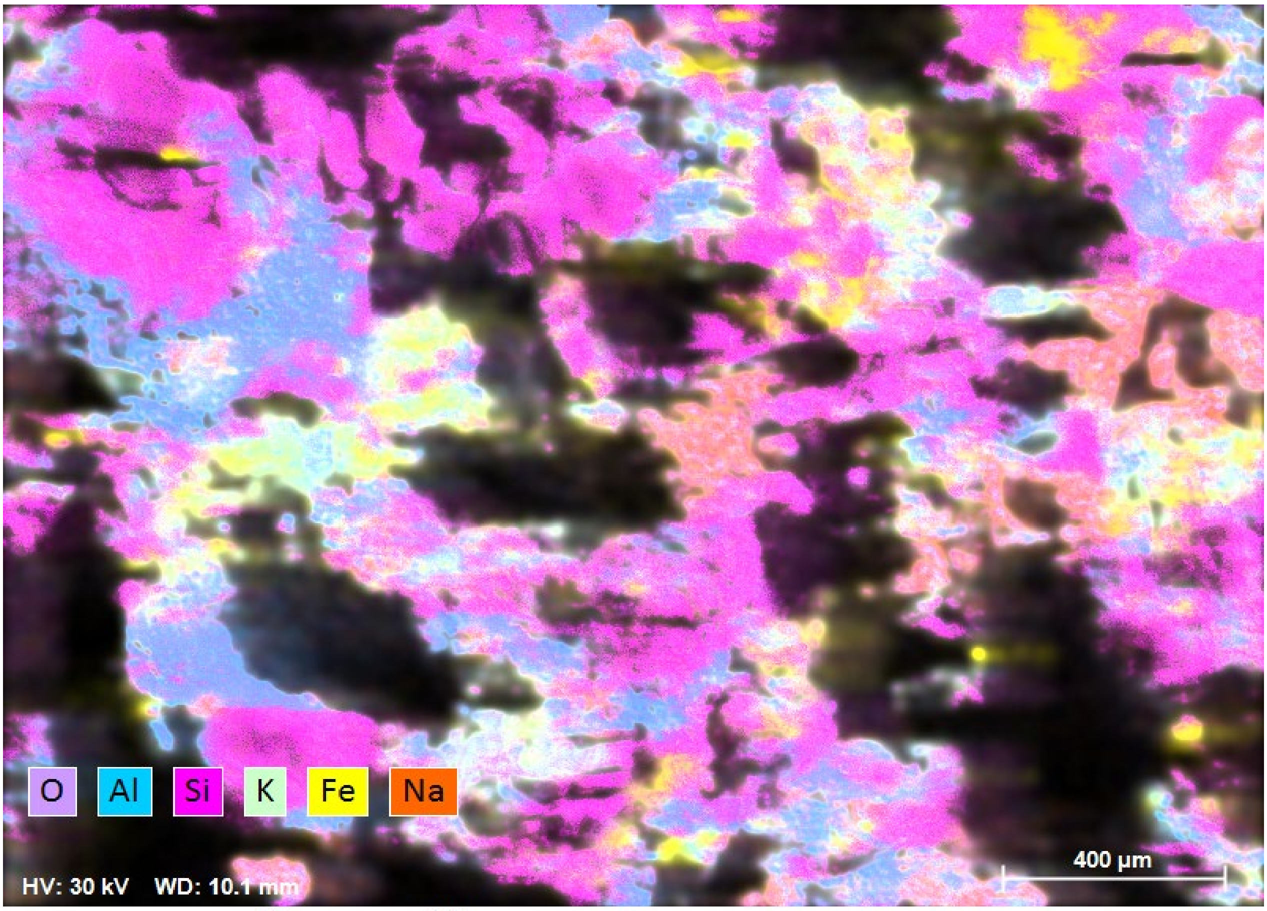

C
400 µm
HV: 30 kV WD: 8.1 mm


S
HV: 30 kV WD: 8.1 mm
400 µm

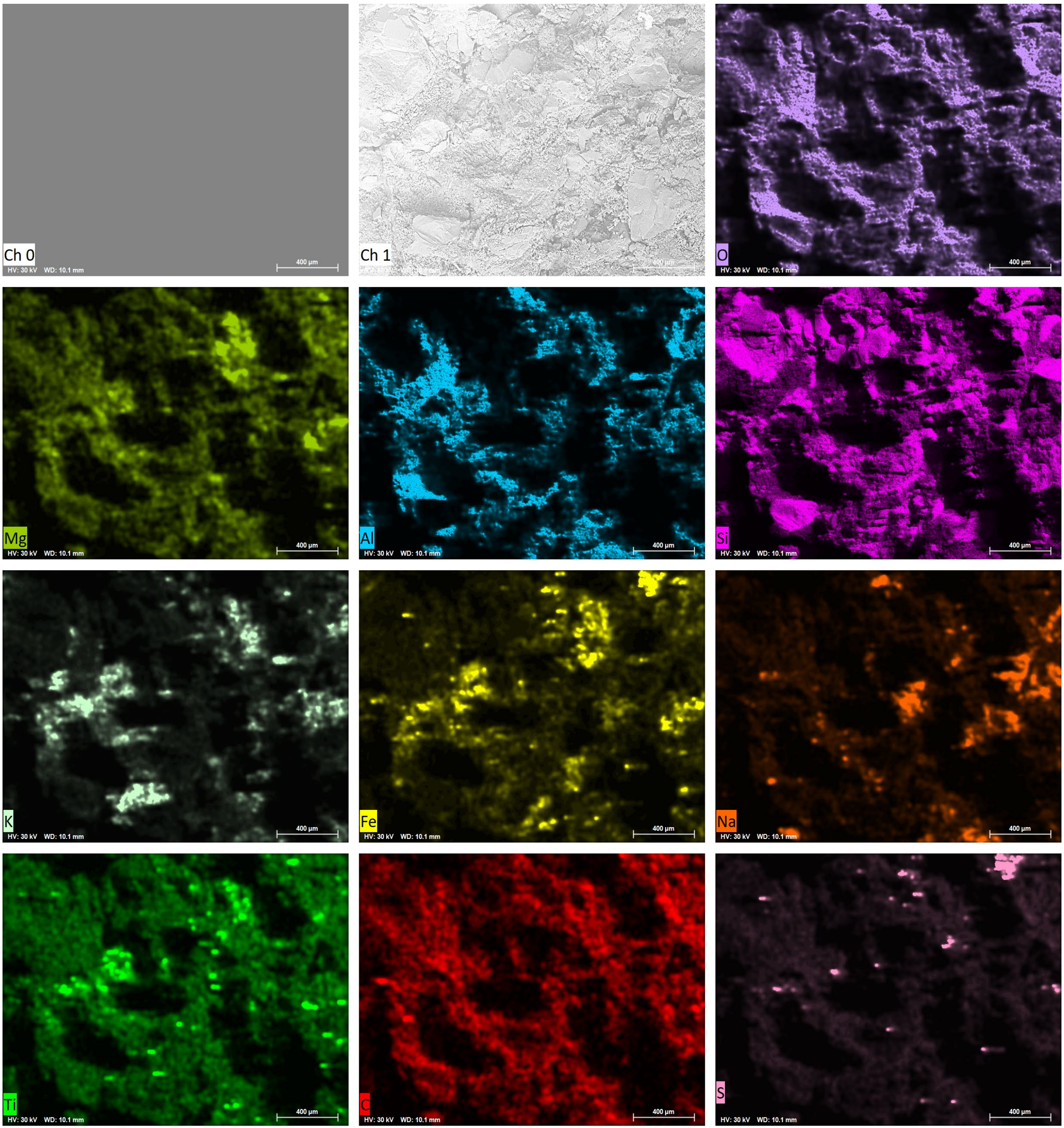

MAG: 126x HV: 30 kV WD: 8.1 mm
400 µm

23009-06 Report

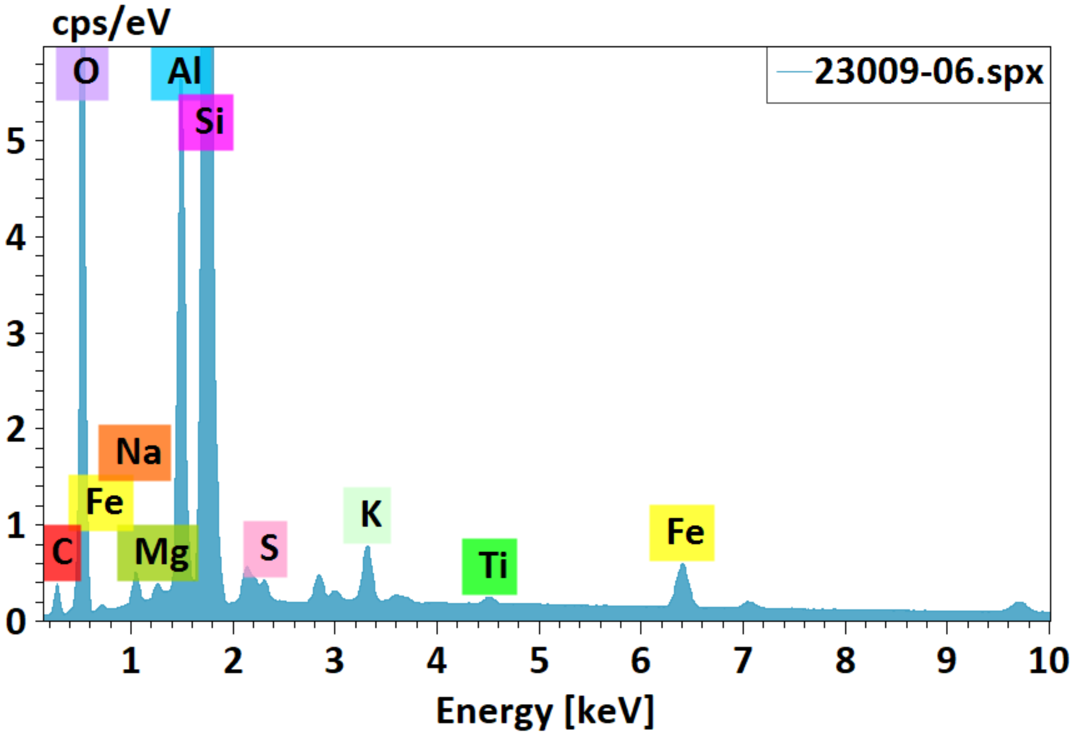
Name	Date	Time	HV [kV]	Mag	WD [mm]
