Annual Groundwater Monitoring Report

Appalachian Power Company

Mountaineer Plant

Bottom Ash Pond CCR Management Unit

Letart, WV

January 2023

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APPALACHIAN POWER

An AEP Company

BOUNDLESS ENERGY

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Abbreviations:
ASD – Alternate Source Demonstration
CCR – Coal Combustion Residual
GWPS – Groundwater Protection Standard
SSI – Statistically Significant Increase
SSL – Statistically Significant Level
MTBAP – Mountaineer Bottom Ash Pond

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 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:

- An assessment monitoring program for Mountaineer Bottom Ash Pond (MT BAP) was established on April 13, 2018.
- Statistically significant level of lithium concentrations above groundwater protection standards were 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.
- Mountaineer BAP started 2022 in corrective measures. 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 within 90 days of selecting a remedy. The BAP ended the year in the corrective action program.
- Groundwater samples were collected in March, May, and November 2022 and analyzed for Appendix III and Appendix IV constituents, as specified in the Corrective Action Monitoring Program and AEP's *Groundwater Sampling and Analysis Plan (2016)*.
- Analytical results for groundwater monitoring are included in **Appendix 1** along with groundwater flow rates and direction.
- Groundwater data underwent various validation tests, including tests for completeness, valid values, transcription errors, and consistent units.
- The November 2021 sampling event statistical analysis was completed in February 2022 and is included in **Appendix 2**. The statistical analysis identified the following:
    - Lithium exceeded the groundwater protection standard (GWPS) at MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
    - Statistically significant increase (SSI) for boron above the upper prediction limit was observed at MW-1604D, MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.

- SSI for calcium above the upper prediction limit was observed at MW-1604S, MW-1606D, and MW-1607D.
- SSI for chloride above the upper prediction limit was observed at MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
- SSI for Fluoride above the upper prediction limit was observed at MW-1606S and MW-1607D.
- SSI for Sulfate above the upper prediction limit was observed at MW-1605S, MW-1606D, and MW-1607D.
- SSI for TDS above the upper prediction limit was observed at MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.

- Notification of a statistically significant level (SSL) of constituent above groundwater protection standard (GWPS) was completed for Lithium for the November 2021 sampling event.
- The statistical analysis for the May 2022 corrective action monitoring event was completed in September 2022 and is included in **Appendix 2**. The statistical analysis identified the following:
  - Arsenic exceeded the groundwater protection standard (GWPS) at MW-1805 and MW-1922D.
  - Lithium exceeded the GWPS at MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S, MW-1921, MW-1922S, MW-1923, MW-1924, and MW-1925.
  - Molybdenum exceeded the GWPS at MW-1921.
  - SSI for boron above the upper prediction limit was observed at MW-1604D, MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
  - SSI for calcium above the upper prediction limit was observed at MW-1604D, MW-1604S, MW-1605D, MW-1606D, and MW-1607D.
  - SSI for chloride above the upper prediction limit was observed at MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.
  - SSI for Fluoride above the upper prediction limit was observed at MW-1606S and MW-1607D.

- SSI for Sulfate above the upper prediction limit was observed at MW-1604S, MW-1605D, MW-1605S, MW-1606D, and MW-1607D.
- SSI for TDS above the upper prediction limit was observed at MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S.

- Notification of a statistically significant level (SSL) of constituent above groundwater protection standard (GWPS) was completed for Lithium, Arsenic, and Molybdenum.
- An alternate source demonstration (ASD) was completed for Arsenic and Molybdenum in December 2022 and is included in **Appendix 3.**
- The November 2022 sampling event data are still undergoing statistical analysis.

The major components of this annual report, to the extent applicable at this time, are presented in sections that follow:

- A map, aerial photograph or a drawing showing the CCR management unit(s), all groundwater monitoring wells and monitoring well identification numbers.
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened.
- All of the monitoring data collected, including the rate and direction of groundwater flow, plus a summary showing the number of samples collected per monitoring well, the dates the samples were collected and whether the sample was collected as part of detection monitoring or assessment monitoring programs (Attached as **Appendix 1**).
- Statistical comparison of monitoring data to determine if there have been SSI's or SSL's (Attached as **Appendix 2**, where applicable).
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (Attached as **Appendix 3**).
- A summary of any transition between monitoring programs or an alternate monitoring frequency, for example the date and circumstances for transitioning from detection monitoring to assessment monitoring, in addition to identifying the constituents detected at a statistically significant increase over background concentrations (**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 (Attached as Appendix 5, where applicable). This is not applicable.
- Other information required to be included in the annual report such as alternate source demonstration or assessment of corrective measures, if applicable.

In addition, this report summarizes key actions completed, and where applicable, describes any problems encountered and actions taken to resolve those problems. The report includes a projection of key activities for the upcoming year.

II. Groundwater Monitoring Well Locations and Identification Numbers

Figure 1 that follows depicts the PE-certified groundwater monitoring network, the monitoring well locations, and their corresponding identification numbers. The total groundwater monitoring network includes 4 up-gradient wells and 8 down-gradient wells. The monitoring well distribution adequately cover down-gradient and up-gradient areas as detailed in the *Ground Water Monitoring Well Network Evaluation* report that was placed in the American Electric Power CCR public internet site on March 9, 2017. Additional wells are shown in the figure that were installed as part of the Nature and Extent Characterization study. Additionally, the Corrective Action Monitoring Plan (CAMP) includes additional monitoring well locations and can be found in **Appendix 6**.

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.

1,000 500 0 1,000 Feet

Site Layout
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.

III. Monitoring Wells Installed or Decommissioned

No monitoring wells were installed or decommissioned in 2022.

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 monitoring, and corrective action monitoring. Static water elevation data from each monitoring event also are shown in **Appendix 1**, along with the groundwater velocity calculations, groundwater flow direction and potentiometric maps developed after each sampling event. 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 only able to be sampled during the first event of 2022.

V. Groundwater Quality Data Statistical Analysis

Statistical analysis of the November 2021 257.95(d)(1) (assessment monitoring of all Appendix III and detected Appendix IV parameters) resulted in a SSL above the GWPS for lithium in February 2022. 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**.

Statistical analysis of the May 2022 257.98 (corrective action) sampling was completed in September 2022 and resulted in a SSL above GWPS for arsenic, molybdenum, and lithium. A notice of these SSL's 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 notice of statistically significant levels above the groundwater protection standard that were completed in 2022 can be found in **Appendix 4** and on the publicly available internet site at https://www.aep.com/environment/ccr.

VI. Alternative Source Demonstrations

A successful ASD was completed for arsenic and molybdenum GWPS exceedances from the May 2022 sampling event and is included in **Appendix 3**.

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

The Mountaineer Bottom Ash Pond 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 on January 8, 2019. An Assessment of Corrective Measures Report was completed on June 24, 2019. A public meeting was held on August 22, 2019 to present the assessment of corrective measure options. Two semi-annual reports describing the progress in selecting and designing the remedy were completed in March and September 2021. Two additional semi-annual progress reports were completed in March and September 2022. Semi-annual assessment monitoring sampling and analysis was continued in 2021. 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 notice for initiating assessment of corrective measures can be found in **Appendix 4** of this report and on the publicly available internet site at https://www.aep.com/environment/ccr. The selection of remedy report can also be found on the publicly available internet site. Additionally, the Corrective Action Monitoring Plan can be found in **Appendix 6**.

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. Other Information Required

All required information has been included in this annual groundwater monitoring report.

IX. Description of Any Problems Encountered in 2022 and Actions Taken

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

X. A Projection of Key Activities for the Upcoming Year

Key activities for 2023 include:

- Continue to implement the remedy for groundwater corrective actions;
- Continue to implement the corrective action monitoring program (CAMP);
- Complete groundwater monitoring in accordance with the CAMP and the CCR Rule;

- Respond to any new data received in light of what the CCR rule requires; and
- Preparation of the next annual groundwater report.

APPENDIX 1

Tables and figures follow that show the groundwater monitoring data collected and rate and direction of groundwater flow. The dates that the samples were collected are also shown.

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
3/30/2021	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.

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

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

Table 1 - Groundwater Data Summary: 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

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

Table 1 - Groundwater Data Summary: MW-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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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

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

Table 1 - Groundwater Data Summary: MW-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

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

Table 1 - Groundwater Data Summary: 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	3.5	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

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

Table 1 - Groundwater Data Summary: MW-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

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

Table 1 - Groundwater Data Summary: MW-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

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

Table 1 - Groundwater Data Summary: MW-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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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

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

Table 1 - Groundwater Data Summary: MW-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

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

Table 1 - Groundwater Data Summary: 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	0.45	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
3/12/2020	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
3/23/2021	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

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

Table 1 - Groundwater Data Summary: MW-1602
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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
3/23/2021	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
5/19/2021	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

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

Table 1 - Groundwater Data Summary: MW-1603
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

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

Table 1 - Groundwater Data Summary: 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
3/23/2021	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

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

Table 1 - Groundwater Data Summary: MW-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

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

Table 1 - Groundwater Data Summary: 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	1.45	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
3/25/2021	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

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

Table 1 - Groundwater Data Summary: MW-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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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	0.92	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

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

Table 1 - Groundwater Data Summary: MW-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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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

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

Table 1 - Groundwater Data Summary: MW-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

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

Table 1 - Groundwater Data Summary: 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

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.

Table 1 - Groundwater Data Summary: MW-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

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

Table 1 - Groundwater Data Summary: 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	0.94	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

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

Table 1 - Groundwater Data Summary: MW-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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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	1.28	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

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.

Table 1 - Groundwater Data Summary: MW-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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 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	1.31	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

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

Table 1 - Groundwater Data Summary: MW-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
9/27/2016	Background	--	--	--	--	7.6	--	--
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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	1.29	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

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.

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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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	0.55	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	0.67	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

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

Table 1 - Groundwater Data Summary: MW-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

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

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

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

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

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

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
3/23/2021	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

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

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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
Due to limited groundwater volume, analytical samples from some sampling events were collected over multiple days.

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

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
Due to limited groundwater volume, analytical samples from some sampling events were collected over multiple days.

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

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

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
10/9/2020	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

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

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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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	0.48	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
3/2/2022	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

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.

Table 1 - Groundwater Data Summary: MW-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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 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

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.

Table 1 - Groundwater Data Summary: MW-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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.
In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.
- -: Not analyzed
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 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	0.91	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

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

Table 1 - Groundwater Data Summary: MW-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

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

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	--	--	--	--	--	--
3/12/2020	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
3/23/2021	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

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

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

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

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	1.19	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	1.2	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	1.6	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

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

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

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

Table 1 - Groundwater Data Summary: 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	0.88	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

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

Table 1: Residence Time Calculation Summary *Geosyntec Consultants, Inc.*

Mountaineer Bottom Ash Pond

			2022-02		2022-05		2022-10	
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	49	1.252	52	1.161	47	1.298
	MW-1602 [1]	2.0	80	0.760	54	1.124	84	0.727
	MW-1603 [1]	2.0	248	0.245	194	0.314	268	0.227
	MW-1608 [1]	2.0	689	0.088	79	1.151	160	0.381
	MW-1604D [2]	2.0	140	0.434	171	0.356	227	0.268
	MW-1604S [2]	2.0	251	0.243	212	0.287	325	0.187
	MW-1605D [2]	2.0	201	0.302	163	0.373	304	0.200
	MW-1605S [2]	2.0	228	0.267	196	0.311	304	0.200
	MW-1606D [2]	2.0	212	0.287	211	0.288	382	0.159
	MW-1606S [2]	2.0	190	0.320	224	0.272	410	0.148
	MW-1607D [2]	2.0	197	0.309	159	0.383	294	0.207
	MW-1607S [2]	2.0	171	0.356	120	0.507	217	0.280
	JTMN-1 [3]	2.0	2,678	0.023	140	0.433	449	0.135
	JTMN-2 [3]	2.0	1,279	0.048	244	0.249	519	0.117
	MW-016 [3]	2.0	164	0.371	131	0.464	707	0.086
	MW-107 [3]	2.0	2,470	0.025	15	6.069	297	0.205
	MW-1921 [3]	2.0	1,600	0.038	500	0.122	1,254	0.049
	MW-1922S [3]	2.0	NC	NC	NC	NC	446	0.136
	MW-1923 [3]	2.0	1,129	0.054	224	0.271	1,672	0.036
	MW-1924 [3]	2.0	1,829	0.033	288	0.211	1,322	0.046
	MW-1925 [3]	2.0	271	0.224	298	0.204	1,047	0.058
	MW-1926 [3]	2.0	147	0.414	105	0.580	81	0.749
	MW-1927 [3]	2.0	287	0.212	1,023	0.059	233	0.261
	MW-203 [3]	2.0	387	0.157	49	1.240	496	0.123
	MW-1929 [4]	2.0	1,216	0.050	412	0.148	79	0.774

Notes:
[1] - Background Well
[2] - Downgradient Well
[3] - Nature and Extent Well
[4] Sentinel Well
NC - Not Calculated

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

- Monitoring well coordinates and water level data (collected on February 28, 2022) provided by AEP.
- Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- Only monitoring wells were used to generate groundwater contours. Water elevations were not collected for the pumping wells.
- No groundwater was present at MW-1928 and MW-112 during the February 2022 sampling event.
- Normal lower pool elevation of the Ohio River at Racine Lock and Dam is 539.5 ft amsl (USACE).
- 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.

Potentiometric Surface Map - Uppermost Aquifer February 2022

AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia

Geosyntec consultants

Columbus, Ohio | 2023/01/06

Figure 2

\\annarbor-01\Data\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2022\AEP-Mountaineer_BAP_GW_2022-02.mxd. ASoltero. 1/6/2023. 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

- Monitoring well coordinates and water level data (collected on May 16, 2022) provided by AEP.
- Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- Only monitoring wells were used to generate groundwater contours. Water elevations were not collected for the pumping wells.
- No groundwater was present at MW-1928 and MW-112 during the May 2022 sampling event.
- Normal lower pool elevation of the Ohio River at Racine Lock and Dam is 539.5 ft amsl (USACE).
- 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.

Potentiometric Surface Map - Uppermost Aquifer
May 2022

AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia

Geosyntec consultants

Columbus, Ohio | 2023/01/06

Figure 3

\\annarbor-01\Data\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2022\AEP-Mountaineer_BAP_GW_2022-05.mxd. ASoltero. 1/6/2023. 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

- Monitoring well coordinates and water level data (collected on October 31, 2022) provided by AEP.
- Site features based on information available in Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- Only monitoring wells were used to generate groundwater contours. Water elevations were not collected for the pumping wells.
- No groundwater was present at MW-1928 and MW-112 during the October 2022 sampling event.
- Normal lower pool elevation of the Ohio River at Racine Lock and Dam is 539.5 ft amsl (USACE).
- 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.

1,000 500 0 1,000 Feet

Potentiometric Surface Map - Uppermost Aquifer
October 2022

AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia

Geosyntec consultants

Columbus, Ohio | 2023/01/06

Figure 4

\\annarbor-01\Data\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2022\AEP-Mountaineer_BAP_GW_2022-10.mxd. ASoltero. 1/6/2023. CHA8423/07/08.

Appendix 2

The groundwater data statistical analyses completed in 2022 follow.

STATISTICAL ANALYSIS SUMMARY
BOTTOM ASH POND
Mountaineer Plant
New Haven, West Virginia

Submitted to

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

941 Chatham Lane
Suite 103
Columbus, Ohio 43221

February 22, 2022

CHA8500

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LIST OF ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

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

SECTION 1

EXECUTIVE SUMMARY

In accordance with the United States Environmental Protection Agency's (USEPA's) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (40 CFR 257.90-257.98, "CCR rule"), groundwater monitoring has been conducted at the Bottom Ash Pond (BAP), an existing CCR unit at the Mountaineer Power Plant located in New Haven, West Virginia. Recent groundwater monitoring results were compared to site-specific groundwater protection standards (GWPSs) to identify potential exceedances.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, calcium, chloride, total dissolved solids (TDS), and sulfate at the BAP. An alternative source was not identified at the time, so the BAP initiated assessment monitoring in April 2018. GWPSs were set in accordance with 40 CFR 257.95(d)(2) and a statistical evaluation of the assessment monitoring data was conducted in January 2019. Statistically significant levels (SSLs) were observed 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 and has been completing assessment monitoring since. One assessment monitoring event was conducted at the BAP in October 2021 in accordance with 40 CFR 257.95. The results of this assessment event are documented in this report.

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

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. GWPSs were re-established for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at SSLs above the GWPS. SSLs were identified for lithium. Thus, the unit will continue the assessment of corrective measures process and will monitor the groundwater monitoring network in accordance with the assessment monitoring program as required by 40 CFR 275.96(b). Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

SECTION 2

BOTTOM ASH POND EVALUATION

2.1 Data Validation & QA/QC

During the assessment monitoring program, one set of samples was collected for analysis from each upgradient and downgradient well to meet the requirements of 40 CFR 257.95(d)(1) in October 2021. The October 2021 samples were analyzed for all Appendix III and IV parameters. A summary of data collected during this assessment monitoring event may be found in Table 1.

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

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

2.2 Statistical Analysis

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

The data obtained in October 2021 were screened for potential outliers. No outliers were identified for these events.

2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with 40 CFR 257.95(h) and the *Statistical Analysis Plan* (Geosyntec, 2020). The established GWPS was determined to be the greater value of the background concentration and the maximum contaminant level (MCL) or risk-based level specified in 40 CFR 257.95(h)(2) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events. Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for arsenic, chromium, cobalt, combined radium, fluoride, lead, and molybdenum. Non-parametric tolerance limits were calculated for antimony, barium, cadmium, lithium, selenium, and thallium due to apparent non-normal distributions and for beryllium and mercury due to a high non-detect frequency. Tolerance limits and the final GWPSs are summarized in Table 2.

2.2.2 Evaluation of Potential Appendix IV SSLs

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

The following SSLs were identified at the Mountaineer BAP:

- The LCL for lithium exceeded the GWPS of 0.0400 mg/L at MW-1605D (0.0508 mg/L), MW-1605S (0.0542 mg/L), MW-1606D (0.0658 mg/L), MW-1606S (0.0820 mg/L), MW-1607D (0.0805 mg/L), and MW-1607S (0.0.0919 mg/L).

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

2.2.3 Establishment of Appendix III Prediction Limits

Upper prediction limits (UPL) for Appendix III parameters were established in January 2018 following the background monitoring period (Geosyntec, 2018). 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. Intrawell and interwell prediction limits have been updated periodically during the assessment monitoring period as sufficient data became available.

For the intrawell tests, insufficient data was available to compare against the existing background dataset; thus, 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 2020 (Geosyntec, 2021). Intrawell prediction limits were used to evaluate potential SSIs for pH.

Prediction limits for the interwell tests were recalculated using data collected during the 2021 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 updated prediction limits were calculated using a one-of-two retesting procedure, as during detection monitoring. 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 non-parametric analysis was selected based on the distribution of the data and the frequency of non-detect data. Estimated results less than the practical quantitation limit (PQL) – i.e., "J-flagged" data – were considered detections and the estimated results were used in the statistical analyses. Non-parametric analyses were selected for datasets with at least 50% non-detect data or datasets that could not be normalized. Parametric analyses were selected for datasets (either transformed or untransformed) that passed the Shapiro-Wilk / Shapiro-Francía test for normality. The Kaplan-Meier non-detect adjustment was applied to datasets with between 15% and 50% non-detect data. For datasets with fewer than 15% non-detect data, non-detect data were replaced with one half of the PQL. The selected analysis (i.e., parametric or non-parametric) and transformation (where applicable) for each background dataset are shown in Attachment B.

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

2.2.4 Evaluation of Potential Appendix III SSIs

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

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

- Boron concentrations exceeded the interwell UPL of 0.546 mg/L at MW-1604D (3.32 mg/L), MW-1604S (2.94 mg/L), MW-1605D (3.70 mg/L), MW-1605S (3.95 mg/L), MW-1606D (7.25 mg/L), MW-1606S (5.49 mg/L), MW-1607D (4.46 mg/L), and MW-1607S (3.07 mg/L).

- Calcium concentrations exceeded the interwell UPL of 187 mg/L at MW-1604S (221 mg/L), MW-1606D (216 mg/L), and MW-1607D (201 mg/L).

- Chloride concentrations exceeded the interwell UPL of 61.0 mg/L at MW-1604S (93.5 mg/L), MW-1605D (103 mg/L), MW-1605S (81.9 mg/L), MW-1606D (226 mg/L), MW-1606S (152 mg/L), MW-1607D (164 mg/L), and MW-1607S (141 mg/L).

- Fluoride concentrations exceeded the interwell UPL of 0.301 mg/L at MW-1606S (0.38 mg/L) and MW-1607D (0.52 mg/L).

- Sulfate concentrations exceeded the interwell UPL of 539 mg/L at MW-1605S (568 mg/L), MW-1606D (652 mg/L), and MW-1607D (612 mg/L).

- TDS concentrations exceeded the interwell UPL of 967 mg/L at MW-1604S (1,210 mg/L), MW-1605D (1,230 mg/L), MW-1605S (1,220 mg/L), MW-1606D (1,650 mg/L), MW-1606S (1,300 mg/L), MW-1607D (1,530 mg/L), and MW-1607S (1,120 mg/L).

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

2.3 Conclusions

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

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

SECTION 3

REFERENCES

Geosyntec Consultants (Geosyntec). 2018. Statistical Analysis Summary – Bottom Ash Pond, Mountaineer Plant. January 2018.

Geosyntec. 2019. Statistical Analysis Summary – Bottom Ash Pond. Mountaineer Plant. January 2019.

Geosyntec. 2020. Statistical Analysis Plan. October 2021.

Geosyntec. 2021. Statistical Analysis Summary – Bottom Ash Pond. Mountaineer Plant. February 2021.

TABLES

Table 1 - Groundwater Data Summary
Mountaineer Plant - Bottom Ash Pond

Parameter	Unit	MW-1601A	MW-1602	MW-1603	MW-1604D	MW-1604S	MW-1605D	MW-1605S	MW-1606D	MW-1606S	MW-1607D	MW-1607S	MW-1608
		10/28/2021	10/28/2021	10/28/2021	10/27/2021	10/27/2021	10/26/2021	10/26/2021	10/26/2021	10/26/2021	10/26/2021	10/26/2021	10/27/2021
Antimony	µg/L	0.03 J	0.1 U	0.02 J	0.03 J	0.15	0.04 J	0.04 J	0.14	0.15	0.03 J	0.40	0.04 J
Arsenic	µg/L	0.55	0.31	0.23	0.29	0.35	2.90	0.39	0.28	0.61	1.87	0.92	0.49
Barium	µg/L	64.4	24.5	29.5	24.1	24.9	24.3	28.2	46.1	55.6	70.3	65.0	23.0
Beryllium	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Boron	mg/L	0.121	0.127	0.328	3.32	2.94	3.70	3.95	7.25	5.49	4.46	3.07	0.069
Cadmium	µg/L	0.016 J	0.011 J	0.010 J	0.027	0.171	0.011 J	0.050	0.075	0.061	0.008 J	0.036	0.01 J
Calcium	mg/L	173	91.3	176	186	221	183	167	216	181	201	156	78.2
Chloride	mg/L	13.0	7.49	18.7	48.7	93.5	103	81.9	226	152	164	141	1.45
Chromium	µg/L	0.28	0.47	0.45	0.28	0.41	0.19 J	0.07 J	0.30	0.21	0.44	0.31	0.43
Cobalt	µg/L	0.012 J	0.013 J	0.033	0.134	2.36	1.23	0.324	1.60	0.142	0.853	1.27	0.113
Combined Radium	pCi/L	1.43	0.86	1.59	0.61	1.48	0.62	0.69	0.89	0.67	1.55	0.52	1.09
Fluoride	mg/L	0.12	0.26	0.09	0.15	0.26	0.21	0.29	0.26	0.38	0.52	0.24	0.29
Lead	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.08 J	0.2 U	0.08 J	0.10 J
Lithium	mg/L	0.00226	0.0129	0.0158	0.0213	0.0380	0.0413	0.0542	0.0594	0.0644	0.0968	0.0974	0.00226
Mercury	µg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Molybdenum	µg/L	0.5	1.1	0.1 J	1.5	13.9	33.0	11.9	61.2	50.6	72.3	30.1	1.9
Selenium	µg/L	0.85	0.11 J	0.14 J	1.49	0.76	0.11 J	0.96	1.92	1.87	0.5 U	2.71	1.32
Sulfate	mg/L	222	222	372	314	532	526	568	652	497	612	312	50.3
Thallium	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.23	0.05 J	0.2 U	0.07 J	0.06 J	0.2 U	0.07 J	0.2 U
Total Dissolved Solids	mg/L	700	530	860	250	1,210	1,230	1,220	1,650	1,300	1,530	1,120	300
pH	SU	6.9	6.9	6.9	6.9	7.1	7.2	7.3	7.0	6.9	7.3	7.1	7.0

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J: Estimated value. Parameter was detected in concentrations below the reporting limit.
-: Not analyzed

Table 2 - Appendix IV Groundwater Protection Standards
Mountaineer Plant - Bottom Ash Pond

Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600		0.000150	0.00600
Arsenic, Total (mg/L)	0.0100		0.000732	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		0.000738	0.100
Cobalt, Total (mg/L)	n/a	0.00600	0.000654	0.00600
Combined Radium, Total (pCi/L)	5.00		2.24	5.00
Fluoride, Total (mg/L)	4.00		0.303	4.00
Lead, Total (mg/L)	n/a	0.0150	0.000454	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	0.00287	0.100
Selenium, Total (mg/L)	0.0500		0.00430	0.0500
Thallium, Total (mg/L)	0.00200		0.000200	0.00200

Notes:
MCL: Maximum Contaminant Level
CCR: Coal Combustion Residual
Calculated UTL (Upper Tolerance Limit) represents site-specific background values.

Table 3 - Appendix III Data 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
			10/27/2021	10/27/2021	10/26/2021	10/26/2021	10/26/2021	10/26/2021	10/26/2021	10/26/2021
Boron	mg/L	Interwell Background Value (UPL)	0.546							
		Analytical Result	**3.32**	**2.94**	**3.70**	**3.95**	**7.25**	**5.49**	**4.46**	**3.07**
Calcium	mg/L	Interwell Background Value (UPL)	187							
		Analytical Result	186	**221**	183	167	**216**	181	**201**	156
Chloride	mg/L	Interwell Background Value (UPL)	61.0							
		Analytical Result	48.7	**93.5**	**103**	**81.9**	**226**	**152**	**164**	**141**
Fluoride	mg/L	Interwell Background Value (UPL)	0.301							
		Analytical Result	0.15	0.26	0.21	0.29	0.26	**0.38**	**0.52**	0.24
pH	SU	Intrawell Background Value (UPL)	7.9	7.7	7.9	7.8	7.9	7.9	8.1	7.9
		Intrawell Background Value (LPL)	6.4	6.6	6.8	6.7	6.8	6.2	6.9	6.9
		Analytical Result	6.9	7.1	7.2	7.3	7.0	6.9	7.3	7.1
Sulfate	mg/L	Interwell Background Value (UPL)	539							
		Analytical Result	314	532	526	**568**	**652**	497	**612**	312
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	967							
		Analytical Result	250	**1,210**	**1,230**	**1,220**	**1,650**	**1,300**	**1,530**	**1,120**

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

ATTACHMENT A

Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

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

DAVID ANTHONY MILLER
Printed Name of Licensed Professional Engineer

David Anthony Miller
Signature

DAVID ANTHONY MILLER
REGISTERED
22663
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

22663	WEST VIRGINIA	02.23.22
License Number	Licensing State	Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS
CONSULTING

January 25, 2022

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

Re: Mountaineer BAP
Assessment Monitoring Report & Background Update – 2021

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical analysis and background update of 2021 groundwater data for American Electric Power Inc.'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 the site 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, MW-1608; and
- **Downgradient wells:** MW-1604D, MW-1604S, MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, MW-1607S.

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. The analysis was reviewed by Kristina Rayner, Founder and Groundwater Statistician 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

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

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

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

Semi-Annual Sampling
1-of-2 resample plan
Constituents, c=7
Downgradient wells, w=8

Summary of Statistical Method – 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 the majority of 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 limits as appropriate. Non-detects are handled as follows:

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

Summary of Appendix III Background Update Summaries

November 2019

Samples from all wells for pH which is tested using intrawell prediction limits and from all upgradient wells for boron, calcium, chloride, fluoride, sulfate, and TDS which are tested using interwell prediction limits were evaluated using Tukey's outlier test and visual screening.

The Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data through June 2017 to the new compliance samples at each well through April 2019 for pH to evaluate whether the groups are statistically different at the 99% confidence level. No statistically significant differences were found between the two groups for any of the well/constituent pairs; therefore, all background data sets for pH were updated.

For parameters tested using interwell analyses, the Sen's Slope/Mann-Kendall trend test was used on upgradient wells to determine whether concentrations are statistically increasing, decreasing or stable. A few statistically significant increasing and decreasing trends were noted; however, the magnitudes of the trends were low relative to average concentrations within each well. Therefore, interwell prediction limits were constructed with using pooled upgradient well data through April 2019.

January 2021

Prior to updating background data for the Fall 2020 analysis, Tukey's outlier test and visual screening were used to re-evaluate data for outliers at all wells for pH and at all upgradient wells for boron, calcium, chloride, fluoride, sulfate, and TDS. High pH values for wells MW-1607D and MW-1607S were flagged as outliers and deselected prior to constructing prediction limits in order to maintain intrawell prediction limits that are conservative (i.e., more pH neutral) from a regulatory perspective. An unusually high value for TDS in well

MW-1606S was identified visually and flagged as an outlier. Since TDS is evaluated using interwell methods, the flagged value has no effect on the calculation of prediction limits. Tukey's outlier test on pooled upgradient well data did not identify any potential outliers, and no new values were flagged.

For pH, which requires intrawell prediction limits, the Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data through April 2019 to the new compliance samples at each well through May 2020. No statistically significant differences were identified found between the two groups for pH, therefore, all background data sets for pH were updated using data through May 2020.

For parameters tested using interwell analyses (boron, calcium, chloride, fluoride, sulfate, and TDS) the Sen's Slope/Mann-Kendall trend test was used on upgradient wells to determine whether concentrations are statistically increasing, decreasing or stable. Although statistically significant trends were identified, the magnitudes of the trends above were either fairly small relative to average concentrations within each well or would not greatly affect the interwell prediction limits. Therefore, all well/constituent pairs using interwell prediction limits were updated using data through October 2020.

Appendix III Background Update – October 2021

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

<u>Outlier Analysis</u>

Prior to updating interwell prediction limits, Tukey's outlier test and visual screening were used to re-evaluate data through October 2021 at all upgradient wells for boron, calcium, chloride, fluoride, sulfate, and TDS (Figure C). Tukey's outlier test on pooled upgradient well data did not identify any potential outliers, and no new values were flagged.

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

Intrawell Prediction Limits

Intrawell prediction limits, combined with a 1-of-2 resample plan, are constructed using historical data through May 2020 for pH at all wells. As discussed earlier, background data sets for pH will be updated after the Fall 2022 sample event when a minimum of 4 new compliance samples are available. A summary table of the limits follows this report (Figure D).

Interwell Prediction Limits

For parameters tested using interwell analyses (boron, calcium, chloride, fluoride, sulfate, and TDS) the Sen's Slope/Mann-Kendall trend test was used on upgradient wells to determine whether concentrations are statistically increasing, decreasing or stable (Figure E). Statistically significant trends were identified for the following upgradient 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-1603
- Fluoride: MW-1601A
- Sulfate: MW-1603

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

Interwell prediction limits, combined with a 1-of-2 resample plan, were updated using all available data from upgradient wells through October 2021 for boron, calcium, chloride, fluoride, sulfate, and TDS (Figure F). Interwell prediction limits pool upgradient well data to establish a background limit for an individual constituent. A summary table of the updated limits may be found following this letter in the Prediction Limit Summary Tables.

Evaluation of Appendix IV Parameters – October 2021

Prior to evaluating Appendix IV parameters, background data are screened through visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits.

For the current analysis, Tukey's outlier test on pooled upgradient well data did not identify any outliers; therefore, no new values were flagged.

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, high values for antimony, arsenic, barium, cadmium, cobalt, fluoride, lead, and selenium among downgradient wells MW-1606D, MW-1607D, and MW-1607S were flagged with the exceptions of those for cobalt in well MW-1606D, fluoride in well MW-1606D, and selenium in well MW-1607D. The values that were flagged as outliers were all recorded for 12/21/2016 and were likely the result of systematic error, thus not being representative of current conditions. The exceptions listed above were not flagged because those values were below their respective MCLs and thus could not result in a confidence interval exceedance. For September 2016 a high value for combined radium in 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 not representative of current conditions. All flagged values may be seen on the Outlier Summary following this letter (Figure C).

<u>Interwell Upper Tolerance Limits</u>

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

Groundwater Protection Standards

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

Confidence Intervals

Confidence intervals were then constructed on downgradient wells with data through October 2021 for each of the Appendix IV parameters and then compared to the GWPS, i.e., the highest limit of the MCL, CCR Rule-Specified level, or background limit as discussed above (Figure I). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. Complete graphical results of the confidence intervals follow this letter. Exceedances were identified for the following well/constituent pairs:

- Lithium: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, and MW-1607S

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

For Groundwater Stats Consulting,

Tristan Clark

Kristina Rayner

Tristan Clark
Groundwater Analyst

Kristina L. Rayner
Groundwater Statistician

100% Non-Detects

Analysis Run 1/14/2022 4:48 PM   View: UTL

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Beryllium, total (mg/L)
MW-1601A

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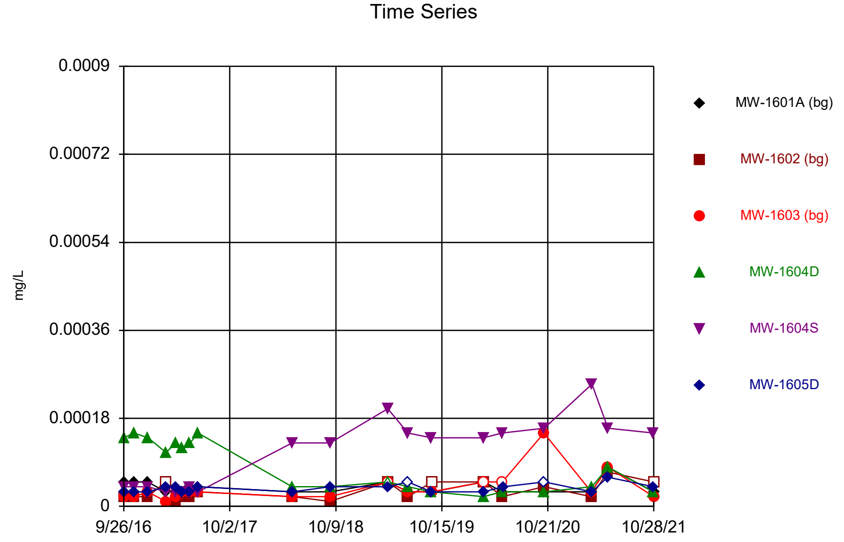
Hollow symbols indicate censored values.



Constituent: Antimony, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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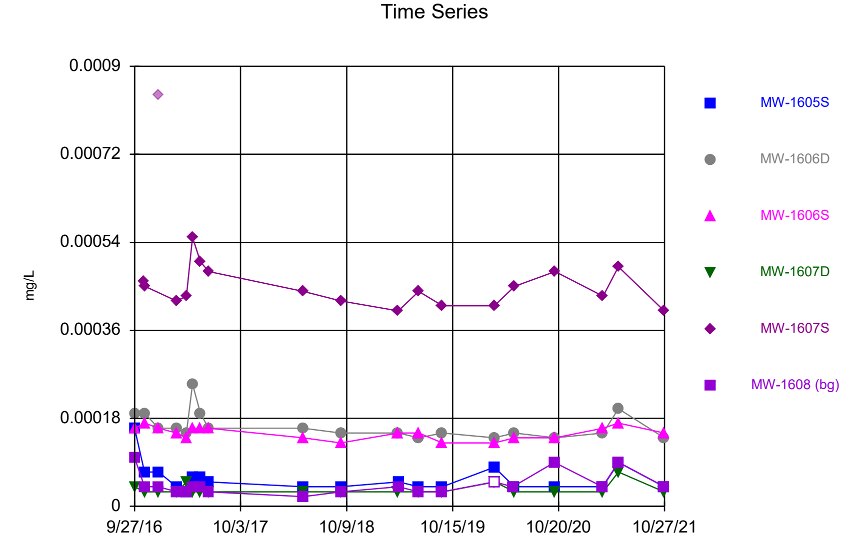

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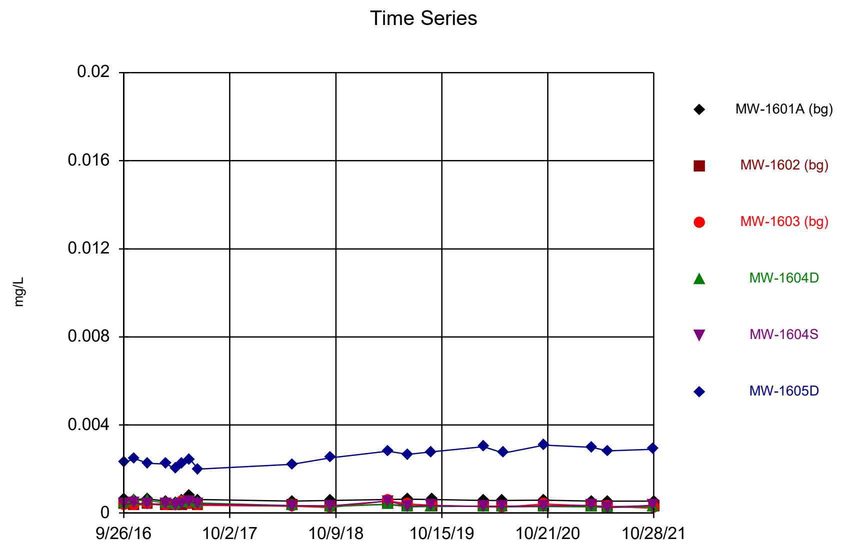

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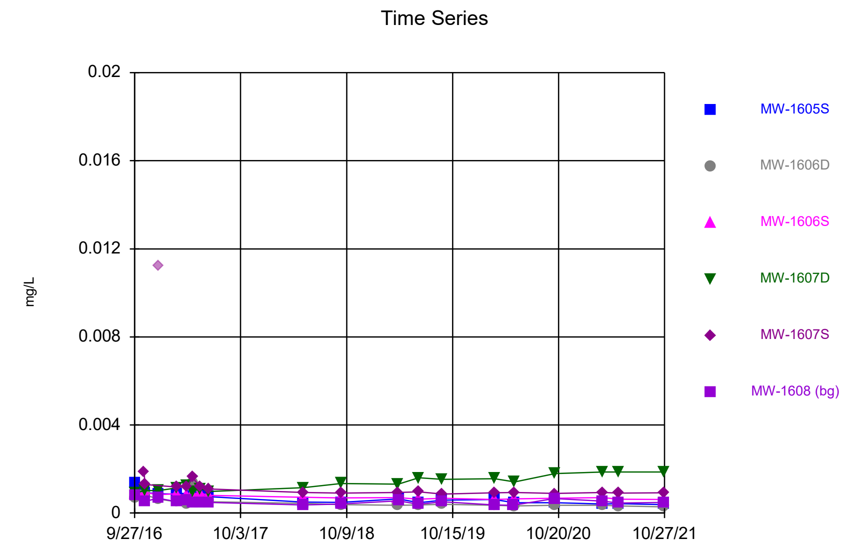

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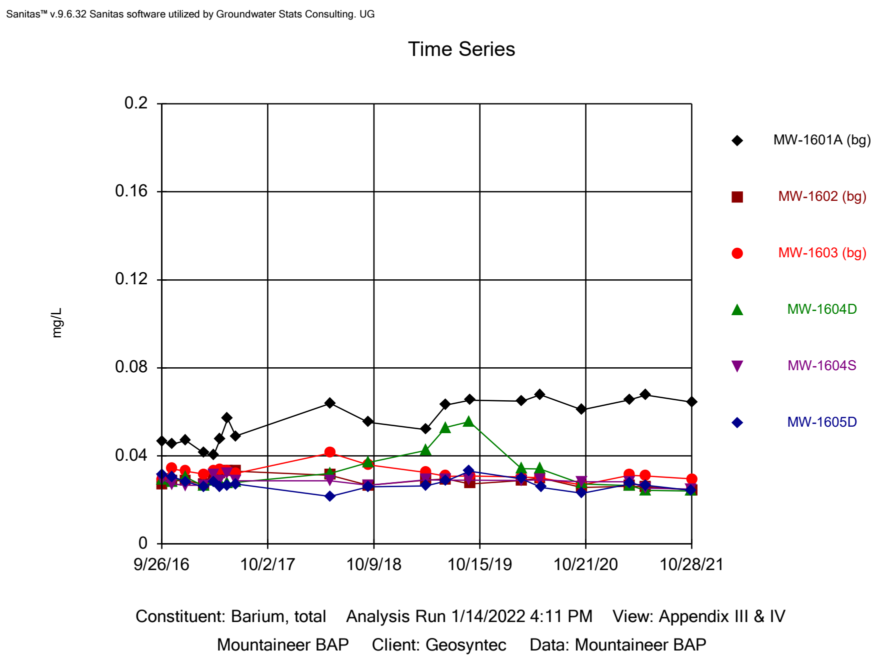
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0.12
0.08
0.04
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mg/L
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10/2/17
10/9/18
10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
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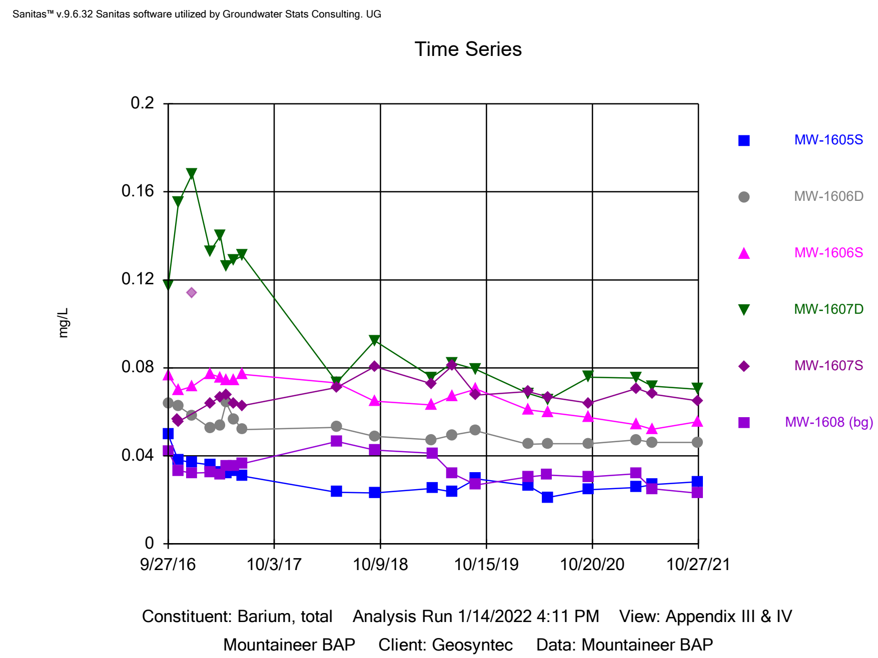
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP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10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
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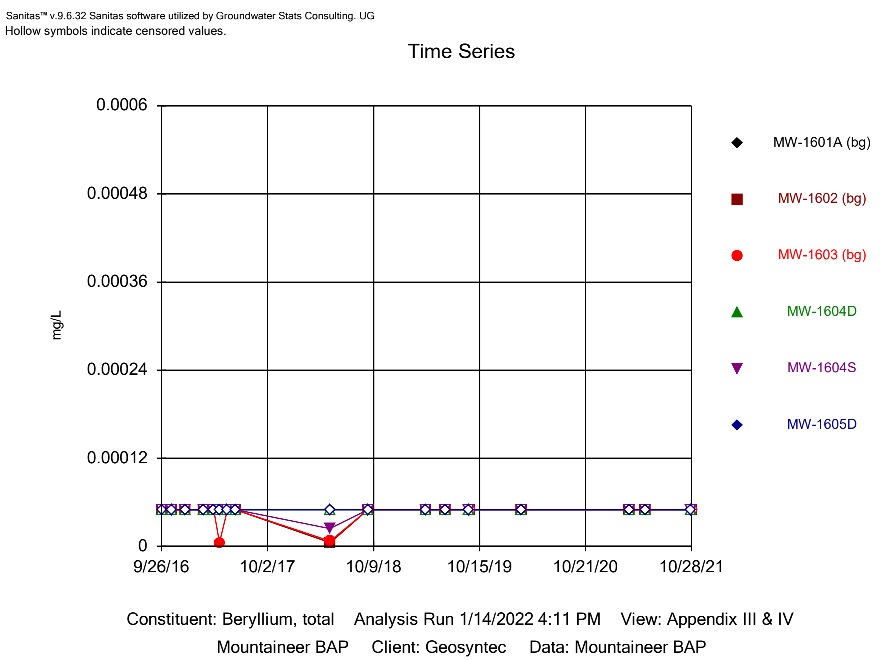
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP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mg/L
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10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
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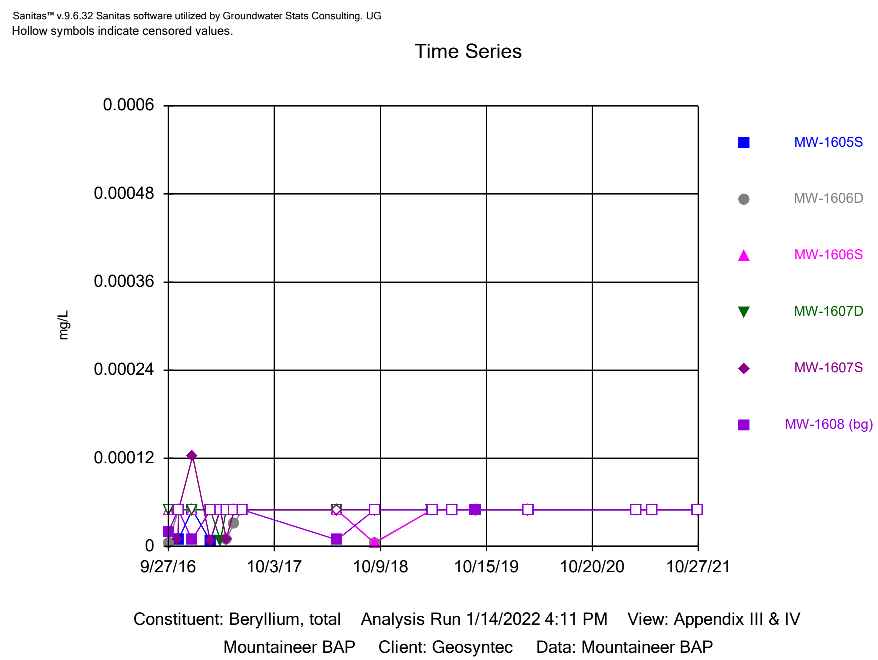
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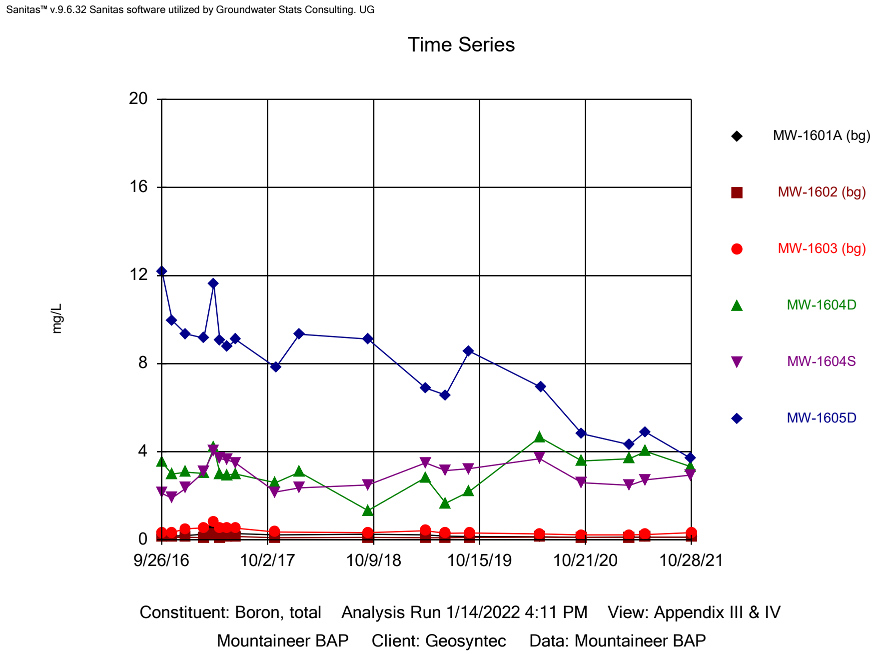
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Beryllium, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP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mg/L
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16
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10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
Constituent: Boron, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
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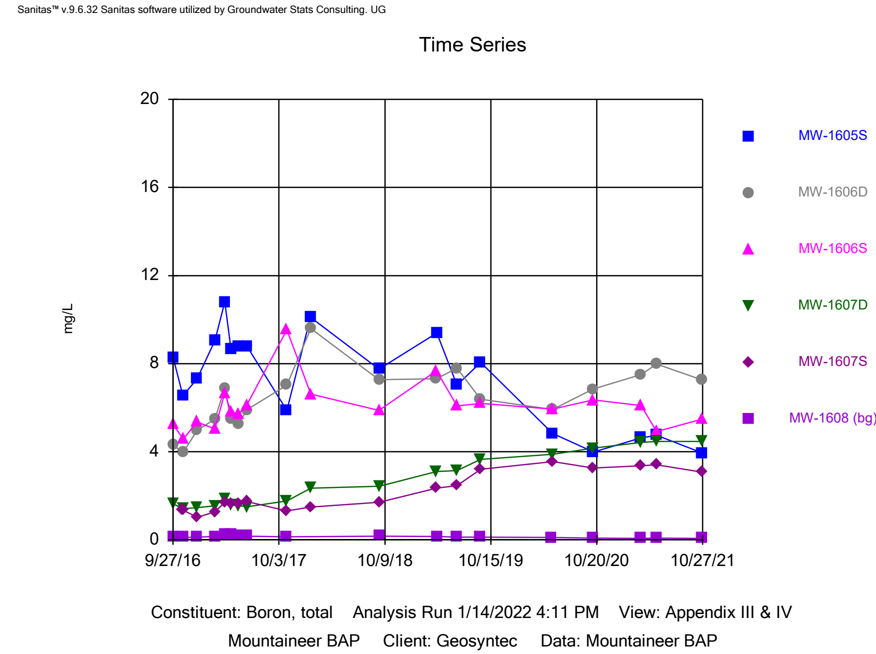
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Time Series
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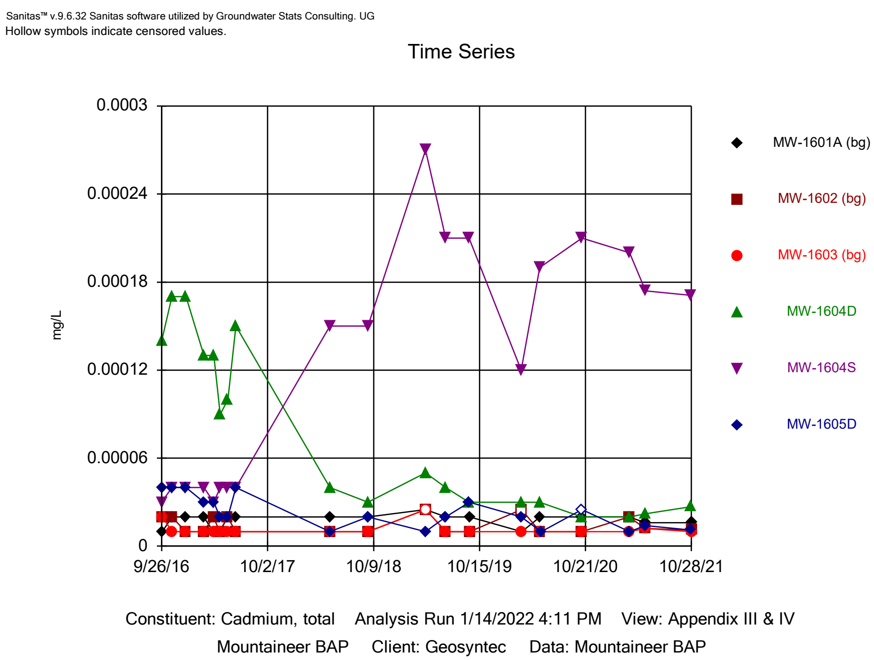
10/9/18
10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Boron, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP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MW-1604D
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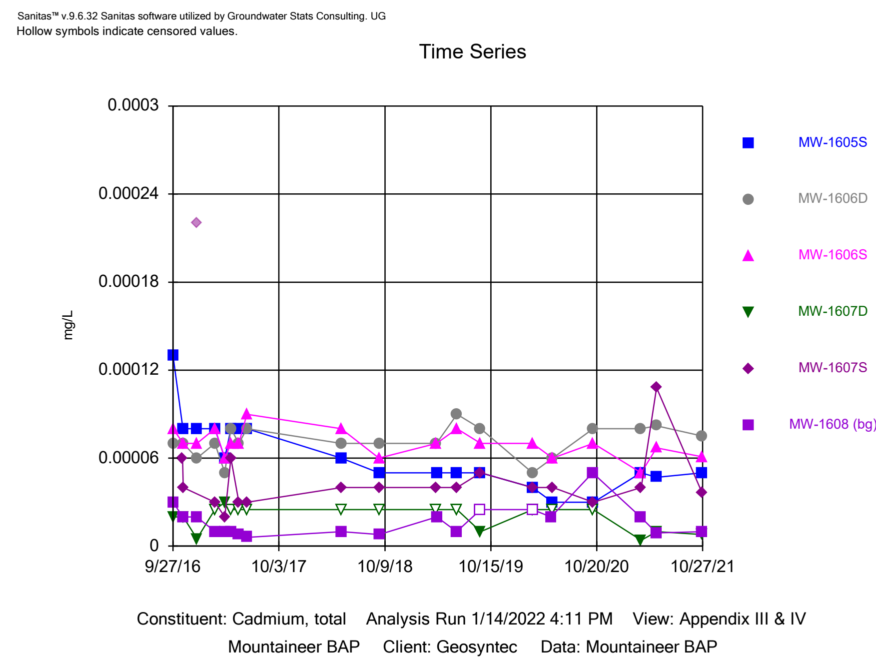
Constituent: Cadmium, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP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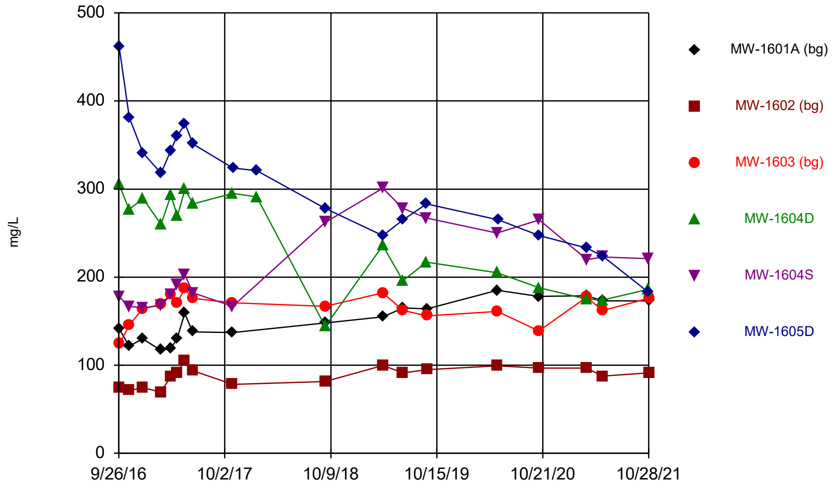
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Cadmium, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

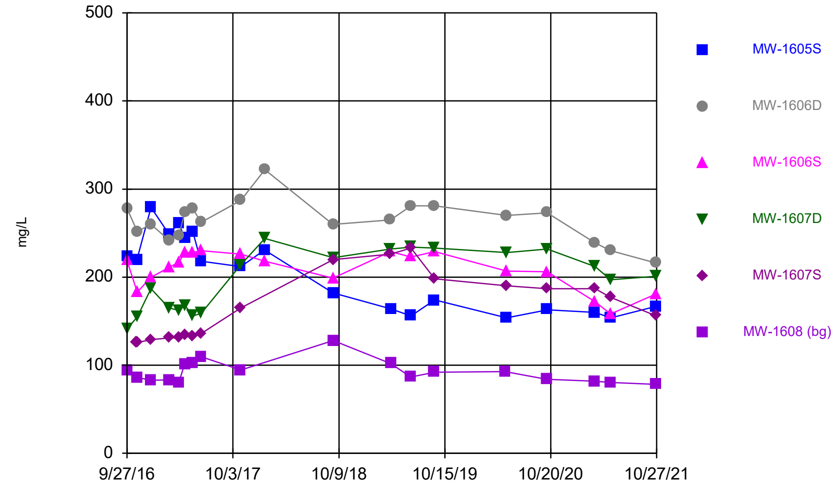
Time Series



Constituent: Calcium, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

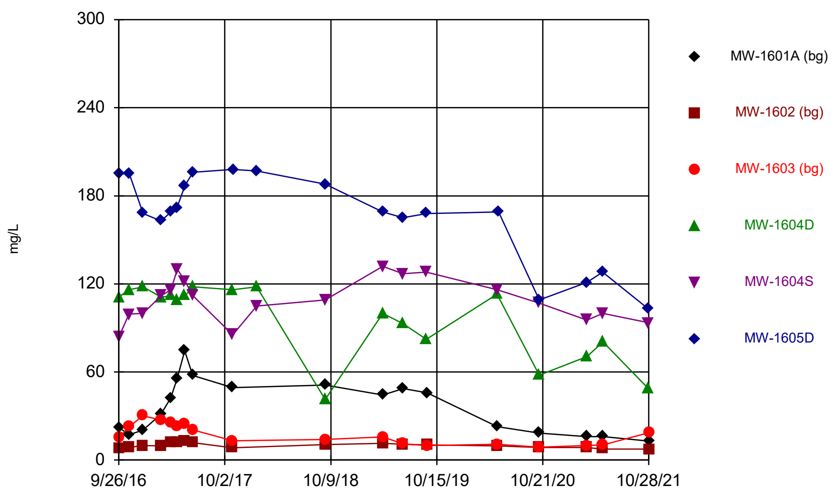
Time Series



Constituent: Calcium, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

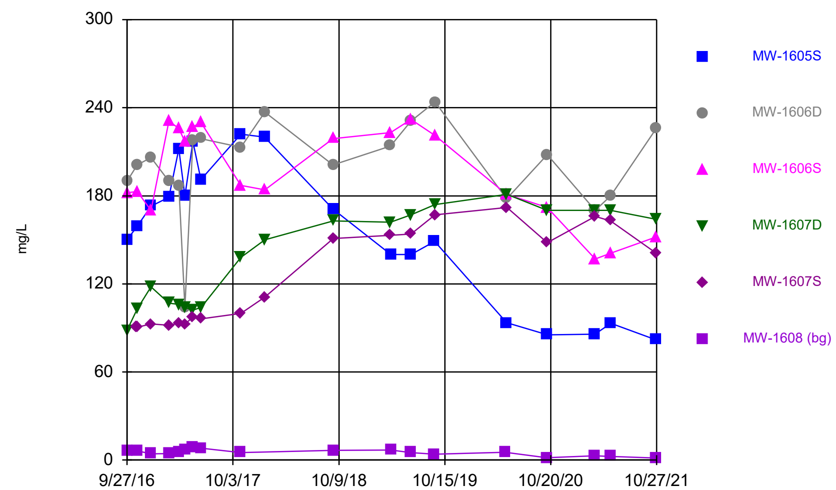
Time Series



Constituent: Chloride, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



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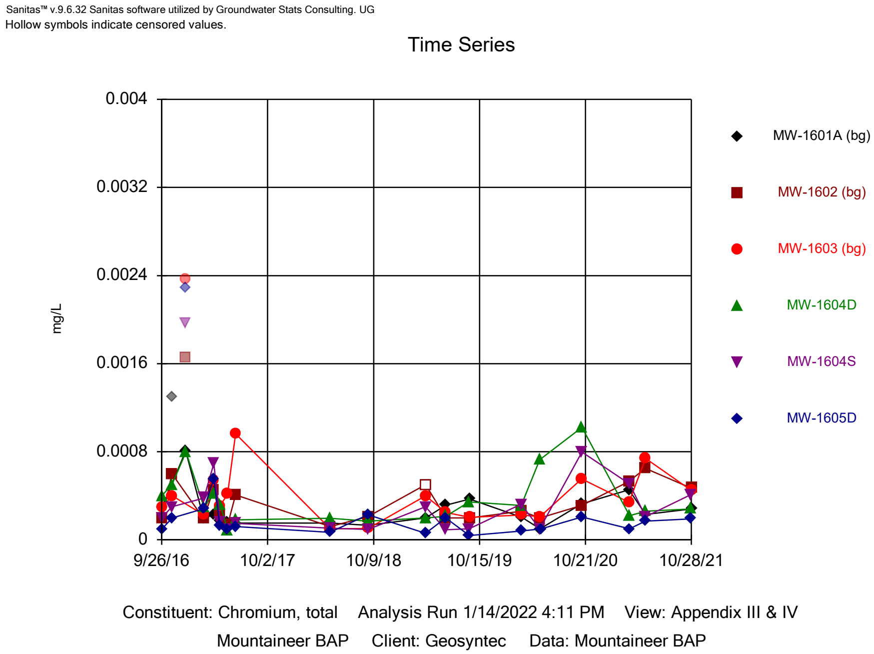
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
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0.0008
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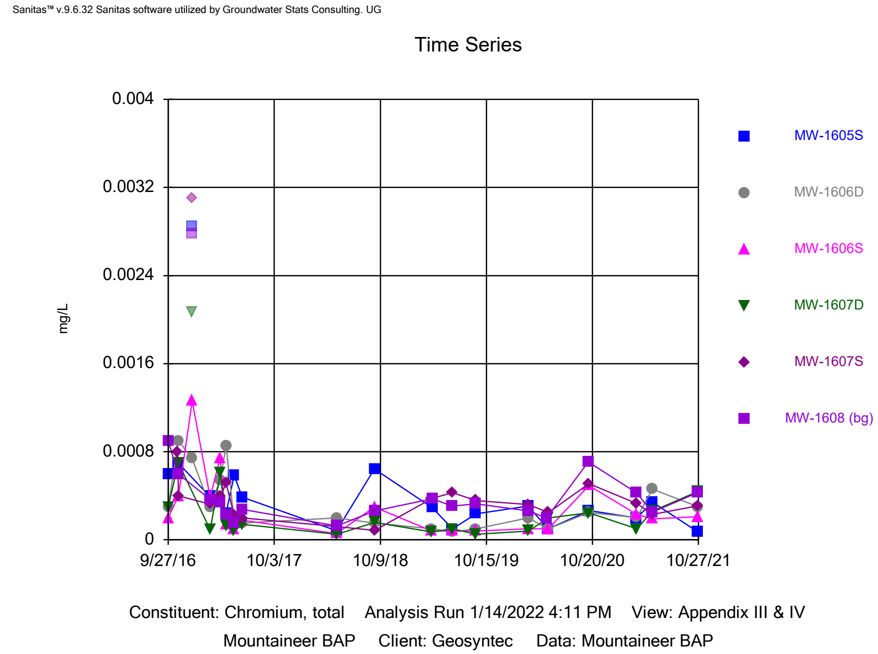
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
Constituent: Chromium, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
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0.0024
0.0016
0.0008
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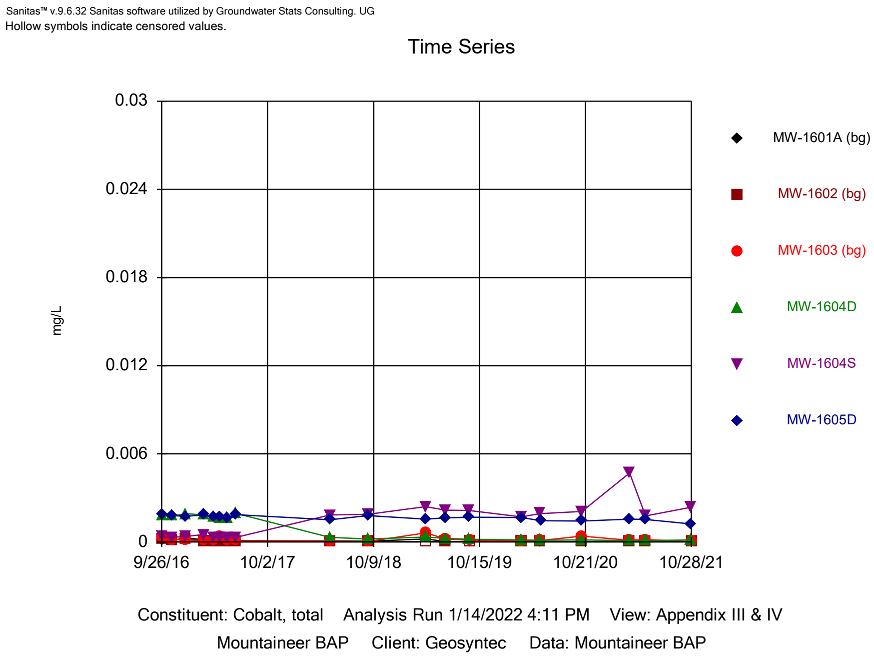
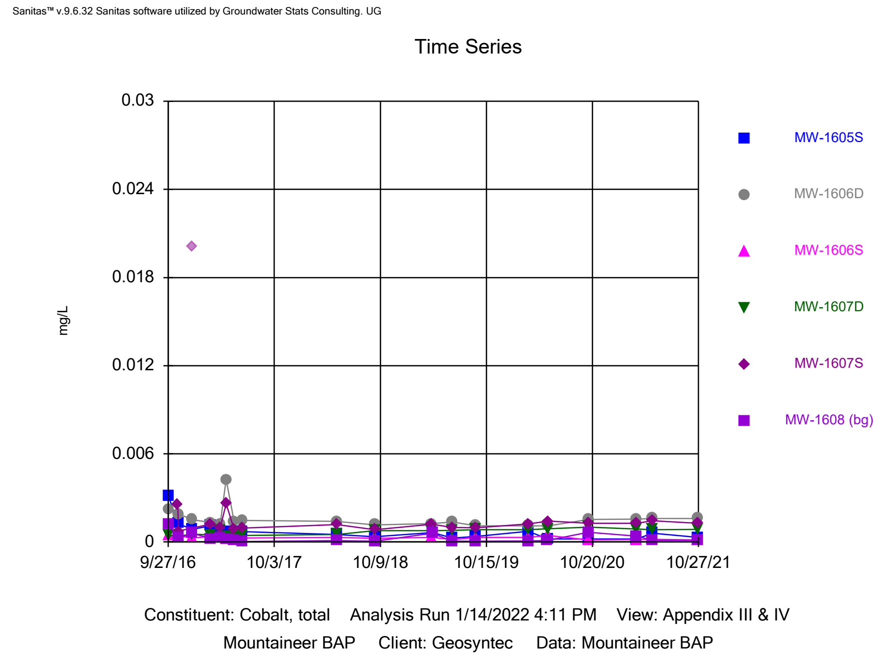
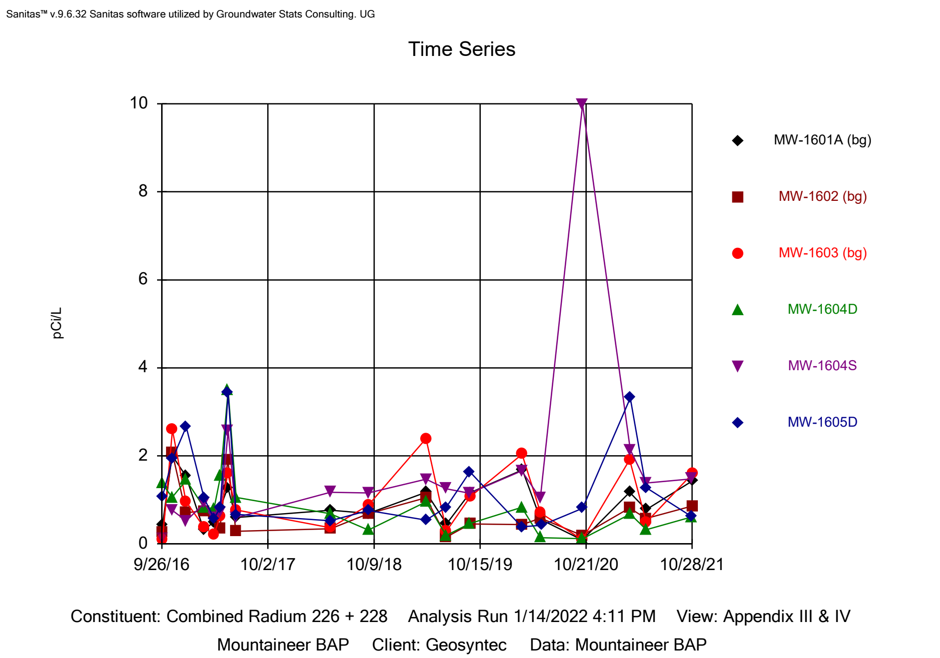
10/3/17
10/9/18
10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Chromium, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



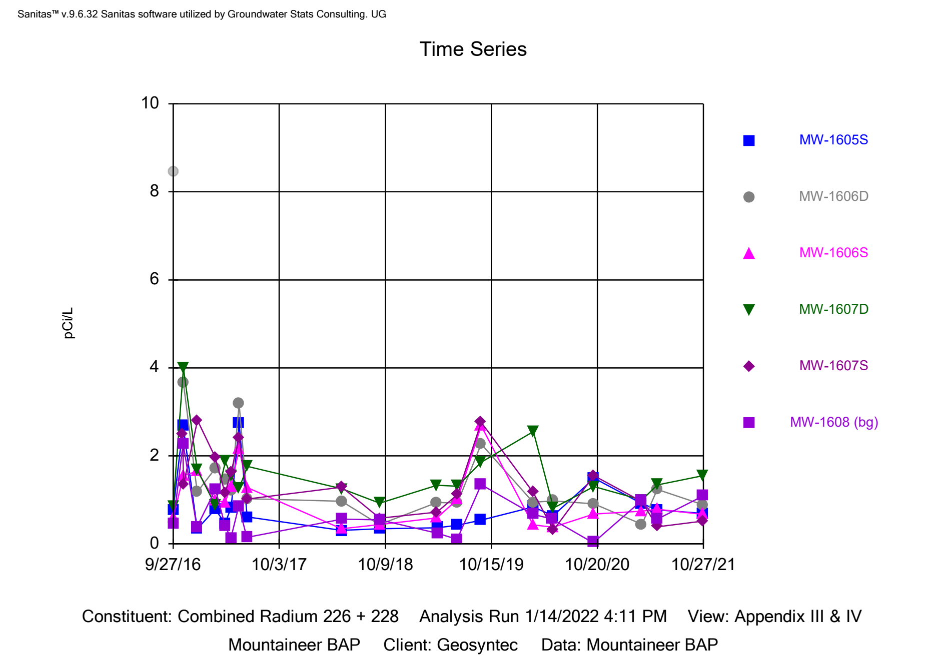
Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
mg/L
0.03
0.024
0.018
0.012
0.006
0
9/26/16
10/2/17
10/9/18
10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
Constituent: Cobalt, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



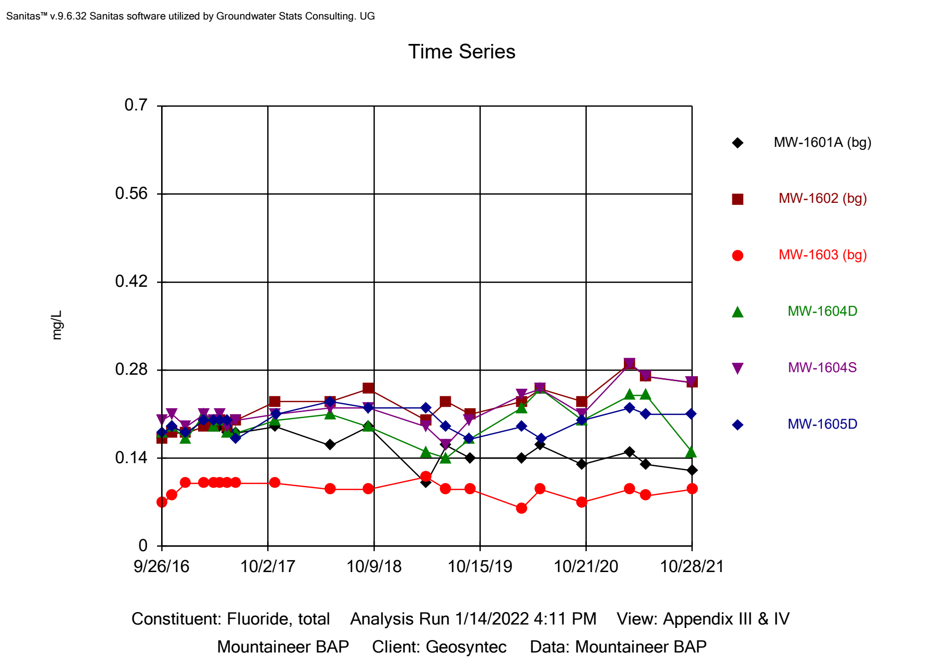
Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
mg/L
0.03
0.024
0.018
0.012
0.006
0
9/27/16
10/3/17
10/9/18
10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Cobalt, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



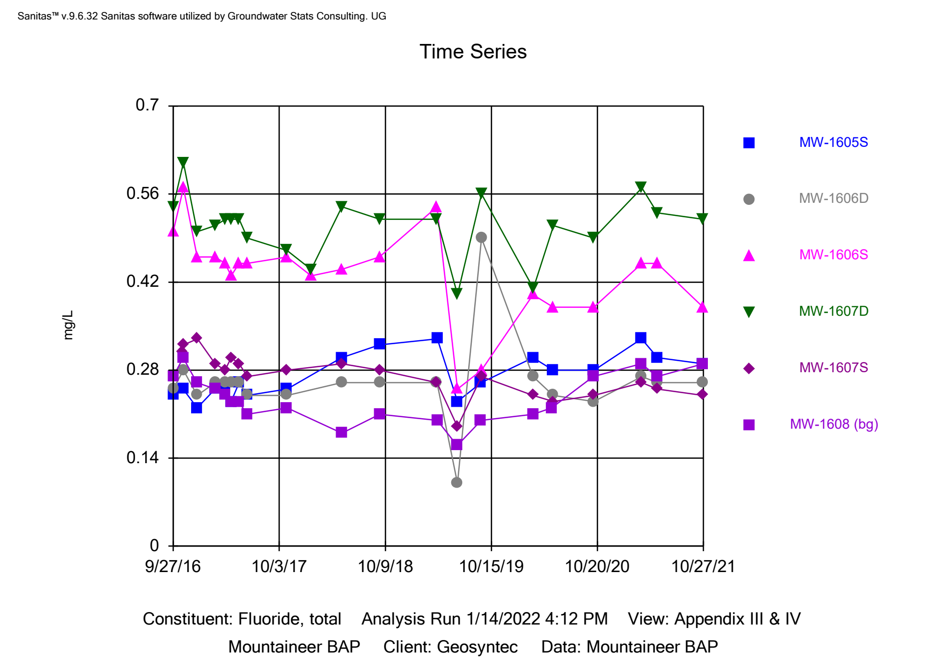
Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
pCi/L
0
2
4
6
8
10
9/26/16
10/2/17
10/9/18
10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
Constituent: Combined Radium 226 + 228 Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
pCi/L
0
2
4
6
8
10
9/27/16
10/3/17
10/9/18
10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Combined Radium 226 + 228 Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

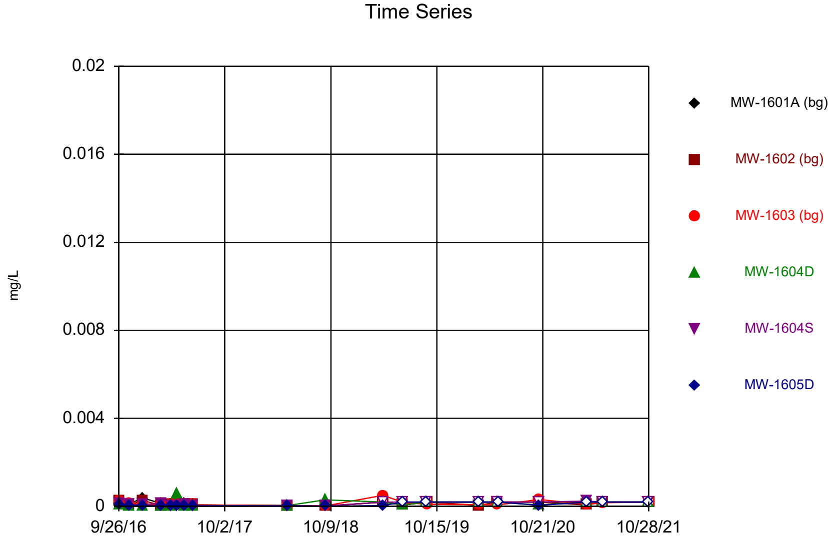


Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
mg/L
0
0.14
0.28
0.42
0.56
0.7
9/26/16
10/2/17
10/9/18
10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
Constituent: Fluoride, total Analysis Run 1/14/2022 4:11 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



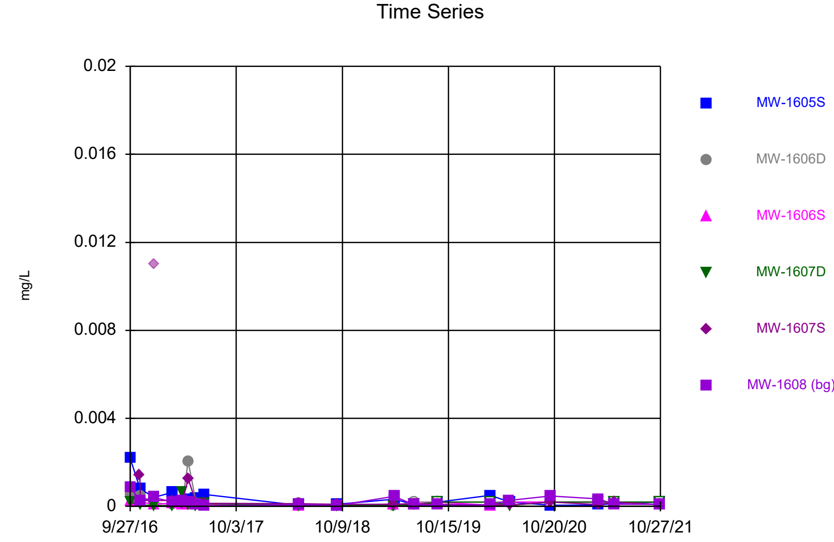
Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
mg/L
0
0.14
0.28
0.42
0.56
0.7
9/27/16
10/3/17
10/9/18
10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Fluoride, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



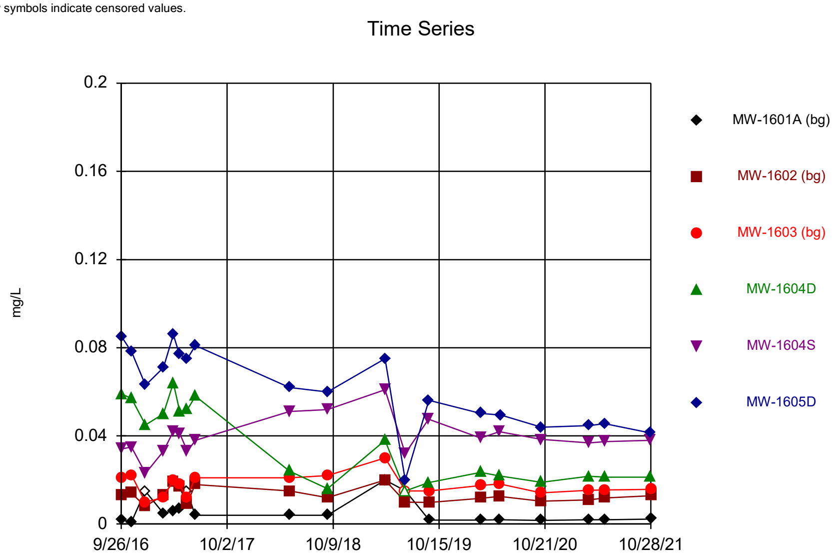
Constituent: Lead, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



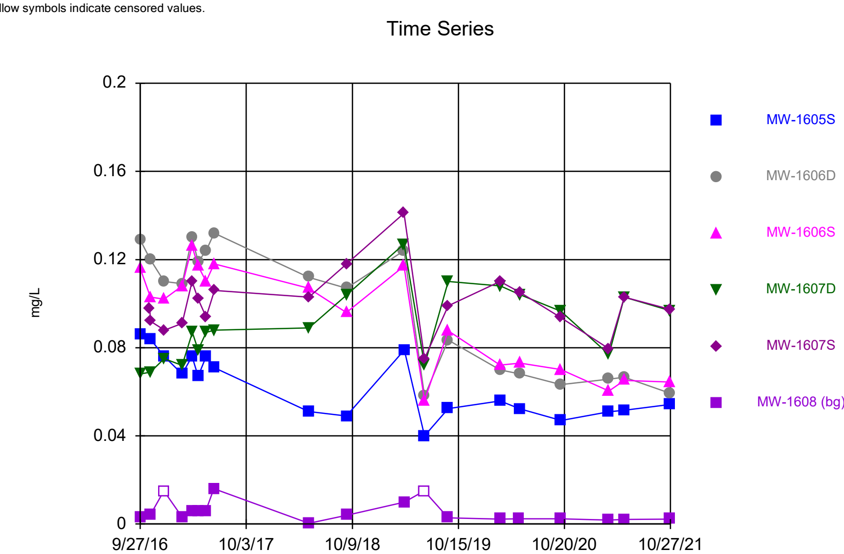
Constituent: Lead, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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

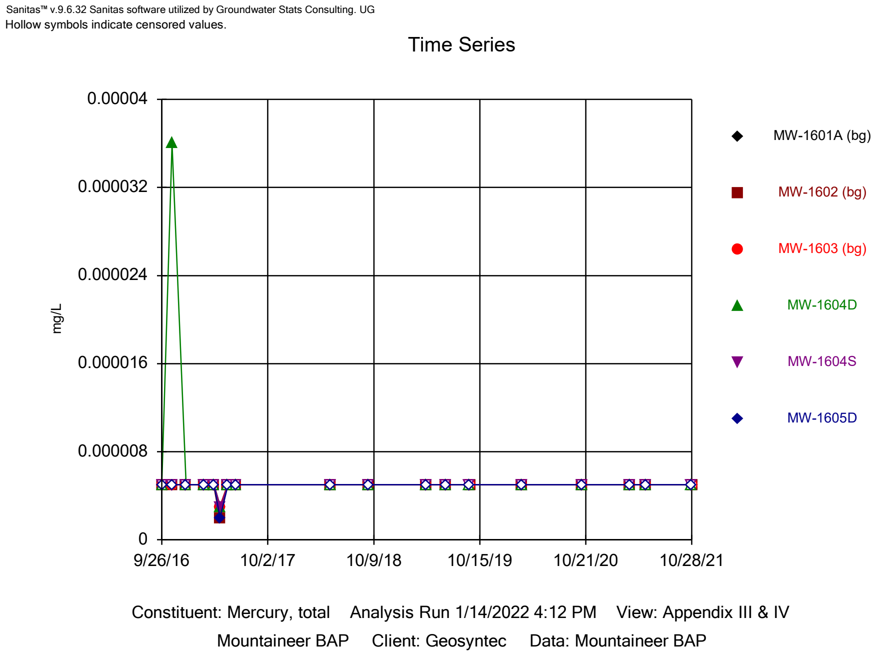


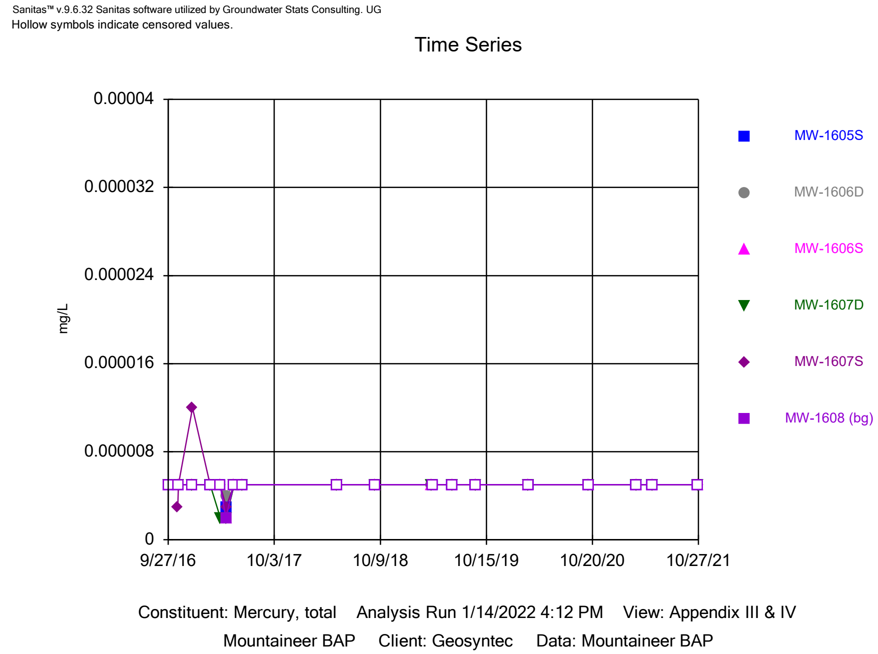
Constituent: Lithium, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

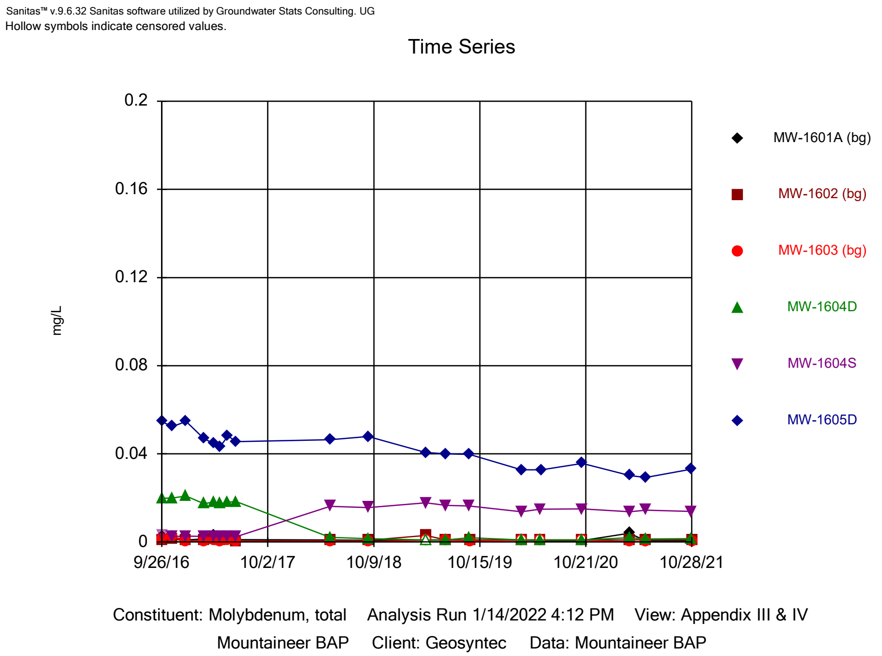
Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

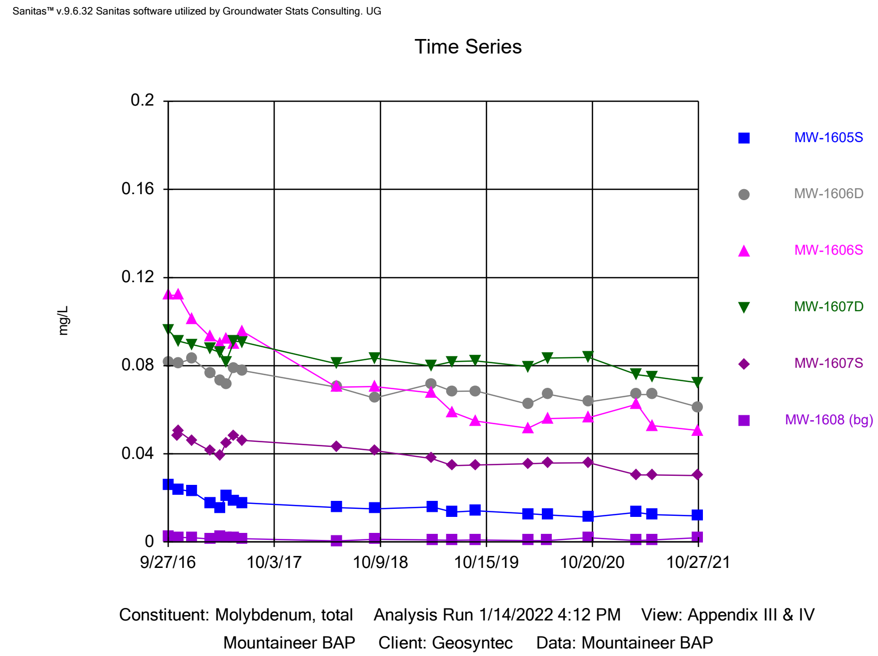


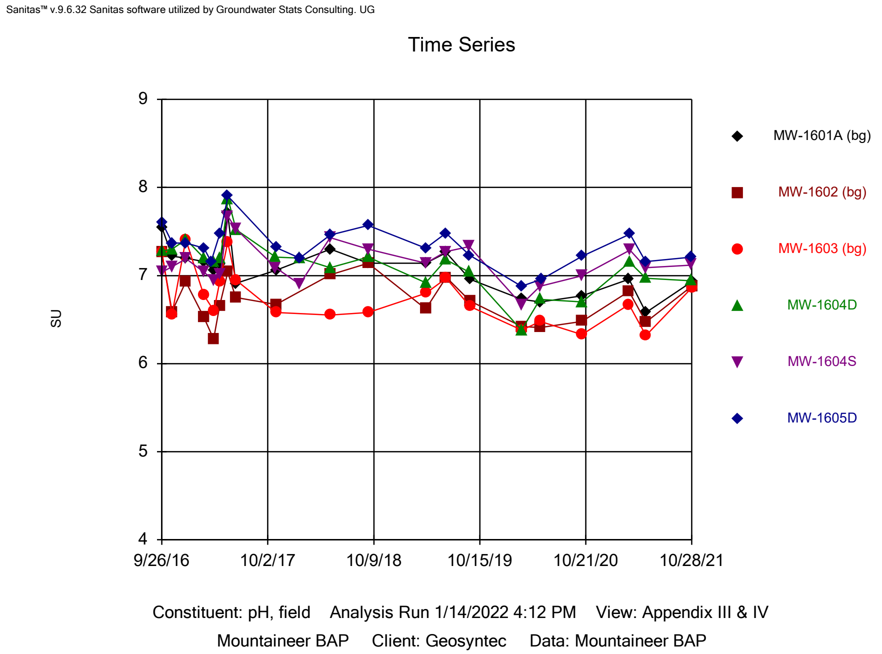
Constituent: Lithium, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

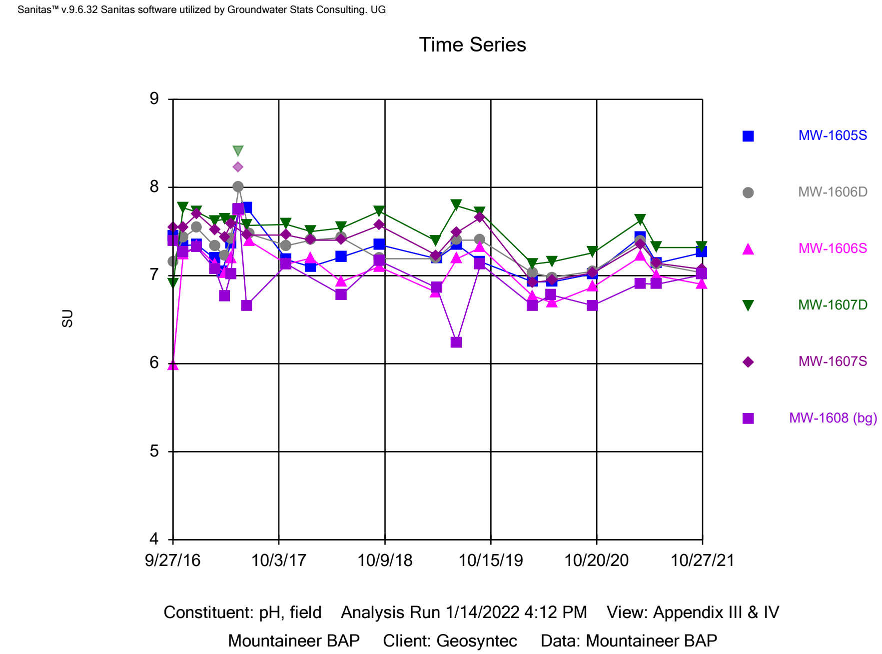

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
0.00004
0.000032
0.000024
0.000016
0.000008
0
mg/L
9/26/16
10/2/17
10/9/18
10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
Constituent: Mercury, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

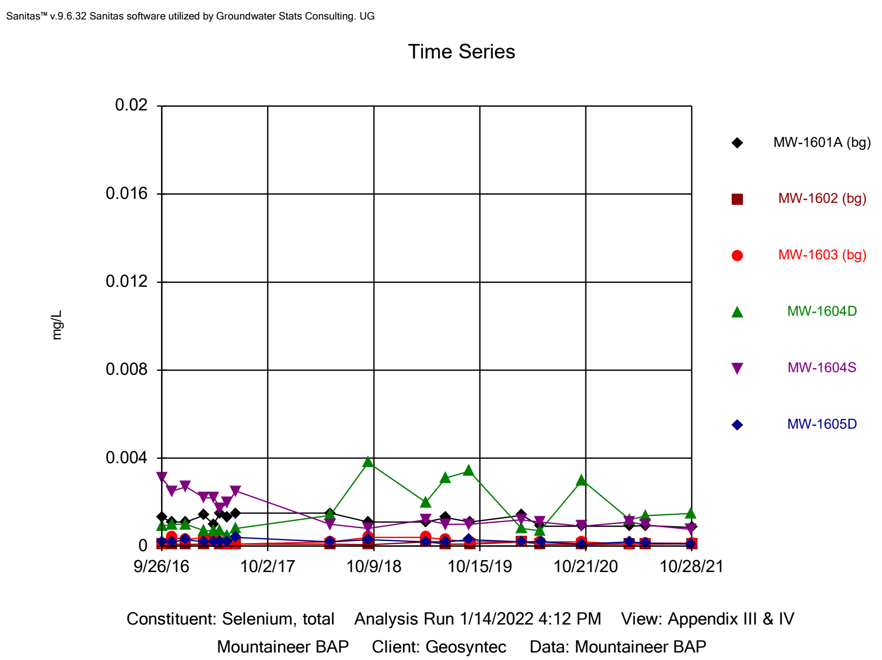

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
0.00004
0.000032
0.000024
0.000016
0.000008
0
mg/L
9/27/16
10/3/17
10/9/18
10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Mercury, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

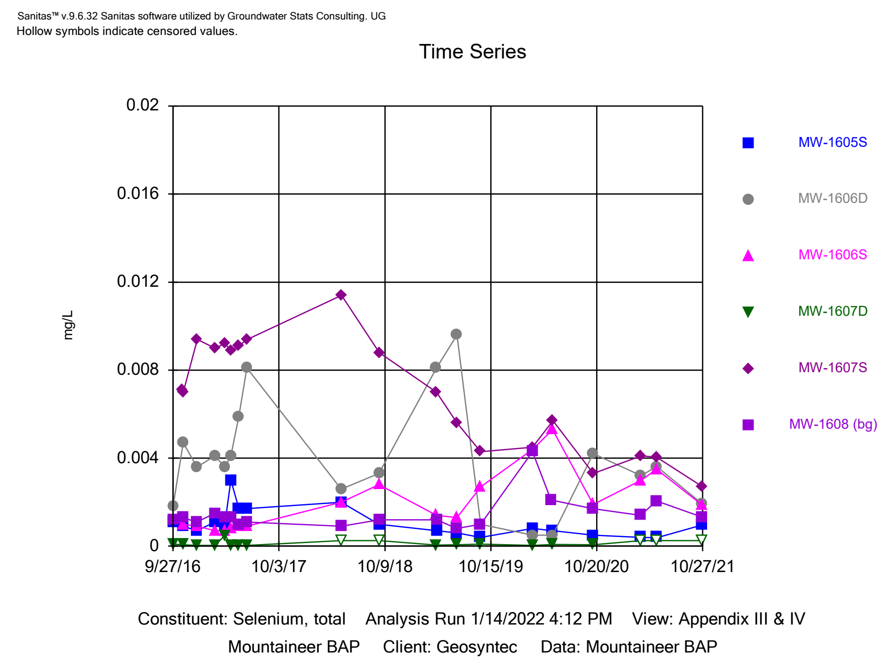

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
0.2
0.16
0.12
0.08
0.04
0
mg/L
9/26/16
10/2/17
10/9/18
10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
Constituent: Molybdenum, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

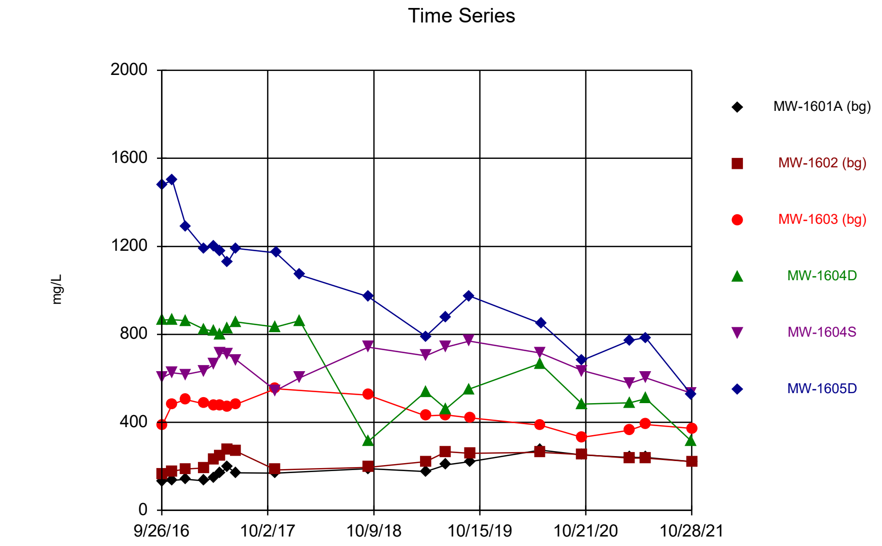

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
0.2
0.16
0.12
0.08
0.04
0
mg/L
9/27/16
10/3/17
10/9/18
10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Molybdenum, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
SU
9
8
7
6
5
4
9/26/16
10/2/17
10/9/18
10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
Constituent: pH, field Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

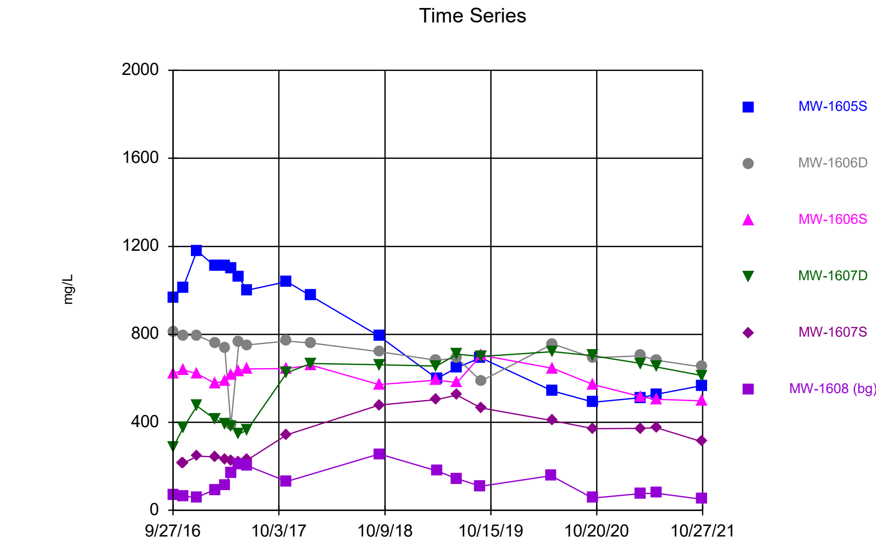

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
SU
9
8
7
6
5
4
9/27/16
10/3/17
10/9/18
10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: pH, field Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Time Series
mg/L
0.02
0.016
0.012
0.008
0.004
0
9/26/16
10/2/17
10/9/18
10/15/19
10/21/20
10/28/21
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
Constituent: Selenium, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
mg/L
0.02
0.016
0.012
0.008
0.004
0
9/27/16
10/3/17
10/9/18
10/15/19
10/20/20
10/27/21
MW-1605S
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
Constituent: Selenium, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

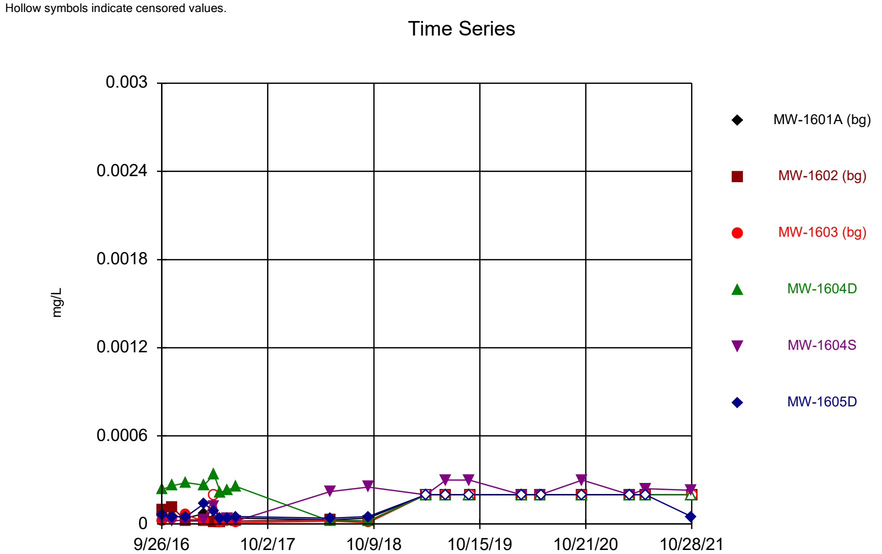


Constituent: Sulfate, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



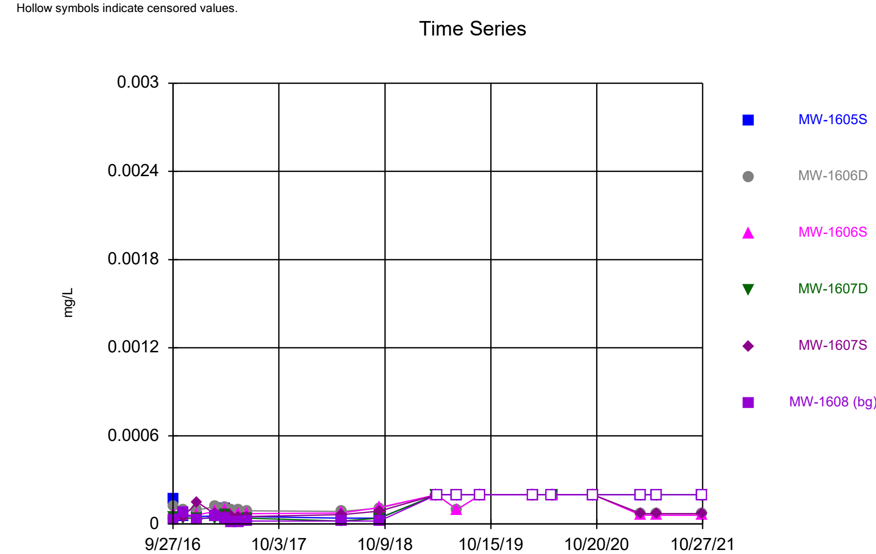
Constituent: Sulfate, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Hollow symbols indicate censored values.