EXTERN_1	3/8/2023	11:40:56 AM	30.0 keV	126x	10.1 mm



Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	2:14:31 PM	30.0 keV	126x	10.1 mm



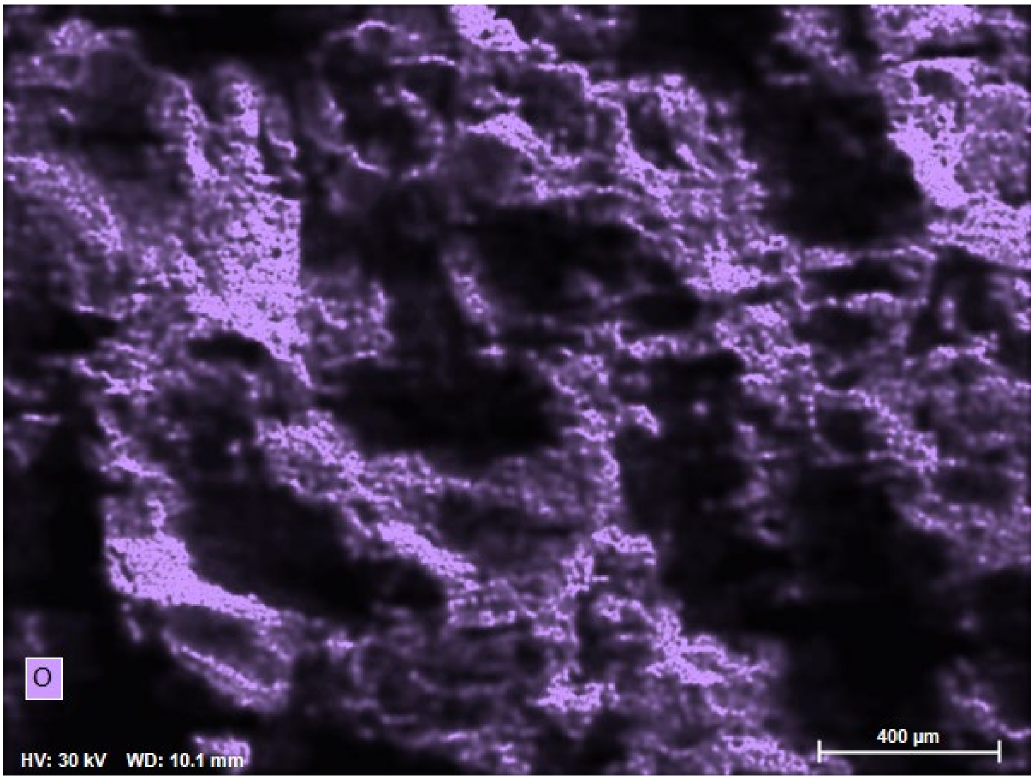
Date	Time	HV [kV]	Mag	WD [mm]
3/8/2023	2:14:31 PM	30.0 keV	126x	10.1 mm