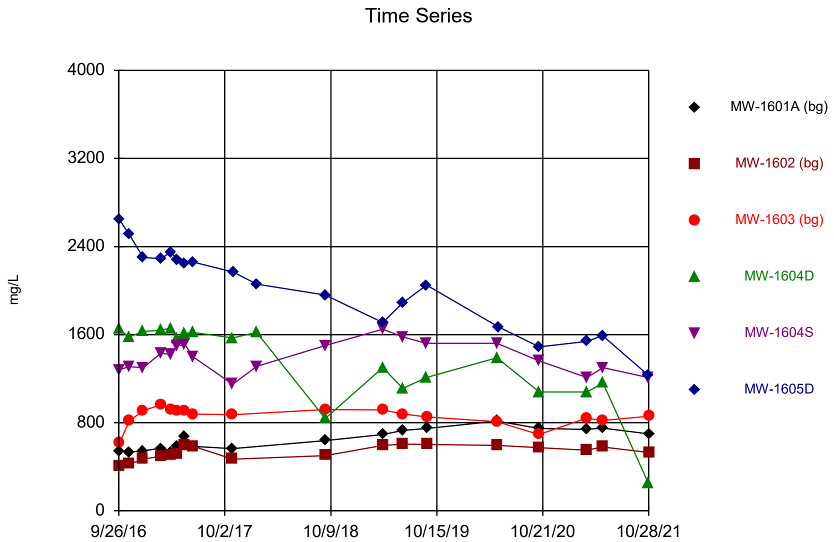
Constituent: Thallium, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Hollow symbols indicate censored values.



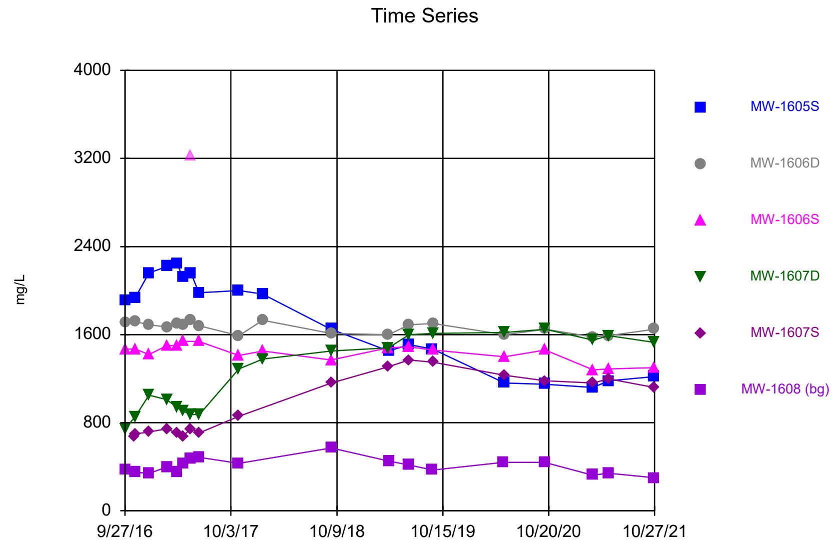
Constituent: Thallium, total Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



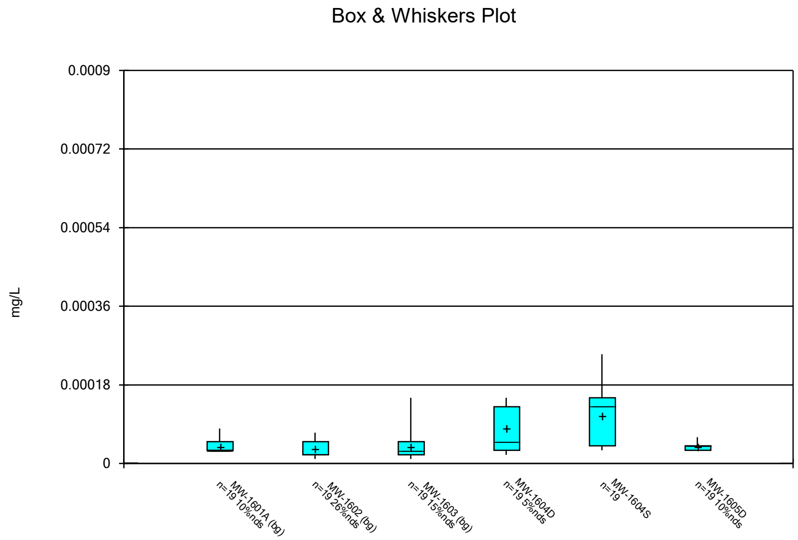
Constituent: Total Dissolved Solids [TDS] Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



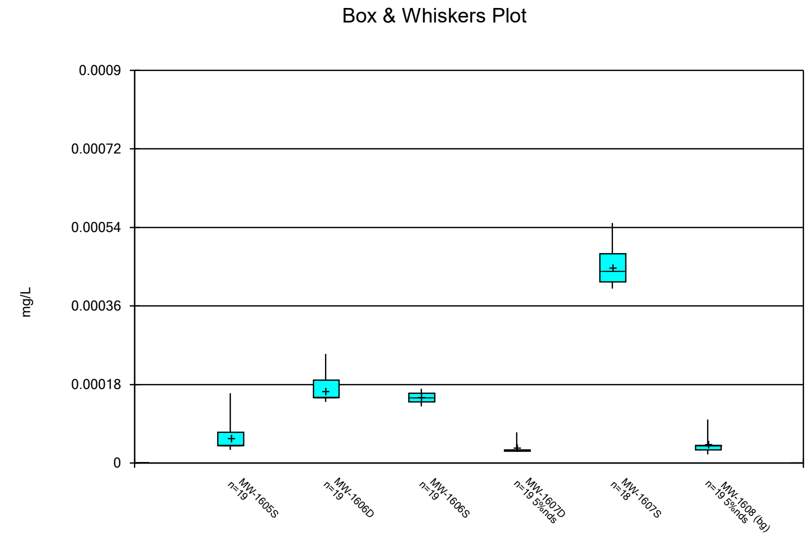
Constituent: Total Dissolved Solids [TDS] Analysis Run 1/14/2022 4:12 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



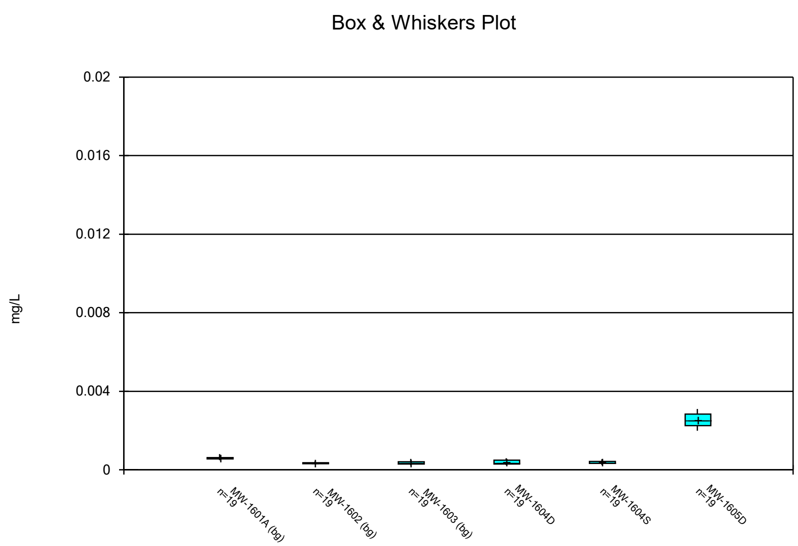
Constituent: Antimony, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



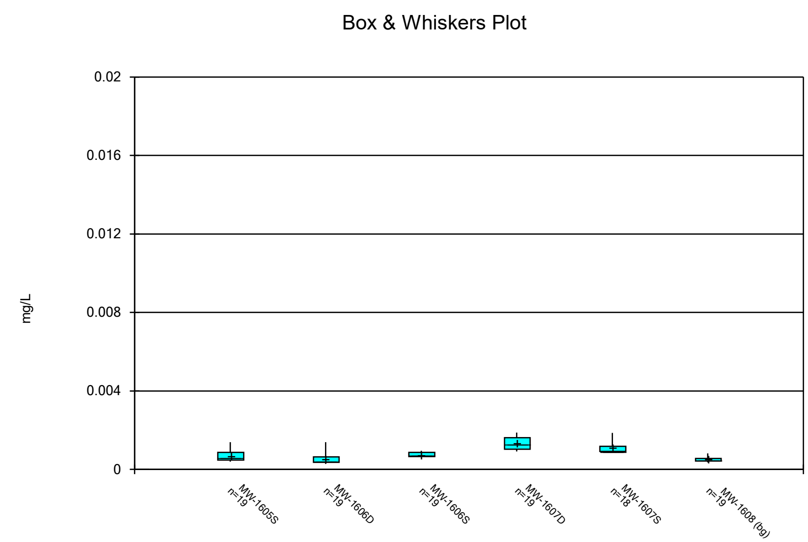
Constituent: Antimony, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



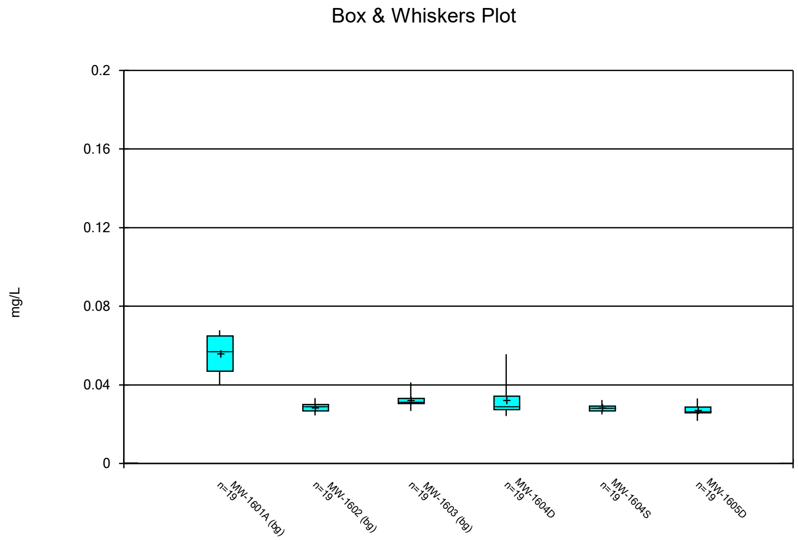
Constituent: Arsenic, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



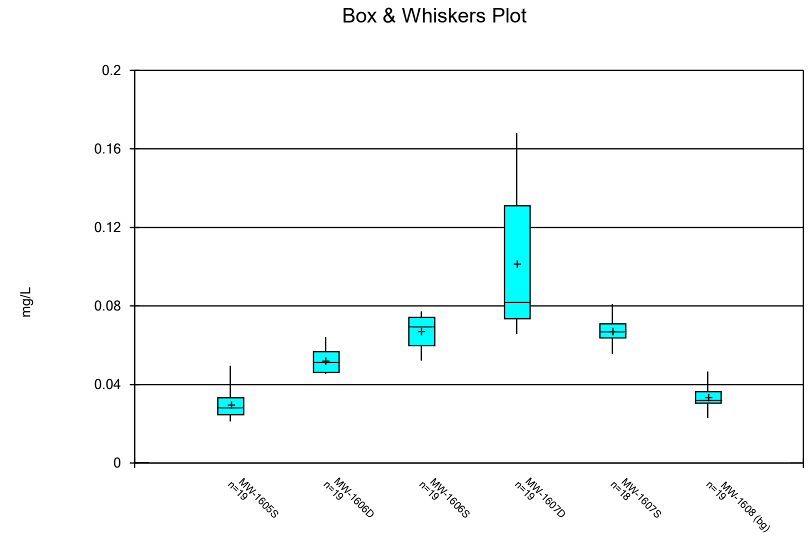
Constituent: Arsenic, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



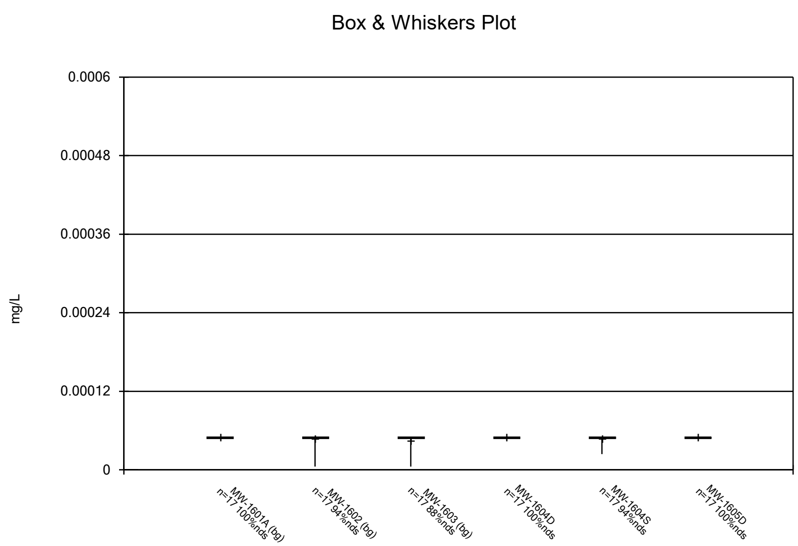
Constituent: Barium, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



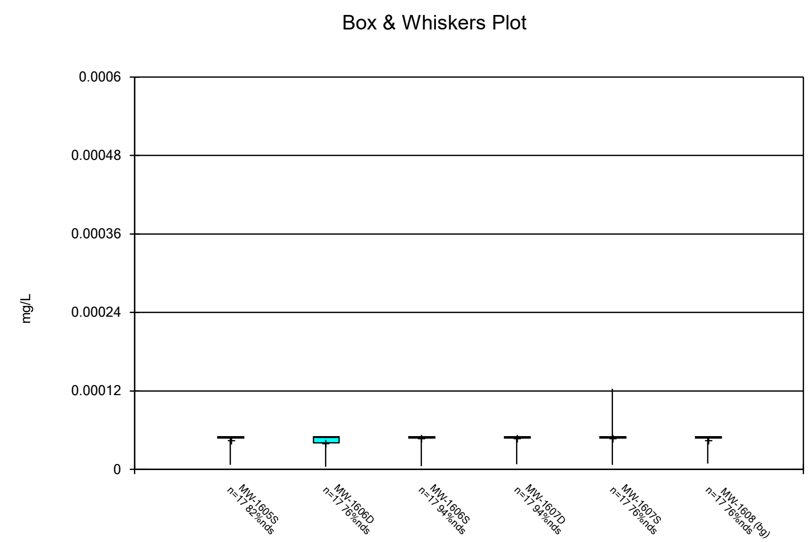
Constituent: Barium, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Beryllium, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

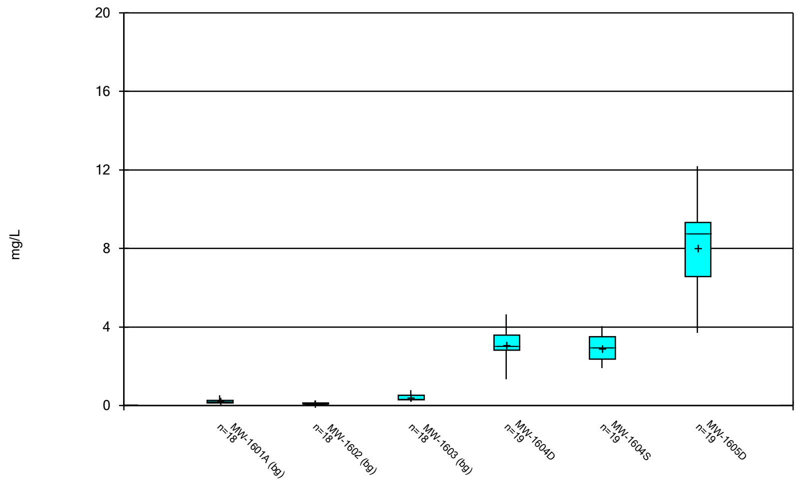
Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Beryllium, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

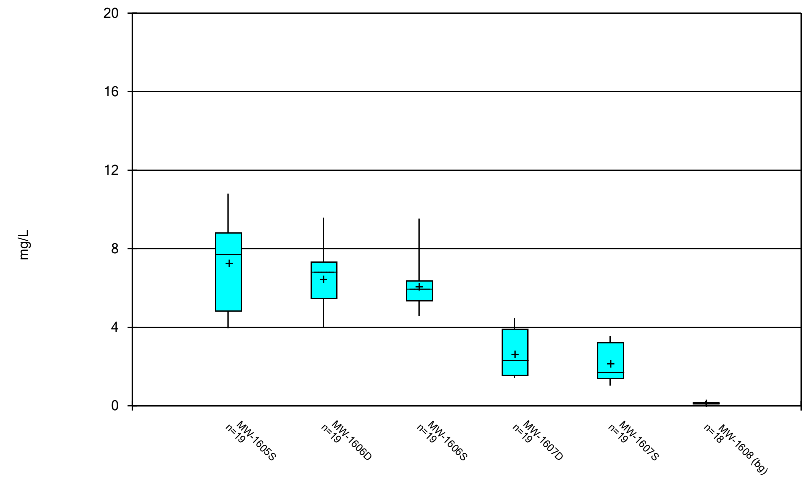
Box & Whiskers Plot



Constituent: Boron, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

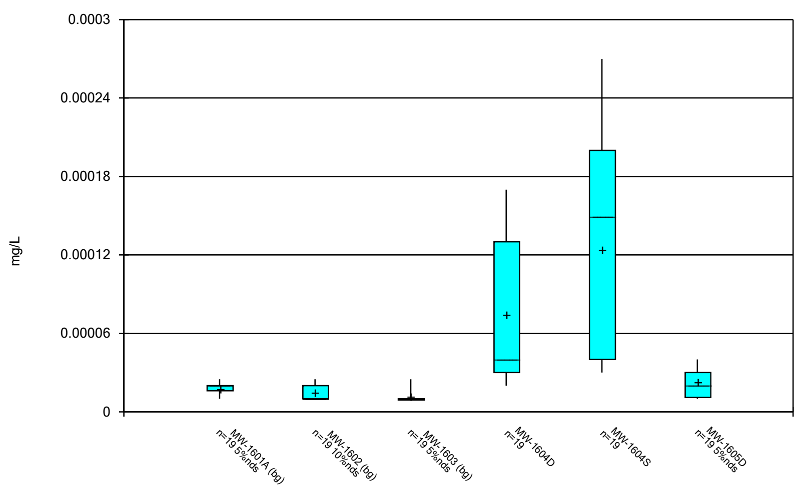
Box & Whiskers Plot



Constituent: Boron, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

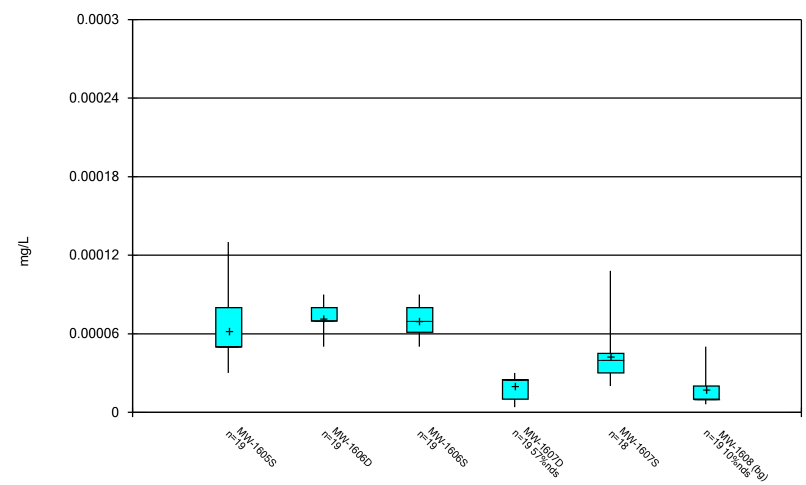
Box & Whiskers Plot



Constituent: Cadmium, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

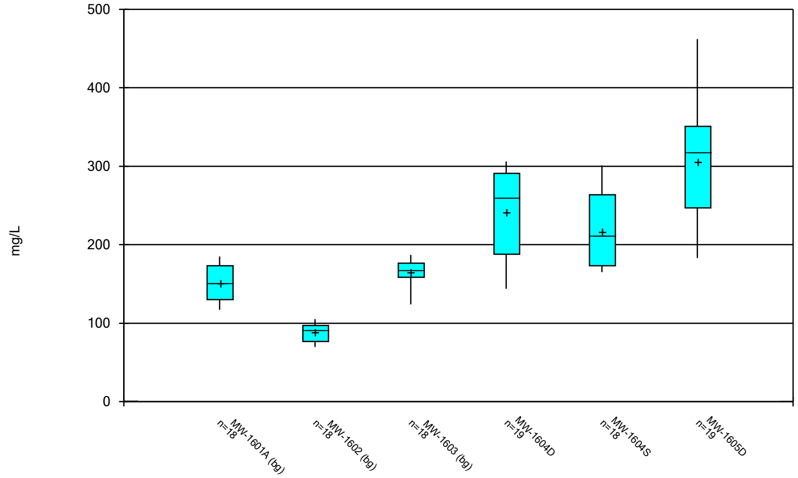
Box & Whiskers Plot



Constituent: Cadmium, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

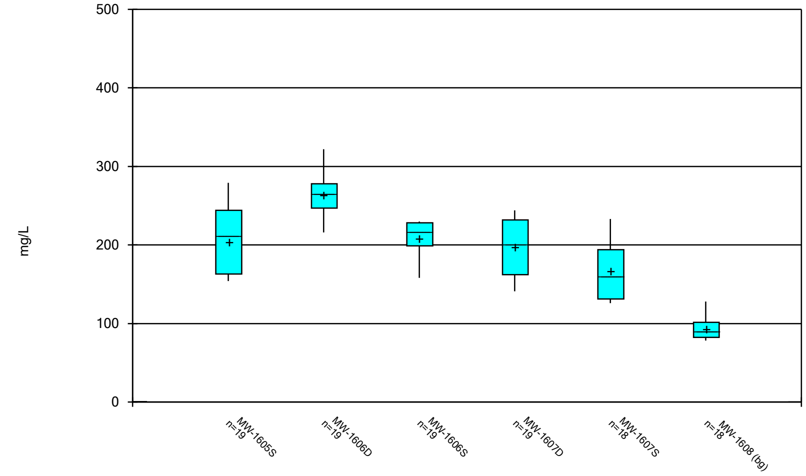
Box & Whiskers Plot



Constituent: Calcium, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

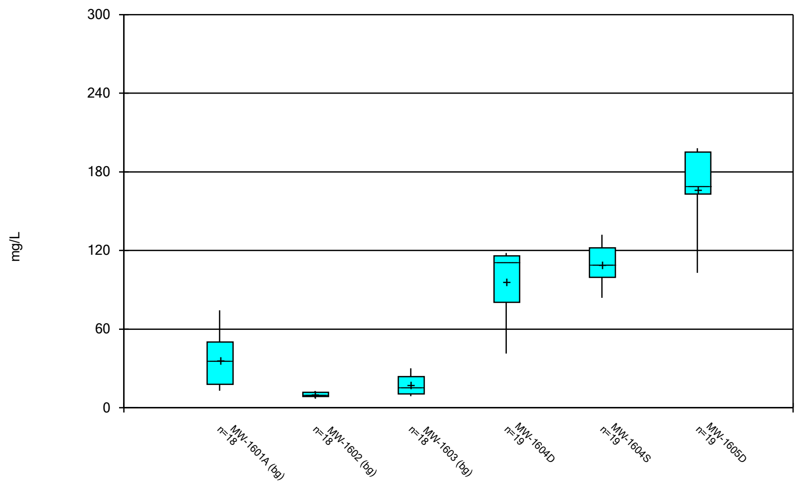
Box & Whiskers Plot



Constituent: Calcium, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

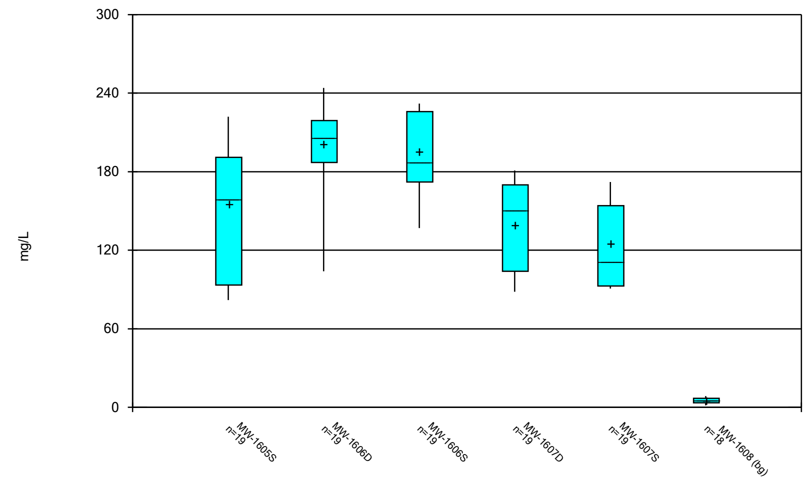
Box & Whiskers Plot



Constituent: Chloride, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

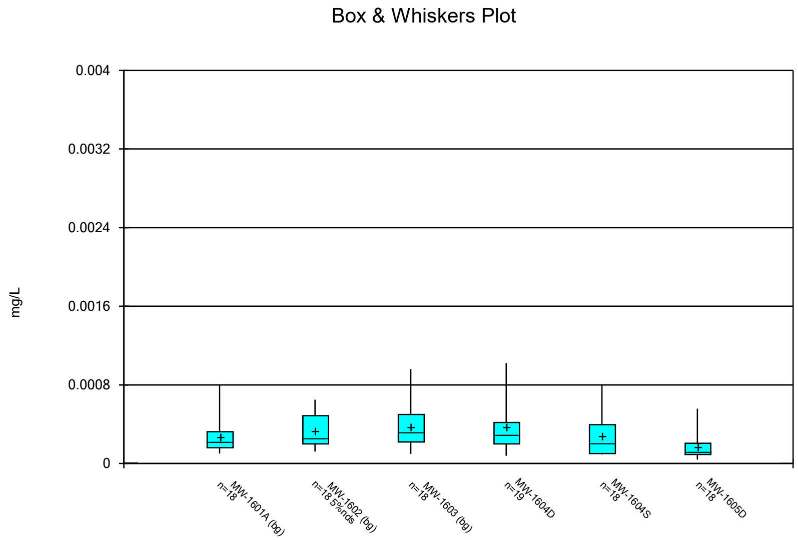
Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



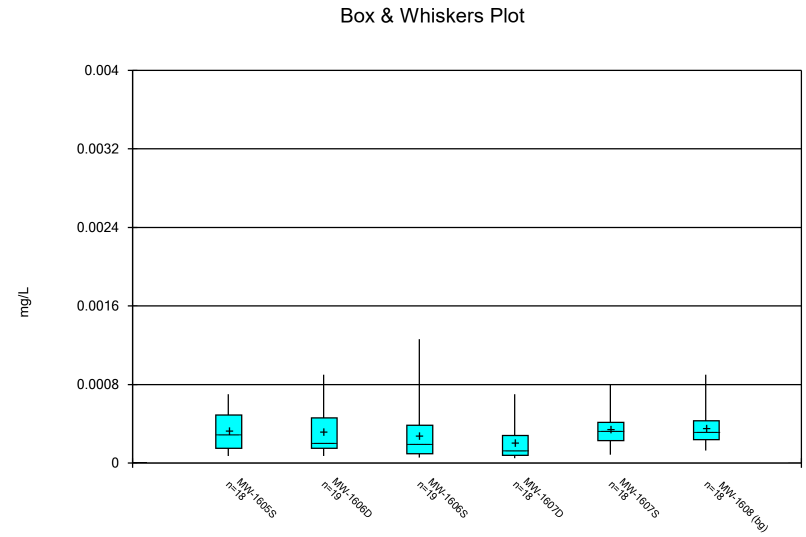
Constituent: Chloride, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



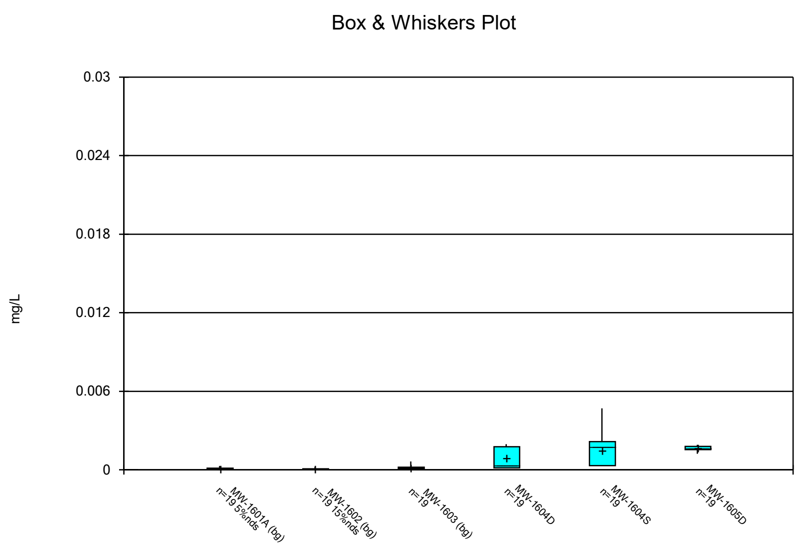
Constituent: Chromium, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



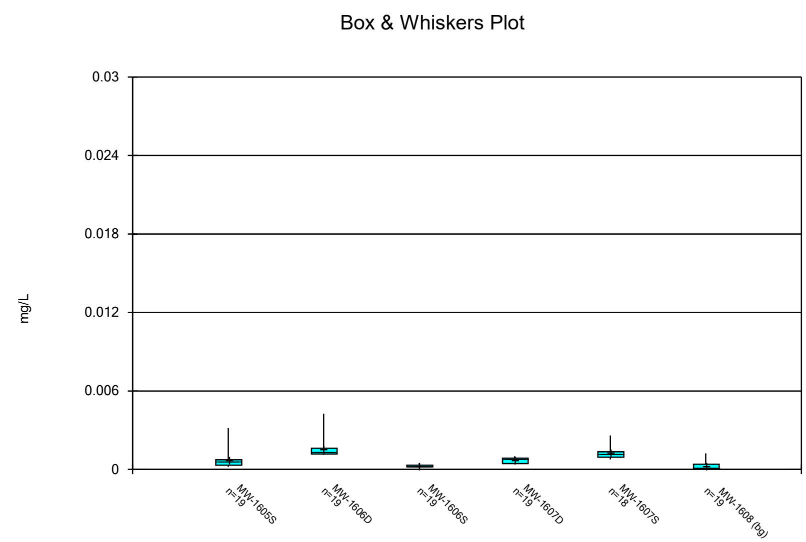
Constituent: Chromium, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Cobalt, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

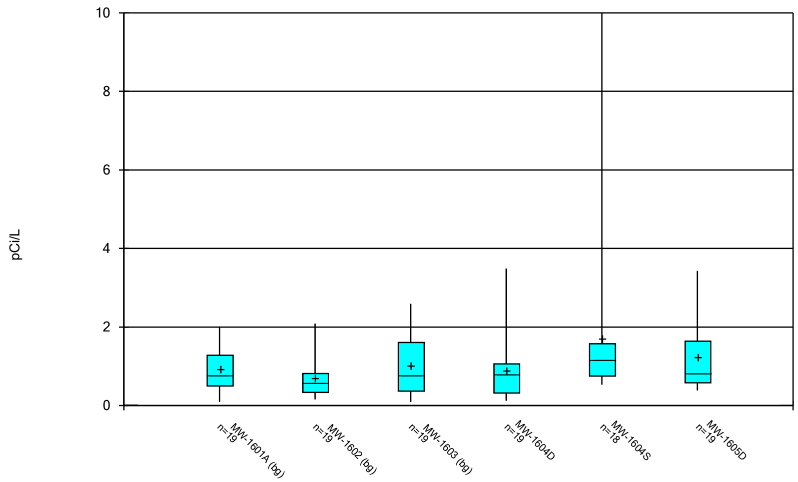
Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Cobalt, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

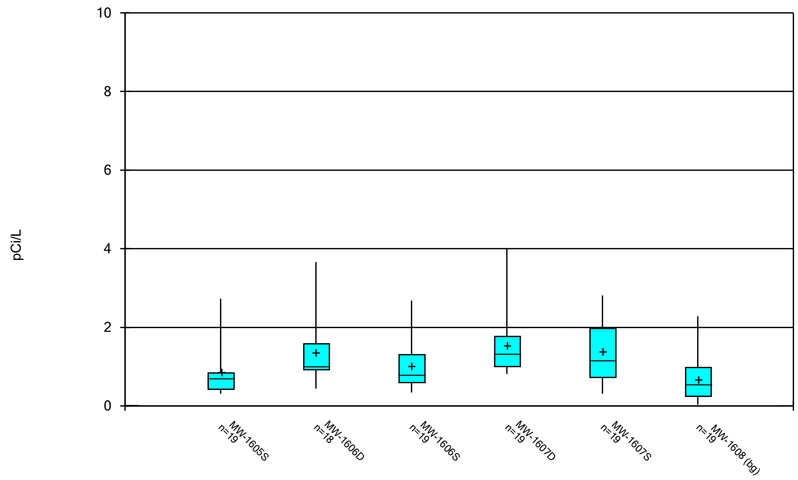
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228 Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

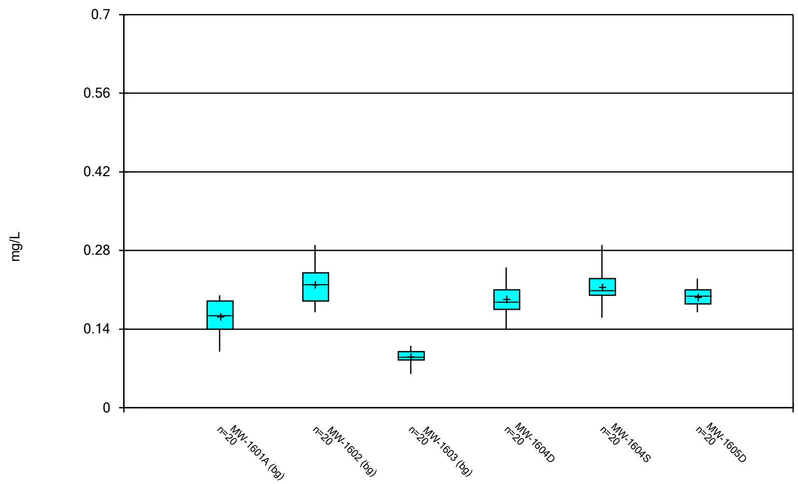
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228 Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

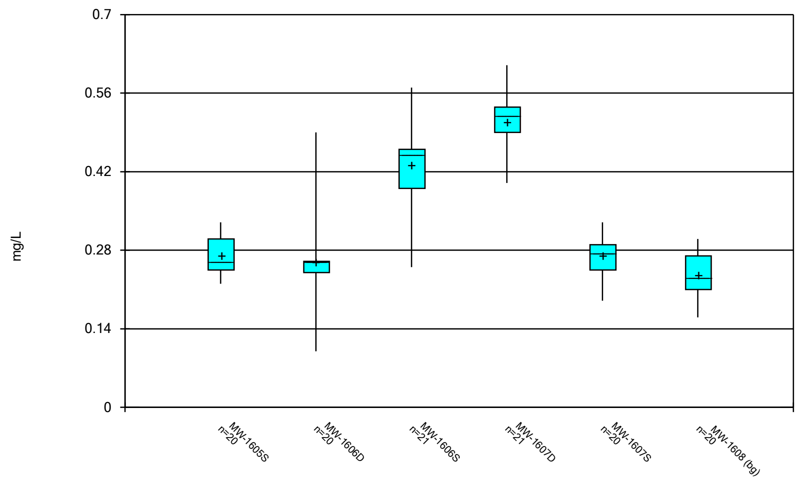
Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

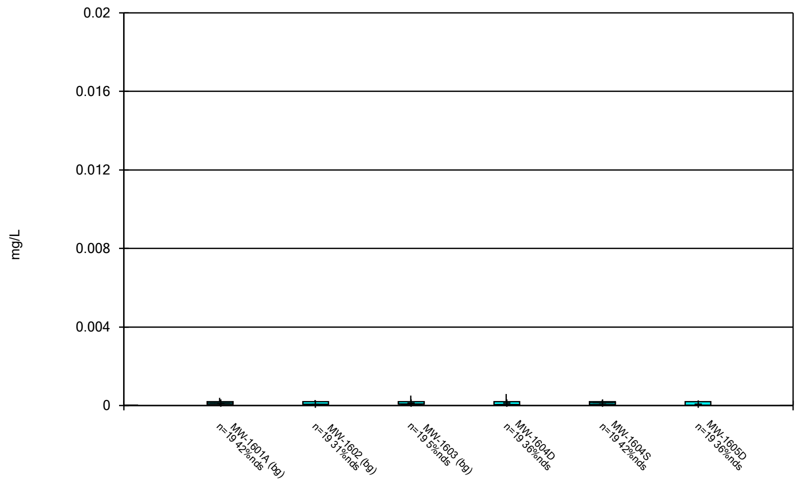
Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

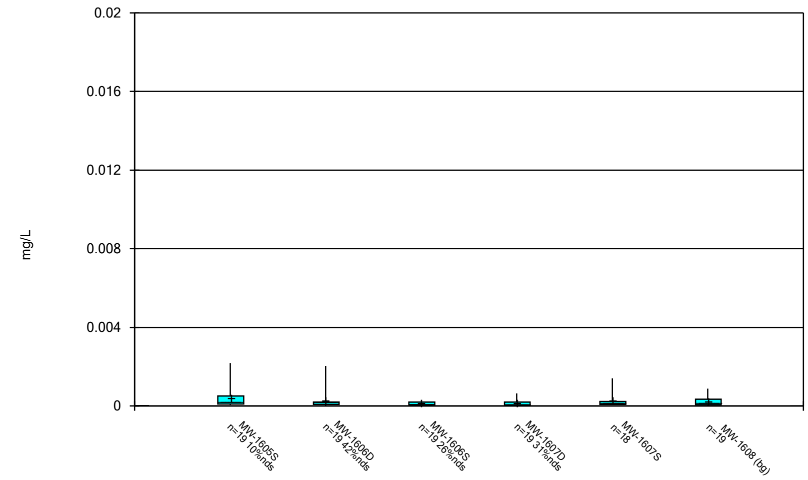
Box & Whiskers Plot



Constituent: Lead, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

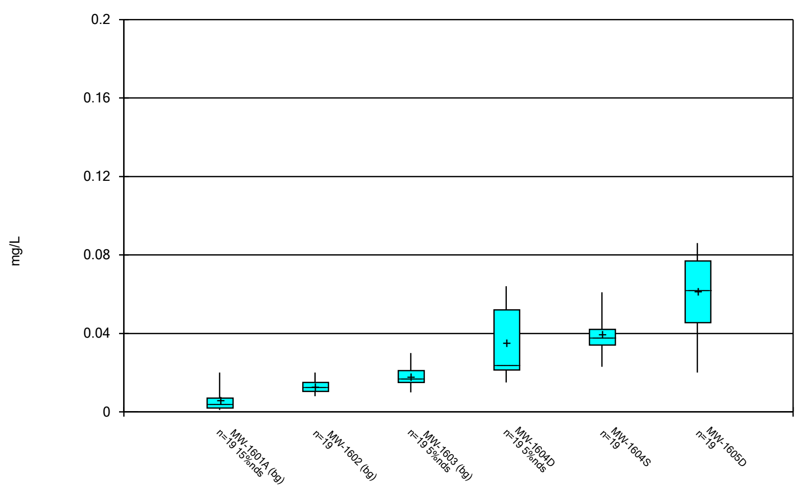
Box & Whiskers Plot



Constituent: Lead, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

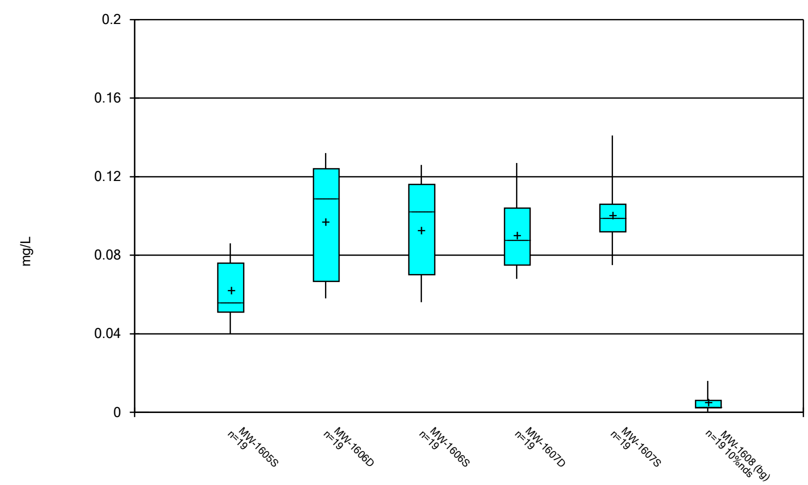
Box & Whiskers Plot



Constituent: Lithium, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

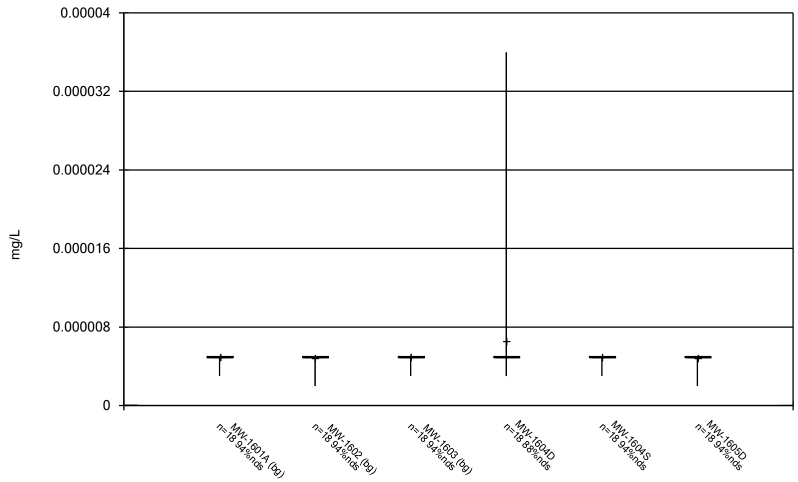
Box & Whiskers Plot



Constituent: Lithium, total Analysis Run 1/14/2022 4:14 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

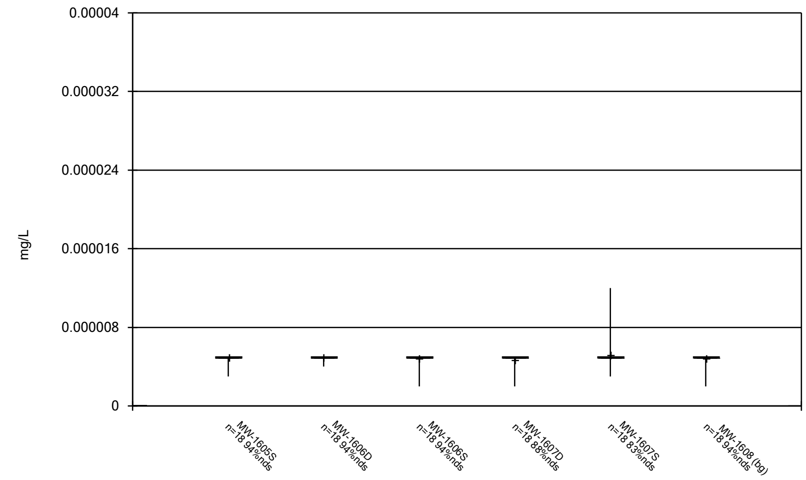
Box & Whiskers Plot



Constituent: Mercury, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

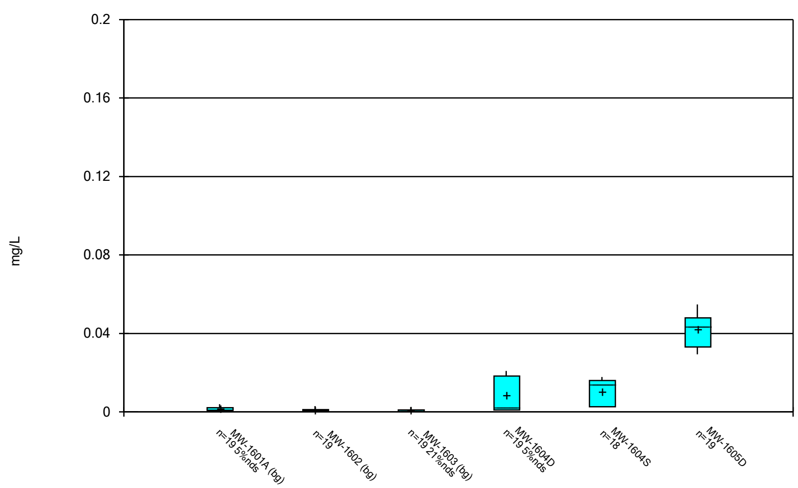
Box & Whiskers Plot



Constituent: Mercury, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

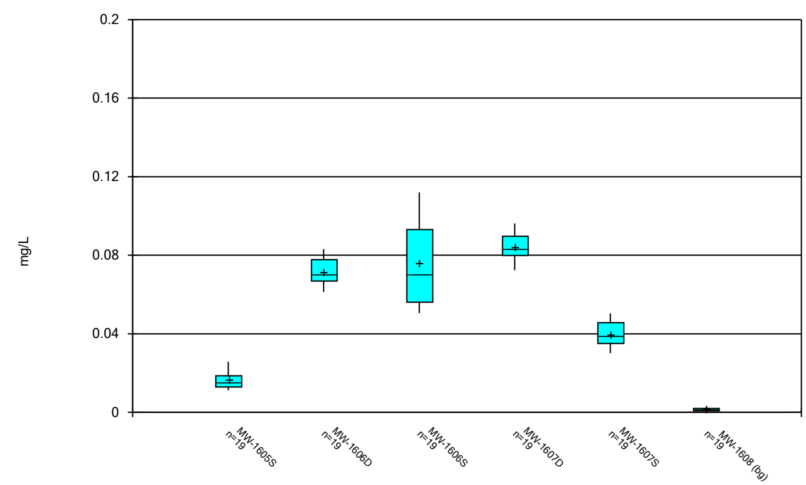
Box & Whiskers Plot



Constituent: Molybdenum, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

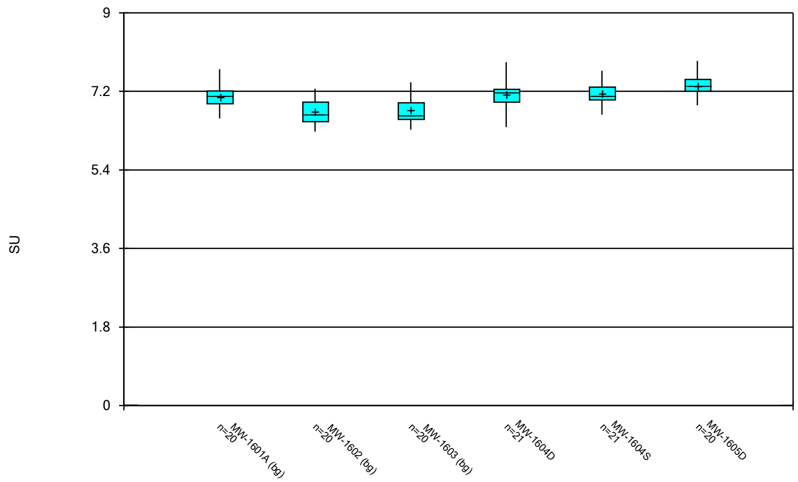
Box & Whiskers Plot



Constituent: Molybdenum, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

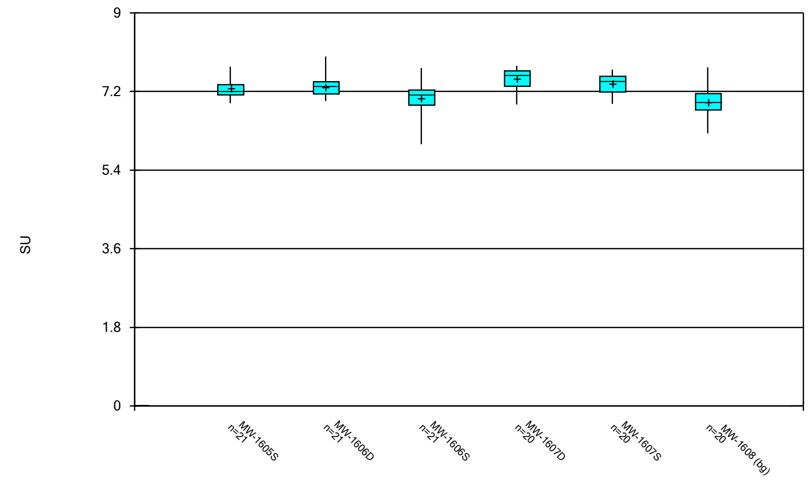
Box & Whiskers Plot



Constituent: pH, field   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

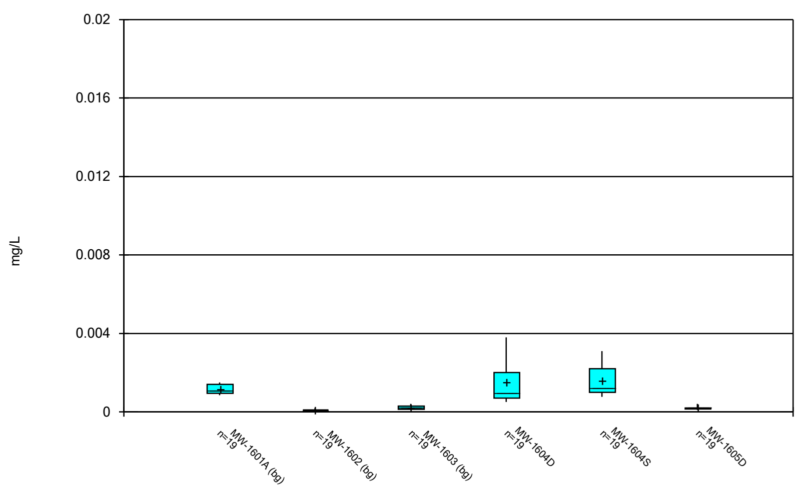
Box & Whiskers Plot



Constituent: pH, field   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

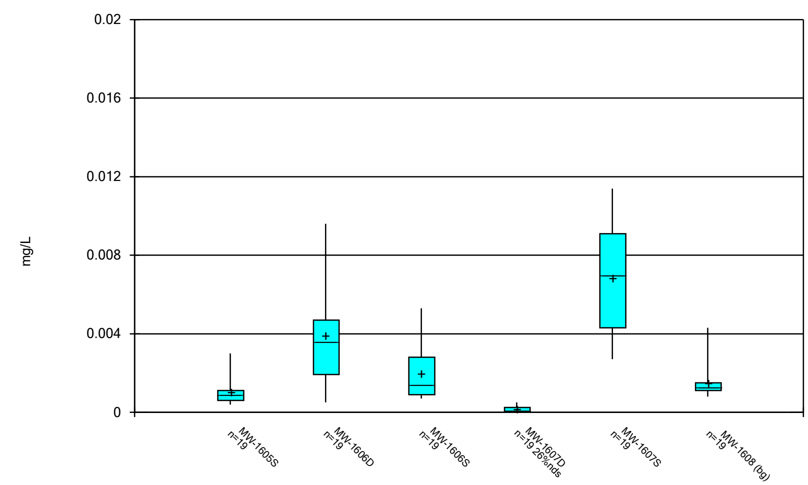
Box & Whiskers Plot



Constituent: Selenium, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

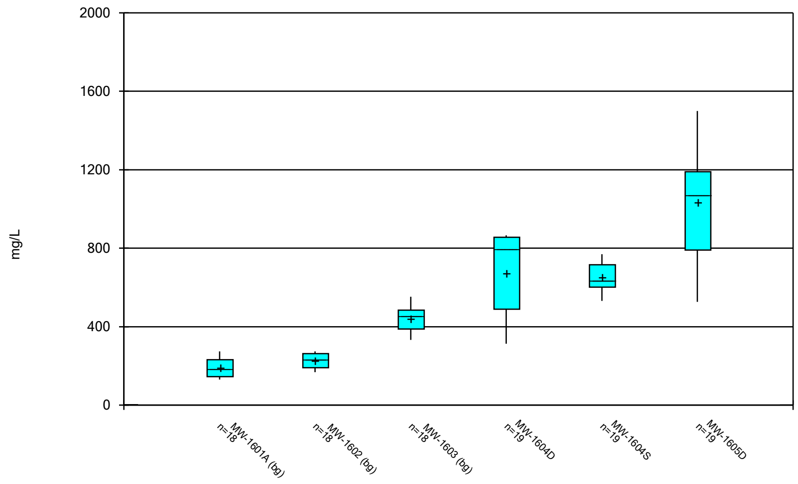
Box & Whiskers Plot



Constituent: Selenium, total   Analysis Run 1/14/2022 4:14 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

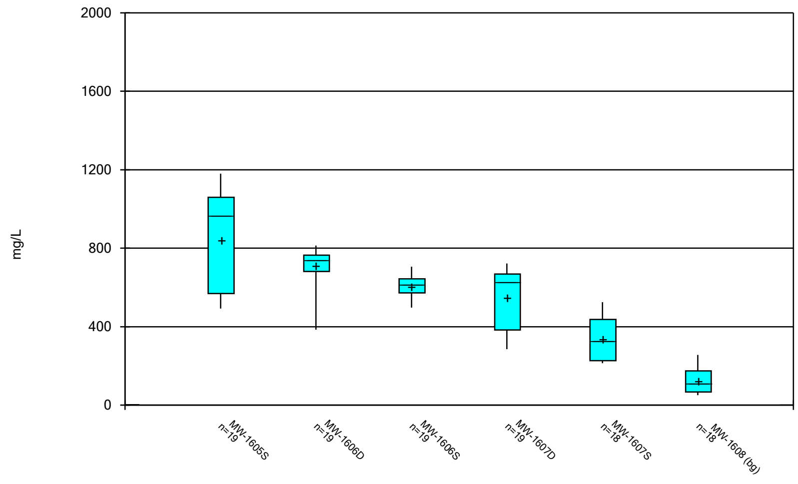
Box & Whiskers Plot



Constituent: Sulfate, total   Analysis Run 1/14/2022 4:15 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

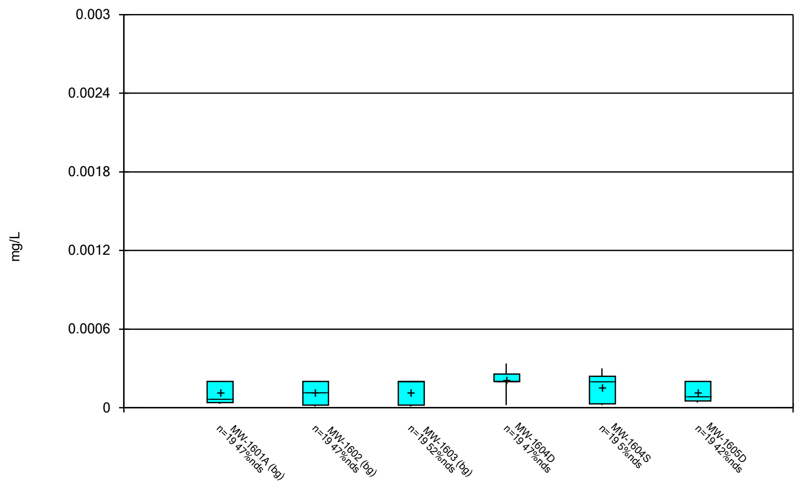
Box & Whiskers Plot



Constituent: Sulfate, total   Analysis Run 1/14/2022 4:15 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

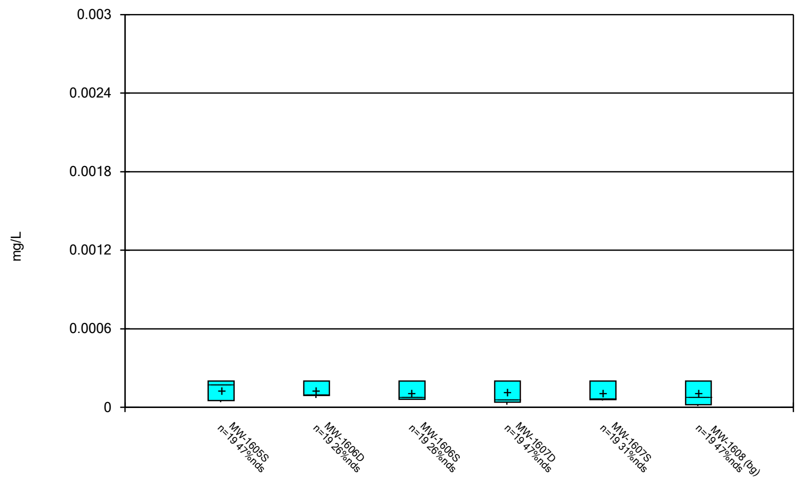
Box & Whiskers Plot



Constituent: Thallium, total   Analysis Run 1/14/2022 4:15 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

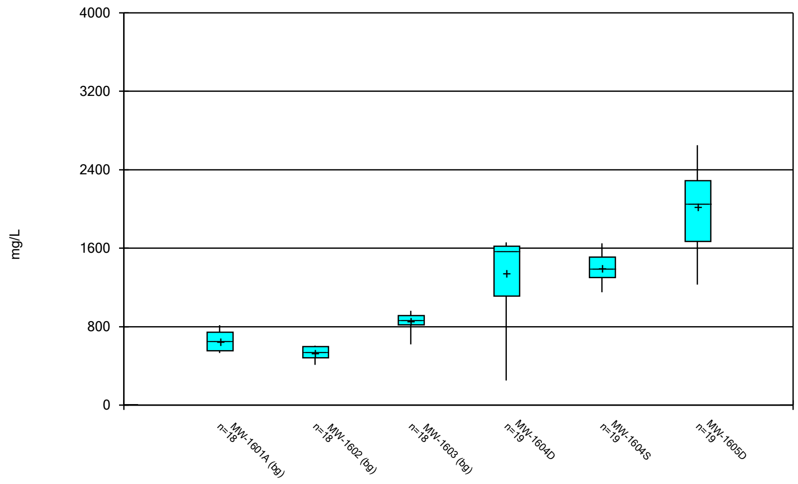
Box & Whiskers Plot



Constituent: Thallium, total   Analysis Run 1/14/2022 4:15 PM   View: Appendix III & IV
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

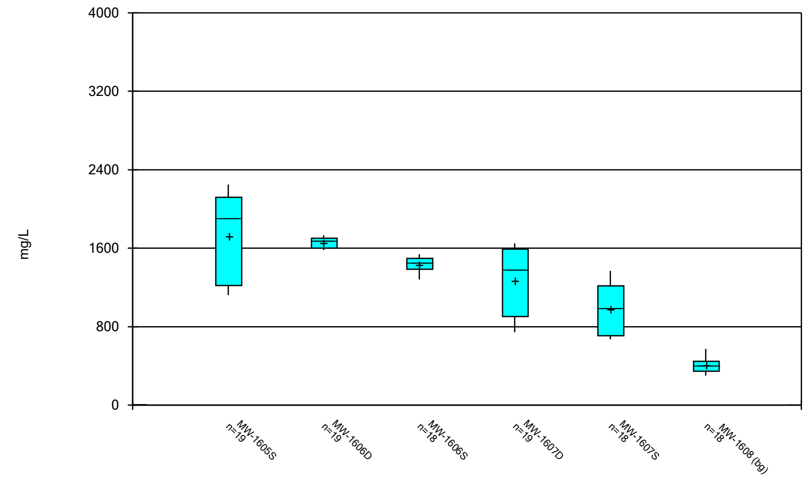
Box & Whiskers Plot



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/14/2022 4:15 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/14/2022 4:15 PM View: Appendix III & IV
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Outlier Summary

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/14/2022, 4:19 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)						
5/16/2017										

	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-1604S Combined Radium 226 + 228 (pCi/L)	MW-1606D Combined Radium 226 + 228 (pCi/L)	MW-1607S Lead, total (mg/L)	MW-1604S Molybdenum, total (mg/L)	MW-1607D pH, field (SU)	MW-1607S pH, field (SU)
9/26/2016					0.136 (o)			0.0032 (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)			
5/16/2017									8.41 (o)	8.23 (o)

	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	
5/16/2017	3230 (o)

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

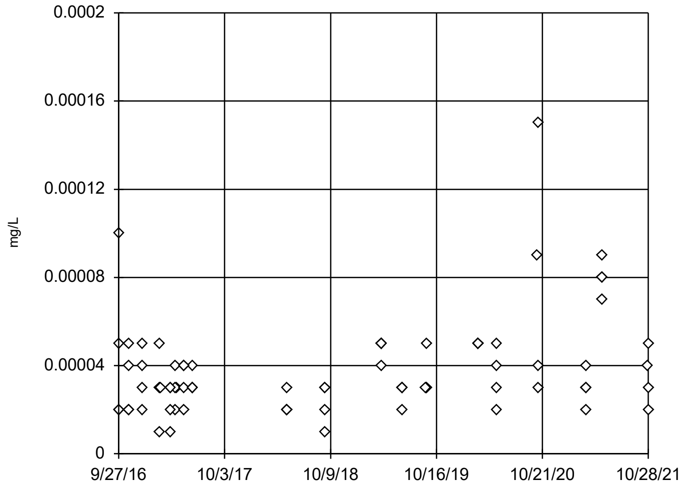
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/14/2022, 4:27 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.00003816	0.00002237	ln(x)	ShapiroFrancia
Arsenic, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.0004533	0.0001309	ln(x)	ShapiroFrancia
Barium, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.03762	0.01233	ln(x)	ShapiroFrancia
Beryllium, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	n/a w/combined bg	NP	NaN	68	0.0000464	0.00001177	unknown	ShapiroFrancia
Boron, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	72	0.2145	0.1417	ln(x)	ShapiroFrancia
Cadmium, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.00001511	0.000007095	ln(x)	ShapiroFrancia
Calcium, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	72	124	37.92	ln(x)	ShapiroFrancia
Chloride, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	72	17.04	15.24	ln(x)	ShapiroFrancia
Chromium, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	72	0.0003323	0.0001896	ln(x)	ShapiroFrancia
Cobalt, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.000148	0.0001921	ln(x)	ShapiroFrancia
Combined Radium 226 + 228 (pCi/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.8199	0.6096	x^(1/3)	ShapiroFrancia
Fluoride, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	80	0.1768	0.06431	normal	ShapiroFrancia
Lead, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.0001617	0.0001401	x^(1/3)	ShapiroFrancia
Lithium, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.01052	0.006944	sqrt(x)	ShapiroFrancia
Mercury, total (mg/L)	MW-1601A,MW-1602,...	n/a	n/a	n/a w/combined bg	NP	NaN	72	0.000004861	5.9e-7	unknown	ShapiroFrancia
Molybdenum, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.001135	0.0007544	sqrt(x)	ShapiroFrancia
Selenium, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.0007414	0.0007093	x^(1/3)	ShapiroFrancia
Sulfate, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	72	245.7	130.7	x^(1/3)	ShapiroFrancia
Thallium, total (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	76	0.0001151	0.00008503	ln(x)	ShapiroFrancia
Total Dissolved Solids [TDS] (mg/L)	MW-1601A,MW-1602,...	No	n/a	n/a w/combined bg	NP	NaN	72	610.4	183.4	ln(x)	ShapiroFrancia

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

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



n = 76

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

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

High cutoff = 0.0004253, low cutoff = 0.00000288, based on IQR multiplier of 3.

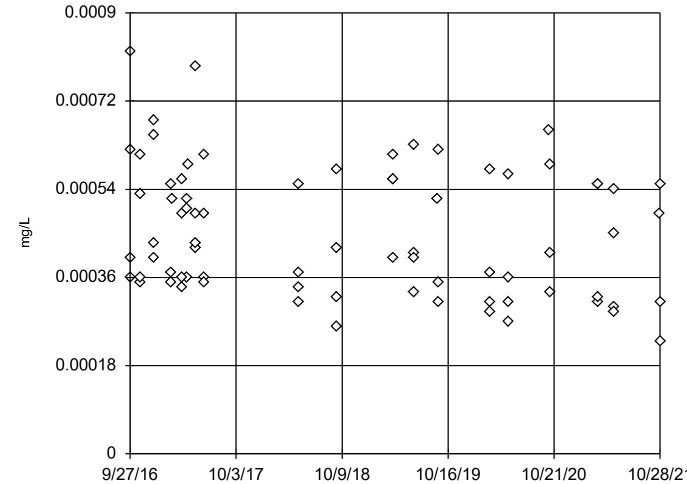
Constituent: Antimony, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

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



n = 76

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

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

High cutoff = 0.002213, low cutoff = 0.00008779, based on IQR multiplier of 3.

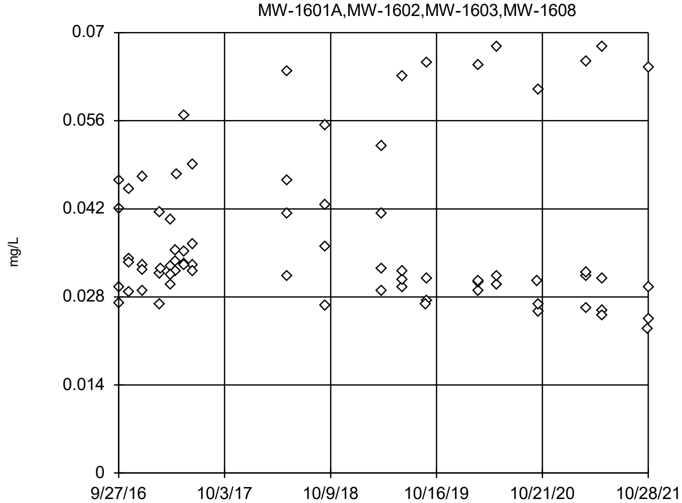
Constituent: Arsenic, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

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



n = 76

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

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

High cutoff = 0.1222, low cutoff = 0.01028, based on IQR multiplier of 3.

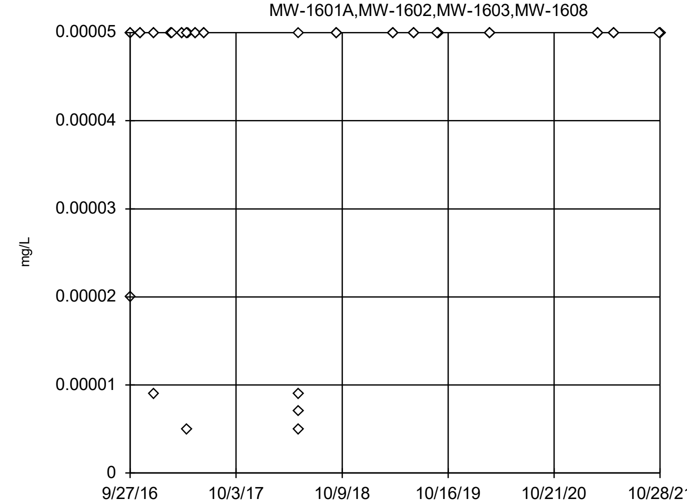
Constituent: Barium, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

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



n = 68

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.

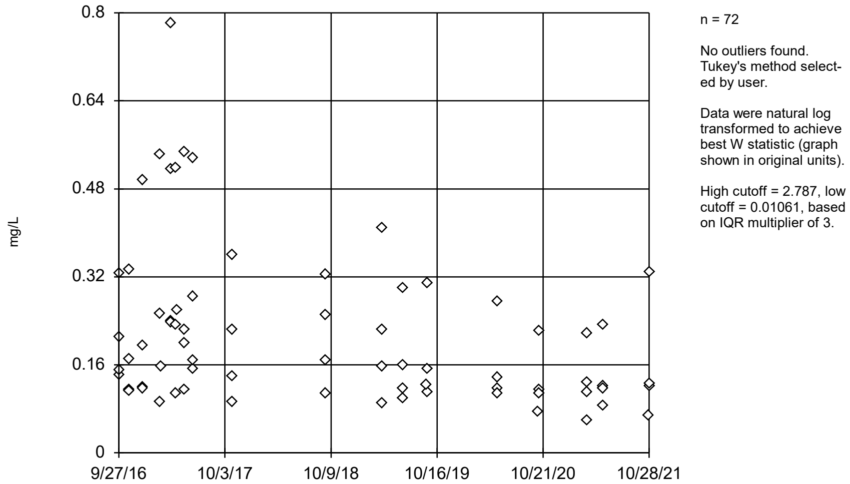
Constituent: Beryllium, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

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



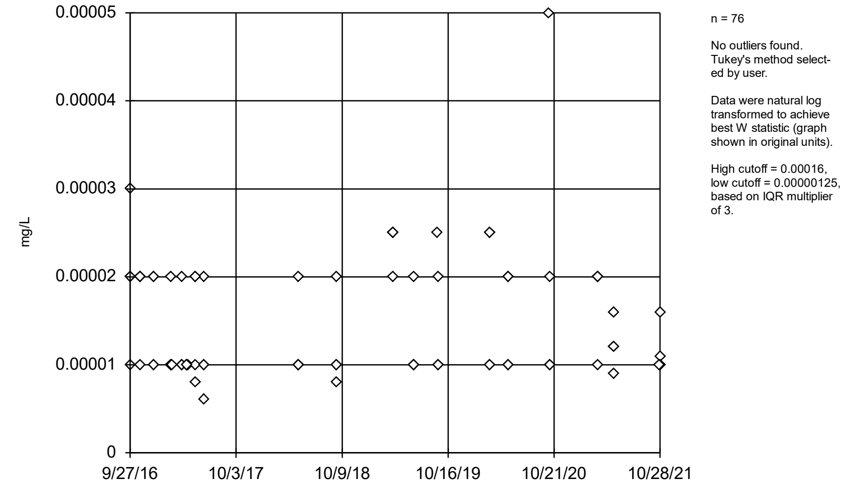
Constituent: Boron, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

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



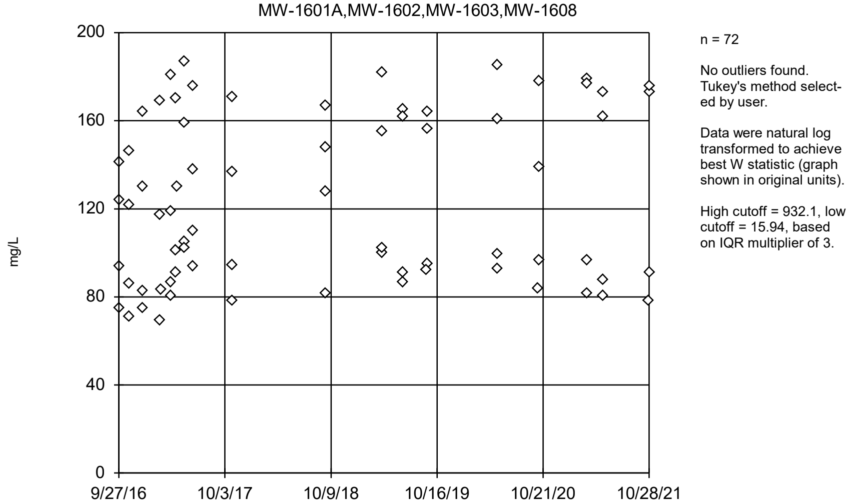
Constituent: Cadmium, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening, Pooled Background

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



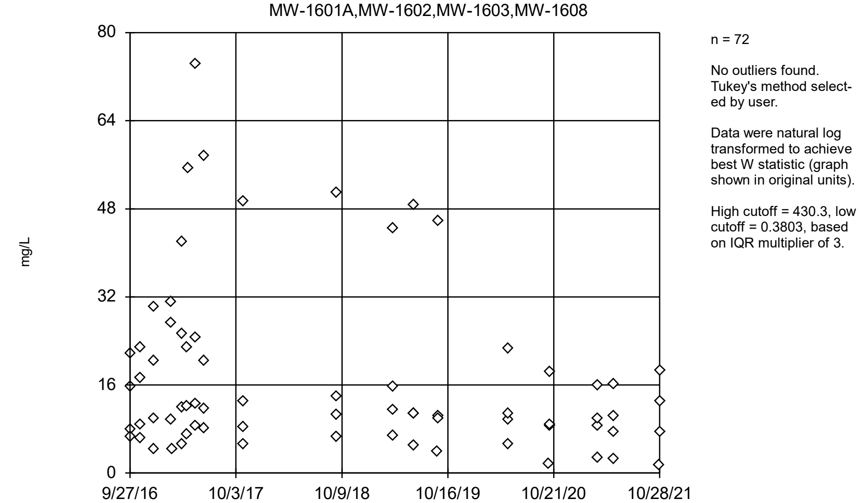
Constituent: Calcium, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

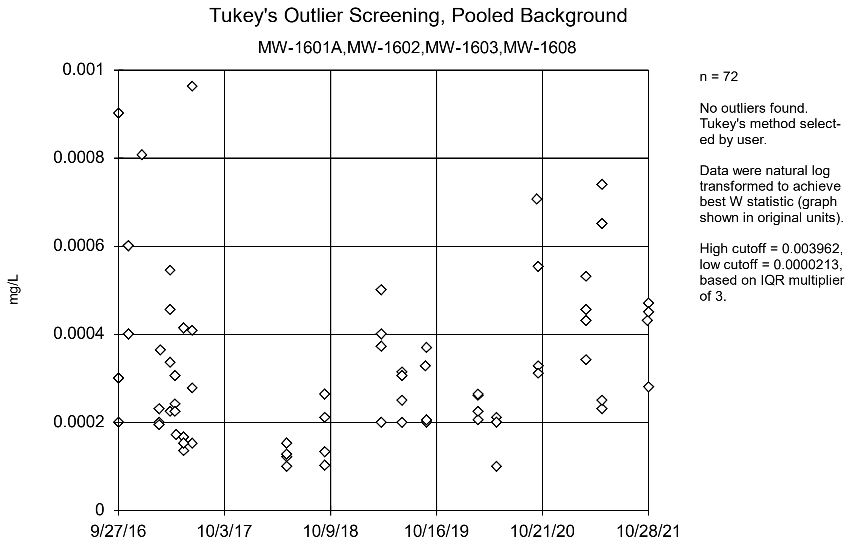
Tukey's Outlier Screening, Pooled Background

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



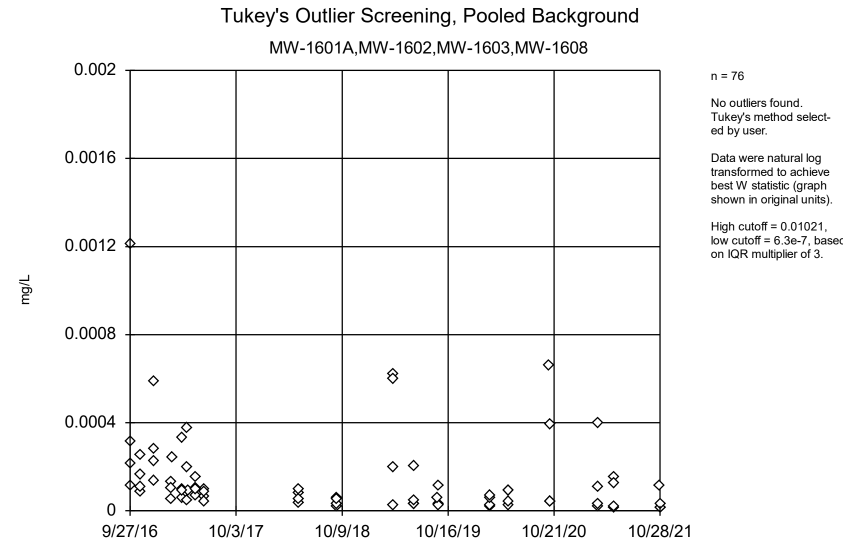
Constituent: Chloride, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



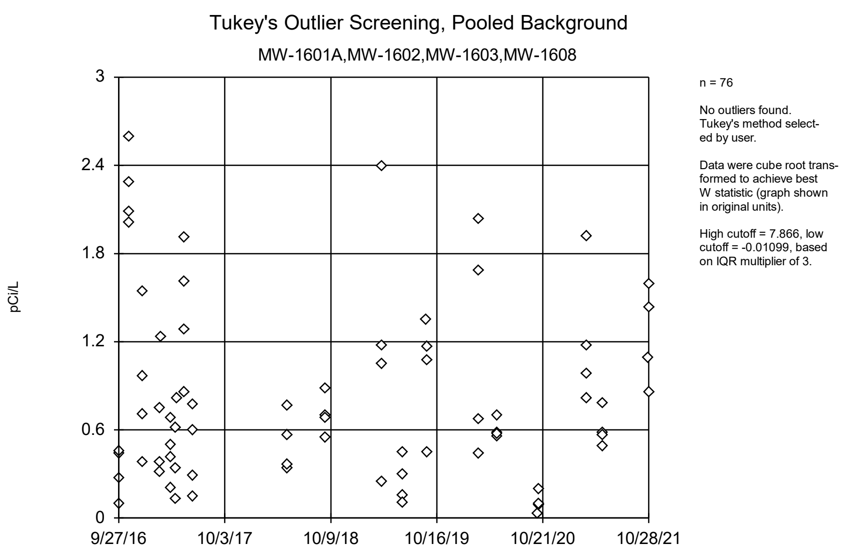
Constituent: Chromium, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



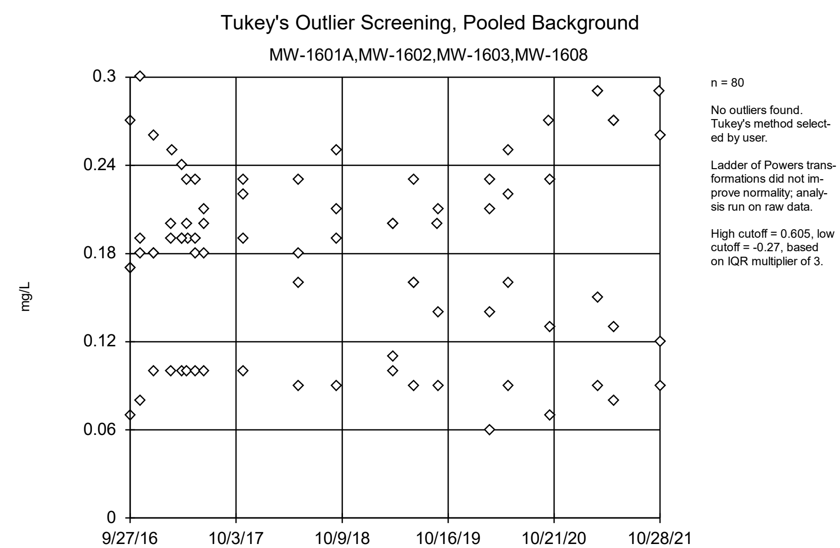
Constituent: Cobalt, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



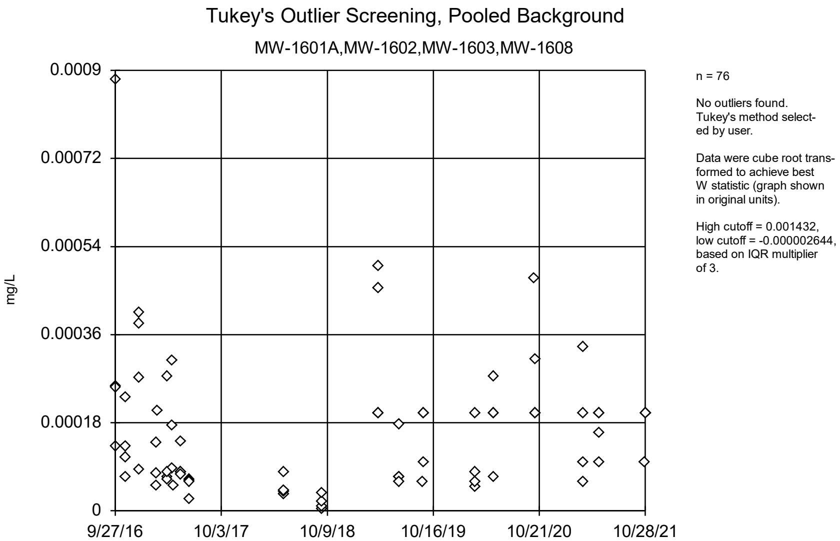
Constituent: Combined Radium 226 + 228 Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



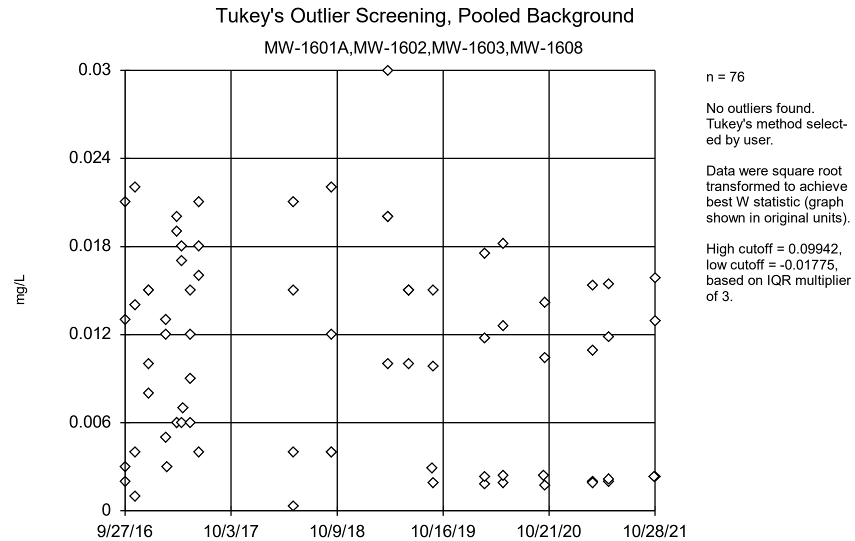
Constituent: Fluoride, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



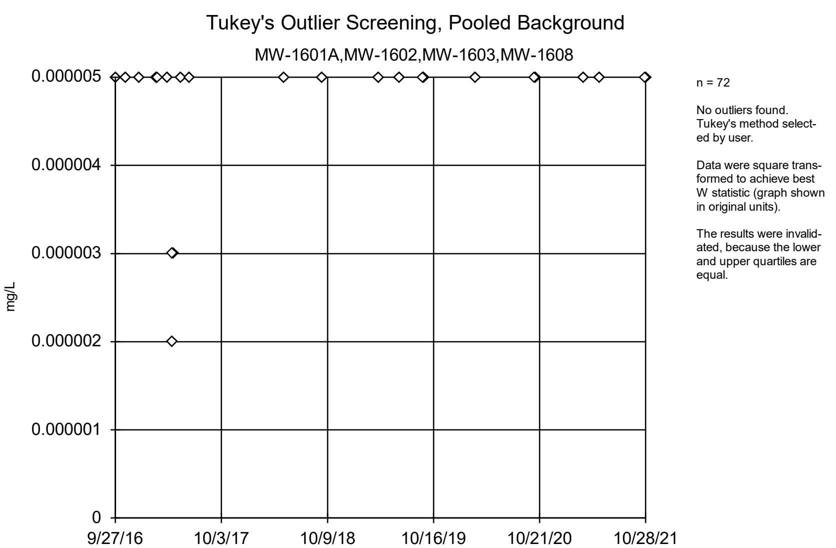
Constituent: Lead, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



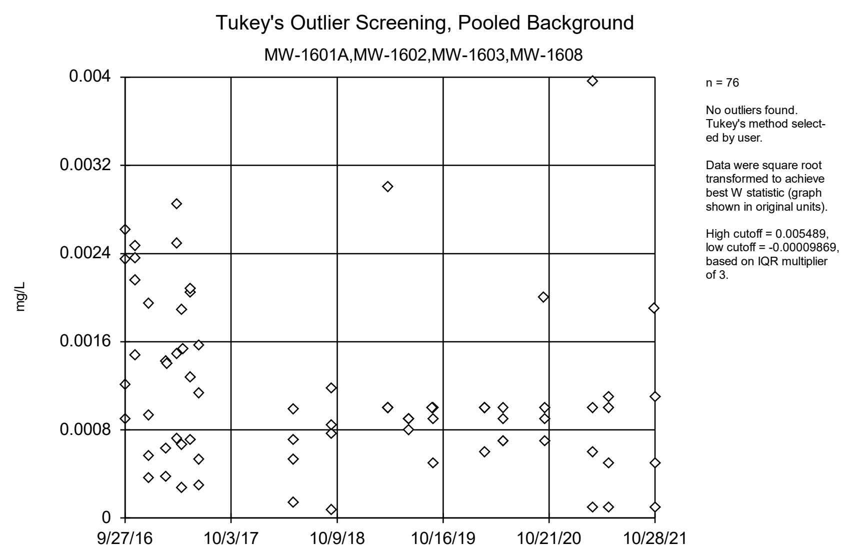
Constituent: Lithium, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

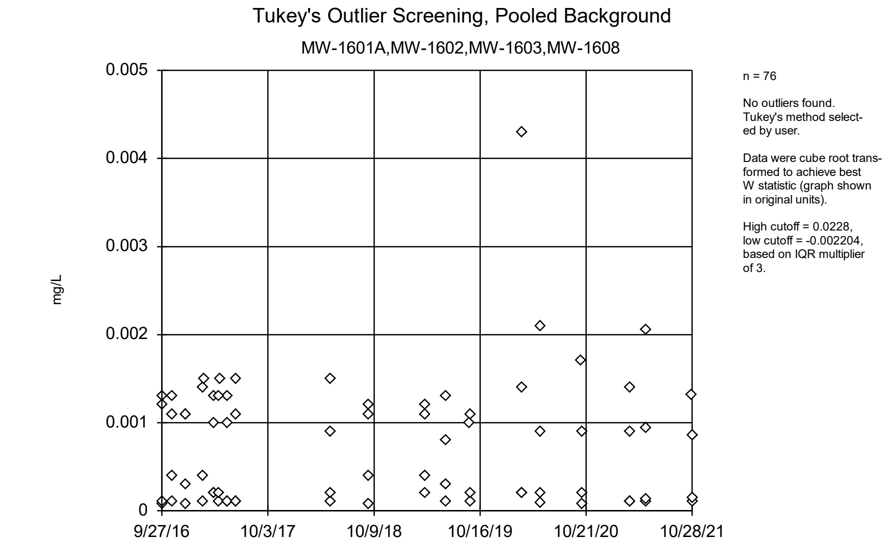


Constituent: Mercury, total Analysis Run 1/14/2022 4:24 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

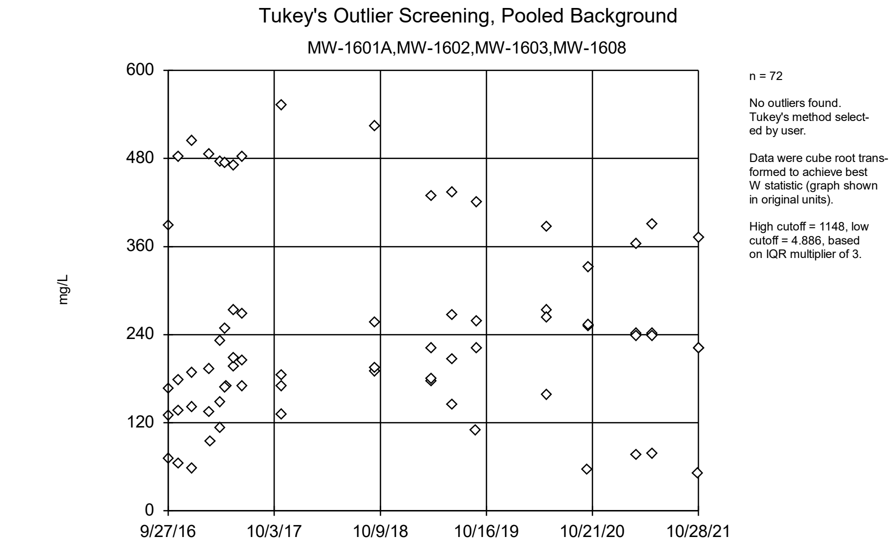


Constituent: Molybdenum, total Analysis Run 1/14/2022 4:25 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



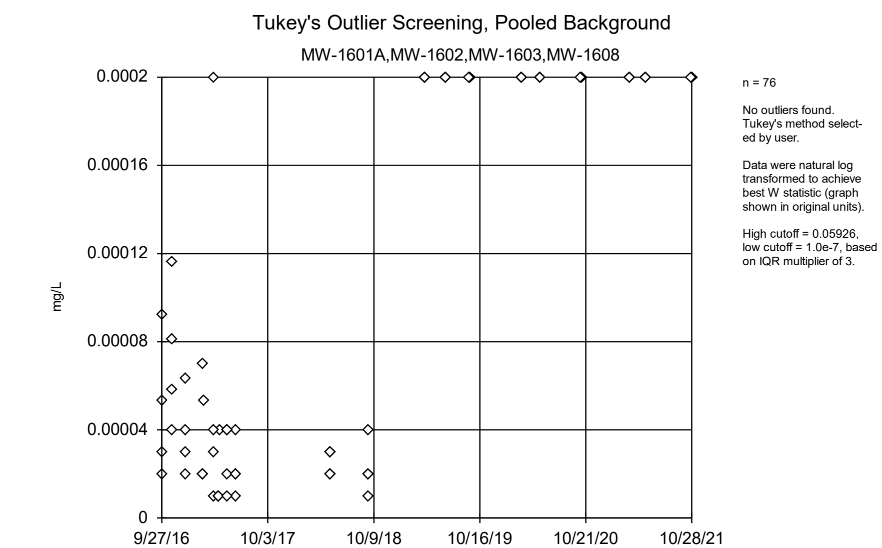
Constituent: Selenium, total Analysis Run 1/14/2022 4:25 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



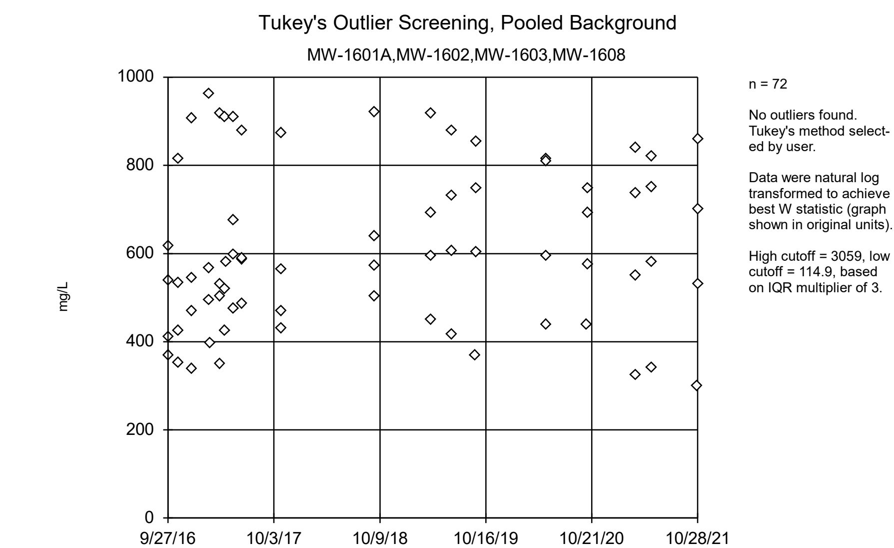
Constituent: Sulfate, total Analysis Run 1/14/2022 4:25 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Thallium, total Analysis Run 1/14/2022 4:25 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/14/2022 4:25 PM View: Tukey (upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Intrawell Prediction Limits - All Results

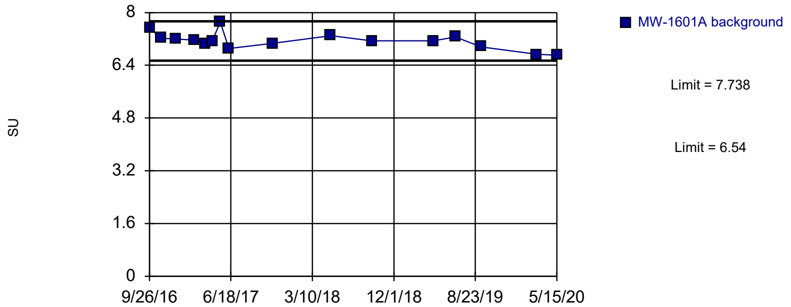
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/25/2022, 3:01 PM