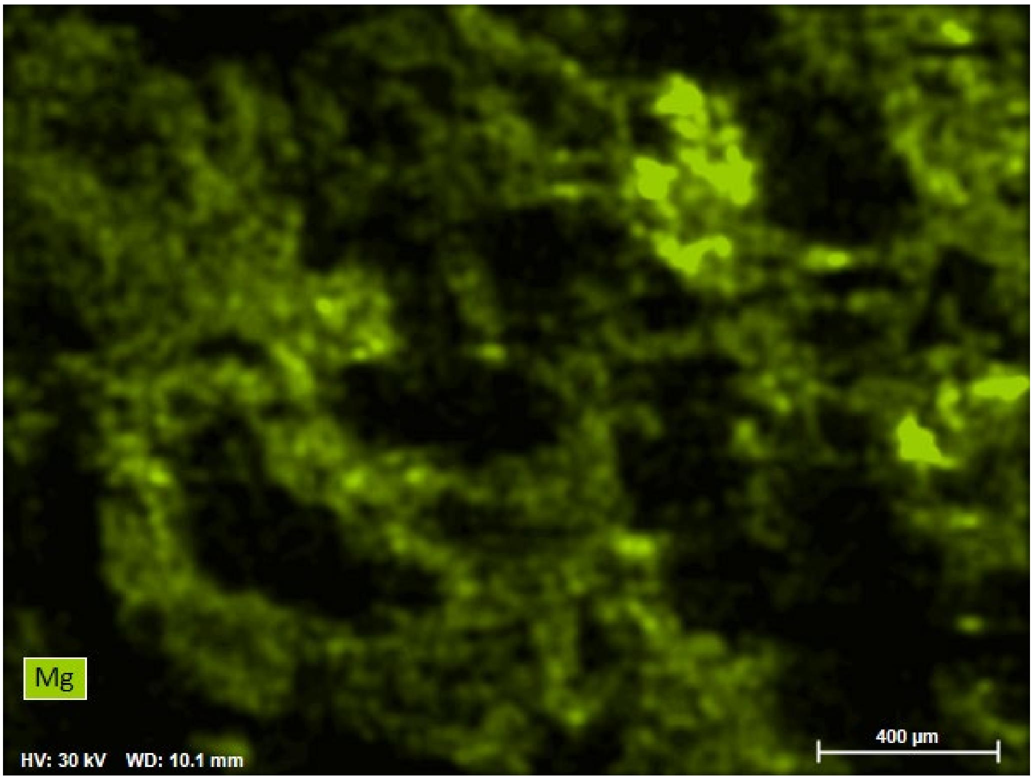


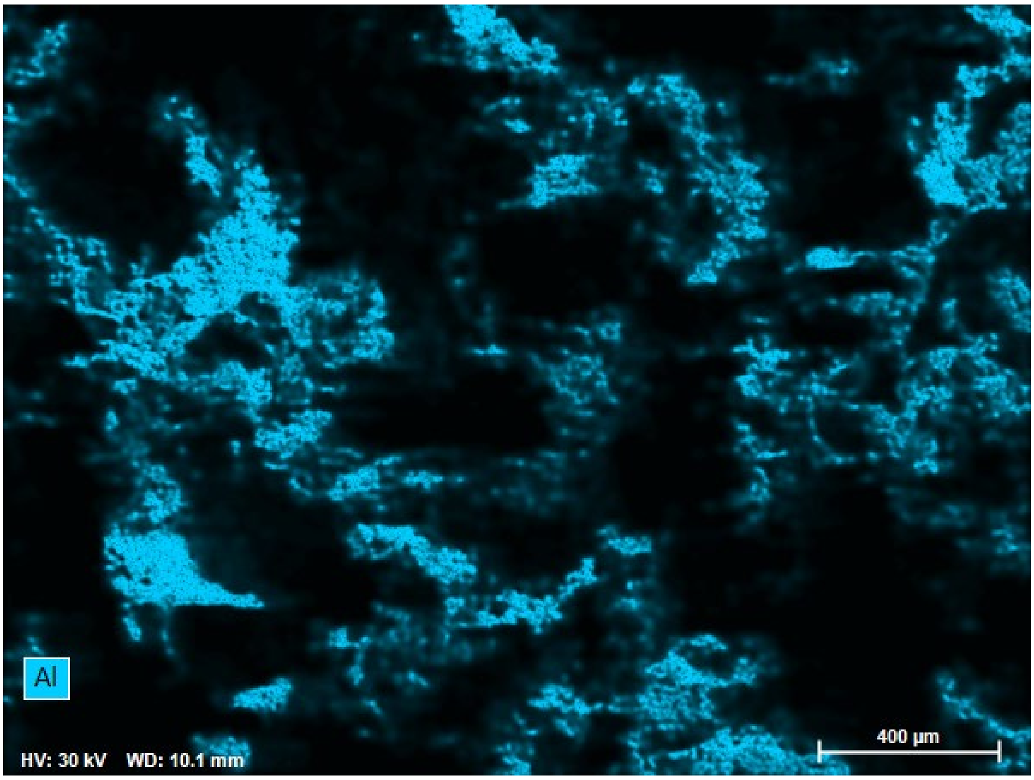
23009-06.spx

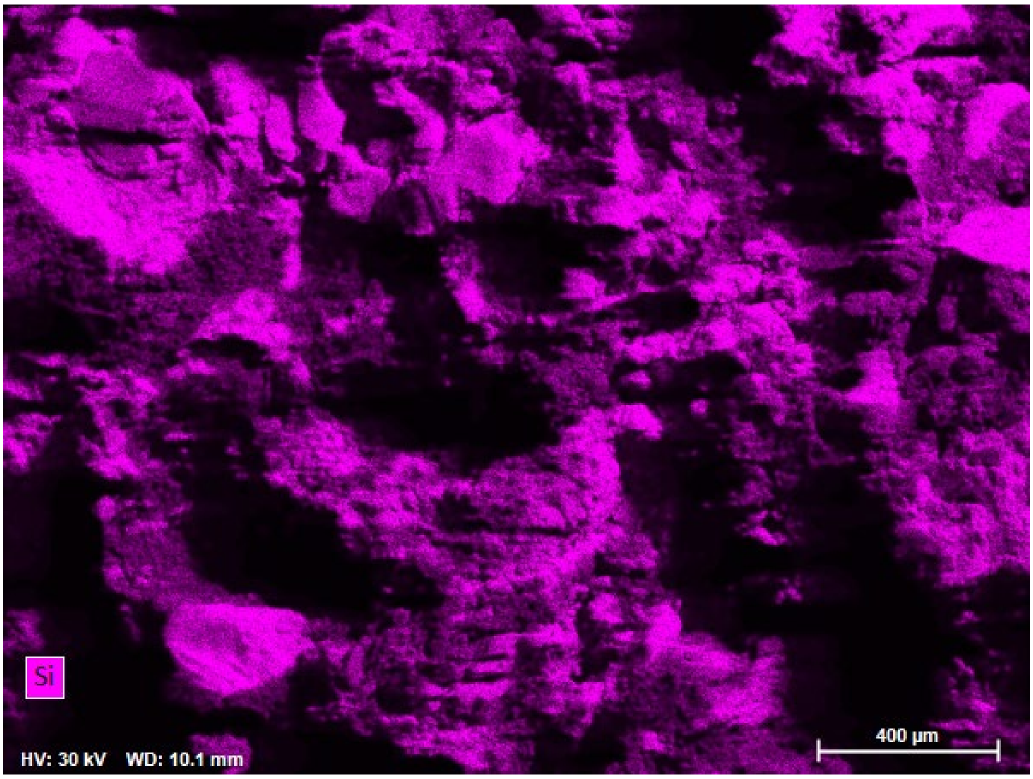
Element	At. No.	Mass [%]	Mass Norm. [%]	Atom [%]
Carbon	6	7.22	7.64	12.07
Oxygen	8	47.75	50.50	59.93
Sodium	11	0.87	0.92	0.76
Magnesium	12	0.22	0.23	0.18
Aluminium	13	6.19	6.55	4.61
Silicon	14	29.84	31.57	21.34
Sulfur	16	0.35	0.37	0.22
Potassium	19	0.86	0.91	0.44
Titanium	22	0.15	0.16	0.06
Iron	26	1.09	1.15	0.39
		94.54	100.00	100.00