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	7.738	6.54	n/a	1 future	n/a	16	7.139	0.2586	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1602	7.406	6.094	n/a	1 future	n/a	16	6.75	0.283	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1603	7.55	6.058	n/a	1 future	n/a	16	6.804	0.3221	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1604D	7.896	6.444	n/a	1 future	n/a	17	7.17	0.317	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1604S	7.728	6.57	n/a	1 future	n/a	17	7.149	0.253	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1605D	7.921	6.779	n/a	1 future	n/a	16	7.35	0.2463	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1605S	7.81	6.737	n/a	1 future	n/a	17	7.274	0.2346	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1606D	7.874	6.824	n/a	1 future	n/a	17	7.349	0.2294	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1606S	7.93	6.21	n/a	1 future	n/a	17	7.07	0.3755	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1607D	8.115	6.931	n/a	1 future	n/a	16	7.523	0.2556	0	None	No	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1607S	7.902	6.903	n/a	1 future	n/a	16	411.2	35.51	0	None	x^3	0.0004701	Param Intra 1 of 2
pH, field (SU)	MW-1608	7.83	6.168	n/a	1 future	n/a	16	6.999	0.3587	0	None	No	0.0004701	Param Intra 1 of 2

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1601A (bg)



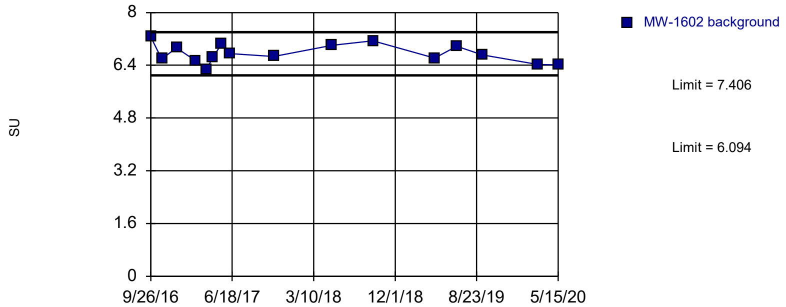
Background Data Summary: Mean=7.139, Std. Dev.=0.2586, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9493, critical = 0.844. Kappa = 2.316 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1602 (bg)



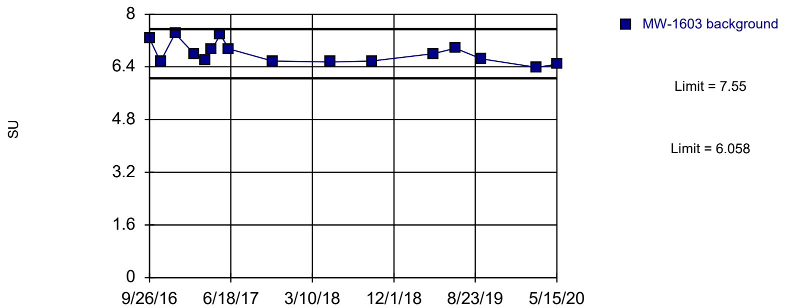
Background Data Summary: Mean=6.75, Std. Dev.=0.283, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9684, critical = 0.844. Kappa = 2.316 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1603 (bg)



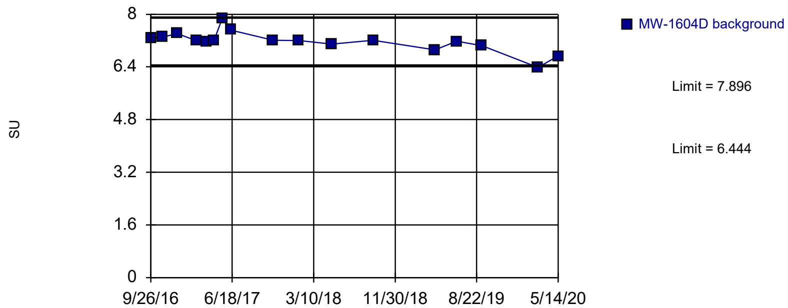
Background Data Summary: Mean=6.804, Std. Dev.=0.3221, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8964, critical = 0.844. Kappa = 2.316 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1604D



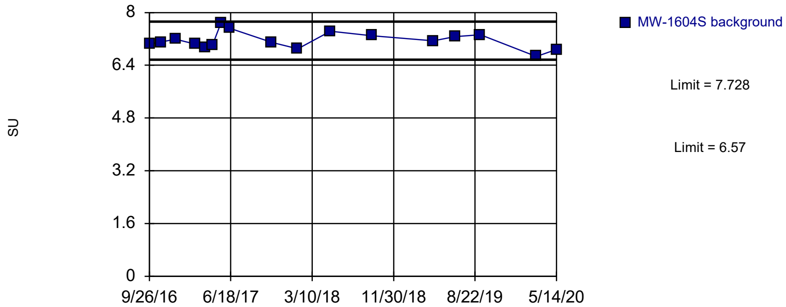
Background Data Summary: Mean=7.17, Std. Dev.=0.317, n=17. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9134, critical = 0.851. Kappa = 2.289 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1604S



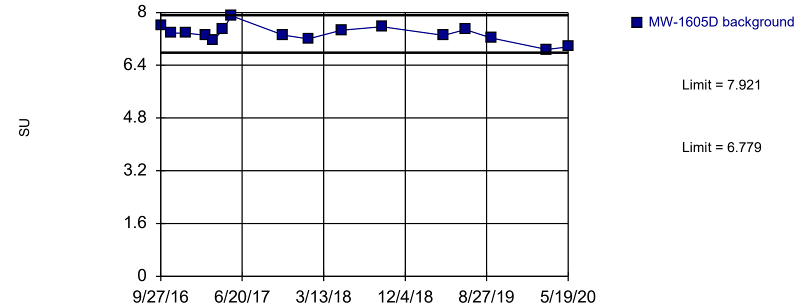
Background Data Summary: Mean=7.149, Std. Dev.=0.253, n=17. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9846, critical = 0.851. Kappa = 2.289 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1605D



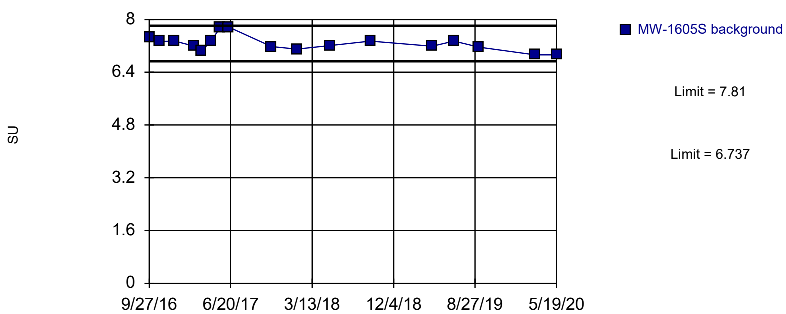
Background Data Summary: Mean=7.35, Std. Dev.=0.2463, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9702, critical = 0.844. Kappa = 2.316 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1605S



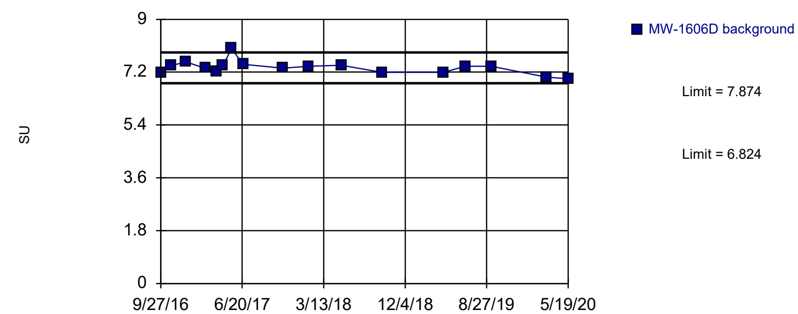
Background Data Summary: Mean=7.274, Std. Dev.=0.2346, n=17. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9211, critical = 0.851. Kappa = 2.289 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1606D

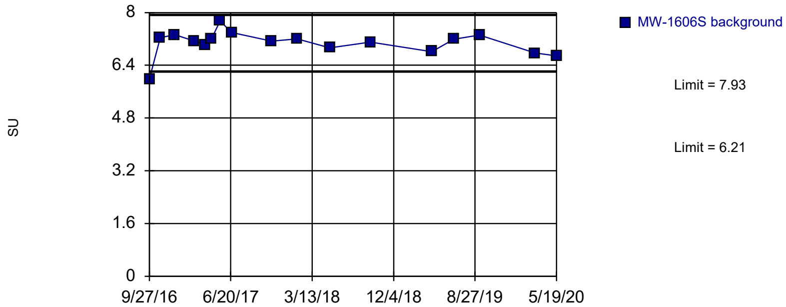


Background Data Summary: Mean=7.349, Std. Dev.=0.2294, n=17. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8907, critical = 0.851. Kappa = 2.289 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Prediction Limit

Intrawell Parametric, MW-1606S



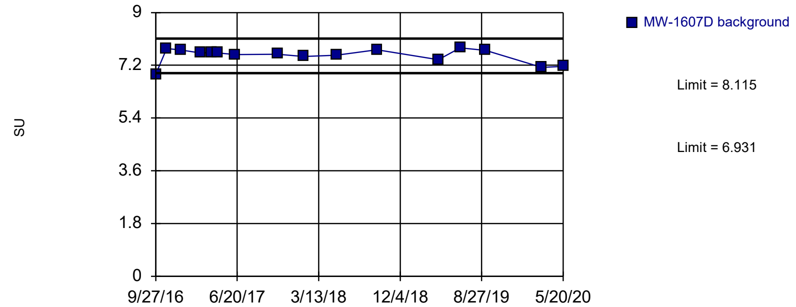
Background Data Summary: Mean=7.07, Std. Dev.=0.3755, n=17. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8907, critical = 0.851. Kappa = 2.289 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1607D



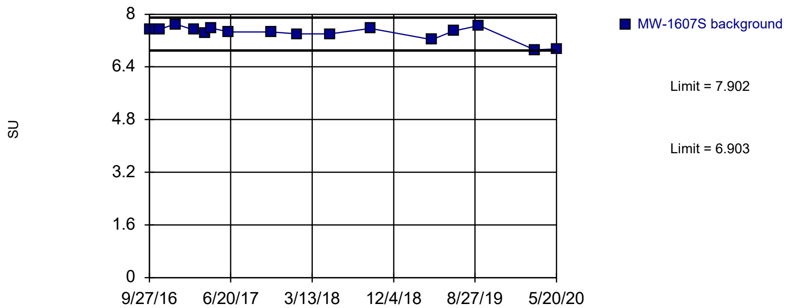
Background Data Summary: Mean=7.523, Std. Dev.=0.2556, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8497, critical = 0.844. Kappa = 2.316 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1607S



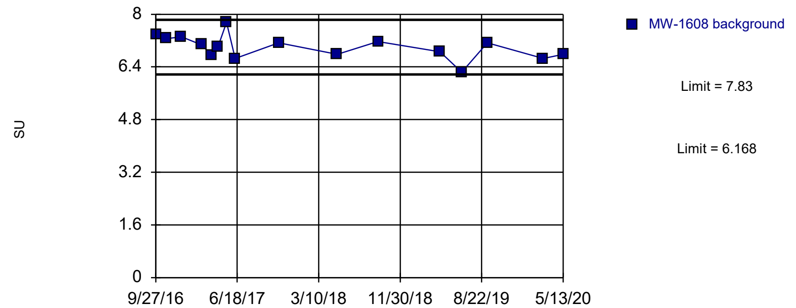
Background Data Summary (based on cube transformation): Mean=411.2, Std. Dev.=35.51, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8522, critical = 0.844. Kappa = 2.316 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1608 (bg)



Background Data Summary: Mean=6.999, Std. Dev.=0.3587, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9777, critical = 0.844. Kappa = 2.316 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.0009403. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/25/2022 3:00 PM View: Intrawell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Appendix III Trend Tests - Upgradient Wells - Significant Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/14/2022, 4:38 PM

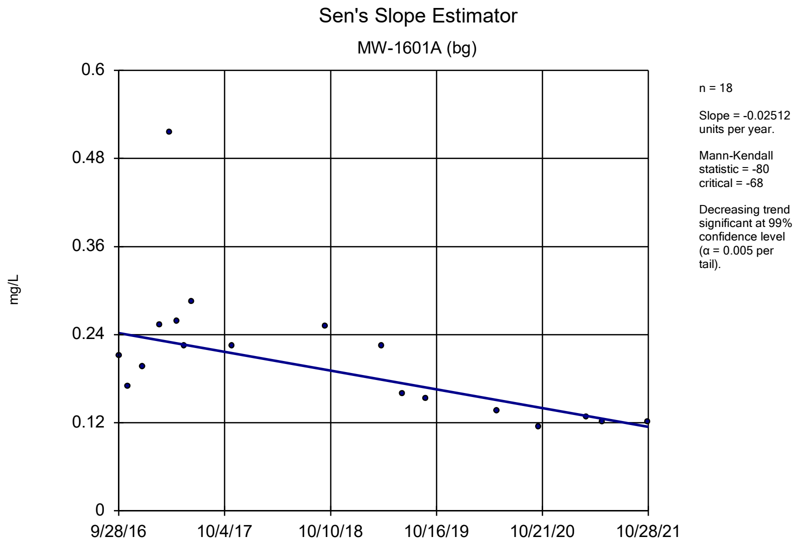
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	**MW-1601A (bg)**	**-0.02512**	**-80**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, total (mg/L)	**MW-1603 (bg)**	**-0.04586**	**-75**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, total (mg/L)	**MW-1608 (bg)**	**-0.02135**	**-75**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Calcium, total (mg/L)	**MW-1601A (bg)**	**12.27**	**101**	**68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Chloride, total (mg/L)	**MW-1603 (bg)**	**-3.424**	**-89**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**MW-1601A (bg)**	**-0.01238**	**-106**	**-81**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**MW-1602 (bg)**	**0.01878**	**142**	**81**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate, total (mg/L)	**MW-1601A (bg)**	**24.65**	**117**	**68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate, total (mg/L)	**MW-1603 (bg)**	**-23.35**	**-75**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids [TDS] (mg/L)	**MW-1601A (bg)**	**52.11**	**107**	**68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**

Appendix III Trend Tests - Upgradient Wells - All Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/14/2022, 4:38 PM

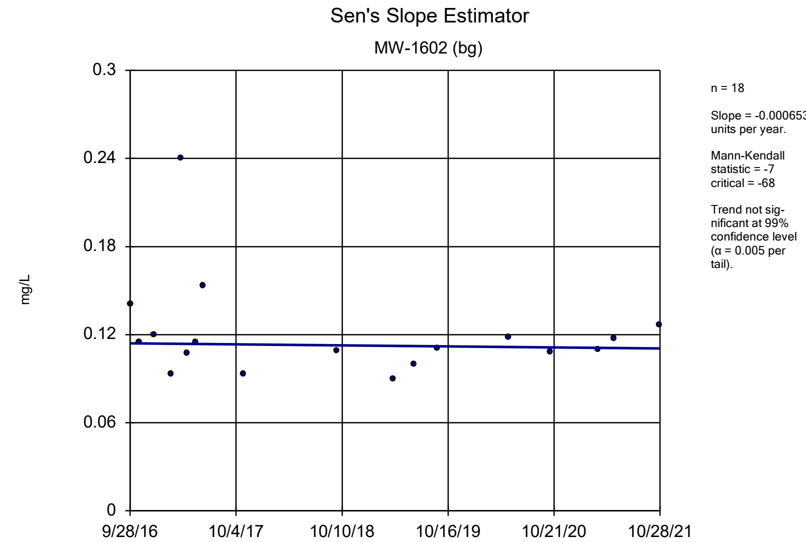
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	**MW-1601A (bg)**	**-0.02512**	**-80**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, total (mg/L)	MW-1602 (bg)	-0.000653	-7	-68	No	18	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	**MW-1603 (bg)**	**-0.04586**	**-75**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Boron, total (mg/L)	**MW-1608 (bg)**	**-0.02135**	**-75**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Calcium, total (mg/L)	**MW-1601A (bg)**	**12.27**	**101**	**68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Calcium, total (mg/L)	MW-1602 (bg)	3.65	65	68	No	18	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW-1603 (bg)	0.9865	7	68	No	18	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW-1608 (bg)	-1.994	-33	-68	No	18	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1601A (bg)	-3.47	-37	-68	No	18	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW-1602 (bg)	-0.4979	-45	-68	No	18	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	**MW-1603 (bg)**	**-3.424**	**-89**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Chloride, total (mg/L)	MW-1608 (bg)	-0.832	-65	-68	No	18	0	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	**MW-1601A (bg)**	**-0.01238**	**-106**	**-81**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	**MW-1602 (bg)**	**0.01878**	**142**	**81**	**Yes**	**20**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Fluoride, total (mg/L)	MW-1603 (bg)	-0.002095	-46	-81	No	20	0	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	MW-1608 (bg)	-0.005934	-24	-81	No	20	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	**MW-1601A (bg)**	**24.65**	**117**	**68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate, total (mg/L)	MW-1602 (bg)	11.01	48	68	No	18	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	**MW-1603 (bg)**	**-23.35**	**-75**	**-68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Sulfate, total (mg/L)	MW-1608 (bg)	-2.806	-9	-68	No	18	0	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (mg/L)	**MW-1601A (bg)**	**52.11**	**107**	**68**	**Yes**	**18**	**0**	**n/a**	**n/a**	**0.01**	**NP**
Total Dissolved Solids [TDS] (mg/L)	MW-1602 (bg)	24.91	64	68	No	18	0	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (mg/L)	MW-1603 (bg)	-14.72	-38	-68	No	18	0	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (mg/L)	MW-1608 (bg)	-3.051	-6	-68	No	18	0	n/a	n/a	0.01	NP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



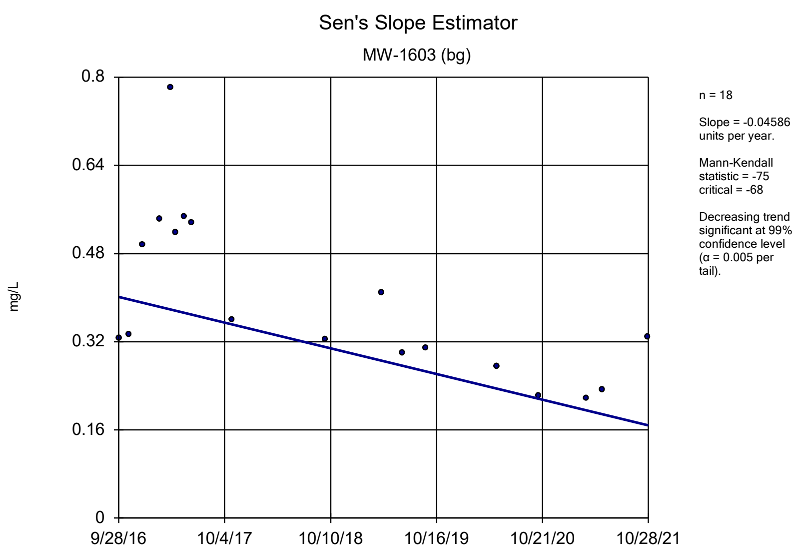
Constituent: Boron, total Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



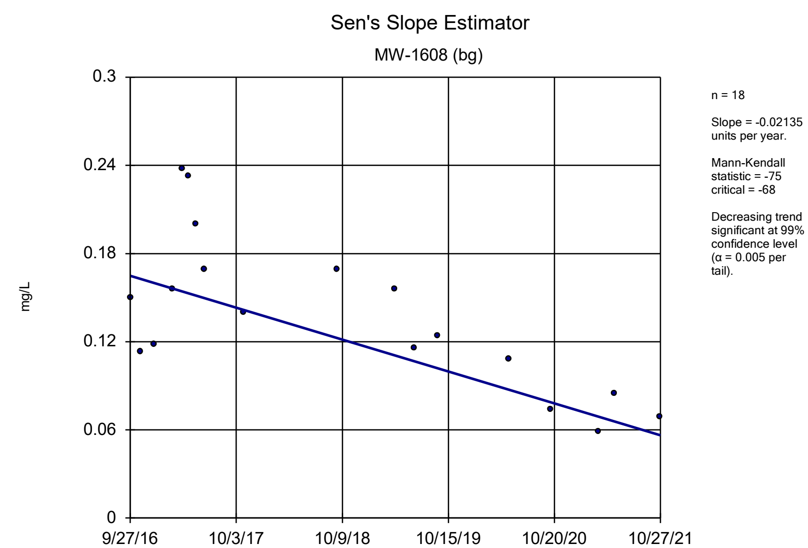
Constituent: Boron, total Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Boron, total Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



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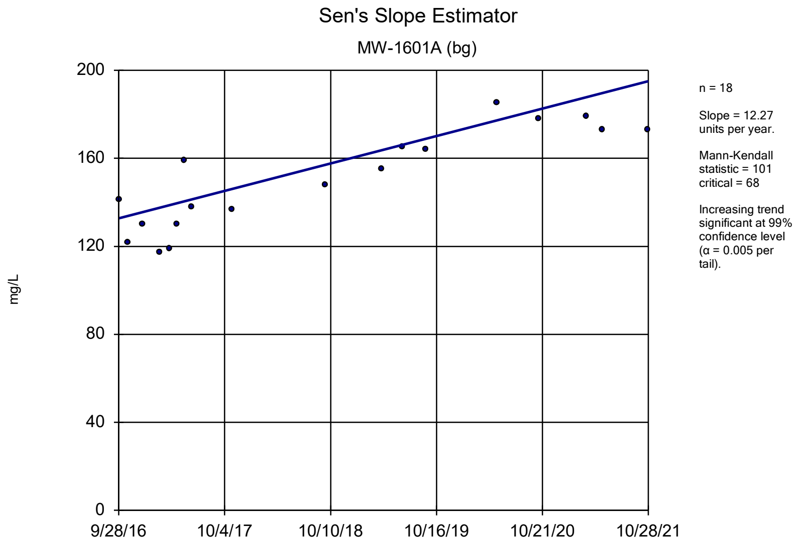
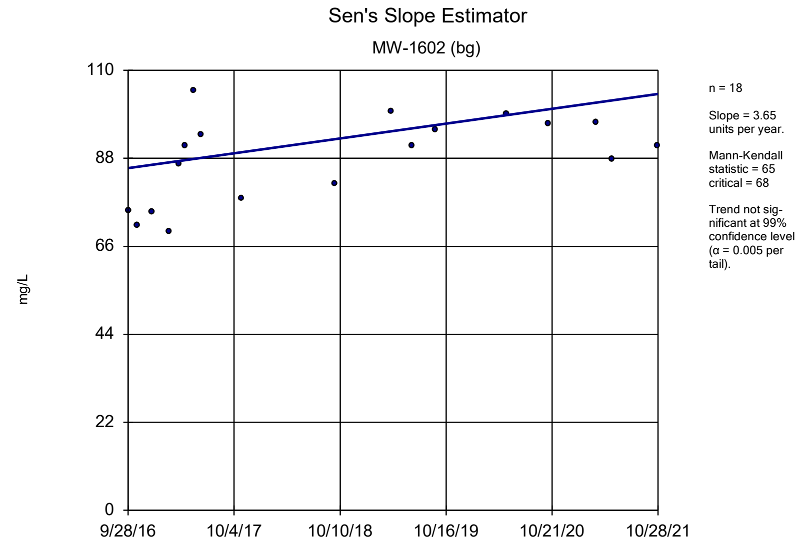
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Constituent: Calcium, total Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



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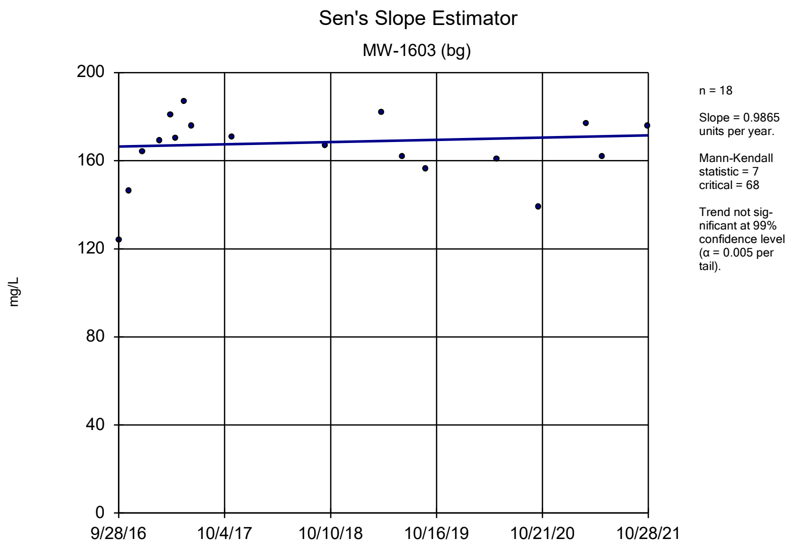
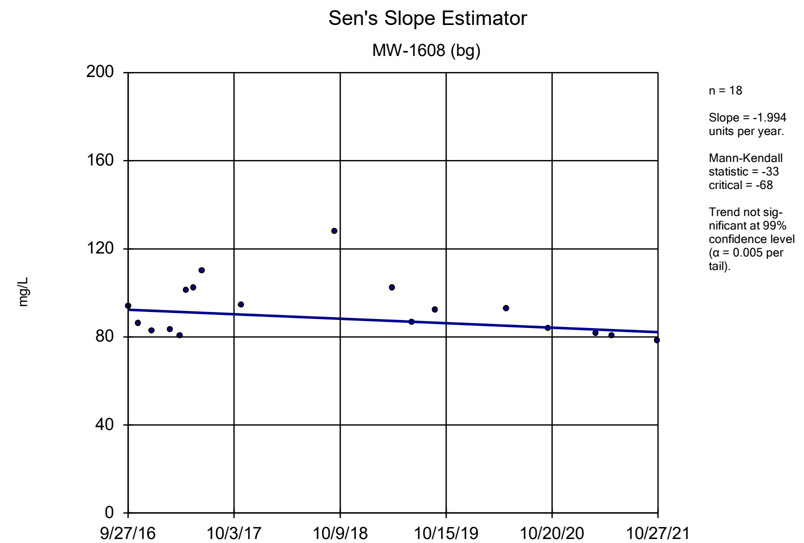
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Calcium, total Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



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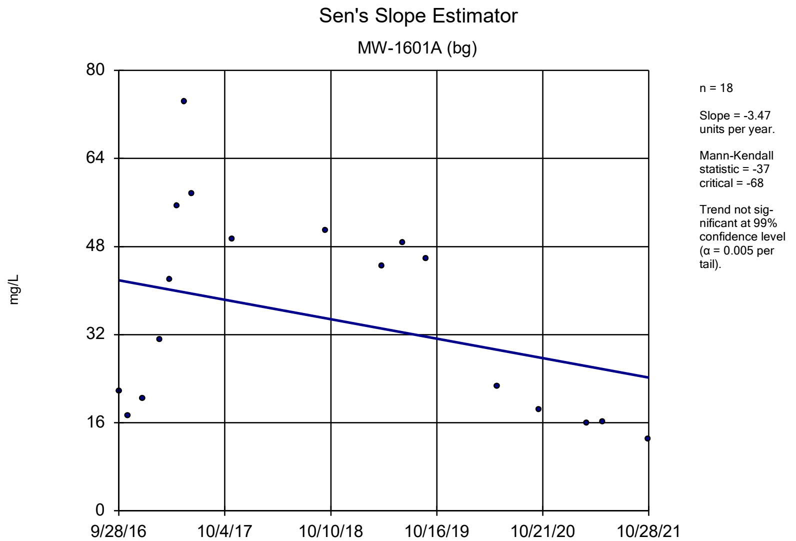
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



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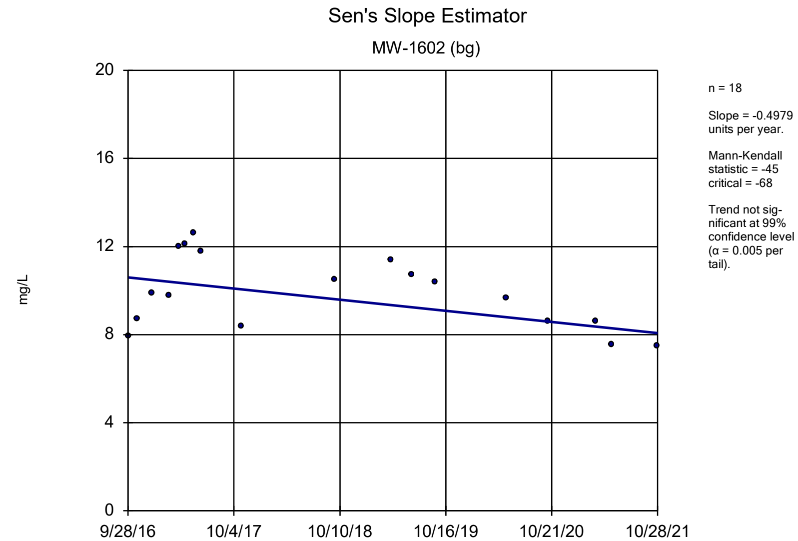
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



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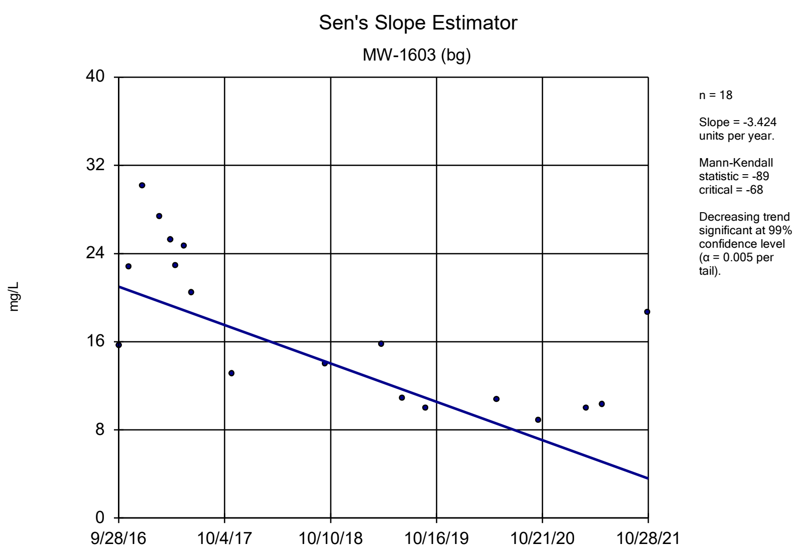
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



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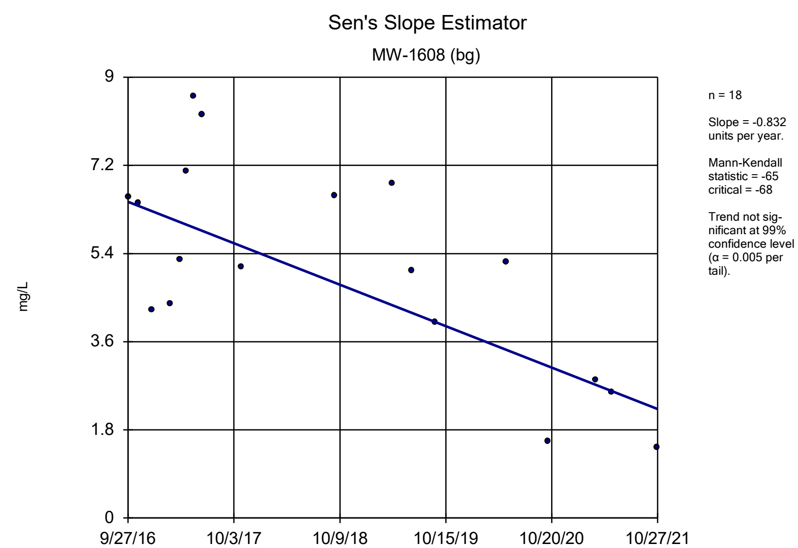
Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



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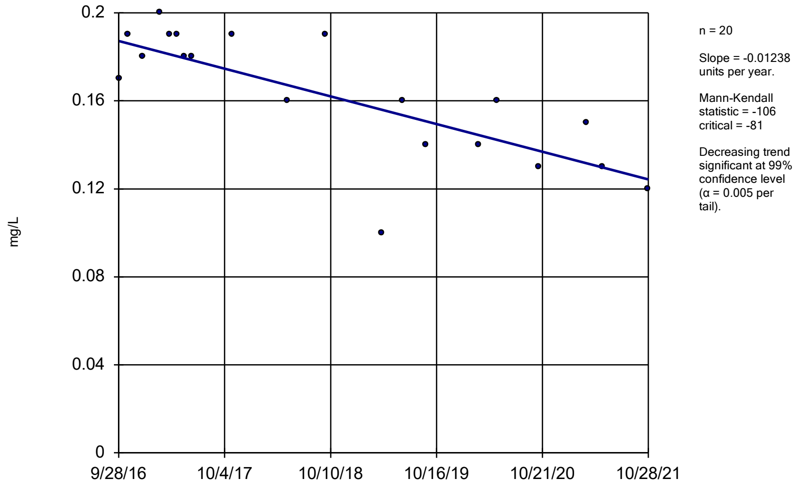
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

MW-1601A (bg)



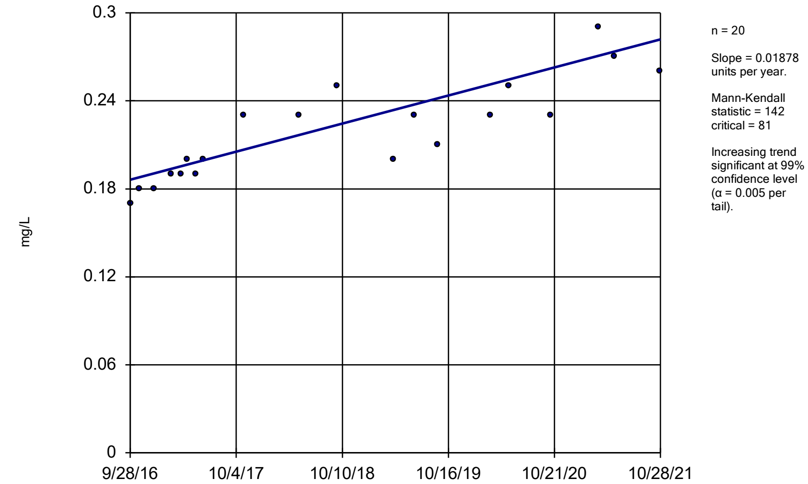
Constituent: Fluoride, total   Analysis Run 1/14/2022 4:35 PM   View: Trend Test (Upgradient)

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

MW-1602 (bg)



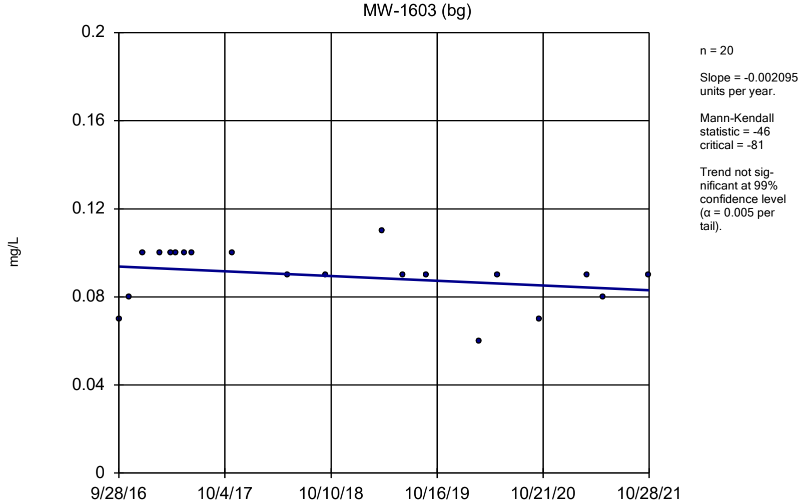
Constituent: Fluoride, total   Analysis Run 1/14/2022 4:35 PM   View: Trend Test (Upgradient)

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

MW-1603 (bg)



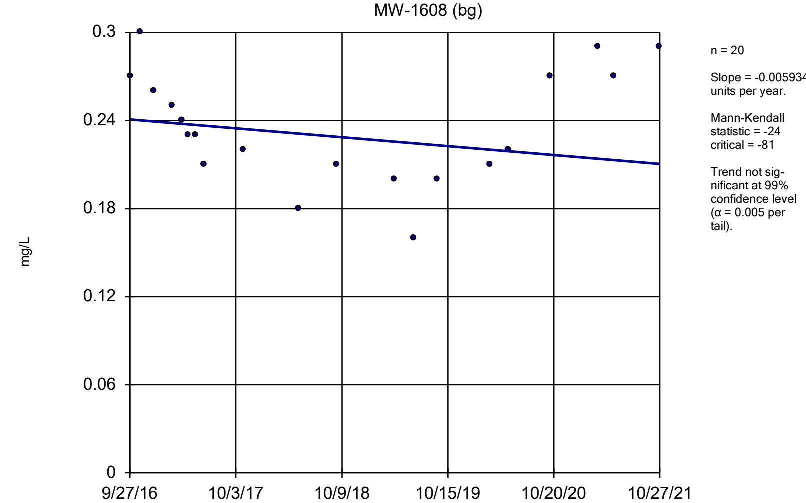
Constituent: Fluoride, total   Analysis Run 1/14/2022 4:35 PM   View: Trend Test (Upgradient)

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Sen's Slope Estimator

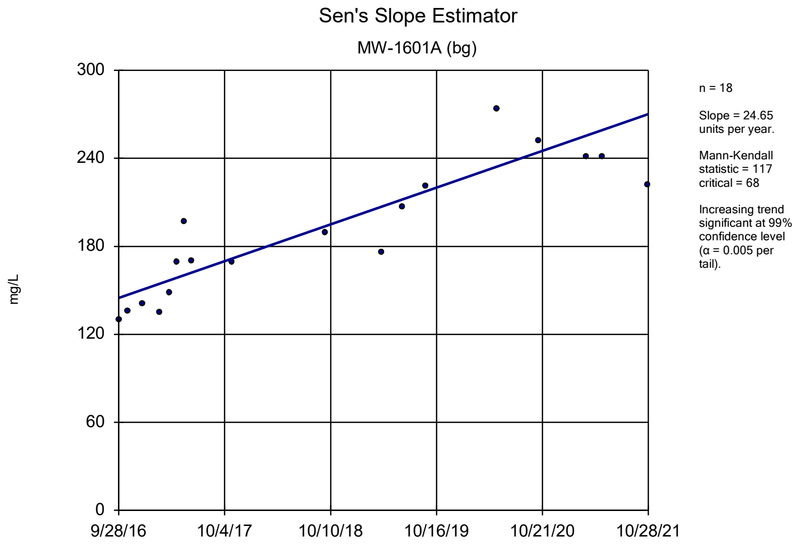
MW-1608 (bg)



Constituent: Fluoride, total   Analysis Run 1/14/2022 4:35 PM   View: Trend Test (Upgradient)

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



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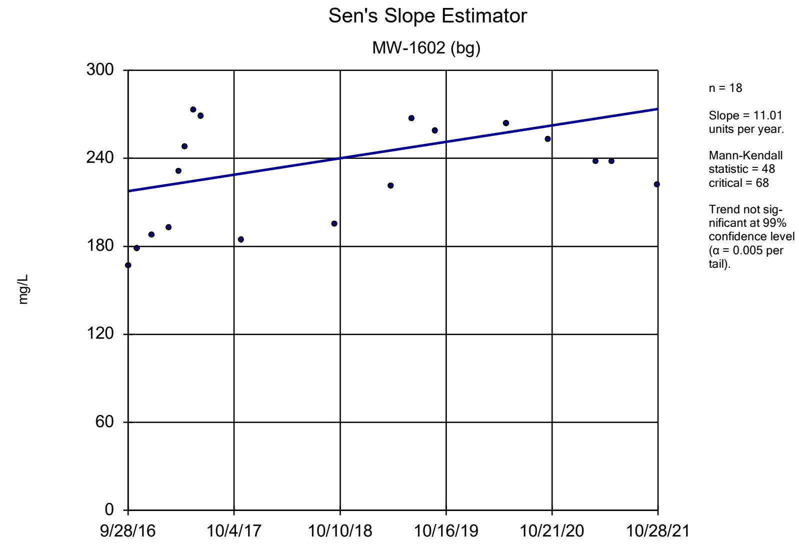
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



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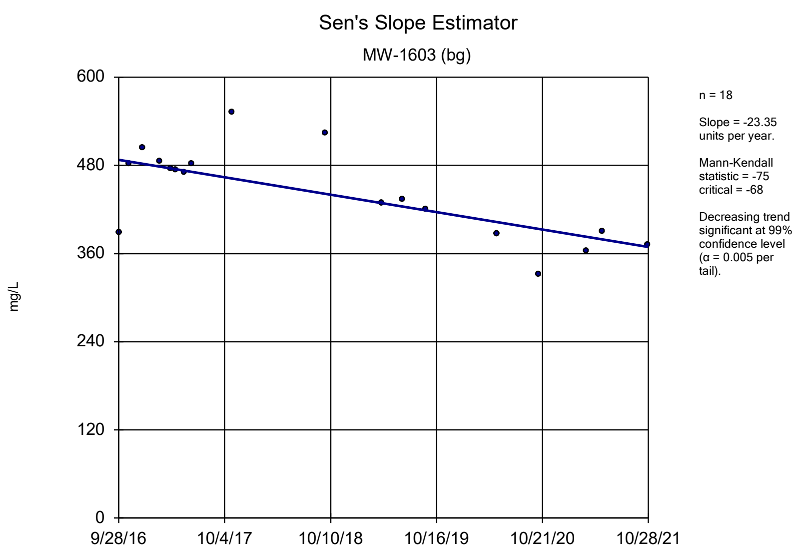
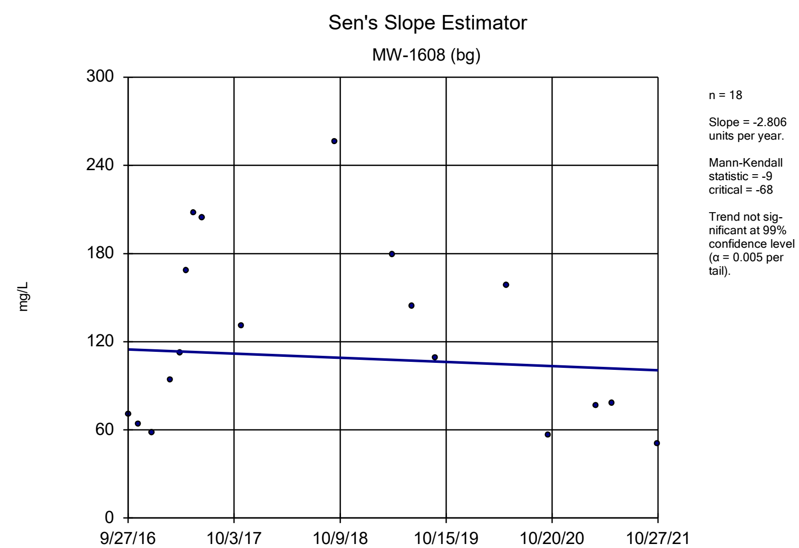
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



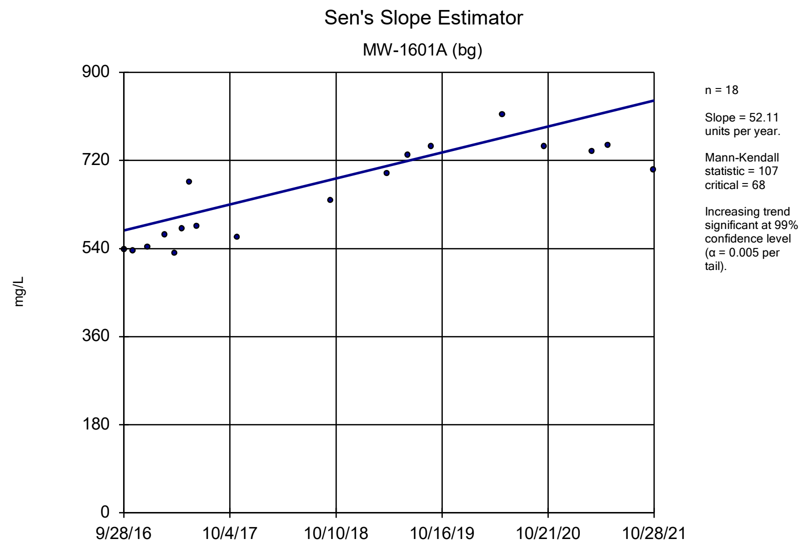
Constituent: Sulfate, total Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



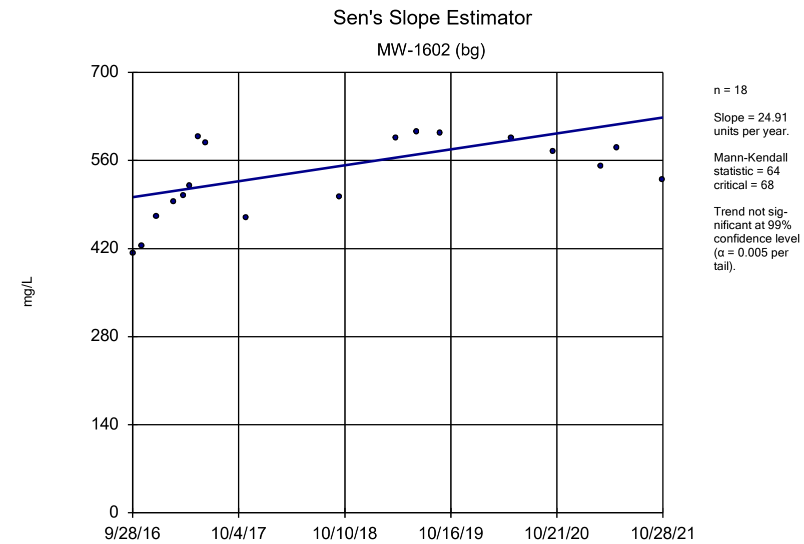
Constituent: Sulfate, total Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



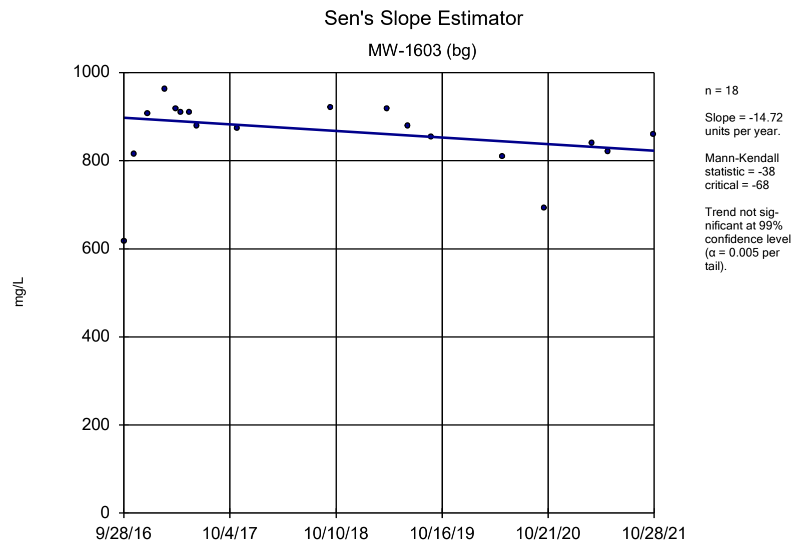
Constituent: Total Dissolved Solids [TDS] Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



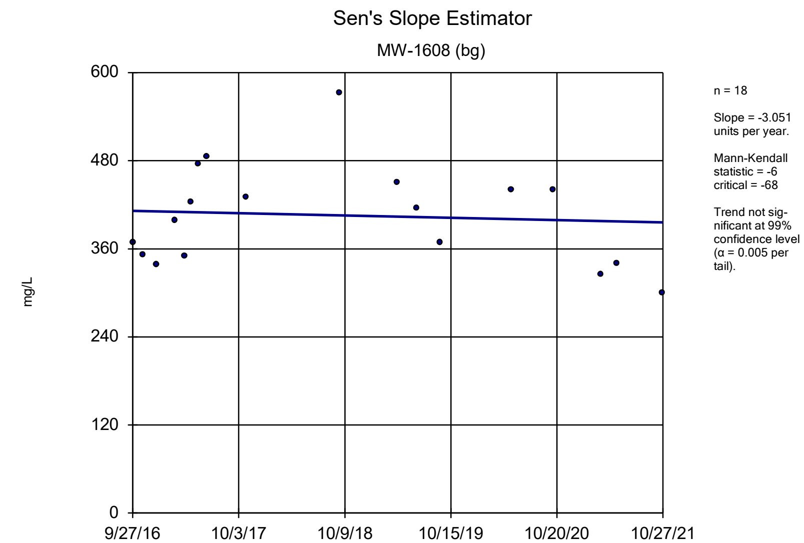
Constituent: Total Dissolved Solids [TDS] Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/14/2022 4:35 PM View: Trend Test (Upgradient)
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Interwell Prediction Limits - All Results

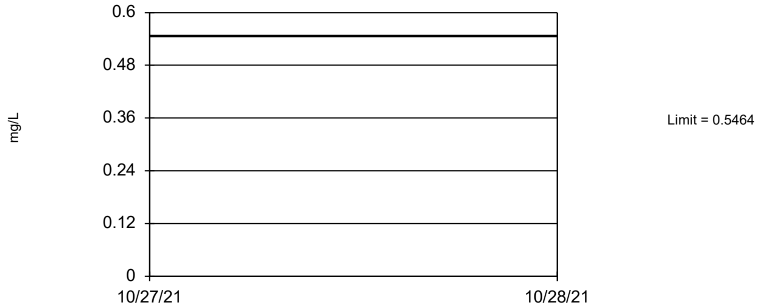
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/25/2022, 3:05 PM

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	0.5464	n/a	n/a	8 future	n/a	72	-1.711	0.569	0	None	ln(x)	0.0009403	Param Inter 1 of 2
Calcium, total (mg/L)	n/a	187	n/a	n/a	8 future	n/a	72	n/a	n/a	0	n/a	n/a	0.0003683	NP Inter (normality) 1 of 2
Chloride, total (mg/L)	n/a	61.03	n/a	n/a	8 future	n/a	72	2.506	0.8254	0	None	ln(x)	0.0009403	Param Inter 1 of 2
Fluoride, total (mg/L)	n/a	0.3011	n/a	n/a	8 future	n/a	80	0.1768	0.06431	0	None	No	0.0009403	Param Inter 1 of 2
Sulfate, total (mg/L)	n/a	538.6	n/a	n/a	8 future	n/a	72	15.12	4.156	0	None	sqrt(x)	0.0009403	Param Inter 1 of 2
Total Dissolved Solids [TDS] (mg/L)	n/a	967.2	n/a	n/a	8 future	n/a	72	610.4	183.4	0	None	No	0.0009403	Param Inter 1 of 2

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Interwell Parametric



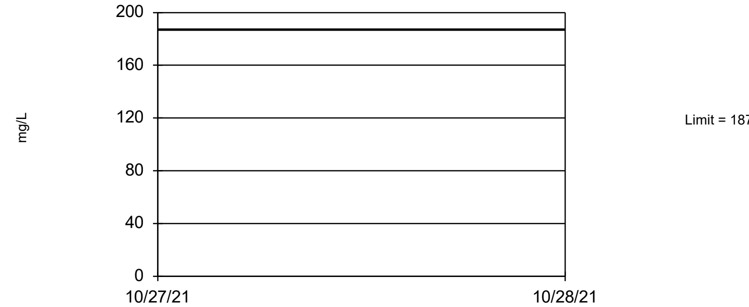
Background Data Summary (based on natural log transformation): Mean=-1.711, Std. Dev.=0.569, n=72. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9642, critical = 0.954. Kappa = 1.945 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009403. Assumes 8 future values.

Constituent: Boron, total Analysis Run 1/25/2022 3:04 PM View: Interwell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 72 background values. Annual per-constituent alpha = 0.005876. Individual comparison alpha = 0.0003683 (1 of 2). Assumes 8 future values.

Constituent: Calcium, total Analysis Run 1/25/2022 3:04 PM View: Interwell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Interwell Parametric

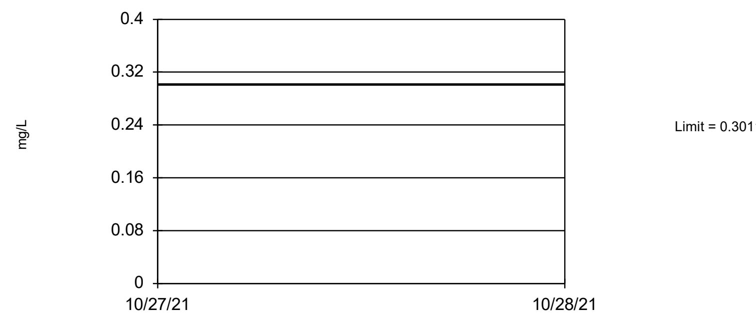
Background Data Summary (based on natural log transformation): Mean=2.506, Std. Dev.=0.8254, n=72. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9796, critical = 0.954. Kappa = 1.945 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009403. Assumes 8 future values.

Constituent: Chloride, total Analysis Run 1/25/2022 3:04 PM View: Interwell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Interwell Parametric

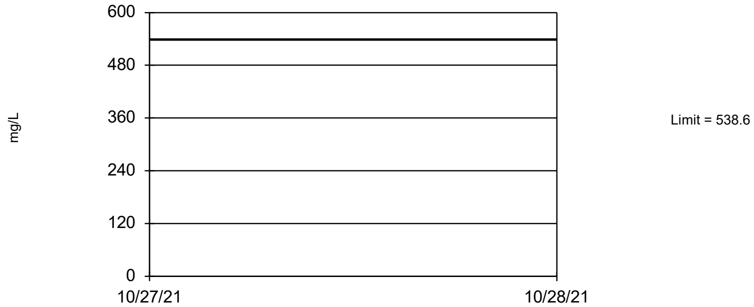


Background Data Summary: Mean=0.1768, Std. Dev.=0.06431, n=80. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9648, critical = 0.957. Kappa = 1.934 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009403. Assumes 8 future values.

Constituent: Fluoride, total Analysis Run 1/25/2022 3:04 PM View: Interwell
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Prediction Limit

Interwell Parametric



Background Data Summary (based on square root transformation): Mean=15.12, Std. Dev.=4.156, n=72. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9725, critical = 0.954. Kappa = 1.945 (c=7, w=8, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0009403. Assumes 8 future values.

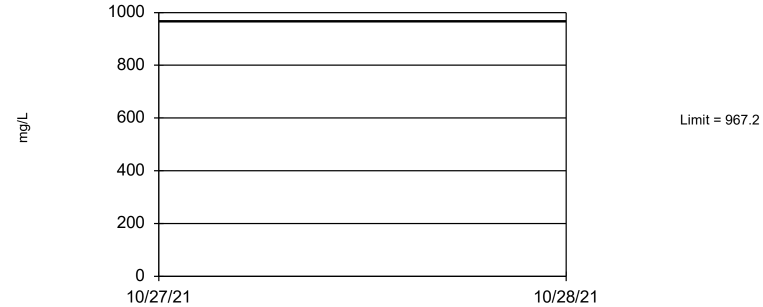
Constituent: Sulfate, total Analysis Run 1/25/2022 3:04 PM View: Interwell

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Groundwater Stats Consulting. UG

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=610.4, Std. Dev.=183.4, n=72. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9612, critical = 0.954. Kappa = 1.945 (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 1/25/2022 3:04 PM View: Interwell

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Upper Tolerance Limit

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/14/2022, 4:44 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.00015	n/a	n/a	n/a	76	14.47	n/a	0.02028	NP Inter(normality)
Arsenic, total (mg/L)	n/a	0.0007324	n/a	n/a	n/a	76	0	sqrt(x)	0.05	Inter
Barium, total (mg/L)	n/a	0.0678	n/a	n/a	n/a	76	0	n/a	0.02028	NP Inter(normality)
Beryllium, total (mg/L)	n/a	0.00005	n/a	n/a	n/a	68	89.71	n/a	0.03056	NP Inter(NDs)
Cadmium, total (mg/L)	n/a	0.00005	n/a	n/a	n/a	76	7.895	n/a	0.02028	NP Inter(normality)
Chromium, total (mg/L)	n/a	0.0007377	n/a	n/a	n/a	72	1.389	sqrt(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.0006544	n/a	n/a	n/a	76	5.263	ln(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	n/a	2.24	n/a	n/a	n/a	76	0	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	n/a	0.303	n/a	n/a	n/a	80	0	No	0.05	Inter
Lead, total (mg/L)	n/a	0.000454	n/a	n/a	n/a	76	19.74	x^(1/3)	0.05	Inter
Lithium, total (mg/L)	n/a	0.03	n/a	n/a	n/a	76	7.895	n/a	0.02028	NP Inter(normality)
Mercury, total (mg/L)	n/a	0.000005	n/a	n/a	n/a	72	94.44	n/a	0.02489	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.002867	n/a	n/a	n/a	76	6.579	sqrt(x)	0.05	Inter
Selenium, total (mg/L)	n/a	0.0043	n/a	n/a	n/a	76	0	n/a	0.02028	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.0002	n/a	n/a	n/a	76	48.68	n/a	0.02028	NP Inter(normality)

Confidence Interval - Significant Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/14/2022, 4:52 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	ND Adj.	Transform	Alpha	Method
Lithium, total (mg/L)	**MW-1605D**	**0.07177**	**0.05078**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605S**	**0.07075**	**0.05421**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606D**	**0.124**	**0.0658**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**NP (normality)**
Lithium, total (mg/L)	**MW-1606S**	**0.1079**	**0.08197**	**0.04**	**Yes**	**19**	**0**	**None**	**x^2**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607D**	**0.09974**	**0.08051**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607S**	**0.1087**	**0.0919**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**Param.**

Confidence Interval - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 1/14/2022, 4:52 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	MW-1604D	0.00014	0.00003	0.006	No	19	5.263	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1604S	0.00016	0.00003	0.006	No	19	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1605D	0.00005	0.00003	0.006	No	19	10.53	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1605S	0.00007	0.00004	0.006	No	19	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606D	0.00019	0.00014	0.006	No	19	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606S	0.0001576	0.0001424	0.006	No	19	0	None	No	0.01	Param.
Antimony, total (mg/L)	MW-1607D	0.00004	0.00003	0.006	No	19	5.263	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1607S	0.0004719	0.0004237	0.006	No	18	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1604D	0.00049	0.00028	0.01	No	19	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1604S	0.0004202	0.0003314	0.01	No	19	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605D	0.002754	0.002351	0.01	No	19	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605S	0.000781	0.0005145	0.01	No	19	0	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1606D	0.00063	0.00035	0.01	No	19	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1606S	0.0008097	0.0006829	0.01	No	19	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607D	0.001548	0.001161	0.01	No	19	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607S	0.00119	0.00091	0.01	No	18	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1604D	0.037	0.0265	2	No	19	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1604S	0.02941	0.02726	2	No	19	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1605D	0.02877	0.02549	2	No	19	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1605S	0.03349	0.02579	2	No	19	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW-1606D	0.0584	0.0461	2	No	19	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1606S	0.07203	0.06217	2	No	19	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1607D	0.133	0.0717	2	No	19	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1607S	0.07142	0.06346	2	No	18	0	None	No	0.01	Param.
Beryllium, total (mg/L)	MW-1604D	0.00005	0.00005	0.004	No	17	100	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1604S	0.00005	0.000024	0.004	No	17	94.12	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1605D	0.00005	0.00005	0.004	No	17	100	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1605S	0.00005	0.00002	0.004	No	17	82.35	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1606D	0.00005	0.000031	0.004	No	17	76.47	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1606S	0.00005	0.000005	0.004	No	17	94.12	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1607D	0.00005	0.000008	0.004	No	17	94.12	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1607S	0.000123	0.00001	0.004	No	17	76.47	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	MW-1604D	0.00014	0.000027	0.005	No	19	0	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1604S	0.0002	0.00004	0.005	No	19	0	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1605D	0.00003	0.000011	0.005	No	19	5.263	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1605S	0.00007382	0.00004753	0.005	No	19	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1606D	0.00007764	0.0000652	0.005	No	19	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1606S	0.0000754	0.00006439	0.005	No	19	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1607D	0.000025	0.00001	0.005	No	19	57.89	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	MW-1607S	0.00005	0.00003	0.005	No	18	0	None	No	0.01	NP (normality)
Chromium, total (mg/L)	MW-1604D	0.000468	0.0002218	0.1	No	19	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1604S	0.0003583	0.0001445	0.1	No	18	0	None	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	MW-1605D	0.0002126	0.00009385	0.1	No	18	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1605S	0.0004461	0.0002088	0.1	No	18	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1606D	0.0004067	0.0001615	0.1	No	19	0	None	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	MW-1606S	0.0003152	0.0001172	0.1	No	19	0	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-1607D	0.0002724	0.00009687	0.1	No	18	0	None	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	MW-1607S	0.0004416	0.0002441	0.1	No	18	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1604D	0.00178	0.000134	0.006	No	19	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1604S	0.00216	0.000317	0.006	No	19	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1605D	0.001744	0.001545	0.006	No	19	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1605S	0.0008121	0.0003589	0.006	No	19	0	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1606D	0.0016	0.00117	0.006	No	19	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1606S	0.0003383	0.0002235	0.006	No	19	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1607D	0.000853	0.000439	0.006	No	19	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1607S	0.00142	0.000936	0.006	No	18	0	None	No	0.01	NP (normality)
Combined Radium 226 + 228 (pCi/L)	MW-1604D	1.182	0.4421	5	No	19	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604S	1.662	0.722	5	No	18	0	None	No	0.01	NP (normality)
Combined Radium 226 + 228 (pCi/L)	MW-1605D	1.44	0.6608	5	No	19	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605S	1.015	0.4877	5	No	19	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606D	1.624	0.831	5	No	18	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606S	1.293	0.6318	5	No	19	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607D	1.777	1.12	5	No	19	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607S	1.841	0.9199	5	No	19	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1604D	0.2101	0.1759	4	No	20	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1604S	0.2342	0.1988	4	No	20	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605D	0.2082	0.1878	4	No	20	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605S	0.29	0.251	4	No	20	0	None	No	0.01	Param.

Confidence Interval - All Results

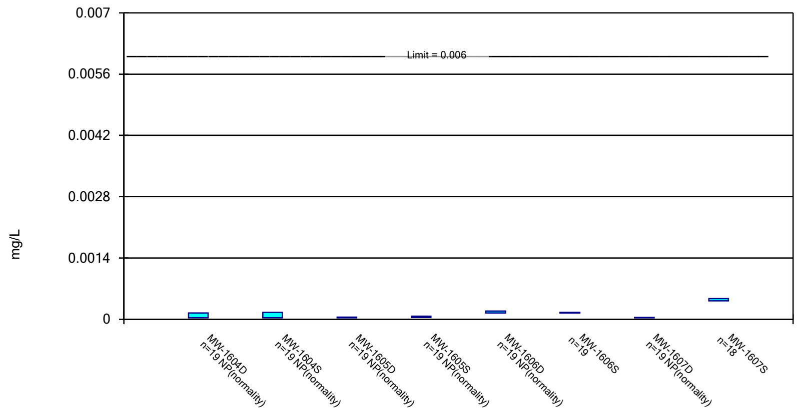
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/14/2022, 4:52 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	ND Adj.	Transform	Alpha	Method
Fluoride, total (mg/L)	MW-1606D	0.27	0.24	4	No	20	0	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW-1606S	0.472	0.3918	4	No	21	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1607D	0.5362	0.4819	4	No	21	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1607S	0.29	0.252	4	No	20	0	None	No	0.01	Param.
Lead, total (mg/L)	MW-1604D	0.0002	0.000027	0.015	No	19	36.84	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1604S	0.0002	0.000051	0.015	No	19	42.11	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1605D	0.0002	0.00002	0.015	No	19	36.84	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1605S	0.0004844	0.0001384	0.015	No	19	10.53	None	x^(1/3)	0.01	Param.
Lead, total (mg/L)	MW-1606D	0.000491	0.000084	0.015	No	19	42.11	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1606S	0.0001202	0.000061	0.015	No	19	26.32	Kaplan-Meier	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW-1607D	0.0002	0.000043	0.015	No	19	31.58	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1607S	0.000264	0.00008	0.015	No	18	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1604D	0.057	0.019	0.04	No	19	5.263	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1604S	0.04469	0.03469	0.04	No	19	0	None	No	0.01	Param.
Lithium, total (mg/L)	**MW-1605D**	**0.07177**	**0.05078**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605S**	**0.07075**	**0.05421**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606D**	**0.124**	**0.0658**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**NP (normality)**
Lithium, total (mg/L)	**MW-1606S**	**0.1079**	**0.08197**	**0.04**	**Yes**	**19**	**0**	**None**	**x^2**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607D**	**0.09974**	**0.08051**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607S**	**0.1087**	**0.0919**	**0.04**	**Yes**	**19**	**0**	**None**	**No**	**0.01**	**Param.**
Mercury, total (mg/L)	MW-1604D	0.000036	0.000003	0.002	No	18	88.89	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1604S	0.000005	0.000003	0.002	No	18	94.44	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1605D	0.000005	0.000002	0.002	No	18	94.44	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1605S	0.000005	0.000003	0.002	No	18	94.44	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1606D	0.000005	0.000004	0.002	No	18	94.44	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1606S	0.000005	0.000002	0.002	No	18	94.44	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1607D	0.000005	0.000002	0.002	No	18	88.89	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1607S	0.000012	0.000003	0.002	No	18	83.33	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	MW-1604D	0.0183	0.0014	0.1	No	19	5.263	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1604S	0.0162	0.00253	0.1	No	18	0	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1605D	0.04672	0.03729	0.1	No	19	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1605S	0.01889	0.01386	0.1	No	19	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1606D	0.07536	0.06742	0.1	No	19	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1606S	0.0957	0.0549	0.1	No	19	0	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1607D	0.08743	0.08019	0.1	No	19	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1607S	0.04349	0.03595	0.1	No	19	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1604D	0.001779	0.0008617	0.05	No	19	0	None	ln(x)	0.01	Param.
Selenium, total (mg/L)	MW-1604S	0.0025	0.00096	0.05	No	19	0	None	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1605D	0.0003	0.00014	0.05	No	19	0	None	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1605S	0.001316	0.0006496	0.05	No	19	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1606D	0.005399	0.002436	0.05	No	19	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1606S	0.002534	0.00115	0.05	No	19	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1607D	0.00025	0.00004	0.05	No	19	26.32	None	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1607S	0.008365	0.005378	0.05	No	19	0	None	No	0.01	Param.
Thallium, total (mg/L)	MW-1604D	0.000261	0.0002	0.002	No	19	47.37	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1604S	0.000251	0.00003	0.002	No	19	5.263	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605D	0.0002	0.00005	0.002	No	19	42.11	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605S	0.0002	0.00005	0.002	No	19	47.37	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1606D	0.0002	0.000086	0.002	No	19	26.32	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1606S	0.0002	0.000062	0.002	No	19	26.32	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1607D	0.0002	0.00004	0.002	No	19	47.37	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1607S	0.0002	0.000052	0.002	No	19	31.58	None	No	0.01	NP (normality)

Sanitas™ v.9.6.32 Sanitas software utilized by 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.



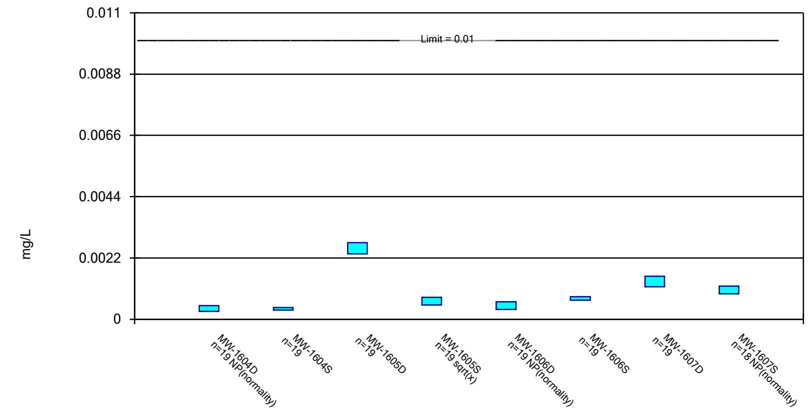
Constituent: Antimony, total Analysis Run 1/14/2022 4:50 PM View: UTL

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.



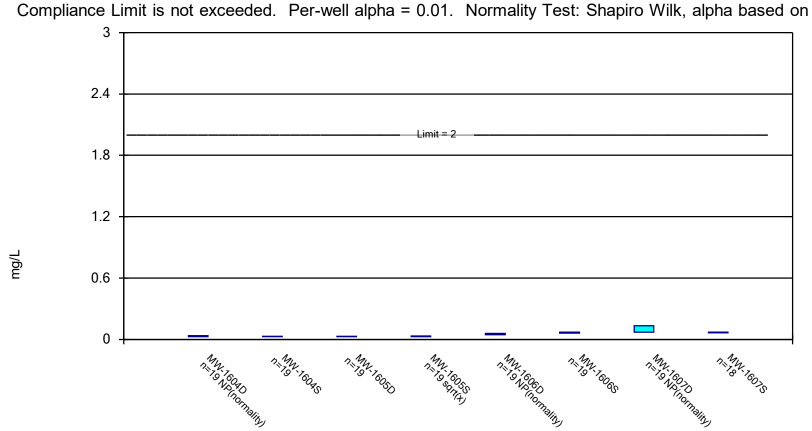
Constituent: Arsenic, total Analysis Run 1/14/2022 4:50 PM View: UTL

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.



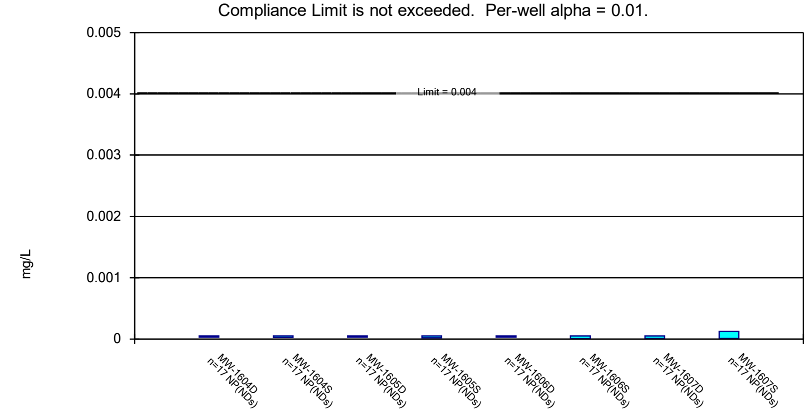
Constituent: Barium, total Analysis Run 1/14/2022 4:51 PM View: UTL

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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



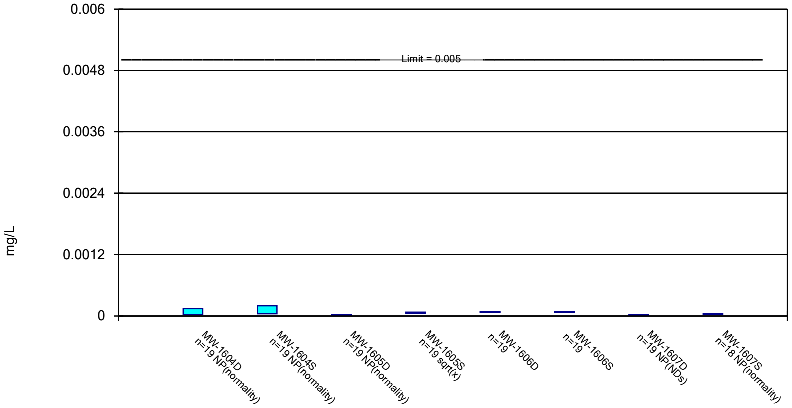
Constituent: Beryllium, total Analysis Run 1/14/2022 4:51 PM View: UTL

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.



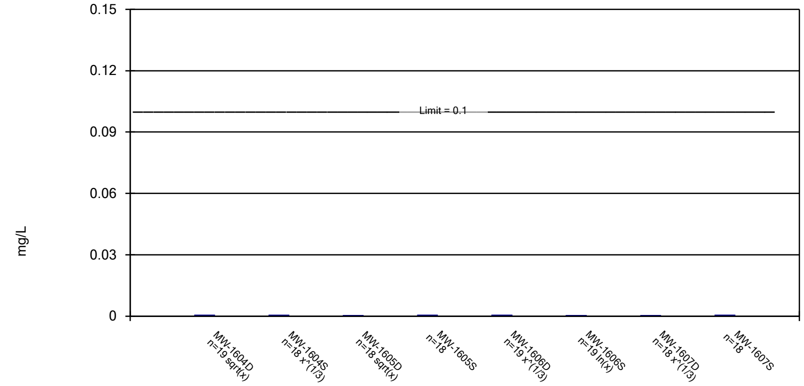
Constituent: Cadmium, total Analysis Run 1/14/2022 4:51 PM View: UTL

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.



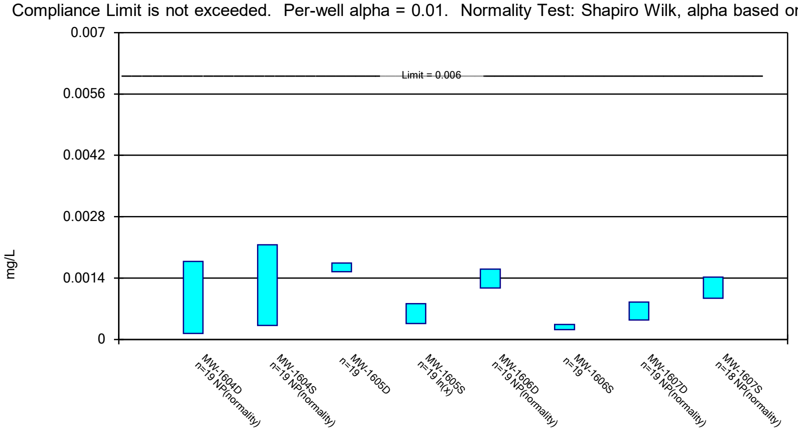
Constituent: Chromium, total Analysis Run 1/14/2022 4:51 PM View: UTL

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.



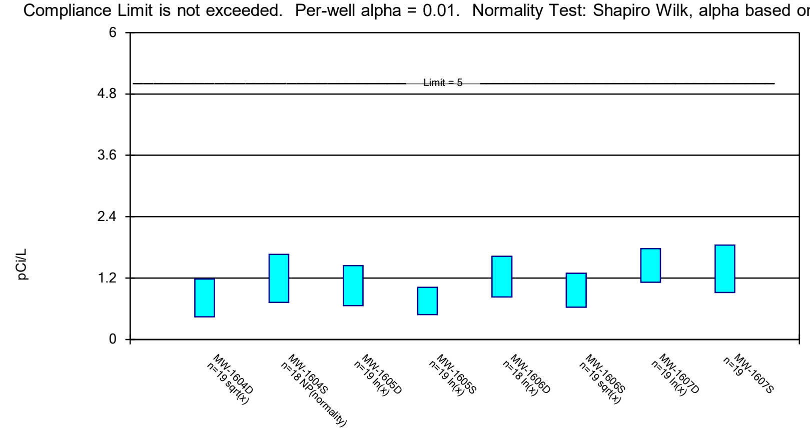
Constituent: Cobalt, total Analysis Run 1/14/2022 4:51 PM View: UTL

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.



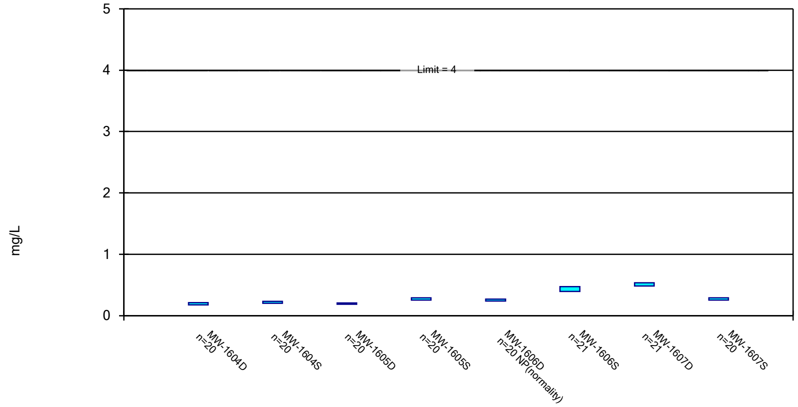
Constituent: Combined Radium 226 + 228 Analysis Run 1/14/2022 4:51 PM View: UTL

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.

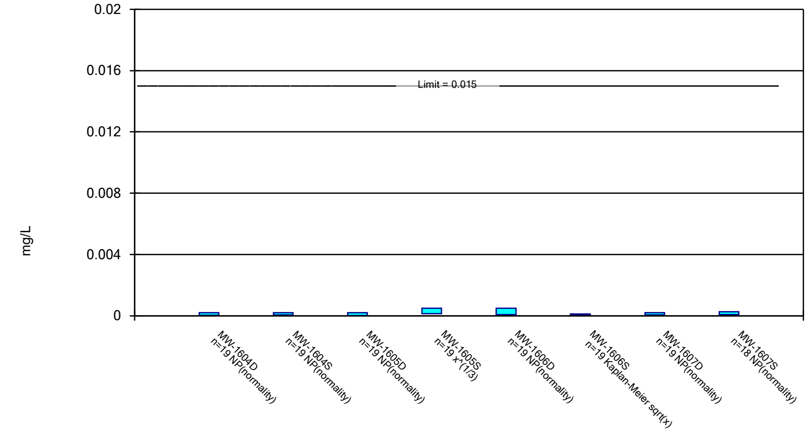


Constituent: Fluoride, total   Analysis Run 1/14/2022 4:51 PM   View: UTL
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.

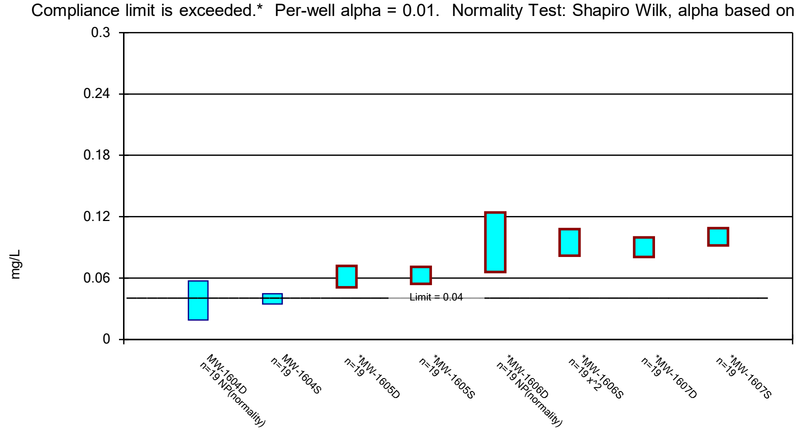


Constituent: Lead, total   Analysis Run 1/14/2022 4:51 PM   View: UTL
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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

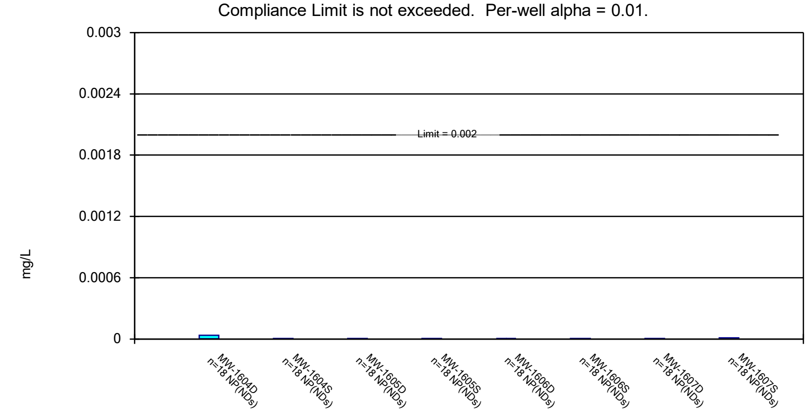


Constituent: Lithium, total   Analysis Run 1/14/2022 4:51 PM   View: UTL
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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

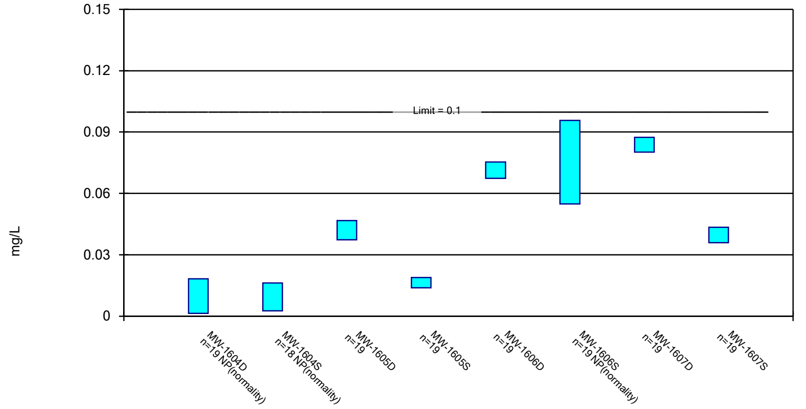


Constituent: Mercury, total   Analysis Run 1/14/2022 4:51 PM   View: UTL
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.



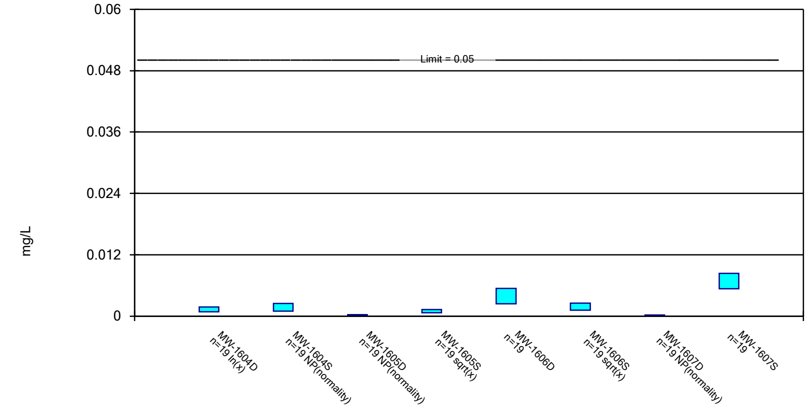
Constituent: Molybdenum, total   Analysis Run 1/14/2022 4:51 PM   View: UTL

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by 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.



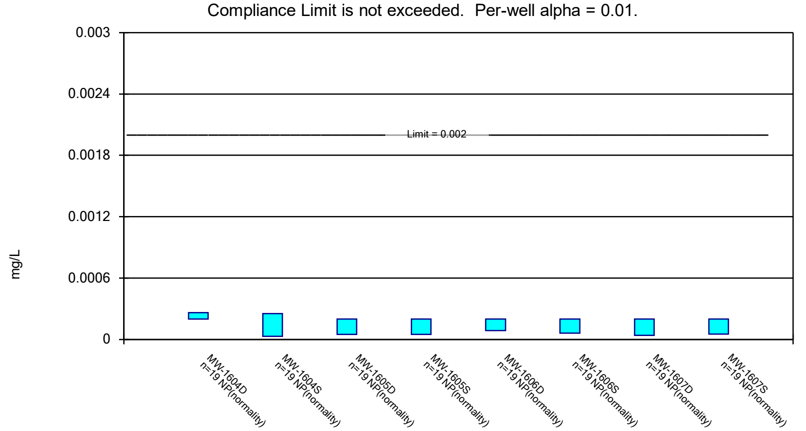
Constituent: Selenium, total   Analysis Run 1/14/2022 4:51 PM   View: UTL

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

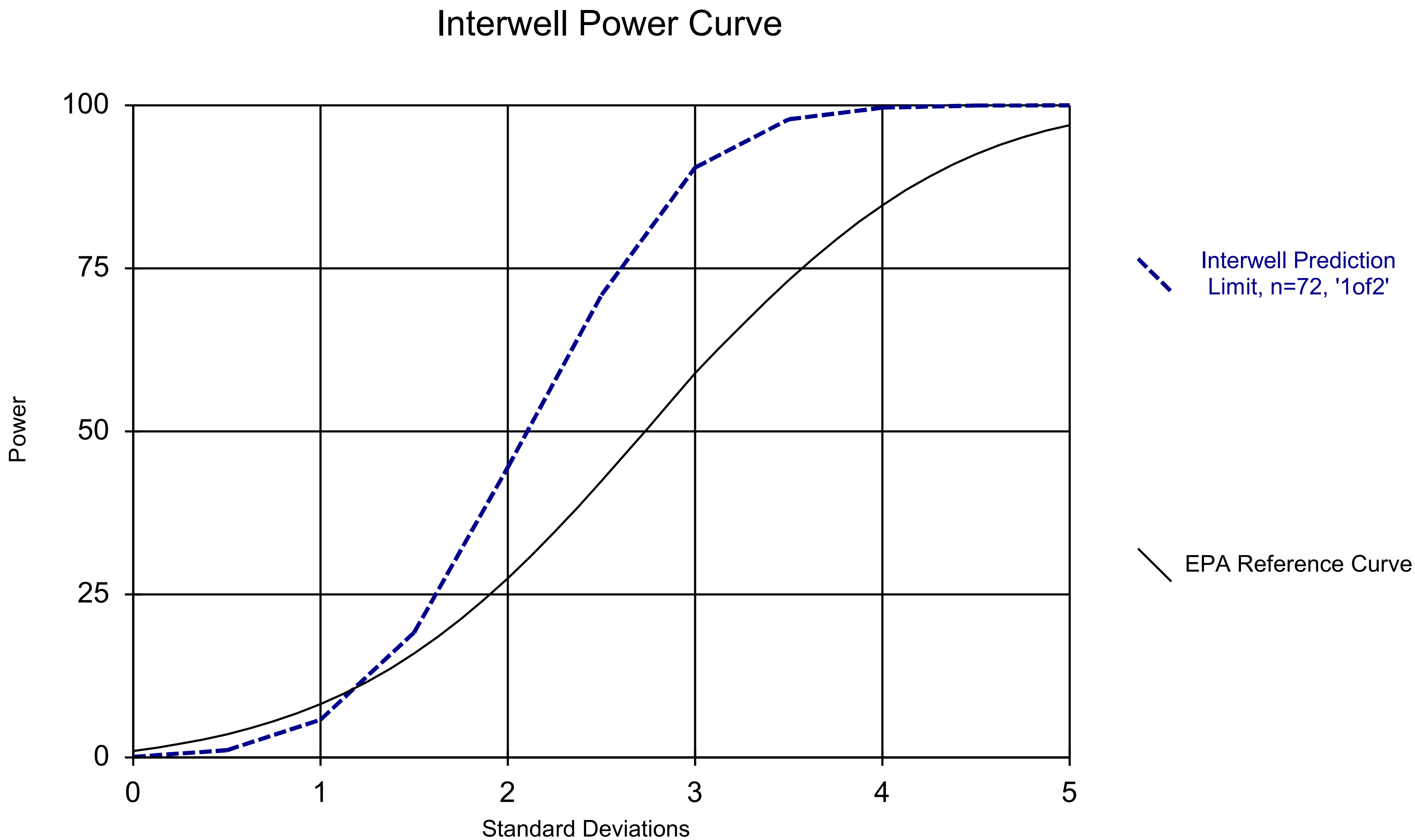
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Thallium, total   Analysis Run 1/14/2022 4:51 PM   View: UTL

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG

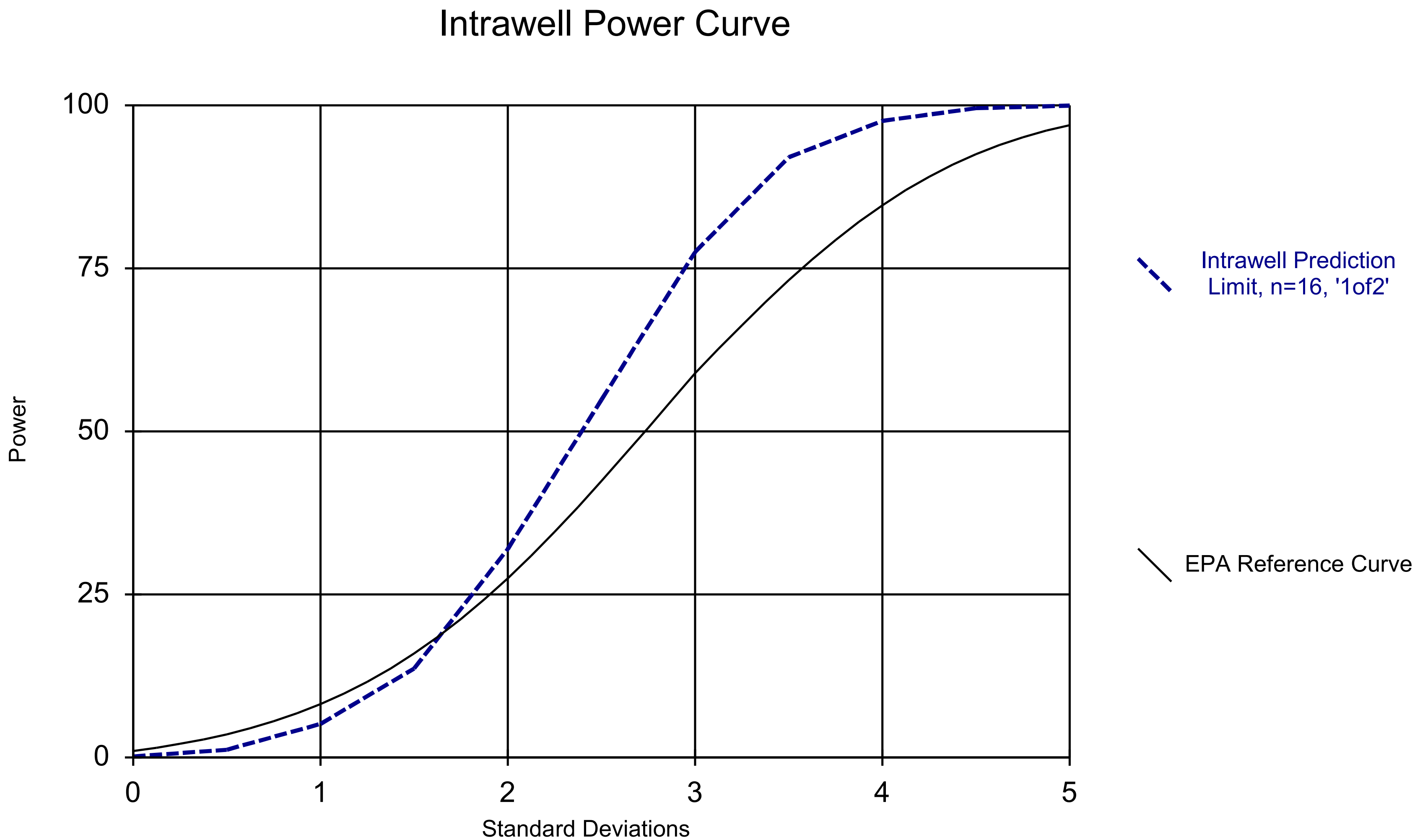


Kappa = 2.012, based on 72 constituent/well pairs, evaluated semi-annually (this report reflects annual total).

Analysis Run 1/23/2022 1:57 PM View: Trend Test (Upgradient)

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.32 Sanitas software utilized by Groundwater Stats Consulting. UG



Kappa = 2.316, based on 8 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 1/14/2022 4:55 PM View: Appendix III & IV

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

STATISTICAL ANALYSIS SUMMARY
BOTTOM ASH POND
Mountaineer Plant
New Haven, West Virginia

Submitted to

AMERICAN ELECTRIC POWER

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

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Worthington, Ohio 43085

September 15, 2022

CHA8500B

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LIST OF ACRONYMS AND ABBREVIATIONS

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

SECTION 1

EXECUTIVE SUMMARY

In accordance with the United States Environmental Protection Agency's (USEPA's) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (40 CFR 257 Subpart D, "CCR rule"), groundwater monitoring has been conducted at the Bottom Ash Pond (BAP), an existing CCR unit at the Mountaineer Power Plant located in New Haven, West Virginia. Recent groundwater monitoring results were compared to site-specific groundwater protection standards (GWPS) to identify potential exceedances and 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, total dissolved solids (TDS), and sulfate at the BAP. An alternative source was not identified at the time, so the BAP initiated assessment monitoring in April 2018. GWPS were set in accordance with 40 CFR 257.95(d)(2) and a statistical evaluation of the assessment monitoring data was conducted in January 2019. Statistically significant levels (SSLs) were observed 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, with corrective action monitoring events conducted at the BAP in March 2022 and May 2022 in accordance with 40 CFR 257.98(a)(1) and the Corrective Action Monitoring Plan (Sanborn Head, 2022). The results of these corrective action monitoring events are documented in this report.

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

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Confidence intervals were calculated for Appendix IV parameters at the compliance, nature and extent, and sentinel wells to assess whether Appendix IV parameters were present at SSLs above previously calculated GWPS. SSLs were identified for arsenic, lithium, and molybdenum. Corrective action statistics identified concentrations of lithium above the GWPS. Thus, the unit will continue corrective action monitoring as required by 40 CFR 275.98(a)(1). Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

SECTION 2

BOTTOM ASH POND EVALUATION

2.1 Data Validation & QA/QC

During the corrective action monitoring program in 2022, two sets of samples were collected for analysis from the background and compliance wells to meet the requirements of 40 CFR 257.95(b) (March 2022) and 257.95(d)(1) (May 2022). The samples from both events were analyzed for all Appendix III and IV parameters. A summary of data collected during these assessment monitoring events may be found in Table 1.

Statistical evaluation of groundwater samples collected from the nature and extent and sentinel wells was also completed. Because this is the first statistical evaluation completed under the corrective action monitoring program, previously collected data from the nature and extent and sentinel wells were incorporated into the statistical calculations. A summary of data from the nature and extent and sentinel wells included in the statistical evaluation is provided in Table 2.

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

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.35 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

2.2 Statistical Analysis

Statistical analyses for the 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 2022 and May 2022 for the background and compliance wells were screened for potential outliers. The data included in the statistical analysis for the nature and extent and sentinel wells were also screened for outliers. No outliers were identified for the data collected from these monitoring locations.

2.2.1 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance, nature and extent, and sentinel well. Confidence limits were generally calculated parametrically ($\alpha = 0.01$); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high). An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B. The calculated confidence limits were compared to the GWPS provided in Table 2. The GWPS were established during a previous statistical analysis as either the greater value of the background concentration or the maximum contaminant level (MCL) and risk-based level specified in 40 CFR 257.95(h)(2) (Geosyntec, 2022).

The following SSLs were identified at the Mountaineer BAP:

- The LCL for arsenic exceeded the GWPS of 0.0100 mg/L at MW-1805 (0.0241 mg/L) and MW-1922D (0.424 mg/L).
- The LCL for lithium exceeded the GWPS of 0.0400 mg/L at MW-1605D (0.0490 mg/L), MW-1605S (0.0536 mg/L), MW-1606D (0.0633 mg/L), MW-1606S (0.0760 mg/L), MW-1607D (0.0820 mg/L), MW-1607S (0.0928 mg/L), MW-1921 (0.783 mg/L), MW-1922S (0.0416 mg/L), MW-1923 (0.131 mg/L), MW-1924 (0.0741 mg/L), and MW-1925 (0.0664 mg/L).
- The LCL for molybdenum exceeded the GWPS of 0.100 mg/L at MW-1921 (0.427 mg/L).

As a result, either an alternative source demonstration for arsenic and/or molybdenum will be prepared in accordance with 40 CFR 257.95(g)(3)(ii) or an assessment of corrective measures will be initiated for these constituents. Additionally, the Mountaineer BAP will continue to monitor the groundwater monitoring network in accordance with the assessment monitoring program per 40 CFR 257.96(b).

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), including the requirement to achieve compliance with the GWPS at all points within the plume of contamination (40 CFR 257.98(c)(1)). For 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 GWPS provided in Table 2. If the UCL is above the GWPS, compliance with the GWPS has not been achieved. The following corrective action exceedances were identified:

- The UCL for lithium exceeded the GWPS of 0.0400 mg/L at MW-1605D (0.0692 mg/L), MW-1605S (0.0690 mg/L), MW-1606D (0.124 mg/L), MW-1606S (0.103 mg/L), MW-1607D (0.0994 mg/L), MW-1607S (0.108 mg/L), MW-1921 (0.0969 mg/L), MW-

1922S (0.0638 mg/L), MW-1923 (0.197 mg/L), MW-1924 (0.116 mg/L), and MW-1925 (0.0912 mg/L).

For lithium exceedances, which are the subject of corrective measures, concentrations remain above the GWPS and implementation of the selected remedy will continue.

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 exceeded background concentrations. Data collected during the May 2022 assessment monitoring event from each compliance well were compared to previously established prediction limits to assess whether the results are above background values. The results from these events and the prediction limits are summarized in Table 4. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 0.546 mg/L at MW-1604D (2.73 mg/L), MW-1604S (2.59 mg/L), MW-1605D (3.98 mg/L), MW-1605S (4.17 mg/L), MW-1606D (4.90 mg/L), MW-1606S (3.61 mg/L), MW-1607D (5.04 mg/L), and MW-1607S (3.37 mg/L).

- Calcium concentrations exceeded the interwell UPL of 187 mg/L at MW-1604D (192 mg/L), MW-1604S (270 mg/L), MW-1605D (220 mg/L), MW-1606D (207 mg/L), and MW-1607D (201 mg/L).

- Chloride concentrations exceeded the interwell UPL of 61.0 mg/L at MW-1604S (98.0 mg/L), MW-1605D (104 mg/L), MW-1605S (66.0 mg/L), MW-1606D (131 mg/L), MW-1606S (124 mg/L), MW-1607D (158 mg/L), and MW-1607S (143 mg/L).

- Fluoride concentrations exceeded the interwell UPL of 0.301 mg/L at MW-1606S (0.39 mg/L), and MW-1607D (0.49 mg/L).

- Sulfate concentrations exceeded the interwell UPL of 539 mg/L at MW-1604S (634 mg/L), MW-1605D (615 mg/L), MW-1605S (547 mg/L), MW-1606D (581 mg/L), and MW-1607D (604 mg/L).

- TDS concentrations exceeded the interwell UPL of 967 mg/L at MW-1604S (1,300 mg/L), MW-1605D (2,610 mg/L), MW-1605S (1,130 mg/L), MW-1606D (1,280 mg/L), MW-1606S (1,150 mg/L), MW-1607D (1,480 mg/L), and MW-1607S (1,130 mg/L).

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

2.3 Conclusions

An annual and semi-annual corrective action monitoring event were conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified no potential outliers in the March 2022 or May 2022 data or for data used for statistical evaluation of the nature and extent and sentinel wells. 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 exceeded the GWPS. SSLs were identified for arsenic, lithium, and molybdenum. For 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 previously calculated prediction limits, with exceedances identified for boron, calcium, chloride, fluoride, sulfate, and TDS.

Based on this evaluation, the Mountaineer BAP CCR unit will continue corrective action monitoring as required by 40 CFR 275.98(a)(1).

SECTION 3

REFERENCES

Geosyntec Consultants (Geosyntec). 2019. Statistical Analysis Summary – Bottom Ash Pond, Mountaineer Plant. January 8, 2019.