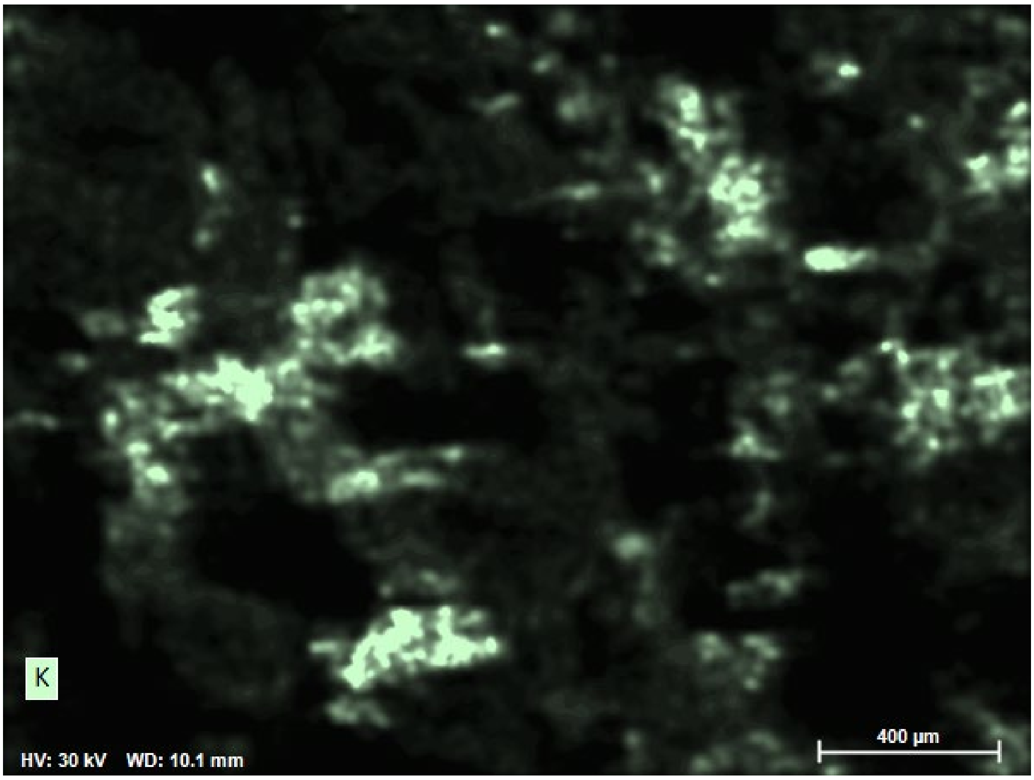

Ch 1
HV: 30 kV
WD: 10.1 mm
400 µm

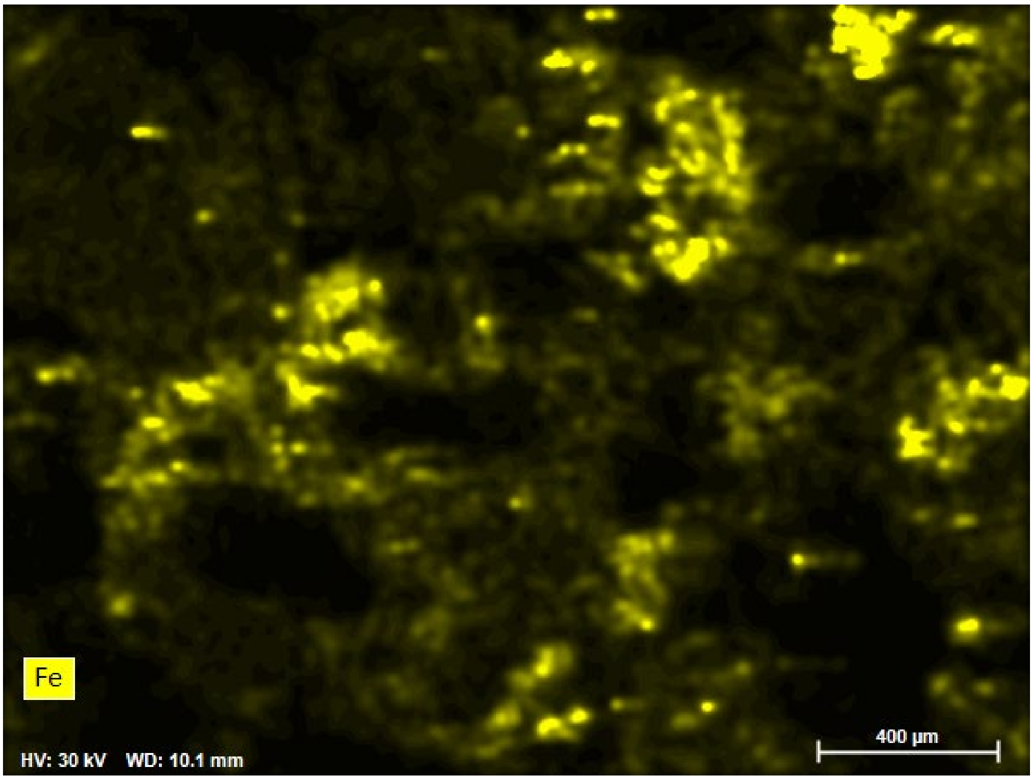

O
HV: 30 kV
WD: 10.1 mm
400 µm

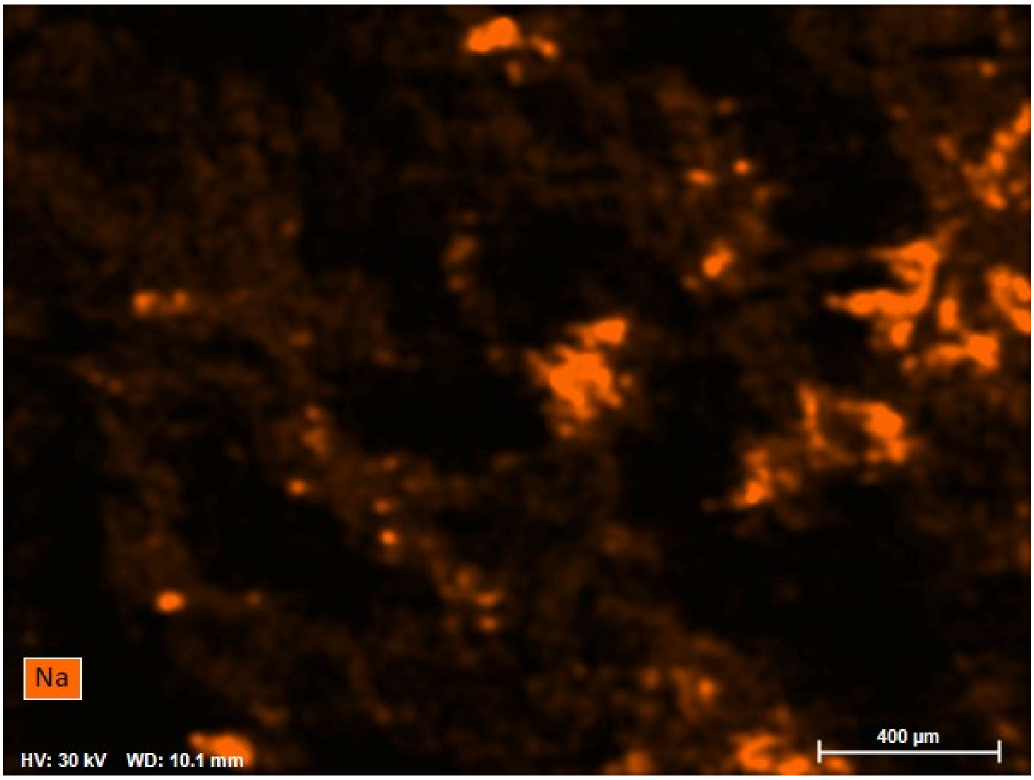

Mg
HV: 30 kV WD: 10.1 mm
400 µm

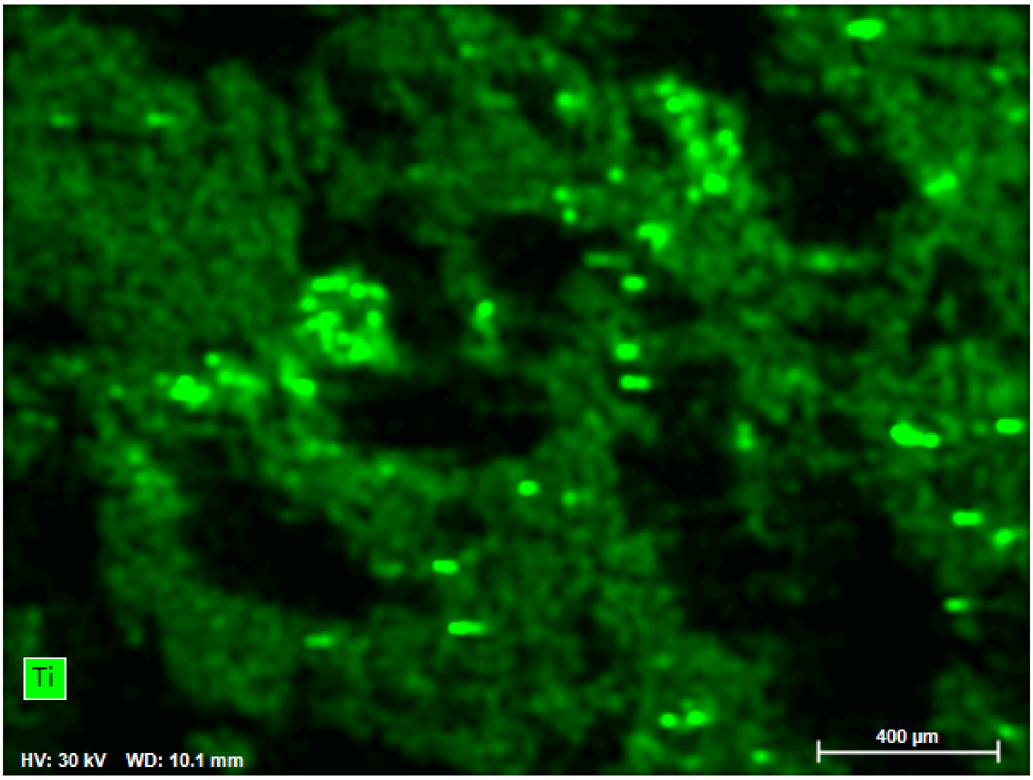

Al
HV: 30 kV WD: 10.1 mm
400 µm

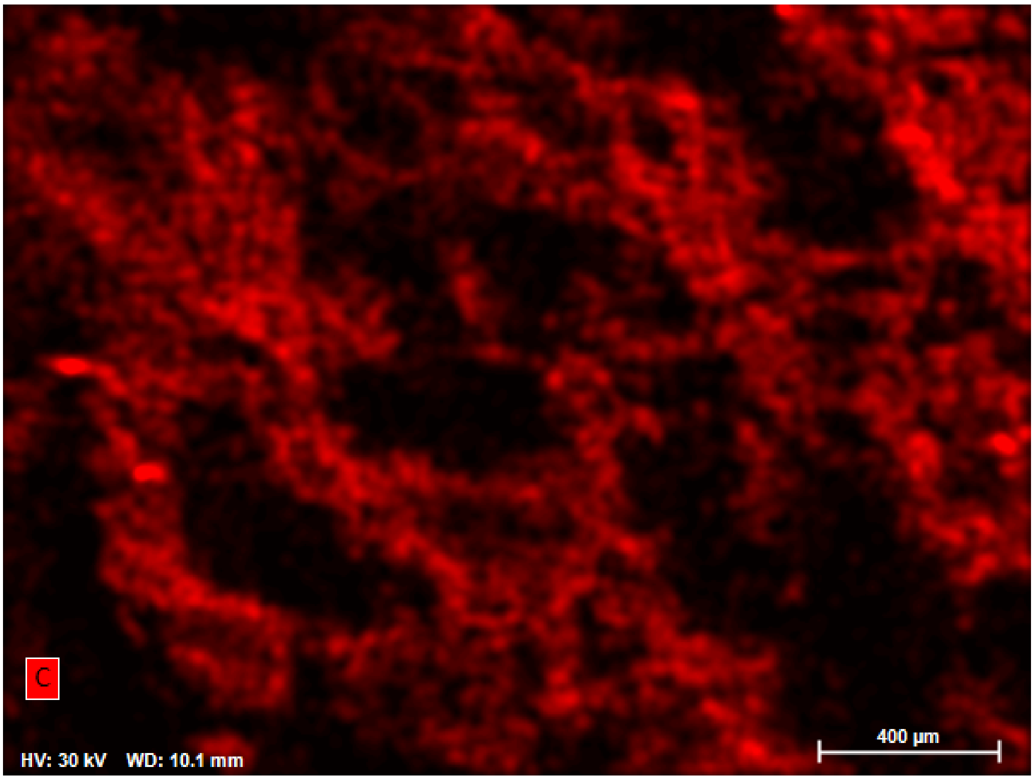

Si
HV: 30 kV WD: 10.1 mm
400 µm

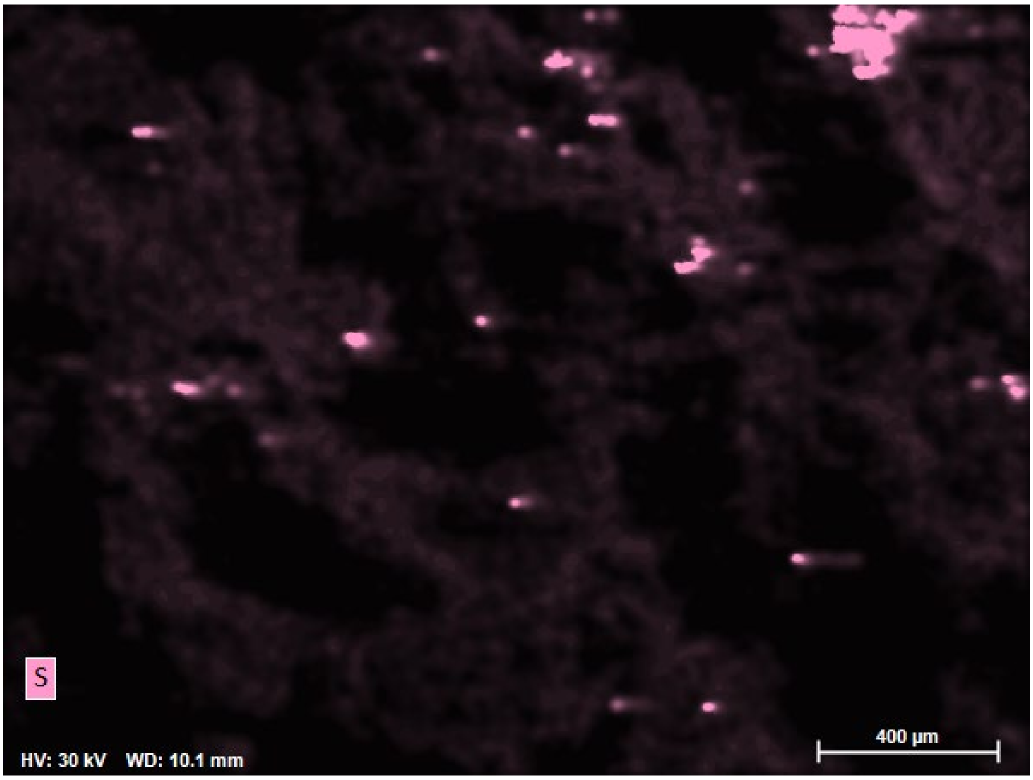

K
HV: 30 kV WD: 10.1 mm
400 µm

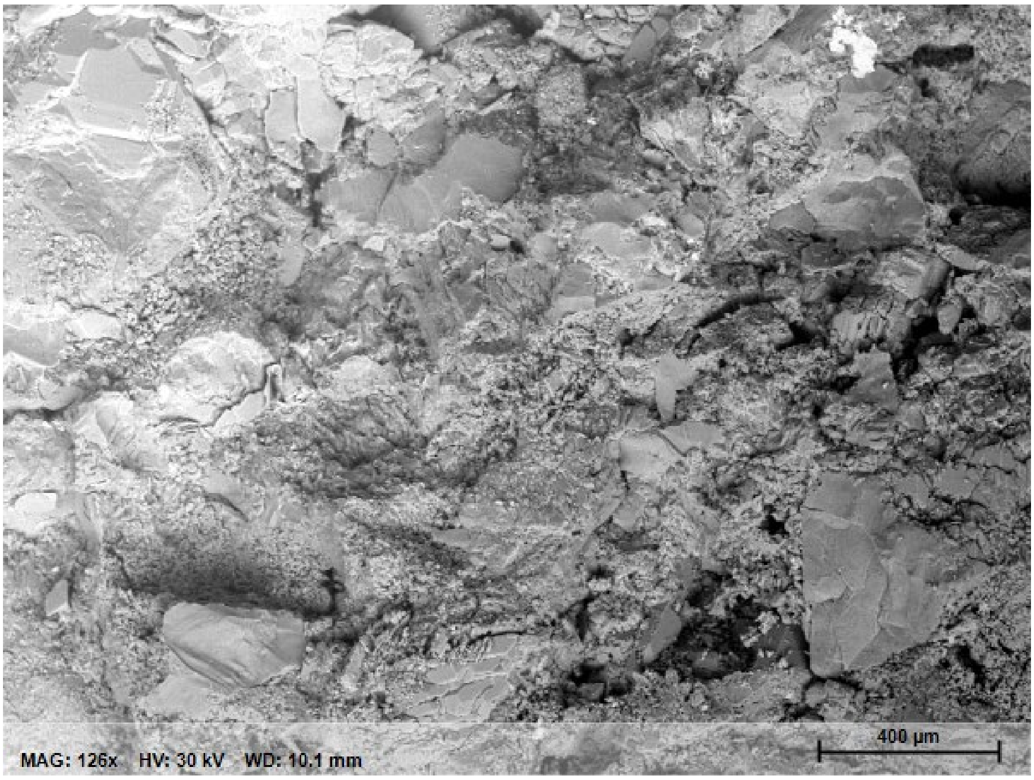

Fe
HV: 30 kV WD: 10.1 mm
400 µm


Na