Geosyntec. 2021. Statistical Analysis Plan. January.

Geosyntec. 2022. Statistical Analysis Summary – Bottom Ash Pond, Mountaineer Plant. February 15, 2022.

Sanborn, Head & Associates, Inc (Sanborn Head). 2021. Remedy Selection Report – AEP Mountaineer Plant, Bottom Ash Ponds. December 22, 2021.

Sanborn Head. 2022. Corrective Action Monitoring Plan – AEP Mountaineer Plant, Bottom Ash Ponds. March 2022.

TABLES

Table 1 - Groundwater Data Summary
Mountaineer Plant - Bottom Ash Pond

Parameter	Unit	MW-1601A		MW-1602		MW-1603		MW-1604D		MW-1604S		MW-1605D	
		3/7/2022	5/20/2022	3/7/2022	5/20/2022	3/8/2022	5/19/2022	3/2/2022	5/23/2022	3/2/2022	5/23/2022	3/9/2022	5/24/2022
Antimony	µg/L	0.02 J1	0.02 J1	0.52	0.02 J1	0.02 J1	0.02 J1	0.03 J1	0.04 J1	0.15	0.16	0.02 J1	0.04 J1
Arsenic	µg/L	0.50	0.47	0.32	0.36	0.27	0.28	0.26	0.40	0.24	0.26	3.33	3.27
Barium	µg/L	62.5	64.3	21.8	28.2	29.3	31.6	23.2	35.3	27.8	34.0	26.6	33.5
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	0.05 U1	0.05 U1
Boron	mg/L	0.144	0.146	0.099	0.115	0.300	0.344	3.17	2.73	2.25	2.59	3.35	3.98
Cadmium	µg/L	0.014 J1	0.015 J1	0.038	0.017 J1	0.012 J1	0.011 J1	0.022	0.022	0.172	0.128	0.015 J1	0.016 J1
Calcium	mg/L	164	178	74.5	104	187	202	185	192	237 M1, P3	270	189	220
Chloride	mg/L	13.8	13.9	7.23	7.63	16.2	17.3	64.0	31.9	100	98.0	102	104
Chromium	µg/L	0.33	0.25	0.62	0.32	0.40	0.32	0.49	0.24	0.45	0.23	0.50	0.18 J1
Cobalt	µg/L	0.013 J1	0.024	0.044	0.027	0.037	0.039	0.092	0.126	1.99	1.79	1.41	1.49
Combined Radium	pCi/L	1.67	1.36	0.72	0.57	0.65	0.4	0.79	0.85	1.99	1.29	2.11	1.33
Fluoride	mg/L	0.11	0.12	0.26	0.25	0.08	0.09	0.22	0.07	0.25	0.26	0.20	0.20
Lead	µg/L	0.2 U1	0.2 U1	0.20	0.20	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Lithium	mg/L	0.00202	0.00201	0.0114	0.0125	0.0145	0.0158	0.0197	0.0199	0.0340	0.0351	0.0352	0.0416
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
Molybdenum	µg/L	1.7	0.4 J1	1.2	1.0	0.2 J1	0.2 J1	1.5	1.9	13.4	14.4	33.7	35.5
Selenium	µg/L	0.89	1.09	0.12 J1	0.5 U1	0.19 J1	0.1 J1	0.51	0.74	0.77	0.73	0.5 U1	0.13 J1
Sulfate	mg/L	242	239	175	220	395	379	496	5.20	609	634	532	615
Thallium	µg/L	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.21	0.21	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	700	720 L1	460	560 L1	910	880 L1	1,110	260 L1	1,250	1,300 L1	1,220	2,610 L1
pH	SU	7	6.74	6.86	6.49	6.85	6.56	7.12	6.77	7.43	6.91	7.41	6.98

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
-: Not analyzed

Table 1 - Groundwater Data Summary
Mountaineer Plant - Bottom Ash Pond

Parameter	Unit	MW-1605S		MW-1606D		MW-1606S		MW-1607D		MW-1607S		MW-1608	
		3/9/2022	5/24/2022	3/9/2022	5/24/2022	3/9/2022	5/24/2022	3/8/2022	5/25/2022	3/8/2022	5/25/2022	3/1/2022	5/17/2022
Antimony	µg/L	0.05 J1	0.09 J1	0.17	0.21	0.15	0.14	0.03 J1	0.03 J1	0.43	0.41	0.04 J1	0.03 J1
Arsenic	µg/L	0.43	0.43	0.30	0.27	0.70	0.61	2.07	1.93	0.85	0.84	0.45	0.40
Barium	µg/L	28.3	29.0	48.1	39.4	54.6	44.8	70.5	67.0	68.6	60.8	25.2	24.0
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	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	4.16	4.17	7.44	4.90	5.01	3.61	4.51	5.04	3.09	3.37	0.075	0.099
Cadmium	µg/L	0.057	0.040	0.083	0.052	0.068	0.055	0.011 J1	0.01 J1	0.042	0.043	0.006 J1	0.008 J1
Calcium	mg/L	180	178	235	207	200	156 M1, P3	225	201	185	169	94.7 M1, P3	90.5 M1, P3
Chloride	mg/L	80.2	66.0	229	131	145	124	166	158	156	143	2.30	2.10
Chromium	µg/L	0.46	0.25	0.64	0.43	0.70	0.30	0.34	0.32	0.43	0.26	0.48	0.60
Cobalt	µg/L	0.547	0.377	1.77	1.01	0.139	0.280	0.902	0.923	1.53	1.78	0.070	0.092
Combined Radium	pCi/L	2.4	0.34	2.43	1.89	1.21	3.53	4.44	3.21	1.42	1.01	0.8	0.53
Fluoride	mg/L	0.24	0.27	0.22	0.26	0.38	0.39	0.50	0.49	0.23	0.21	0.25	0.26
Lead	µg/L	0.08 J1	0.08 J1	0.07 J1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.05 J1	0.09 J1	0.05 J1	0.06 J1
Lithium	mg/L	0.0522	0.0481	0.0603	0.0540	0.0543	0.0582	0.0919	0.0998	0.0967	0.104	0.00206	0.00223
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
Molybdenum	µg/L	14.3	13.4	66.5	62.0	58.3	56.6	71.9	75.0	29.4	30.5	0.8	0.9
Selenium	µg/L	0.88	0.92	1.64	0.85	2.04	5.90	0.5 U1	0.5 U1	3.38	4.53	1.58	2.38
Sulfate	mg/L	607	547	657	581	495	485	622	604	341	339	85.1	78.9
Thallium	µg/L	0.2 U1	0.2 U1	0.07 J1	0.06 J1	0.06 J1	0.06 J1	0.2 U1	0.2 U1	0.06 J1	0.06 J1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	1,250	1,130 L1	1,530	1,280 L1	1,280	1,150 L1	1,530	1,480 L1	1,170	1,130 L1	370	340 L1
pH	SU	7.34	6.85	7.34	6.92	7.14	6.91	7.5	7.57	7.28	7.09	6.99	7.08

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-016								
Well Classification		Nature and Extent								
Parameter	Unit	9/11/2019	3/11/2020	5/13/2020	10/9/2020	3/24/2021	5/19/2021	10/28/2021	3/2/2022	5/17/2022
Antimony	µg/L	0.04 J1	0.1 U1	0.04 J1	0.04 J1	0.02 J1	0.09 J1	0.1 U1	0.1 U1	0.04 J1
Arsenic	µg/L	4.55	8.51	4.02	4.10	4.11	3.07	3.55	3.47	2.45
Barium	µg/L	48.7	39.1	28.7	22.6	23.2	23.9	23.9	24.2	24.2
Beryllium	µg/L	0.04 J1	0.1 U1	-	-	0.1 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	1.87	-	2.28	1.79	1.79	1.65	1.54	1.43 P3	1.45
Cadmium	µg/L	0.04 J1	0.02 J1	0.03 J1	0.05 U1	0.02 J1	0.021	0.018 J1	0.019 J1	0.022
Calcium	mg/L	230	-	204	228	224	195	203	221 M1	197
Chloride	mg/L	64.4	-	64.2	56.7	67.0	73	64.0	72.0	77.8
Chromium	µg/L	1.47	0.728	0.423	0.363	0.2 J1	0.26	0.33	0.47	0.27
Cobalt	µg/L	1.90	1.64	1.42	1.12	1.07	0.92	1.17	1.06	1.05
Combined Radium	pCi/L	2.17	2.23	0.577	0.548	0.951	1.41	0.44	0.89	1.42
Fluoride	mg/L	0.21	0.23	0.26	0.23	0.27	0.26	0.27	0.25	0.24
Lead	µg/L	1.28	0.459	0.260	0.1 J1	0.2 U1	0.17 J1	0.17 J1	0.05 J1	0.06 J1
Lithium	mg/L	0.0348	0.0345	0.0338	0.0305	0.0289	0.0284	0.0293	0.0252	0.0304
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	36.8	40.5	39.0	37.3	36.3	32.1	40.2	35.5	36.3
Selenium	µg/L	0.2	0.1 J1	0.2 J1	0.09 J1	0.2 J1	0.14 J1	0.5 U1	0.19 J1	0.13 J1
Sulfate	mg/L	545	-	530	542	521	495	470	476	458
Thallium	µg/L	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	1,240	-	1,210	1,220	1,050	1,090	1,060	1,010	1,010 L1
pH	SU	7.3	7.18	7.21	7.1	7.5	7.3	7.29	7.39	7.32

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-107										
Well Classification		Nature and Extent										
Parameter	Unit	4/10/2019	6/18/2019	9/10/2019	3/10/2020	5/13/2020	10/6/2020	3/23/2021	5/18/2021	10/27/2021	3/1/2022	5/17/2022
Antimony	µg/L	0.5 U1	0.03 J1	0.02 J1	0.1 U1	0.03 J1	0.1 U1	0.03 J1	0.06 J1	0.1 U1	0.02 J1	0.02 J1
Arsenic	µg/L	1.08	0.44	0.44	0.42	0.59	0.34	0.33	0.25	0.30	0.42	0.37
Barium	µg/L	68.3	69.4	67.8	48.2	48.1	35.4	42.4	39.0	37.1	52.1	50.9
Beryllium	µg/L	0.5 U1	0.1 U1	0.1 U1	0.1 U1	-	-	0.1 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	0.614	0.592	0.696	-	0.579	0.560	0.757	0.684	0.491	0.872	0.952
Cadmium	µg/L	0.05 J1	0.05	0.04 J1	0.03 J1	0.07	0.02 J1	0.03 J1	0.031	0.024	0.031	0.035
Calcium	mg/L	270	245	316	-	239	179	225	204	185	300	338
Chloride	mg/L	71.4	71.7	79.7	-	66.5	46.1	48.5	51.8	48.6	76.4	74.3
Chromium	µg/L	0.4 J1	0.08 J1	0.07 J1	0.1 J1	0.2 J1	0.548	0.355	0.20	0.58	0.35	0.64
Cobalt	µg/L	1.03	1.45	1.08	0.741	1.90	0.219	0.154	0.169	0.269	0.821	0.734
Combined Radium	pCi/L	1.854	0.2284	3.5	0.161	0.524	1.111	0.1427	0.41	0.81	0.77	1.22
Fluoride	mg/L	0.21	0.22	0.19	0.25	0.26	0.25	0.25	0.25	0.21	0.22	0.22
Lead	µg/L	0.4 J1	0.04 J1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Lithium	mg/L	0.02 J1	0.03 U1	0.00358	0.00410	0.00336	0.00308	0.00370	0.00350	0.00357	0.00451	0.00486
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	10 U1	2 U1	2 U1	2 U1	0.7 J1	2 U1	0.7 J1	0.2 J1	0.6	0.2 J1	1.7
Selenium	µg/L	0.7 J1	0.6	0.8	0.7	0.5	1.0	0.4	0.47 J1	0.97	0.48 J1	0.48 J1
Sulfate	mg/L	518	545	631	-	555	301	454	418	273	683	666
Thallium	µg/L	2 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	1,270	1,250	1,410	-	1,240	845	1,060	1,020	850	1,440	1,460 L1
pH	SU	6.81	6.81	7.14	-	6.74	6.6	7.1	6.82	6.77	7.03	6.94

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-112				
Well Classification		Nature and Extent				
Parameter	Unit	6/19/2019	5/13/2020	3/24/2021	5/19/2021	3/1/2022
Antimony	µg/L	0.1 U1	0.1 U1	0.03 J1	0.06 J1	0.03 J1
Arsenic	µg/L	0.40	0.33	0.41	0.38	0.33
Barium	µg/L	76.9	59.7	73.7	72.7	54.0
Beryllium	µg/L	0.1 U1	-	0.1 U1	0.05 U1	0.05 U1
Boron	mg/L	0.283	0.246	0.315	0.324	0.229
Cadmium	µg/L	0.05 U1	0.05 U1	0.007 J1	0.005 J1	0.007 J1
Calcium	mg/L	142	108	170	159	117
Chloride	mg/L	37.2	33.3	45.6	45.6	34.9
Chromium	µg/L	0.2 J1	0.236	0.419	0.34	0.46
Cobalt	µg/L	0.02 J1	0.02 J1	0.03 J1	0.023	0.027
Combined Radium	pCi/L	0.0507	0.08899	0.13538	0.78	0.38
Fluoride	mg/L	0.24	0.29	0.32	0.3	0.22
Lead	µg/L	0.02 J1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Lithium	mg/L	0.03 U1	0.00151	0.00180	0.00186	0.00127
Mercury	µg/L	0.005 U1	-	0.005 U1	0.005 U1	0.005 U1
Molybdenum	µg/L	11.2	5.62	9.18	8.3	5.2
Selenium	µg/L	1.5	0.9	0.7	0.85	0.69
Sulfate	mg/L	255	205	333	347	199
Thallium	µg/L	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	668	533	753	800	520
pH	SU	7.17	6.78	7.1	6.98	6.8

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detect
J1: Estimated value. Parameter was detected in concentrations below the reporti
L1: The associated laboratory control sample (LCS) or laboratory control samp
M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recove
P3: The precision on the matrix spike duplicate (MSD) was above acceptance li
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-203									
Well Classification		Nature and Extent									
Parameter	Unit	6/18/2019	9/11/2019	3/11/2020	5/13/2020	10/6/2020	3/23/2021	5/18/2021	10/27/2021	3/2/2022	5/17/2022
Antimony	µg/L	0.1 U1	0.02 J1	0.1 U1	0.1 U1	0.03 J1	0.03 J1	0.06 J1	0.1 U1	0.1 U1	0.1 U1
Arsenic	µg/L	0.30	0.33	0.25	0.29	0.28	0.29	0.27	0.25	0.21	0.26
Barium	µg/L	34.7	31.6	33.4	31.0	24.6	26.7	28.2	26.5	32.8	29.3
Beryllium	µg/L	0.1 U1	0.1 U1	0.1 U1	-	-	0.1 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	0.1 J1	0.104	-	0.094	0.085	0.090	0.077	0.085	0.089	0.093
Cadmium	µg/L	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.007 J1	0.005 J1	0.005 J1	0.006 J1	0.004 J1
Calcium	mg/L	115	106	-	103	92.3	98.1	101	95.0	114	114 M1, P3
Chloride	mg/L	31.4	10.1	-	12.6	12.5	15.6	60.8	27.2	42.0	28.8
Chromium	µg/L	0.2 J1	0.2 J1	0.217	0.204	0.360	0.211	0.19 J1	0.44	0.44	0.39
Cobalt	µg/L	0.054	0.139	0.05 J1	0.03 J1	0.107	0.04 J1	0.027	0.015 J1	0.024	0.030
Combined Radium	pCi/L	0.1139	0.381	0.824	0.4071	1.568	0.501	3.67	0.46	0.55	0.28
Fluoride	mg/L	0.22	0.22	0.25	0.28	0.32	0.32	0.29	0.28	0.28	0.28
Lead	µg/L	0.113	0.2 J1	0.1 J1	0.2 U1	0.226	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Lithium	mg/L	0.03 U1	0.00230	0.00237	0.00227	0.00205	0.00194	0.00199	0.00224	0.00224	0.00199
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
Molybdenum	µg/L	2 J1	1 J1	1 J1	1 J1	0.9 J1	1 J1	1	1.1	1.1	1.3
Selenium	µg/L	1.4	1.1	1.4	1.1	0.8	1.3	1.08	1.05	0.85	0.91
Sulfate	mg/L	86.8	65.5	-	77.1	60.0	56.2	54.8	64.1	70.9	65.9
Thallium	µg/L	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	472	435	-	434	423	353	470	380	420	390 L1
pH	SU	7.15	7.06	7.02	7.0	6.8	7.3	7.14	7.21	7.3	7.14

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-1805											
Well Classification		**Nature and Extent**											
Parameter	**Unit**	**4/10/2019**	**6/19/2019**	**9/10/2019**	**9/11/2019**	**3/10/2020**	**5/14/2020**	**10/9/2020**	**3/25/2021**	**5/19/2021**	**10/26/2021**	**3/2/2022**	**5/20/2022**
Antimony	µg/L	2.14	0.2 U1	0.07 J1	-	0.02 J1	0.03 J1	0.1 U1	0.03 J1	0.05 J1	0.04 J1	0.09 J1	0.09 J1
Arsenic	µg/L	20.3	66.3	70.4	-	11.4	56.0	80.9	74.2	69.5	37.3	19.4	10.9
Barium	µg/L	54.3	42.4	41.9	-	24.3	41.3	32.2	28.8	27.7	25.2	32.3	44.5
Beryllium	µg/L	0.5 U1	0.2 U1	0.1 U1	-	0.1 U1	-	-	0.1 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	4.24	6.38	6.00	-	-	5.74	5.11	4.67	4.46	3.43	2.96	3.13
Cadmium	µg/L	0.2 U1	0.1 U1	0.05 U1	-	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.02 U1	0.02 U1	0.02 U1	0.02 U1
Calcium	mg/L	147	280	273	-	-	254	265	225	204	111	86.9	65.6
Chloride	mg/L	146	156	-	167	-	169	131	127	124	140	151	152
Chromium	µg/L	1.00	0.2 J1	0.415	-	0.2 J1	0.1 J1	0.326	0.2 J1	0.32	0.24	0.40	0.26
Cobalt	µg/L	3.31	4.91	3.39	-	0.091	0.384	1.01	0.417	0.358	0.066	0.037	0.098
Combined Radium	pCi/L	3.12	1.412	2.7353	-	1.409	0.641	1.5	0.755	0.98	0.58	1.7	2.07
Fluoride	mg/L	0.36	0.1 J1	-	0.24	0.27	0.24	0.19	0.24	0.29	0.29	0.38	0.41
Lead	µg/L	1.21	0.2 U1	0.1 J1	-	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Lithium	mg/L	0.043	0.032	0.0426	-	0.0316	0.0422	0.0432	0.0426	0.0409	0.0347	0.0248	0.0260
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	80.1	96.2	78.0	-	10.7	42.7	50.0	43.9	41.0	10.6	5.3	3.8
Selenium	µg/L	2 U1	0.1 J1	0.1 J1	-	0.2 U1	0.1 J1	0.05 J1	0.5 U1	0.5 U1	0.5 M1, U1	0.5 U1	0.5 U1
Sulfate	mg/L	639	894	-	908	-	923	789	762	735	473	368	288
Thallium	µg/L	2 U1	1 U1	0.5 U1	-	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	1,500	1,860	-	1,880	-	1,800	1,660	1,530	1,480	1,250	1,100	1,050 L1
pH	SU	7.82	7.53	7.35	-	7.19	7.24	7.2	7.6	7.22	7.29	7.82	7.7

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-1921											
Well Classification		Nature and Extent											
Parameter	Unit	4/10/2019	6/19/2019	9/11/2019	9/13/2019	3/12/2020	5/18/2020	10/6/2020	3/23/2021	5/20/2021	10/29/2021	3/2/2022	5/18/2022
Antimony	µg/L	0.1 J1	0.10	0.1 J1	-	0.08 J1	0.11	0.11	0.14	0.16	0.09 J1	0.10	0.11
Arsenic	µg/L	3.36	1.19	1.25	-	1.21	1.12	1.18	1.61	1.59	1.22	1.14	1.25
Barium	µg/L	68.0	51.2	50.8	-	58.5	54.1	47.4	54.7	55.5	56.9	60.3	60.6
Beryllium	µg/L	0.5 U1	0.1 U1	0.1 U1	-	0.1 U1	-	-	0.02 J1	0.009 J1	0.05 U1	0.05 U1	0.25 U1
Boron	mg/L	0.571	0.644	0.647	-	-	0.751	0.577	0.654	0.585	0.563	0.647	0.727
Cadmium	µg/L	0.2 U1	0.05 U1	0.03 J1	-	0.05 U1	0.05 U1	0.05 U1	0.06	0.043	0.023	0.040	0.047
Calcium	mg/L	55.9	77.7	79.6	-	-	88.3	77.2	86.8	83.8	85.3	95.2	109
Chloride	mg/L	34.7	33.3	-	33.2	-	35.8	38.7	51.3	53.6	56.9	57.0	53.2
Chromium	µg/L	1.13	0.07 J1	0.1 J1	-	0.230	0.2 J1	0.524	0.748	0.46	0.48	0.52	0.26
Cobalt	µg/L	2.64	0.860	0.692	-	0.879	0.795	0.604	0.951	0.707	0.574	0.630	0.657
Combined Radium	pCi/L	1.678	0.276	1.228	-	3.441	1.053	0.451	0.925	0.62	1.04	0.82	1.37
Fluoride	mg/L	0.77	0.87	-	0.79	0.94	0.98	0.98	1.05	1.0	0.96	1.15	1.13
Lead	µg/L	0.944	0.06 J1	0.08 J1	-	0.217	0.385	0.2 J1	0.572	0.30	0.1 J1	0.2 U1	0.07 J1
Lithium	mg/L	0.075	0.074	0.0926	-	0.0995	0.0990	0.0870	0.0672	0.0942	0.0862	0.0892	0.0998
Mercury	µg/L	0.002 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
Molybdenum	µg/L	478	502	500	-	461	472	472	364	489	417	445	468
Selenium	µg/L	0.4 J1	0.2 J1	0.1 J1	-	0.1 J1	0.1 J1	0.1 J1	0.2	0.19 J1	0.13 J1	0.19 J1	0.26 J1
Sulfate	mg/L	106	128	-	131	-	153	127	130	137	152	163	148
Thallium	µg/L	2 U1	0.5 U1	0.5 U1	-	0.5 U1	0.5 U1	0.5 U1	0.06 J1	0.07 J1	0.05 J1	0.06 J1	0.07 J1
Total Dissolved Solids	mg/L	452	435	-	438	-	469	603	448	470	500	510	470 L1
pH	SU	7.6	8.17	7.59	-	7.36	7.36	7.2	7.8	7.72	7.6	7.75	7.77

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-1922D											
Well Classification		Nature and Extent											
Parameter	Unit	4/9/2019	6/19/2019	9/10/2019	9/11/2019	3/11/2020	5/19/2020	10/8/2020	3/25/2021	5/20/2021	10/27/2021	3/3/2022	5/23/2022
Antimony	µg/L	0.88	0.29	1.04	-	0.63	0.31	4.91	1.61	0.65	0.60	0.90	0.94
Arsenic	µg/L	323	716	839	-	1,240	522	1,040	546	494	456	478	562
Barium	µg/L	69.3	54.7	51.0	-	72.3	66.3	144	227	262	331	353	300
Beryllium	µg/L	0.5 U1	0.1 U1	0.1 U1	-	0.1 U1	-	-	0.1 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	1.00	0.725	0.440	-	-	0.310	0.131	0.098	0.085	0.071	0.082	0.131
Cadmium	µg/L	0.2 U1	0.05 U1	0.01 J1	-	0.05 U1	0.05 U1	0.05 U1	0.05 U1	0.02 U1	0.02 U1	0.005 J1	0.009 J1
Calcium	mg/L	145	121	96.5	-	-	80.0	64.5	59.8	58.7	59.5	62.4	65.0
Chloride	mg/L	53.5	44.1	-	32.7	-	28.3	19.5	18.8	18.1	17.6	17.9	20.3
Chromium	µg/L	0.4 J1	0.2 U1	0.08 J1	-	0.335	0.2 J1	0.351	0.248	0.18 J1	0.2 U1	0.39	0.25
Cobalt	µg/L	1.02	0.530	0.492	-	0.267	0.218	0.326	0.215	0.104	0.124	0.138	0.161
Combined Radium	pCi/L	2.64	3.332	3.089	-	3.28	1.816	2.815	3.232	4.45	5.33	6.28	5.55
Fluoride	mg/L	0.29	0.31	-	0.33	0.29	0.32	0.30	0.34	0.32	0.31	0.30	0.31
Lead	µg/L	0.1 J1	0.1 U1	0.2 U1	-	0.07 J1	0.2 U1	0.07 J1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Lithium	mg/L	0.02 J1	0.03 U1	0.0126	-	0.0117	0.0110	0.00747	0.00796	0.00755	0.00779	0.00712	0.00848
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	488	515	478	-	314	289	109	77.6	40.5	47.7	57.4	105
Selenium	µg/L	1 U1	0.04 J1	0.06 J1	-	0.05 J1	0.2 U1	0.2 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1
Sulfate	mg/L	333	269	-	167	-	118	47.3	34.6	25.2	22.1	22.3	40.7
Thallium	µg/L	2 U1	0.5 U1	0.5 U1	-	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	908	724	-	566	-	484	389	362	370	340	340	10,300 L1
pH	SU	7.48	7.58	7.55	-	6.91	7.04	7.1	7.6	7.36	7.35	7.53	7.17

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
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M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-1922S											
Well Classification		Nature and Extent											
Parameter	Unit	4/9/2019	6/20/2019	9/10/2019	9/11/2019	3/11/2020	5/18/2020	10/8/2020	3/25/2021	5/20/2021	10/26/2021	3/2/2022	5/23/2022
Antimony	µg/L	0.5 U1	0.2 U1	0.02 J1	-	0.1 U1	0.1 U1	0.09 J1	0.02 J1	0.05 J1	0.1 U1	0.06 J1	0.02 J1
Arsenic	µg/L	1.95	1.89	1.75	-	2.92	1.79	3.25	2.12	2.04	2.07	4.08	1.99
Barium	µg/L	30.7	26.9	26.5	-	28.0	27.4	37.7	24.3	25.8	25.4	30.7	29.2
Beryllium	µg/L	0.5 U1	0.2 U1	0.1 U1	-	0.2 U1	-	-	0.1 U1	0.05 U1	0.05 U1	0.018 J1	0.05 U1
Boron	mg/L	7.66	6.95	6.34	-	-	6.92	4.09	4.22	3.60	2.99	2.99	3.49
Cadmium	µg/L	0.2 U1	0.1 U1	0.05 U1	-	0.05 U1	0.05 U1	0.11	0.006 J1	0.012 J1	0.010 J1	0.076	0.013 J1
Calcium	mg/L	359	335	342	-	-	345	293	284	265	250	283	282
Chloride	mg/L	171	169	-	179	-	160	126	120	117	102	103	97.2
Chromium	µg/L	0.3 J1	0.2 J1	0.2 J1	-	0.220	0.2 J1	1.48	0.222	0.25	0.22	0.88	0.26
Cobalt	µg/L	1.83	1.37	1.23	-	1.31	1.52	2.88	1.12	1.14	1.02	1.63	1.00
Combined Radium	pCi/L	2.124	1.156	2.945	-	2.028	0.821	1.844	0.372	0.45	1.3	1.46	1.74
Fluoride	mg/L	0.16	0.17	-	0.19	0.1 J1	0.19	0.16	0.20	0.19	0.17	0.17	0.16
Lead	µg/L	0.3 J1	0.08 J1	0.1 J1	-	0.2 J1	0.06 J1	1.57	0.06 J1	0.22	0.14 J1	0.88	0.09 J1
Lithium	mg/L	0.082	0.03 J1	0.0556	-	0.0615	0.0611	0.0551	0.0484	0.0520	0.0477	0.0409	0.0455
Mercury	µg/L	0.005 U1	0.005 U1	0.005 U1	-	0.005 U1	-	0.002 J1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1
Molybdenum	µg/L	43.5	36.4	33.9	-	32.4	34.3	30.7	29.4	31.1	27.4	31.8	31.0
Selenium	µg/L	1 U1	0.07 J1	0.08 J1	-	0.09 J1	0.1 J1	0.3	0.5 U1	0.11 J1	0.5 U1	0.14 J1	0.1 J1
Sulfate	mg/L	978	1,020	-	1,070	-	1,060	842	832	828	721	752	723
Thallium	µg/L	2 U1	1 U1	0.5 U1	-	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.05 J1	0.2 U1	0.04 J1	0.2 U1
Total Dissolved Solids	mg/L	2,090	2,090	-	2,060	-	1,920	1,750	1,630	1,660	1,460	1,430	1,450 L1
pH	SU	7.22	7.36	7.27	-	6.87	6.92	7.1	7.4	7.15	7.17	7.32	6.98

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
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J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-1923										
Well Classification		**Nature and Extent**										
Parameter	**Unit**	**4/10/2019**	**6/18/2019**	**9/11/2019**	**3/12/2020**	**5/14/2020**	**10/6/2020**	**3/24/2021**	**5/20/2021**	**10/28/2021**	**3/2/2022**	**5/19/2022**
Antimony	µg/L	0.2 J1	0.21	0.24	0.15	0.23	0.18	0.21	0.23	0.23	0.16	0.21
Arsenic	µg/L	0.55	0.56	0.75	0.58	0.69	0.62	0.52	1.14	1.66	0.78	0.85
Barium	µg/L	77.6	72.9	86.6	73.3	79.8	86.4	95.1	98.1	103 M1, P3	99.9	95.5
Beryllium	µg/L	0.5 U1	0.1 U1	0.1 U1	0.1 U1	-	-	0.1 U1	0.041 J1	0.064	0.017 J1	0.015 J1
Boron	mg/L	1.09	0.804	0.756	-	0.770	1.19	1.17	1.27	1.30	1.23	1.34
Cadmium	µg/L	0.2 U1	0.01 J1	0.03 J1	0.02 J1	0.02 J1	0.01 J1	0.01 J1	0.033	0.053	0.036	0.049
Calcium	mg/L	113	91.4	105	-	103	117	123	119	117	131	128 M1, P3
Chloride	mg/L	38.0	35.9	38.3	-	33.1	34.2	33.1	32.8	32.4	34.3	31.4
Chromium	µg/L	0.3 J1	0.353	0.541	0.903	0.484	2.13	0.715	1.12	2.26	0.68	0.64
Cobalt	µg/L	0.317	0.657	1.01	0.622	0.814	0.747	0.370	1.84	2.65	0.780	0.865
Combined Radium	pCi/L	0.706	0.836	2.099	0.935	0.48	1.241	0.778	1.36	0.9	0.76	0.91
Fluoride	mg/L	0.16	0.16	0.13	0.18	0.21	0.27	0.23	0.23	0.26	0.25	0.24
Lead	µg/L	0.1 J1	0.255	0.543	0.302	0.354	0.434	0.09 J1	1.16	1.98	0.50	0.58
Lithium	mg/L	0.223	0.135	0.137	0.115	0.109	0.177	0.135	0.207	0.182	0.197	0.187 M1
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	0.005 U1
Molybdenum	µg/L	160	101	84.2	70.1	70.9	98.0	308	344	319 M1, P3	353	334 P3
Selenium	µg/L	23.8	14.4	14.0	5.2	4.1	17.8	38.7	14.1	7.59	9.47	28.0
Sulfate	mg/L	181	147	159	-	150	253	260	220	224	251	239
Thallium	µg/L	2 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	584	526	545	-	525	329	610	630	610	600	600 L1
pH	SU	7.61	7.31	6.82	-	7.26	7.2	7.6	7.44	7.42	7.47	7.21

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-1924										
Well Classification		Nature and Extent										
Parameter	Unit	4/10/2019	6/18/2019	9/11/2019	3/12/2020	5/14/2020	10/5/2020	3/24/2021	5/20/2021	10/28/2021	3/7/2022	5/19/2022
Antimony	µg/L	0.2 J1	0.06 J1	0.07 J1	0.09 J1	0.06 J1	0.09 J1	0.07 J1	0.06 J1	0.07 J1	0.05 J1	0.11
Arsenic	µg/L	0.91	0.55	0.61	0.72	0.66	1.30	1.18	0.56	0.57	0.64	0.54
Barium	µg/L	59.8	69.5	54.5	46.7	54.5	55.3	44.7	42.9	37.7	37.6	34.3
Beryllium	µg/L	0.5 U1	0.1 U1	0.1 U1	0.5 U1	-	-	0.03 J1	0.009 J1	0.05 U1	0.008 J1	0.1 U1
Boron	mg/L	7.49	6.22	4.89	-	5.28	5.27	5.07	6.17	5.78 M1	2.29	1.39
Cadmium	µg/L	0.2 J1	0.05	0.06	0.06	0.06	0.09	0.07	0.068	0.065	0.056	0.051
Calcium	mg/L	286	243	238	-	314	301	288	264	214	173	158
Chloride	mg/L	136	122	109	-	145	159	131	146	144	74.8	39.1
Chromium	µg/L	0.3 J1	0.1 J1	0.2 J1	0.324	0.784	1.64	1.04	0.59	0.37	0.32	0.39
Cobalt	µg/L	2.29	2.74	4.10	6.80	3.10	10.3	3.26	2.15	2.93	2.86	1.74
Combined Radium	pCi/L	0.921	1.417	1.719	0.974	1.785	1.013	0.956	1.3	1.23	1.22	0.71
Fluoride	mg/L	0.42	0.38	0.44	0.44	0.47	0.40	0.53	0.51	0.52	0.57	0.55
Lead	µg/L	0.3 J1	0.07 J1	0.218	0.394	0.229	1.14	0.905	0.13 J1	0.1 J1	0.22	0.05 J1
Lithium	mg/L	0.133	0.087	0.102	0.130	0.104	0.113	0.0668	0.0964	0.0877 M1	0.0645	0.0594
Mercury	µg/L	0.005 U1	0.005 U1	0.005 U1	0.005 U1	-	0.003 J1	0.005 U1	0.005 U1	0.005 U1	0.005 U1	0.005 U1
Molybdenum	µg/L	89.5	69.0	76.7	92.0	77.6	82.7	87.1	112	134	113	100
Selenium	µg/L	1.3	3.6	3.5	1.1	1.1	0.9	2.5	0.74	0.50	0.48 J1	1.26
Sulfate	mg/L	766	721	662	-	817	851	800	830	663	483	291
Thallium	µg/L	2 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	1,700	1,570	1,500	-	1,730	1,840	1,660	1,720	1,490	1,120	790 L1
pH	SU	6.91	7.33	7.09	7.09	6.96	7.1	7.6	7.28	7.3	7.47	7.18

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-1925										
Well Classification		**Nature and Extent**										
Parameter	**Unit**	**4/10/2019**	**6/19/2019**	**9/10/2019**	**3/11/2020**	**5/14/2020**	**10/6/2020**	**3/23/2021**	**5/19/2021**	**10/28/2021**	**3/2/2022**	**5/18/2022**
Antimony	µg/L	0.2 J1	0.18	0.20	0.16	0.19	0.20	0.21	0.27	0.20	0.20	0.21
Arsenic	µg/L	0.88	0.35	0.41	0.37	0.32	0.56	0.53	0.52	0.28	0.28	0.39
Barium	µg/L	46.6	48.0	45.0	40.4	36.8	39.5	39.7	38.3	33.9	38.5	42.1
Beryllium	µg/L	0.5 U1	0.1 U1	0.1 U1	0.1 U1	-	-	0.1 U1	0.008 J1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	4.17	5.21	5.86	-	4.91	4.31	3.13	4.26	4.28	3.33	2.90
Cadmium	µg/L	0.06 J1	0.04 J1	0.06	0.05 J1	0.04 J1	0.04 J1	0.05 J1	0.067	0.037	0.047	0.057
Calcium	mg/L	172	242	249	-	205	211	223	183	166 M1	177	188
Chloride	mg/L	128	147	147	-	119	122	106	90.2	88.3	80.0	125
Chromium	µg/L	0.4 J1	0.1 J1	0.1 J1	0.1 J1	0.08 J1	0.428	0.311	0.47	0.40	0.37	0.29
Cobalt	µg/L	1.65	1.28	1.27	1.21	1.07	1.07	1.03	1.18	0.996	1.06	1.48
Combined Radium	pCi/L	2.726	1.245	1.041	1.59	0.91	0.2096	2.076	1.07	1.96	0.77	1.28
Fluoride	mg/L	0.33	0.25	0.26	0.24	0.34	0.29	0.33	0.31	0.31	0.29	0.26
Lead	µg/L	0.4 J1	0.04 J1	0.2 J1	0.2 U1	0.2 U1	0.09 J1	0.06 J1	0.17 J1	0.2 U1	0.2 U1	0.08 J1
Lithium	mg/L	0.094	0.095	0.0947	0.0926	0.0853	0.0776	0.0517	0.0714	0.0621	0.0662	0.0761
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	76.0	63.5	54.6	56.2	57.9	45.8	47.8	46.1	52.3	48.2	43.4
Selenium	µg/L	6.2	6.3	4.1	2.9	4.8	5.4	4.4	4.41	2.96	3.26	2.51
Sulfate	mg/L	624	686	683	-	565	548	521	495	421	453	446
Thallium	µg/L	2 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	1,460	1,520	1,500	-	1,250	372	1,180	1,130	1,040	1,040	1,090 L1
pH	SU	7.2	7.62	7.18	7.04	7.04	6.8	7.3	7.11	7.13	7.18	7.2

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-1926											
Well Classification		Nature and Extent											
Parameter	Unit	4/10/2019	6/20/2019	9/11/2019	9/13/2019	3/11/2020	5/18/2020	10/8/2020	3/22/2021	5/20/2021	10/28/2021	3/8/2022	5/19/2022
Antimony	µg/L	0.1 J1	0.08 J1	0.07 J1	-	0.03 J1	0.08 J1	0.05 J1	0.06 J1	0.1	0.05 J1	0.05 J1	0.07 J1
Arsenic	µg/L	0.95	0.38	0.37	-	0.33	0.36	0.32	0.33	0.31	0.31	0.30	0.34
Barium	µg/L	28.8	22.9	23.9	-	20.3	23.7	20.0	20.8	19.1	22.0	20.2	20.0
Beryllium	µg/L	0.5 U1	0.1 U1	0.1 U1	-	0.1 U1	-	-	0.1 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	0.263	0.165	0.145	-	-	0.146	0.121	0.121	0.132	0.110	0.116	0.127
Cadmium	µg/L	0.06 J1	0.05	0.06	-	0.04 J1	0.05	0.05 J1	0.04 J1	0.035	0.039	0.035	0.033
Calcium	mg/L	95.4	82.1	87.6	-	-	95.3	87.2	89.1	78.0	103	90.9	91.7
Chloride	mg/L	57.8	23.2	-	8.57	-	7.86	3.49	4.15	3.86	3.17	3.11	3.58
Chromium	µg/L	0.4 J1	0.06 J1	0.09 J1	-	0.206	0.2 J1	0.323	0.294	0.62	0.37	0.38	0.55
Cobalt	µg/L	5.05	1.81	1.17	-	1.08	1.42	1.03	0.953	0.925	0.475	0.889	1.14
Combined Radium	pCi/L	1.327	0.524	0.4608	-	1.316	0.3552	0.379	0.9312	0.35	0.46	0.82	0.57
Fluoride	mg/L	0.25	0.28	-	0.24	0.28	0.29	0.26	0.30	0.28	0.25	0.24	0.24
Lead	µg/L	0.981	0.05 J1	0.07 J1	-	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1	0.06 J1	0.2 U1	0.2 U1
Lithium	mg/L	0.01 J1	0.03 U1	0.00624	-	0.00675	0.00744	0.00575	0.00585	0.00586	0.00673	0.00667	0.00658
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	9 J1	7.05	5.38	-	6.16	5.72	5.04	4.52	4.7	4.1	4.4	4.9
Selenium	µg/L	0.3 J1	0.3	0.4	-	0.2	0.3	1.0	0.7	0.59	0.73	0.60	0.46 J1
Sulfate	mg/L	67.4	47.8	-	26.4	-	28.5	30.0	32.2	29.6	35.1	40.4	29.5
Thallium	µg/L	2 U1	0.5 U1	0.5 U1	-	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.09 J1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	506	416	-	396	-	354	351	357	360	410	380	340 L1
pH	SU	7.24	7.31	7.25	-	7.04	7.0	7.0	7.4	7.01	7.01	7.35	7.15

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		MW-1927											
Well Classification		Nature and Extent											
Parameter	Unit	4/10/2019	6/20/2019	9/11/2019	9/13/2019	3/11/2020	5/14/2020	10/9/2020	3/24/2021	5/20/2021	10/27/2021	3/2/2022	5/20/2022
Antimony	µg/L	0.3 J1	0.15	0.12	-	0.09 J1	0.14	0.12	0.09 J1	0.15	0.07 J1	0.11	0.1
Arsenic	µg/L	0.4 J1	0.28	0.27	-	0.29	0.29	0.44	0.25	0.22	0.23	0.28	0.28
Barium	µg/L	63.4	61.5	58.7	-	56.2	54.4	51.3	57.1	56.5	53.4	55.5	59.6
Beryllium	µg/L	0.5 U1	0.1 U1	0.1 U1	-	0.1 U1	-	-	0.1 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	0.654	0.513	0.498	-	-	0.501	0.429	0.431	0.420	0.416	0.390	0.443
Cadmium	µg/L	0.2 U1	0.05 J1	0.05	-	0.06	0.06	0.07	0.07	0.055	0.067	0.098	0.072
Calcium	mg/L	151	159	143	-	-	143	155	154	155	151	170	171
Chloride	mg/L	20.3	15.6	-	15.2	-	12.9	11.8	12.2	11.6	11.4	13.2	13.0
Chromium	µg/L	1 U1	0.1 J1	0.08 J1	-	0.1 J1	0.1 J1	0.763	0.256	0.25	0.1 J1	0.36	0.35
Cobalt	µg/L	0.319	0.251	0.225	-	0.319	0.434	0.602	0.255	0.264	0.331	0.791	0.522
Combined Radium	pCi/L	1.533	0.866	1.415	-	0.765	1.19	1.371	0.918	1	1.2	1.6	1.58
Fluoride	mg/L	0.18	0.13	-	0.14	0.14	0.17	0.14	0.18	0.17	0.16	0.15	0.15
Lead	µg/L	0.1 J1	0.03 J1	0.2 U1	-	0.2 U1	0.08 J1	0.441	0.2 U1	0.2 U1	0.2 U1	0.18 J1	0.17 J1
Lithium	mg/L	0.03 J1	0.03 U1	0.00638	-	0.00723	0.00725	0.00598	0.00612	0.00594	0.00631	0.00594	0.00603
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	7 J1	2.82	2 J1	-	2 J1	2 J1	2 J1	1 J1	1.1	1.1	1.1	1.2
Selenium	µg/L	0.8 J1	0.3	0.4	-	0.2 J1	0.1 J1	0.3	0.9	1.39	0.98	1.70	1.36
Sulfate	mg/L	327	335	-	306	-	290	277	294	284	264	322	293
Thallium	µg/L	2 U1	0.5 U1	0.5 U1	-	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	898	849	-	839	-	807	741	762	770	770	830	800 L1
pH	SU	7.25	7.82	6.96	-	6.88	6.82	6.9	7.3	7.03	7.04	7.2	6.9

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Well ID		MW-1929										
Well Classification		Sentinel										
Parameter	Unit	4/10/2019	6/18/2019	9/10/2019	3/10/2020	5/13/2020	10/9/2020	3/23/2021	5/18/2021	10/27/2021	3/1/2022	5/17/2022
Antimony	µg/L	0.5 U1	0.02 J1	0.03 J1	0.1 U1	0.04 J1	0.02 J1	0.04 J1	0.05 J1	0.02 J1	0.03 J1	0.02 J1
Arsenic	µg/L	0.80	0.37	0.47	0.41	0.79	0.41	0.46	0.47	0.33	0.32	0.35
Barium	µg/L	56.9	47.6	52.1	43.8	52.1	44.6	45.9	51.9	45.4	48.3	47.8
Beryllium	µg/L	0.5 U1	0.1 U1	0.1 U1	0.1 U1	-	-	0.1 U1	0.05 U1	0.05 U1	0.05 U1	0.05 U1
Boron	mg/L	0.243	0.219	0.236	-	0.189	0.218	0.183	0.182	0.248	0.155	0.179
Cadmium	µg/L	0.2 U1	0.02 J1	0.01 J1	0.05 U1	0.04 J1	0.01 J1	0.02 J1	0.017 J1	0.005 J1	0.009 J1	0.01 J1
Calcium	mg/L	115	97.8	113	-	98.0	104	103	111	112	116	122
Chloride	mg/L	11.7	13.6	15.1	-	10.7	10.7	9.16	8.60	8.13	18.9	14.3
Chromium	µg/L	0.5 J1	0.2 J1	0.280	0.529	0.584	0.416	0.639	0.40	0.51	0.40	0.43
Cobalt	µg/L	3.03	0.157	0.606	0.214	1.81	0.363	0.638	0.437	0.182	0.160	0.133
Combined Radium	pCi/L	0.823	0.398	2.994	0.478	0.88	0.988	1.373	1.17	3.24	0.8	1
Fluoride	mg/L	0.19	0.20	0.19	0.23	0.23	0.22	0.27	0.23	0.25	0.20	0.20
Lead	µg/L	1.15	0.08 J1	0.274	0.1 J1	0.870	0.2 J1	0.355	0.21	0.1 J1	0.08 J1	0.06 J1
Lithium	mg/L	0.01 J1	0.03 U1	0.00480	0.00382	0.00416	0.00430	0.00352	0.00363	0.00463	0.00331	0.00368
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	10 U1	0.7 J1	0.7 J1	0.5 J1	0.6 J1	0.6 J1	0.6 J1	0.5	0.8	0.3 J1	0.3 J1
Selenium	µg/L	1.3	1.3	1.7	0.9	1.1	1.8	1.6	0.89	2.08	0.92	1.07
Sulfate	mg/L	214	237	234	-	176	198	179	163	202	191	185
Thallium	µg/L	2 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	574	541	528	-	461	508	484	510	520	480	480 L1
pH	SU	7.48	7.51	7.64	7.22	7.24	7.2	7.6	7.2	7.26	7.29	7.28

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 2 - Groundwater Data Summary - Nature and Extent and Sentinel Wells
Mountaineer Plant - Bottom Ash Pond

Well ID		JTMN-1					JTMN-2				
Well Classification		Nature and Extent					Nature and Extent				
Parameter	Unit	3/31/2021	5/20/2021	10/27/2021	3/3/2022	5/24/2022	3/31/2021	5/20/2021	10/28/2021	3/3/2022	5/24/2022
Antimony	µg/L	0.1 J1	0.14	0.08 J1	0.04 J1	0.07 J1	0.06 J1	0.14	0.05 J1	0.05 J1	0.06 J1
Arsenic	µg/L	2.16	1.46	2.52	0.88	2.02	1.09	0.83	0.79	1.08	0.94
Barium	µg/L	89.1	84.6	85.9	67.1	94.7	87.1	90.6	68.3	91.5	71.3
Beryllium	µg/L	0.07 J1	0.032 J1	0.063	0.015 J1	0.041 J1	0.03 J1	0.019 J1	0.021 J1	0.029 J1	0.019 J1
Boron	mg/L	0.295	0.249	0.335	0.266	0.302	0.378	0.289	0.407	0.230	0.364
Cadmium	µg/L	0.03 J1	0.114	0.029	0.021	0.028	0.04 J1	0.052	0.036	0.031	0.014 J1
Calcium	mg/L	149	142	164	172	188	178	142	185	165	182
Chloride	mg/L	42.3	37.6	50.4	47.2	46.9	54.0	35.0	59.3	43.2	48.2
Chromium	µg/L	2.82	1.36	1.72	0.88	1.48	1.27	0.67	0.86	1.52	0.89
Cobalt	µg/L	2.07	1.31	2.77	0.674	1.95	1.24	0.826	0.928	0.938	0.688
Combined Radium	pCi/L	0.686	0.65	0.84	1.25	0.68	0.27	0.42	3.42	1.12	0.37
Fluoride	mg/L	0.31	0.26	0.34	0.29	0.29	0.36	0.26	0.41	0.22	0.41
Lead	µg/L	2.13	1.28	2.36	0.59	1.78	0.775	0.66	0.58	0.79	0.58
Lithium	mg/L	0.00594	0.00370	0.0127	0.00948	0.0113	0.0151	0.00934	0.0225	0.00586	0.0208
Mercury	µg/L	0.003 J1	0.005 U1	0.003 J1	0.005 U1	0.003 J1	0.005 U1	0.005 U1	0.005 U1	0.002 J1	0.004 J1
Molybdenum	µg/L	6.59	3.2	17.1	13.0	15.0	20.0	10.7	30.8	5.5	33.2
Selenium	µg/L	0.7	1.19	0.50	0.89	1.33	0.6	1.05	0.36 J1	0.96	0.81
Sulfate	mg/L	255	217	342	294	304	392	186	420	262	304
Thallium	µg/L	0.5 U1	0.2 U1	0.04 J1	0.2 U1	0.2 U1	0.5 U1	0.2 U1	0.2 U1	0.2 U1	0.2 U1
Total Dissolved Solids	mg/L	716	670	840	740	780 L1	862	690	940	700	770 L1
pH	SU	7.2	6.69	7.02	7.21	7.26	7.2	6.57	7.16	7.12	7.54

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.
J1: Estimated value. Parameter was detected in concentrations below the reporting limit.
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.
P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.
-: Not analyzed

Table 3 - Appendix IV Groundwater Protection Standards
Mountaineer Plant - Bottom Ash Pond

Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600		0.000150	0.00600
Arsenic, Total (mg/L)	0.0100		0.000732	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		0.000738	0.100
Cobalt, Total (mg/L)	n/a	0.00600	0.000654	0.00600
Combined Radium, Total (pCi/L)	5.00		2.24	5.00
Fluoride, Total (mg/L)	4.00		0.303	4.00
Lead, Total (mg/L)	n/a	0.0150	0.000454	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	0.00287	0.100
Selenium, Total (mg/L)	0.0500		0.00430	0.0500
Thallium, Total (mg/L)	0.00200		0.000200	0.00200

Notes:
MCL: Maximum Contaminant Level
CCR: Coal Combustion Residual
GWPS: Groundwater Protection Standard
Calculated UTL (Upper Tolerance Limit) represents site-specific background values.

Table 4 - Appendix III Data 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
			5/23/2022	5/23/2022	5/24/2022	5/24/2022	5/24/2022	5/24/2022	5/25/2022	5/25/2022
Boron	mg/L	Interwell Background Value (UPL)	0.546							
		Analytical Result	**2.73**	**2.59**	**3.98**	**4.17**	**4.90**	**3.61**	**5.04**	**3.37**
Calcium	mg/L	Interwell Background Value (UPL)	187							
		Analytical Result	**192**	**270**	**220**	178	**207**	156	**201**	169
Chloride	mg/L	Interwell Background Value (UPL)	61.0							
		Analytical Result	31.9	**98.0**	**104**	**66.0**	**131**	**124**	**158**	**143**
Fluoride	mg/L	Interwell Background Value (UPL)	0.301							
		Analytical Result	0.07	0.26	0.20	0.27	0.26	**0.39**	**0.49**	0.21
pH	SU	Intrawell Background Value (UPL)	7.9	7.7	7.9	7.8	7.9	7.9	8.1	7.9
		Intrawell Background Value (LPL)	6.4	6.6	6.8	6.7	6.8	6.2	6.9	6.9
		Analytical Result	6.8	6.9	7.0	6.9	6.9	6.9	7.6	7.1
Sulfate	mg/L	Interwell Background Value (UPL)	539							
		Analytical Result	5.20	**634**	**615**	**547**	**581**	485	**604**	339
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	967							
		Analytical Result	260	**1,300**	**2,610**	**1,130**	**1,280**	**1,150**	**1,480**	**1,130**

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

ATTACHMENT A

Certification by Qualified Professional Engineer

Certification by Qualified Professional Engineer

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

DAVID ANTHONY MILLER
REGISTERED
22663
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

DAVID ANTHONY MILLER
Printed Name of Licensed Professional Engineer

David Anthony Miller
Signature

22663	WEST VIRGINIA	09.15.22
License Number	Licensing State	Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS
CONSULTING

September 1, 2022

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

Re: Mountaineer Bottom Ash Pond
Assessment Monitoring and Corrective Action Summary – March & May 2022

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 2022 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.

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 Dr. Jim Loftis, Civil & Environmental Engineering professor emeritus at Colorado State University and Senior Advisor to Groundwater Stats Consulting, and Kristina Rayner, Senior Statistician and Founder of Groundwater Stats Consulting.

The CCR program consists of the following constituents:

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

Time series and box plots for Appendix IV parameters are provided for all wells and constituents; and are used to evaluate concentrations over the entire record (Figures A and B, respectively). 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.

Summary of Statistical Methods – Appendix IV Parameters

Interwell upper tolerance limits, UTL's, are used to establish background limits for both Assessment Monitoring and Corrective Action Monitoring. A Ground Water 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 in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for non-detects is the most recent practical quantification limit (PQL) as reported by the laboratory.
- When data contain between 15-50% non-detects, the Kaplan-Meier non-detect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric tolerance limits are used on data containing greater than 50% non-detects.

Summary of Background Update – Conducted in January 2022

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 January 2022 update, Tukey's outlier test on pooled upgradient well data did not identify any outliers; therefore, no new values were flagged. Additionally, no new values were flagged among downgradient wells.

Note that during the March/May 2022 analysis, a previously flagged high value of molybdenum in well MW-1604S was unflagged due to the observation being lower than present-day groundwater quality conditions.

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 for the 12/19/2016 to 12/21/2016 sampling 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 occur for the same sampling 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 2021 statistical analysis using data through October 2021 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 during the Fall 2022 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 – March & May 2022

Assessment Monitoring

Confidence intervals were then constructed for downgradient, nature and extent, and sentinel wells for each of the Appendix IV parameters using data through May 2022 (Figure F). 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. Confidence interval exceedances were identified for the following well/constituent pairs:

- Arsenic: MW-1805 and MW-1922D
- Lithium: MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, MW-1607S, MW-1921, MW-1922S, MW-1923, MW-1924, and MW-1925
- Molybdenum: MW-1921

Note that exceedances for arsenic and molybdenum 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

During 2022, Mountaineer BAP entered Corrective Action protocols for lithium due to previously identified SSLs. Additionally, the nature and extent and sentinel wells identified above with SSLs for lithium were placed into Corrective Action. Confidence intervals were constructed using data through May 2022 for this constituent at downgradient, nature and extent, and sentinel wells (Figure G) and are the same as the confidence intervals for assessment monitoring. These confidence intervals are then compared to the same GWPS used in Assessment Monitoring to assess 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 using confidence intervals during the Monitoring and Natural Attenuation program. However, in future analyses lithium will 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-1921, MW-1922S, MW-1923, MW-1924, and MW-1925

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 T. Collins
Project Manager

Kristina Rayner

Kristina L. Rayner
Senior Statistician

100% Non-Detects

Analysis Run 8/26/2022 9:25 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

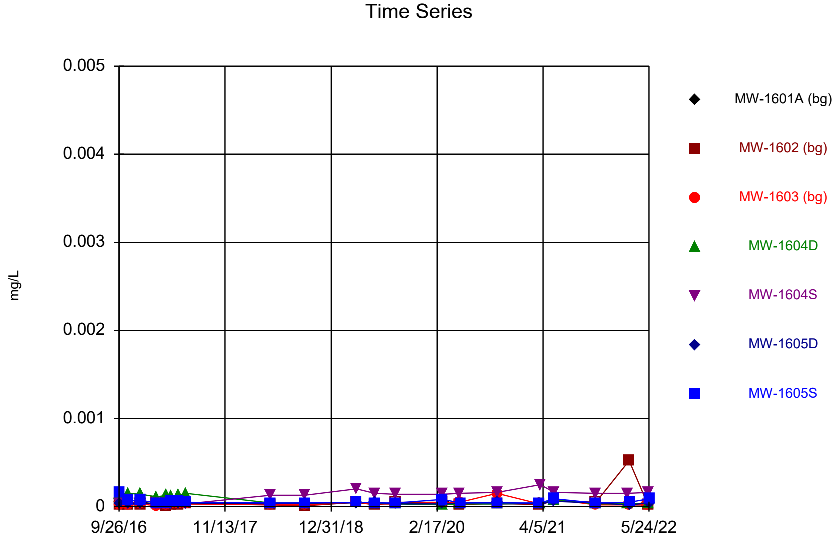
Beryllium, total (mg/L)
MW-1604D, MW-1605D, MW-107, MW-112, MW-1805, MW-1926, MW-1927, MW-1929, MW-203, MW-1922D

Cadmium, total (mg/L)
MW-1805

Mercury, total (mg/L)
MW-107, MW-112, MW-1805, MW-1925, MW-1926, MW-1927, MW-1929, MW-203, MW-016, MW-1922D

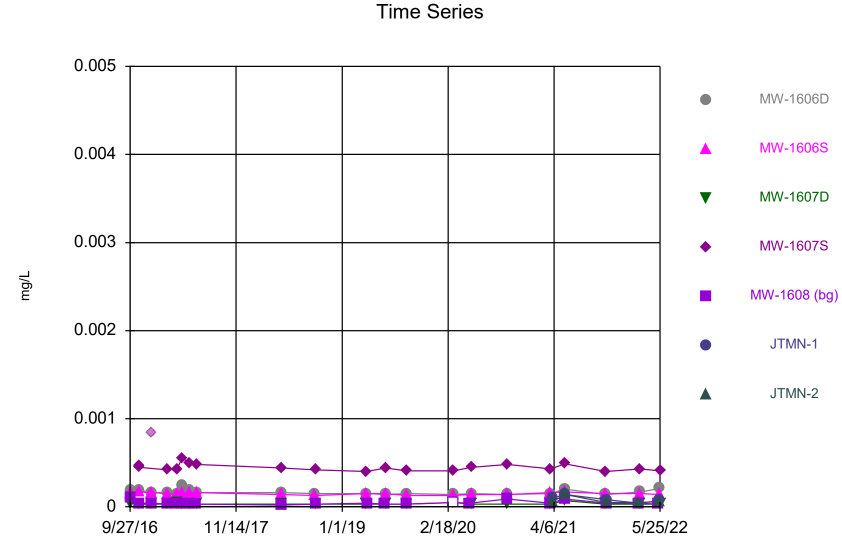
Thallium, total (mg/L)
JTMN-2, MW-107, MW-112, MW-1805, MW-1923, MW-1924, MW-1925, MW-1927, MW-1929, MW-203, MW-016, MW-1922D

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



Constituent: Antimony, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



Constituent: Antimony, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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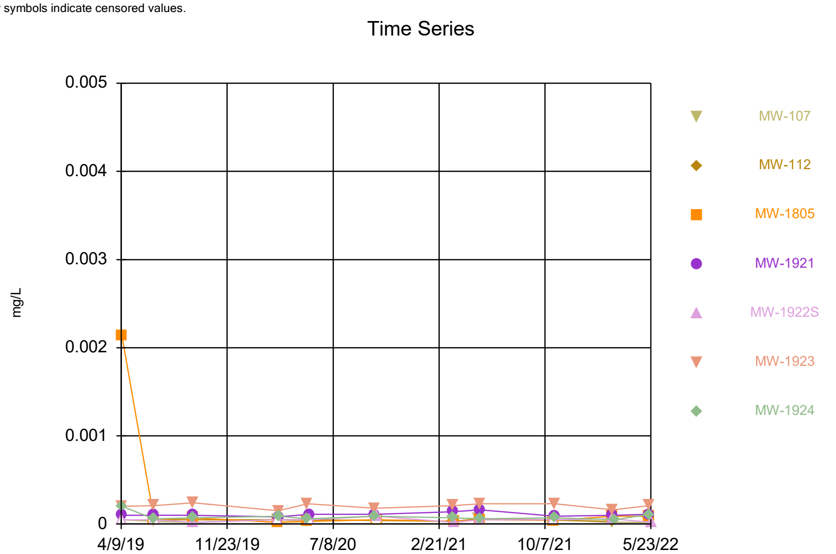
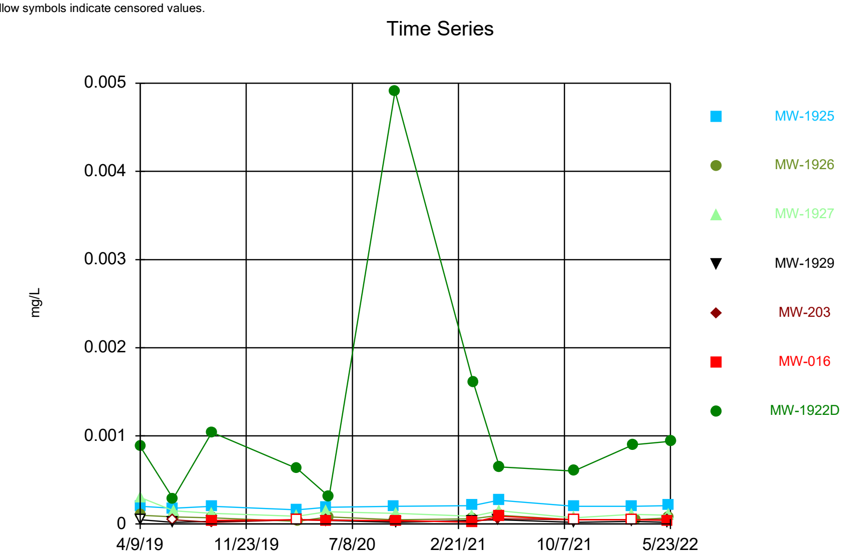
Hollow symbols indicate censored values.



Constituent: Antimony, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



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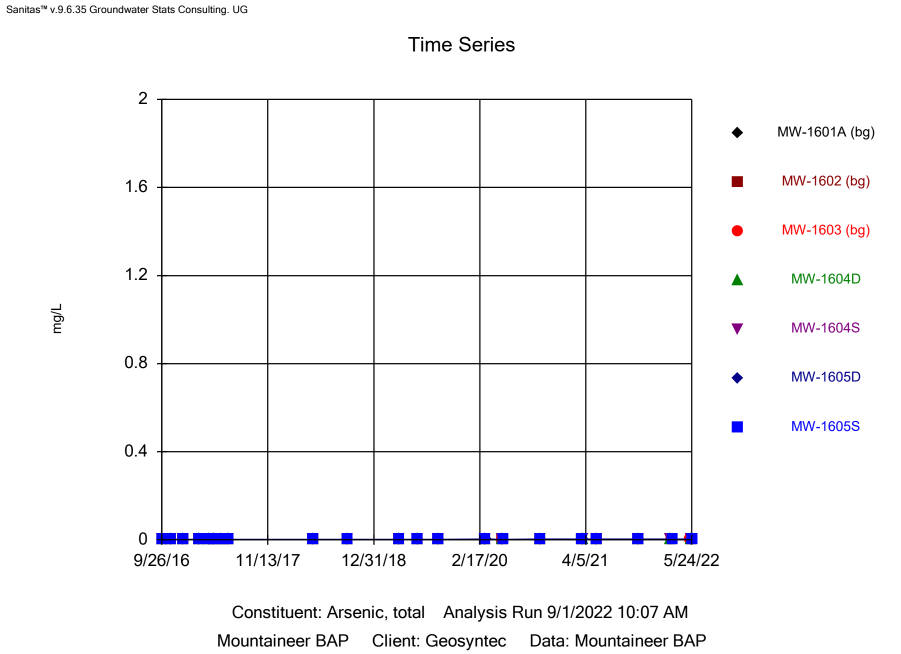
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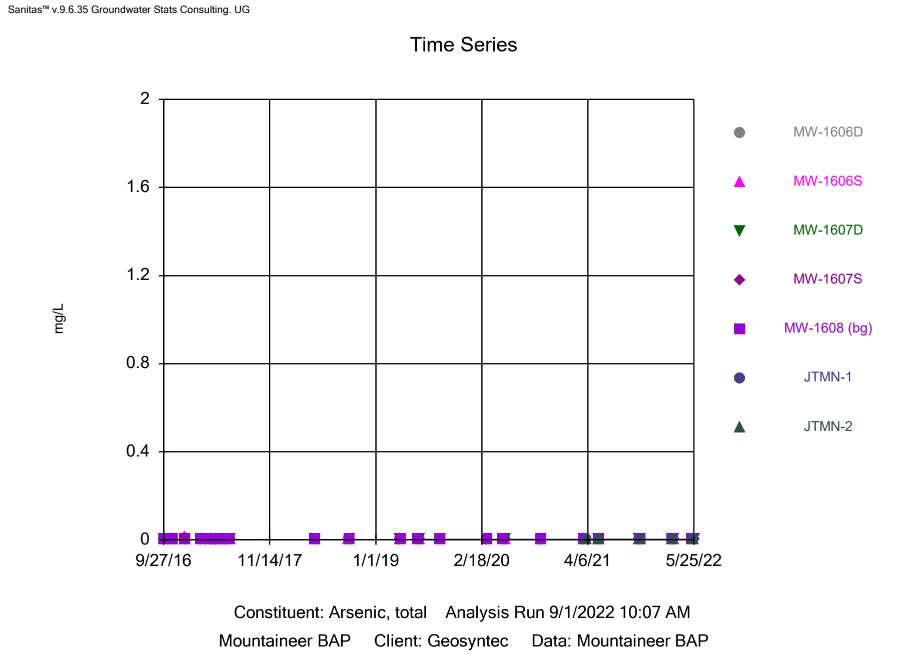
Time Series
mg/L
2
1.6
1.2
0.8
0.4
0
9/26/16
11/13/17
12/31/18
2/17/20
4/5/21
5/24/22
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
MW-1605S
Constituent: Arsenic, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP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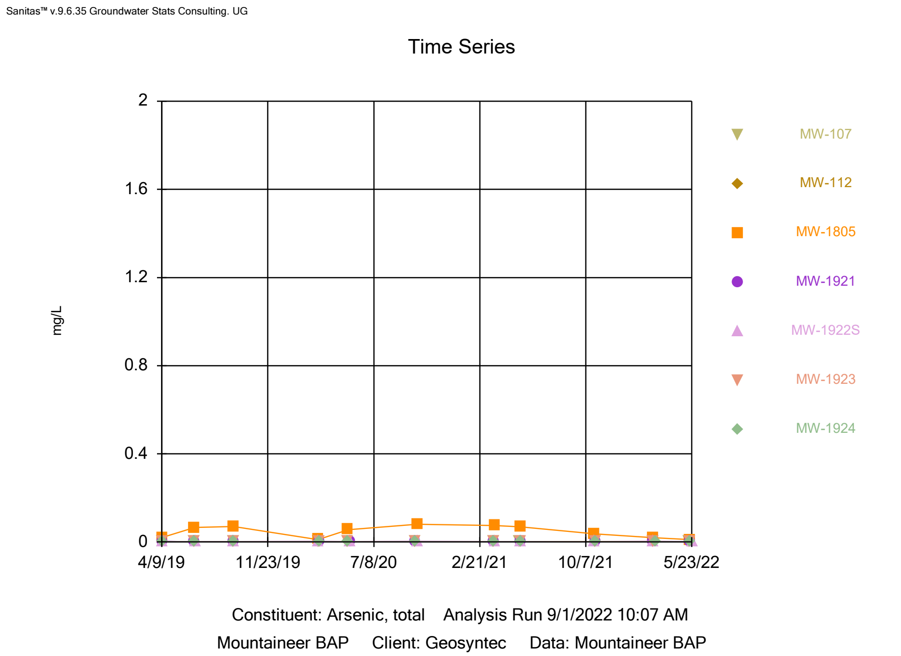
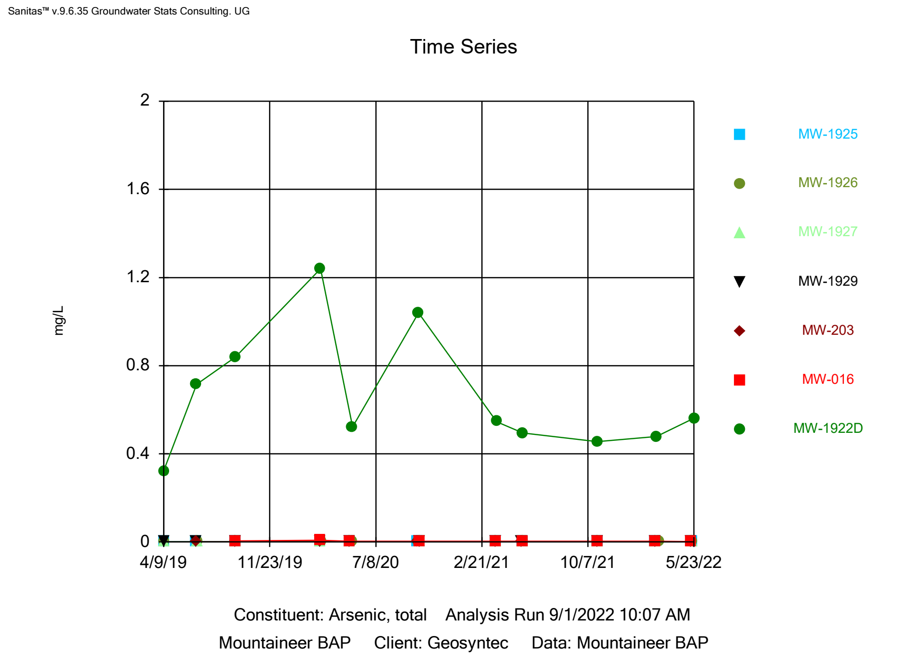
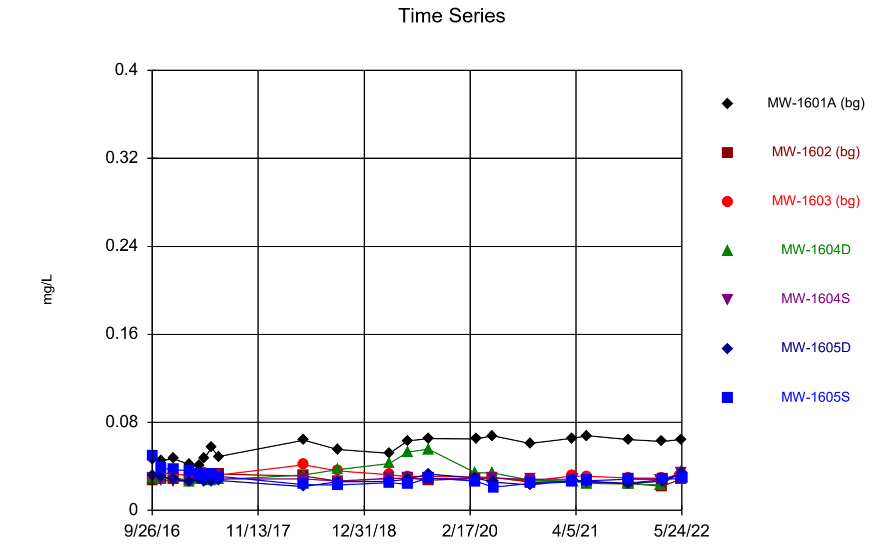
Time Series
mg/L
2
1.6
1.2
0.8
0.4
0
9/27/16
11/14/17
1/1/19
2/18/20
4/6/21
5/25/22
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
JTMN-1
JTMN-2
Constituent: Arsenic, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Time Series
mg/L
2
1.6
1.2
0.8
0.4
0
4/9/19
11/23/19
7/8/20
2/21/21
10/7/21
5/23/22
MW-107
MW-112
MW-1805
MW-1921
MW-1922S
MW-1923
MW-1924
Constituent: Arsenic, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Time Series
mg/L
2
1.6
1.2
0.8
0.4
0
4/9/19
11/23/19
7/8/20
2/21/21
10/7/21
5/23/22
MW-1925
MW-1926
MW-1927
MW-1929
MW-203
MW-016
MW-1922D
Constituent: Arsenic, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Constituent: Barium, total Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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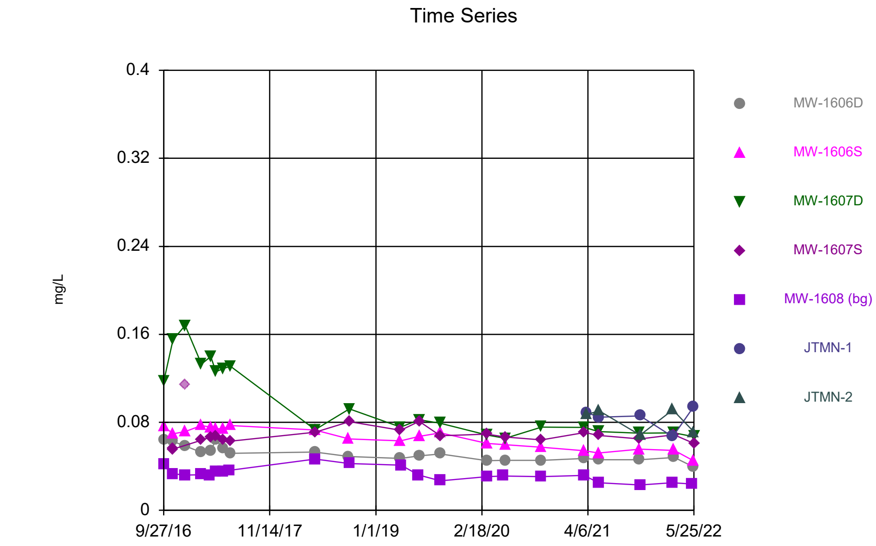

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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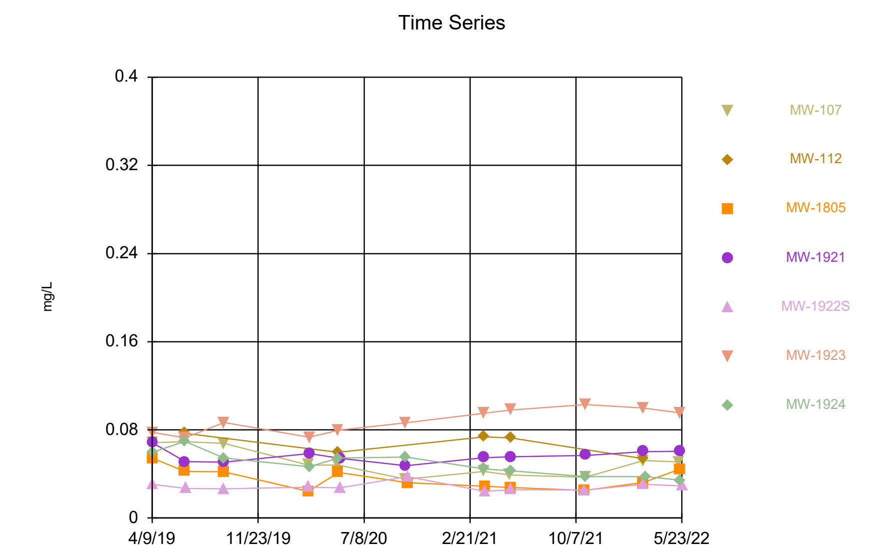

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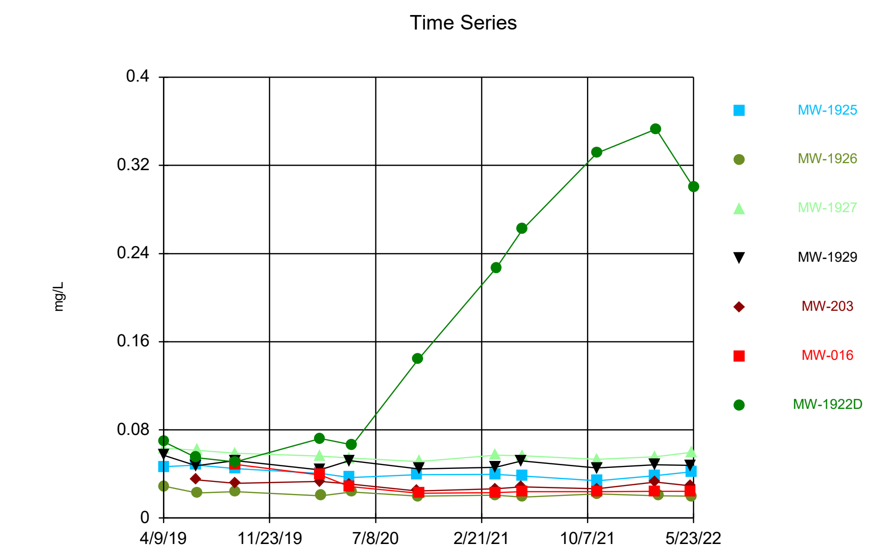

Constituent: Barium, total Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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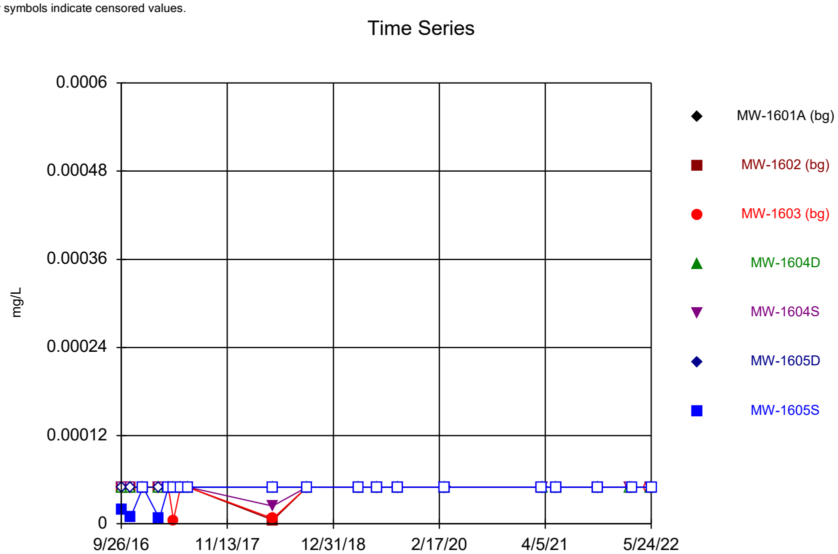
Hollow symbols indicate censored values.



Constituent: Beryllium, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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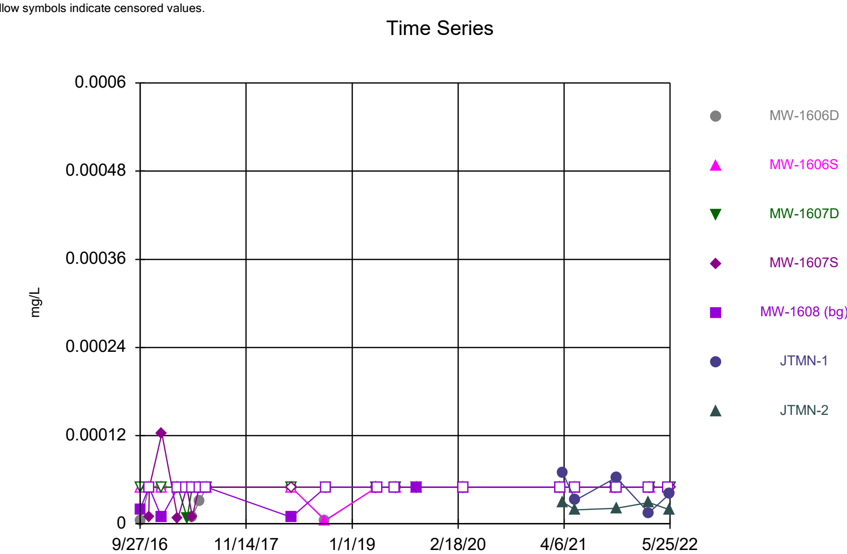
Hollow symbols indicate censored values.



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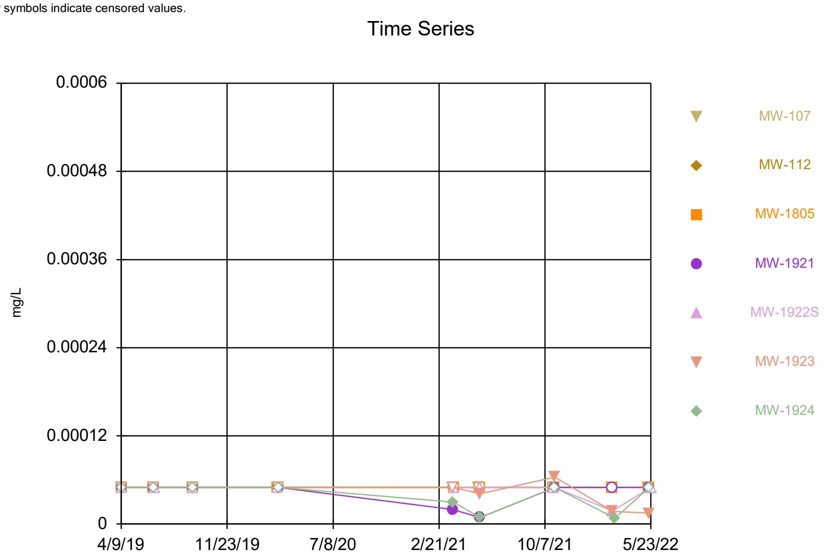
Hollow symbols indicate censored values.



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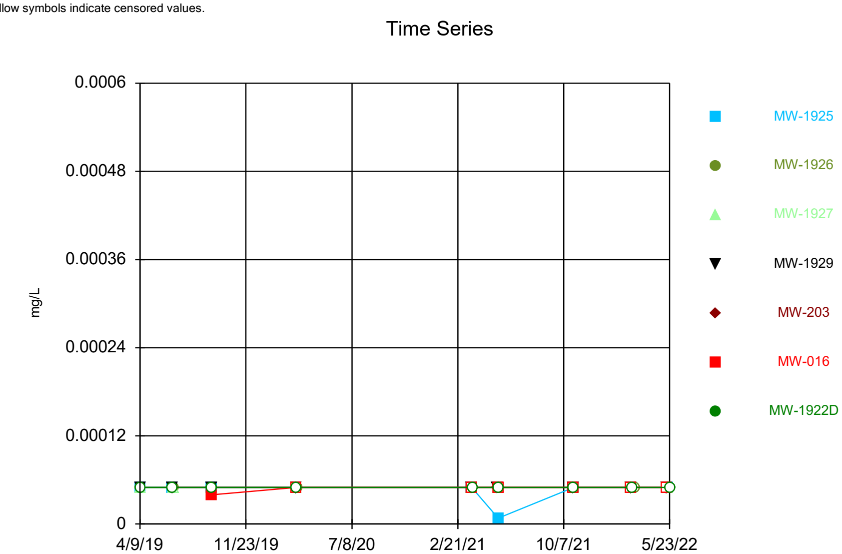

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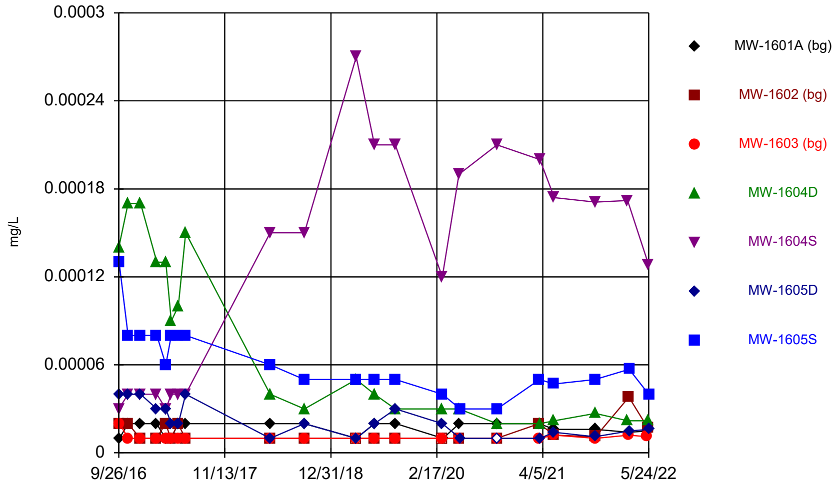
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

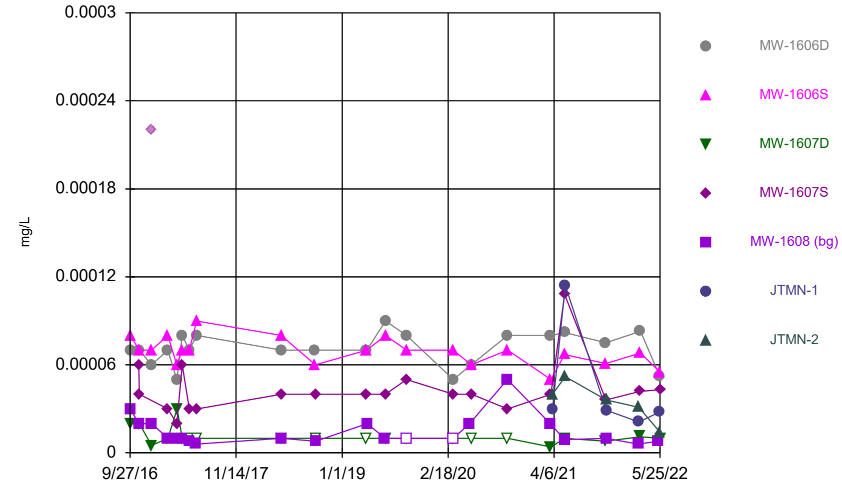
Time Series



Constituent: Cadmium, total   Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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

Time Series



Constituent: Cadmium, total   Analysis Run 9/1/2022 10:07 AM
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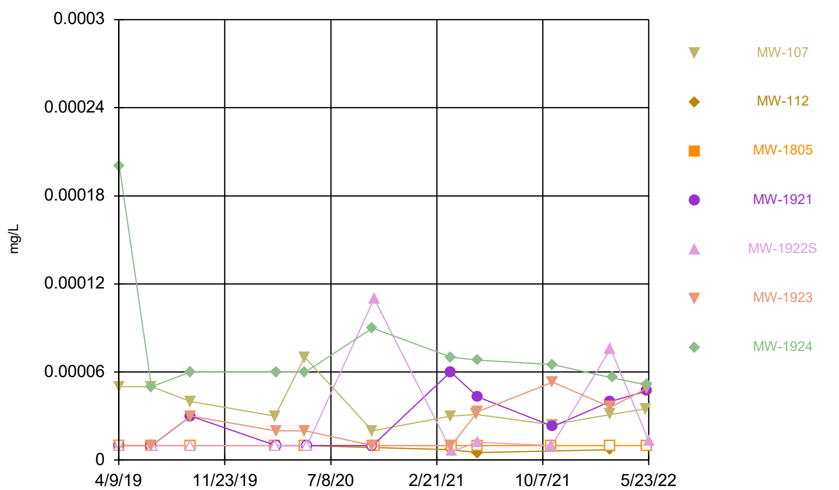
Hollow symbols indicate censored values.

Time Series



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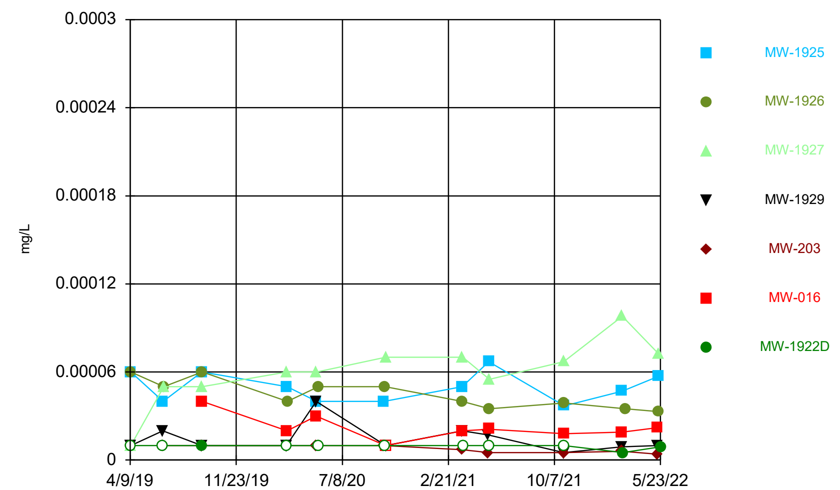
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

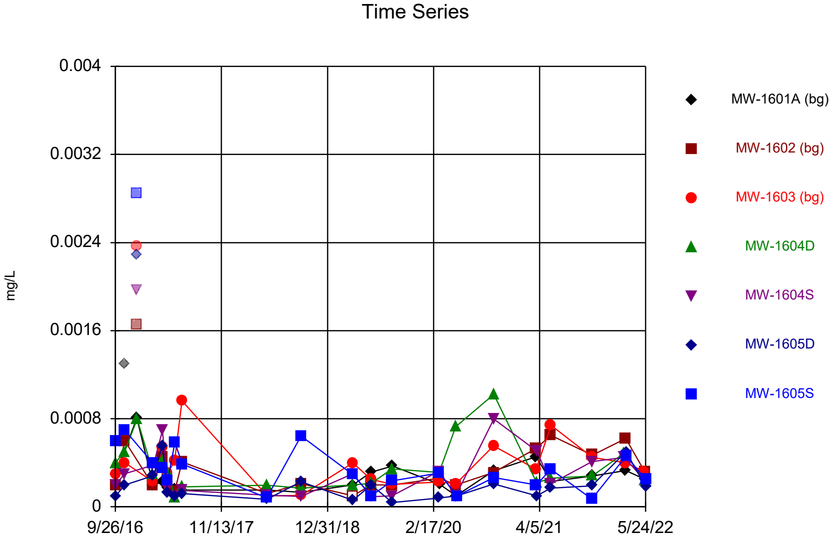
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



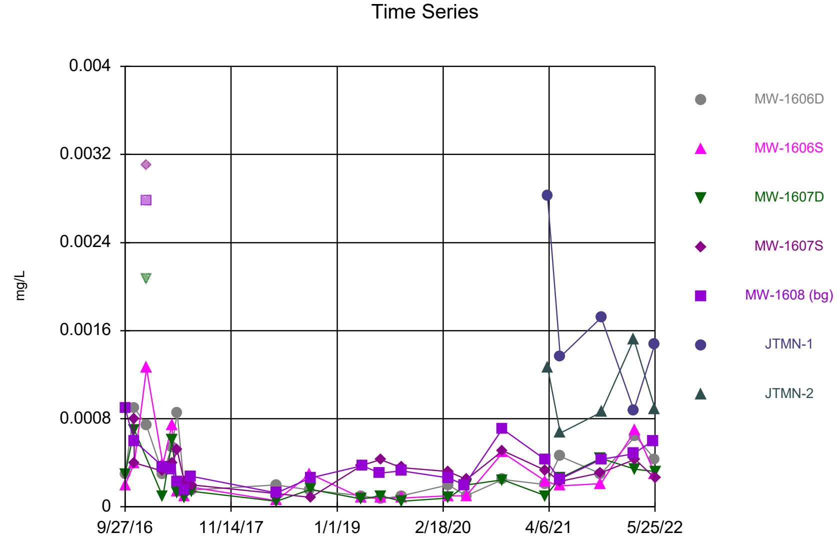
Constituent: Cadmium, total   Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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



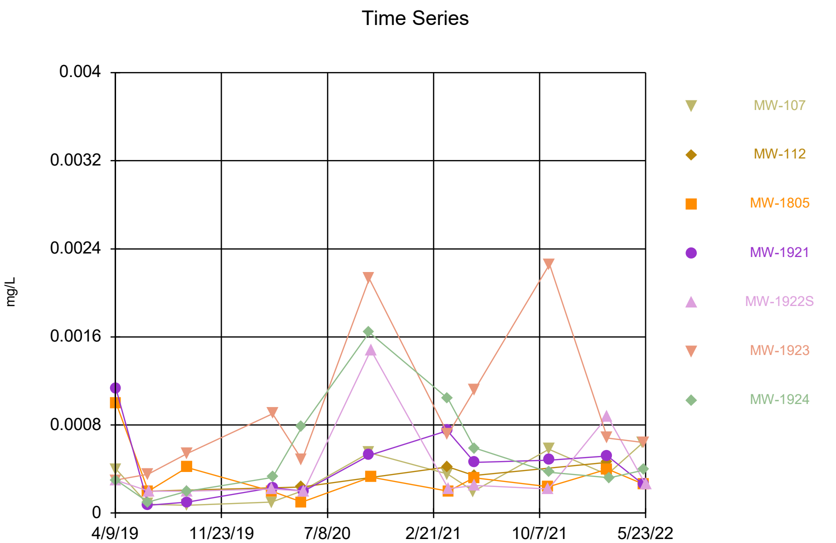
Constituent: Chromium, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



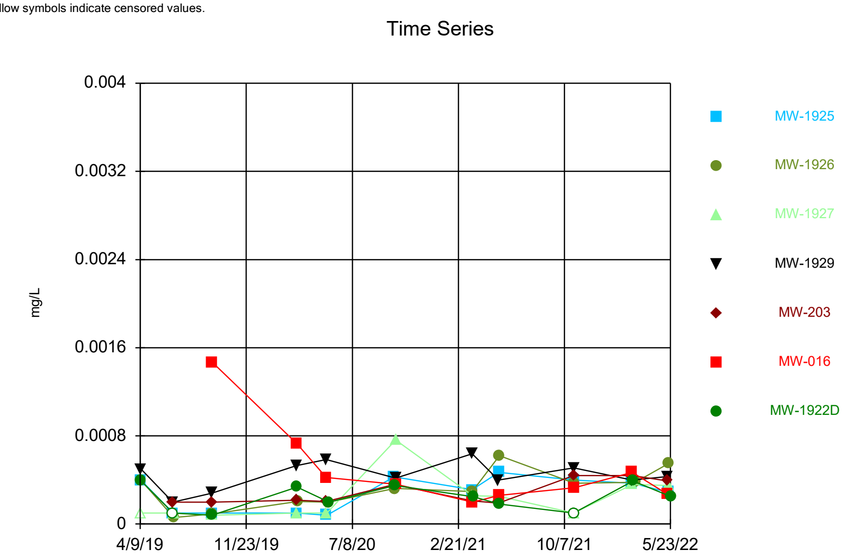
Constituent: Chromium, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

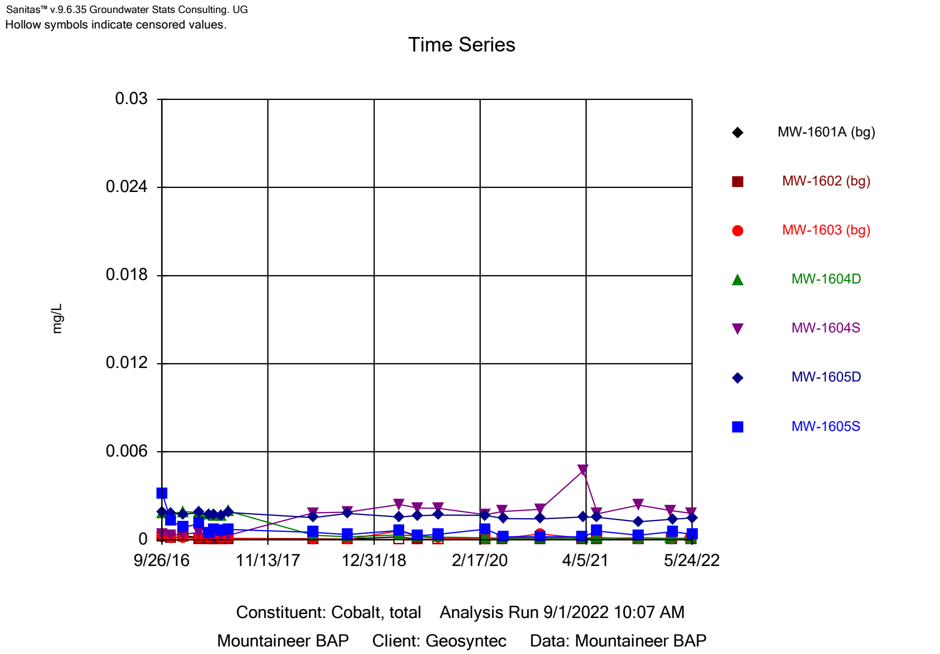


Constituent: Chromium, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

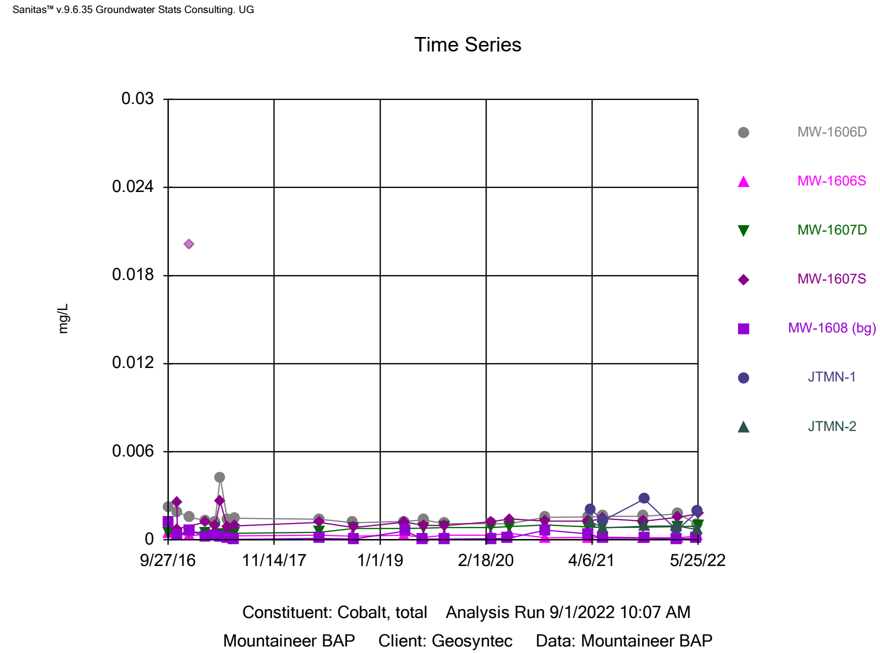
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.