HV: 30 kV WD: 10.1 mm
400 µm


Ti
HV: 30 kV WD: 10.1 mm
400 µm


C
HV: 30 kV WD: 10.1 mm
400 µm


S
HV: 30 kV WD: 10.1 mm
400 µm


MAG: 126x HV: 30 kV WD: 10.1 mm
400 µm

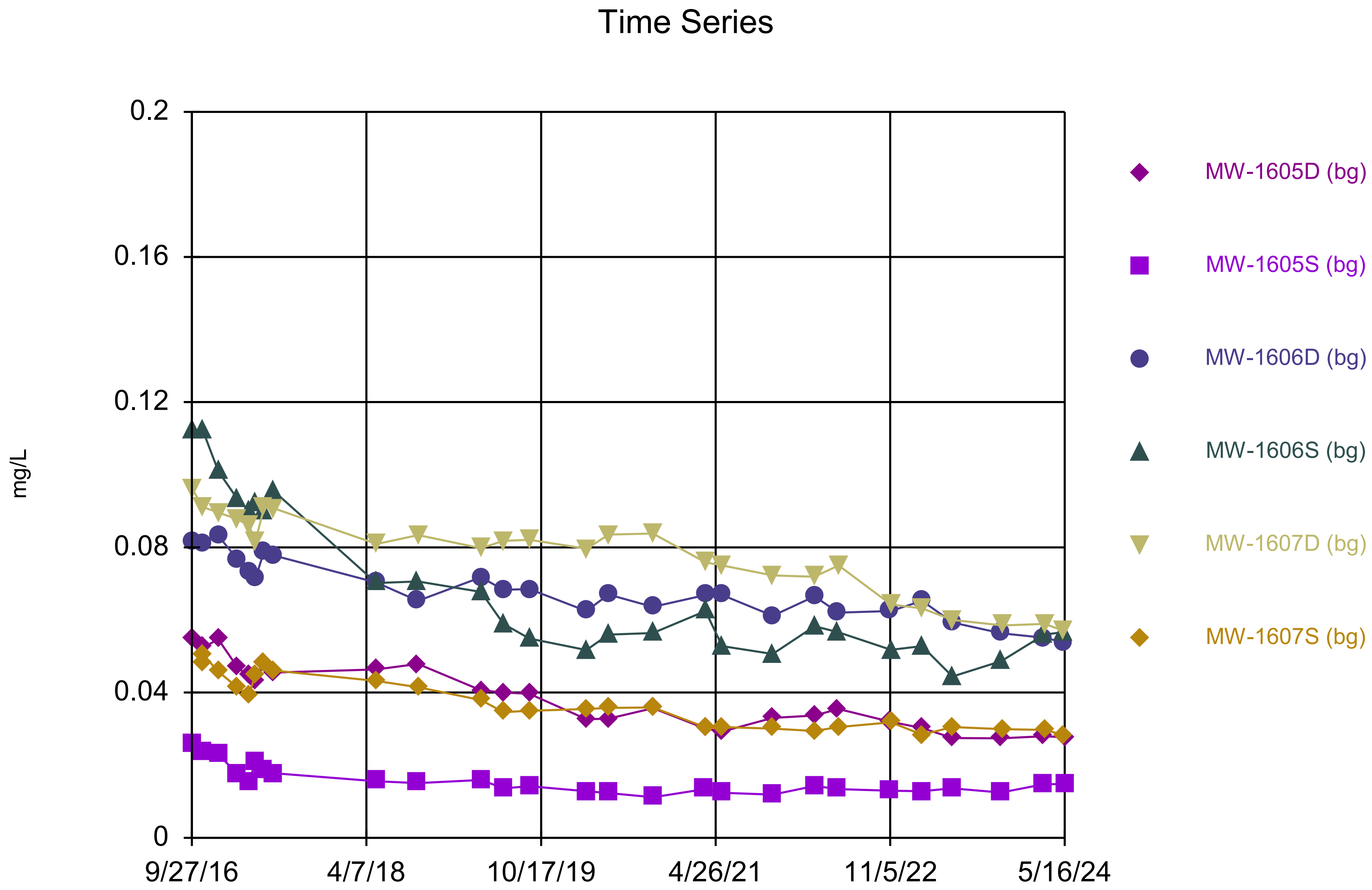
ATTACHMENT E

Molybdenum Upper Tolerance Limit Statistical Assessment

Upper Tolerance Limit - Downgradient Well Series

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 11/20/2024, 8:27 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Molybdenum, total (mg/L)	n/a	0.09719	n/a	n/a	n/a	162	0.05096	0.02486	0	None	No	0.05	Inter