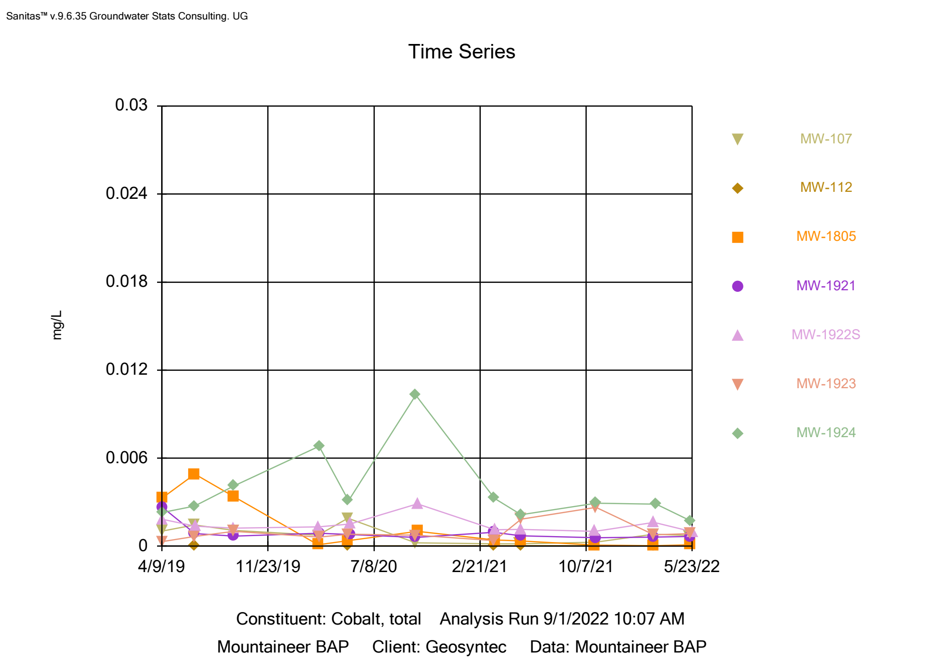
Constituent: Chromium, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



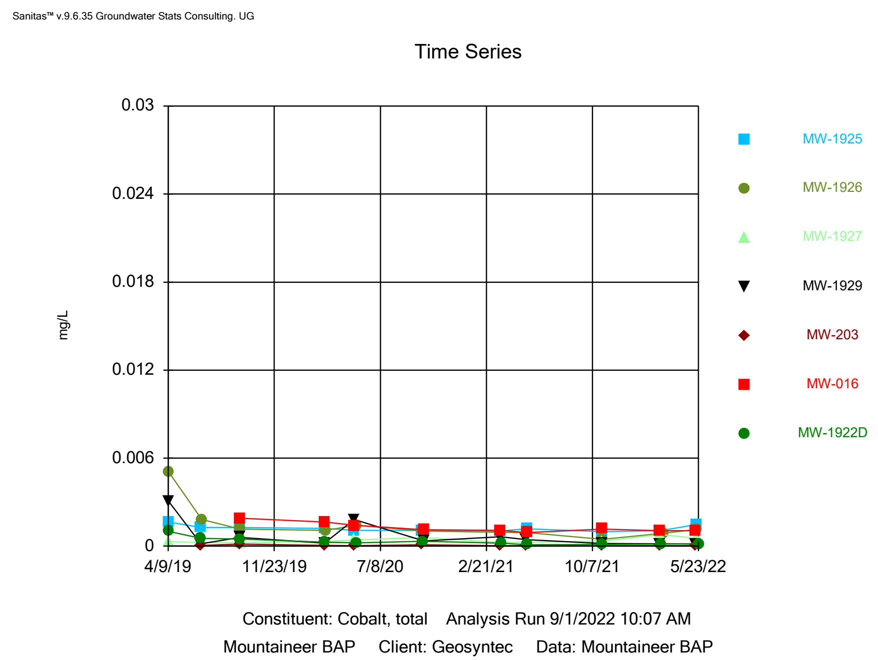
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
mg/L
0.03
0.024
0.018
0.012
0.006
0
9/26/16
11/13/17
12/31/18
2/17/20
4/5/21
5/24/22
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
MW-1605S
Constituent: Cobalt, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Time Series
mg/L
0.03
0.024
0.018
0.012
0.006
0
9/27/16
11/14/17
1/1/19
2/18/20
4/6/21
5/25/22
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
JTMN-1
JTMN-2
Constituent: Cobalt, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



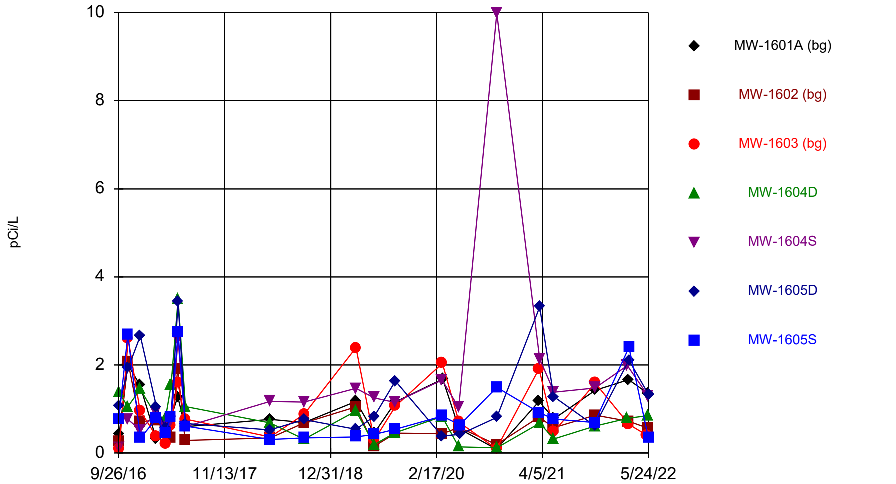
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Time Series
mg/L
0.03
0.024
0.018
0.012
0.006
0
4/9/19
11/23/19
7/8/20
2/21/21
10/7/21
5/23/22
MW-107
MW-112
MW-1805
MW-1921
MW-1922S
MW-1923
MW-1924
Constituent: Cobalt, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Time Series
mg/L
0.03
0.024
0.018
0.012
0.006
0
4/9/19
11/23/19
7/8/20
2/21/21
10/7/21
5/23/22
MW-1925
MW-1926
MW-1927
MW-1929
MW-203
MW-016
MW-1922D
Constituent: Cobalt, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Time Series

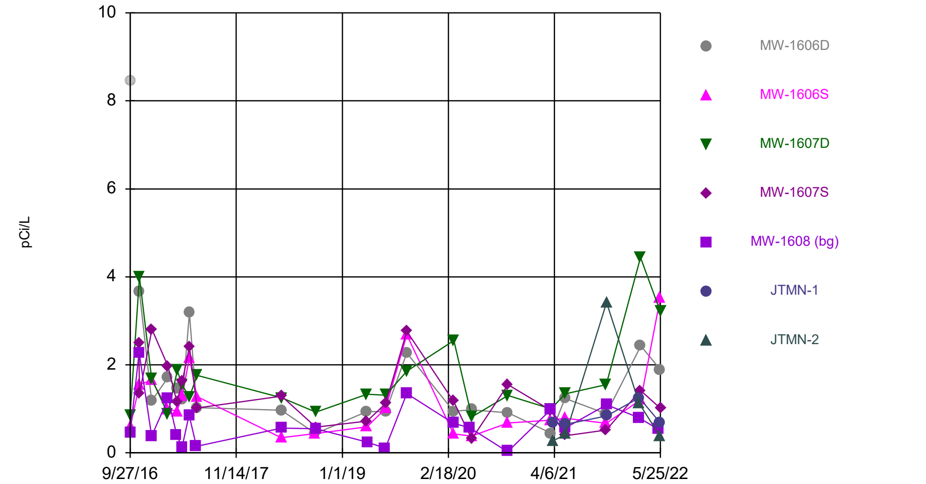


Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Time Series

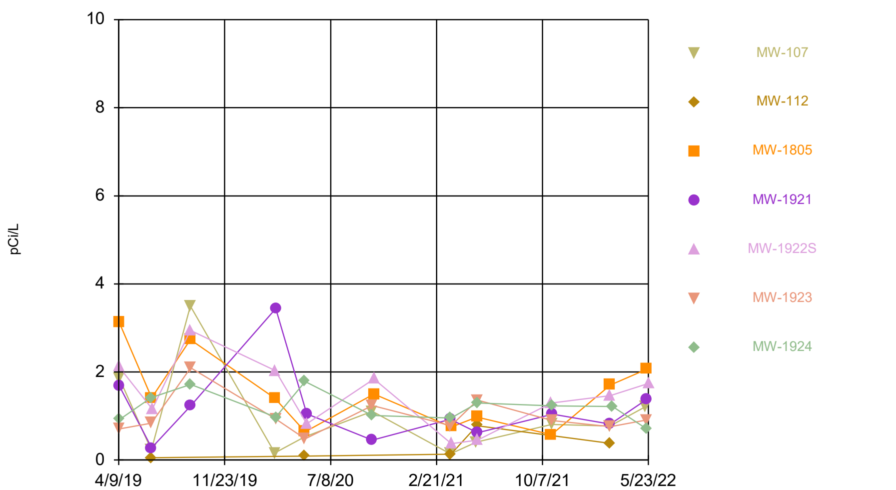


Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Time Series

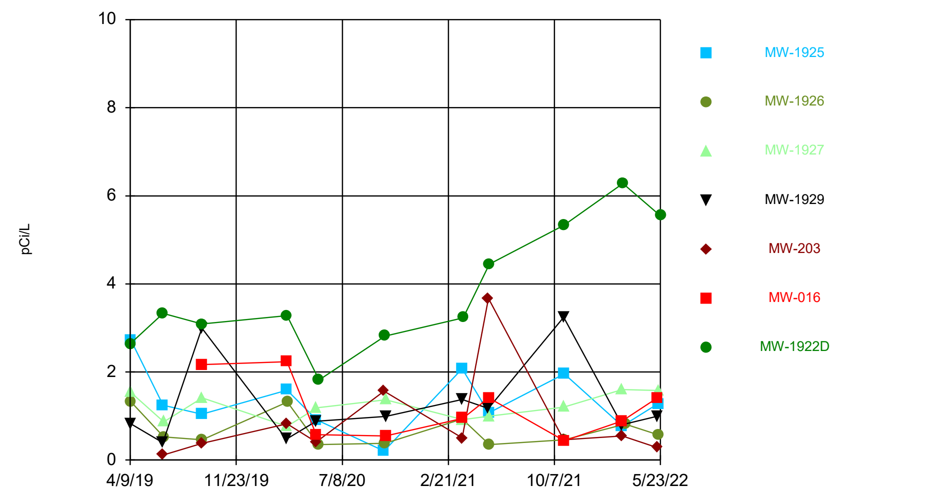


Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

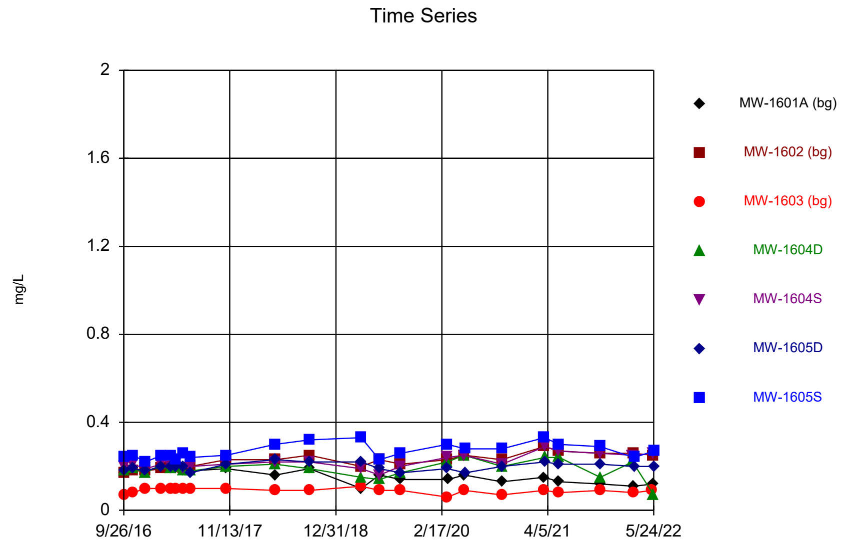
Time Series



Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

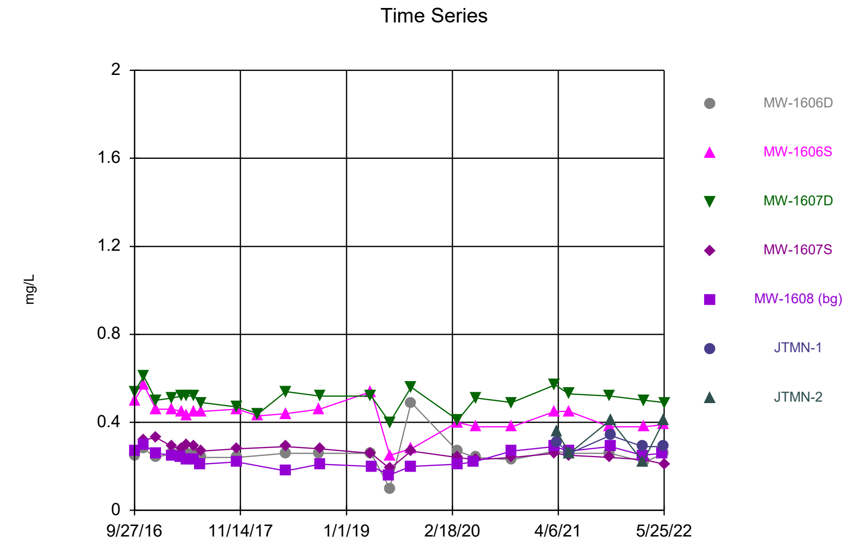
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



Constituent: Fluoride, total   Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

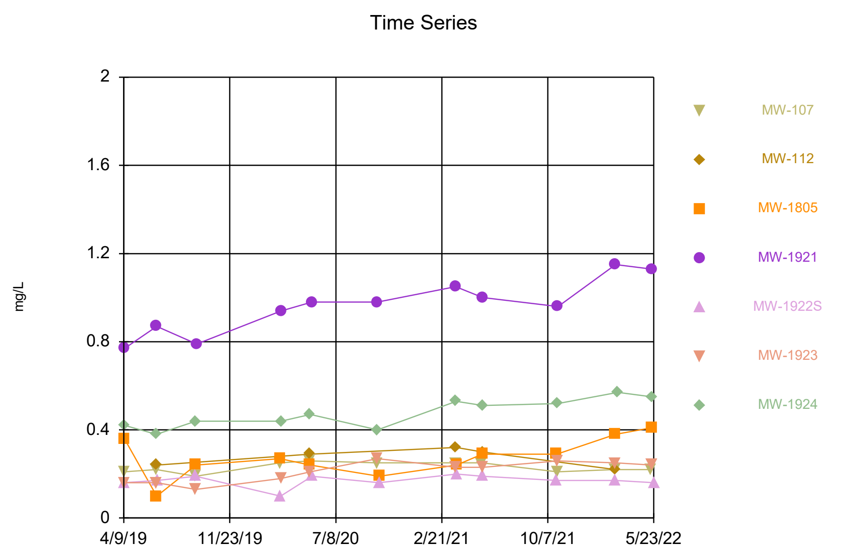
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



Constituent: Fluoride, total   Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

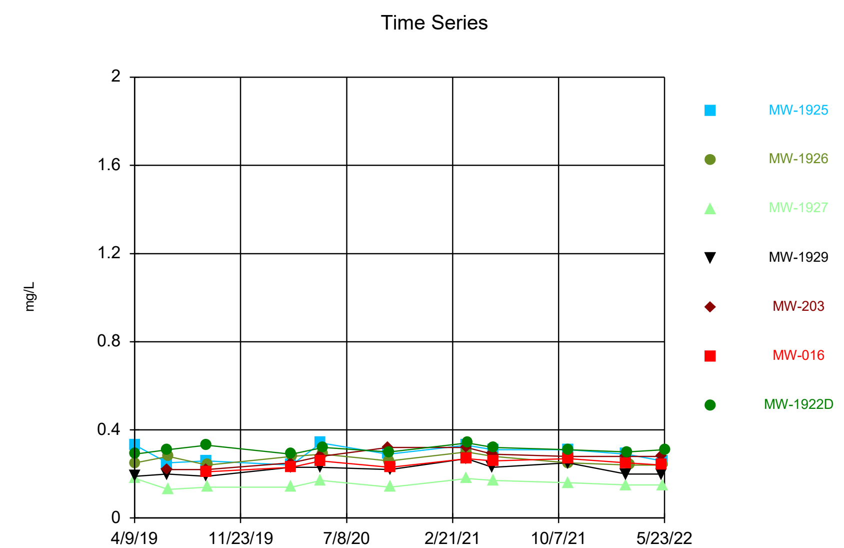
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



Constituent: Fluoride, total   Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

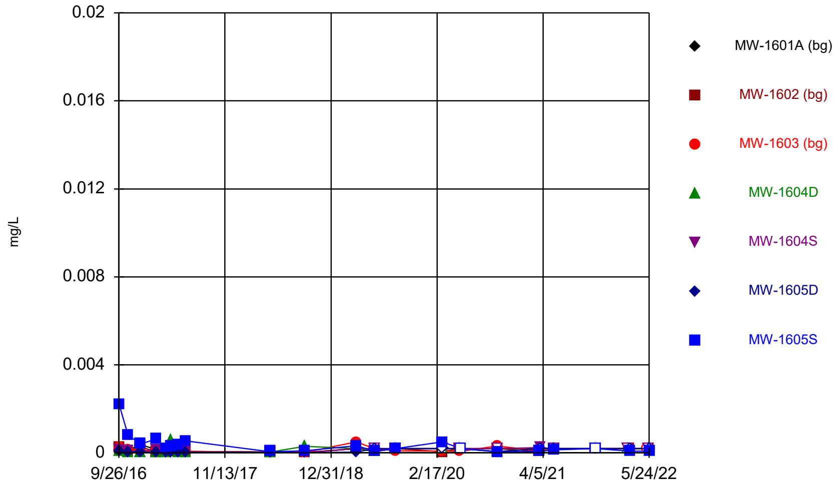


Constituent: Fluoride, total   Analysis Run 9/1/2022 10:07 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

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

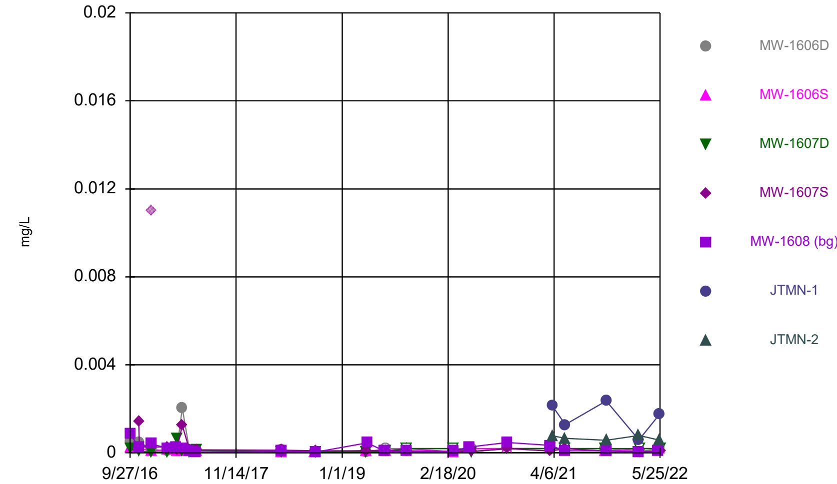
Time Series



Constituent: Lead, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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

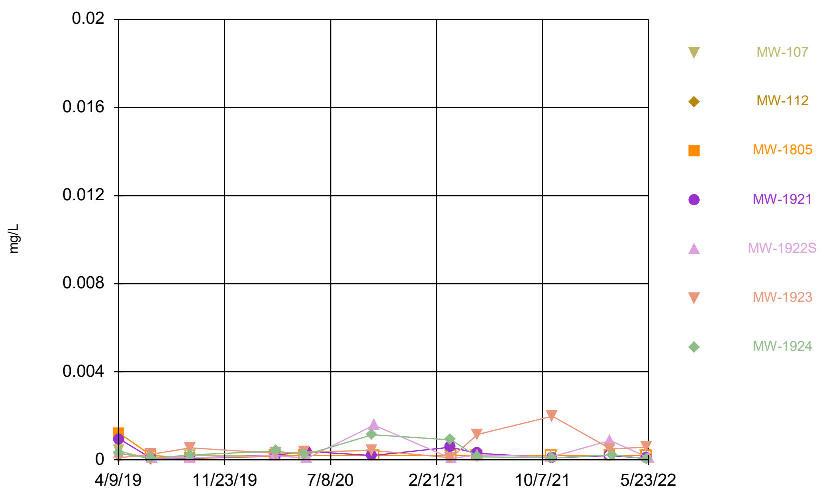
Time Series



Constituent: Lead, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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

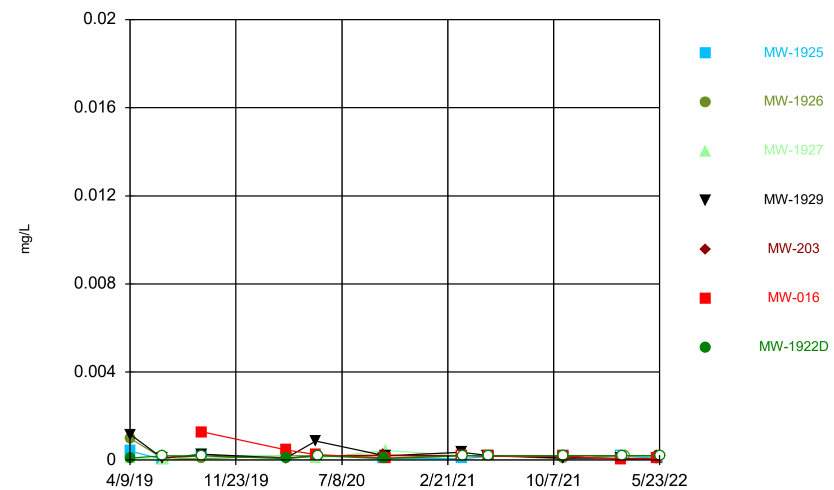
Time Series



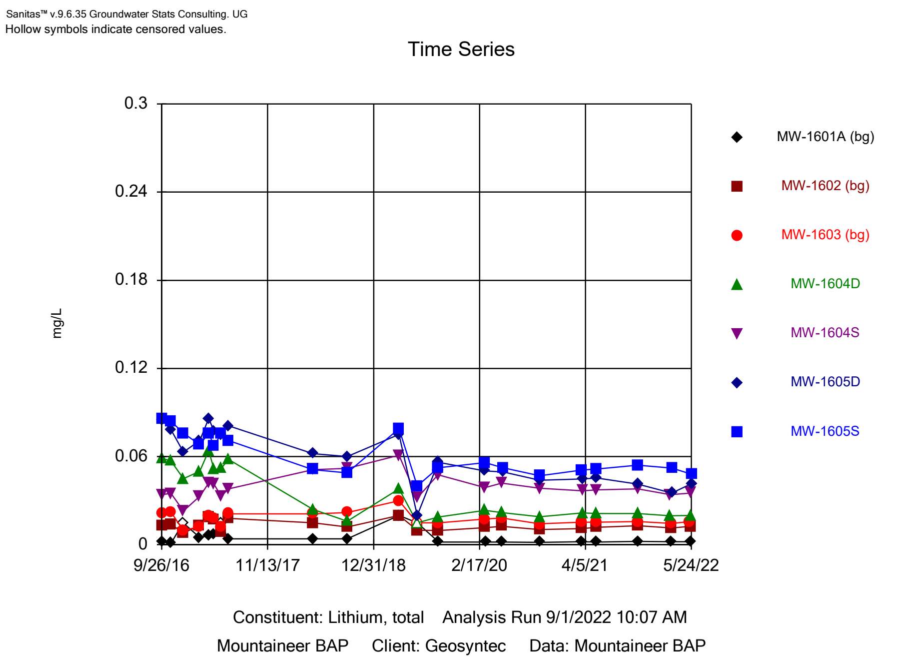
Constituent: Lead, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

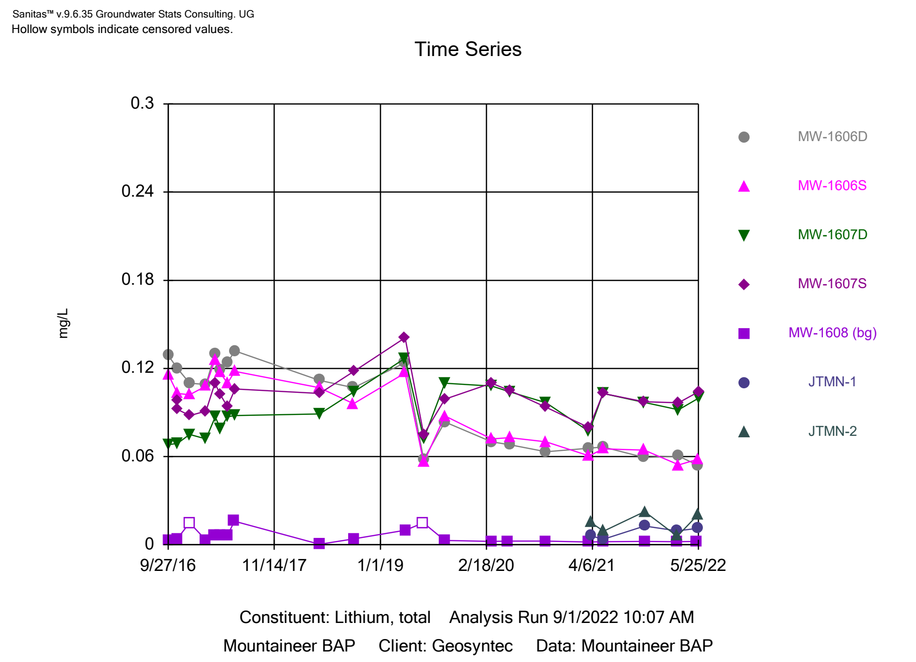
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



Constituent: Lead, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
mg/L
0.3
0.24
0.18
0.12
0.06
0
9/26/16
11/13/17
12/31/18
2/17/20
4/5/21
5/24/22
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
MW-1605S
Constituent: Lithium, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
mg/L
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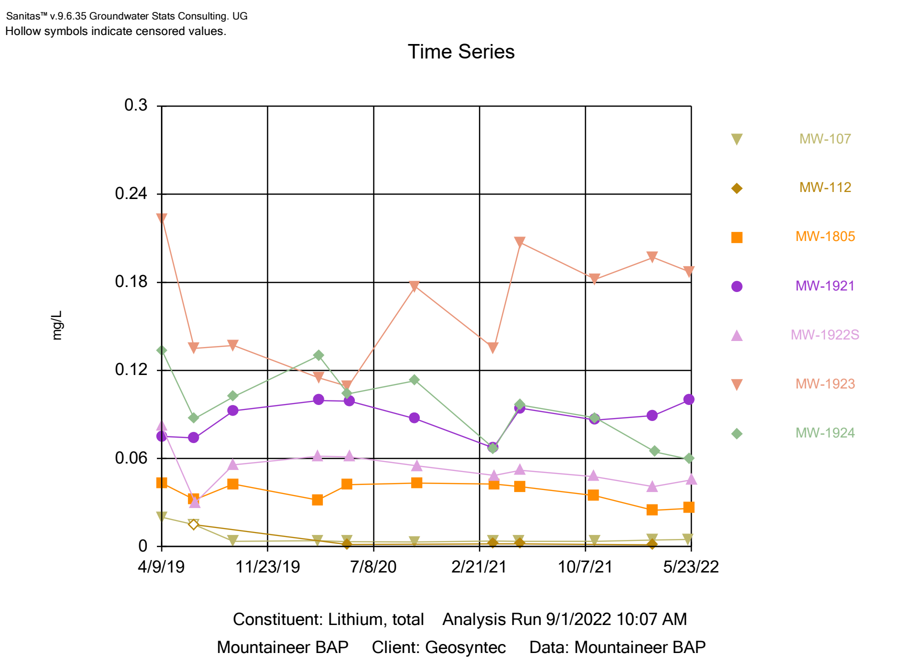
0.24
0.18
0.12
0.06
0
9/27/16
11/14/17
1/1/19
2/18/20
4/6/21
5/25/22
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
JTMN-1
JTMN-2
Constituent: Lithium, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
mg/L
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0.24
0.18
0.12
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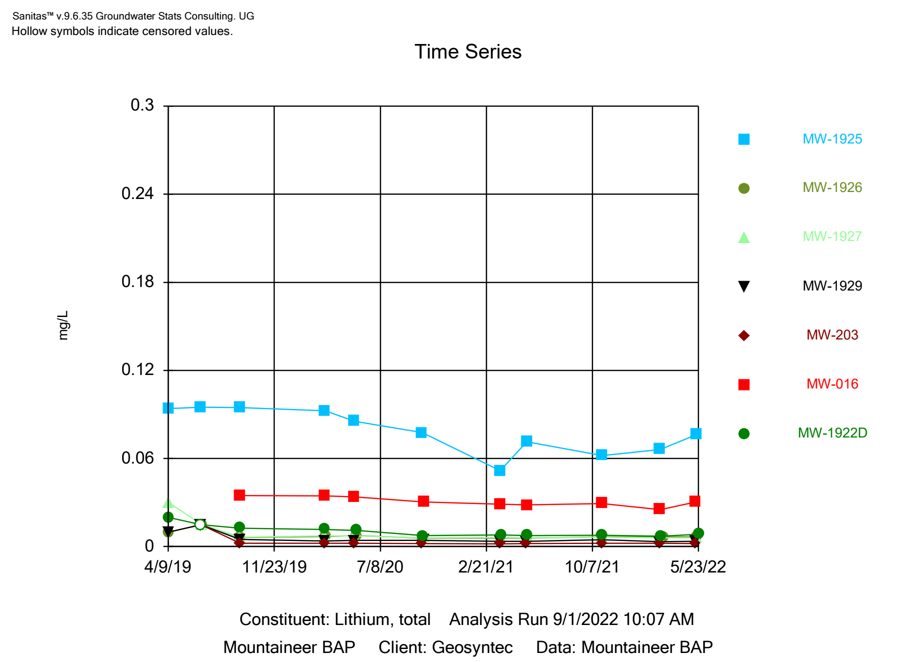
2/21/21
10/7/21
5/23/22
MW-107
MW-112
MW-1805
MW-1921
MW-1922S
MW-1923
MW-1924
Constituent: Lithium, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
mg/L
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0.24
0.18
0.12
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11/23/19
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2/21/21
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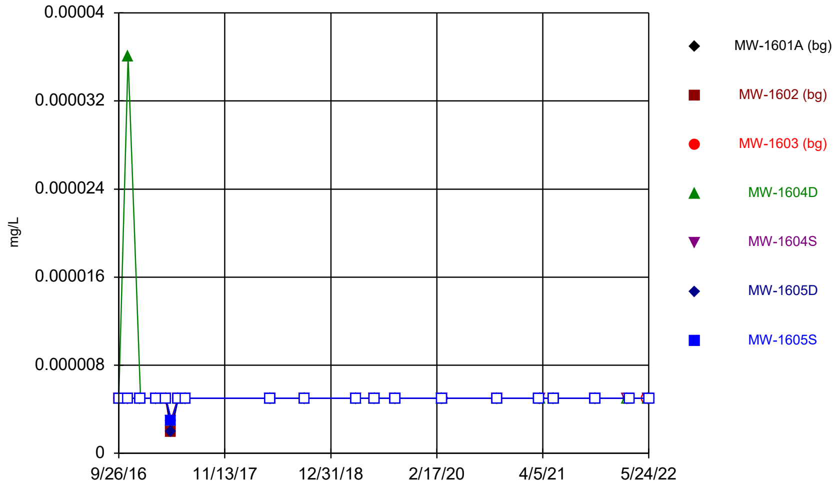
MW-1925
MW-1926
MW-1927
MW-1929
MW-203
MW-016
MW-1922D
Constituent: Lithium, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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

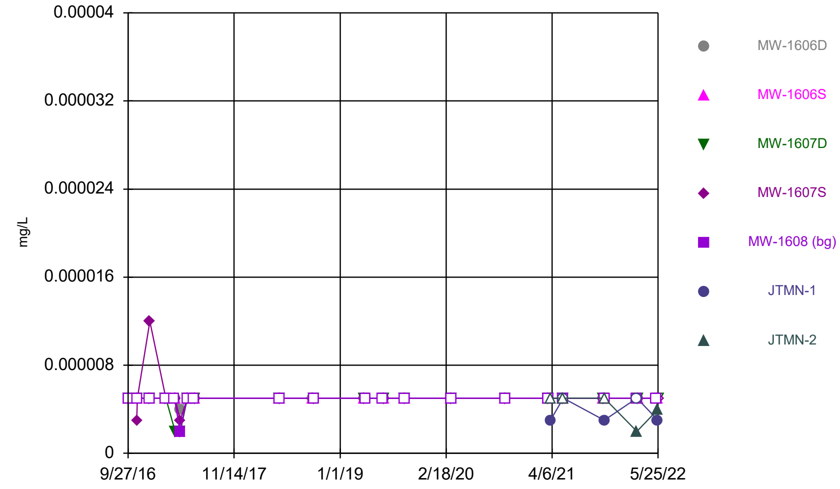
Time Series



Constituent: Mercury, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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

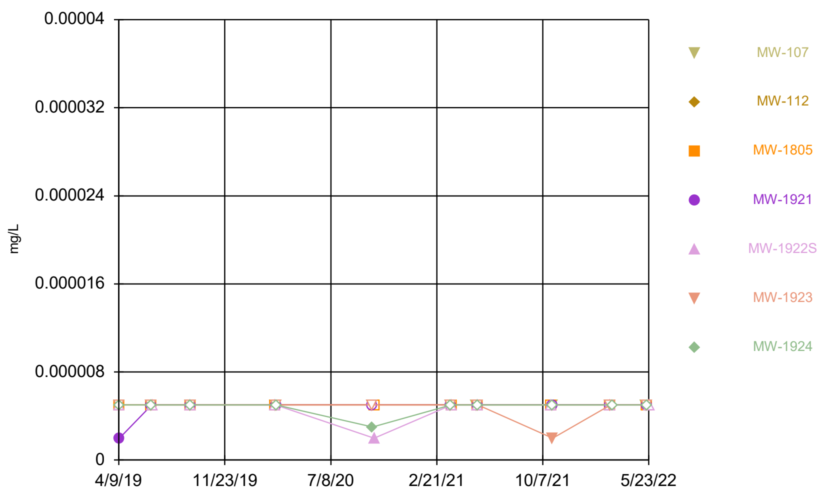
Time Series



Constituent: Mercury, total Analysis Run 9/1/2022 10:07 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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

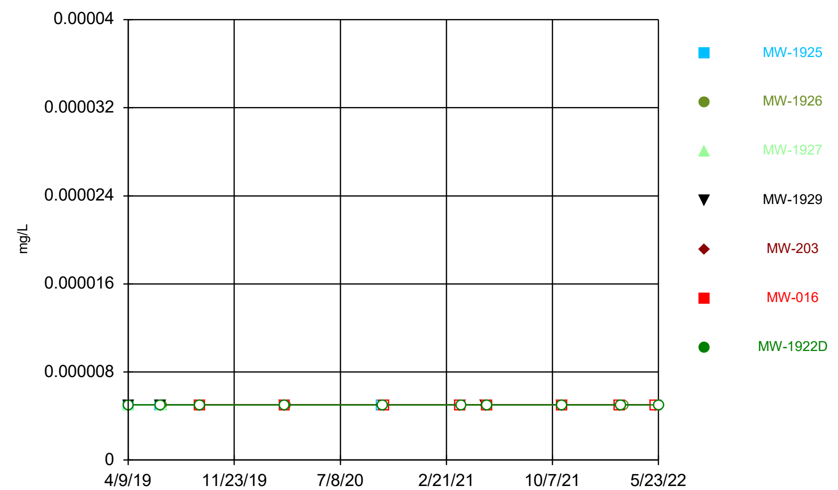
Time Series



Constituent: Mercury, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

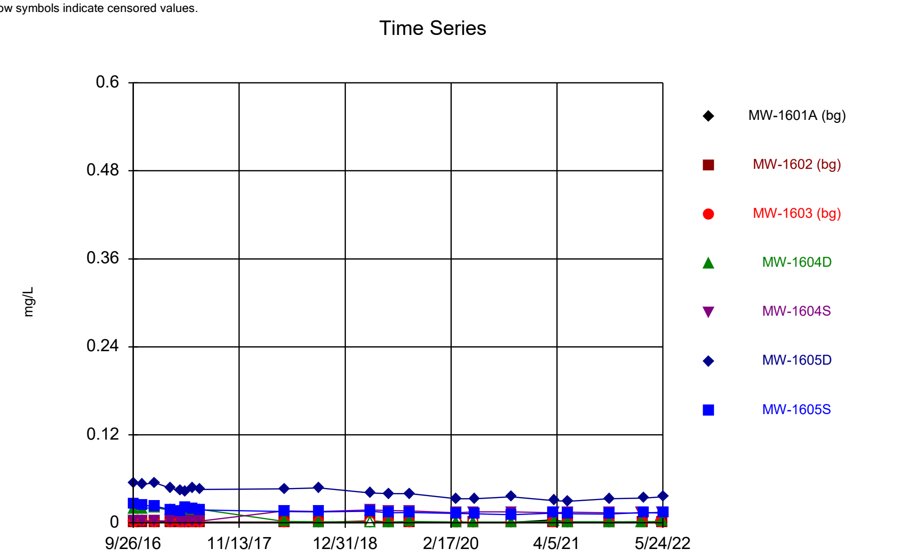
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Time Series



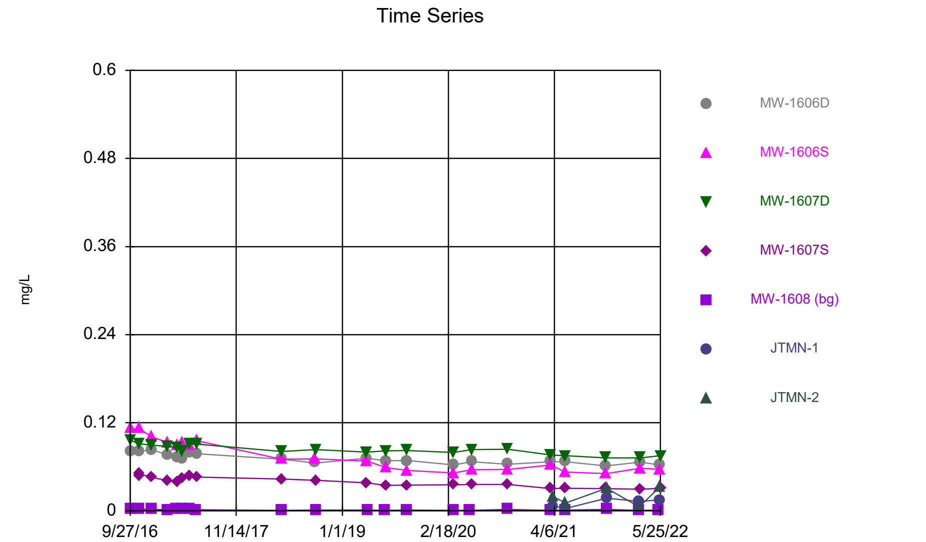
Constituent: Mercury, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



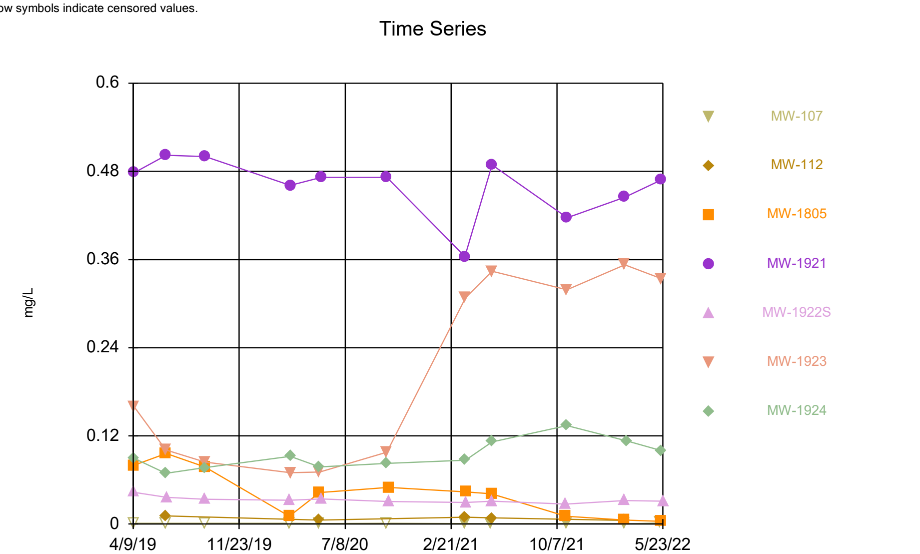
Constituent: Molybdenum, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



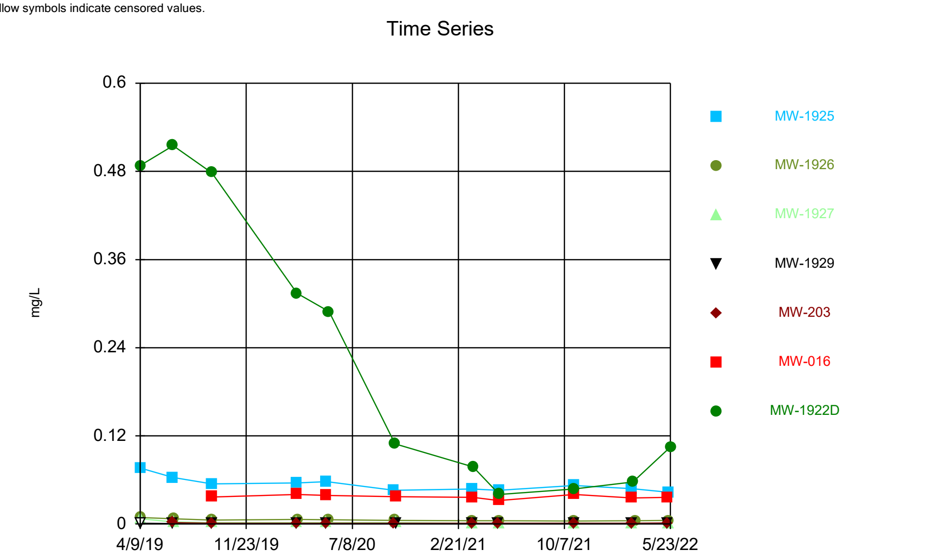
Constituent: Molybdenum, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



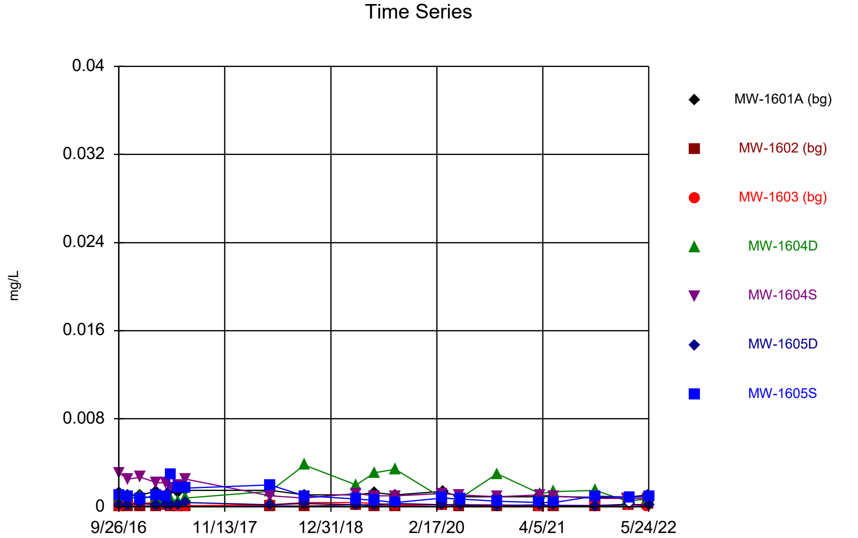
Constituent: Molybdenum, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



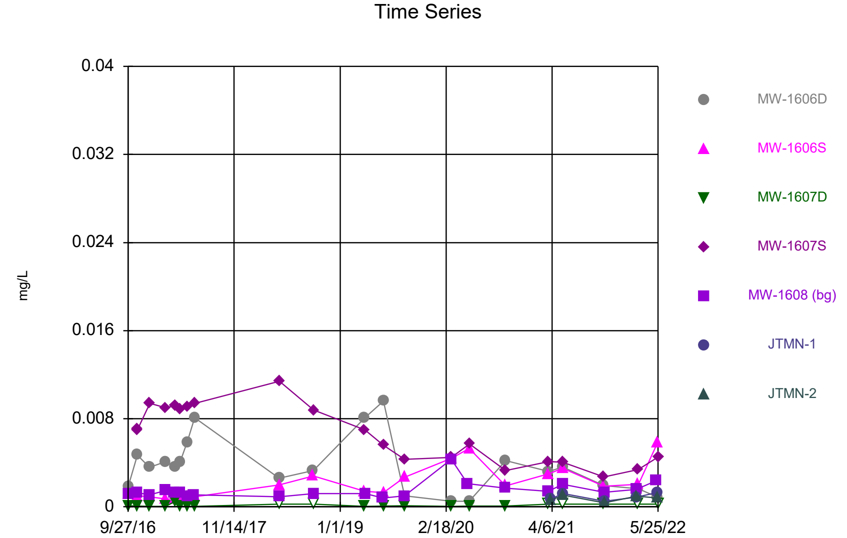
Constituent: Molybdenum, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



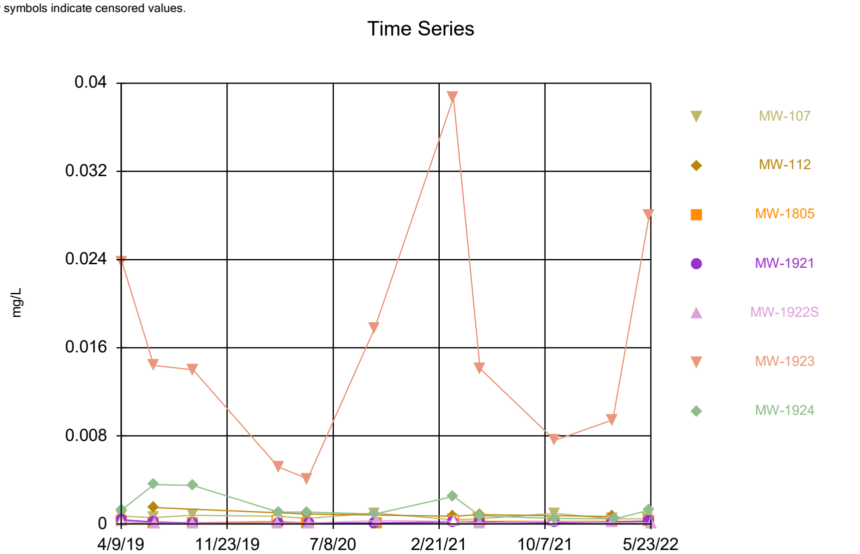
Constituent: Selenium, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



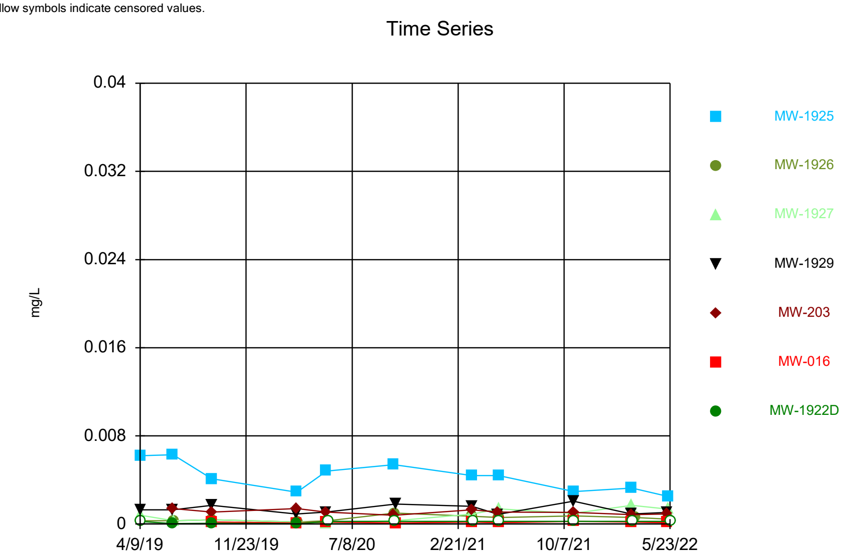
Constituent: Selenium, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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

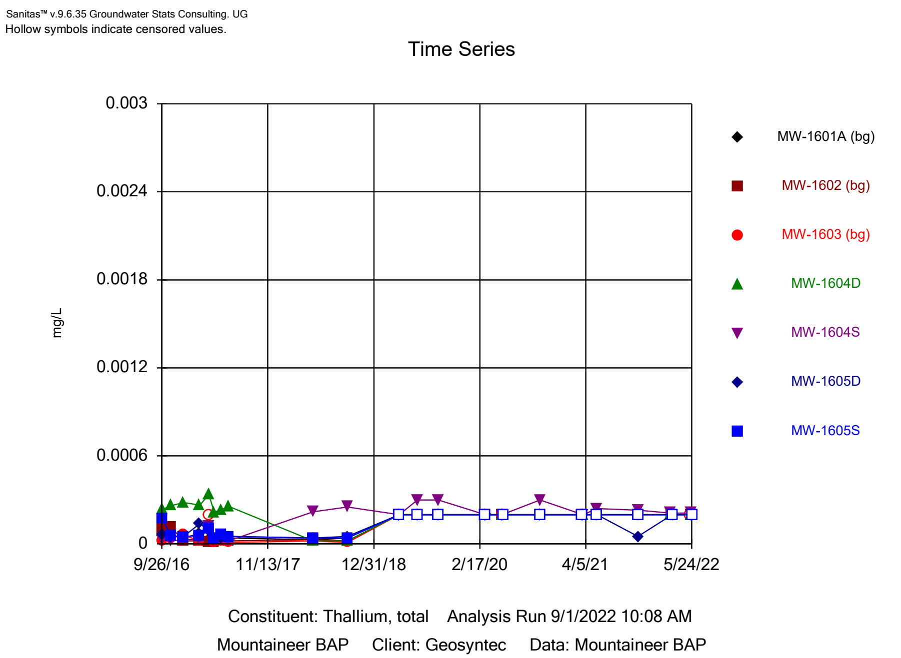


Constituent: Selenium, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

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



Constituent: Selenium, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
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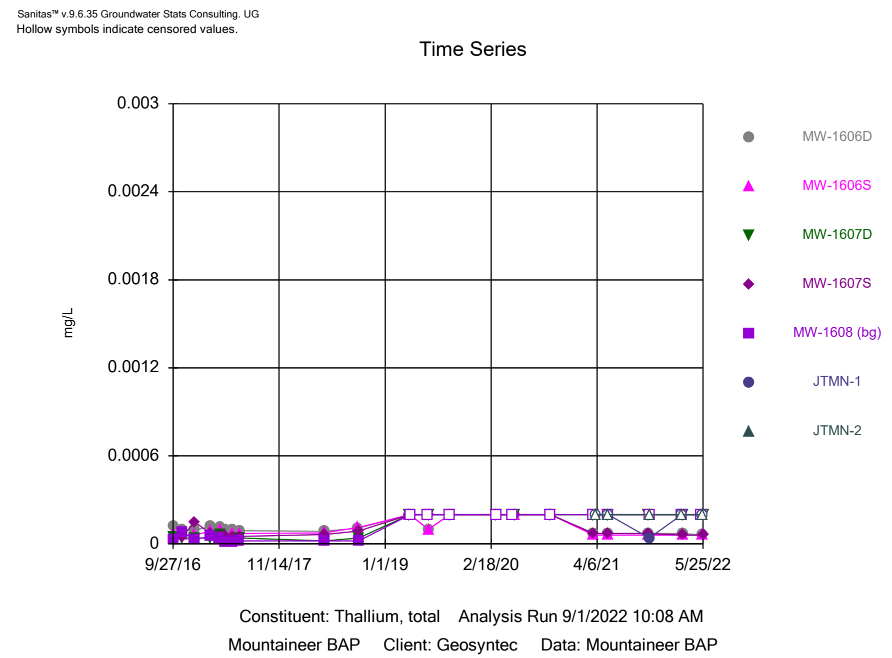
0.0024
0.0018
0.0012
0.0006
0
mg/L
9/26/16
11/13/17
12/31/18
2/17/20
4/5/21
5/24/22
MW-1601A (bg)
MW-1602 (bg)
MW-1603 (bg)
MW-1604D
MW-1604S
MW-1605D
MW-1605S
Constituent: Thallium, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
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0.0024
0.0018
0.0012
0.0006
0
mg/L
9/27/16
11/14/17
1/1/19
2/18/20
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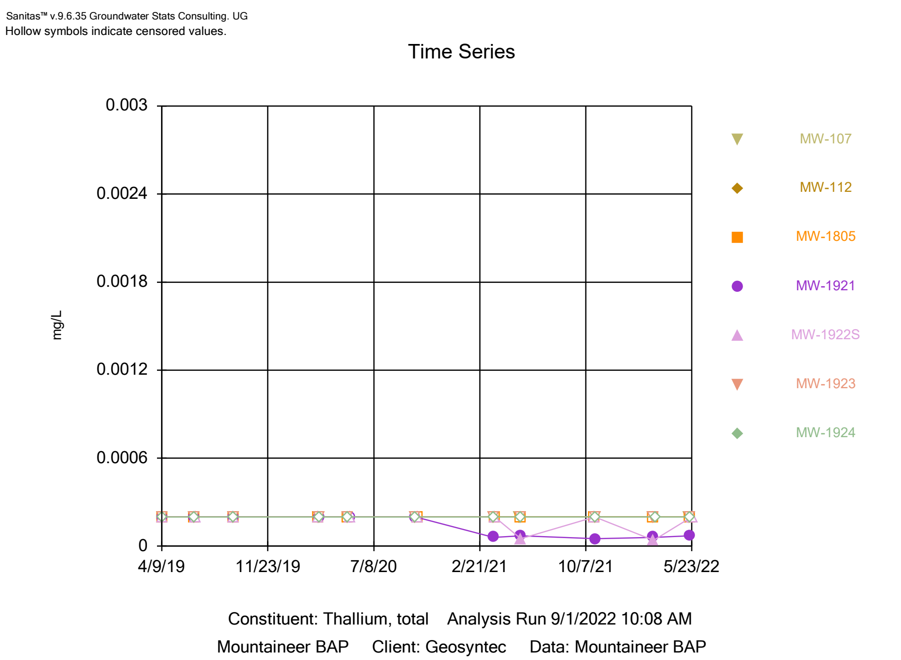
5/25/22
MW-1606D
MW-1606S
MW-1607D
MW-1607S
MW-1608 (bg)
JTMN-1
JTMN-2
Constituent: Thallium, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
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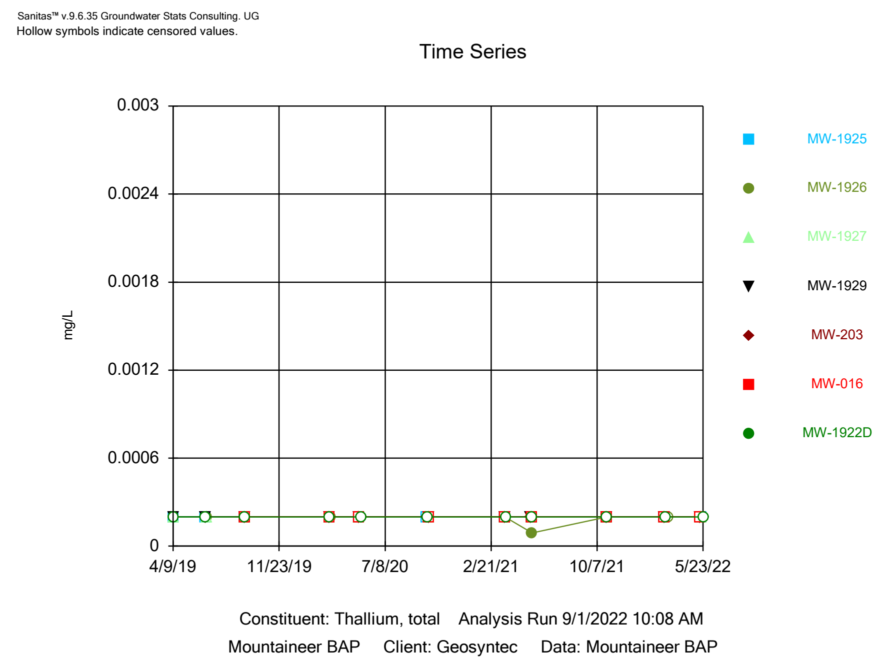
0.0024
0.0018
0.0012
0.0006
0
mg/L
4/9/19
11/23/19
7/8/20
2/21/21
10/7/21
5/23/22
MW-107
MW-112
MW-1805
MW-1921
MW-1922S
MW-1923
MW-1924
Constituent: Thallium, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.
Time Series
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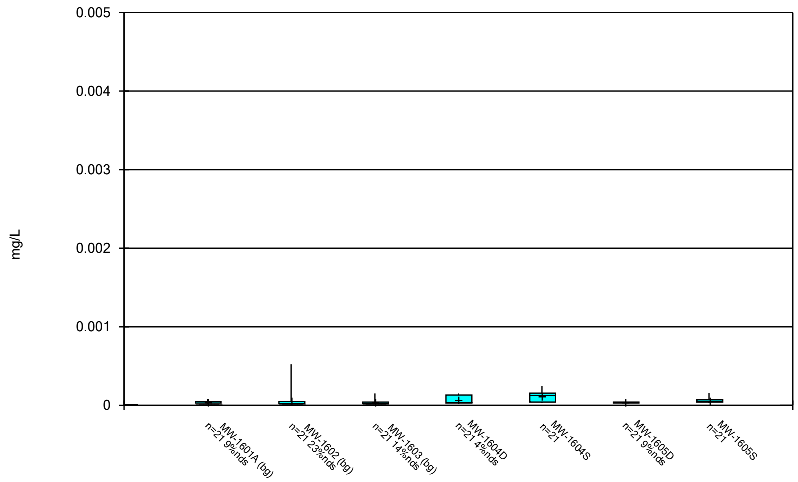
0.0024
0.0018
0.0012
0.0006
0
mg/L
4/9/19
11/23/19
7/8/20
2/21/21
10/7/21
5/23/22
MW-1925
MW-1926
MW-1927
MW-1929
MW-203
MW-016
MW-1922D
Constituent: Thallium, total Analysis Run 9/1/2022 10:08 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

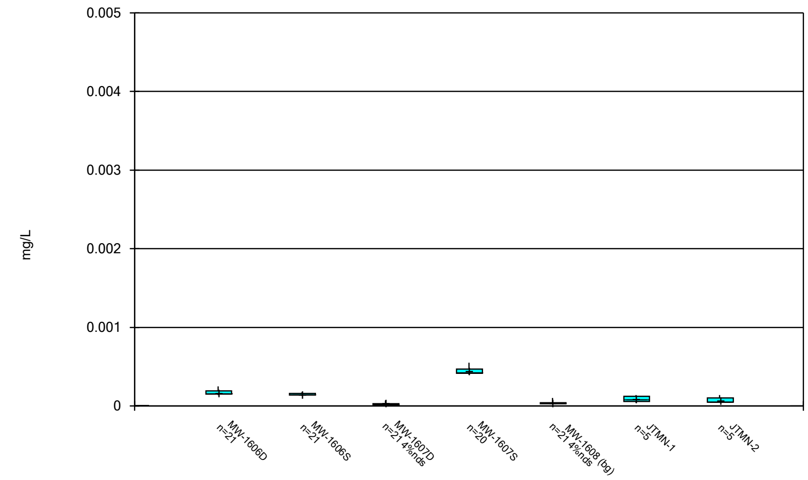


Constituent: Antimony, total Analysis Run 9/1/2022 10:11 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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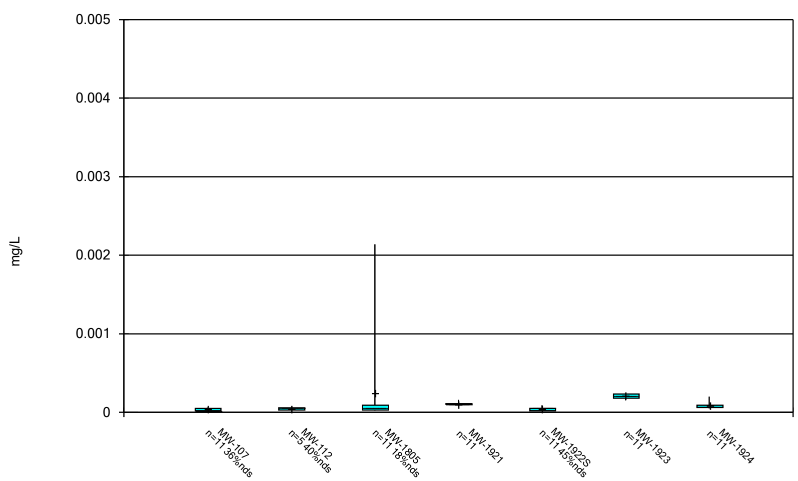
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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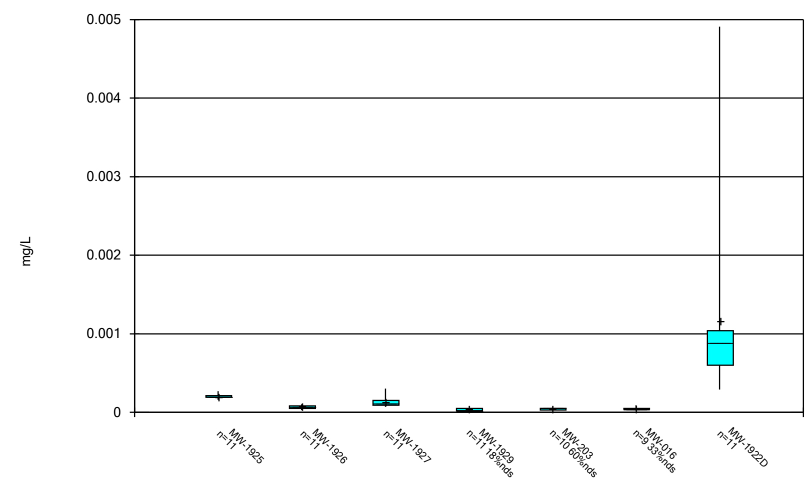
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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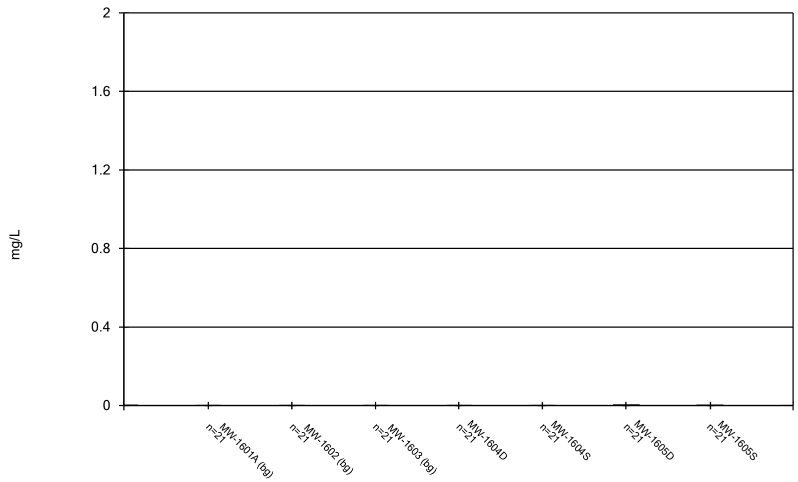
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

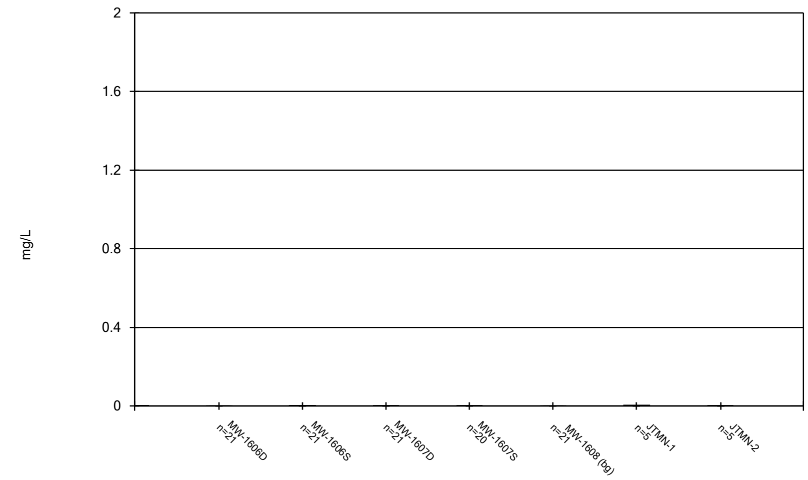
Box & Whiskers Plot



Constituent: Arsenic, total Analysis Run 9/1/2022 10:11 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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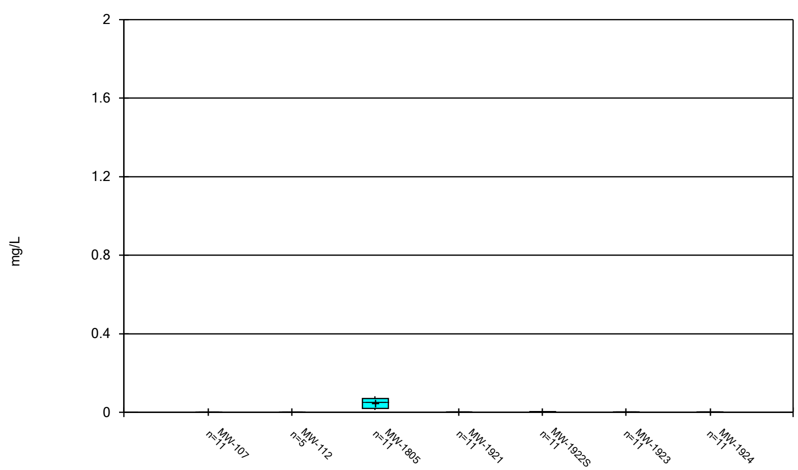
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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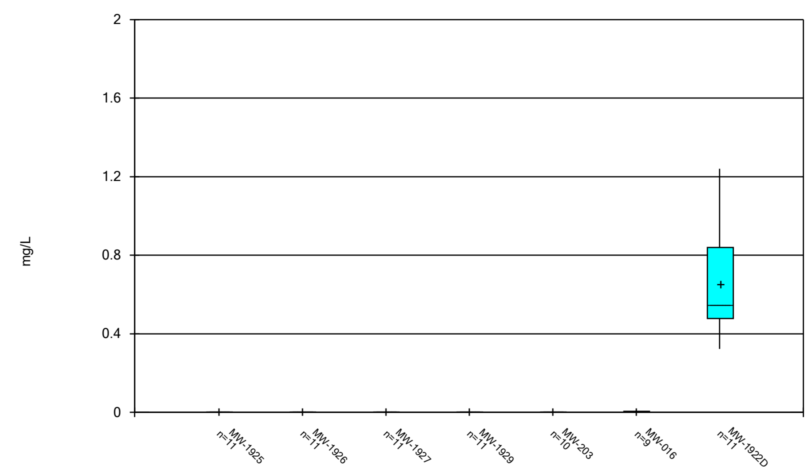
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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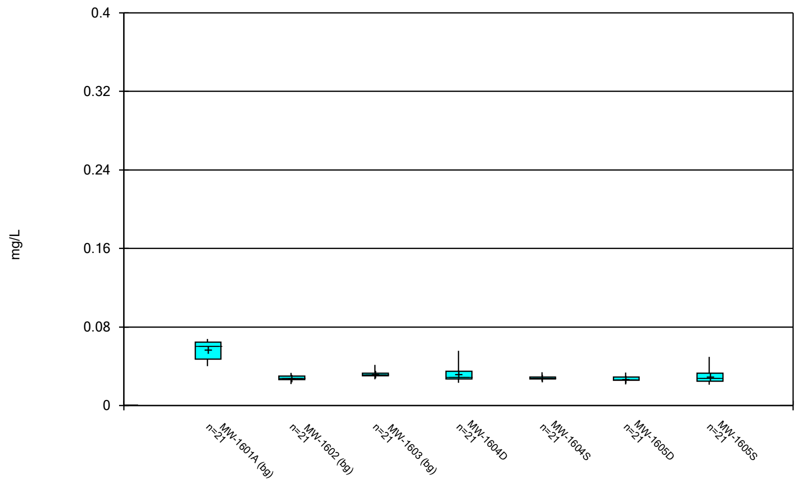
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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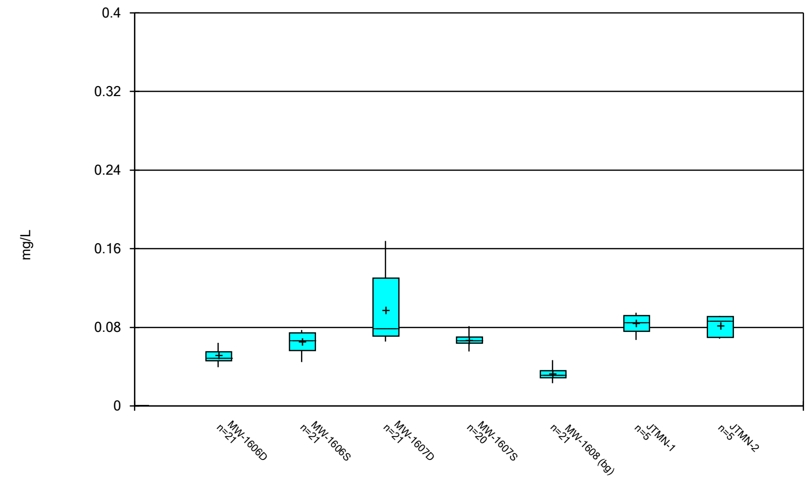
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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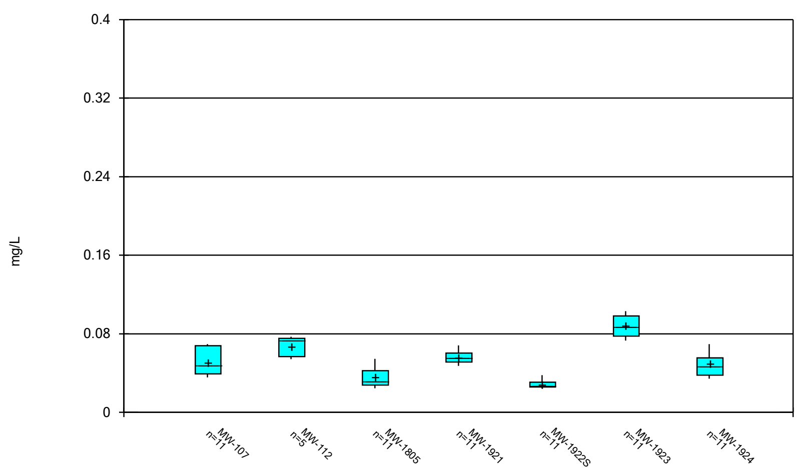
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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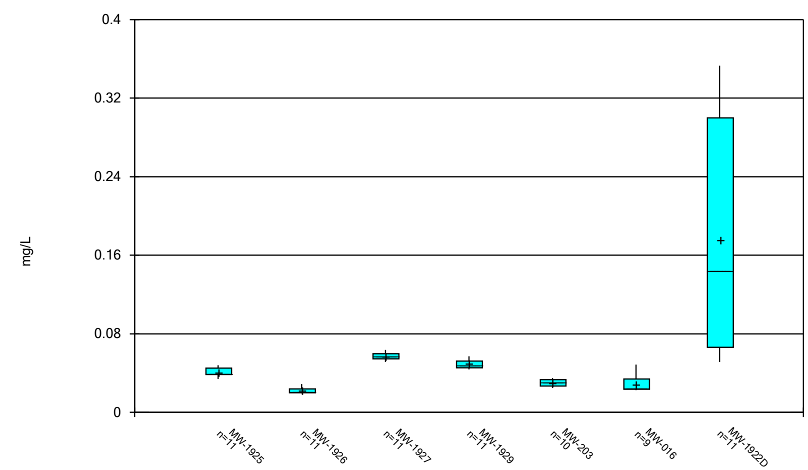
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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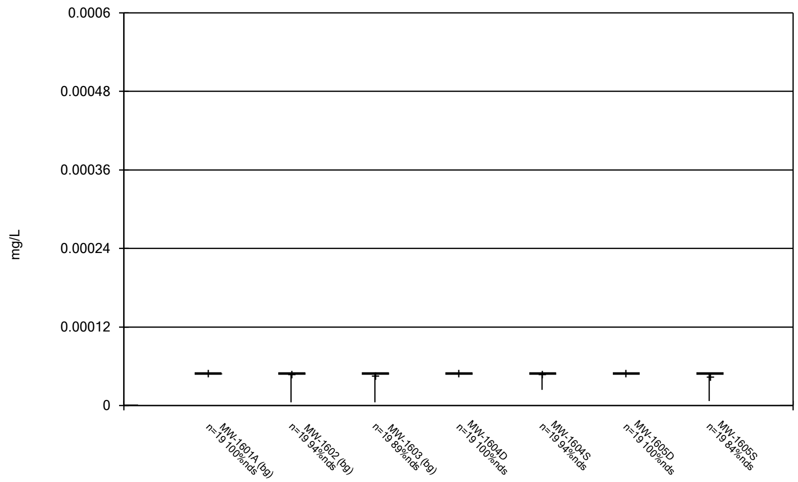
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

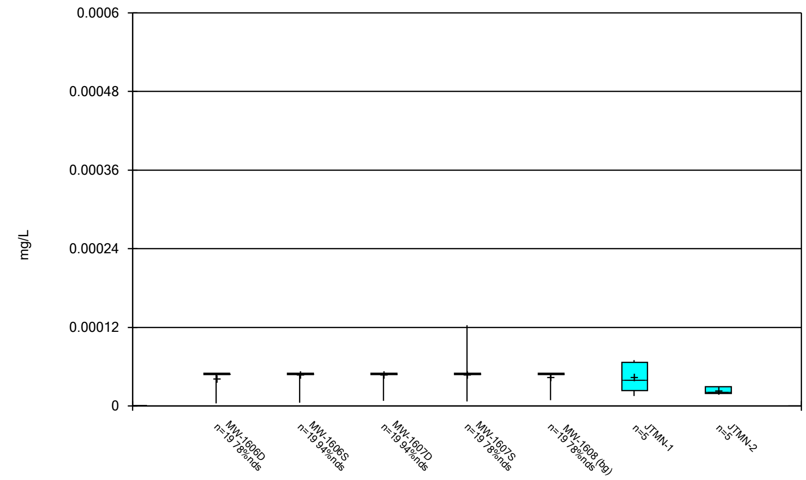
Box & Whiskers Plot



Constituent: Beryllium, total   Analysis Run 9/1/2022 10:11 AM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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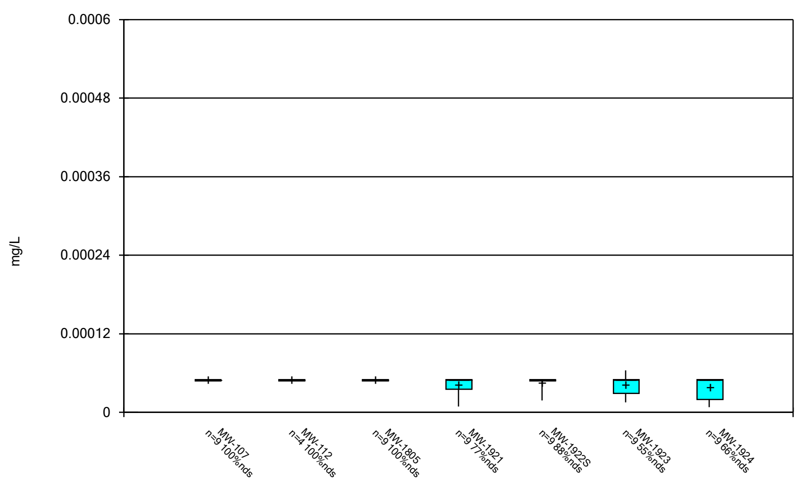
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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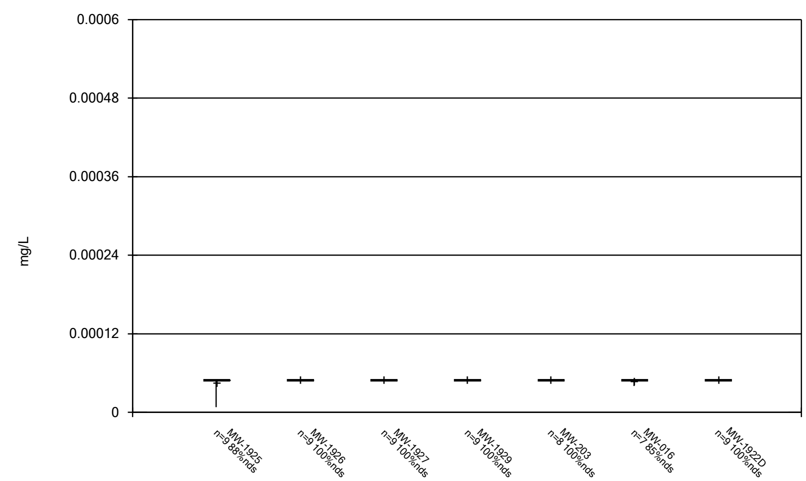
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

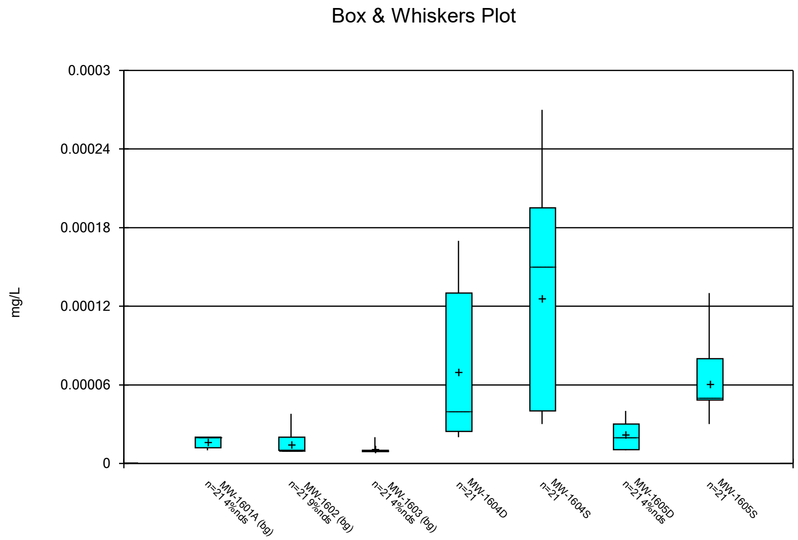
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Beryllium, total   Analysis Run 9/1/2022 10:11 AM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



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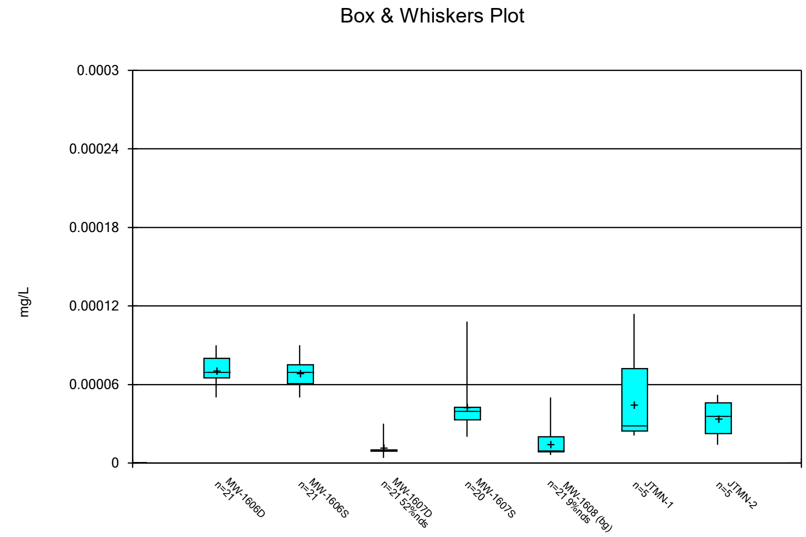
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



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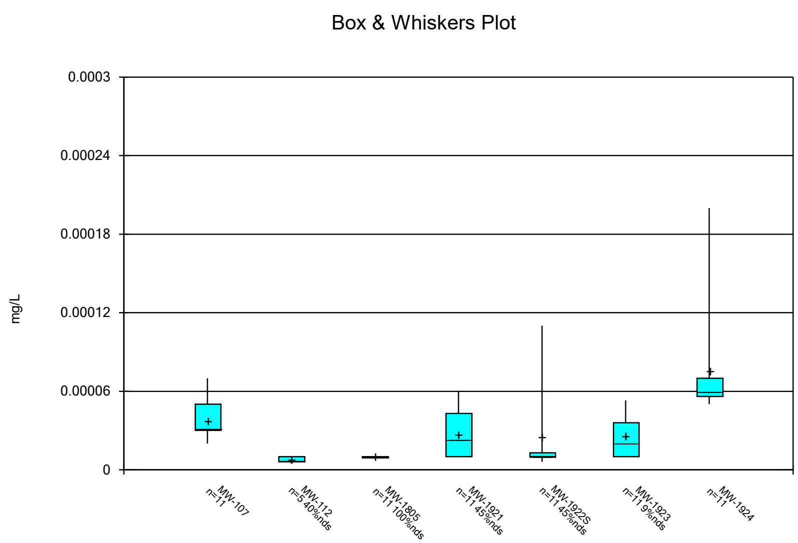
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



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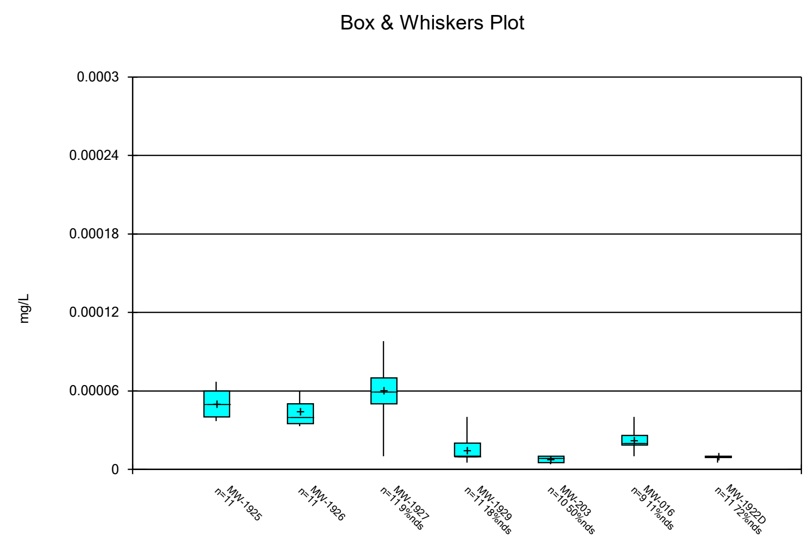
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



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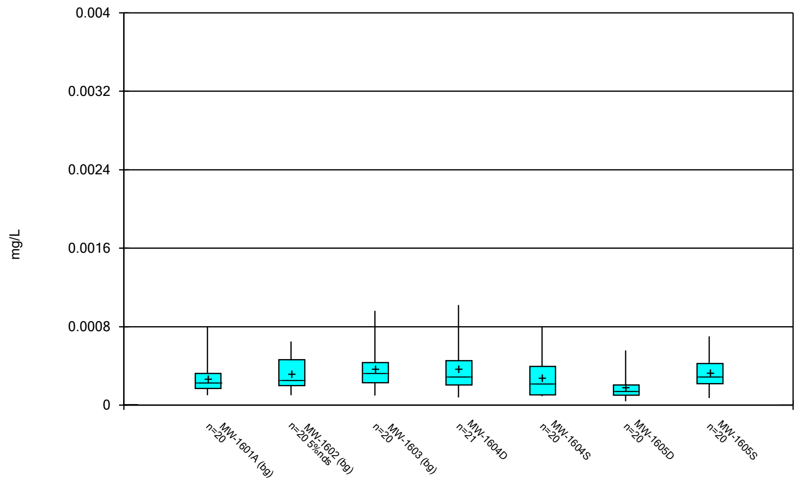
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Chromium, total   Analysis Run 9/1/2022 10:11 AM

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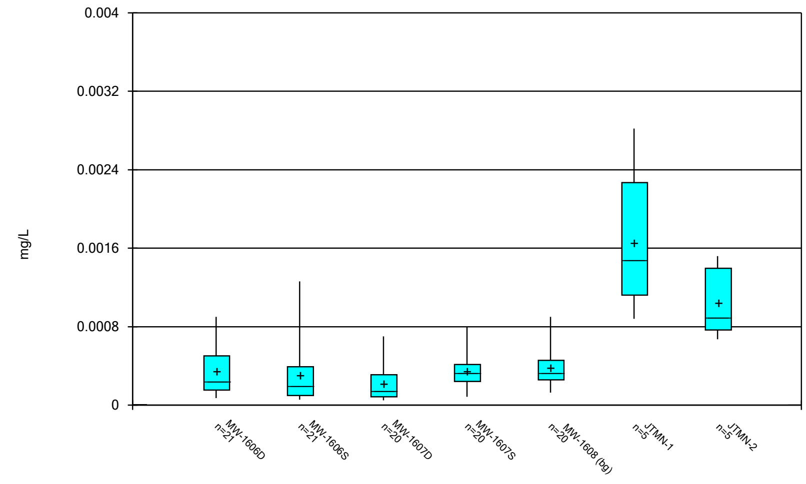
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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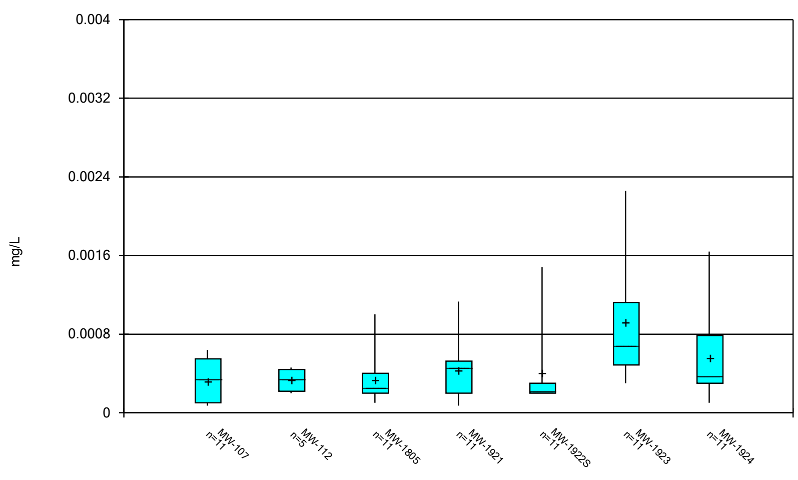
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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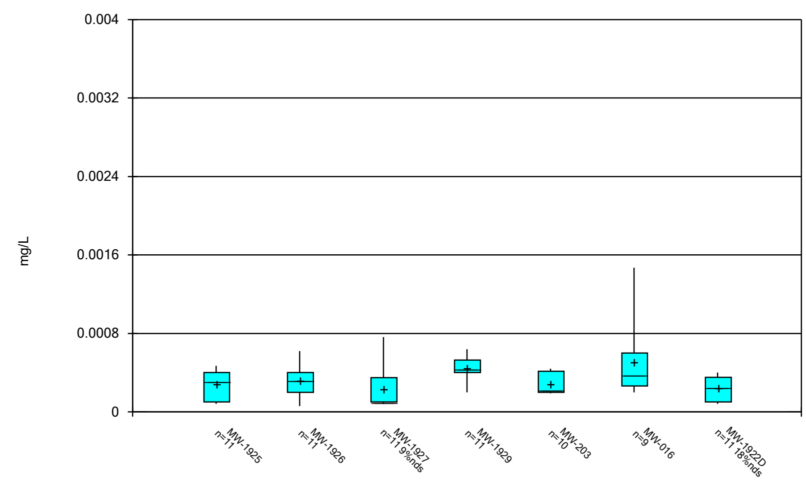
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

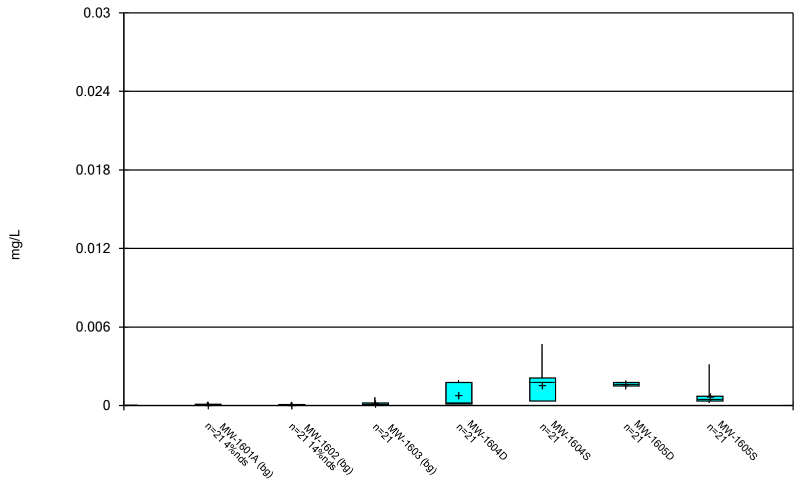


Constituent: Chromium, total   Analysis Run 9/1/2022 10:11 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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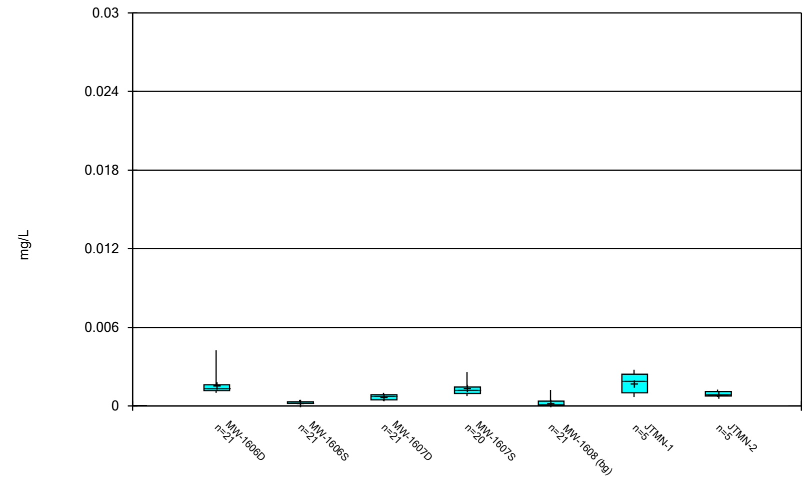
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

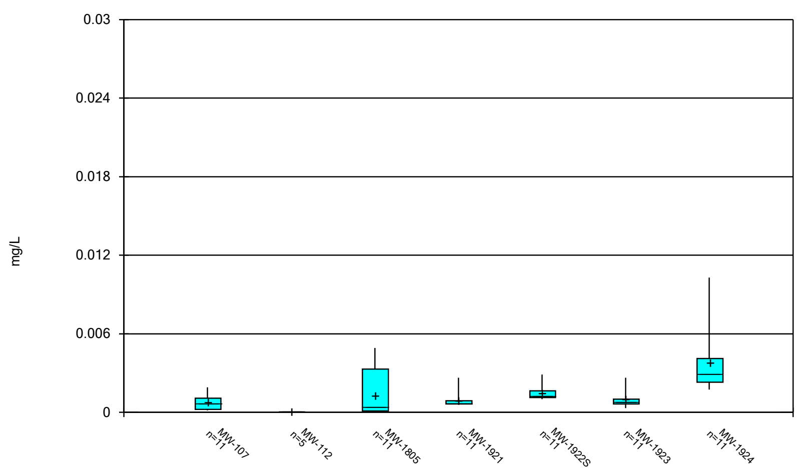
Box & Whiskers Plot



Constituent: Cobalt, total Analysis Run 9/1/2022 10:11 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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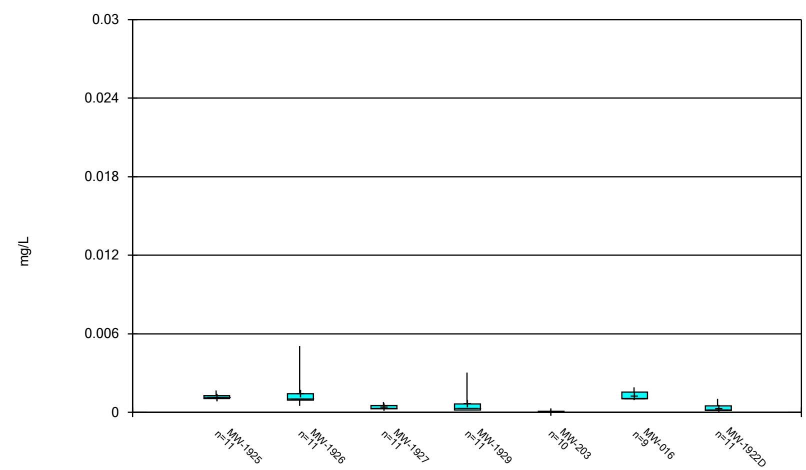
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

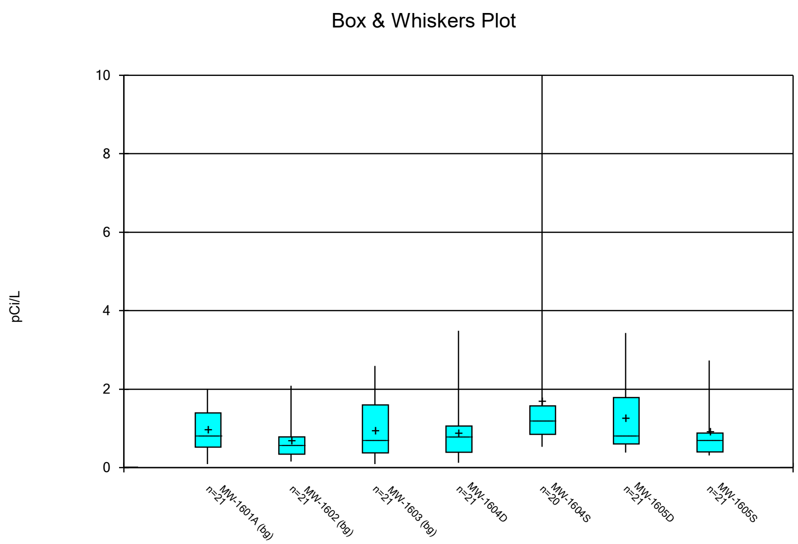
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Cobalt, total Analysis Run 9/1/2022 10:12 AM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

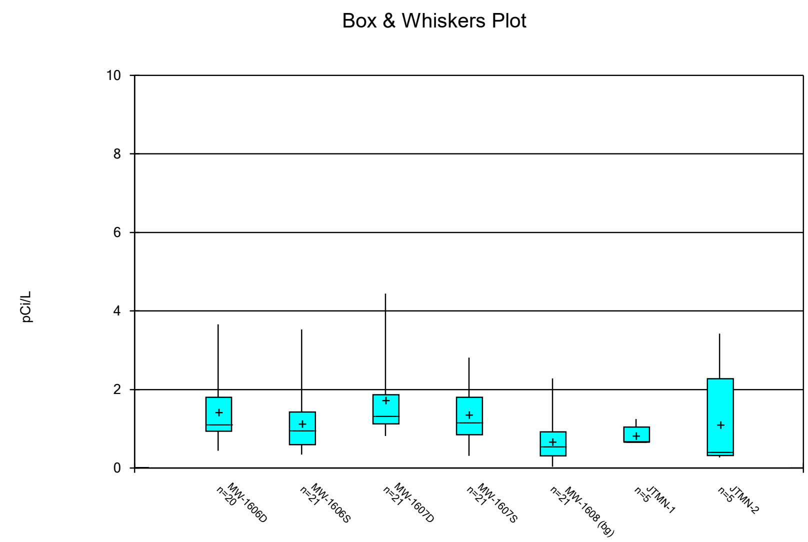
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



Constituent: Combined Radium 226 + 228   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

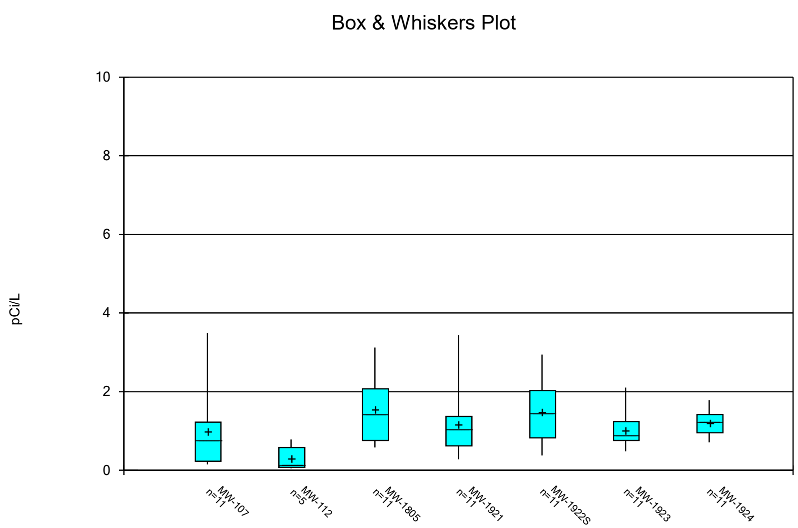
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



Constituent: Combined Radium 226 + 228   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

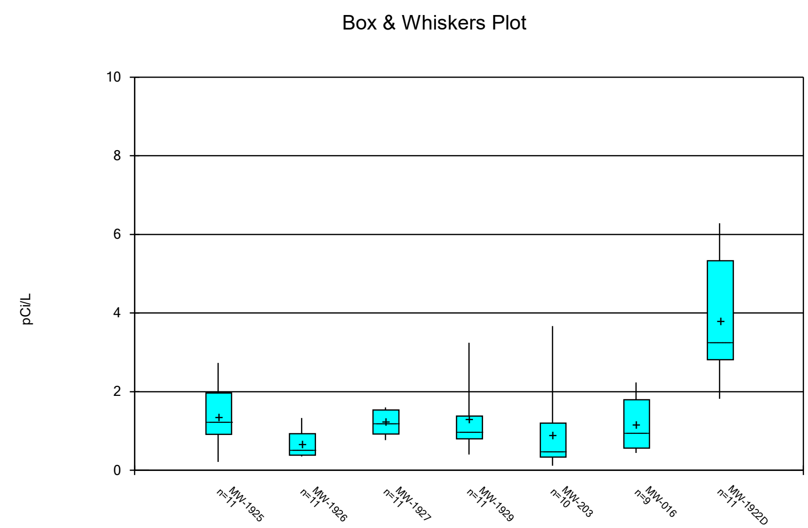
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



Constituent: Combined Radium 226 + 228   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



Constituent: Combined Radium 226 + 228   Analysis Run 9/1/2022 10:12 AM

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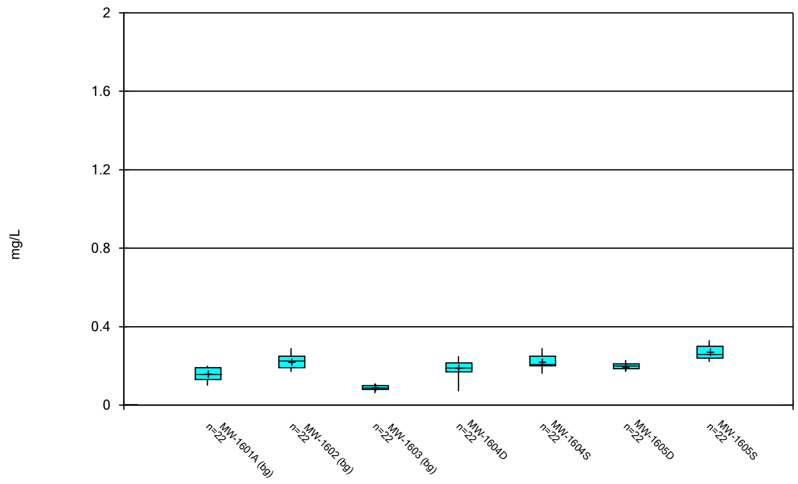
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Fluoride, total   Analysis Run 9/1/2022 10:12 AM

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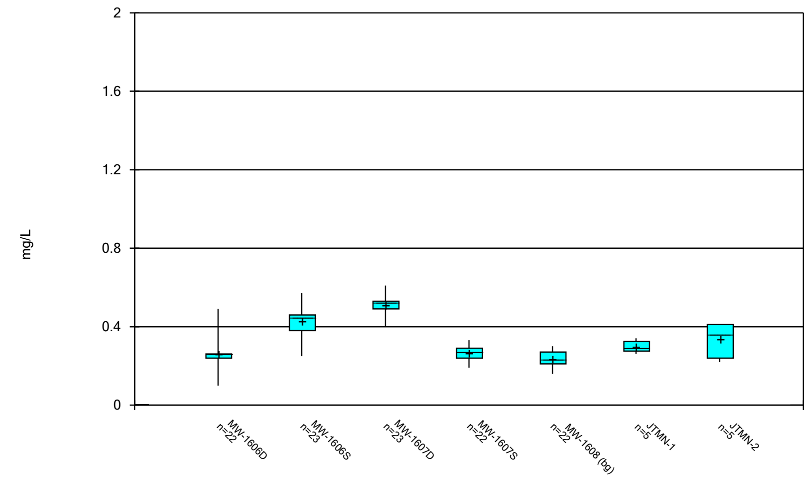
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Fluoride, total   Analysis Run 9/1/2022 10:12 AM

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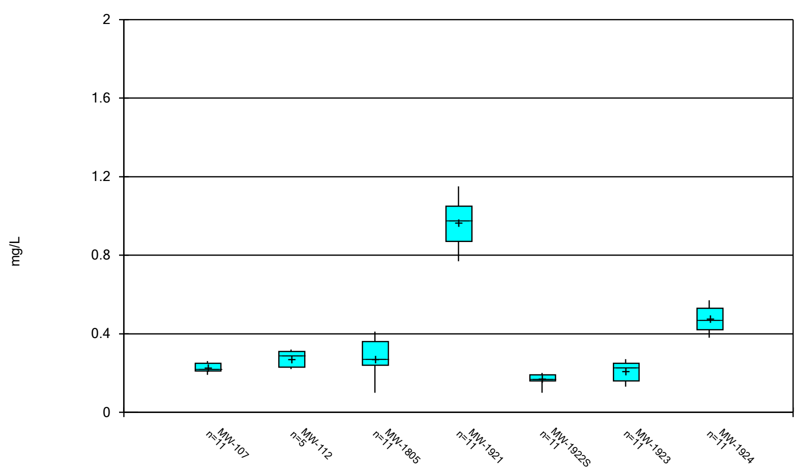
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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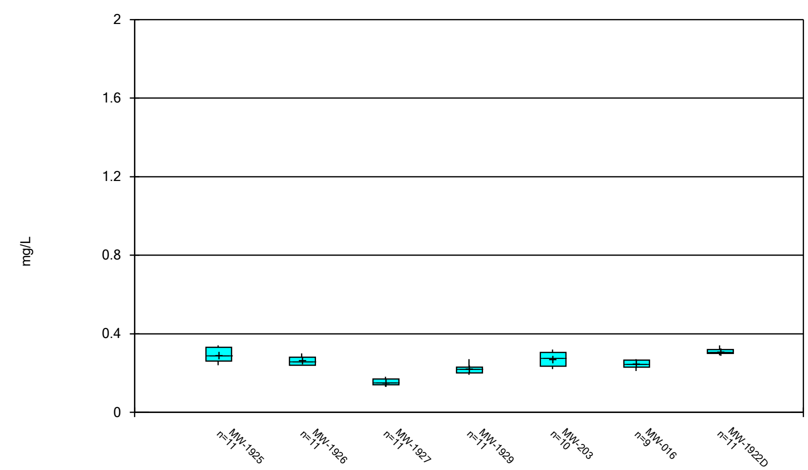
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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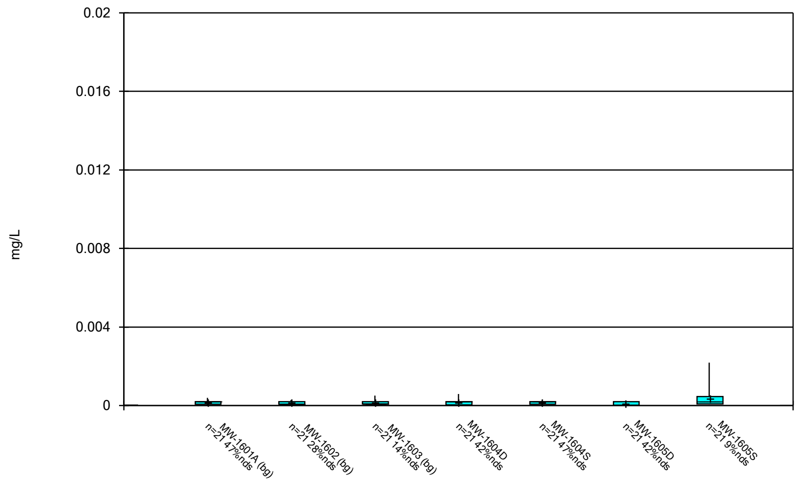
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

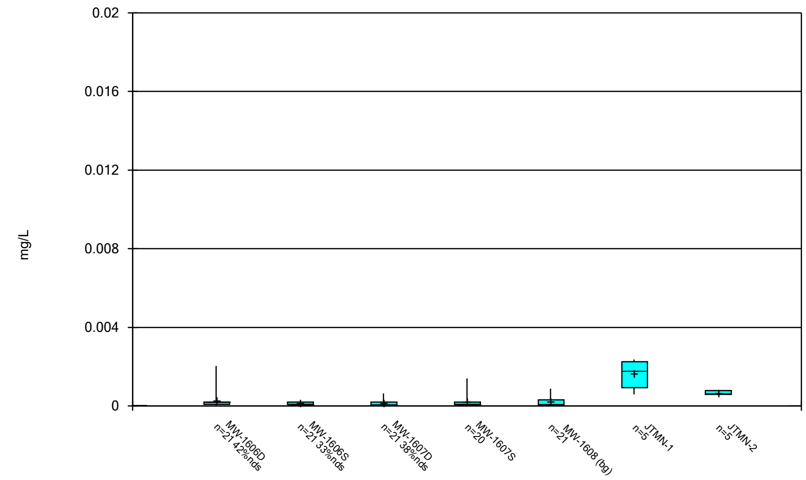


Constituent: Lead, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

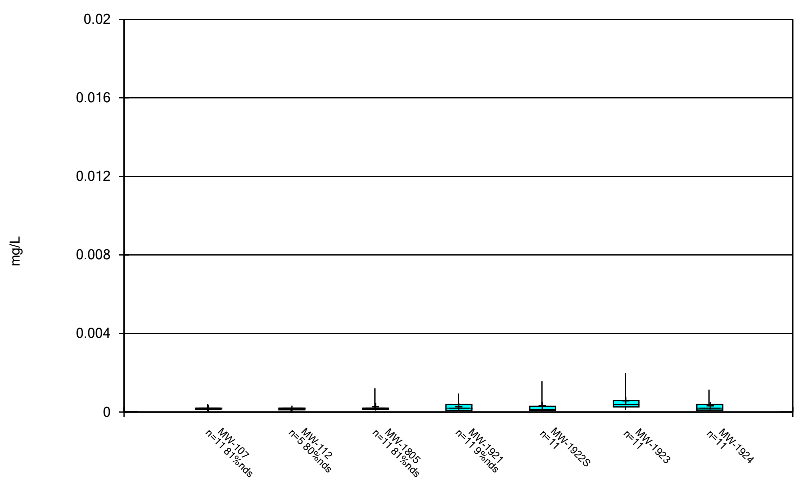


Constituent: Lead, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

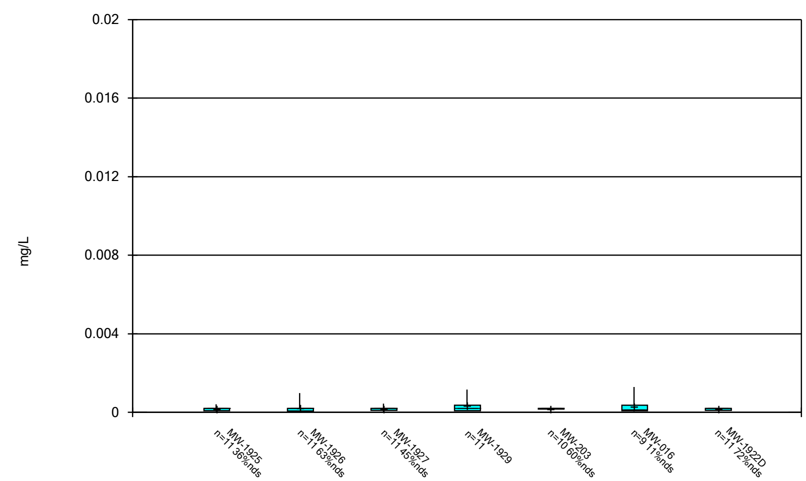


Constituent: Lead, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

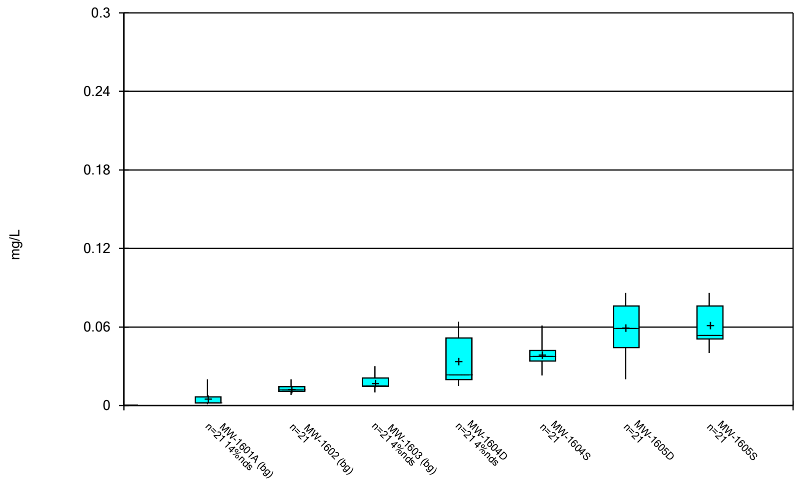


Constituent: Lead, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

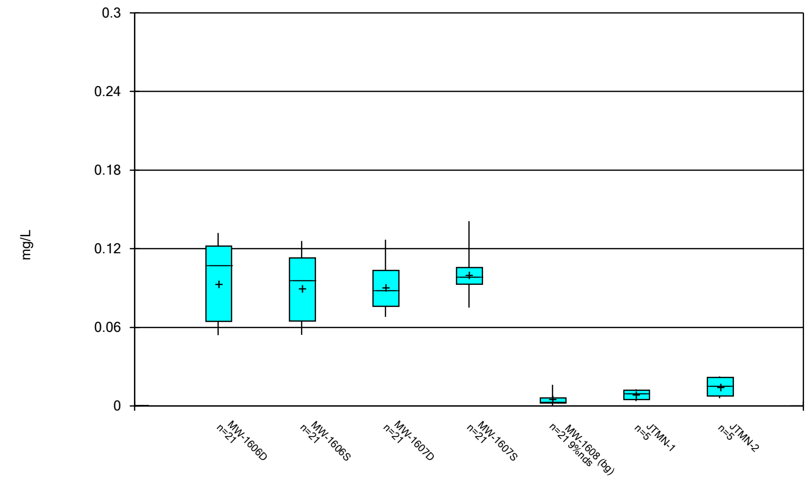


Constituent: Lithium, total Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

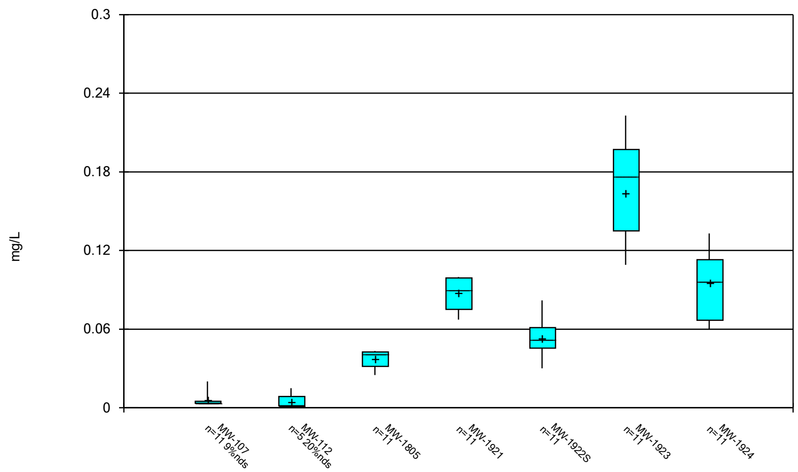


Constituent: Lithium, total Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



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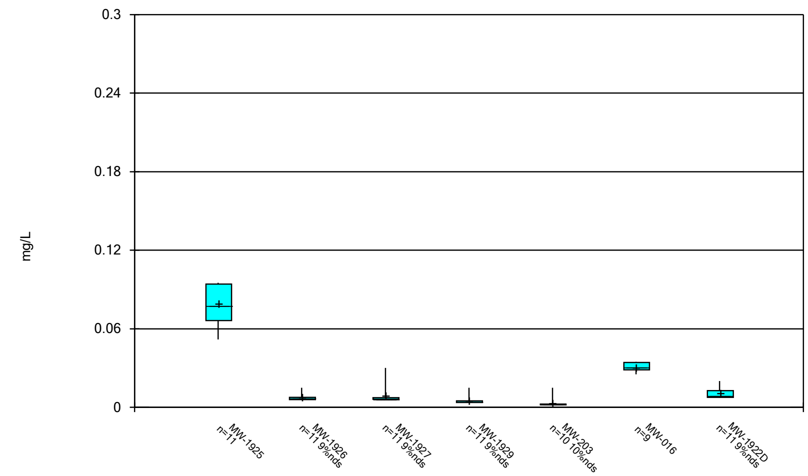
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

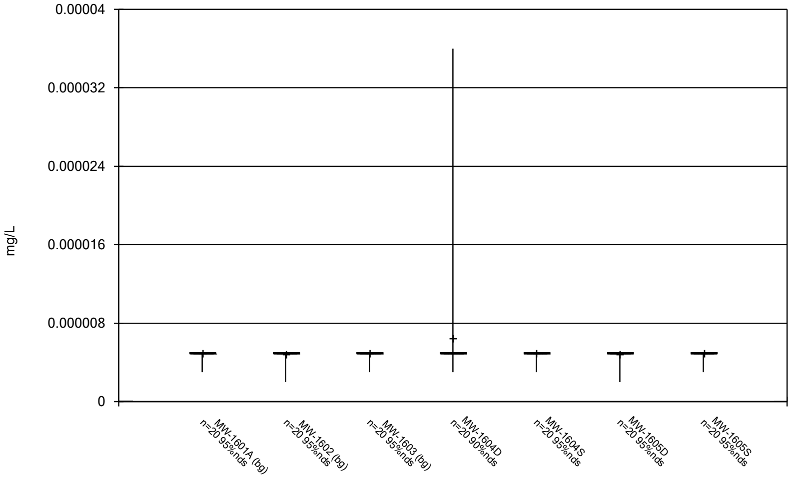


Constituent: Lithium, total Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

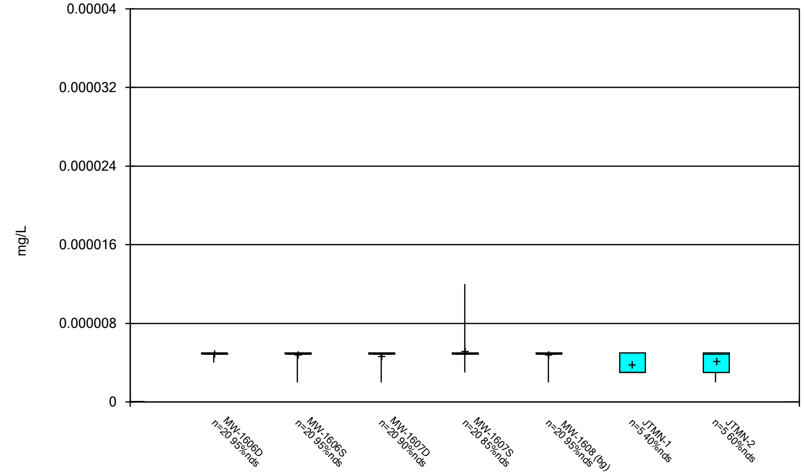


Constituent: Mercury, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

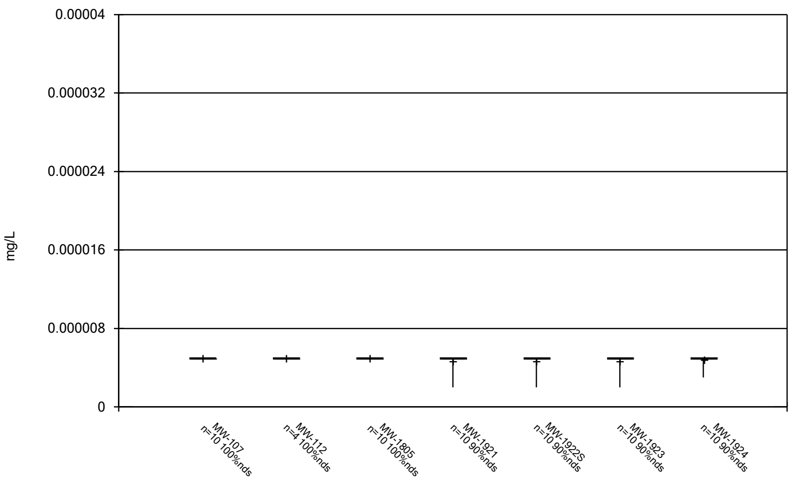


Constituent: Mercury, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

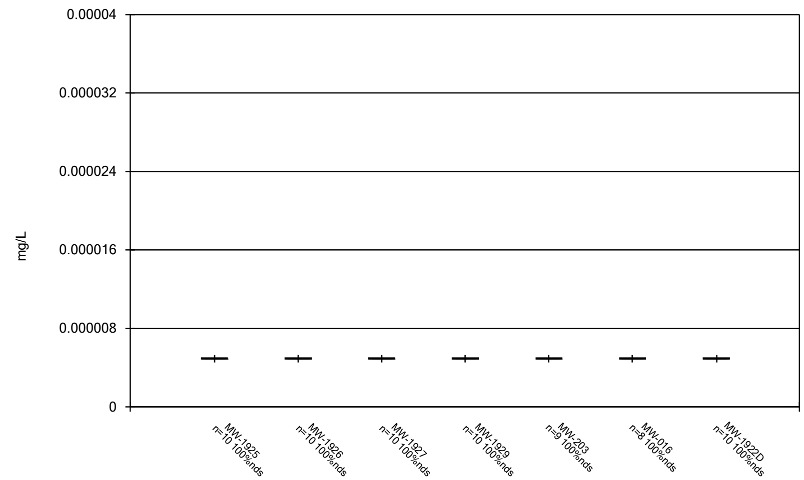


Constituent: Mercury, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

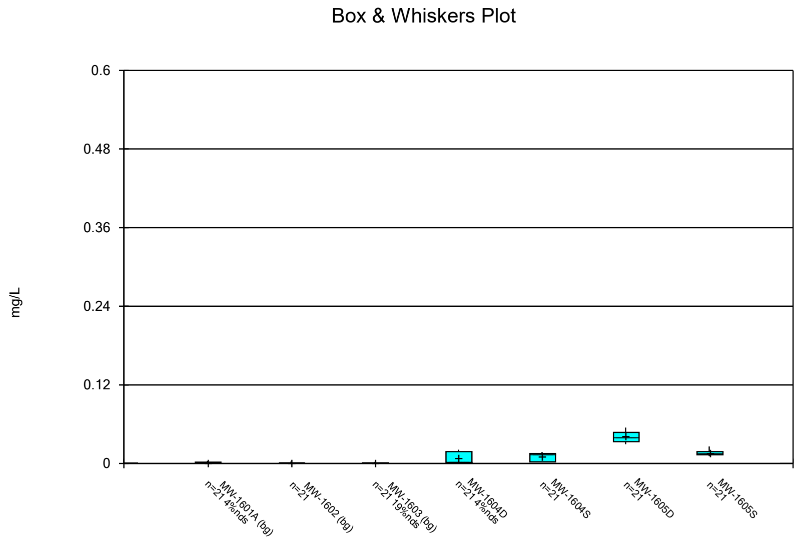
Box & Whiskers Plot



Constituent: Mercury, total   Analysis Run 9/1/2022 10:12 AM

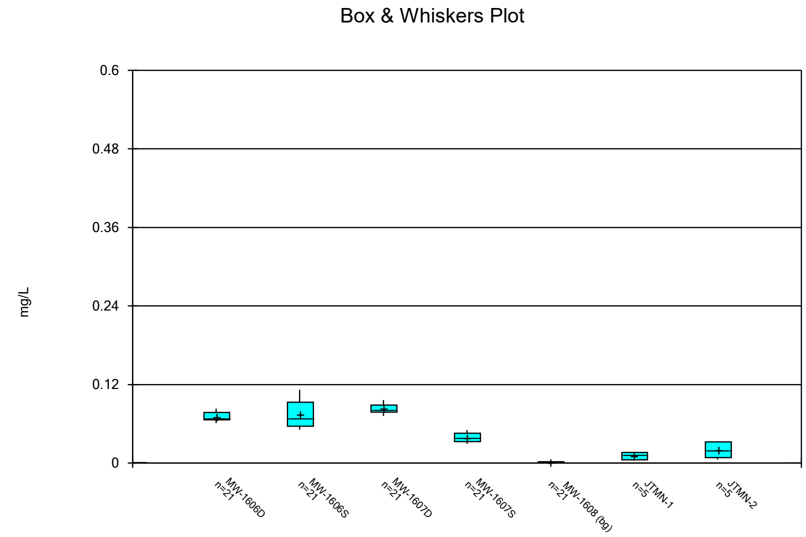
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



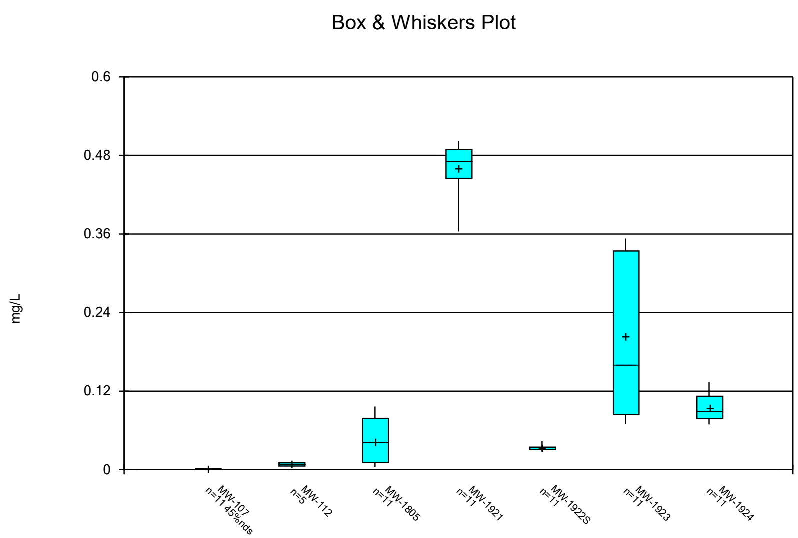
Constituent: Molybdenum, total   Analysis Run 9/1/2022 10:12 AM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



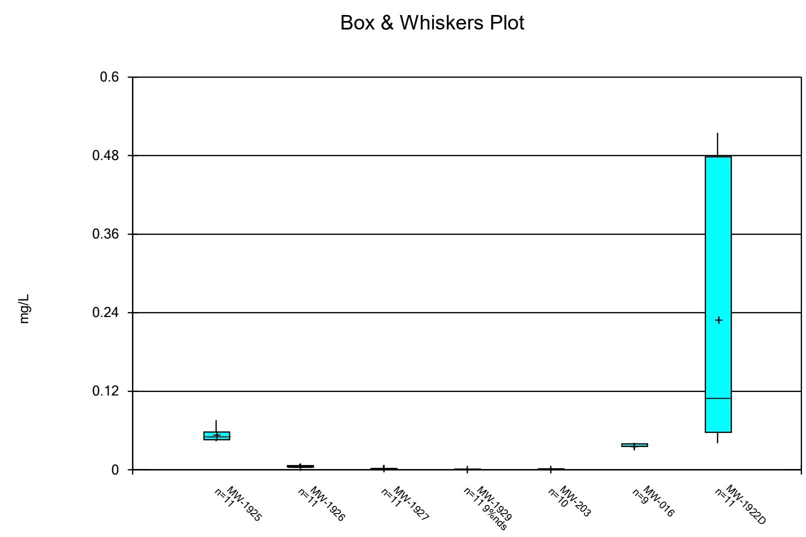
Constituent: Molybdenum, total   Analysis Run 9/1/2022 10:12 AM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



Constituent: Molybdenum, total   Analysis Run 9/1/2022 10:12 AM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

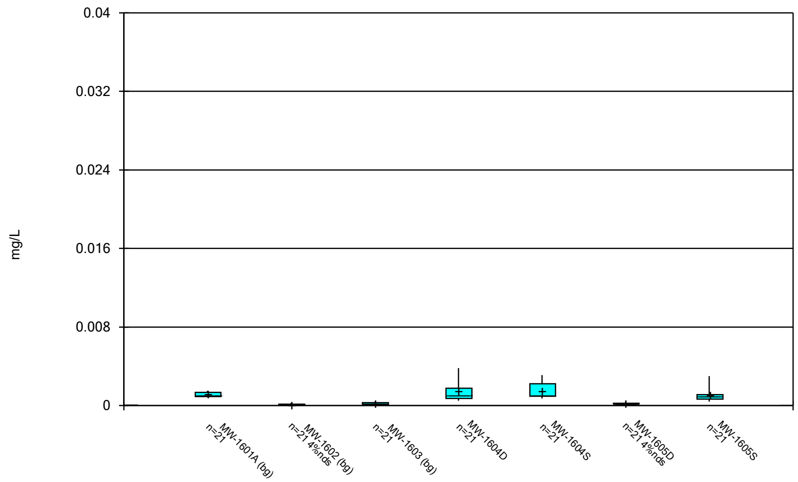
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG



Constituent: Molybdenum, total   Analysis Run 9/1/2022 10:12 AM
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

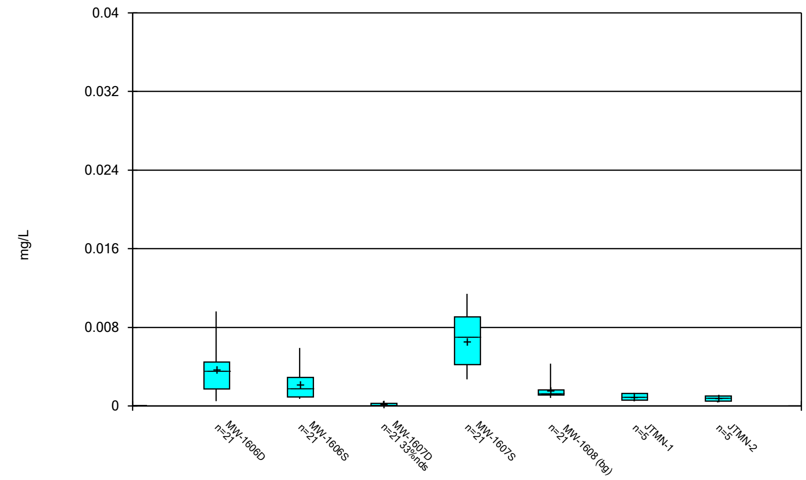


Constituent: Selenium, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

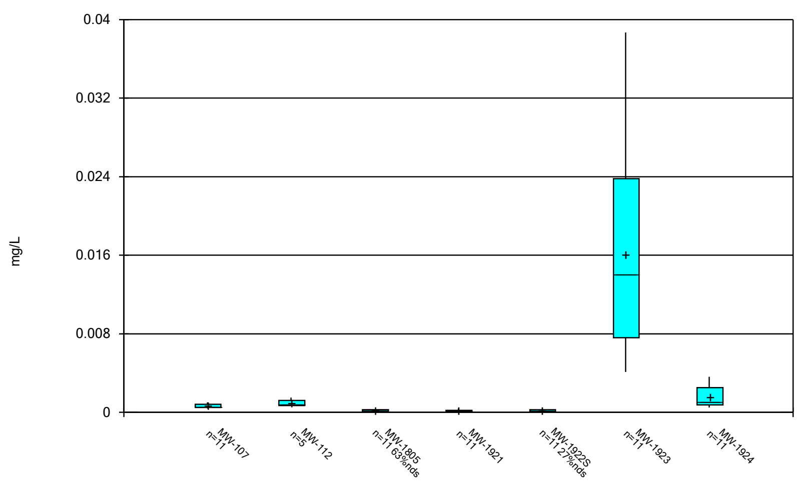


Constituent: Selenium, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

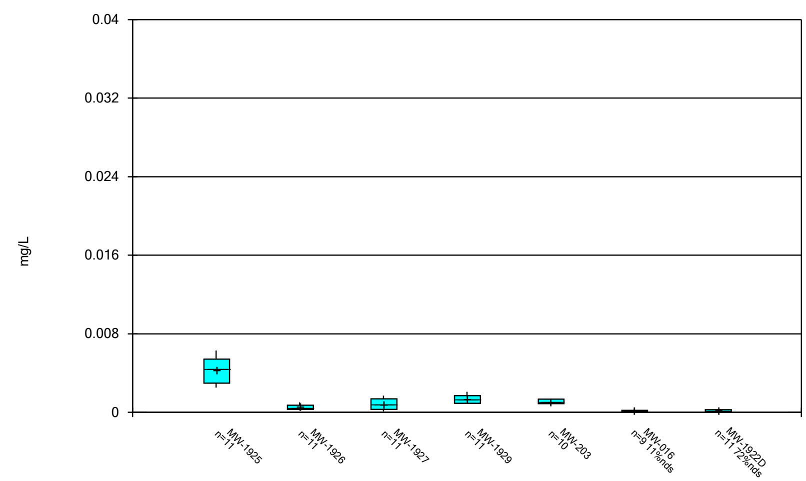


Constituent: Selenium, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

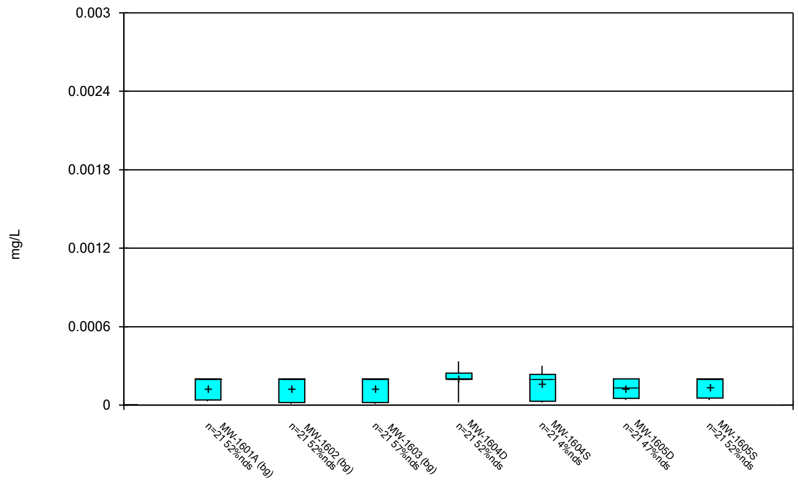


Constituent: Selenium, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

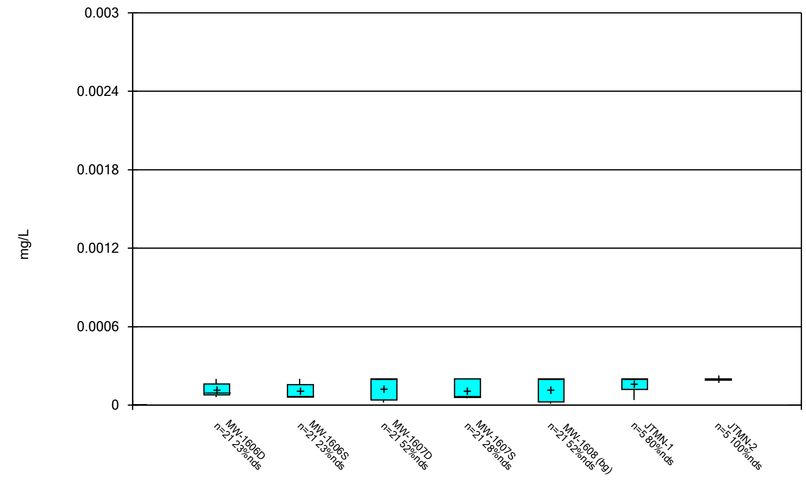


Constituent: Thallium, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

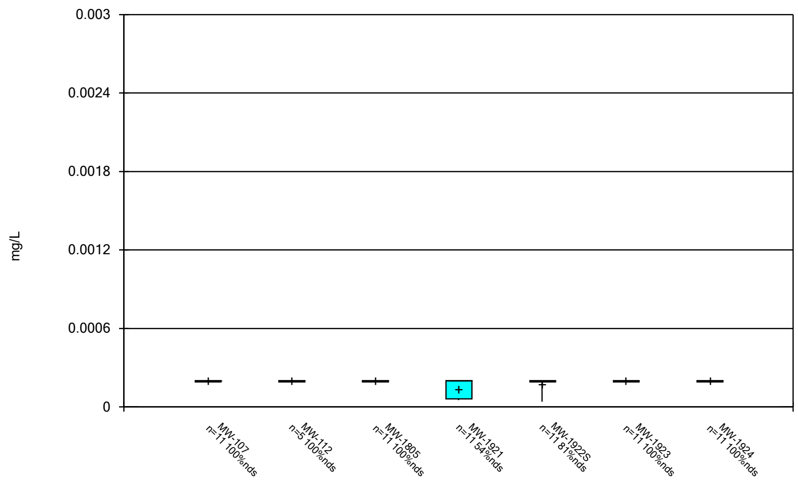


Constituent: Thallium, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot

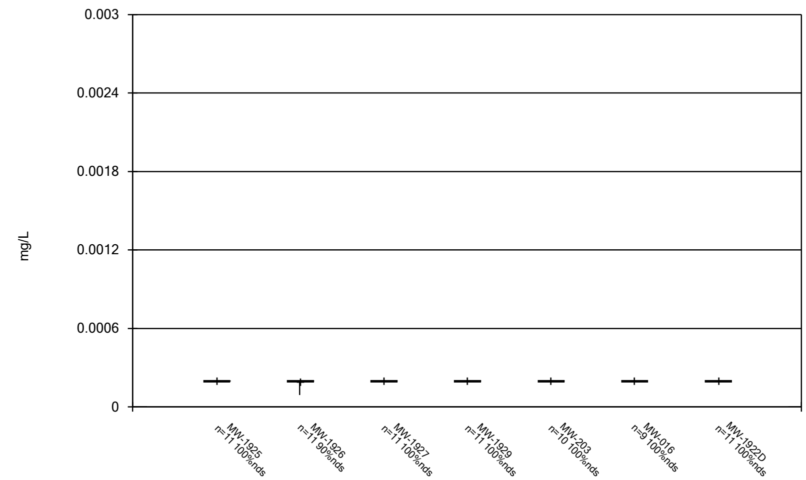


Constituent: Thallium, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Thallium, total   Analysis Run 9/1/2022 10:12 AM

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Outlier Summary

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 9/1/2022, 10:03 AM

	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)						

	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-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)

Upper Tolerance Limit

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 1/14/2022, 4:44 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.00015	n/a	n/a	n/a	76	14.47	n/a	0.02028	NP Inter(normality)
Arsenic, total (mg/L)	n/a	0.0007324	n/a	n/a	n/a	76	0	sqrt(x)	0.05	Inter
Barium, total (mg/L)	n/a	0.0678	n/a	n/a	n/a	76	0	n/a	0.02028	NP Inter(normality)
Beryllium, total (mg/L)	n/a	0.00005	n/a	n/a	n/a	68	89.71	n/a	0.03056	NP Inter(NDs)
Cadmium, total (mg/L)	n/a	0.00005	n/a	n/a	n/a	76	7.895	n/a	0.02028	NP Inter(normality)
Chromium, total (mg/L)	n/a	0.0007377	n/a	n/a	n/a	72	1.389	sqrt(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.0006544	n/a	n/a	n/a	76	5.263	ln(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	n/a	2.24	n/a	n/a	n/a	76	0	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	n/a	0.303	n/a	n/a	n/a	80	0	No	0.05	Inter
Lead, total (mg/L)	n/a	0.000454	n/a	n/a	n/a	76	19.74	x^(1/3)	0.05	Inter
Lithium, total (mg/L)	n/a	0.03	n/a	n/a	n/a	76	7.895	n/a	0.02028	NP Inter(normality)
Mercury, total (mg/L)	n/a	0.000005	n/a	n/a	n/a	72	94.44	n/a	0.02489	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.002867	n/a	n/a	n/a	76	6.579	sqrt(x)	0.05	Inter
Selenium, total (mg/L)	n/a	0.0043	n/a	n/a	n/a	76	0	n/a	0.02028	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.0002	n/a	n/a	n/a	76	48.68	n/a	0.02028	NP Inter(normality)

MOUNTAINEER BAP GWPS				
Constituent Name	MCL	CCR Rule-Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00015	0.006
Arsenic, Total (mg/L)	0.01		0.00073	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	0.00066	0.006
Combined Radium, Total (pCi/L)	5		2.24	5
Fluoride, Total (mg/L)	4		0.3	4
Lead, Total (mg/L)	0.015		0.00045	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	0.0029	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*

Confidence Intervals - Assessment Monitoring - Significant Results

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 9/1/2022, 10:21 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**	**0.06984**	**0.02409**	**0.01**	**Yes**	**11**	**0.04696**	**0.02745**	**0**	**None**	**No**	**0.01**	**Param.**
Arsenic, total (mg/L)	**MW-1922D**	**0.8877**	**0.4243**	**0.01**	**Yes**	**11**	**0.656**	**0.2781**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605D**	**0.06923**	**0.04896**	**0.04**	**Yes**	**21**	**0.0591**	**0.01837**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605S**	**0.06899**	**0.05363**	**0.04**	**Yes**	**21**	**0.06131**	**0.01392**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606D**	**0.124**	**0.0633**	**0.04**	**Yes**	**21**	**0.09357**	**0.02925**	**0**	**None**	**No**	**0.01**	**NP (normality)**
Lithium, total (mg/L)	**MW-1606S**	**0.1032**	**0.07598**	**0.04**	**Yes**	**21**	**0.08959**	**0.02467**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607D**	**0.09935**	**0.082**	**0.04**	**Yes**	**21**	**0.09067**	**0.01572**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607S**	**0.1078**	**0.09277**	**0.04**	**Yes**	**21**	**0.1003**	**0.01366**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1921**	**0.09694**	**0.07828**	**0.04**	**Yes**	**11**	**0.08761**	**0.0112**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1922S**	**0.0638**	**0.04162**	**0.04**	**Yes**	**11**	**0.05271**	**0.01331**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1923**	**0.1966**	**0.1314**	**0.04**	**Yes**	**11**	**0.164**	**0.03909**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1924**	**0.1157**	**0.07408**	**0.04**	**Yes**	**11**	**0.09489**	**0.02497**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1925**	**0.09119**	**0.06639**	**0.04**	**Yes**	**11**	**0.07879**	**0.01488**	**0**	**None**	**No**	**0.01**	**Param.**
Molybdenum, total (mg/L)	**MW-1921**	**0.4942**	**0.4272**	**0.1**	**Yes**	**11**	**0.4607**	**0.04021**	**0**	**None**	**No**	**0.01**	**Param.**

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 9/1/2022, 10:22 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	MW-1604D	0.00013	0.00003	0.006	No	21	0.00007476	0.00004946	4.762	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1604S	0.00016	0.00004	0.006	No	21	0.0001119	0.00006683	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1605D	0.00004122	0.0000314	0.006	No	21	0.00003667	0.000009129	9.524	None	sqrt(x)	0.01	Param.
Antimony, total (mg/L)	MW-1605S	0.00007	0.00004	0.006	No	21	0.0000581	0.00002926	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606D	0.00019	0.00015	0.006	No	21	0.0001667	0.00002852	0	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606S	0.0001564	0.0001427	0.006	No	21	0.0001495	0.00001244	0	None	No	0.01	Param.
Antimony, total (mg/L)	MW-1607D	0.00004	0.00003	0.006	No	21	0.00003429	0.00001028	4.762	None	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1607S	0.000467	0.000423	0.006	No	20	0.000445	0.00003873	0	None	No	0.01	Param.
Antimony, total (mg/L)	JTMN-1	0.0001482	0.00002375	0.006	No	5	0.000086	0.00003715	0	None	No	0.01	Param.
Antimony, total (mg/L)	JTMN-2	0.00014	0.00005	0.006	No	5	0.000072	0.00003834	0	None	No	0.031	NP (normality)
Antimony, total (mg/L)	MW-107	0.00005	0.00002	0.006	No	11	0.00003727	0.00001489	36.36	None	No	0.006	NP (normality)
Antimony, total (mg/L)	MW-112	0.0000637	0.0000163	0.006	No	5	0.000044	0.00001342	40	Kaplan-Meier	No	0.01	Param.
Antimony, total (mg/L)	MW-1805	0.00009	0.00003	0.006	No	11	0.0002418	0.00063	18.18	None	No	0.006	NP (normality)
Antimony, total (mg/L)	MW-1921	0.0001268	0.00009091	0.006	No	11	0.0001091	0.00002256	0	None	sqrt(x)	0.01	Param.
Antimony, total (mg/L)	MW-1922S	0.00006	0.00002	0.006	No	11	0.00004636	0.00002063	45.45	None	No	0.006	NP (normality)
Antimony, total (mg/L)	MW-1923	0.0002294	0.0001797	0.006	No	11	0.0002045	0.00002979	0	None	No	0.01	Param.
Antimony, total (mg/L)	MW-1924	0.0001077	0.00005665	0.006	No	11	0.00008455	0.00004204	0	None	ln(x)	0.01	Param.
Antimony, total (mg/L)	MW-1925	0.00021	0.00018	0.006	No	11	0.0002018	0.00002676	0	None	No	0.006	NP (normality)
Antimony, total (mg/L)	MW-1926	0.00008556	0.00004898	0.006	No	11	0.00006727	0.00002195	0	None	No	0.01	Param.
Antimony, total (mg/L)	MW-1927	0.0001714	0.00008668	0.006	No	11	0.0001309	0.00006172	0	None	x^(1/3)	0.01	Param.
Antimony, total (mg/L)	MW-1929	0.00005	0.00002	0.006	No	11	0.00003364	0.00001286	18.18	None	No	0.006	NP (normality)
Antimony, total (mg/L)	MW-203	0.00005	0.00003	0.006	No	10	0.000044	0.00001265	60	None	No	0.011	NP (NDs)
Antimony, total (mg/L)	MW-016	0.00004993	0.00001666	0.006	No	9	0.00004667	0.00001871	33.33	Kaplan-Meier	ln(x)	0.01	Param.
Antimony, total (mg/L)	MW-1922D	0.001589	0.0004374	0.006	No	11	0.00116	0.001296	0	None	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1604D	0.0004394	0.0003187	0.01	No	21	0.000379	0.0001094	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1604S	0.0004087	0.0003189	0.01	No	21	0.0003638	0.00008133	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605D	0.002842	0.002405	0.01	No	21	0.002623	0.0003965	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605S	0.0007481	0.0005021	0.01	No	21	0.0006381	0.0002442	0	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1606D	0.0005522	0.0003529	0.01	No	21	0.0004838	0.0002551	0	None	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1606S	0.0007968	0.0006784	0.01	No	21	0.0007376	0.0001073	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607D	0.00162	0.001212	0.01	No	21	0.001416	0.0003696	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607S	0.00117	0.0009	0.01	No	20	0.00106	0.0002689	0	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	JTMN-1	0.002887	0.0007291	0.01	No	5	0.001808	0.0006438	0	None	No	0.01	Param.
Arsenic, total (mg/L)	JTMN-2	0.001178	0.0007142	0.01	No	5	0.000946	0.0001383	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-107	0.0005778	0.0003022	0.01	No	11	0.0004527	0.0002267	0	None	ln(x)	0.01	Param.
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-1805**	**0.06984**	**0.02409**	**0.01**	**Yes**	**11**	**0.04696**	**0.02745**	**0**	**None**	**No**	**0.01**	**Param.**
Arsenic, total (mg/L)	MW-1921	0.00161	0.00114	0.01	No	11	0.001465	0.0006501	0	None	No	0.006	NP (normality)
Arsenic, total (mg/L)	MW-1922S	0.00325	0.00179	0.01	No	11	0.00235	0.0007436	0	None	No	0.006	NP (normality)
Arsenic, total (mg/L)	MW-1923	0.0009956	0.0005526	0.01	No	11	0.0007909	0.0003393	0	None	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1924	0.00118	0.00055	0.01	No	11	0.0007491	0.0002658	0	None	No	0.006	NP (normality)
Arsenic, total (mg/L)	MW-1925	0.0005735	0.0003094	0.01	No	11	0.0004445	0.0001744	0	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1926	0.00038	0.00031	0.01	No	11	0.0003909	0.0001872	0	None	No	0.006	NP (normality)
Arsenic, total (mg/L)	MW-1927	0.0003422	0.0002415	0.01	No	11	0.0002936	0.00006727	0	None	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1929	0.00079	0.00033	0.01	No	11	0.0004709	0.0001688	0	None	No	0.006	NP (normality)
Arsenic, total (mg/L)	MW-203	0.0003025	0.0002435	0.01	No	10	0.000273	0.00003302	0	None	No	0.01	Param.
Arsenic, total (mg/L)	MW-016	0.005515	0.002853	0.01	No	9	0.004203	0.001734	0	None	ln(x)	0.01	Param.
Arsenic, total (mg/L)	**MW-1922D**	**0.8877**	**0.4243**	**0.01**	**Yes**	**11**	**0.656**	**0.2781**	**0**	**None**	**No**	**0.01**	**Param.**
Barium, total (mg/L)	MW-1604D	0.03559	0.02741	2	No	21	0.03216	0.008718	0	None	ln(x)	0.01	Param.
Barium, total (mg/L)	MW-1604S	0.02976	0.02739	2	No	21	0.02858	0.002143	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1605D	0.02906	0.02575	2	No	21	0.02741	0.003	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1605S	0.03337	0.02611	2	No	21	0.02974	0.006581	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1606D	0.055	0.04763	2	No	21	0.05131	0.006684	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1606S	0.07078	0.06011	2	No	21	0.06544	0.009674	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1607D	0.131	0.0705	2	No	21	0.09841	0.0333	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1607S	0.0708	0.06353	2	No	20	0.06717	0.006407	0	None	No	0.01	Param.
Barium, total (mg/L)	JTMN-1	0.1016	0.06691	2	No	5	0.08428	0.01036	0	None	No	0.01	Param.
Barium, total (mg/L)	JTMN-2	0.1003	0.06317	2	No	5	0.08176	0.01109	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-107	0.0613	0.04028	2	No	11	0.05079	0.01262	0	None	No	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.

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 9/1/2022, 10:22 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Barium, total (mg/L)	MW-1805	0.04386	0.02794	2	No	11	0.0359	0.009557	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1921	0.0609	0.05147	2	No	11	0.05618	0.005656	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1922S	0.03151	0.02533	2	No	11	0.02842	0.003705	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1923	0.09714	0.07889	2	No	11	0.08802	0.01095	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1924	0.05788	0.03984	2	No	11	0.04886	0.01082	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1925	0.04436	0.03724	2	No	11	0.0408	0.004278	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1926	0.02419	0.01972	2	No	11	0.02197	0.002784	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW-1927	0.06001	0.05409	2	No	11	0.05705	0.003552	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-1929	0.05212	0.04541	2	No	11	0.04876	0.004028	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-203	0.03287	0.02689	2	No	10	0.02988	0.003349	0	None	No	0.01	Param.
Barium, total (mg/L)	MW-016	0.0487	0.0226	2	No	9	0.02872	0.009098	0	None	No	0.002	NP (normality)
Barium, total (mg/L)	MW-1922D	0.331	0.0547	2	No	11	0.1755	0.1209	0	None	No	0.006	NP (normality)
Beryllium, total (mg/L)	MW-1604S	0.00005	0.000024	0.004	No	19	0.00004863	0.000005965	94.74	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1605S	0.00005	0.00002	0.004	No	19	0.000044	0.00001443	84.21	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1606D	0.00005	0.000031	0.004	No	19	0.00004211	0.00001653	78.95	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1606S	0.00005	0.000005	0.004	No	19	0.00004763	0.00001032	94.74	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1607D	0.00005	0.000008	0.004	No	19	0.00004779	0.000009635	94.74	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	MW-1607S	0.000123	0.00001	0.004	No	19	0.00004737	0.00002386	78.95	None	No	0.01	NP (NDs)
Beryllium, total (mg/L)	JTMN-1	0.00008196	0.000006443	0.004	No	5	0.0000442	0.00002253	0	None	No	0.01	Param.
Beryllium, total (mg/L)	JTMN-2	0.00003	0.000019	0.004	No	5	0.0000236	0.000005459	0	None	No	0.031	NP (normality)
Beryllium, total (mg/L)	MW-107	0.00005	0.00005	0.004	No	9	0.00005	0	100	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-112	0.00005	0.00005	0.004	No	4	0.00005	0	100	None	No	0.0625	NP (NDs)
Beryllium, total (mg/L)	MW-1805	0.00005	0.00005	0.004	No	9	0.00005	0	100	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-1921	0.00005	0.000009	0.004	No	9	0.00004211	0.00001589	77.78	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-1922S	0.00005	0.000018	0.004	No	9	0.00004644	0.00001067	88.89	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-1923	0.000064	0.000015	0.004	No	9	0.000043	0.00001639	55.56	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-1924	0.00005	0.000008	0.004	No	9	0.00003856	0.00001826	66.67	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-1925	0.00005	0.000008	0.004	No	9	0.00004533	0.000014	88.89	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-1926	0.00005	0.00005	0.004	No	9	0.00005	0	100	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-1927	0.00005	0.00005	0.004	No	9	0.00005	0	100	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-1929	0.00005	0.00005	0.004	No	9	0.00005	0	100	None	No	0.002	NP (NDs)
Beryllium, total (mg/L)	MW-203	0.00005	0.00005	0.004	No	8	0.00005	0	100	None	No	0.004	NP (NDs)
Beryllium, total (mg/L)	MW-016	0.00005	0.00004	0.004	No	7	0.00004857	0.00000378	85.71	None	No	0.008	NP (NDs)
Beryllium, total (mg/L)	MW-1922D	0.00005	0.00005	0.004	No	9	0.00005	0	100	None	No	0.002	NP (NDs)
Cadmium, total (mg/L)	MW-1604D	0.00013	0.000027	0.005	No	21	0.00006967	0.00005575	0	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1604S	0.0001816	0.0001029	0.005	No	21	0.0001264	0.00007808	0	None	x^2	0.01	Param.
Cadmium, total (mg/L)	MW-1605D	0.00002709	0.00001561	0.005	No	21	0.00002219	0.00001086	4.762	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1605S	0.0000713	0.00004745	0.005	No	21	0.00006067	0.0000231	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1606D	0.00007726	0.00006483	0.005	No	21	0.00007105	0.00001127	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1606S	0.00007433	0.00006386	0.005	No	21	0.0000691	0.000009492	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1607D	0.00002	0.00001	0.005	No	21	0.00001657	0.000006554	52.38	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	MW-1607S	0.000049	0.00003331	0.005	No	20	0.00004295	0.00001803	0	None	ln(x)	0.01	Param.
Cadmium, total (mg/L)	JTMN-1	0.000114	0.000021	0.005	No	5	0.0000444	0.00003907	0	None	No	0.031	NP (normality)
Cadmium, total (mg/L)	JTMN-2	0.00005787	0.00001133	0.005	No	5	0.0000346	0.00001389	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-107	0.00004934	0.00002538	0.005	No	11	0.00003736	0.00001438	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-112	0.000007296	0.000004288	0.005	No	5	0.0000118	0.00000753	40	Kaplan-Meier	ln(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1805	0.00002	0.00002	0.005	No	11	0.00002	0	100	Kaplan-Meier	No	0.006	NP (NDs)
Cadmium, total (mg/L)	MW-1921	0.000047	0.00002	0.005	No	11	0.00003118	0.00001411	45.45	None	No	0.006	NP (normality)
Cadmium, total (mg/L)	MW-1922S	0.00003137	0.000006938	0.005	No	11	0.00002973	0.00003256	45.45	Kaplan-Meier	ln(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1923	0.00003908	0.00001383	0.005	No	11	0.00002645	0.00001515	9.091	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1924	0.00009	0.000051	0.005	No	11	0.00007545	0.00004273	0	None	No	0.006	NP (normality)
Cadmium, total (mg/L)	MW-1925	0.00005822	0.00004142	0.005	No	11	0.00004982	0.00001008	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1926	0.00005287	0.00003659	0.005	No	11	0.00004473	0.000009768	0	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1927	0.00007701	0.00004517	0.005	No	11	0.00006109	0.0000191	9.091	None	No	0.01	Param.
Cadmium, total (mg/L)	MW-1929	0.00001918	0.000005886	0.005	No	11	0.00001645	0.000009575	18.18	Kaplan-Meier	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-203	0.00002	0.000005	0.005	No	10	0.0000127	0.000007732	50	None	No	0.011	NP (normality)
Cadmium, total (mg/L)	MW-016	0.00004	0.000018	0.005	No	9	0.00002333	0.000007159	11.11	None	No	0.002	NP (normality)
Cadmium, total (mg/L)	MW-1922D	0.00002	0.000009	0.005	No	11	0.00001673	0.000005729	72.73	None	No	0.006	NP (NDs)
Chromium, total (mg/L)	MW-1604D	0.0004573	0.0002325	0.1	No	21	0.0003649	0.000233	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1604S	0.0003675	0.0001609	0.1	No	20	0.0002847	0.0002041	0	None	sqrt(x)	0.01	Param.

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 9/1/2022, 10:22 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Chromium, total (mg/L)	MW-1605D	0.0002323	0.0001036	0.1	No	20	0.0001804	0.0001352	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1605S	0.0004374	0.000223	0.1	No	20	0.0003302	0.0001888	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1606D	0.0004378	0.0001862	0.1	No	21	0.0003402	0.0002556	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1606S	0.000393	0.0001392	0.1	No	21	0.0003004	0.0002946	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1607D	0.000292	0.0001133	0.1	No	20	0.0002229	0.0001837	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1607S	0.0004321	0.000254	0.1	No	20	0.0003431	0.0001568	0	None	No	0.01	Param.
Chromium, total (mg/L)	JTMN-1	0.00286	0.0004437	0.1	No	5	0.001652	0.0007211	0	None	No	0.01	Param.
Chromium, total (mg/L)	JTMN-2	0.001619	0.0004645	0.1	No	5	0.001042	0.0003446	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-107	0.0004926	0.0001479	0.1	No	11	0.0003203	0.0002068	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-1805	0.0004757	0.0001688	0.1	No	11	0.0003328	0.0002403	0	None	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	MW-1921	0.000689	0.0001695	0.1	No	11	0.0004293	0.0003117	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1922S	0.00088	0.0002	0.1	No	11	0.0004029	0.0004081	0	None	No	0.006	NP (normality)
Chromium, total (mg/L)	MW-1923	0.001381	0.000417	0.1	No	11	0.0009205	0.0006721	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1924	0.0008535	0.0002152	0.1	No	11	0.0005507	0.000451	0	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1925	0.0004054	0.000178	0.1	No	11	0.0002772	0.0001527	0	None	x^2	0.01	Param.
Chromium, total (mg/L)	MW-1926	0.0004628	0.0001723	0.1	No	11	0.0003175	0.0001743	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-1927	0.00036	0.0001	0.1	No	11	0.0002326	0.0002058	9.091	None	No	0.006	NP (normality)
Chromium, total (mg/L)	MW-1929	0.000551	0.0003378	0.1	No	11	0.0004444	0.0001279	0	None	No	0.01	Param.
Chromium, total (mg/L)	MW-203	0.00044	0.0002	0.1	No	10	0.0002852	0.0001079	0	None	No	0.011	NP (normality)
Chromium, total (mg/L)	MW-016	0.0007433	0.0002307	0.1	No	9	0.0005016	0.0003949	0	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-1922D	0.0003353	0.0001545	0.1	No	11	0.0002395	0.0001182	18.18	Kaplan-Meier	No	0.01	Param.
Cobalt, total (mg/L)	MW-1604D	0.00176	0.000126	0.006	No	21	0.0007823	0.0008043	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1604S	0.00214	0.000317	0.006	No	21	0.001503	0.001106	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1605D	0.001721	0.001531	0.006	No	21	0.001626	0.0001719	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1605S	0.000833	0.0003719	0.006	No	21	0.0006786	0.0006348	0	None	x^(1/3)	0.01	Param.
Cobalt, total (mg/L)	MW-1606D	0.0016	0.00117	0.006	No	21	0.001562	0.0006846	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1606S	0.0003281	0.0002201	0.006	No	21	0.0002741	0.00009796	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1607D	0.0008329	0.0006178	0.006	No	21	0.0007037	0.0002112	0	None	x^2	0.01	Param.
Cobalt, total (mg/L)	MW-1607S	0.001549	0.00103	0.006	No	20	0.001315	0.0005071	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	JTMN-1	0.003089	0.0004211	0.006	No	5	0.001755	0.0007959	0	None	No	0.01	Param.
Cobalt, total (mg/L)	JTMN-2	0.001265	0.0005833	0.006	No	5	0.000924	0.0002033	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-107	0.00125	0.0003073	0.006	No	11	0.0007788	0.0005659	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-1805	0.00207	0.00009599	0.006	No	11	0.001279	0.001733	0	None	x^(1/3)	0.01	Param.
Cobalt, total (mg/L)	MW-1921	0.000951	0.000604	0.006	No	11	0.0009081	0.0005873	0	None	No	0.006	NP (normality)
Cobalt, total (mg/L)	MW-1922S	0.001831	0.001061	0.006	No	11	0.001459	0.0005378	0	None	x^(1/3)	0.01	Param.
Cobalt, total (mg/L)	MW-1923	0.001433	0.0004661	0.006	No	11	0.0009702	0.0006861	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1924	0.00513	0.00217	0.006	No	11	0.003843	0.002532	0	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1925	0.001379	0.001039	0.006	No	11	0.001209	0.0002039	0	None	No	0.01	Param.
Cobalt, total (mg/L)	MW-1926	0.00194	0.0007374	0.006	No	11	0.001449	0.00124	0	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1927	0.000524	0.0002526	0.006	No	11	0.0003921	0.0001787	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1929	0.0009518	0.0001694	0.006	No	11	0.0007027	0.0009093	0	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW-203	0.00008121	0.00002069	0.006	No	10	0.0000516	0.00004013	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-016	0.00156	0.0009638	0.006	No	9	0.001261	0.0003246	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW-1922D	0.0005021	0.0001332	0.006	No	11	0.0003268	0.0002704	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604D	1.14	0.4761	5	No	21	0.8838	0.7229	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604S	1.849	0.8833	5	No	20	1.694	2.025	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605D	1.623	0.7456	5	No	21	1.274	0.919	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605S	1.044	0.4969	5	No	21	0.9192	0.7591	0	None	ln(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606D	1.8	0.9319	5	No	20	1.435	0.8583	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606S	1.45	0.6844	5	No	21	1.143	0.8127	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607D	2.106	1.198	5	No	21	1.75	1.001	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607S	1.779	0.9507	5	No	21	1.365	0.7505	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	JTMN-1	1.25	0.65	5	No	5	0.8212	0.2509	0	None	No	0.031	NP (normality)
Combined Radium 226 + 228 (pCi/L)	JTMN-2	3.457	0.0001968	5	No	5	1.12	1.329	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-107	1.599	0.2658	5	No	11	0.9756	0.9865	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-1805	2.23	0.8431	5	No	11	1.537	0.8322	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1921	1.75	0.5422	5	No	11	1.173	0.8538	0	None	sqrt(x)	0.01	Param.

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 9/1/2022, 10:22 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	2.118	0.8351	5	No	11	1.476	0.7695	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1923	1.32	0.6638	5	No	11	1	0.4369	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1924	1.485	0.9236	5	No	11	1.204	0.3366	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1925	1.934	0.771	5	No	11	1.353	0.6979	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1926	0.9514	0.3921	5	No	11	0.6812	0.3666	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1927	1.472	0.9708	5	No	11	1.222	0.301	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1929	1.927	0.5844	5	No	11	1.286	0.9478	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-203	1.435	0.2144	5	No	10	0.8755	1.06	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-016	1.833	0.5305	5	No	9	1.182	0.6746	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1922D	4.966	2.636	5	No	11	3.801	1.398	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1604D	0.2098	0.1675	4	No	22	0.1886	0.03944	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1604S	0.2371	0.2029	4	No	22	0.22	0.03177	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605D	0.2074	0.189	4	No	22	0.1982	0.01708	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605S	0.2869	0.2513	4	No	22	0.2691	0.03322	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1606D	0.27	0.24	4	No	22	0.2577	0.06294	0	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW-1606S	0.4647	0.3909	4	No	23	0.4278	0.07058	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1607D	0.5325	0.4832	4	No	23	0.5078	0.04709	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1607S	0.2854	0.2474	4	No	22	0.2664	0.0354	0	None	No	0.01	Param.
Fluoride, total (mg/L)	JTMN-1	0.3474	0.2486	4	No	5	0.298	0.0295	0	None	No	0.01	Param.
Fluoride, total (mg/L)	JTMN-2	0.4788	0.1852	4	No	5	0.332	0.08758	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-107	0.249	0.211	4	No	11	0.23	0.0228	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-1805	0.3474	0.1998	4	No	11	0.2736	0.08857	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1921	1.067	0.8638	4	No	11	0.9655	0.1219	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1922S	0.1899	0.1498	4	No	11	0.1691	0.027	0	None	x^2	0.01	Param.
Fluoride, total (mg/L)	MW-1923	0.2497	0.1721	4	No	11	0.2109	0.04657	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1924	0.5289	0.422	4	No	11	0.4755	0.06409	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1925	0.3211	0.2625	4	No	11	0.2918	0.03516	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1926	0.2829	0.2462	4	No	11	0.2645	0.02207	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1927	0.1701	0.1408	4	No	11	0.1555	0.01753	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1929	0.2406	0.1975	4	No	11	0.2191	0.02587	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-203	0.3052	0.2428	4	No	10	0.274	0.03502	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-016	0.2666	0.2268	4	No	9	0.2467	0.02062	0	None	No	0.01	Param.
Fluoride, total (mg/L)	MW-1922D	0.3241	0.2978	4	No	11	0.3109	0.01578	0	None	No	0.01	Param.
Lead, total (mg/L)	MW-1604D	0.00009353	0.00002719	0.015	No	21	0.0001484	0.0001334	42.86	Kaplan-Meier	x^(1/3)	0.01	Param.
Lead, total (mg/L)	MW-1604S	0.0002	0.000055	0.015	No	21	0.0001405	0.00007395	47.62	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1605D	0.0002	0.00002	0.015	No	21	0.0001026	0.00008767	42.86	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1605S	0.0004313	0.0001289	0.015	No	21	0.000356	0.0004679	9.524	None	x^(1/3)	0.01	Param.
Lead, total (mg/L)	MW-1606D	0.0001895	0.0000515	0.015	No	21	0.0002694	0.0004246	42.86	Kaplan-Meier	ln(x)	0.01	Param.
Lead, total (mg/L)	MW-1606S	0.0001232	0.00006475	0.015	No	21	0.0001338	0.00006878	33.33	Kaplan-Meier	No	0.01	Param.
Lead, total (mg/L)	MW-1607D	0.0002	0.000044	0.015	No	21	0.0001446	0.0001322	38.1	None	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1607S	0.0002	0.00008	0.015	No	20	0.0002466	0.0003748	0	None	No	0.01	NP (normality)
Lead, total (mg/L)	JTMN-1	0.002816	0.0004403	0.015	No	5	0.001628	0.0007088	0	None	No	0.01	Param.
Lead, total (mg/L)	JTMN-2	0.0008476	0.0005064	0.015	No	5	0.000677	0.0001018	0	None	No	0.01	Param.
Lead, total (mg/L)	MW-107	0.0002	0.0002	0.015	No	11	0.0002036	0.0000809	81.82	None	No	0.006	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-1805	0.0002	0.0002	0.015	No	11	0.0002827	0.000309	81.82	None	No	0.006	NP (NDs)
Lead, total (mg/L)	MW-1921	0.0004572	0.00008957	0.015	No	11	0.0002844	0.0002682	9.091	None	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW-1922S	0.0004408	0.0000739	0.015	No	11	0.0003364	0.0004716	0	None	ln(x)	0.01	Param.
Lead, total (mg/L)	MW-1923	0.0009203	0.0001807	0.015	No	11	0.0005725	0.0005504	0	None	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW-1924	0.0005615	0.00009029	0.015	No	11	0.0003415	0.0003555	0	None	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW-1925	0.0002104	0.00004271	0.015	No	11	0.0001673	0.0001004	36.36	Kaplan-Meier	No	0.01	Param.
Lead, total (mg/L)	MW-1926	0.0002	0.00006	0.015	No	11	0.0002328	0.0002563	63.64	Kaplan-Meier	No	0.006	NP (NDs)
Lead, total (mg/L)	MW-1927	0.0002141	0.00005907	0.015	No	11	0.0001819	0.0001044	45.45	Kaplan-Meier	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW-1929	0.0004986	0.00007896	0.015	No	11	0.0003163	0.0003607	0	None	x^(1/3)	0.01	Param.
Lead, total (mg/L)	MW-203	0.0002	0.000113	0.015	No	10	0.0001839	0.0000417	60	None	No	0.011	NP (NDs)
Lead, total (mg/L)	MW-016	0.0005387	0.00005889	0.015	No	9	0.0003054	0.0003858	11.11	None	x^(1/3)	0.01	Param.
Lead, total (mg/L)	MW-1922D	0.0002	0.00007	0.015	No	11	0.0001673	0.00005658	72.73	None	No	0.006	NP (NDs)
Lithium, total (mg/L)	MW-1604D	0.052	0.0197	0.04	No	21	0.0341	0.01734	4.762	None	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1604S	0.04375	0.03465	0.04	No	21	0.0392	0.008245	0	None	No	0.01	Param.

Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 9/1/2022, 10:22 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Lithium, total (mg/L)	**MW-1605D**	**0.06923**	**0.04896**	**0.04**	**Yes**	**21**	**0.0591**	**0.01837**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605S**	**0.06899**	**0.05363**	**0.04**	**Yes**	**21**	**0.06131**	**0.01392**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606D**	**0.124**	**0.0633**	**0.04**	**Yes**	**21**	**0.09357**	**0.02925**	**0**	**None**	**No**	**0.01**	**NP (normality)**
Lithium, total (mg/L)	**MW-1606S**	**0.1032**	**0.07598**	**0.04**	**Yes**	**21**	**0.08959**	**0.02467**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607D**	**0.09935**	**0.082**	**0.04**	**Yes**	**21**	**0.09067**	**0.01572**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607S**	**0.1078**	**0.09277**	**0.04**	**Yes**	**21**	**0.1003**	**0.01366**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	JTMN-1	0.01489	0.002357	0.04	No	5	0.008624	0.00374	0	None	No	0.01	Param.
Lithium, total (mg/L)	JTMN-2	0.02672	0.002721	0.04	No	5	0.01472	0.00716	0	None	No	0.01	Param.
Lithium, total (mg/L)	MW-107	0.015	0.00336	0.04	No	11	0.006296	0.005674	9.091	None	No	0.006	NP (normality)
Lithium, total (mg/L)	MW-112	0.015	0.00127	0.04	No	5	0.004288	0.005993	20	None	No	0.031	NP (normality)
Lithium, total (mg/L)	MW-1805	0.043	0.026	0.04	No	11	0.03669	0.007125	0	None	No	0.006	NP (normality)
Lithium, total (mg/L)	**MW-1921**	**0.09694**	**0.07828**	**0.04**	**Yes**	**11**	**0.08761**	**0.0112**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1922S**	**0.0638**	**0.04162**	**0.04**	**Yes**	**11**	**0.05271**	**0.01331**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1923**	**0.1966**	**0.1314**	**0.04**	**Yes**	**11**	**0.164**	**0.03909**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1924**	**0.1157**	**0.07408**	**0.04**	**Yes**	**11**	**0.09489**	**0.02497**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1925**	**0.09119**	**0.06639**	**0.04**	**Yes**	**11**	**0.07879**	**0.01488**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	MW-1926	0.01	0.00585	0.04	No	11	0.007534	0.002743	9.091	None	No	0.006	NP (normality)
Lithium, total (mg/L)	MW-1927	0.015	0.00594	0.04	No	11	0.009289	0.007358	9.091	None	No	0.006	NP (normality)
Lithium, total (mg/L)	MW-1929	0.01	0.00352	0.04	No	11	0.005532	0.003651	9.091	None	No	0.006	NP (normality)
Lithium, total (mg/L)	MW-203	0.00237	0.00199	0.04	No	10	0.003439	0.004065	10	None	No	0.011	NP (normality)
Lithium, total (mg/L)	MW-016	0.03373	0.02756	0.04	No	9	0.03064	0.003196	0	None	No	0.01	Param.
Lithium, total (mg/L)	MW-1922D	0.01363	0.007437	0.04	No	11	0.01061	0.004045	9.091	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	MW-1604D	0.000036	0.000003	0.002	No	20	0.00000645	0.00000697	90	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1604S	0.000005	0.000003	0.002	No	20	0.0000049	4.5e-7	95	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1605D	0.000005	0.000002	0.002	No	20	0.00000485	6.7e-7	95	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1605S	0.000005	0.000003	0.002	No	20	0.0000049	4.5e-7	95	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1606D	0.000005	0.000004	0.002	No	20	0.00000495	2.2e-7	95	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1606S	0.000005	0.000002	0.002	No	20	0.00000485	6.7e-7	95	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1607D	0.000005	0.000002	0.002	No	20	0.0000047	9.2e-7	90	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW-1607S	0.000012	0.000003	0.002	No	20	0.00000515	0.000001725	85	None	No	0.01	NP (NDs)
Mercury, total (mg/L)	JTMN-1	0.000005	0.000003	0.002	No	5	0.0000038	0.000001095	40	None	No	0.031	NP (normality)
Mercury, total (mg/L)	JTMN-2	0.000005	0.000002	0.002	No	5	0.0000042	0.000001304	60	None	No	0.031	NP (NDs)
Mercury, total (mg/L)	MW-107	0.000005	0.000005	0.002	No	10	0.000005	0	100	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-112	0.000005	0.000005	0.002	No	4	0.000005	0	100	None	No	0.0625	NP (NDs)
Mercury, total (mg/L)	MW-1805	0.000005	0.000005	0.002	No	10	0.000005	0	100	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-1921	0.000005	0.000005	0.002	No	10	0.0000047	9.5e-7	90	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-1922S	0.000005	0.000005	0.002	No	10	0.0000047	9.5e-7	90	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-1923	0.000005	0.000005	0.002	No	10	0.0000047	9.5e-7	90	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-1924	0.000005	0.000005	0.002	No	10	0.0000048	6.3e-7	90	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-1925	0.000005	0.000005	0.002	No	10	0.000005	0	100	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-1926	0.000005	0.000005	0.002	No	10	0.000005	0	100	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-1927	0.000005	0.000005	0.002	No	10	0.000005	0	100	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-1929	0.000005	0.000005	0.002	No	10	0.000005	0	100	None	No	0.011	NP (NDs)
Mercury, total (mg/L)	MW-203	0.000005	0.000005	0.002	No	9	0.000005	0	100	None	No	0.002	NP (NDs)
Mercury, total (mg/L)	MW-016	0.000005	0.000005	0.002	No	8	0.000005	0	100	None	No	0.004	NP (NDs)
Mercury, total (mg/L)	MW-1922D	0.000005	0.000005	0.002	No	10	0.000005	0	100	None	No	0.011	NP (NDs)
Molybdenum, total (mg/L)	MW-1604D	0.0182	0.001	0.1	No	21	0.008044	0.008646	4.762	None	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1604S	0.015	0.0113	0.1	No	21	0.01033	0.00629	0	None	x^4	0.01	Param.
Molybdenum, total (mg/L)	MW-1605D	0.0457	0.0369	0.1	No	21	0.0413	0.007968	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1605S	0.01842	0.01384	0.1	No	21	0.01613	0.00415	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1606D	0.07447	0.06695	0.1	No	21	0.07071	0.006816	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1606S	0.08428	0.06185	0.1	No	21	0.07399	0.02095	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW-1607D	0.0865	0.07915	0.1	No	21	0.08282	0.006665	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1607S	0.04253	0.03505	0.1	No	21	0.03879	0.006784	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	JTMN-1	0.0208	0.001154	0.1	No	5	0.01098	0.005863	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	JTMN-2	0.04035	-0.0002699	0.1	No	5	0.02004	0.01212	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-107	0.001058	0.0001861	0.1	No	11	0.0008273	0.0004221	45.45	Kaplan-Meier	No	0.01	Param.
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-1805	0.06906	0.01499	0.1	No	11	0.04203	0.03244	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	**MW-1921**	**0.4942**	**0.4272**	**0.1**	**Yes**	**11**	**0.4607**	**0.04021**	**0**	**None**	**No**	**0.01**	**Param.**

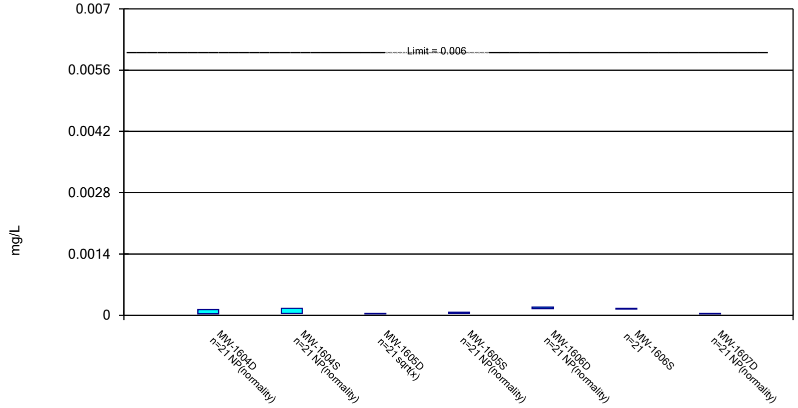
Confidence Intervals - Assessment Monitoring - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 9/1/2022, 10:22 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Molybdenum, total (mg/L)	MW-1922S	0.03647	0.02933	0.1	No	11	0.0329	0.00428	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1923	0.344	0.0709	0.1	No	11	0.2038	0.1251	0	None	No	0.006	NP (normality)
Molybdenum, total (mg/L)	MW-1924	0.11	0.0779	0.1	No	11	0.09396	0.01927	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1925	0.06175	0.04585	0.1	No	11	0.0538	0.009546	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1926	0.006735	0.00435	0.1	No	11	0.005543	0.001431	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1927	0.00282	0.0011	0.1	No	11	0.00212	0.00172	0	None	No	0.006	NP (normality)
Molybdenum, total (mg/L)	MW-1929	0.0007708	0.0004292	0.1	No	11	0.0006	0.0002049	9.091	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-203	0.0013	0.001	0.1	No	10	0.00114	0.0003204	0	None	No	0.011	NP (normality)
Molybdenum, total (mg/L)	MW-016	0.03961	0.03461	0.1	No	9	0.03711	0.002592	0	None	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1922D	0.3705	0.06947	0.1	No	11	0.2292	0.1929	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1604D	0.001636	0.0008197	0.05	No	21	0.00142	0.001022	0	None	ln(x)	0.01	Param.
Selenium, total (mg/L)	MW-1604S	0.001827	0.001053	0.05	No	21	0.001496	0.0007528	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1605D	0.0002446	0.0001689	0.05	No	21	0.0002105	0.00007032	4.762	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1605S	0.001269	0.0006746	0.05	No	21	0.001021	0.0006259	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1606D	0.005061	0.002265	0.05	No	21	0.003663	0.002534	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1606S	0.002743	0.001258	0.05	No	21	0.002152	0.001528	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1607D	0.00008389	0.00003674	0.05	No	21	0.0001419	0.0001249	33.33	Kaplan-Meier	ln(x)	0.01	Param.
Selenium, total (mg/L)	MW-1607S	0.008017	0.005171	0.05	No	21	0.006594	0.00258	0	None	No	0.01	Param.
Selenium, total (mg/L)	JTMN-1	0.001494	0.0003496	0.05	No	5	0.000922	0.0003416	0	None	No	0.01	Param.
Selenium, total (mg/L)	JTMN-2	0.001224	0.0002879	0.05	No	5	0.000756	0.0002793	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-107	0.0008182	0.0004727	0.05	No	11	0.0006455	0.0002073	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-1805	0.00025	0.0001	0.05	No	11	0.0001909	0.00008312	63.64	None	No	0.006	NP (NDs)
Selenium, total (mg/L)	MW-1921	0.000246	0.0001078	0.05	No	11	0.0001791	0.00009159	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1922S	0.0001632	0.00007246	0.05	No	11	0.0001582	0.00008565	27.27	Kaplan-Meier	x^(1/3)	0.01	Param.
Selenium, total (mg/L)	MW-1923	0.02487	0.007346	0.05	No	11	0.01611	0.01051	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1924	0.002337	0.0006725	0.05	No	11	0.001544	0.001131	0	None	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1925	0.005387	0.003203	0.05	No	11	0.004295	0.00131	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1926	0.0007083	0.0003062	0.05	No	11	0.0005073	0.0002413	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1927	0.001224	0.0003091	0.05	No	11	0.0007664	0.0005488	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1929	0.001672	0.000993	0.05	No	11	0.001333	0.0004077	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-203	0.00129	0.0009082	0.05	No	10	0.001099	0.0002138	0	None	No	0.01	Param.
Selenium, total (mg/L)	MW-016	0.0002187	0.0001147	0.05	No	9	0.0001667	0.00005385	11.11	None	No	0.01	Param.
Selenium, total (mg/L)	MW-1922D	0.00025	0.00005	0.05	No	11	0.0001955	0.00009353	72.73	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-1604D	0.000256	0.0002	0.002	No	21	0.0002059	0.00007173	52.38	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1604S	0.00024	0.00003	0.002	No	21	0.0001605	0.0001046	4.762	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605D	0.0002	0.00005	0.002	No	21	0.0001266	0.00007471	47.62	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605S	0.0002	0.00005	0.002	No	21	0.0001365	0.00007382	52.38	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1606D	0.00009927	0.00007553	0.002	No	21	0.000117	0.00005034	23.81	Kaplan-Meier	ln(x)	0.01	Param.
Thallium, total (mg/L)	MW-1606S	0.000112	0.00006	0.002	No	21	0.0001034	0.00005728	23.81	None	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1607D	0.0002	0.00004	0.002	No	21	0.0001225	0.00008383	52.38	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	MW-1607S	0.0002	0.000058	0.002	No	21	0.0001058	0.00006451	28.57	None	No	0.01	NP (normality)
Thallium, total (mg/L)	JTMN-1	0.0002	0.00004	0.002	No	5	0.000168	0.00007155	80	None	No	0.031	NP (NDs)
Thallium, total (mg/L)	JTMN-2	0.0002	0.0002	0.002	No	5	0.0002	0	100	None	No	0.031	NP (NDs)
Thallium, total (mg/L)	MW-107	0.0002	0.0002	0.002	No	11	0.0002	0	100	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-112	0.0002	0.0002	0.002	No	5	0.0002	0	100	None	No	0.031	NP (NDs)
Thallium, total (mg/L)	MW-1805	0.0002	0.0002	0.002	No	11	0.0002	0	100	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-1921	0.0002	0.00006	0.002	No	11	0.0001373	0.00007226	54.55	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-1922S	0.0002	0.00005	0.002	No	11	0.0001718	0.00006274	81.82	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-1923	0.0002	0.0002	0.002	No	11	0.0002	0	100	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-1924	0.0002	0.0002	0.002	No	11	0.0002	0	100	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-1925	0.0002	0.0002	0.002	No	11	0.0002	0	100	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-1926	0.0002	0.0002	0.002	No	11	0.00019	0.00003317	90.91	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-1927	0.0002	0.0002	0.002	No	11	0.0002	0	100	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-1929	0.0002	0.0002	0.002	No	11	0.0002	0	100	None	No	0.006	NP (NDs)
Thallium, total (mg/L)	MW-203	0.0002	0.0002	0.002	No	10	0.0002	0	100	None	No	0.011	NP (NDs)
Thallium, total (mg/L)	MW-016	0.0002	0.0002	0.002	No	9	0.0002	0	100	None	No	0.002	NP (NDs)
Thallium, total (mg/L)	MW-1922D	0.0002	0.0002	0.002	No	11	0.0002	0	100	None	No	0.006	NP (NDs)

Parametric and Non-Parametric (NP) Confidence Interval

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

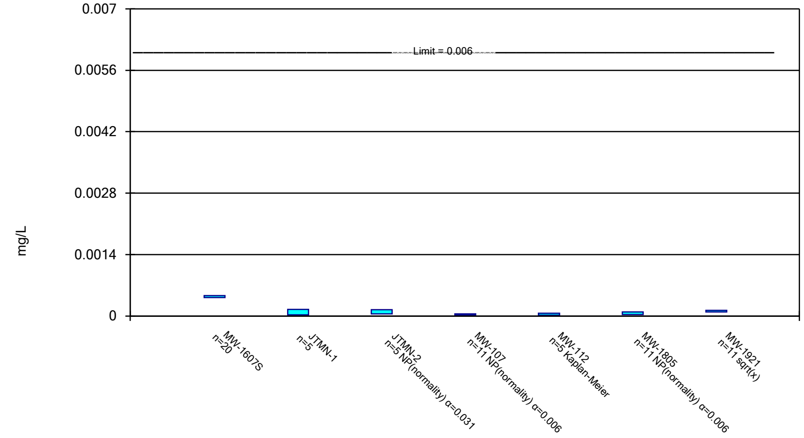


Constituent: Antimony, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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: Antimony, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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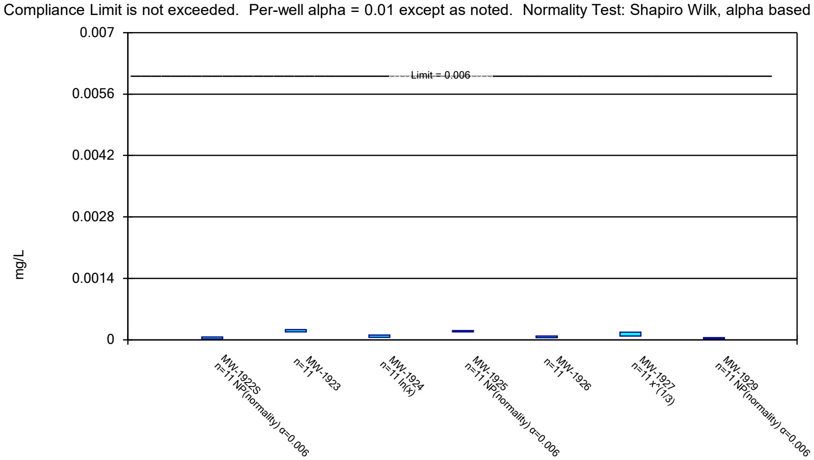
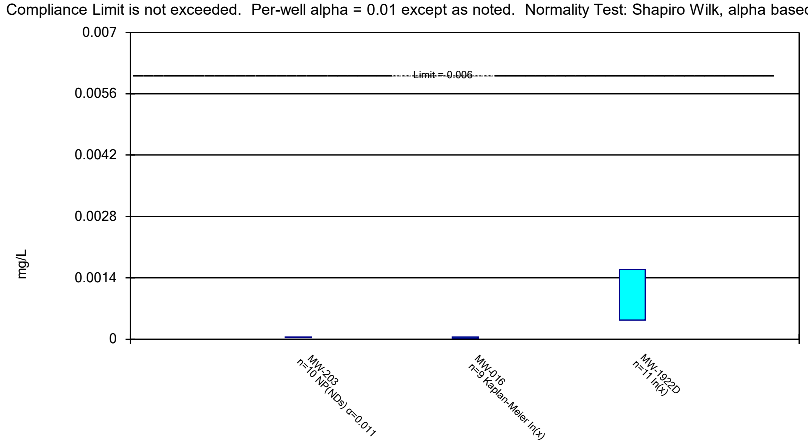


Constituent: Antimony, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.

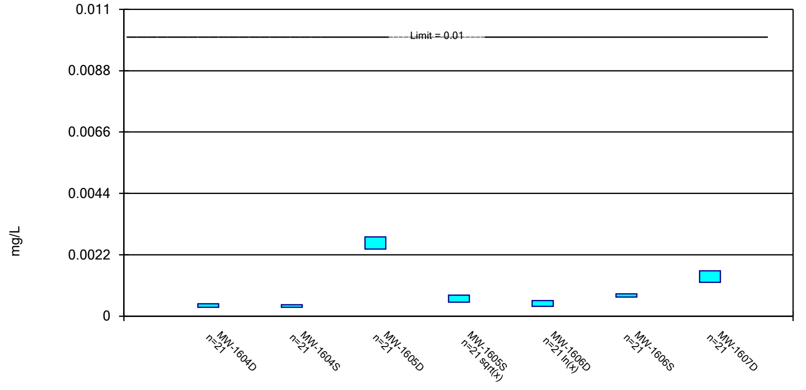


Constituent: Antimony, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



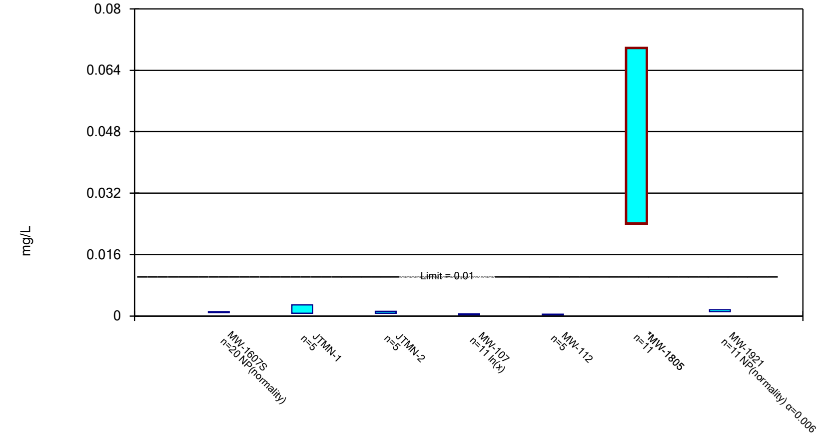
Constituent: Arsenic, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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



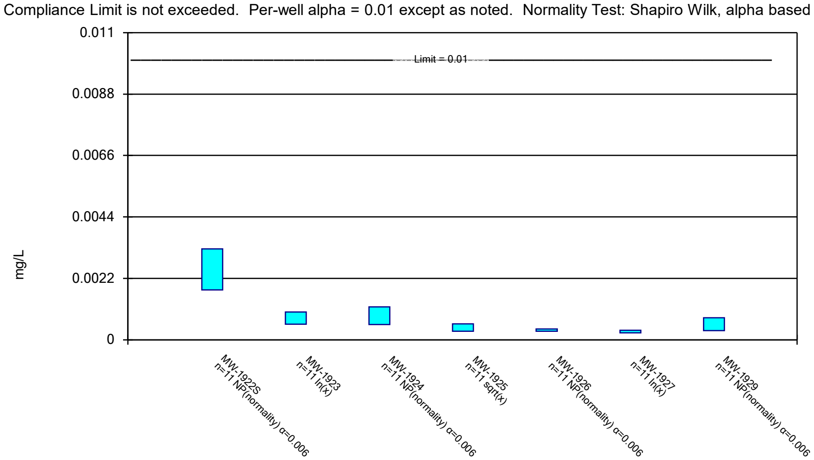
Constituent: Arsenic, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.



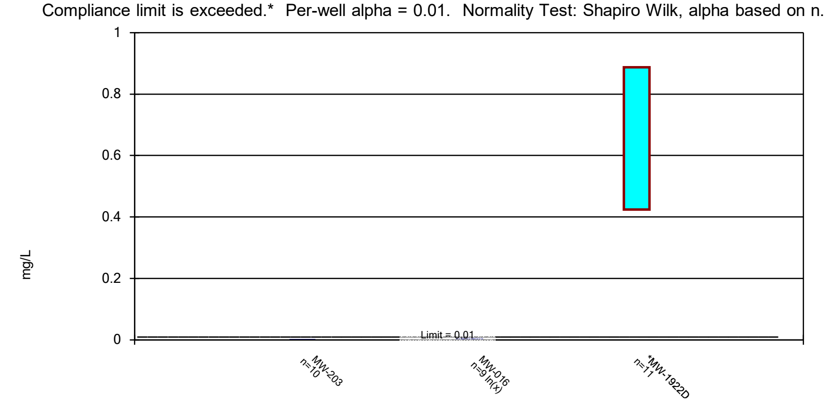
Constituent: Arsenic, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



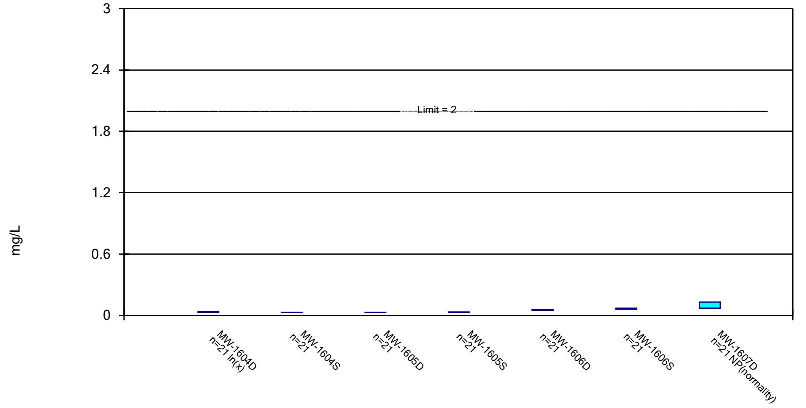
Constituent: Arsenic, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 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.



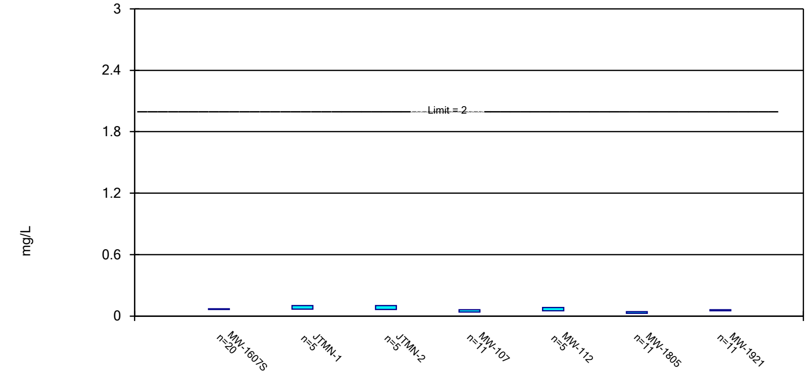
Constituent: Barium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



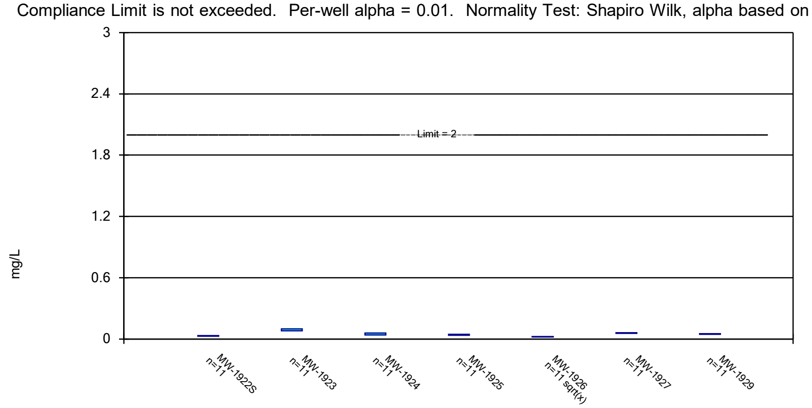
Constituent: Barium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



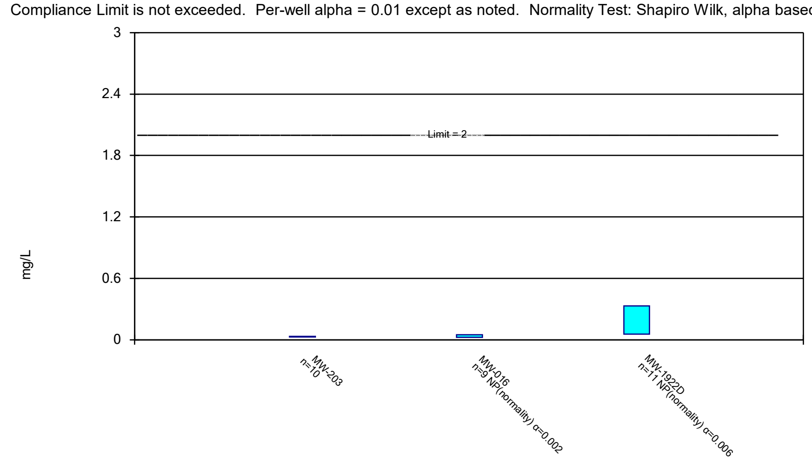
Constituent: Barium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.



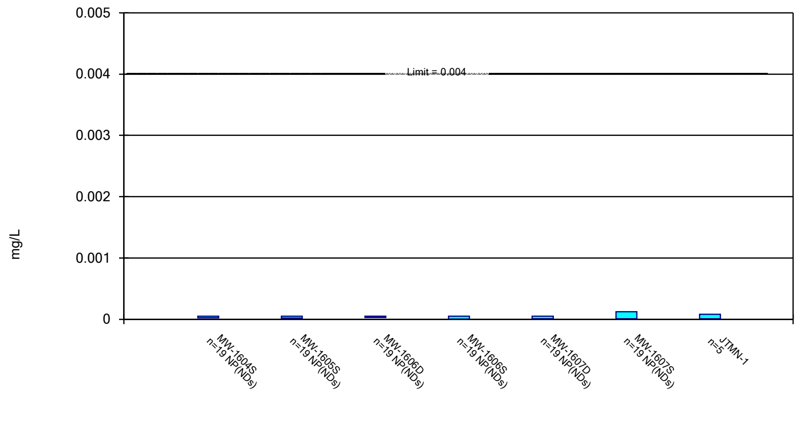
Constituent: Barium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 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.

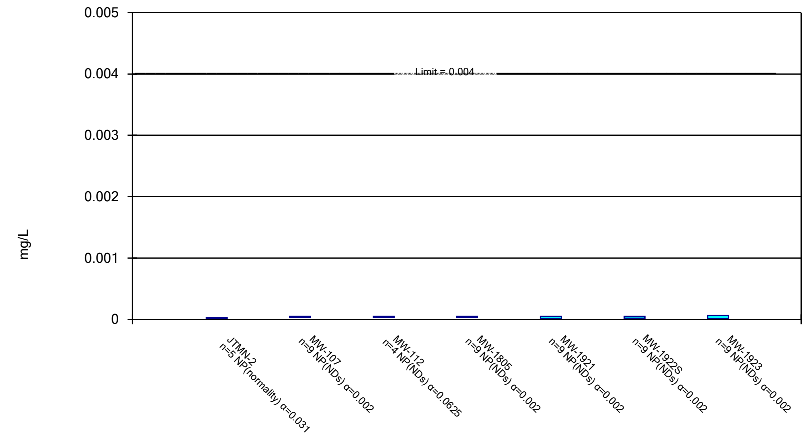


Constituent: Beryllium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

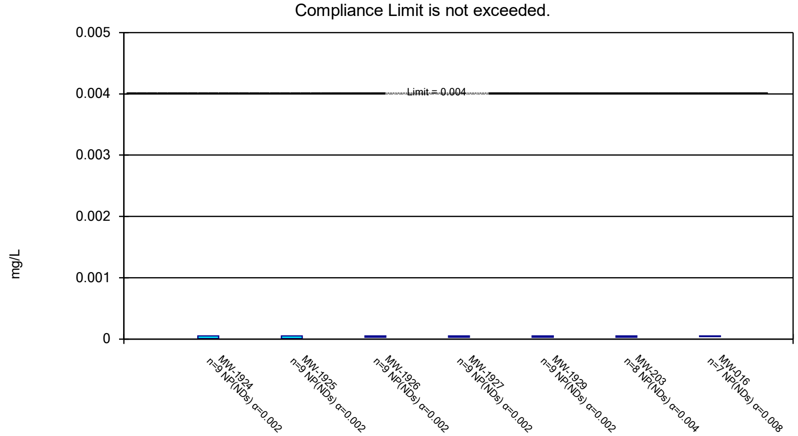


Constituent: Beryllium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

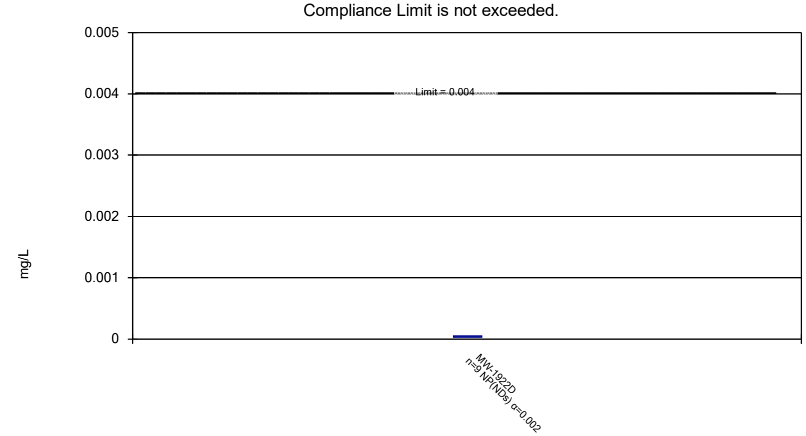


Constituent: Beryllium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

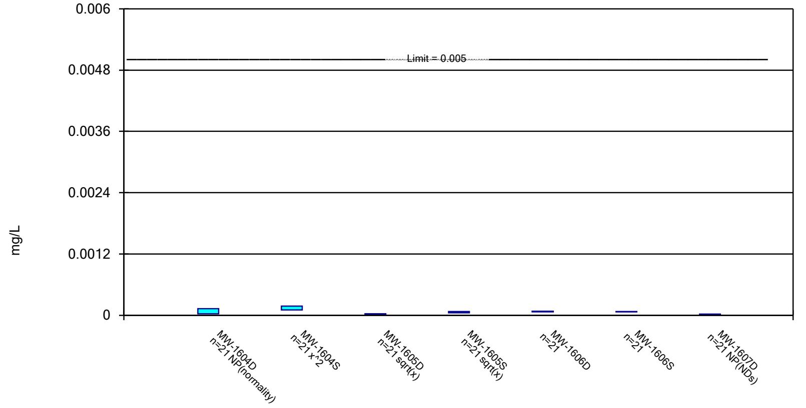


Constituent: Beryllium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 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.