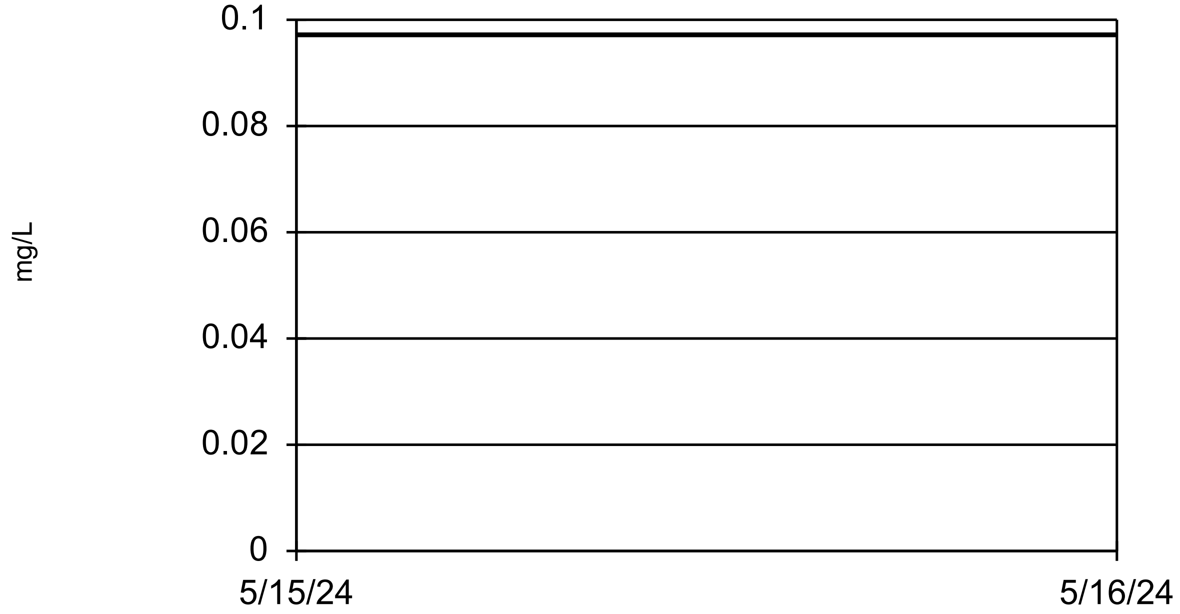


Constituent: Molybdenum, total Analysis Run 11/20/2024 8:26 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Tolerance Limit

Interwell Parametric



Limit = 0.09719

95% coverage. Background Data Summary: Mean=0.05096, Std. Dev.=0.02486, n=162. Normality test: Chi Squared @alpha = 0.01, calculated = 8.864, critical = 14.07. Report alpha = 0.05.

Constituent: Molybdenum, total Analysis Run 11/20/2024 8:26 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Tolerance Limit

Constituent: Molybdenum, total (mg/L)   Analysis Run 11/20/2024 8:27 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

	MW-1605D (bg)	MW-1605S (bg)	MW-1606S (bg)	MW-1606D (bg)	MW-1607D (bg)	MW-1607S (bg)
9/27/2016	0.0546	0.0258	0.112	0.0814	0.0962	
10/31/2016						0.0484
11/1/2016		0.0239				
11/2/2016	0.0524		0.112	0.0812	0.0911	0.0504
12/20/2016	0.0547	0.0229	0.101	0.0832	0.0896	
12/21/2016						0.0457
2/21/2017	0.0468	0.0175	0.0931	0.0766	0.0877	0.0413
3/28/2017	0.0446	0.0154	0.0901	0.0733		0.0392
3/29/2017					0.0859	
4/18/2017	0.0432	0.0208	0.0924	0.0715	0.0818	0.0451
5/16/2017	0.0481	0.0186	0.0902	0.0791	0.0912	0.0481
6/13/2017	0.0455	0.0178	0.0957	0.0778		
6/14/2017					0.0908	0.0461
5/9/2018	0.0464	0.0156	0.0702	0.0703		
5/10/2018					0.0809	0.0432
9/19/2018	0.0479	0.0151	0.0706	0.0653		
9/20/2018					0.0834	0.0415
4/8/2019			0.0677	0.0718	0.0798	0.0379
4/9/2019	0.0406	0.0159				
6/19/2019	0.04	0.0136	0.0589	0.0683	0.0818	0.0346
9/10/2019	0.0397	0.0142	0.0549	0.0685	0.0821	0.035
3/10/2020	0.0327	0.0128	0.0517	0.0625		0.0355
3/11/2020					0.0796	
5/19/2020	0.0328	0.0123	0.056	0.067		
5/20/2020					0.0835	0.0358
10/8/2020			0.0564	0.0636	0.0838	0.0359
10/9/2020	0.0357	0.0112				
3/24/2021		0.0134				
3/25/2021	0.0301		0.0625	0.0669	0.0759	0.0304
5/18/2021			0.0528	0.0669	0.075	0.0305
5/19/2021	0.0293	0.0124				
10/26/2021	0.033	0.0119	0.0506	0.0612	0.0723	0.0301
3/8/2022					0.0719	0.0294
3/9/2022	0.0337	0.0143	0.0583	0.0665		
5/24/2022	0.0355	0.0134	0.0566	0.062		
5/25/2022					0.075	0.0305
11/4/2022	0.032	0.013				
11/7/2022				0.0625		
11/8/2022			0.0518		0.0643	0.0318
2/15/2023	0.0302	0.0128	0.0528	0.0653	0.0632	0.0284
5/22/2023		0.0136				
5/23/2023			0.0444		0.06	0.0305
5/24/2023	0.0275			0.0593		
10/26/2023	0.0274	0.0125				
10/27/2023			0.0487	0.0563		
10/31/2023					0.0585	0.0299
3/12/2024	0.028	0.0148	0.056	0.0551		
3/13/2024					0.0589	0.0297
5/15/2024			0.0567	0.0538	0.0569	0.0283
5/16/2024	0.0277	0.0148				

ATTACHMENT F

Certification by a Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

I certify that this alternative source demonstration is appropriate for evaluating the groundwater monitoring data for the Mountaineer BAPs CCR management unit and that the requirements of 40 CFR 257.95(g)(3)(ii) have been met.

JOHN P. SEYMOUR
17091

John Seymour
Printed Name of Licensed Professional Engineer

John Seymour
Signature

017091
License Number

West Virginia
Licensing State

12/19/2024
Date

Appendix 4

The notice of initiating the assessment monitoring program and subsequently the Assessment of Corrective Measures program follow.

Mountaineer Plant

Notice of Assessment Monitoring Program Establishment

Bottom Ash Pond

On January 15, 2018, it was determined that Mountaineer Plant's Bottom Ash Pond had statistically significant increases over background for Boron, Calcium, Chloride, Fluoride, Sulfate, and Total Dissolved Solids (TDS). An alternative source demonstration was not successful within the 90 day period as allowed for in 257.94(e)(2) prompting the initiation of an assessment monitoring program, which was established on April 13, 2018. Therefore this notice is being placed in the operating record in accordance with the requirement of 257.94(e)(3).

Mountaineer Plant

Notice for Initiating an Assessment of Corrective Measures

CCR Unit – Bottom Ash Pond

This notice is being provided, as required by 40 CFR 257.95(g)(5), that an Assessment of Corrective Measures was initiated on March 26, 2019 for Mountaineer Plant's Bottom Ash Pond due to the statistically significant concentrations detected above the established groundwater protection standard for lithium.

Appendix 5

No monitoring wells were installed or decommissioned during this reporting period.