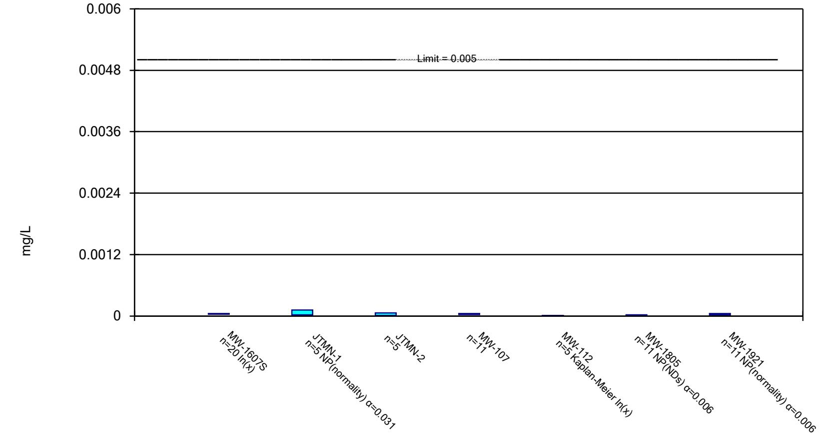


Constituent: Cadmium, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.

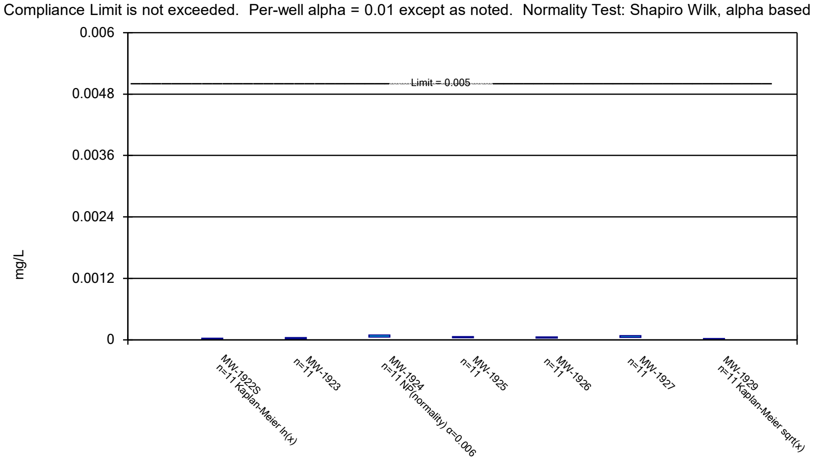


Constituent: Cadmium, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.

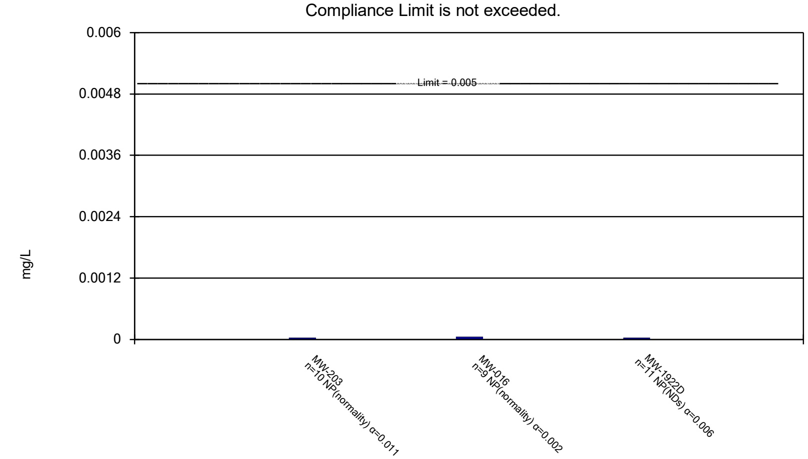


Constituent: Cadmium, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

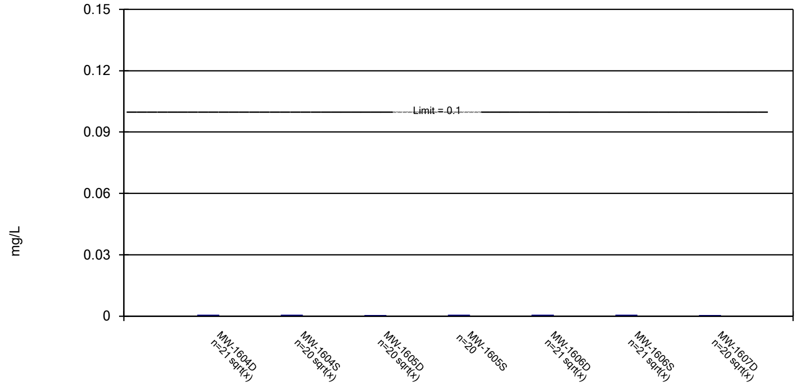


Constituent: Cadmium, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

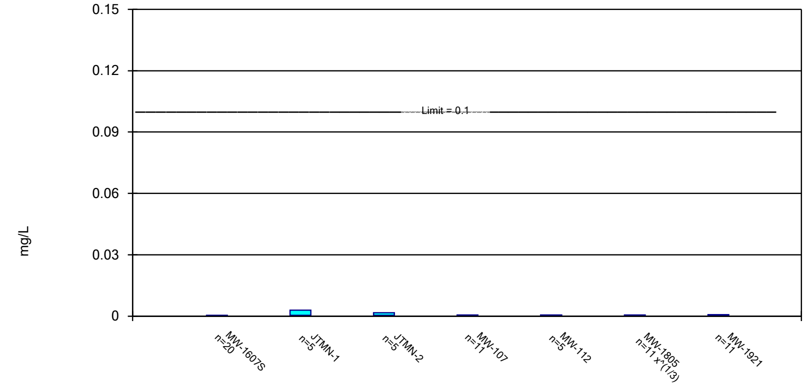


Constituent: Chromium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

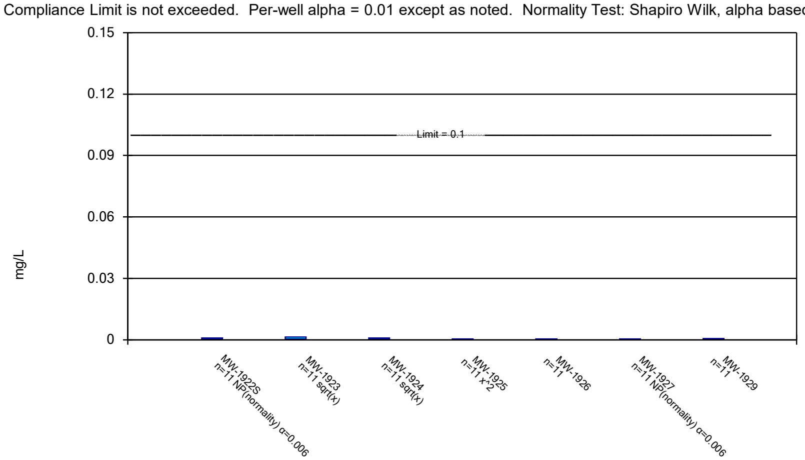


Constituent: Chromium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.

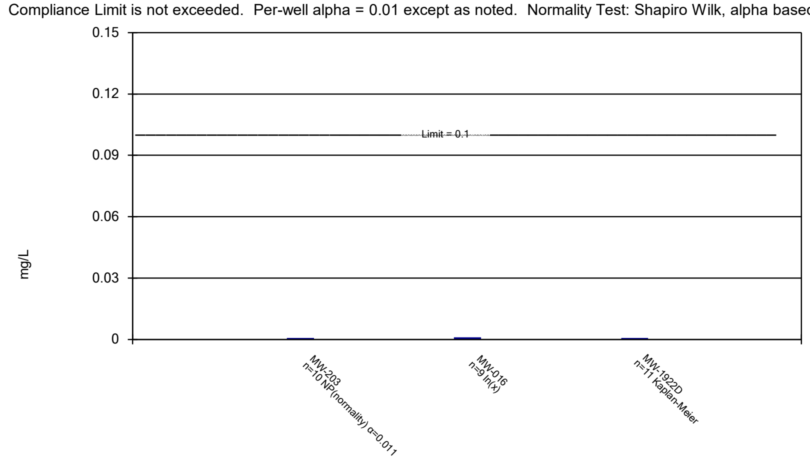


Constituent: Chromium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.

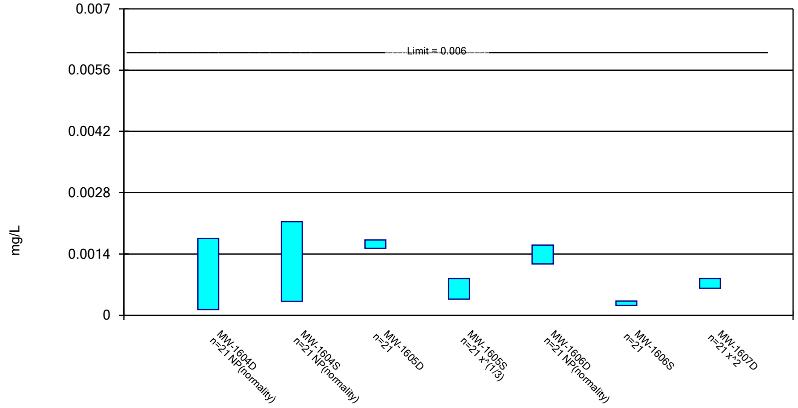


Constituent: Chromium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 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.

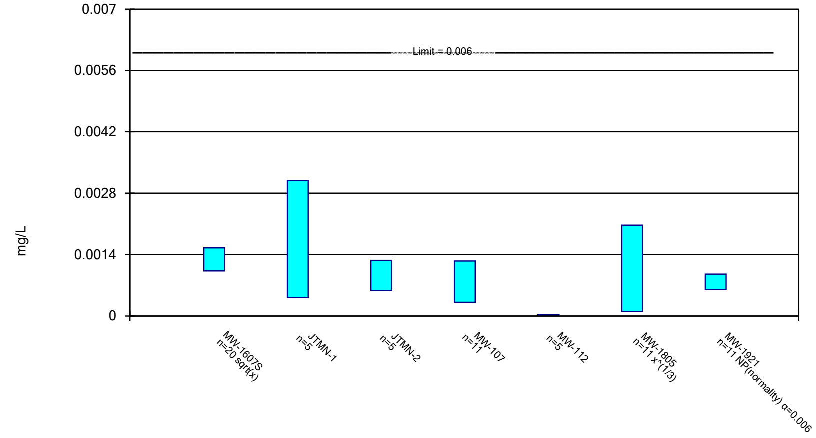


Constituent: Cobalt, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.

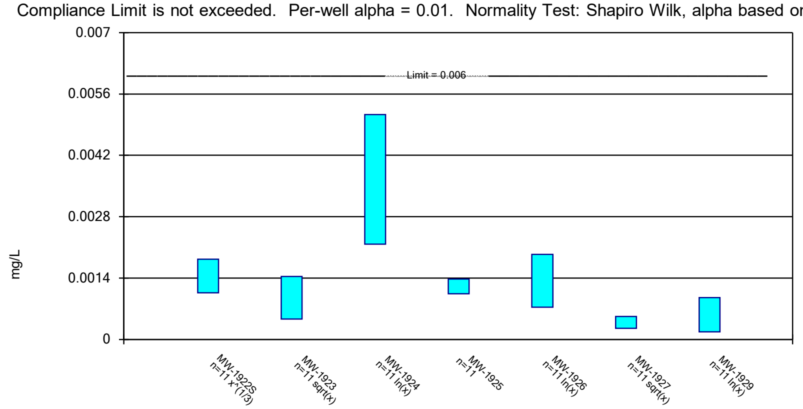


Constituent: Cobalt, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

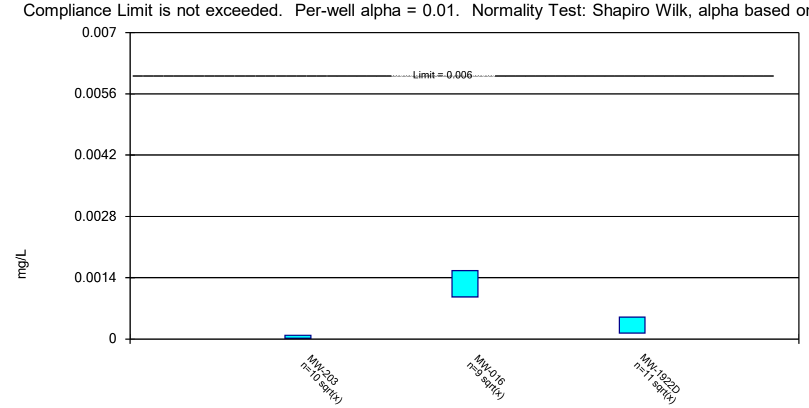


Constituent: Cobalt, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

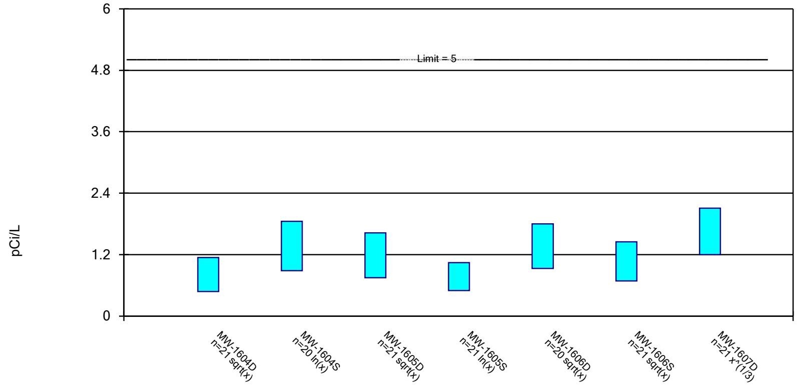


Constituent: Cobalt, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

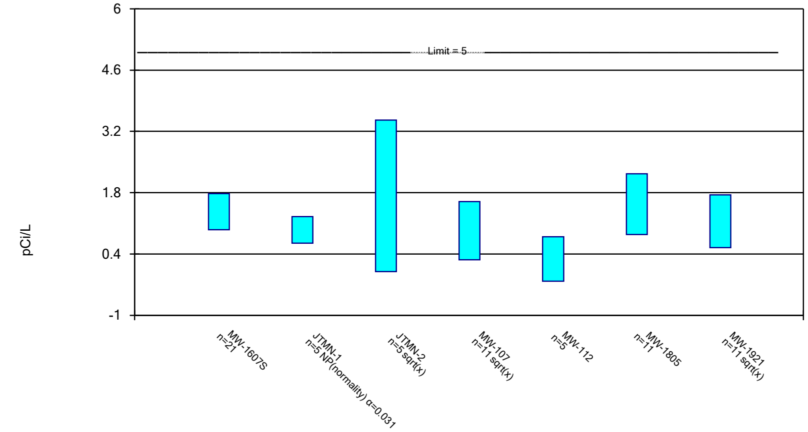


Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.

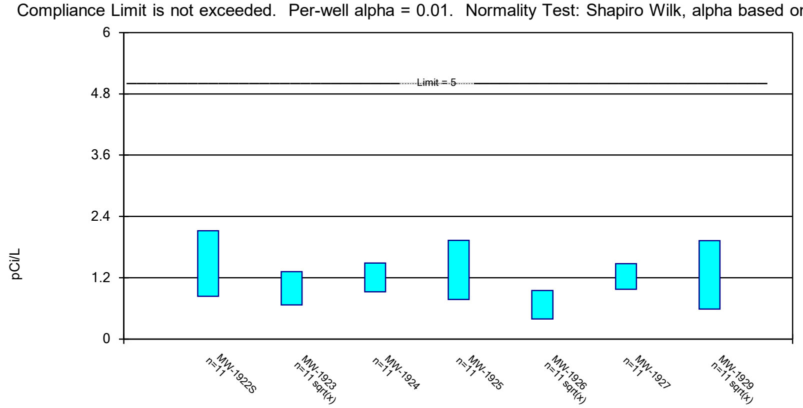


Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

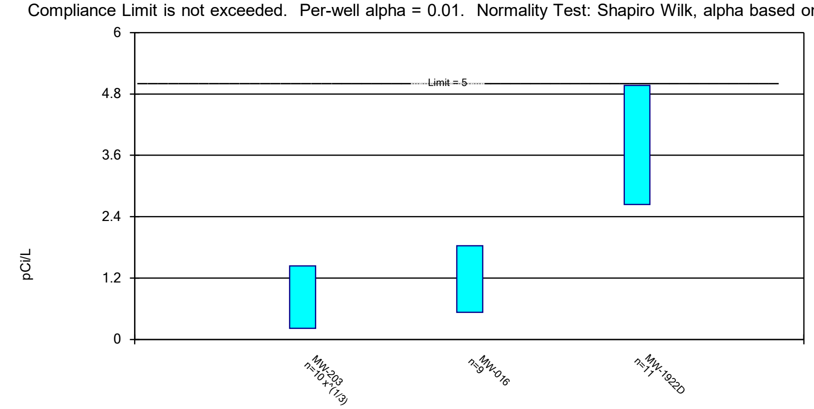


Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

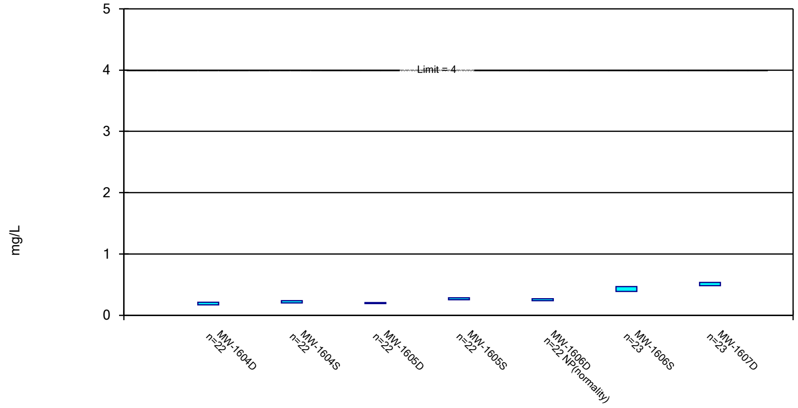


Constituent: Combined Radium 226 + 228 Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 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.

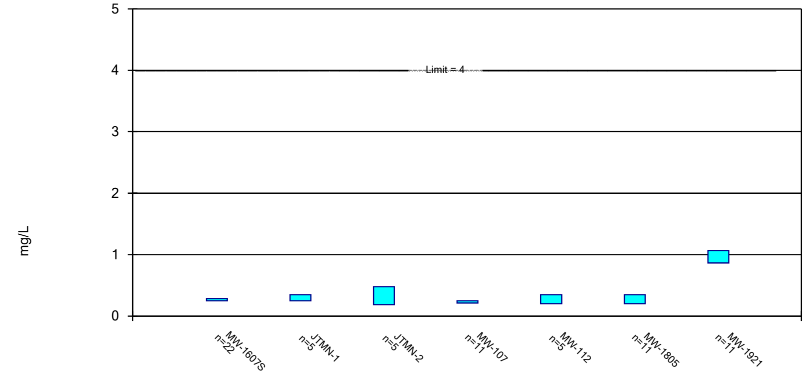


Constituent: Fluoride, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

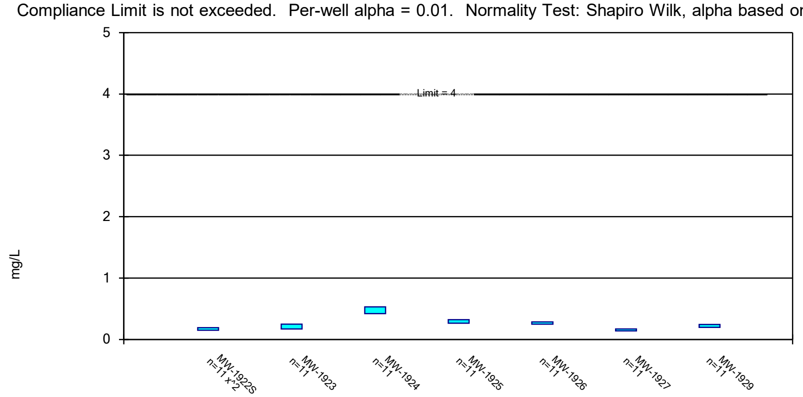


Constituent: Fluoride, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

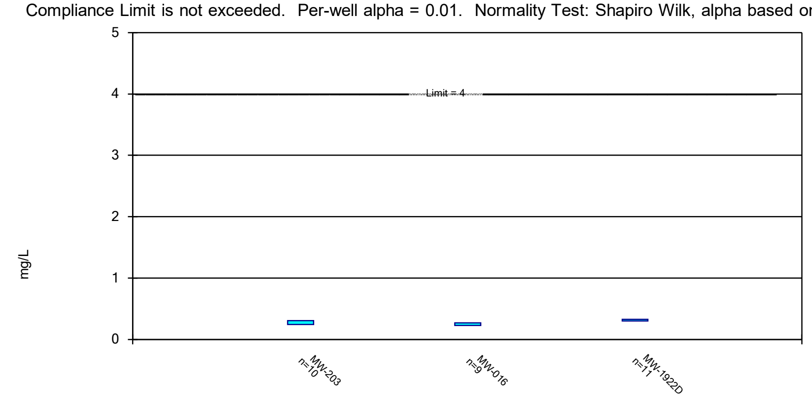


Constituent: Fluoride, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

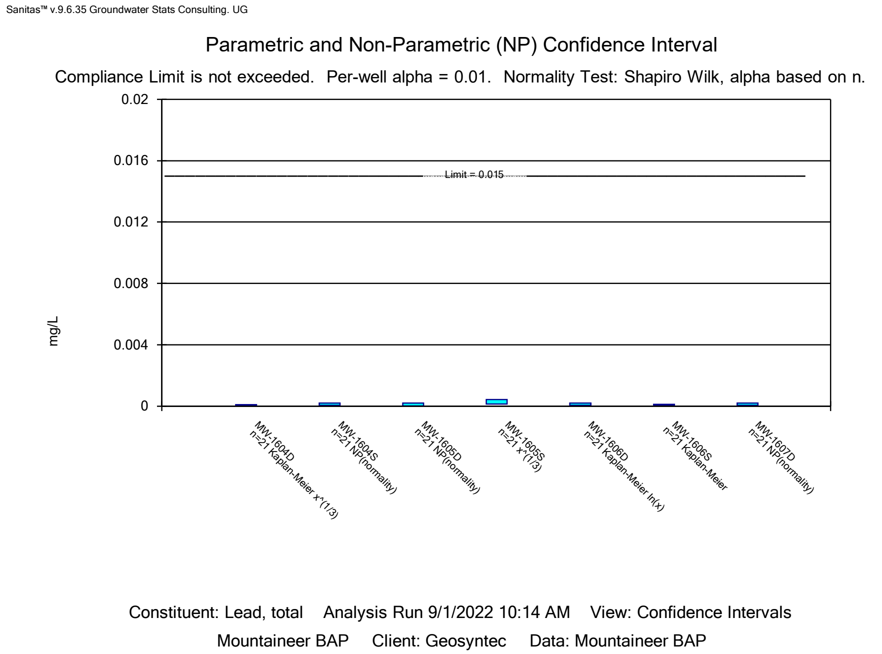
Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

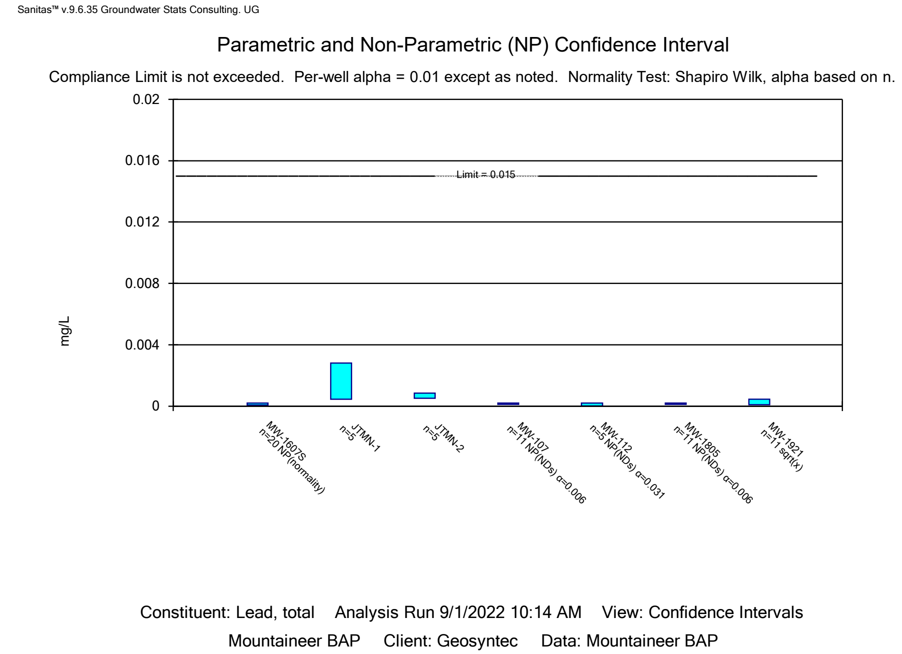
Parametric Confidence Interval

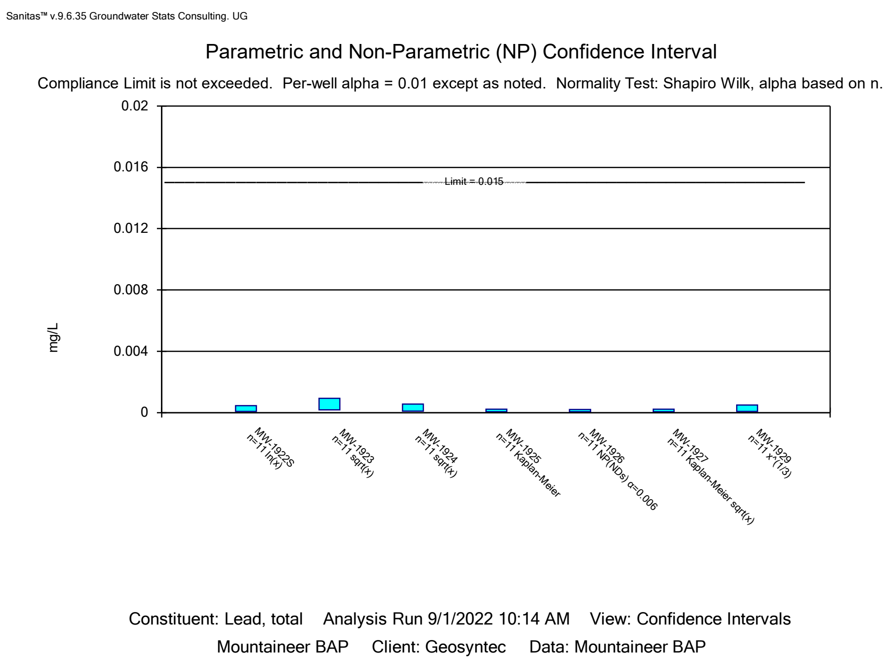
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

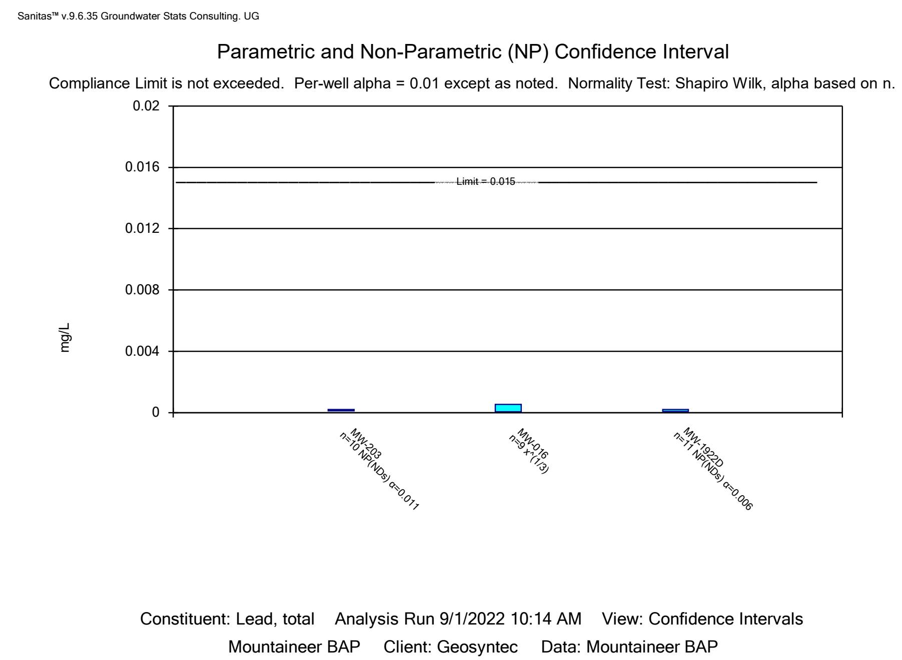


Constituent: Fluoride, total   Analysis Run 9/1/2022 10:14 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP


Sanitas™ v.9.6.35 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.
mg/L
0.02
0.016
0.012
0.008
0.004
0
Limit = 0.015
MW-1604D n=21 Kaplan-Meier x^(1/3)
MW-1604S n=21 NP(normality)
MW-1605D n=21 NP(normality)
MW-1605S n=21 x^(1/3)
MW-1606D n=21 Kaplan-Meier ln(x)
MW-1606S n=21 Kaplan-Meier
MW-1607D n=21 NP(normality)
Constituent: Lead, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.
mg/L
0.02
0.016
0.012
0.008
0.004
0
Limit = 0.015
MW-1607S n=20 NP(normality)
JTMN-1 n=5
JTMN-2 n=5
MW-107 n=11 NP(NDs) α=0.006
MW-112 n=5 NP(NDs) α=0.031
MW-1805 n=11 NP(NDs) α=0.006
MW-1921 n=11 sqrt(x)
Constituent: Lead, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

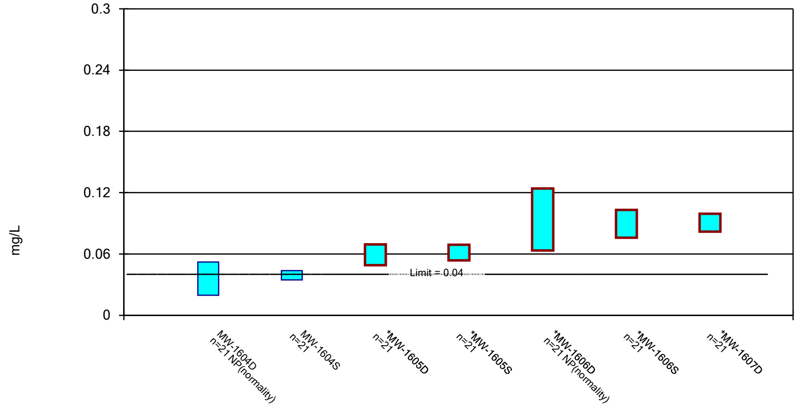

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG
Parametric and Non-Parametric (NP) Confidence Interval
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.
mg/L
0.02
0.016
0.012
0.008
0.004
0
Limit = 0.015
MW-1922S n=11 ln(x)
MW-1923 n=11 sqrt(x)
MW-1924 n=11 sqrt(x)
MW-1925 n=11 Kaplan-Meier
MW-1926 n=11 NP(NDs) α=0.006
MW-1927 n=11 Kaplan-Meier sqrt(x)
MW-1929 n=11 x^(1/3)
Constituent: Lead, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP


Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.
mg/L
0.02
0.016
0.012
0.008
0.004
0
Limit = 0.015
MW-203 n=10 NP(NDs) α=0.011
MW-016 n=9 x^(1/3)
MW-1922D n=11 NP(NDs) α=0.006
Constituent: Lead, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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



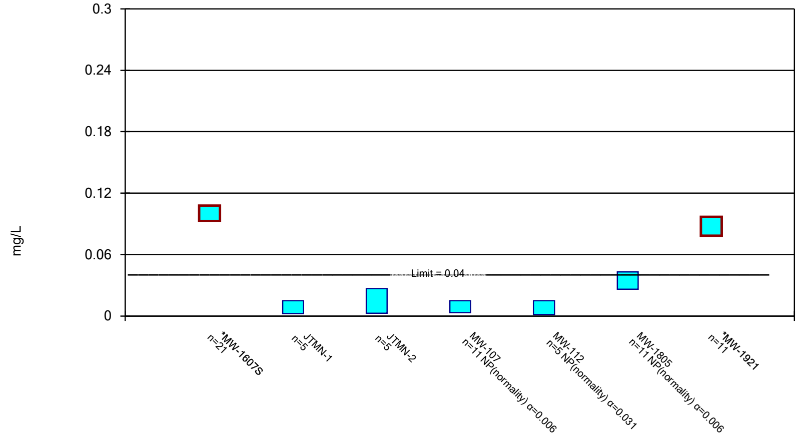
Constituent: Lithium, total Analysis Run 9/1/2022 10:14 AM View: Confidence Intervals

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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



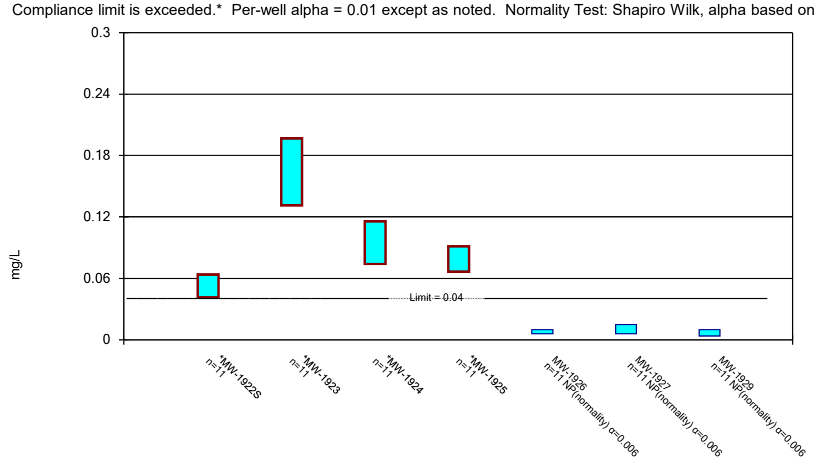
Constituent: Lithium, total Analysis Run 9/1/2022 10:15 AM View: Confidence Intervals

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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



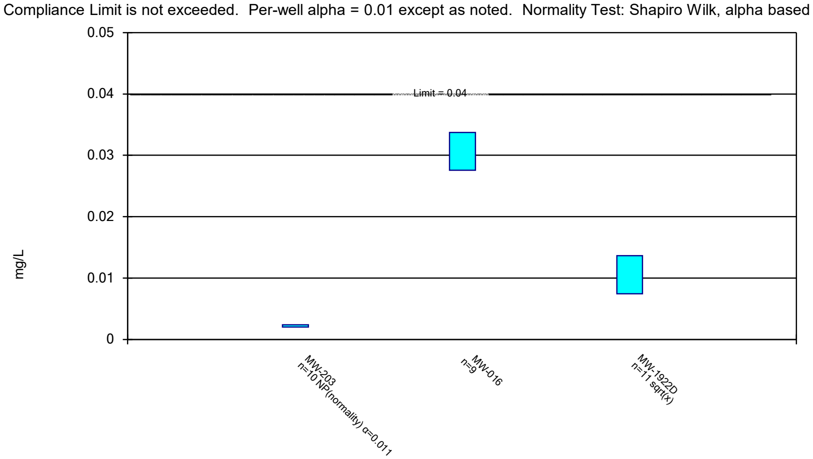
Constituent: Lithium, total Analysis Run 9/1/2022 10:15 AM View: Confidence Intervals

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.



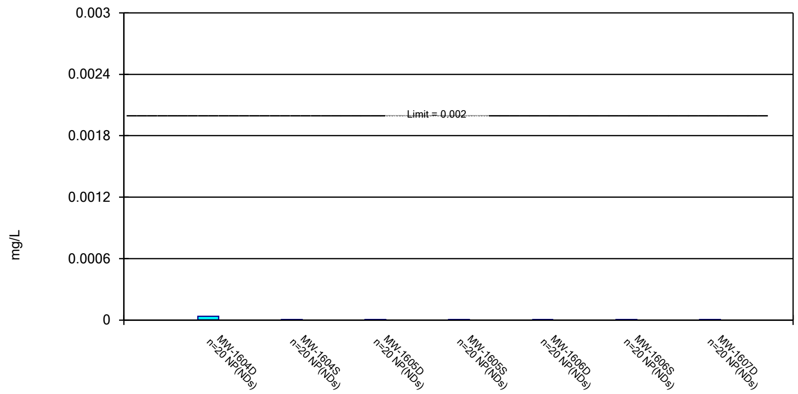
Constituent: Lithium, total Analysis Run 9/1/2022 10:15 AM View: Confidence Intervals

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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

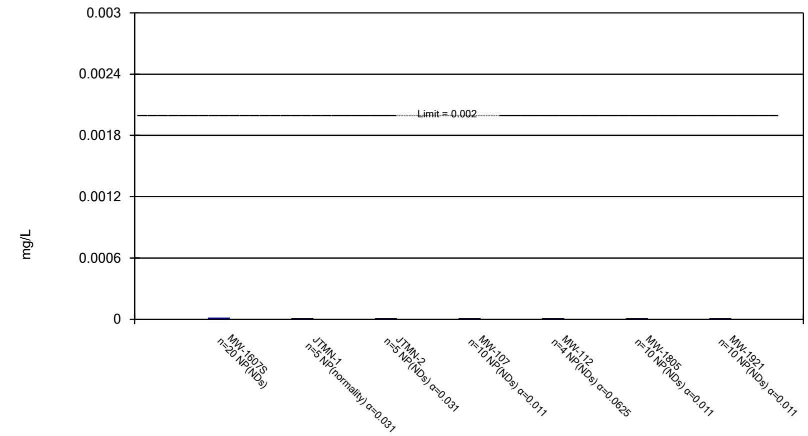


Constituent: Mercury, total   Analysis Run 9/1/2022 10:15 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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

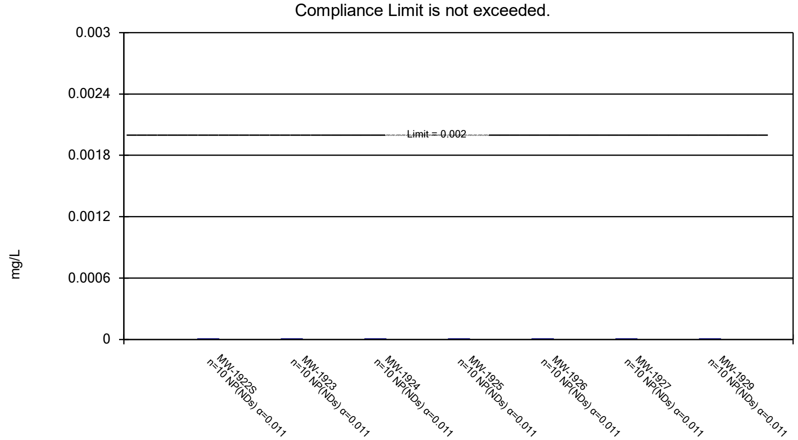


Constituent: Mercury, total   Analysis Run 9/1/2022 10:15 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

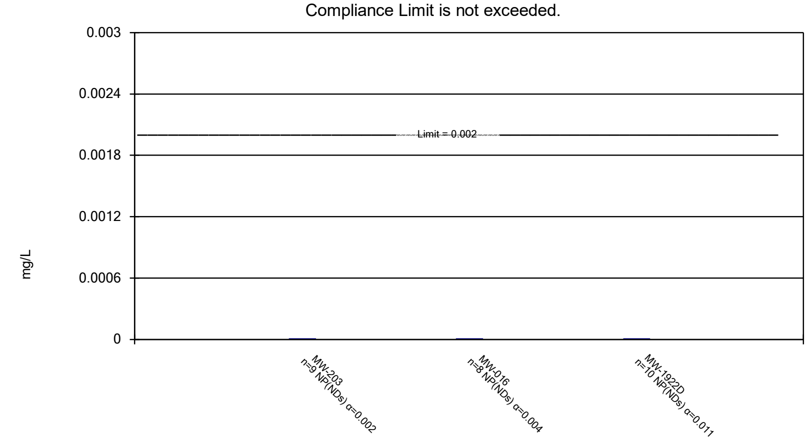


Constituent: Mercury, total   Analysis Run 9/1/2022 10:15 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.

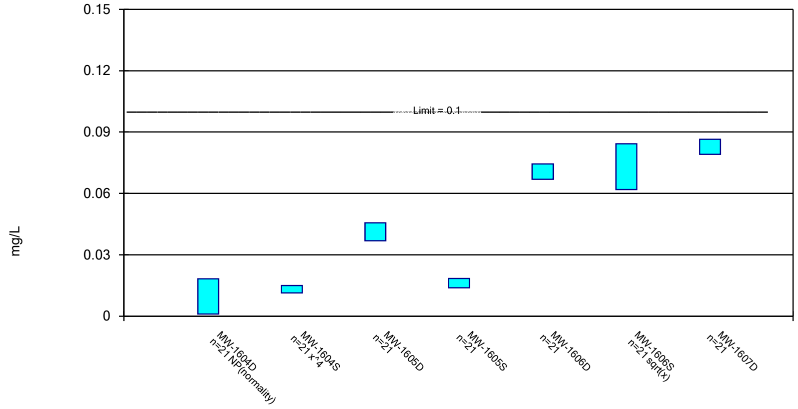


Constituent: Mercury, total   Analysis Run 9/1/2022 10:15 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 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.

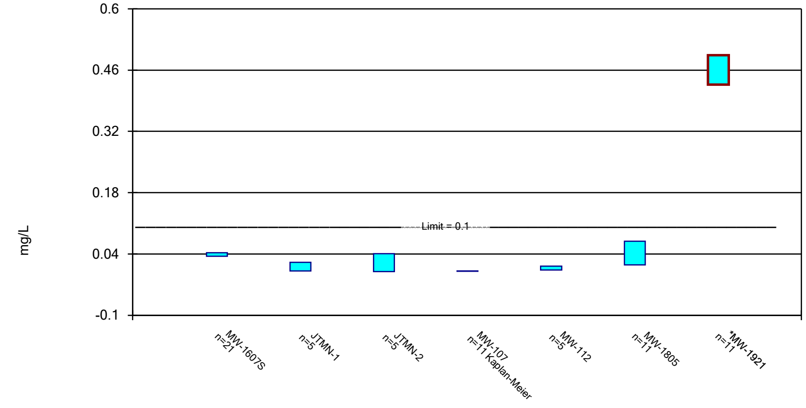


Constituent: Molybdenum, total   Analysis Run 9/1/2022 10:15 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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

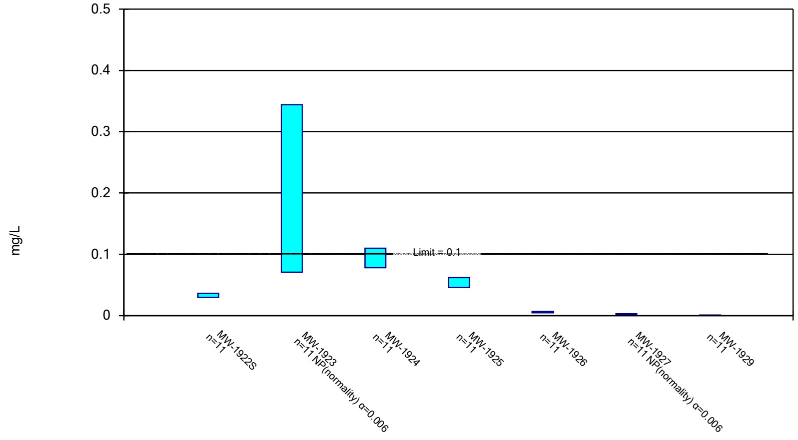


Constituent: Molybdenum, total   Analysis Run 9/1/2022 10:15 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.

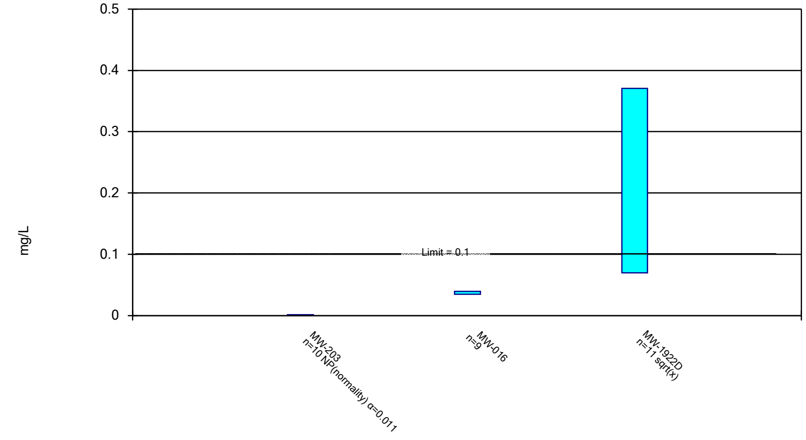


Constituent: Molybdenum, total   Analysis Run 9/1/2022 10:15 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. 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.

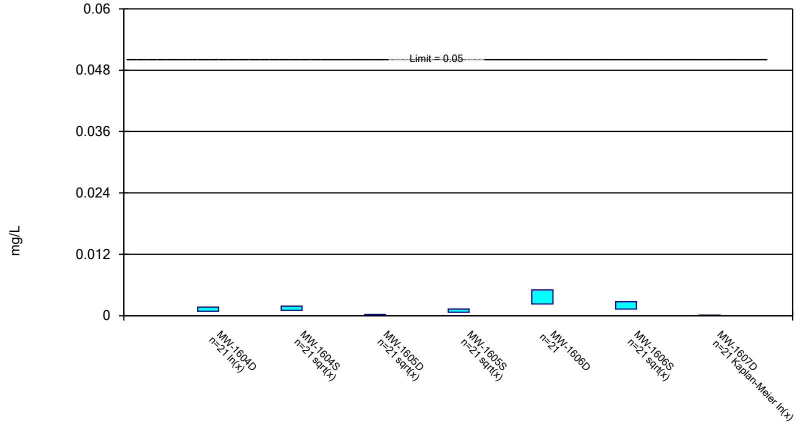


Constituent: Molybdenum, total   Analysis Run 9/1/2022 10:15 AM   View: Confidence Intervals
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



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Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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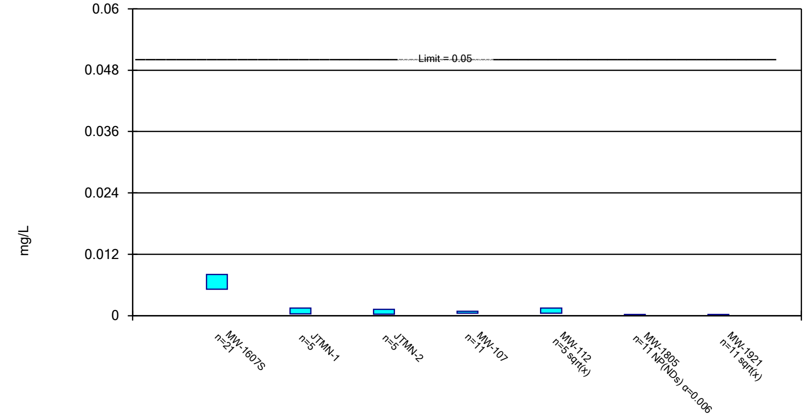

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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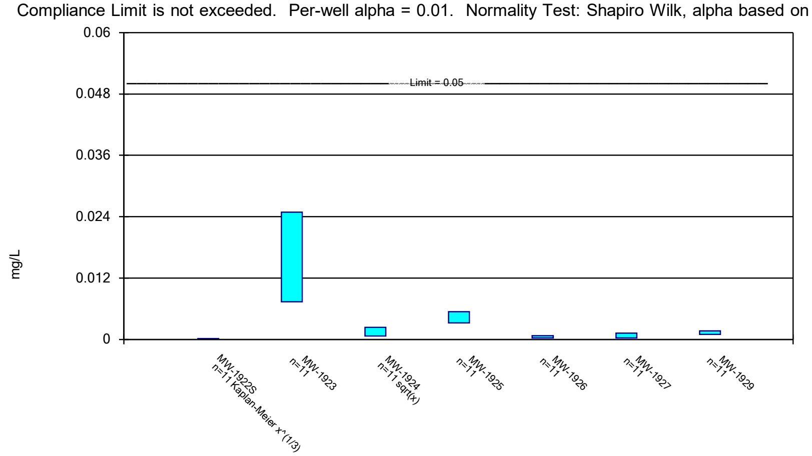

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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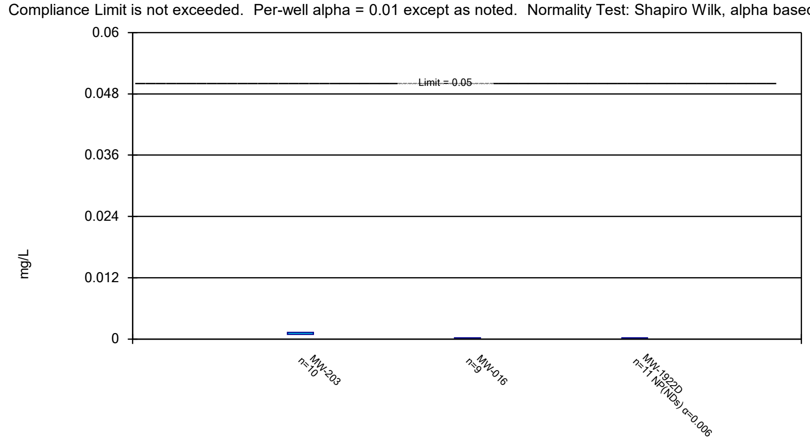

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric and Non-Parametric (NP) Confidence Interval

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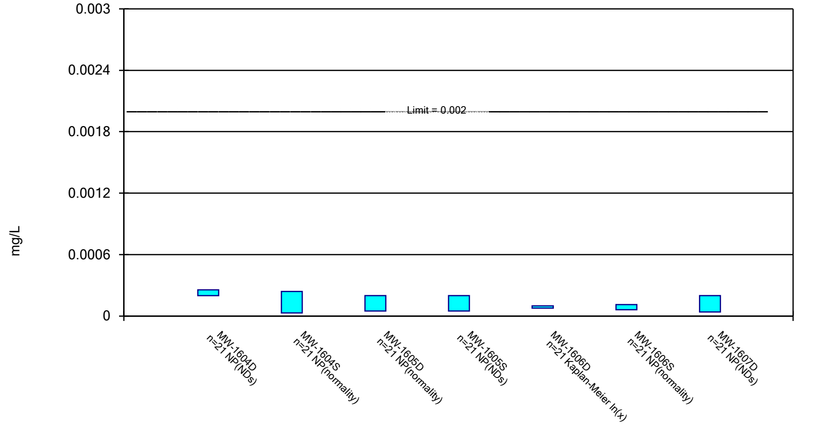

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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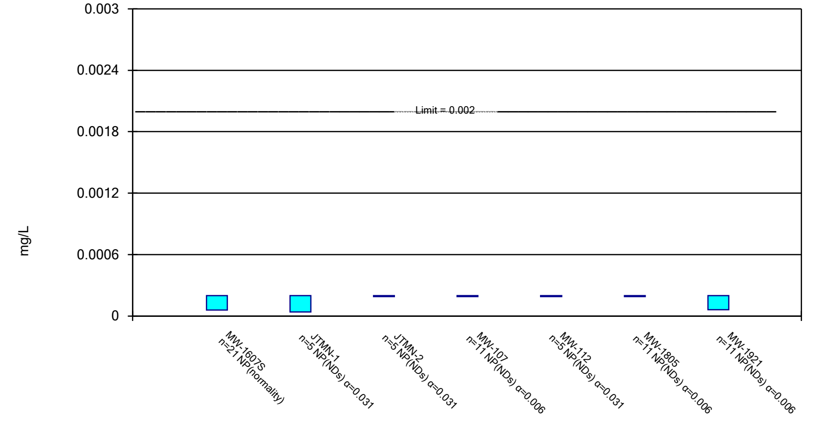

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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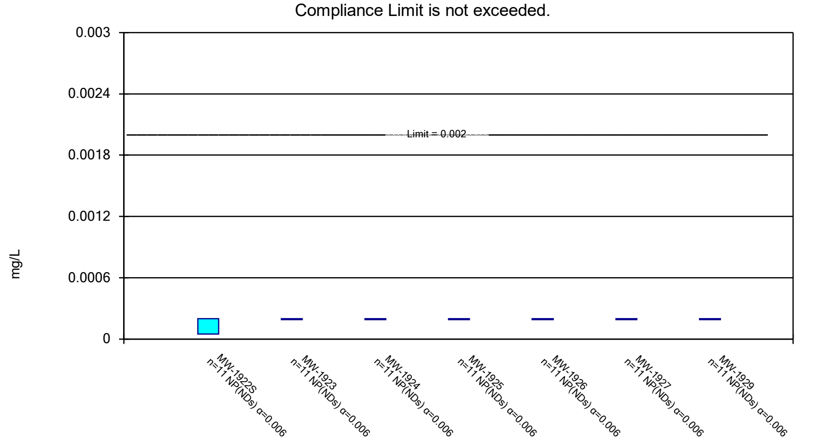

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Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Non-Parametric Confidence Interval

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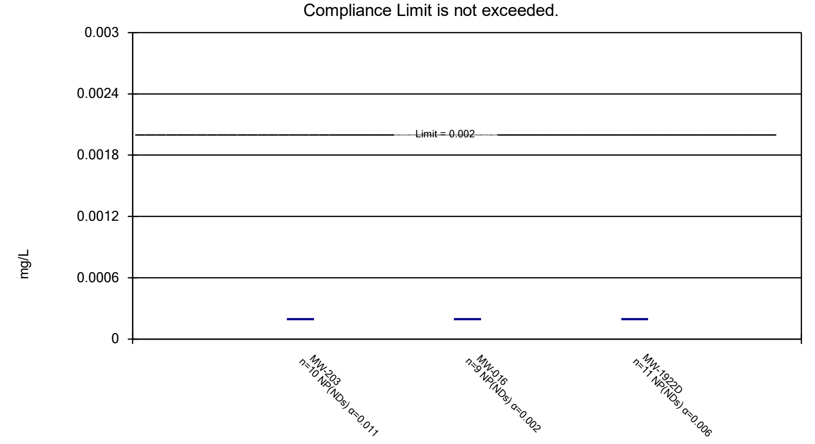


Constituent: Thallium, total Analysis Run 9/1/2022 10:15 AM View: Confidence Intervals

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Confidence Intervals - Corrective Action - All Results (All Significant)

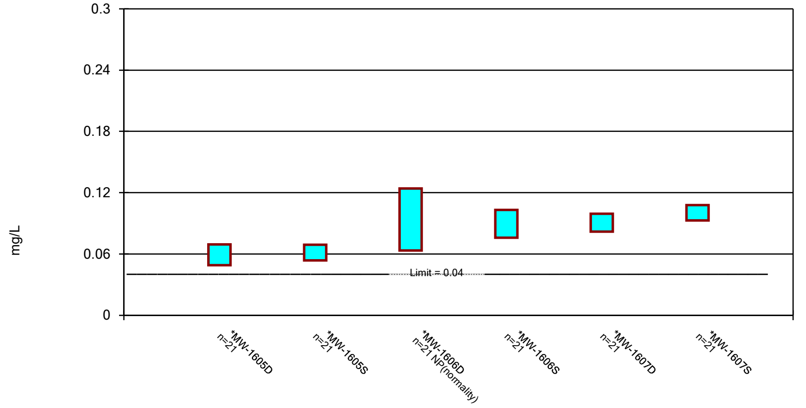
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 8/26/2022, 11:40 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Lithium, total (mg/L)	**MW-1605D**	**0.06923**	**0.04896**	**0.04**	**Yes**	**21**	**0.0591**	**0.01837**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605S**	**0.06899**	**0.05363**	**0.04**	**Yes**	**21**	**0.06131**	**0.01392**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606D**	**0.124**	**0.0633**	**0.04**	**Yes**	**21**	**0.09357**	**0.02925**	**0**	**None**	**No**	**0.01**	**NP (normality)**
Lithium, total (mg/L)	**MW-1606S**	**0.1032**	**0.07598**	**0.04**	**Yes**	**21**	**0.08959**	**0.02467**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607D**	**0.09935**	**0.082**	**0.04**	**Yes**	**21**	**0.09067**	**0.01572**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607S**	**0.1078**	**0.09277**	**0.04**	**Yes**	**21**	**0.1003**	**0.01366**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1921**	**0.09694**	**0.07828**	**0.04**	**Yes**	**11**	**0.08761**	**0.0112**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1922S**	**0.0638**	**0.04162**	**0.04**	**Yes**	**11**	**0.05271**	**0.01331**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1923**	**0.1966**	**0.1314**	**0.04**	**Yes**	**11**	**0.164**	**0.03909**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1924**	**0.1157**	**0.07408**	**0.04**	**Yes**	**11**	**0.09489**	**0.02497**	**0**	**None**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1925**	**0.09119**	**0.06639**	**0.04**	**Yes**	**11**	**0.07879**	**0.01488**	**0**	**None**	**No**	**0.01**	**Param.**

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

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.



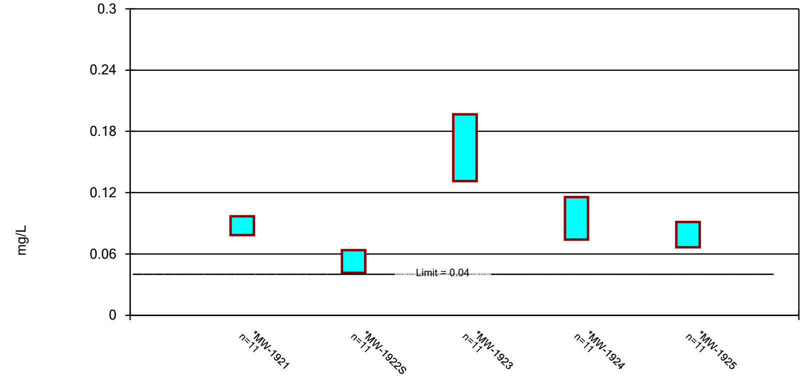
Constituent: Lithium, total Analysis Run 8/26/2022 11:40 AM View: Confidence Intervals - CA

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.35 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 8/26/2022 11:40 AM View: Confidence Intervals - CA

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Appendix 3

Alternate Source Demonstration for the May 2022 sampling event follows.

ALTERNATIVE SOURCE DEMONSTRATION REPORT

AEP Mountaineer Plant
Bottom Ash Ponds
New Haven, West Virginia

Submitted to

AMERICAN ELECTRIC POWER

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

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

December 2022

CHA8495

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FIGURES

ATTACHMENTS

LIST OF ACRONYMS

AEP	American Electric Power
ASD	Alternative Source Demonstration
BAPs	Bottom Ash Ponds
CCR	Coal Combustion Residuals
EPRI	Electric Power Research Institute
ft bgs	feet below ground surface
gpm	gallons per minute
GSC	Groundwater Stats Consulting, LLC.
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
QA	Quality Assurance
QC	Quality Control
SSL	Statistically Significant Level
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

SECTION 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 Bottom Ash Ponds (BAPs), located in New Haven, West Virginia, following the first semiannual corrective action monitoring event of 2022.

In May 2022, a semiannual corrective action monitoring event was conducted at the BAPs in accordance with 40 CFR 257.98(a)(1). The monitoring data were submitted to Groundwater Stats Consulting, LLC (GSC) for statistical analysis. A confidence interval was constructed for each Appendix IV parameter at each compliance, nature and extent, and sentinel well. An SSL was concluded if the lower confidence limit (LCL) exceeded the groundwater protection standard (GWPS) (i.e., if the entire confidence interval exceeded the GWPS). The GWPS was established as either the greater value of the background concentration or 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, 2022):

- Arsenic at MW-1805 and MW-1922D, both of which screened in the underlying Monongahela bedrock Formation;
- Lithium at MW-1605D, MW-1605S, MW-1606D, MW-1606S, MW-1607D, MW-1607S, MW-1921, MW-1922S, MW-1923, MW-1924, and MW-1925, all screened in the sand and gravel aquifer; and,
- Molybdenum at MW-1921, which is also screened in the sand and gravel aquifer.

Source Removal and Hydraulic Containment was previously selected as the remedy for groundwater impacts of lithium associated with the BAPs (Sanborn Head, 2021). Therefore, alternative sources were not evaluated for lithium in this demonstration.

1.1 <u>CCR Rule Requirements</u>

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 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 BAPs.

1.2 Demonstration of Alternative Sources

An evaluation was completed to assess possible alternative sources to which identified SSLs could be attributed. Alternative sources were identified amongst five types:

- ASD Type I: Sampling Causes;
- ASD Type II: Laboratory Causes;
- ASD Type III: Statistical Evaluation Causes;
- ASD Type IV: Natural Variation; and
- ASD Type V: Alternative Sources.

A demonstration was conducted to assess whether the SSLs of arsenic at MW-1805 and MW-1922D and molybdenum at MW-1921 were based on Type IV or Type V causes (Natural Variation and Alternative Sources, respectively) and not by a release from the BAPs.

SECTION 2

SITE BACKGROUND

A brief description of the site construction, geology and hydrogeology are provided below.

2.1 Site Construction and Location

The BAP CCR unit consist of two ponds of approximately equal size named the BAP East and the BAP West with a combined surface area of approximately 28 acres. The BAP West has a normal pool area of 14.1 acres and the BAP East has a normal pool area of 13.9 acres (Arcadis, 2016). The BAPs were constructed between 1978 and 1980 with a three-foot-thick clay liner.

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. The former Sporn mine, a bituminous coal mining facility, is located to the west of the BAPs. A 60-acre fly ash pond associated with the former Philip Sporn (Sporn) Power Plant is located to the northeast (**Figure 1**). The Sporn Power Plant was a generating facility which operated from the early 1950s until 2015. The fly ash pond received wet fly ash sluiced from Sporn's coal-fired steam electric generation Unit 5, runoff from the coal storage yard, water from the sump in the Sporn Mine, and wastewater from the boiler room sumps (EPRI, 1999).

2.2 Regional Geology

The BAPs are immediately underlain by Quaternary-aged alluvial deposits consisting of clay, silt, sand, and gravel. The unconsolidated alluvial deposits consist of two units (Sanborn Head, 2020):

- Alternating horizons of clay and clayey silt, with thickness ranging from 0 to up to 30 feet below ground surface (ft bgs); and,
- Sand, generally medium to coarse grained, with some gravel horizons, that generally coarsens with depth from about 15 to 100 ft bgs.

The unconsolidated alluvial deposits are underlain by bedrock consisting of Pennsylvanian age sandstones, shales, limestones, and coal of the Monongahela group (Arcadis, 2016). All wells within the corrective action monitoring network are screened in the unconsolidated alluvial deposits except MW-1805 and MW-1922D. MW-1805 and MW-1922D are both screened in the underlying Monongahela bedrock formation, as shown in the boring logs provided in **Attachment A**.

2.3 Regional Hydrogeology

Five groundwater pumping wells were installed at the Site in 2008 and are currently active (**Figure 1**). 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.

Groundwater flow direction at the Site is influenced by operation of the pumping wells. Extraction of groundwater from the production wells depresses groundwater elevation 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 was included as Appendix C of the Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) 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 suggests a pattern of diverging flow away from the BAPs, with flow being directed towards the Ohio River and a cone of depression surrounding the West 1 and East 1 wells (**Attachment B**). Groundwater migrating from the downgradient, northeast side of the BAPs would be predicted to migrate beneath the former Sporn fly ash pond towards West 1 and East 1.

SECTION 3

ALTERNATIVE SOURCE DEMONSTRATION

3.1 Proposed Alternative Source

The ASD evaluation methodology, the proposed alternative source of arsenic at MW-1805 and MW-1922D, the proposed alternate source of molybdenum at MW-1921, and the future groundwater sampling requirements, are described below.

3.1.1 Arsenic

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.

3.1.1.1 Evidence: Arsenic Distribution

The BAP liquids have lower concentrations of arsenic than groundwater at the wells of interest, making the BAP an unlikely source. If the inverse were true, it would indicate the BAP could be the source. Surface water samples collected from the pond in 2016 and 2021 contained lower reported concentrations of arsenic than the concentrations reported at the MW-1805 and MW-1922D (**Table 1**). The average BAP arsenic concentrations are 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.

Downgradient sand and gravel aquifer wells MW-1604S, MW-1604D, and MW-1922S are in the immediate vicinity of bedrock wells MW-1805 and MW-1922D. These locations consistently have lower arsenic concentrations than MW-1805 and MW-1922D (**Figure 2**). If elevated arsenic concentrations were a result of a release from the BAPs, arsenic concentrations would be expected 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 is verified because downward vertical gradients are periodically observed from the sand and gravel aquifer into the underlying bedrock (**Table 2**). The lack of exceedances in shallow sand and gravel aquifer monitoring wells suggest an alternative source of arsenic is impacting bedrock wells MW-1805 and MW-1922D.

3.1.1.2 Evidence: Bedrock Lithology

MW-1805 and MW-1922D are the only two wells within the corrective action monitoring network screened in the underlying Pennsylvanian-aged bedrock. The boring log for MW-1805 noted the presence of silty clay inclusions, silty clay shale, and coal within the sandstone bedrock lithology (**Attachment A**). Arsenic is often associated with naturally occurring pyrite, iron oxides, coal, and clays. Adsorbed or co-precipitated arsenic may be mobilized to groundwater through the desorption or dissolution of host minerals which may occur because of changes in groundwater pH and/or redox conditions (Gross and Low, 2013).

A review of the redox conditions at bedrock wells MW-1805 and MW-1922D finds that conditions are favorable for variable iron and arsenic dynamic dissolution processes related to thermodynamic stability of the various minerals relevant to each element. To evaluate the predicted stability of iron and arsenic species under groundwater conditions at the Site, Eh-pH diagrams were generated for iron and arsenic at conditions representative of MW-1805 and MW-1922D (**Figure 4** and **5**, respectively).

Samples from MW-1805 generally plot within the thermodynamic stability of aqueous Fe^{2+} and along the thermodynamic stability boundary of aqueous Fe^{2+} and ferric oxide $Fe(OH)_3$. Results for MW-1922D plot generally along the thermodynamic stability boundary between insoluble iron oxide ($Fe(OH)_3$) and siderite ($FeCO_3$), a ferrous (Fe^{2+}) iron carbonate mineral (**Figure 4**). Arsenic adsorbed to iron oxide mineral surfaces or incorporated into the crystal structure of these minerals would be released into the aqueous phase should these minerals encounter geochemical conditions which favor desorption/dissolution from solid phase minerals, including the dissolution of iron oxides or alteration to siderite.

Figure 5 illustrates that arsenic in groundwater at these wells is currently distributed near the stability boundary of As(V) and As(III) species ($HAsO_4^{2-}$ and $As(OH)_3$ respectively). The negatively charged As(V) species is more likely to attenuate with positively charged solid phase surfaces such as iron oxides. The neutral $As(OH)_3$ species is less likely to interact with aquifer solids. **Figure 5** indicates that arsenic at MW-1805 (and to a lesser extent at MW-1922D) exists in a state of thermodynamic disequilibrium between As(V) and As(III) species. Thermodynamic modeling indicates that shifts in the stability of arsenic species are occurring, which would result in changes to the capability of solid phase materials to sorb aqueous arsenic due to the accompanying changes in electric charge during episodic conditions where soluble arsenic is favored.

3.1.2 Molybdenum

An initial 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 preliminary 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 BAP liquids have lower concentrations of molybdenum than groundwater at the well of interest, making the BAP an unlikely source. If the inverse were true, it would indicate the BAP could be the source. Surface water samples collected from the BAPs in 2016 and 2021 contained lower concentrations of molybdenum than the concentrations historically measured at MW-1921 (**Table 3**).

3.1.2.2 Evidence: Molybdenum Distribution

MW-1921 had the highest reported molybdenum concentration during the May 2022 groundwater sampling event, including the groundwater monitoring network wells located upgradient of MW-1921 and downgradient of BAP East (**Figure 6**). These results are consistent with sampling events completed to date (**Figure 7**). If the molybdenum exceedance at MW-1921 were a result of a release from the BAPs, elevated concentrations would be expected at wells immediately downgradient of the waste boundary. However, these groundwater monitoring network wells located immediately downgradient of the BAPs do not have elevated concentrations and have never had SSLs of molybdenum (Geosyntec, 2022).

MW-1921 is located approximately 2,000 ft downgradient of the waste boundary of BAP East. The molybdenum concentrations in MW-1921 are higher than all the downgradient monitoring wells that are within 100 ft downgradient of the waste boundary of BAP East. Because the concentrations in MW-1921 are higher than wells closer to the waste boundary, an alternate source is expected between the waste boundary and MW-1921.

Groundwater on the northeast side of the BAPs has migrated beneath the former Sporn fly ash pond and towards production wells West 1 and East 1 during regular operational conditions (**Attachment B**). The increase in molybdenum concentrations between the monitoring wells at the immediate downgradient waste boundary of the BAPs (i.e., the MW-1605S/D, MW-1606S/D, and MW-1607S/D) and farther downgradient well MW-1921 suggests that the former Sporn fly ash pond is the alternative source of molybdenum to groundwater at MW-1921.

A statistical evaluation was completed to compare molybdenum concentrations at MW-1921, located downgradient of the Sporn fly ash pond, to wells upgradient of the Sporn fly ash ponds and downgradient of the BAPs (MW-1605S/D, MW-1606S/D, and MW-1607S/D). Molybdenum results from wells MW-1605S/D, MW-1606S/D, and MW-1607S/D were pooled to generate an upper tolerance limit (UTL) of 0.103 mg/L, which is representative of groundwater conditions immediately downgradient of the Mountaineer BAPs and upgradient of the Sporn fly ash pond. The calculated LCL for MW-1921 was 0.427 mg/L, which exceeds the calculated molybdenum UTL for wells downgradient of the Mountaineer BAPs (**Figure 8; Attachment C**). This statistically significant result provides further evidence that the former Sporn fly ash pond is the alternative source of molybdenum to groundwater at MW-1921.

3.2 Sampling Requirements

The ASD supports the position that the arsenic and molybdenum SSLs are not due to a release from the Mountaineer BAPs and initiation of a corrective measures assessment for arsenic and molybdenum is not required at this time. The influence of the former Sporn fly ash pond precludes groundwater samples collected from MW-1921 from documenting the effectiveness of the remedy, as required in 40 CFR 257.98(a)(1)(ii). Therefore, MW-1921, which was identified as a Nature and Extent well in the Corrective Action Monitoring Plan (Sanborn Head, 2022), should be removed from the corrective action groundwater monitoring network.

SECTION 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 and molybdenum identified during corrective action monitoring in May 2022 were not due to a release from the BAPs. Instead:

- The arsenic SSLs should be attributed to natural variation in the underlying geology.
- The molybdenum SSL should be attributed to impacts to groundwater from an adjacent anthropogenic source.

Therefore, no further action for arsenic and molybdenum 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 D.**

SECTION 5

REFERENCES

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USEPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. EPA 530/R-09/007. March.

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	47.0
	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-1922D	MW-1922D-20190409	4/9/2019	323	656
	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	

Notes:
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
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:
Anomalous groundwater elevations were excluded from calculations - MW-1922D and MW-1922S from September 2019, MW-1805 from May 2021.
Groundwater elevation data was generated by Arcadis and provided to Geosyntec.

Table 3 - 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-1921	MW-1921-20190410	4/10/2019	478	742
	MW-1921-20190619	6/19/2019	502	
	MW-1921-20190911	9/11/2019	500	
	MW-1921-20200312	3/12/2020	909	
	MW-1921-20200518	5/18/2020	942	
	MW-1921-20201006	10/6/2020	938	
	MW-1921-20210323	3/23/2021	735	
	MW-1921-20210520	5/20/2021	489	
	MW-1921-20211029	10/29/2021	836	
	MW-1921-20220302	3/2/2022	894	
	MW-1921-20220518	5/18/2022	941	

Notes:
All results are shown in micrograms per liter (µg/L).
BAP - Bottom Ash Pond

FIGURES

Legend

- CCR Network Monitoring Wells
- Nature and Extent Monitoring Wells
- Piezometer
- CCR Unit Boundary
- AEP-Owned Pumping Well

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.

1,000 500 0 1,000 Feet

Site Layout

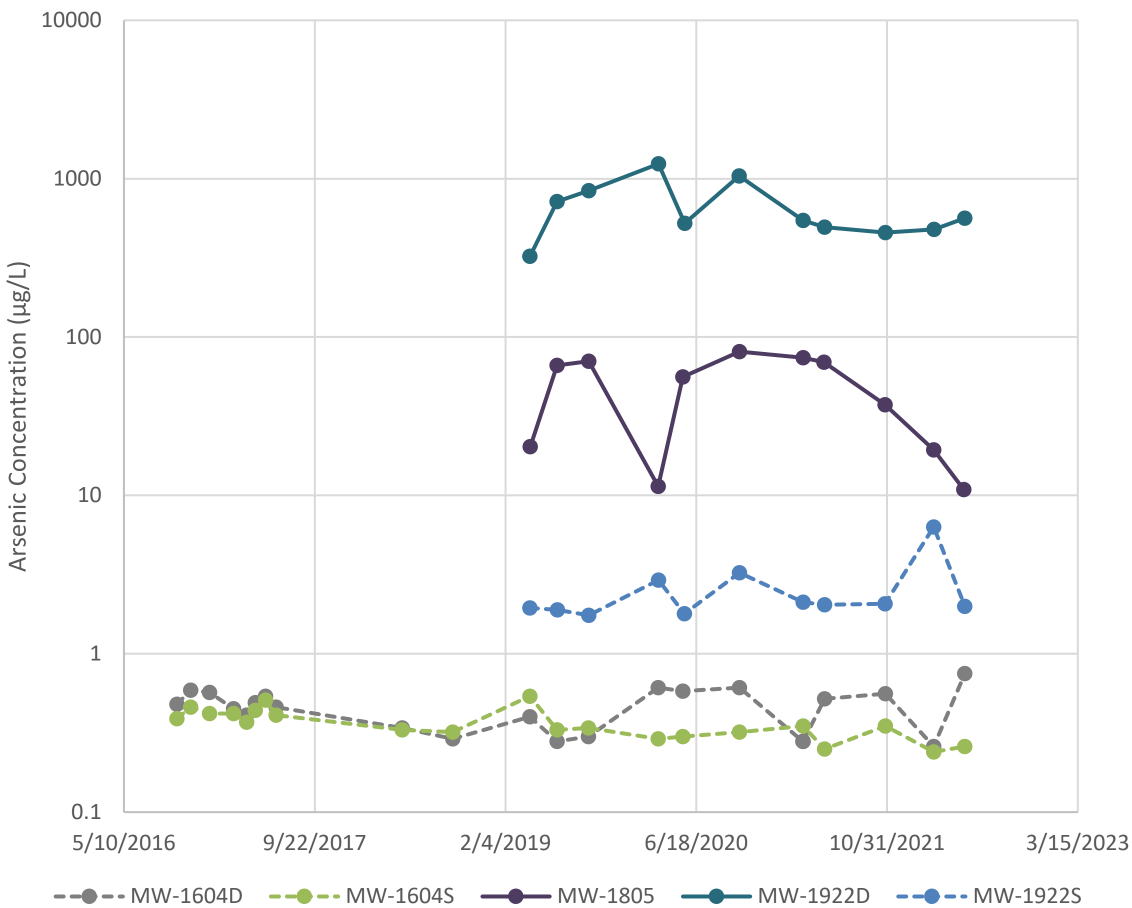
AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia

Geosyntec consultants

Columbus, Ohio | 2022/12/07

Figure 1

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2022\AEP-Mountaineer_Site Layout_ASD.mxd. BAres. 12/7/2022. CHA8423/07/08.



Notes: Wells screened in the unconsolidated sand and gravel lithology are shown with dashed lines. Wells screened in bedrock are shown with solid lines. 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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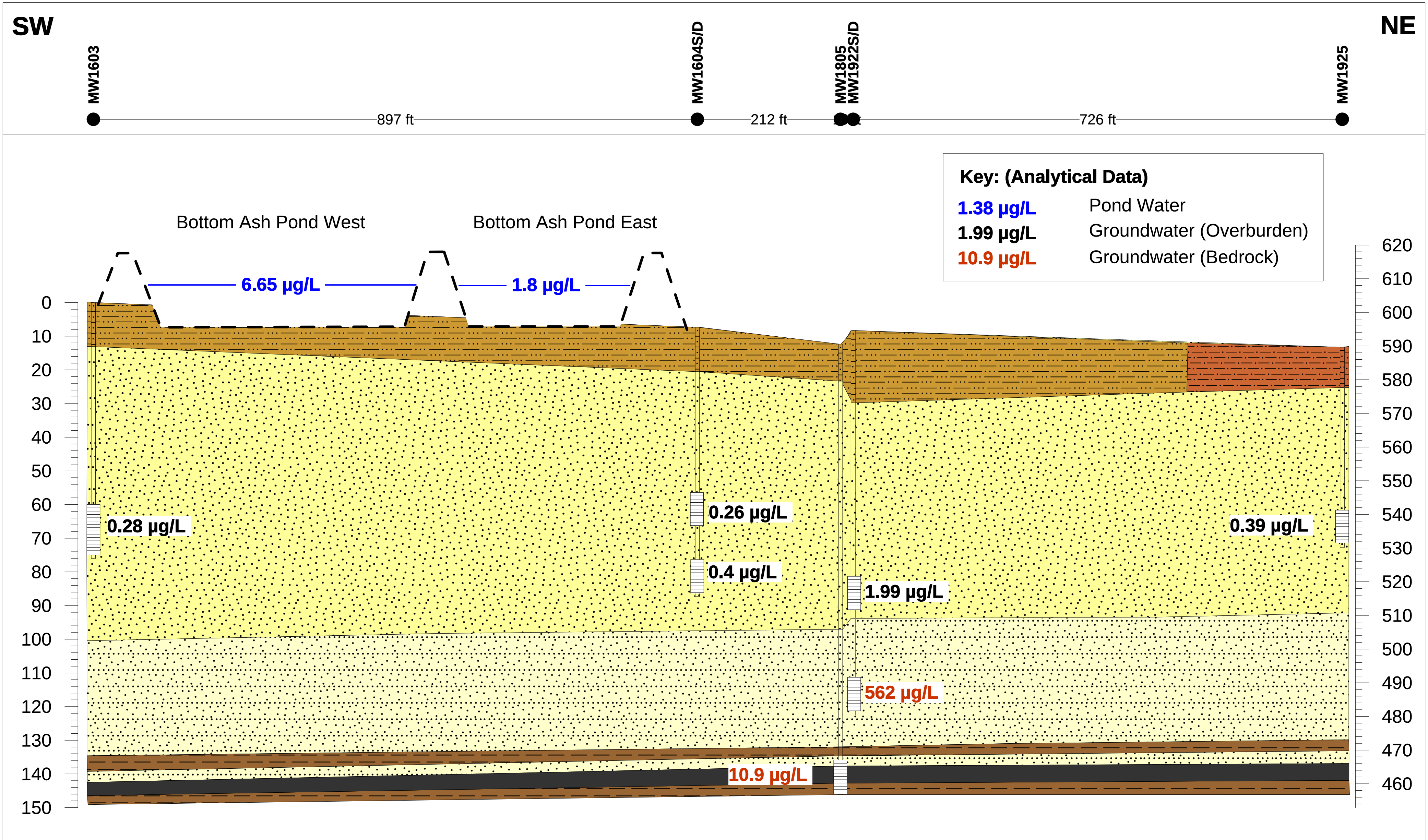
Figure 2

Columbus, Ohio

December 2022



Lithology

Overburden

- CLAY
- GRAVEL
- COAL
- SHALE

Bedrock

- SANDSTONE
- SILT
- SAND

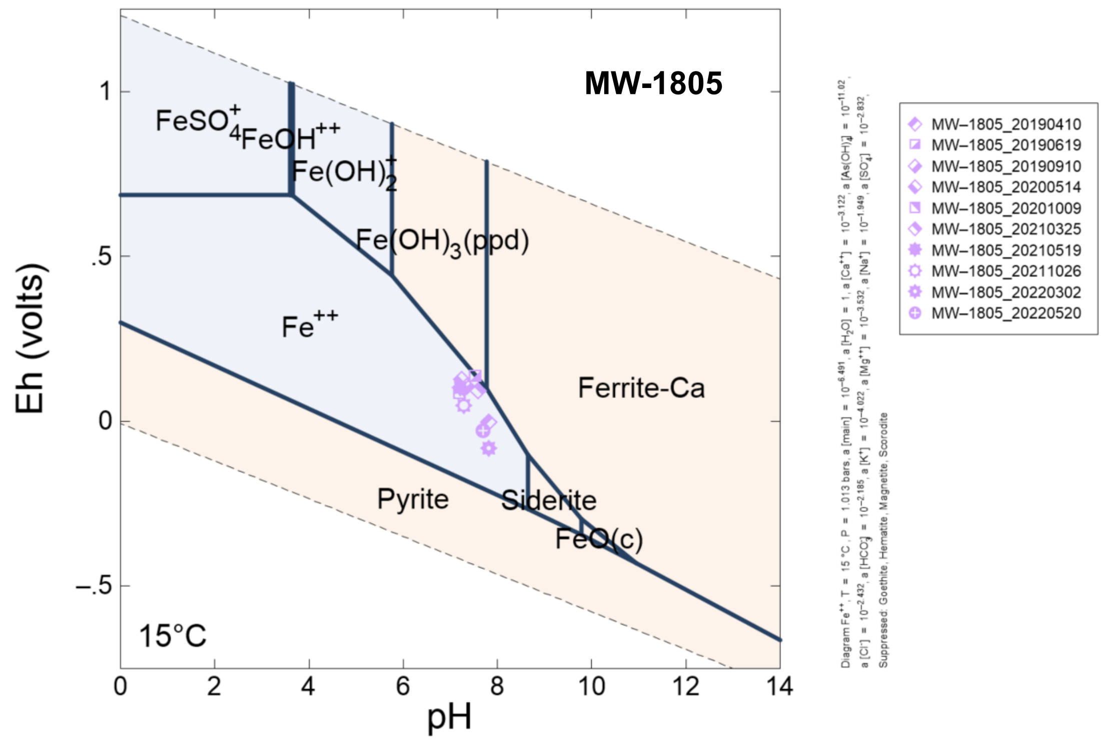
Well Construction

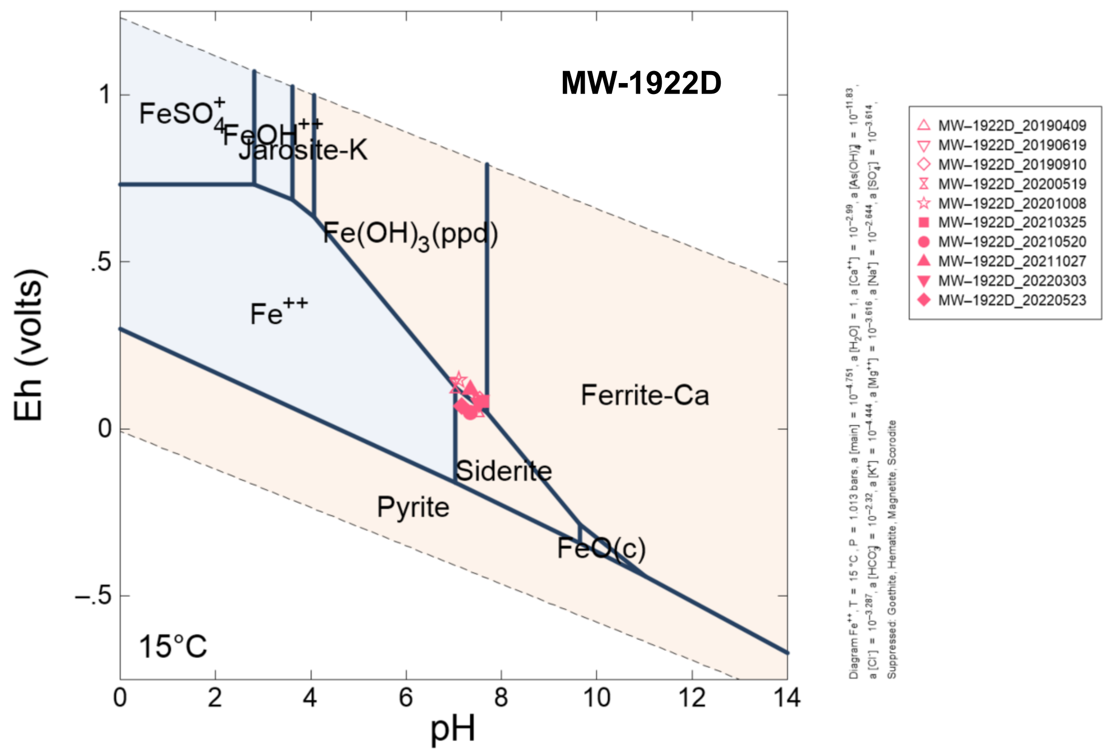
- Screen
- Ash Pond Extent
- Ash Pond Water Level

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 May of 2022.
5. 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 BAP Letart, WV	
Geosyntec consultants	
Columbus, OH	Figure
November 2022	3





Notes: Eh-pH diagrams generated with data from the May 2022 event.

Iron Eh-pH Diagram
Mountaineer Bottom Ash Ponds

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Columbus, Ohio

December 2022

Figure 4

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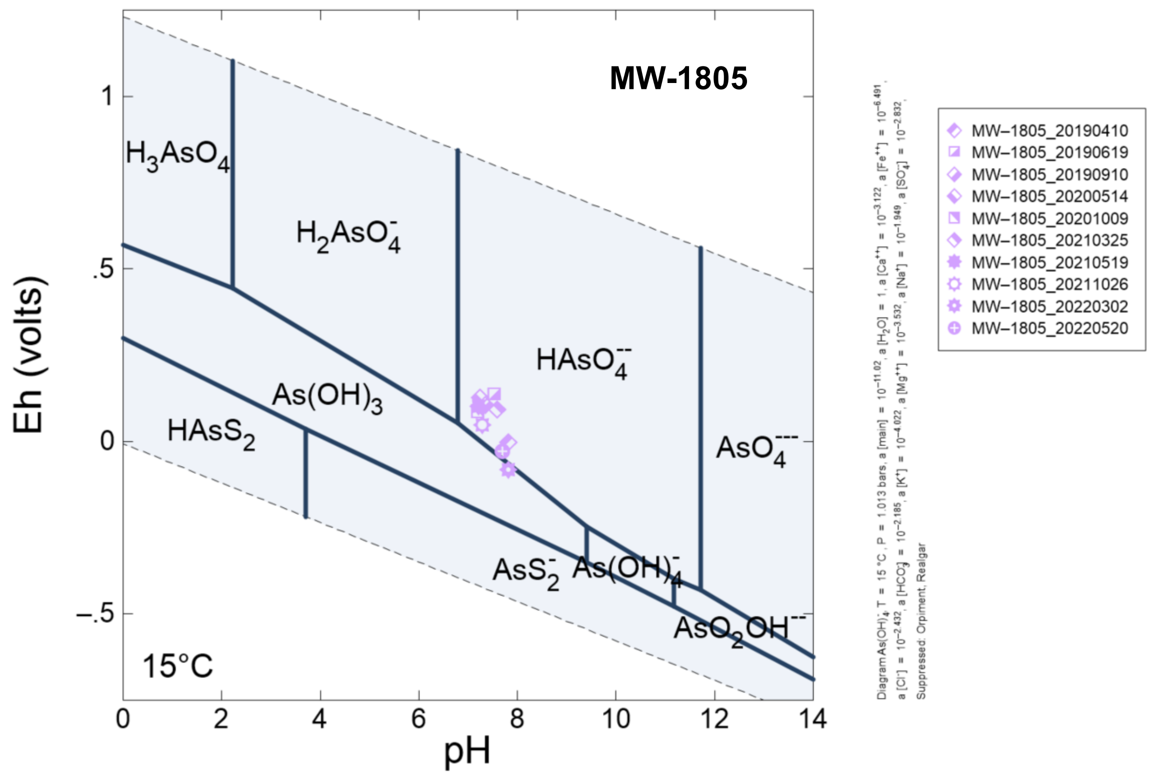

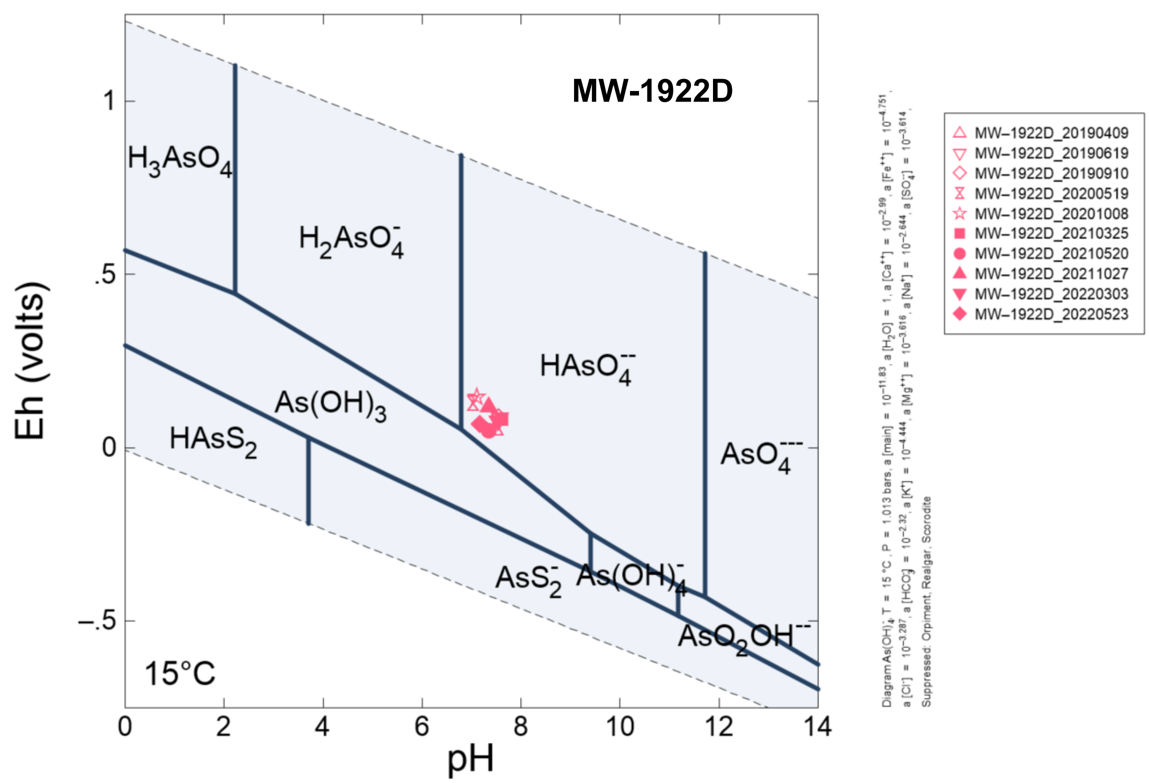

Notes: Eh-pH diagrams generated with data from the May 2022 event.

Arsenic Eh-pH Diagram

Mountaineer Bottom Ash Ponds

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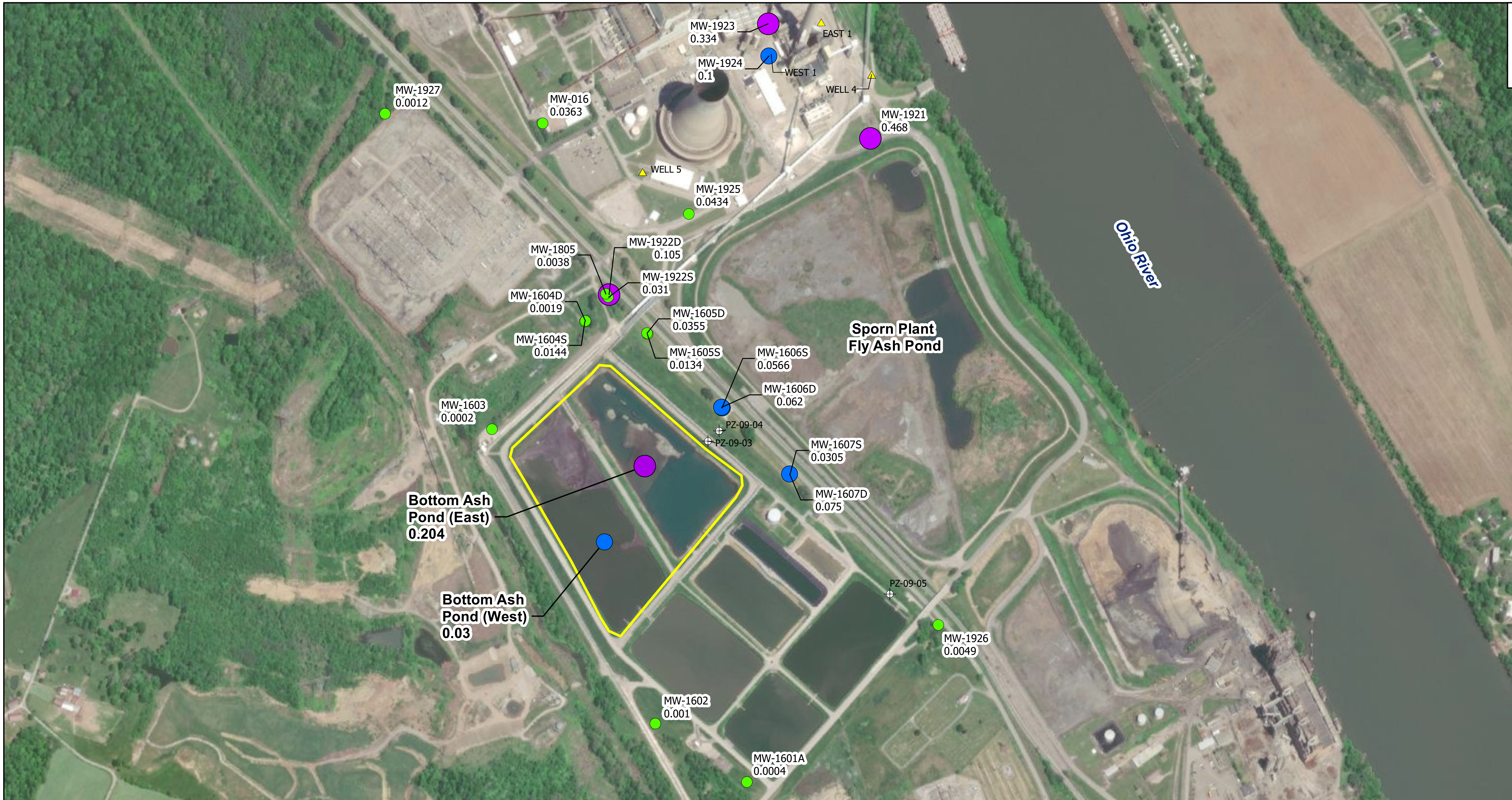
Columbus, Ohio

December 2022

Figure 5



Legend

- Piezometer
- AEP-Owned Pumping Well
- CCR Unit Boundary

Molybdenum Concentration (mg/L)

- < 0.05
- 0.05 - 0.1
- > 0.1

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.

600 300 0 600 Feet

Molybdenum Analytical Results Spatial Distribution

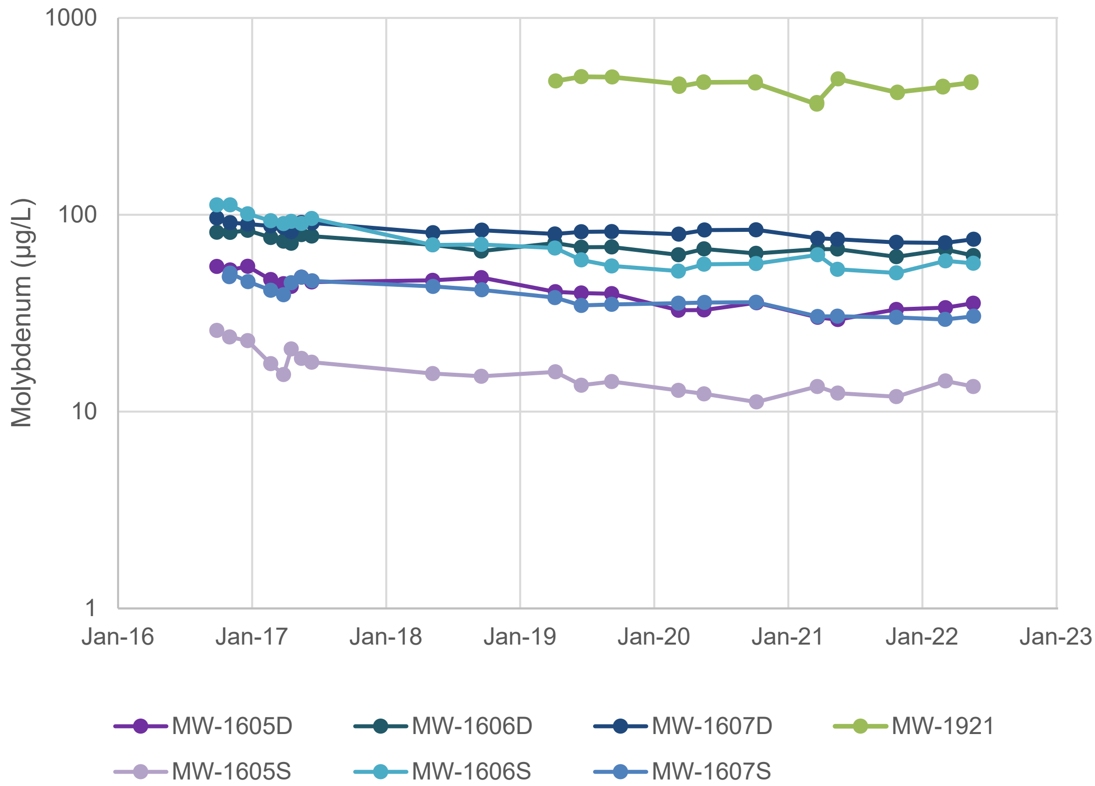
AEP Mountaineer Generating Plant - Bottom Ash Ponds
New Haven, West Virginia

Geosyntec consultants

Figure 6

Columbus, Ohio | 2022/12/05

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\2022\AEP-Mountaineer_BAP_Molybdenum Analytical Results_2022-05.mxd. hduff. 11/28/2022. CHA8423/07/08.



Notes: Groundwater data collected as part of federal groundwater monitoring requirements. Molybdenum concentrations in micrograms per liter (µg/L) are shown on a log scale. MW-1605S/D, MW-1606S/D, and MW-1607S/D are located immediately downgradient of the Mountaineer BAPs.

Molybdenum Time Series Graph

Mountaineer Bottom Ash Ponds

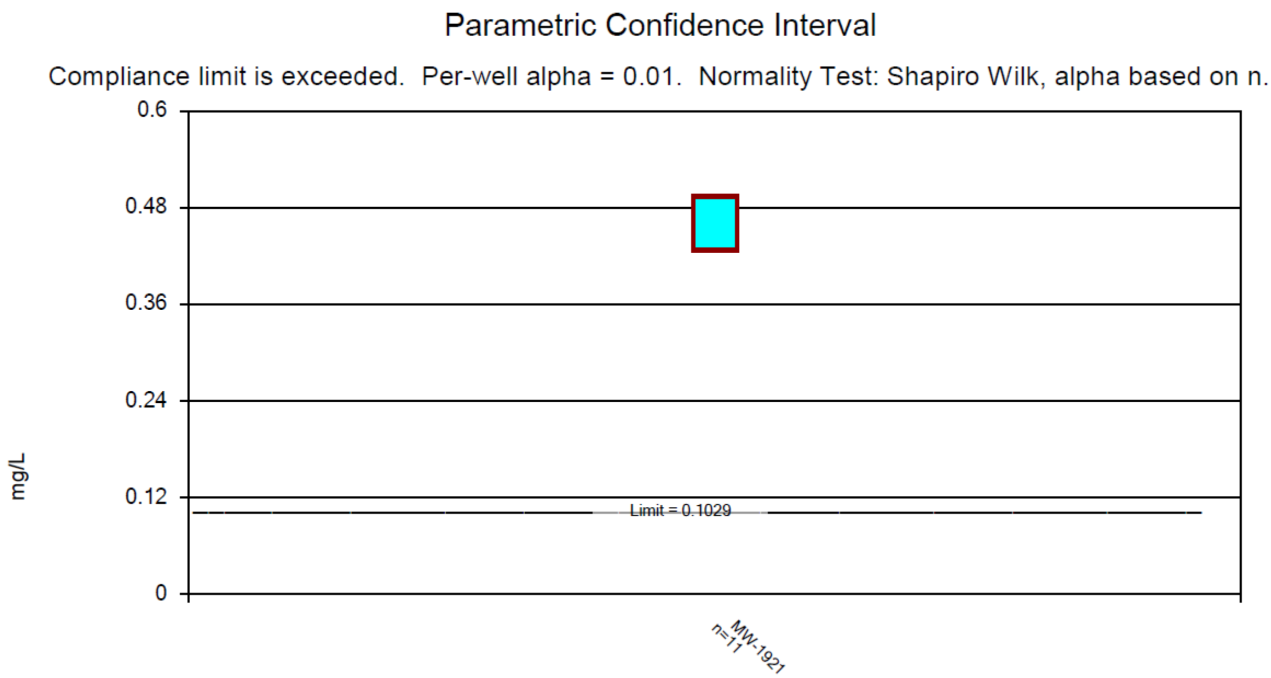
Geosyntec consultants

AMERICAN ELECTRIC POWER

Columbus, Ohio

December 2022

Figure 7



Notes: The parametric confidence interval for total molybdenum at MW-1921 was compared to the upper tolerance limit (UTL) calculated using data from BAPs downgradient monitoring wells MW-1606S/D, MW-1606S/D, and MW-1607S/D. These wells are located upgradient of MW-1921. Total molybdenum concentrations are shown in milligrams per liter (mg/L).

Downgradient Well UTL and MW-1921 LCL Comparison

Mountaineer Bottom Ash Ponds

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Figure 8

Columbus, Ohio

December 2022

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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 No.	Sample Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum Description	Geologic Description	Remarks
0							0'		
5		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.	
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.	
15		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.	
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.	

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

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
26		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.	
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										
36		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.	
		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 No.	Sample Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum Log	Stratum Description	Geologic Description	Remarks
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.	
72		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.	
		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 No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum Description	Geologic Description	Remarks
76		S-32	75.5 - 77	8 12 15	18/13	PID: NM	FINE TO COARSE SAND	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		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	84.5 - 84.7	50/2"	2/7	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 - 89.3		55/39		SANDSTONE	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			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

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.	Sample Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum Log	Stratum Description	Geologic Description	Remarks
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%.	
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%.	
109	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%.	
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%.	
119	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%.	
124	8	C-09	124.3 - 129.3		60/53			SANDSTONE	C-09A (124.3 to 125.3'): Medium hard, light gray, very fine to medium-grained,	

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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.	Sample Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum Log	Stratum Description	Geologic Description	Remarks
								SANDSTONE	SANDSTONE, with very thin to thin black lenses. Sound. REC=88%. RQD=65%.	
126								125.3'		
128								COAL	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.	
	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.

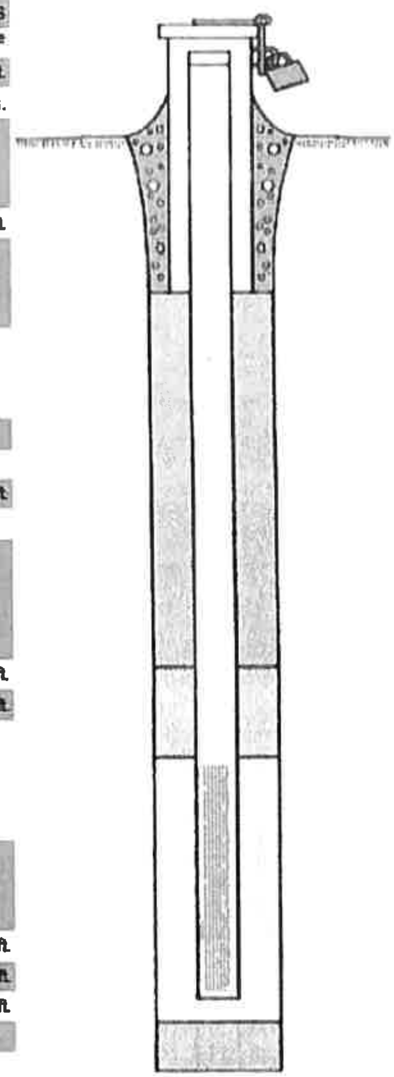
State of West Virginia
Department of Environmental Protection

Monitoring Well Construction
Well Number: WV00540-1805-18
Approved

Site Name/Physical Address:	Well Registration No. WV00540-1805-18	Purpose of Monitoring Well:
Site: AEP Mountaineer Plant Line 1: 1347 Graham Station Road Line 2: City: Letart State: WV Zip: 25253- County: Mason	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	to monitor the hydrologic conditions of a coal seam.
Well Owner (Name, Firm, Address):	**Installed By (Name, Firm, Address):**	**Date Well Installed:**
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	Installer: Kenn Fowler Line 1: Terracon Consultants, Inc. Line 2: 912 Morris Street City: Charleston State: WV Zip: 25301- Phone: 304-344-0821	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.	



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Client: American Electric Power		**WELL LOG**
Project: CHW8293		**Well No.** MW-1922D
Address: New Haven, WV		

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)	Sample Type	Date & Time	Blow Counts	Recovery (ft)	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS
0						(0') Large stones.	Advanced hollow stem auger
						(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							
	SS02		2 3 4	1.3		(6.5') Changes to damp, cohesive, trace fine sand.	
10							
	SS03		2 4 4	0.8		(11.5') Loose, red-brown, SANDY SILT (ML); damp, nonplastic, noncohesive, trace clay, uniform.	
15							
	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							

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.

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Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG

Well No. MW-1922D

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)
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.

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Client: American Electric Power
Project: CHW8293
Address: New Haven, WV

WELL LOG

Well No. MW-1922D

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)	Sample Type	Blow Counts	Recovery (ft)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS
40					
41.5	SS09	4, 5, 8	1.3	(41.5') Loose, brown, SILTY CLAY (CL); damp, low plasticity, cohesive, trace sand.	
42				(42') Loose, brown SAND (SP); damp, nonplastic, noncohesive, fine- to medium-grained sand, uniform.	
45					
46.5	SS10	4, 6, 7	1.5	(46.5') Changes to wet with few coarse sand and trace fine gravel.	
48	SS11	9, 6, 8	1.3	(48.5') 2 inch dark gray clay lens at 48.5 feet.	
49.5	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.	
51	SS13	4, 6, 9	1.3		
52.5	SS14	4, 7, 8	1.2	(52.5') With few fine to coarse gravel.	
54	SS15	3, 5, 10	1.1		
55.5	SS16	6, 8, 9	0.9		
57	SS17	4, 7, 8	1.0		
58.5	SS18	4, 5, 4	1.0		
60					

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.

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Client:	American Electric Power
Project:	CHW8293
Address:	New Haven, WV

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)	Sample Type	Blow Counts	Recovery (ft)	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS
60	SS19	8 / 13 / 16	0.9		(60') Loose to medium dense, brown SAND (SP); wet, some coarse sand, uniform.	
	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			
	SS23	6 / 7 / 10	1.2			
	SS24	8 / 11 / 16	1.1		(67.5') Trace fine gravel.	
70	SS25	12 / 13 / 15	1.0			
	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.	
	SS30	12 / 11 / 13	1.2		(77') Medium dense, gray SAND (SP); wet, nonplastic, noncohesive, uniform.	
	SS31	10 / 13 / 15	1.1			
80	SS32	20	1.3			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.

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Client: American Electric Power		**WELL LOG**
Project: CHW8293		**Well No.** MW-1922D
Address: New Haven, WV		**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	Date & Time	Blow Counts	Recovery (ft)	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	
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.		85.0
									(85.5') Auger refusal at 85.0 feet.		
									(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.

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Client:	**American Electric Power**	**WELL LOG**	
Project:	**CHW8293**	**Well No.**	**MW-1922D**
Address:	**New Haven, WV**	**Page:**	**6 of 6**

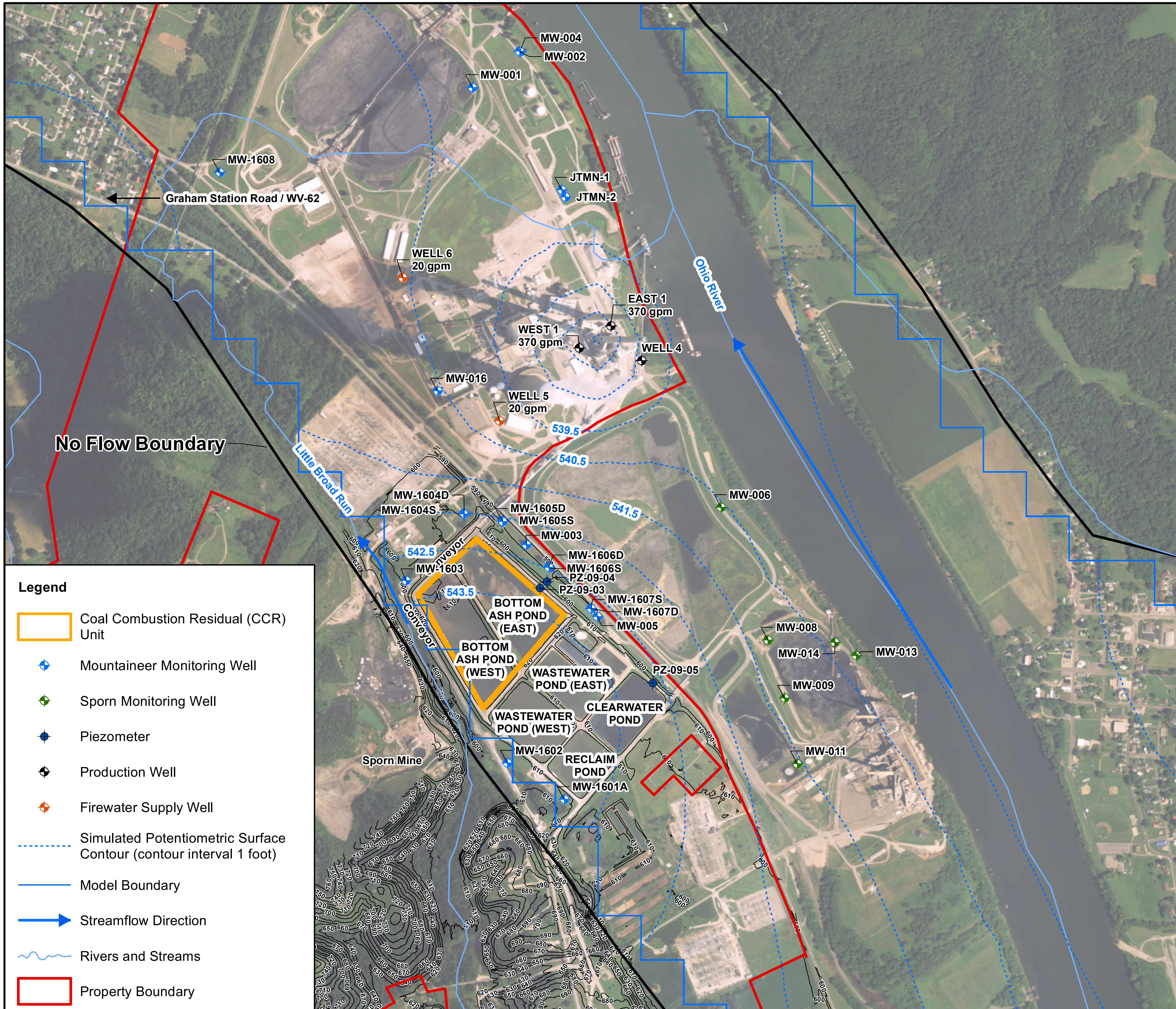
Drilling Start Date:	**1/28/2019**	Boring Depth (ft):	**114.2**	Well Depth (ft):	**83.5**
Drilling End Date:	**1/29/2019**	Boring Diameter (in):	**8.25**	Well Diameter (in):	**2**
Drilling Company:	**AEP**	Sampling Method(s):	**SPT; Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Hollow 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.

ATTACHMENT B

Groundwater Flow Modeling Output



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 C

Molybdenum Statistical Evaluation

Upper Tolerance Limits - Downgradient Well Series

Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 11/23/2022, 11:00 AM

Constituent	Well	Upper Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Molybdenum, total (mg/L)	n/a	0.1027	126	0.05396	0.0258	0	None	No	0.05	Inter

Confidence Interval - Molybdenum Well MW-1921

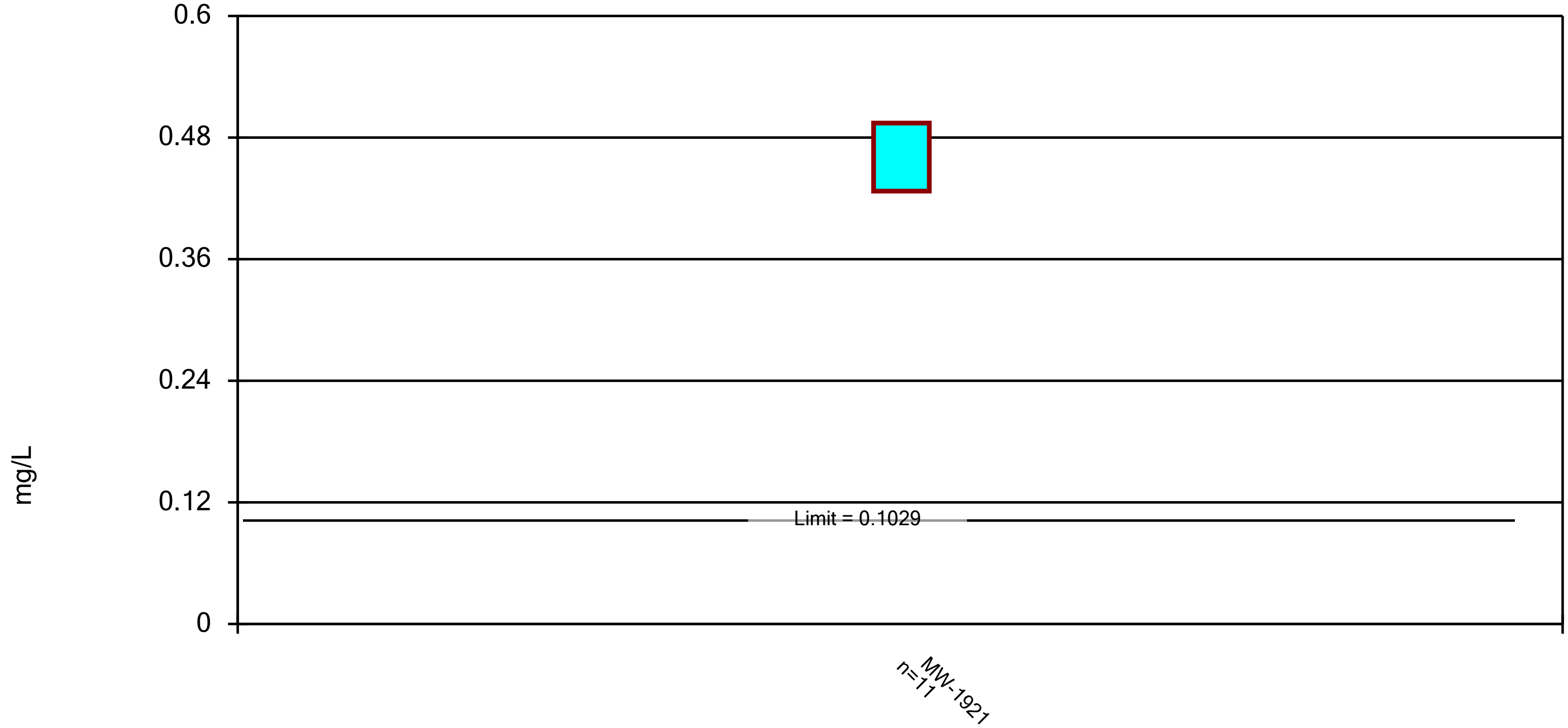
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP   Printed 11/22/2022, 1:56 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	Transform	Alpha	Method
Molybdenum, total (mg/L)	**MW-1921**	**0.4942**	**0.4272**	**0.1029**	**Yes**	**11**	**0.4607**	**0.04021**	**0**	**No**	**0.01**	**Param.**

Sanitas™ v.9.6.35 Groundwater Stats Consulting. UG

Parametric Confidence Interval

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



Constituent: Molybdenum, total   Analysis Run 11/22/2022 1:54 PM   View: Confidence Interval - Molybdenu

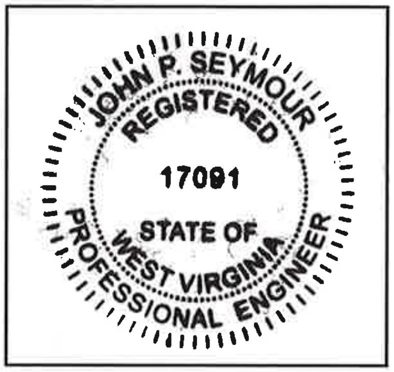
Mountaineer BAP   Client: Geosyntec   Data: Mountaineer BAP

ATTACHMENT D

Certification by 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 Seymour
Printed Name of Licensed Professional Engineer

John Seymour
Signature

017091	West Virginia	12/14/2023
License Number	Licensing State	Date

Appendix 4

The notifications of an SSL above a GWPS that were posted in 2022, as determined by statistical analysis following each monitoring event, and 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.

Mountaineer Plant

Notice of Statistically Significant Levels (SSLs) above the Groundwater Protection Standard (GWPS)

CCR Unit – Bottom Ash Pond

As required by 40 CFR 257.95(g), this is a notification that on February 23, 2022 lithium was detected at SSL's above the GWPS's. This notification is being placed in the operating record, as required by 40 CRF 257.105(h)(8).

Mountaineer Plant

Notice of Statistically Significant Levels (SSLs) above the Groundwater Protection Standard (GWPS)

CCR Unit – Bottom Ash Pond

As required by 40 CFR 257.95(g), this is a notification that on September 15, 2022 arsenic, lithium, and molybdenum were detected at SSL's above the GWPS's. This notification is being placed in the operating record, as required by 40 CRF 257.105(h)(8).

Appendix 5

No monitoring wells were installed or decommissioned in 2022.

Appendix 6

The Corrective Action Monitoring Plan follows.

SANBORN HEAD

Building Trust. Engineering Success.

CORRECTIVE ACTION MONITORING PLAN

AEP MOUNTAINEER PLANT

BOTTOM ASH PONDS

New Haven, West Virginia

Prepared for ***American Electric Power***

APPALACHIAN POWER

An AEP Company

BOUNDLESS ENERGY

Prepared by ***Sanborn, Head & Associates, Inc.***
File No. 4345.03
March 2022

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

American Electric Power Service Corporation (AEP) has retained Sanborn Head & Associates, Inc. (Sanborn Head), to prepare a corrective action monitoring plan for the Bottom Ash Ponds (BAPs), a unit that was designated for handling of coal combustion residuals (CCR) at the Mountaineer Plant (Plant) in Letart, West Virginia near the Town of New Haven. The location of the BAPs is provided on the site locus map on Figure 1 and the site layout is provided on Figure 2. This corrective action monitoring plan has been prepared in general accordance with 40 CFR Part § 257.98 Paragraph (a)(1), which requires that the owner or operator establish and implement a corrective action groundwater monitoring program. The corrective action monitoring program must:

- Meet the requirements of an assessment monitoring program [40 CFR 257.98(a)(1)(i)];
- Document the effectiveness of the remedy [40 CFR 257.98(a)(1)(ii)]; and
- Demonstrate compliance with the Groundwater Protection Standard (GWPS) [40 CFR 257.98(a)(1)(iii)].

2.0 WELL NETWORK DESCRIPTION

2.1 General Geology and Hydrogeology

The general stratigraphic units identified at the Site are unconsolidated valley-fill alluvial deposits (silt, clay, sand and gravel), and bedrock. Additionally, fill material, comprised of reworked soils (i.e., silt, clay and sand) and mine spoil is found in areas of the Site that have been excavated and reworked during construction activities, and covers a generally limited area. The unconsolidated valley-fill alluvial deposits consist of two units. The upper unit is alternating horizons of clay and clayey silt, with thickness ranging from approximately 0 to 30 feet. The lower unit is a generally medium to coarse grained sand with some gravel horizons, that generally coarsens with depth, and which varies in thickness across the Site typically in the range of 40 to 60 feet. Bedrock beneath the Site is typically 60 to 90 feet below ground surface and described as a fine to medium grained, moderately hard, competent sandstone.

The Site lies within the Ohio River alluvial floodplain and the Upper Ohio-Shade watershed. The Ohio River flows north-northwest along the northeastern Site boundary, but regionally flows south and west. The alluvial sand and gravel associated with the Ohio River valley is the only aquifer at the Site, with a saturated thickness of roughly 20 to 45 feet. The aquifer is primarily recharged by local precipitation and inflow from high river stages from the Ohio River. Groundwater flow is influenced by Site pumping wells and the stage of the Ohio River. During regular facility operating conditions, East 1 and West 1 are actively pumping and have capacities of 550 and 950 gallons per minute (gpm) respectively, although the wells are typically operated at lower flow rates with a combined average flow rate of 1,000-1,100 gpm. These pumping conditions result in a cone of depression extending at least 800 feet from the wells, in which groundwater flow is towards the wells. Outside of this area, groundwater flow is generally east towards the Ohio River.

2.2 Groundwater Monitoring System

The CCR groundwater monitoring system for the BAPs was first defined in 2016 following review of the existing site monitoring well network and installation of new monitoring wells specifically for use as part of the CCR groundwater monitoring network. Groundwater monitoring under the CCR Rules was initiated in 2016 and the initial network consisted of 12 groundwater monitoring wells to monitor groundwater quality up- and downgradient of the CCR unit in the uppermost aquifer. The network was substantially expanded as part of the nature and extent study in 2019 with the installation of 10 additional monitoring wells, and incorporation of three existing monitoring wells.

The groundwater monitoring network for the purpose of corrective action monitoring will consist of the following elements:

- Background sampling locations that are upgradient or side-gradient of the BAPs.
- Compliance sampling locations (located immediately adjacent to the BAPs on the downgradient edge).
- Nature and extent monitoring wells (used to define groundwater quality downgradient of the BAPs).
- Sentinel Wells (used to define groundwater quality between the known area of groundwater contamination and drinking water supply wells).

Table 1 presents construction details for the monitoring wells included in the corrective action monitoring network and the locations are shown on Figure 2. All monitoring wells in Table 1 are designated for monitoring groundwater levels for assessment of performance of the remedy (hydraulic containment). In addition, these monitoring wells will be used for groundwater quality monitoring and have been designated as either background wells, compliance wells, nature and extent wells, or sentinel monitoring wells. A summary of these groups and the monitoring wells included in the corrective action network is provided below.

2.2.1 Background Monitoring Wells

Five monitoring wells are designated as background monitoring wells for corrective action monitoring. These include four wells (MW-1601A, MW-1602, MW-1603 and MW-1608) that were installed in 2016 as a major component of the groundwater monitoring network for the BAPs. An additional well (MW-1928) was installed in 2019 as part of the nature and extent characterization study but has been consistently dry following installation. These background monitoring wells are located southwest, south, and northwest of the BAPs which established background groundwater quality upgradient of the CCR unit boundary except for MW-1608 which is used to establish background water quality of groundwater flowing from the bedrock ridge into the Ohio River Valley.

2.2.2 Compliance Monitoring Wells

Eight wells, MW-1604S, MW-1604D, MW-1605S, MW-1605D, MW-1606S, MW-1606D, MW-1607S and MW-1607D, were installed in 2016 as a major component of the groundwater monitoring network for the BAPs. The compliance monitoring wells are located to the north, northeast, and east (downgradient) of the BAPs. These wells monitor groundwater as it flows north and northeast past the CCR unit boundary, and were installed as shallow and deep well pairs within the uppermost aquifer to monitor the full saturated thickness of the aquifer.

2.2.3 Nature and Extent Wells

Sixteen monitoring wells are designated as nature and extent wells with the purpose of monitoring groundwater quality downgradient of the compliance monitoring wells. Nine overburden monitoring wells (MW-1921, MW-1922S, MW-1922D, MW-1923, MW-1924, MW-1925, MW-1926, MW-1927, and MW-1929) were installed in 2019 as part of the nature and extent characterization study. Six additional overburden monitoring wells (JTMN-01, JTMN-02, MW-016, MW-107, MW-112, MW-203) installed for subsurface investigations prior to 2019, and a bedrock monitoring well (MW-1805) installed in 2018, were also included in the nature and extent characterization study.

2.2.4 Sentinel Wells

Sentinel wells are located between a known area of groundwater contamination and drinking-water supply. Monitoring well MW-1929 is designated as a sentinel well for the purpose of assessing groundwater quality between the area of groundwater requiring remediation and the New Haven Supply Well network. No sentinel well is currently designated for the area between the pumping wells and the Ohio River due to the proximity of the pumping wells to the Ohio River.

2.3 Well Operations & Maintenance Program

The monitoring network should be operated and maintained in a manner that keeps the monitoring wells in good, working condition. An inspection of the visible components of each monitoring well should be conducted during every monitoring event. Any visual defects or problems experienced during monitoring or sampling with the wells in this network will be recorded in the field log. Any issues identified following inspections or sampling should be communicated to AEP prior to completion of the monitoring event. If a monitoring well becomes damaged or is otherwise not performing as intended, it will be repaired or replaced. AEP will be responsible for coordinating repairs or well replacement required to maintain a fully functional and compliant monitoring network. A West Virginia certified monitoring well driller is required to be on site and in direct charge of actively drilling, constructing, altering, testing or abandoning any monitoring well. Monitoring well repair or replacement should meet the requirements of the legislative rules of the West Virginia Department of Environmental Protection including the regulations governing monitoring well rules (47CSR59. Title 47 Series 59) and design standards (47CSR59. Title 47 Series 60).

3.0 MONITORING OF HYDRAULIC CONTROL

Achieving and maintaining hydraulic control is an important remedial objective. The operation of the groundwater extraction system serves a dual purpose of providing water for plant operations; and limiting migration of impacted groundwater while also removing contaminants from groundwater.

The number and location of wells required to monitor performance of the hydraulic containment system was established by evaluation of groundwater contaminant data and by application of the numerical groundwater model developed for the site as described in the remedy assessment report.

Simulations performed using the numerical groundwater model, and evaluation of the spatial extent of the plume, has demonstrated that the current extraction well system functioning under typical plant operating conditions can meet the objective of hydraulic control. However, it is recognized that actual site conditions are more variable than those modelled and ongoing monitoring of hydraulic conditions at the site will be required to demonstrate effective containment.

During typical operation of the plant, it is anticipated that hydraulic control will be established by pumping water from supply wells including East 1, West 1, and Well 5.

It is acknowledged that there may be occasions when the plant is non-operational for a period of time due to planned or unplanned shutdowns. During this type of event there will be reduced demand for water for operational purposes. It is anticipated that the supply wells will continue to operate but at a reduced overall pumping rate. During this type of event, the locations and frequency of hydraulic monitoring will be adjusted as described below.

3.1 Monitoring Locations

Hydraulic control will be monitored by collection of water level measurements taken from each of the groundwater monitoring wells summarized in Table 1.

In addition, two extraction wells that are being used for hydraulic control (East 1, West 1) will be monitored for pumping rate using automatic measurement logging devices.

Monitoring wells MW-1923 and MW-1924 will be equipped with pressure transducer dataloggers and used to collect automatic readings of water level.

If the plant is non-operational for more than 2 weeks and the typical pumping schedule is altered (i.e., reduced number of extraction wells and lower total pumping rate), water level measurements will be taken from a subset of the existing groundwater monitoring well network as summarized in Table 1. If an annual/semi-annual event occurs during non-operational periods, then water level measurements will be taken from the full list of monitoring well locations for annual/semi-annual events stated in Table 1.

If necessary, additional monitoring wells and/or automatic dataloggers may be added in the future to provide additional measurements of hydraulic head in the vicinity of the extraction wells.

3.2 Monitoring Frequency

Manual water level measurements from monitoring wells will be collected prior to each sampling event during typical plant operating conditions.

During periods of time when the plant is non-operational for more than 2 weeks, manual water level measurements will be collected on a biweekly frequency from a subset of wells (see Table 1 – hydraulic monitoring under non-operational conditions) until plant operation is resumed.

Water level measurements from monitoring wells MW-1923 and MW-1924, and pumping rates from two of the extraction wells used for hydraulic control (East 1, West 1,) will be collected automatically using dedicated electronic logging devices set to record at 15-minute intervals.

3.3 Operation and Maintenance of Electronic Logging Devices

Electronic logging devices (i.e., water level and flow measurement devices) used in the monitoring network should be operated and maintained in a manner that keeps the equipment in good, working condition. An inspection of each monitoring device should be conducted during every monitoring event. Any visual defects observed, or problems experienced, with the electronic logging devices in this network will be recorded in the field log. Any issues identified following inspections should be communicated to AEP prior to completion of the monitoring event. If a device becomes damaged or is otherwise not performing as intended, it will be repaired or replaced. AEP will be responsible for coordinating repairs or replacement required to maintain a fully functional monitoring network.

3.4 Evaluation and Reporting

Effectiveness of hydraulic containment will be evaluated by using measured groundwater levels to prepare groundwater level contour maps (one for each monitoring event, and if applicable, one for each biweekly event). These will be used to make an interpretation of the induced hydraulic gradients to demonstrate they are inward toward the extraction wells in the area of impacted groundwater. Interpretation of the data may also be supported by use of a numerical groundwater flow model as an additional means to evaluate the groundwater elevation and groundwater flow under variable pumping conditions.

A discussion of adequacy of hydraulic control from the extraction system will be included with each annual report.

The evaluation completed as part of the annual report will be used to make recommendations about operation of the system including, if necessary, adjustments to pumping rates at individual extraction wells.

4.0 MONITORING, SAMPLING AND ANALYTICAL METHODS

Procedures for collecting, preserving, and shipping groundwater samples are not included in this corrective action monitoring plan. Samples will be collected and handled in accordance with the Mountaineer Plant Monitoring Program Sampling and Analysis Plan (September 2016) that was prepared by Arcadis on behalf of AEP, and the requirements of 40 CFR 257.93. A copy of the Mountaineer Plant Monitoring Program Sampling and Analysis Plan (September 2016) is included as Appendix A of this corrective action monitoring plan.

4.1 Sampling Schedule/Frequency

Groundwater sampling for corrective action monitoring will be conducted on the same frequency as assessment monitoring was conducted i.e., an annual event and two semi-annual events for a total of three sampling events each year.

4.2 Groundwater Elevation Monitoring

At the beginning of each groundwater sampling event, groundwater elevations will be measured at each well in Table 1 prior to the collection of any groundwater samples. The intent of this approach is to obtain a set of groundwater elevation measurements that are closely spaced in time and that are not influenced by changes in groundwater elevations that may result from collection of groundwater samples. Procedures for performing groundwater elevation measurements are described in Section 4.1 of the Mountaineer Plant Monitoring Program Sampling and Analysis Plan.

4.3 Sample Collection and Handling Procedures

Methods and procedures for collection and handling of groundwater samples will be performed in a manner consistent with the approach described in the Mountaineer Plant Monitoring Program Sampling and Analysis Plan.

4.3.1 Sampling Procedures

Groundwater sampling performed for corrective action monitoring will follow the procedures described in the Mountaineer Plant Monitoring Program Sampling and Analysis Plan.

4.3.2 Sampling Parameter List

Samples collected during the monitoring events will be submitted for analysis of the full list of the 40 CFR 257 Appendix III and Appendix IV constituents. Optional parameters (i.e., not required by 40 CFR 257) may be added to the sampling parameter list on an event-by-event basis. Optional parameters may be added to allow for evaluation of groundwater quality conditions e.g., to help interpret the data obtained for Appendix III and Appendix IV constituents, to help support an alternative source demonstration, etc. Any additional parameters added to sample parameter list will be authorized by AEP prior to each sampling event.

4.3.3 Sample Handling, Chain of Custody, Packing and Shipping Procedures

Sample handling, chain of custody, and sample packing and shipping procedures for corrective action monitoring will follow the approach described in the Mountaineer Plant Monitoring Program Sampling and Analysis Plan.

5.0 ANALYTICAL METHODS

5.1 Laboratory Name and Accreditation

Samples will be analyzed by AEP's John E. Dolan Laboratory (Dolan) at the Dolan Tech Center in Groveport, Ohio in most cases. Dolan is an accredited laboratory in the State of West Virginia. If Dolan does not maintain laboratory accreditation, or if there is a need to utilize a different laboratory, then an alternative laboratory will be used that has accreditation in the State of West Virginia. In addition, if subcontracted laboratory services are required for any reason, the subcontract laboratory will also be required to maintain the appropriate West Virginia accreditation.

5.2 Laboratory Analytical Methods

The laboratory analytical methods, sample preservation, sample hold time, and method reporting limits associated with the full list of the 40 CFR 257 Appendix III and Appendix IV constituents are summarized in the Mountaineer Plant Monitoring Program Sampling and Analysis Plan.

5.3 Data Validation

AEP, and/or their consultants, may at any time undertake third-party data validation of the analytical data received from the laboratory. Undertaking such validation efforts is a voluntary action on the part of the owner or operator and shall not alter the timeframes defined and required under 40 CFR 257 that are associated with statistical evaluation and reporting.

5.4 Record Keeping

AEP will be provided with, and retain record of, all field sampling, monitoring, testing, and analytical data obtained throughout the corrective action monitoring period.

5.5 Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) procedures will consist of those specified in the Mountaineer Plant Monitoring Program Sampling and Analysis Plan in addition to any laboratory QA/QC requirements specified in the individual test procedures.

6.0 STATISTICAL EVALUATION

6.1 Methods Used

Appropriate statistical analysis of groundwater data collected in compliance with the CCR rules is described in the Statistical Analysis Plan (Revision 1, January 2021) that was prepared by Geosyntec Consultants, Inc. on behalf of AEP. The Statistical Analysis Plan provides a narrative description of the statistical approach and procedures used to establish background conditions, and implement detection monitoring, assessment monitoring, and corrective action monitoring in accordance with the CCR rule reporting requirements [40 CFR 257.93(f)(6)]. A copy of the Statistical Analysis Plan (Revision 1, January 2021) is provided as Appendix B of this corrective action monitoring plan.

6.2 Comparison with Groundwater Protection Standards

The corrective action process is triggered if the statistical evaluation demonstrates that an Appendix IV constituent is present at a statistically significant level (SSL) above its GWPS. For each detected Appendix IV constituent, a GWPS is set at the MCL (or CCR rule specified screening level for cobalt, lead, lithium, and molybdenum) or a value based on background data, whichever is greater. A confidence interval is constructed based on recent data at each compliance well, and the confidence interval is compared to the site wide GWPS. For well-constituent pairs in corrective action monitoring, new data must be evaluated to determine whether they are statistically significantly lower than the GWPS. The statistical approach for comparing corrective action monitoring data to the GWPS is contained in the Mountaineer Plant Statistical Analysis Plan attached as Appendix B. The remedy is considered complete when, among other things, confidence intervals constructed for Appendix IV constituents, for wells identified with SSLs, have not exceeded the GWPS for three consecutive years [40 CFR 257.98(c)(2)]. In this instance, a return to assessment monitoring would be warranted.

7.0 REPORTING AND NOTIFICATIONS

7.1 Contents of Corrective Action Reports

Corrective action reports describe the success of the remedy and its related components in addressing the groundwater impact. The monitoring well network will be evaluated for functionality and documented in the reports. Each report will contain groundwater elevation data and preparation of groundwater level contour maps, to evaluate the effectiveness of the system in achieving hydraulic containment. This evaluation may be supplemented by use of a numerical groundwater flow model to support assessment of the data. In addition, each report will contain the most recent groundwater analytical results and any subsequent statistical evaluation. In addition, the reports will include the following:

- Progress of remedy implementation;
- Descriptions of remediation activities conducted during the review period;
- Results of monitoring and sampling activities conducted during the review period;
- Groundwater level contour maps and evaluation of groundwater flow directions;
- Progress in meeting cleanup standards since remedy implementation;
- Discussion of any problems encountered during the reporting period and actions taken to resolve problems; and
- Work planned for next review period.

7.2 Notifications Regarding Non-Performing Wells

Nonfunctioning monitoring wells will be replaced or repaired upon recognition of damage or nonperformance and a summary of the work included in the subsequent annual report. Well installation and well abandonment will be reported to the West Virginia DEP as required by the regulations governing monitoring wells (47CSR59. Title 47 Series 59) and design standards (47CSR59. Title 47 Series 60).

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TABLE

TABLE 1
Monitoring Summary and Well Construction Details
Bottom Ash Ponds - Corrective Action Monitoring
AEP Mountaineer Plant
New Haven, West Virginia

Well Name	Well Group	Hydraulic Monitoring		Location Description to CCR Unit	Northing	Easting	Ground Surface Elevation	Reference Point Elevation	Date Installed	Well Diameter (in)	Borehole Depth (ft bgs)	Top of Screen		Bottom of Screen	
		Annual and Semi-annual Events	Bi-weekly Events #									Depth (ft bgs)	Elevation	Depth (ft bgs)	Elevation
MW-1601A	Background	x		Upgradient	717349.02	1702641.29	607.47	610.66	6/9/2016	2	80	67	540.467	77	530.47
MW-1602	Background	x		Upgradient	717715.99	1702066.17	602.37	605.12	5/10/2016	2	71.6	61	541.366	71	531.37
MW-1603	Background	x		Upgradient	719560.25	1701042.03	602.92	606.30	5/4/2016	2	76	60	542.915	75	527.92
MW-1608	Background	x		Sidegradient	723686.79	1699158.25	587.26	590.65	6/10/2016	2	70	46	541.259	56	531.26
MW-1928	Background	x		Upgradient	718578.44	1701131.19	650.25	650.25	2/21/2019	2	99.5	89	561.248	99	551.25
MW-1604D	Compliance	x		Downgradient	720238.04	1701629.09	595.59	598.22	4/27/2016	2	80	69	526.591	79	516.59
MW-1604S	Compliance	x		Downgradient	720233.87	1701624.21	595.48	598.07	5/2/2016	2	60	49	546.484	59	536.48
MW-1605D	Compliance	x		Downgradient	720161.35	1702015.62	588.51	591.01	5/11/2016	2	80	69	519.509	79	509.51
MW-1605S	Compliance	x		Downgradient	720156.26	1702018.30	588.51	590.86	5/12/2016	2	59.5	49	539.507	59	529.51
MW-1606D	Compliance	x		Downgradient	719697.75	1702482.40	587.25	590.10	5/16/2016	2	76	65	522.252	75	512.25
MW-1606S	Compliance	x		Downgradient	719693.26	1702486.37	587.28	590.15	5/18/2016	2	56	49	538.278	59	528.28
MW-1607D	Compliance	x		Downgradient	719279.74	1702908.89	590.75	593.93	5/19/2016	2	80	70	520.748	80	510.75
MW-1607S	Compliance	x		Downgradient	719276.05	1702912.19	590.79	593.99	5/26/2016	2	60	50	540.793	60	530.79
JTMN-1	Nature and Extent	x	x	Downgradient	723507.55	1702616.76	582.20	583.70	7/19/1990	2	76.6	56.7	525.5	75.7	506.50
JTMN-2	Nature and Extent	x	x	Downgradient	723436.85	1702653.46	582.20	584.10	7/18/1990	2	77.8	57.9	524.3	76.9	505.30
MW-016	Nature and Extent	x	x	Downgradient	721475.54	1701361.26	586.82	588.61	6/17/2008	2	82	67.5	519.32	77.5	509.32
MW-107	Nature and Extent	x	x	Downgradient	723702.34	1701693.06	586.10	588.80	8/28/2006	2	58.2	28.2	557.9	58.2	527.90
MW-112	Nature and Extent	x	x	Downgradient	723880.56	1702583.56	583.50	586.40	8/31/2006	2	44.4	34.4	549.1	44.4	539.10
MW-1805	Nature and Extent	x	x	Downgradient	720407.52	1701757.25	590.57	592.98	6/18/2018	2	133.8	123.5	467.069	133.5	457.07
MW-1921	Nature and Extent	x	x	Downgradient	721382.83	1703415.39	599.19	599.19	1/22/2019	2	87.5	77	522.189	87	512.19
MW-1922D	Nature and Extent	x	x	Downgradient	720391.59	1701767.24	594.61	594.61	1/28/2019	2	113.5	103	491.606	113	481.61
MW-1922S	Nature and Extent	x	x	Downgradient	720388.21	1701770.84	594.60	594.60	2/5/2019	2	83.5	73	521.602	83	511.60
MW-1923	Nature and Extent	x	x	Downgradient	722110.93	1703106.86	585.89	585.89	2/8/2019	2	65.5	55	530.886	65	520.89
MW-1924	Nature and Extent	x	x	Downgradient	721898.62	1702778.84	586.24	586.24	2/11/2019	2	70.7	60.6	525.642	70.2	516.04
MW-1925	Nature and Extent	x	x	Downgradient	720908.87	1702276.82	589.66	589.66	2/13/2019	2	58.5	48.4	541.261	58	531.66
MW-1926	Nature and Extent	x		Downgradient	718333.80	1703841.49	600.72	600.72	2/15/2019	2	63.5	53.4	547.323	63	537.72
MW-1927	Nature and Extent	x	x	Downgradient	721535.78	1700372.34	597.35	597.35	2/19/2019	2	68.5	58.4	538.947	68	529.35
MW-203	Nature and Extent	x	x	Downgradient	722925.77	1701202.02	587.00	590.42	9/27/2006	2	58	48	539	58	529.00
MW-1929	Sentinel	x		Sidegradient	725148.19	1699808.06	585.23	585.23	3/19/2019	2	55.5	45.4	539.825	55	530.23

Notes:
Northing and Easting are presented in1983 West Virginia State Planar Coordinates; survey zone - West Virginia South 4702
Bi-weekly events are performed during periods when the plant is non-operational
"CCR" indicates coal combustion residuals.
"in" indicates inches.
"ft bgs" indicates feet below ground surface.

FIGURES

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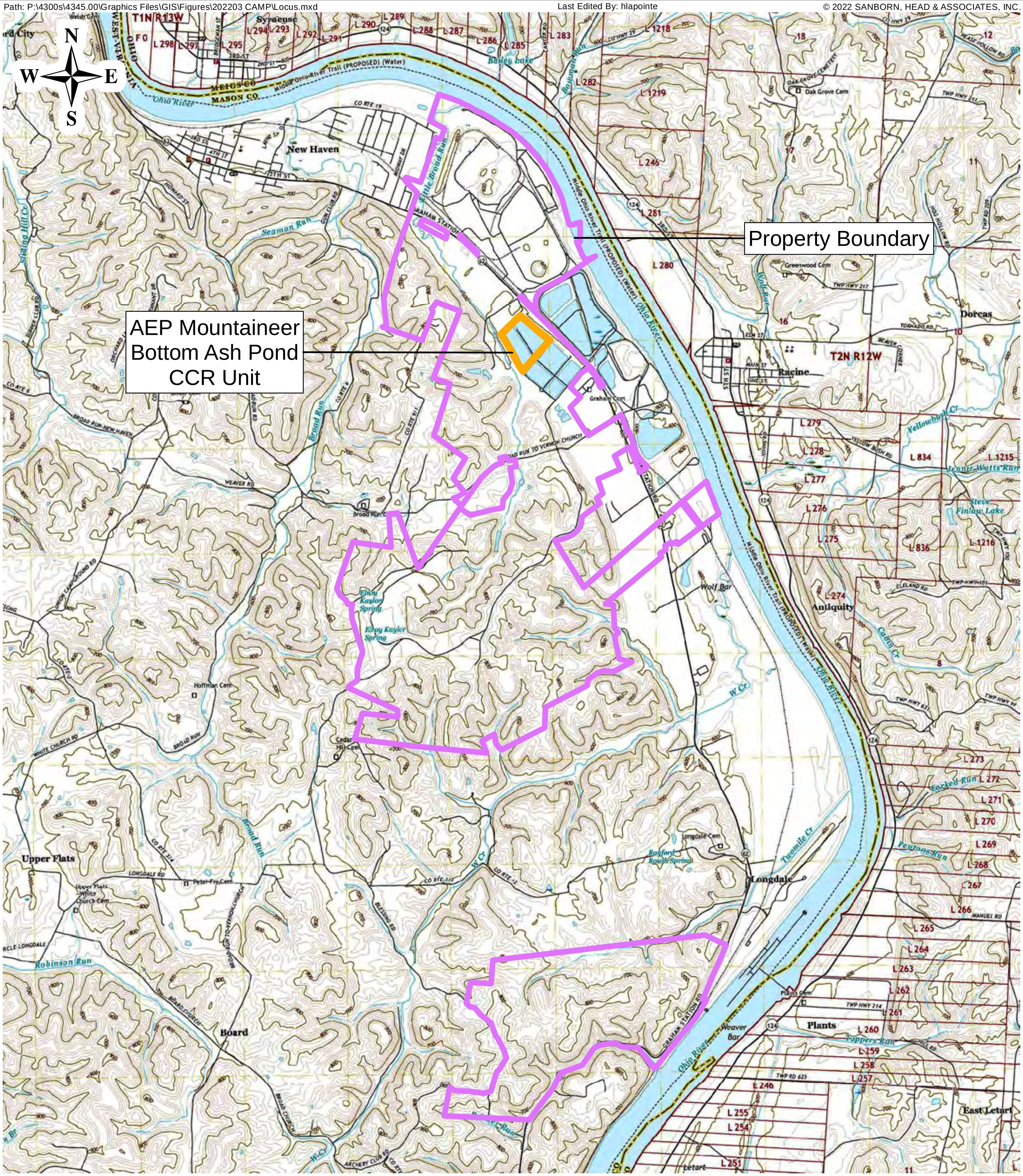

Drawn By: H. LaPointe
Designed By: A. Ashton
Reviewed By: C. Crocetti
Project No: 4345.03
Date: March 2022

0.5 0.25 0 0.5 1 Mile

SANBORN HEAD

Figure 1

Location Plan

Corrective Action Monitoring Plan

American Electric Power
AEP Mountaineer Generating Plant
New Haven, West Virginia

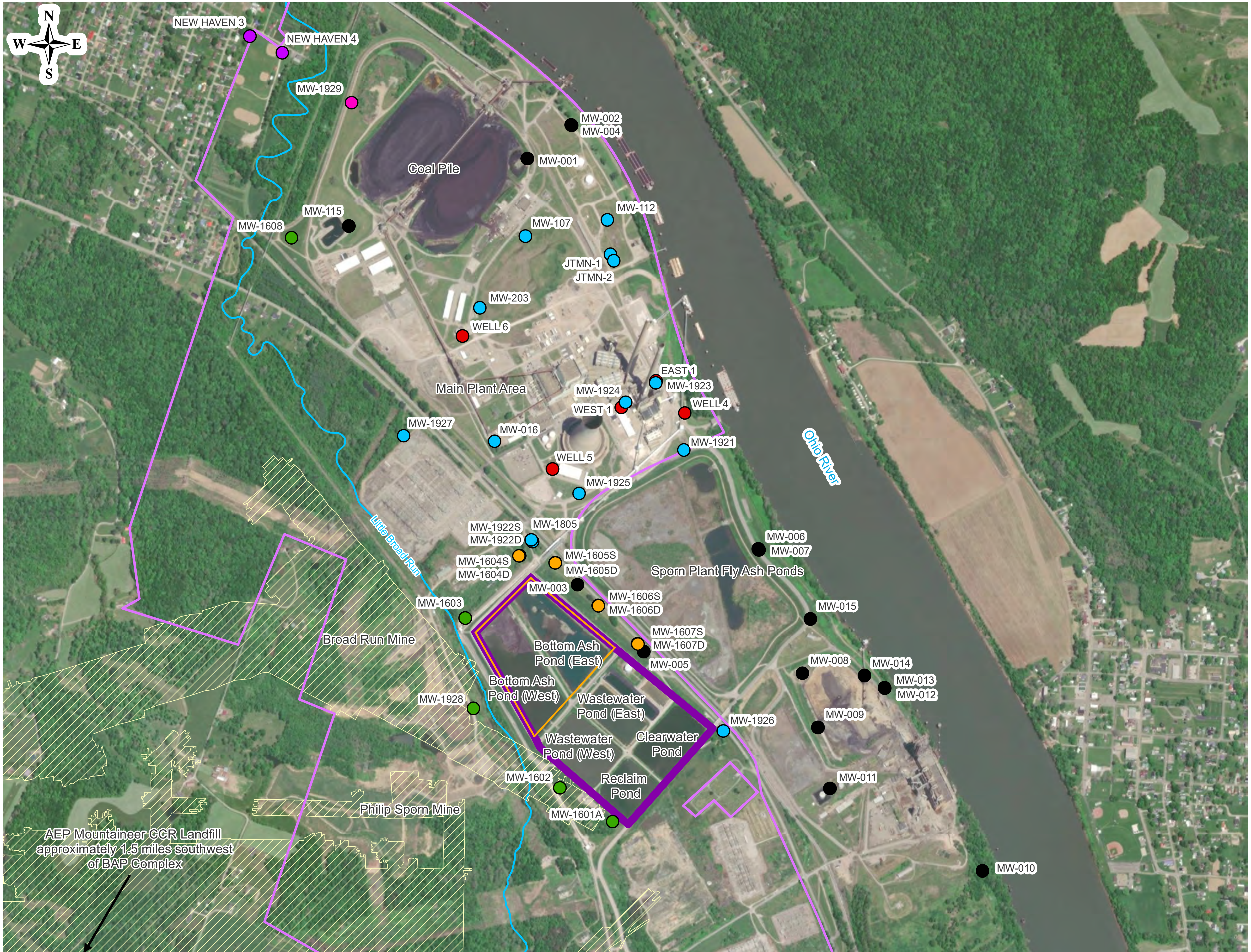

Figure 2

Site Plan and Monitoring Well Locations

Corrective Action Monitoring Plan

American Electric Power
AEP Mountaineer Generating Plant
New Haven, West Virginia

Drawn By: H. LaPointe
Designed By: A. Ashton
Reviewed By: C. Crocetti
Project No: 4345.03
Date: March 2022

Figure Narrative

This site plan depicts the general area in and around American Electric Power's (AEP) Mountaineer Generating Plant in Letart near the Town of New Haven, West Virginia. The location of key site features pertinent to this report including the power plant, bottom ash ponds, and site pumping (water supply) wells are shown. The plan also shows monitoring wells that are part of the corrective action monitoring program.

Notes

1. Locations of the monitoring wells and other site features were provided by Geosyntec Consultants.

2. Aerial Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

Well Group

- Background
- Compliance
- Nature and Extent
- Sentinel
- Plant Supply Wells
- Public Supply Wells
- Other (Not Used for Corrective Action Monitoring)
- Approximate area of underground mine
- Bottom Ash Pond CCR Unit
- Mountaineer Pond Complex
- Property Boundary

Feet
500 250 0 500 1,000

SANBORN HEAD

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APPENDIX A

ARCADIS Design & Consultancy for natural and built assets

American Electric Power

ELECTRIC GENERATION FACILITIES RCRA CCR DETECTION MONITORING PROGRAM

Mountaineer Plant Monitoring Program
Sample and Analysis Plan
New Haven, West Virginia

September 15, 2016

ELECTRIC GENERATION FACILITIES RCRA CCR DETECTION MONITORING PROGRAM

Mountaineer Plant Monitoring Program Sample and Analysis Plan

Trey Fortner
Senior Geologist

Matthew Lamb
Certified Project Manager

Prepared for:

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New Haven, West Virginia

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Our Ref.:

WV015976.0002

Date:

September 15, 2016

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APPENDICES

1 INTRODUCTION

Arcadis U.S., Inc. (Arcadis) has prepared this Groundwater Sampling and Analysis Plan (SAP) to evaluate background and downgradient groundwater quality at the Mountaineer electric generation facility (Plant), located in New Haven, West Virginia (Site). The collection of groundwater data will be completed to achieve compliance under the recently published 40 CFR Part 257, Subpart D – Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments. The methodologies outlined in this SAP are consistent with the regulations, general federal and state guidance, and industry standards.

2 PURPOSE AND OBJECTIVES

The groundwater monitoring and corrective action compliance requirements for existing CCR units are set forth in 40 CFR 257.90 through 257.98. The groundwater sampling and analysis requirements detailed in 40 CFR 257.93 require the development of a SAP which details the sampling and analysis procedures that will be utilized to provide an accurate representation of groundwater quality at the background and downgradient wells. As per, 40 CFR 257.93 a), this SAP includes a description of the procedures and techniques that will be implemented for:

- Sample collection
- Sample preservation and shipment
- Analytical procedures
- Chain of custody control
- Quality assurance and quality control

3 IMPLEMENTATION AND SAMPLING SCHEDULE

As set forth in 40 CFR 257.93, a minimum of eight (8) background sample sets must be collected prior to October 17, 2017 (AEP requests sampling be completed by August 1, 2017). The Mountaineer Plant has 2 CCR regulated units including the landfill and bottom ash pond. Background and detection monitoring events will be completed concurrently by comparison of data from monitoring wells located both away from (background location relative to upgradient or side gradient of CCR unit based on groundwater flow direction) and downgradient of any CCR unit still receiving ash as of the implementation date of the rule (October 19, 2015).

The sampling events will be spaced accordingly for seasonal variability and will be approximately 30 days apart to be considered statistically independent. The following is a conceptual schedule to be followed based on August 1, 2017 deadline set by AEP. Minor modification to the timing of sampling events can be made as long as the requirements listed above are still met.

- Event 1 – 3rd Quarter 2016 (September)
- Event 2 – 4th Quarter 2016 (October)
- Event 3 – 4th Quarter 2016 (November)

- Event 4 – 4th Quarter 2016 (December)
- Event 5 – 1st Quarter 2017 (February)
- Event 6 – 2nd Quarter 2017 (April)
- Event 7 – 2nd Quarter 2017 (June)
- Event 8 – 3rd Quarter 2017 (July)

Resampling of a well due to an anomalous result, either relative to data collected from other monitoring wells of similar type, or relative to other time-series data at an individual monitoring well may be completed at any time. The timing of the resampling event, and the rationale for additional data collection will determine if events are statistically dependent and inform the appropriate method for addressing interpretation or inclusion of data. Additional analytes may also be required pending the results of the monitoring events (in accordance with Section 257.94(e)). This document does not cover collection and analysis of such additional data.

4 SAMPLE COLLECTION AND HANDLING PROCEDURES

The following sections address the methods and procedures associated with the collection and handling of groundwater samples at the Site. The monitoring well locations are show in **Figures 1** and **2**, and relevant construction details and monitoring purpose (e.g. background or downgradient) provided in **Tables 1** and **2**. A total of 19 monitoring wells will be sampled at the Mountaineer Plant to assess groundwater quality within the appropriate monitoring zones.

4.1 Groundwater Elevations

Groundwater level data will be collected from all monitoring wells during each sampling event, prior to sampling. The monitoring well locations are depicted on **Figures 1** and **2**.

Upon arrival at the site, all monitoring wells will be opened and allowed to equilibrate with ambient air pressures prior to measuring the depths to water. Groundwater level measurements will then be made to the nearest 0.01 foot with an electronic water level indicator from the entire monitoring well network prior to sampling. Monitoring wells that constitute a groundwater monitoring system for a CCR Unit shall be preferentially sampled in order to further minimize water level elevational changes relative to the CCR Unit. The entire monitoring well network shall be gauged on the same day to provide an interpretive groundwater flow map.

Depth to water will be measured from the mark surveyed reference point (or north side of top of casing if marked surveyed reference point is not present) for all measurements. Groundwater levels, well conditions, and any pertinent observations will be recorded on the depth to water level measurements field log provided in **Appendix A**.

Based on the depth to water level measurements and survey information, groundwater elevations will be calculated along with groundwater contour maps with interpreted flow direction. In addition, horizontal hydraulic gradients will be calculated and provided.

4.2 Groundwater Sample Collection

Groundwater samples will be collected from the monitoring well network following Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures (US EPA, 1996) and the Low Flow Groundwater Purging and Sampling Procedures for Monitoring Wells Standard Operating Procedure (SOP) (**Appendix A**). Low flow sampling will commence by using the AEP installed bladder pumps and tubing. The discharge line will be connected to a flow-cell and multi-meter to collect water quality indicator parameters (described below) during well purging to determine water quality stabilization.

The pump will be operated at a flow rate that best establish limited volatilization and disturbance. Water quality indicator parameters and depth to water will be recorded at 3 to 5 minute intervals during the purging process and recorded on the sampling worksheet provided in **Appendix A**. Groundwater purging and sampling will proceed at a low-flow rate, expected to be between approximately 0.1 and 0.5 liters per minute, such that the water column in the well is not lowered more than 0.3 feet below the initial static depth to water measurement and water level is stabilized. The subject well will be considered prepared for sampling when three consecutive water quality measurements meet the stabilization criteria presented below. Please note that with decreased flow rates, turbidity levels will be reduced as best as possible to be in the expected optimal reading range of less than 10 Nephelometric Turbidity Units (NTUs). Addition protocols are detailed in the SOP if turbidity levels are greater than 10 NTU after 1 hour of the start of purging (**Appendix A**).

Parameter	Stabilization Criteria
pH	3 readings within +/- 0.1 standard units (SU)
Specific Conductance	3 readings within +/- 3% millisiemens per centimetre (mS/cm)
Temperature	3 readings within +/- 3% degrees
Turbidity	+/- 10% Nephelometric Turbidity Unit (NTU) variance between three consecutive readings and a turbidity less than 50 NTU
Oxygen Reduction Potential (ORP)	3 readings within +/- 10 milivolts (mV)
Dissolved Oxygen (DO)	3 readings within +/- 0.3 milligrams per liter (mg/L)

If the well is dry, no attempt at sampling will be conducted, as the aquifer is not considered to have sufficient quantity at that location. If the recharge rate of the well is very low, and notable drawdown or the well is purged dry even at very low purge rates, alternative purging techniques should be used, which will vary based on the well construction and screen position. For wells screened across the water table, the well should be pumped dry and sampling should commence within 24 hours, as soon as practical after the volume in the well has recovered sufficiently to permit collection of samples. For wells screened entirely below the water table, the well should be pumped until a stabilized level (which may be below the maximum displacement goal of 0.3 feet) can be maintained and monitoring for stabilization of field indicator parameters can commence. If a lower stabilization level cannot be maintained, the well should be pumped until the drawdown is at a level slightly higher than the bentonite seal above the well screen. Sampling should commence after one well volume has been removed and the well has recovered sufficiently to permit collection of samples.

Equipment will be calibrated in accordance with the manufactures recommendations. Calibration information will be recorded in the field notes.

4.3 Sample Preservation and Shipment

Samples will be collected immediately following stabilization of field parameters as set forth in in the preceding section. Groundwater samples will be collected into the laboratory provided sample containers required for the analyses specified in the following section. The groundwater samples will be collected from the discharge tubing upstream of the water quality meter flow cell. Care will be taken to allow for a non-turbulent filling of laboratory containers. Routine samples will not be filtered in the field to provide a measure of total recoverable metals that will include both the dissolved and particulate fractions of metals as per the CCR RCRA Rule.

If a more detailed understanding of the source of metals concentrations in groundwater is required for select monitoring wells, field filtered samples may be analyzed in addition to routine analysis. Field filtering may also be completed on highly turbid samples (greater than 10 NTU at stabilization). Field filtering will be completed using a 0.45 micron filter. If required, prior to the subsequent sampling event, an attempt will be made to redevelop any monitoring wells that produce highly turbid samples (e.g. greater than 10 to 50 NTU) even following extensive field purging. Where samples are filtered, a corresponding, unfiltered sample will also be collected.

The samples will be labelled, stored and transported to the laboratory according to the Chain-of-Custody, Handling, Packing and Shipping SOP presented in **Appendix B**. Following collection, samples will be immediately labelled, logged on the chain-of-custody, and placed in a cooler with ice. Sample coolers transported to the laboratory via overnight or next day air freight will be sealed with packing tape and a signed Chain-of-Custody seal. Sample coolers transported to the laboratory directly must be secured to ensure sample integrity is maintained. The samples will be packaged and shipped according to U.S. Department of Transportation and EPA regulations. The documentation of actual sample storage and transport will be by the use of chain-of-custody procedures. A laboratory provided chain-of-custody record will contain the dates and times of collection, receipt, and completion of all the analyses on a particular set of samples. The laboratory will return a copy of the chain-of-custody with the analytical report.

4.4 Quality Assurance/Quality Control (QA/QC)

Quality assurance/quality control (QA/QC) samples will be collected to ensure sample containers are free of analytes of interest, assess the variability of the sampling and laboratory methods, and monitor the effectiveness of decontamination protocols. The following QA/QC samples will be collected during each groundwater sampling event:

- Field duplicates will be collected at a frequency of one duplicate sample per 10 groundwater samples with at least one duplicate collected from each CCR Unit. The field duplicates will be collected at the same time and in the same manner as the original sample.
- Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a frequency of one MS/MSD sample per 20 groundwater samples with at least one MS/MSD collected from each CCR Unit. Duplicate and MS/MSD samples will be collected from different monitoring wells.
- Field blanks will be collected at a frequency of one field blank per 20 groundwater samples with at least one field blank collected from each CCR Unit.
- Equipment blanks will be collected at a frequency of one equipment blank per 10 groundwater samples with at least one equipment blank collected from each CCR Unit. The equipment blank will be collected by pouring lab grade distilled (or de-ionized) water over the decontaminated static water level meter or low flow pump and into the laboratory supplied containers.

Based on the number of CCR Units at the Mountaineer Plant (two CCR Units) and total number of wells (19), a total of 2 field duplicates, 2 MS/MSD, 2 field blanks, and 2 equipment blanks will be collected during each sample event. The QA/QC samples will be submitted to the laboratory for the routine analyses specified in Section 5 and in Appendix III and IV to Part 257. The laboratory should provide adequate documentation of laboratory reporting and QA/QC procedures.

4.5 Equipment Decontamination Procedures

All non-dedicated equipment will be decontaminated prior to use and between samples, following procedures presented in Field Equipment Decontamination SOP in **Appendix C**. Non-dedicated equipment will include a water level meter. Each item will be cleaned using distilled (or de-ionized) water and non-phosphate detergent wash followed by a distilled (or de-ionized) water rinse.

The flow-cell and water quality meter will be decontaminated at the completion of low-flow sampling. All sample collection will occur upstream of this device and therefore will not affect groundwater sample analytical results.

4.6 Investigation Derived Waste (IDW)

All waste created during monitoring well sampling will remain on site. All purge water from wells around the ash ponds will be discharged back to the ash ponds at locations designated by AEP plant personnel. All purge water from wells around the landfill will be discharged to the leachate collection system associated with the landfill. All IDW will be handled according to details provided in section VII of the SOP provided in **Appendix A**.

4.7 Field Documentation

All information pertinent to the field activities and sampling efforts will be recorded in a log or notebook, following the documentation procedures presented in the Field Log Book Entries SOP in **Appendix D**. At a minimum, entries in the sample logs will include the following:

- Property details and location
- Type of sample (for example, groundwater, surface water, waste)

- Number and volume of samples taken
- Sampling methodology
- Date and time of collection
- Sample identification number(s)
- Field observations including weather
- Any field measurements made (for example, pH, temperature and water depth)
- Personnel present

Records shall contain sufficient information so that the sampling activity can be reconstructed without relying on the collector's memory. The sample logs will be preserved in electronic format.

5 ANALYTICAL SUITE AND PROCEDURES

As required for existing CCR Units, all groundwater samples collected at the Mountaineer Plant will be submitted to the laboratory for the analyses specified in Appendix III and IV to Part 257. The analytical methods and reporting limits for each constituent are summarized below. If required, and in consultation with the laboratory, a comparable analytical method may be substituted for the analytical method recommended below. Analytical methods may also be modified to incorporate newer versions of the stated methods. All groundwater samples will be submitted to AEP's John E. Dolan Laboratory. If any analyses are subsequently subcontracted to another accredited laboratory, the samples will be shipped using appropriate methods and documentation. All analyses will be performed within required hold times and consistent with the data quality objectives of this SAP.

Appendix III to Part 257—Constituents

Constituent	Analytical method	Preservation	Hold Time (Days)	Reporting Limit (µg/L)
Boron	EPA 6020B	HNO_3, pH <2	180	20
Calcium	EPA 6020B	HNO_3, pH <2	180	1,000
Chloride	EPA 300.0	None, <6°C	28	1,000
Fluoride#	EPA 300.0	None	28	1,000
pH	Stabilized field measurement	NA	NA	0.1 standard units
Sulfate	EPA 300.0	None, <6°C	28	2,000
Total Dissolved Solids	SM 2540C	None, <6°C	7	1,000

HNO_3 – Nitric acid
NA – Not applicable

Appendix IV to Part 257—Constituents

Constituent	Analytical method	Preservation	Hold Time (Days)	Reporting Limit (µg/L)
Antimony	EPA 6020B	HNO_3, pH <2	180	1
Arsenic	EPA 6020B	HNO_3, pH <2	180	1
Barium	EPA 6020B	HNO_3, pH <2	180	5
Beryllium	EPA 6020B	HNO_3, pH <2	180	1
Cadmium	EPA 6020B	HNO_3, pH <2	180	0.2
Chromium, total	EPA 6020B	HNO_3, pH <2	180	1
Cobalt	EPA 6020B	HNO_3, pH <2	180	15
Fluoride#	EPA 300	None, <6°C	28	1,000
Lead	EPA 6020B	HNO_3, pH <2	180	1
Lithium	EPA 6020B	HNO_3, pH <2	180	10
Mercury	EPA 7470A	HNO_3, pH <2	28	0.2
Molybdenum	EPA 6020B	HNO_3, pH <2	180	5
Selenium	EPA 6020B	HNO_3, pH <2	180	1
Thallium	EPA 6020B	HNO_3, pH <2	180	2
Radium 226 and 228 combined^	EPA 903.1/904.0	HNO_3, pH <2	None	1 picocurie per liter

 # Listed in both Appendix III and Appendix IV

^Requires a larger sample volume (minimum 2.5 liter)

5.1 Optional Additional Analyses

To interpret groundwater monitoring data and determine the appropriate statistical methods for use in comparison of background and downgradient data sets, an understanding of aquifer connectivity and water types may be required. To determine if samples are collected from comparable aquifer units the predominant water type will be determined using Piper and Stiff diagrams.

Piper and Stiff diagrams are a graphical representation of the major anion and cation composition of a water sample and are useful in establishing if groundwater samples are from the same or a similar aquifer unit. To generate Piper and Stiff diagrams additional analytical data beyond that collected during routine sampling will be required. The additional analytical requirements are shown in the table below. Please note that calcium, sulfate, and chloride are not included on the below list as they were included in the routine sampling analysis above. The results for calcium, sulfate, and chloride will be used in the generation of the Piper and Stiff diagrams.

Constituent	Analytical method	Preservation	Hold Time (Days)	Reporting Limit (µg/L)
Bicarbonate, carbonate and total alkalinity	ASM 2320B	None, 6°C	14	10,000
Magnesium	EPA 6020B	HNO_3, pH <2	180	1,000
Sodium	EPA 6020B	HNO_3, pH <2	180	1,000
Potassium	EPA 6020B	HNO_3, pH <2	180	100

6 DATA EVALUATION

In accordance with 40 CFR 257.93 data collected from eight samples from each background well will be used to calculate background concentrations for each constituent at each site. Background concentrations for each constituent will be calculated using an appropriate statistical method for each background well and constituent pair at the site, selected based on the distribution of the data in accordance with 40 CFR 257.93.

The data collected from background and downgradient monitoring wells will be compared using an appropriate statistical method, to be determined based on the distribution of data for each constituent, to assess if downgradient concentrations are consistent with background concentrations for each constituent. The statistical method used for this analysis will be one, or a combination, of the four statistical methods described below and in 40 CFR 257.93(f) and will meet the performance standards outlined in 40 CFR 257.93(g).

A combination of statistical methods may be applied depending on the statistical distribution observed for each specified constituent in each monitoring well. The four specific statistical procedures provided in 40 CFR 257.93(f) are: (1) a parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination; (2) an analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination; (3) a tolerance or prediction interval procedure; and (4) a control chart approach.

The potential for seasonal and spatial variability as well as temporal trends will be considered when selecting the statistical method for comparison. Data will also be displayed graphically using box-and-whisker plots, which provide a visual representation of the statistical properties and distribution of each dataset, to aid in interpretation of the statistical analysis.

In order to select the appropriate method for statistical analysis for each constituent at each monitoring well, the distribution type for each constituent/well pair will be calculated. Normally distributed data will use parametric methods for comparisons and non-normally distributed data will use non-parametric methods, consistent with the requirements outlined in 40 CFR 257.93(g).

Statistical comparisons will be performed using a confidence level of 99 percent (alpha of 0.01) for comparisons of individual data point to background concentrations, and a confidence level of 95 percent (alpha of 0.05) where multiple data points will be compared to background, consistent with 40 CFR 257.93(g).

TABLES

Table 1
CCR Ash Pond Monitoring
Well Construction Details
AEP Mountaineer Generating Plant
New Haven, West Virginia

Well ID	Northing [a]	Easting [a]	Ground Surface Elevation	Top of Casing Elevation	Borehole depth ft bls	Date Installed	Screen Material	Well diameter inches	Top of Screen		Bottom of Screen	
									Depth ft bls	Elevation ft amsl	Depth ft bls	Elevation ft amsl
MW-001 [b]	724542.7	1701713.0	569.18	571.32	38.0	6/18/1997	Sch. 40 PVC	2	27.0	542.18	37.0	532.18
MW-002 [b]	724901.8	1702197.6	580.82	582.81	73.0	6/24/1997	Sch. 40 PVC	2	60.5	520.32	70.5	510.32
MW-004 [b]	724909.9	1702190.5	581.08	583.13	48.2	6/30/1997	Sch. 40 PVC	2	37.6	543.48	47.6	533.48
MW-005 [b]	719196.9	1702976.0	591.00	593.19	50.0	7/1/1997	Sch. 40 PVC	2	37.7	553.30	47.7	543.30
MW-016 [c]	721475.5	1701361.3	586.82	588.61	82.0	6/17/2008	Sch. 40 PVC	2	67.5	519.32	77.5	509.32
JTMN-1 [c]	723507.5	1702516.8	582.17	583.67	76.6	7/19/1990	Sch. 40 PVC	2	56.7	525.47	75.7	506.47
JTMN-2 [c]	723436.8	1702653.5	582.16	584.06	77.8	7/18/1990	Sch. 40 PVC	2	57.9	524.26	76.9	505.26
PZ-09-03 [d]	719485.3	1702397.3	621.60	621.17	50.4	2/17/2009	Sch. 40 PVC	1.5	5.0	616.60	50.4	571.20
PZ-09-04 [d]	719550.1	1702466.6	597.10	596.64	25.0	2/18/2009	Sch. 40 PVC	1.5	5.0	592.10	24.8	572.30
PZ-09-05 [d]	716527.3	1703537.3	611.70	610.74	50.2	2/18/2009	Sch. 40 PVC	1.5	5.0	606.70	50.2	561.50
MW-1601A	717305.0	1734094.2	607.47	610.66	88.0	6/9/2016	Sch. 40 PVC	2	67.0	540.47	77.0	530.47
MW-1602	717671.9	1733519.1	602.37	605.12	71.5	5/10/2016	Sch. 40 PVC	2	61.0	541.37	71.0	531.37
MW-1603	719516.2	1732495.0	602.92	606.30	76.0	5/4/2016	Sch. 40 PVC	2	60.0	542.92	75.0	527.92
MW-1604S	720189.8	1733077.2	595.48	598.07	60.0	5/2/2016	Sch. 40 PVC	2	49.0	546.48	59.0	536.48
MW-1604D	720194.0	1733082.0	595.59	598.22	80.0	4/27/2016	Sch. 40 PVC	2	69.0	526.59	79.0	516.59
MW-1605S	720112.2	1733471.2	588.51	590.86	60.0	5/12/2016	Sch. 40 PVC	2	49.0	539.51	59.0	529.51
MW-1605D	720117.3	1733468.6	588.51	591.01	80.0	5/11/2016	Sch. 40 PVC	2	69.0	519.51	79.0	509.51
MW-1606S	719649.2	1733939.3	587.28	590.15	59.0	5/18/2016	Sch. 40 PVC	2	45.0	542.28	55.0	532.28
MW-1606D	719653.7	1733935.3	587.25	590.10	76.0	5/16/2016	Sch. 40 PVC	2	65.0	522.25	75.0	512.25
MW-1607S	719232.0	1734365.1	590.79	593.99	61.0	5/26/2016	Sch. 40 PVC	2	50.0	540.79	60.0	530.79
MW-1607D	719235.7	1734361.8	590.75	593.93	81.0	5/19/2016	Sch. 40 PVC	2	70.0	520.75	80.0	510.75
MW-1608	723642.8	1730611.2	587.26	590.65	70.0	6/10/2016	Sch. 40 PVC	2	46.0	541.26	56.0	531.26

Notes:
Hydraulic Monitoring Well Only
Elevation in feet above mean sea level
a. 1983 West Virginia State Planar Coordinates
b. Source: EPRI. June 1999. Groundwater Quality at the Philip Sporn and Mountaineer Power Plants, Mason County, West Virginia
c. Source: AEP-provided boring logs
d. Source: H.C. Nutting. March 2009. Geotechnical Engineering Report. AEP Mountaineer Bottom Ash Pond Complex. Appendix A
amsl = above mean sea level
bls = below land surface
ft = feet

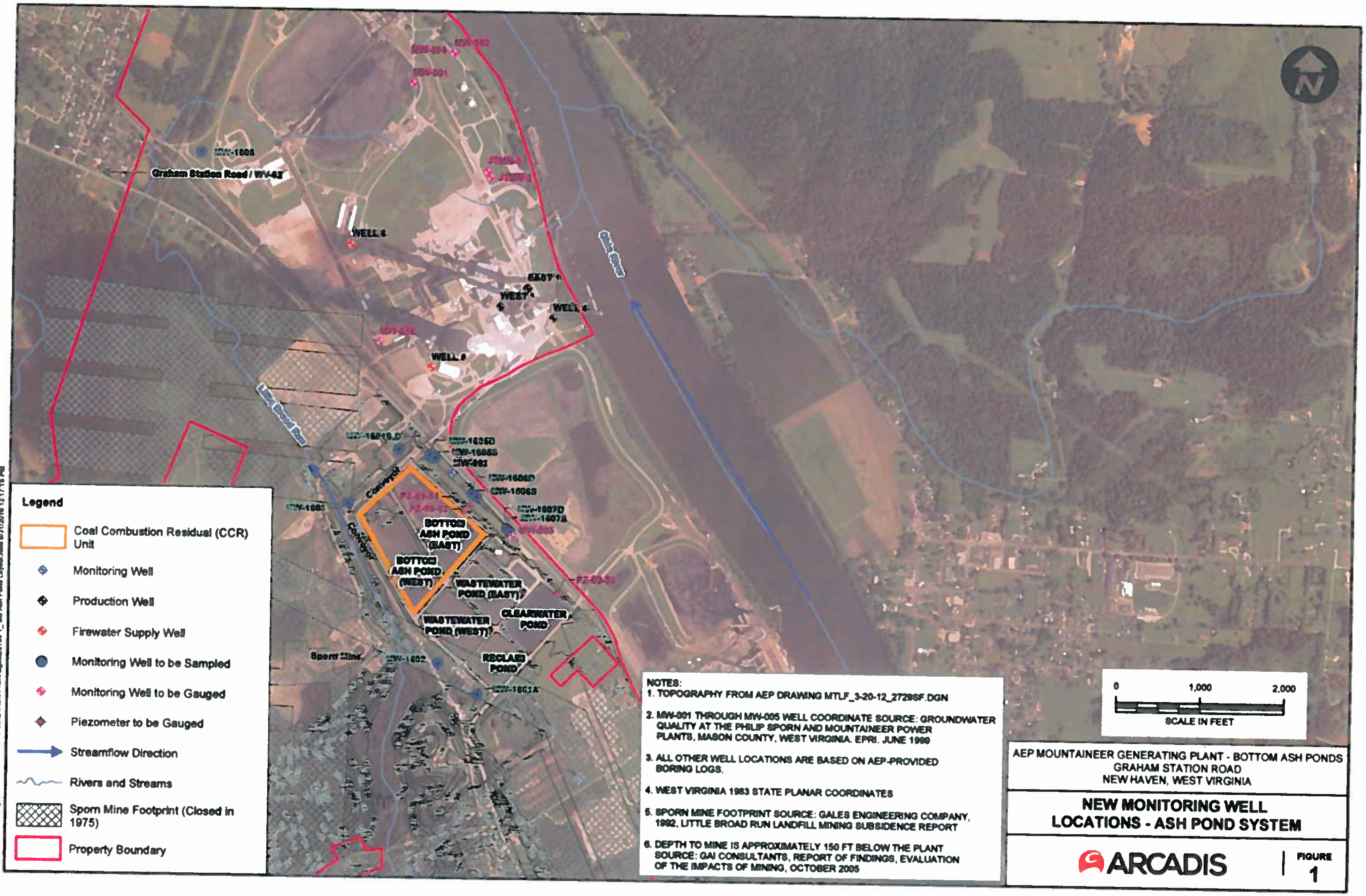
Table 2
CCR Landfill Monitoring
Well Construction Details
AEP Mountaineer Generating Plant
New Haven, West Virginia

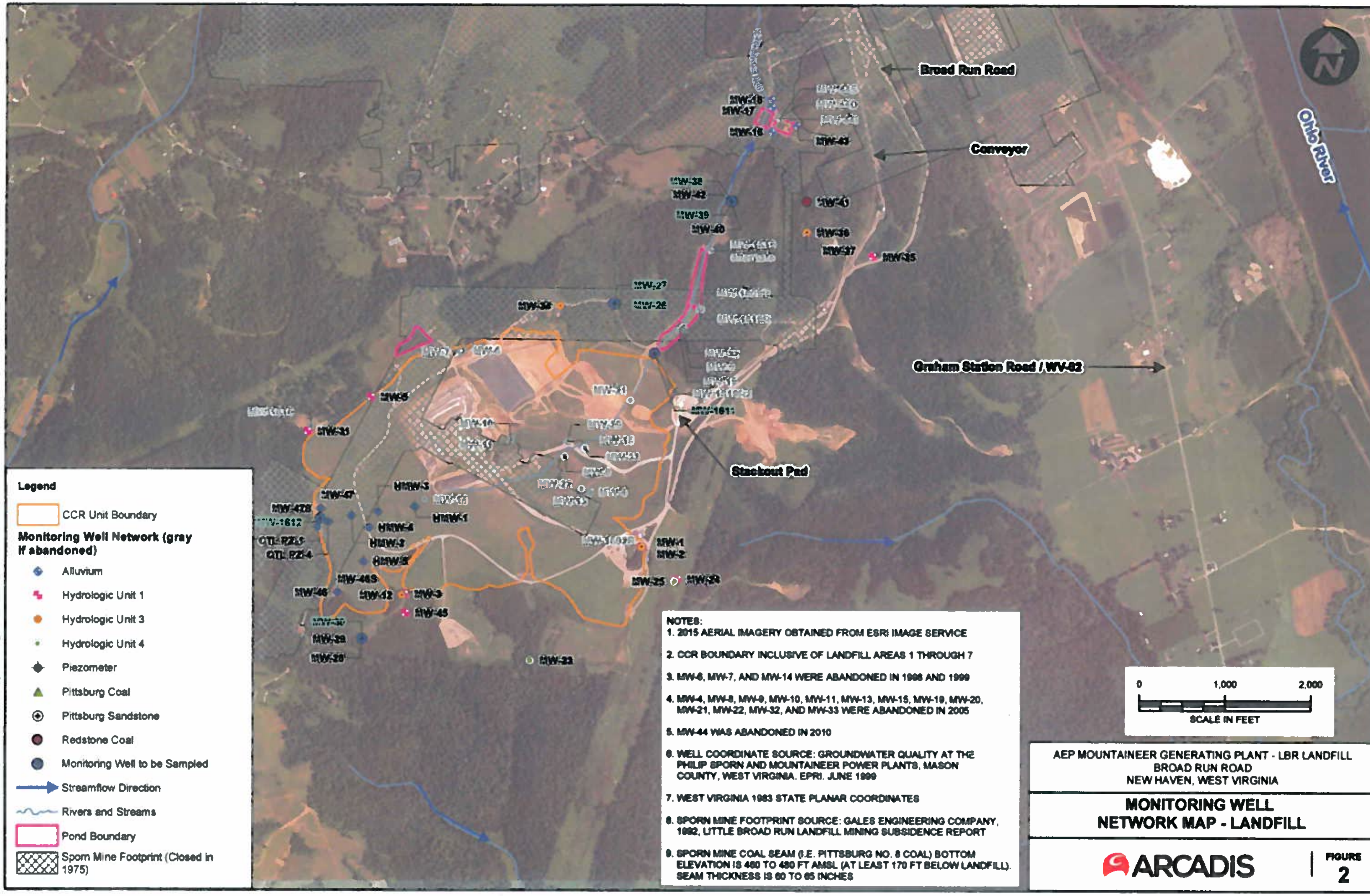
ARCADIS Design & Consultancy for natural and built assets

Well ID	Northing [a]	Easting [a]	Ground Surface Elevation	Top of Casing Elevation	Borehole depth ft bls	Date Installed	Screen Material	Well diameter inches	Top of Screen Depth ft bls	Top of Screen Elevation ft amsl	Bottom of Screen Depth ft bls	Bottom of Screen Elevation ft amsl
MW-26 [b]	712593.03	1699981.97	718.20	720.70	59.80	8/24/2005	Sch. 40 PVC	2.00	27.3	690.90	56.3	661.90
MW-27 [b]	712597.94	1699973.80	718.06	719.49	132.53	10/9/1996	Sch. 40 PVC	2.00	111.0	607.06	130.0	588.06
MW-30 [b]	708701.00	1697043.00	879.83	881.54	227.81	12/11/1996	Sch. 40 PVC	2.00	195.9	683.93	225.0	654.83
MW-38 [b]	713780.04	1701342.57	627.70	630.40	27.10	9/8/2005	Sch. 40 PVC	2.00	8.3	619.40	24.0	603.70
MW-39 [b]	713778.64	1701334.27	627.70	630.00	57.80	9/7/2005	Sch. 40 PVC	2.00	35.8	591.90	54.8	572.90
MW-1611	711948.840	1731867.599	654.01	656.90	46.8	6/23/2016	Sch. 40 PVC	2.00	29.0	625.01	44.0	610.01
MW-1612	709978.466	1727983.057	780.70	783.27	156.0	7/19/2016	Sch. 40 PVC	2.00	101.0	679.70	121.0	659.70

Notes:
Elevation in feet above mean sea level
a. 1983 West Virginia State Planar Coordinates
b. Source: AEP DWG. NO. 1-30045-F, Monitoring Wells Construction Details Table
amsl = above mean sea level
bls = below land surface
ft = feet

FIGURES


Legend
Coal Combustion Residual (CCR) Unit
Monitoring Well
Production Well
Firewater Supply Well
Monitoring Well to be Sampled
Monitoring Well to be Gauged
Piezometer to be Gauged
Streamflow Direction
Rivers and Streams
Sporn Mine Footprint (Closed in 1975)
Property Boundary
Graham Station Road / WV-62
WELL 6
WEST
EAST
WELL 4
WELL 8
Conveyor
BOTTOM ASH POND (EAST)
BOTTOM ASH POND (WEST)
WASTEWATER POND (EAST)
WASTEWATER POND (WEST)
CLEARWATER POND
RECLAIM POND
NOTES:
1. TOPOGRAPHY FROM AEP DRAWING MTLF_3-20-12_2729SF.DGN
2. MW-001 THROUGH MW-005 WELL COORDINATE SOURCE: GROUNDWATER QUALITY AT THE PHILIP SPORN AND MOUNTAINEER POWER PLANTS, MASON COUNTY, WEST VIRGINIA. EPRI. JUNE 1990
3. ALL OTHER WELL LOCATIONS ARE BASED ON AEP-PROVIDED BORING LOGS.
4. WEST VIRGINIA 1983 STATE PLANAR COORDINATES
5. SPORN MINE FOOTPRINT SOURCE: GALES ENGINEERING COMPANY, 1992, LITTLE BROAD RUN LANDFILL MINING SUBSIDENCE REPORT
6. DEPTH TO MINE IS APPROXIMATELY 150 FT BELOW THE PLANT SOURCE: GAI CONSULTANTS, REPORT OF FINDINGS, EVALUATION OF THE IMPACTS OF MINING, OCTOBER 2005
0
1,000
2,000
SCALE IN FEET
AEP MOUNTAINEER GENERATING PLANT - BOTTOM ASH PONDS
GRAHAM STATION ROAD
NEW HAVEN, WEST VIRGINIA
NEW MONITORING WELL LOCATIONS - ASH POND SYSTEM
ARCADIS
FIGURE
1



NOTES:
1. 2015 AERIAL IMAGERY OBTAINED FROM ESRI IMAGE SERVICE
2. CCR BOUNDARY INCLUSIVE OF LANDFILL AREAS 1 THROUGH 7
3. MW-6, MW-7, AND MW-14 WERE ABANDONED IN 1998 AND 1999
4. MW-4, MW-8, MW-9, MW-10, MW-11, MW-13, MW-15, MW-19, MW-20, MW-21, MW-22, MW-32, AND MW-33 WERE ABANDONED IN 2005
5. MW-44 WAS ABANDONED IN 2010
6. WELL COORDINATE SOURCE: GROUNDWATER QUALITY AT THE PHILIP SPORN AND MOUNTAINEER POWER PLANTS, MASON COUNTY, WEST VIRGINIA. EPRI. JUNE 1999
7. WEST VIRGINIA 1983 STATE PLANAR COORDINATES
8. SPORN MINE FOOTPRINT SOURCE: GALES ENGINEERING COMPANY, 1992, LITTLE BROAD RUN LANDFILL MINING SUBSIDENCE REPORT
9. SPORN MINE COAL SEAM (I.E. PITTSBURG NO. 8 COAL) BOTTOM ELEVATION IS 460 TO 480 FT AMSL (AT LEAST 170 FT BELOW LANDFILL). SEAM THICKNESS IS 60 TO 65 INCHES

AEP MOUNTAINEER GENERATING PLANT - LBR LANDFILL
BROAD RUN ROAD
NEW HAVEN, WEST VIRGINIA

MONITORING WELL NETWORK MAP - LANDFILL

ARCADIS

FIGURE 2

APPENDIX A

Low Flow Groundwater Purging and Sampling Procedures for Monitoring Wells

ARCADIS
Infrastructure, environment, facilities

Imagine the result

Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells

Rev. #: 4

Rev Date: February 2, 2011

Approval Signatures

Prepared by: David S. Lipson Date: 2/2/2011

Reviewed by: Michael J. Gefell Date: 2/2/2011
(Technical Expert)

I. Scope and Application

Groundwater samples will be collected from monitoring wells to evaluate groundwater quality. The protocol presented in this standard operating procedure (SOP) describes the procedures to be used to purge monitoring wells and collect groundwater samples. This protocol has been developed in accordance with the United States Environmental Protection Agency (USEPA) Region I Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells (USEPA SOP No. GW0001; July 30, 1996). Both filtered and unfiltered groundwater samples may be collected using this low-flow sampling method. Filtered samples will be obtained using a 0.45-micron disposable filter. No wells will be sampled until well development has been performed in accordance with the procedures presented in the SOP titled Monitoring Well Development, unless that well has been sampled or developed within the prior 1-year time period. Groundwater samples will not be collected within 1 week following well development.

II. Personnel Qualifications

ARCADIS personnel directing, supervising, or leading groundwater sample collection activities should have a minimum of 2 years of previous groundwater sampling experience. ARCADIS personnel providing assistance to groundwater sample collection and associated activities should have a minimum of 6 months of related experience or an advanced degree in environmental sciences, engineering, hydrogeology, or geology.

The supervisor of the groundwater sampling team will have at least 1 year of previous supervised groundwater sampling experience.

Prior to mobilizing to the field, the groundwater sampling team should review and be thoroughly familiar with relevant site-specific documents including but not limited to the site work plan, field sampling plan, QAPP, HASP, and historical information. Additionally, the groundwater sampling team should review and be thoroughly familiar with documentation provided by equipment manufacturers for all equipment that will be used in the field prior to mobilization.

III. Equipment List

Specific to this activity, the following materials (or equivalent) will be available:

- Health and safety equipment (as required in the site Health and Safety Plan [HASP]).

- Site Plan, well construction records, prior groundwater sampling records (if available).

- Sampling pump, which may consist of one or more of the following:

  - submersible pump (e.g., Grundfos Redi-Flo 2);

  - peristaltic pump (e.g., ISCO Model 150); and/or

  - bladder pump (e.g., Marschalk System 1, QED Well Wizard, Geotech, etc.).

- Appropriate controller and power source for pump:

  - Submersible and peristaltic pumps require electric power from either a generator or a deep cell battery.

  - Submersible pumps such as Grundfos require a pump controller to run the pump

  - Bladder pumps require a pump controller and a gas source (e.g., air compressor or compressed N_2 or CO_2 gas cylinders).

- Teflon® tubing or Teflon®-lined polyethylene tubing of an appropriate size for the pump being used. For peristaltic pumps, dedicated Tygon® tubing (or other type as specified by the manufacturer) will also be used through the pump apparatus.

- Water-level probe (e.g., Solinist Model 101).

- Water-quality (temperature/pH/specific conductivity/ORP/turbidity/dissolved oxygen) meter and flow-through measurement cell. Several brands may be used, including:

  - YSI 6-Series Multi-Parameter Instrument;

  - Hydrolab Series 3 or Series 4a Multiprobe and Display; and/or

  - Horiba U-10 or U-22 Water Quality Monitoring System.

- Supplemental turbidity meter (e.g., Horiba U-10, Hach 2100P, LaMotte 2020). Turbidity measurements collected with multi-parameter meters have been shown to sometimes be unreliable due to fouling of the optic lens of the turbidity meter within the flow-through cell. A supplemental turbidity meter will be used to verify turbidity data during purging if such fouling is suspected. Note that industry improvements may eliminate the need for these supplemental measurements in the future.

- Appropriate water sample containers (supplied by the laboratory).
- Appropriate blanks (trip blank supplied by the laboratory).
- 0.45-micron disposable filters (if field filtering is required).
- Large glass mixing container (if sampling with a bailer).
- Teflon® stirring rod (if sampling with a bailer).
- Cleaning equipment.
- Groundwater sampling log (attached) or bound field logbook.

Note that in the future, the client may acquire different makes/models of some of this equipment if the listed makes/models are no longer available, or as a result of general upgrades or additional equipment acquisitions. In the event that the client uses a different make/model of the equipment listed, the client will use an equivalent type of equipment (e.g., pumps, flow-through analytical cells) and note the specific make/model of the equipment used during a sampling event on the groundwater sampling log. In addition, should the client desire to change to a markedly different sampling methodology (e.g., discrete interval samplers, passive diffusion bags, or a yet to be developed technique), the client will submit a proposed SOP for the new methodology for USEPA approval prior to implementing such a change.

The maintenance requirements for the above equipment generally involve decontamination or periodic cleaning, battery charging, and proper storage, as specified by the manufacturer. For operational difficulties, the equipment will be serviced by a qualified technician.

IV. Cautions

If heavy precipitation occurs and no cover over the sampling area and monitoring well can be erected, sampling must be discontinued until adequate cover is provided. Rain water could contaminate groundwater samples.

Do not use permanent marker or felt-tip pens for labels on sample container or sample coolers – use indelible ink. The permanent markers could introduce volatile constituents into the samples.

It may be necessary to field filter some parameters (e.g., metals) prior to collection, depending on preservation, analytical method, and project quality objectives.

Store and/or stage empty and full sample containers and coolers out of direct sunlight.

To mitigate potential cross-contamination, groundwater samples are to be collected in a pre-determined order from least impacted to impacted based on previous analytical data. If no analytical data are available, samples are collected in order of upgradient, then furthest downgradient to source area locations.

Be careful not to over-tighten lids with Teflon liners or septa (e.g., 40 mL vials). Over-tightening can cause the glass to shatter or impair the integrity of the Teflon seal.

V. Health and Safety Considerations

Use caution and appropriate cut resistant gloves when tightening lids to 40 mL vials. These vials can break while tightening and can lacerate hand. Amber vials (thinner glass) are more prone to breakage.

If thunder or lighting is present, discontinue sampling and take cover until 30 minutes have passed after the last occurrence of thunder or lighting.

Use caution when removing well caps as well may be under pressure, cap can dislodge forcefully and cause injury.

Use caution when opening protective casing on stickup wells as wasps frequently nest inside the tops of the covers. Also watch for fire ant mounds near well pads when sampling in the south or western U.S.

VI. Procedure

Groundwater will be purged from the wells using an appropriate pump. Peristaltic pumps will initially be used to purge and sample all wells when applicable. If the depth to water is below the sampling range of a peristaltic pump (approximately 25 feet), submersible pumps or bladder pumps will be used provided the well is constructed with a casing diameter greater than or equal to 2 inches (the minimum well diameter capable of accommodating such pumps). Bladder pumps are preferred over peristaltic and submersible pumps if sampling of VOCs is required to prevent volatilization. For smaller diameter wells where the depth to water is below the sampling range of a peristaltic pump, alternative sampling methods (i.e., bailing or small diameter bladder pumps) will be used to purge and sample the groundwater. Purge water will be collected and containerized.

1. Calibrate field instruments according to manufacturer procedures for calibration.

2. Measure initial depth to groundwater prior to placement of pumps.

3. Prepare and install pump in well: For submersible and non-dedicated bladder pumps, decontaminate pump according to site decontamination procedures. Non-dedicated bladder pumps will require a new Teflon® bladder and attachment of an air line, sample discharge line, and safety cable prior to placement in the well. Attach the air line tubing to the air port on the top of the bladder pump. Attach the sample discharge tubing to the water port on the top of the bladder pump. Care should be taken not to reverse the air and discharge tubing lines during bladder pump set-up as this could result in bladder failure or rupture. Attach and secure a safety cable to the eyebolt on the top of bladder pump (if present, depending on pump model used). Slowly lower pump, safety cable, tubing, and electrical lines into the well to a depth corresponding to the approximate center of the saturated screen section of the well. Take care to avoid twisting and tangling of safety cable, tubing, and electrical lines while lowering pump into well; twisted and tangled lines could result in the pump becoming stuck in the well casing. Also, make sure to keep tubing and lines from touching the ground or other surfaces while introducing them into the well as this could lead to well contamination. If a peristaltic pump is being used, slowly lower the sampling tubing into the well to a depth corresponding to the approximate center of the saturated screen section of the well. The pump intake or sampling tube must be kept at least 2 feet above the bottom of the well to prevent mobilization of any sediment present in the bottom of the well.

4. If using a bladder pump, connect the air line to the pump controller output port. The pump controller should then be connected to a supply line from an air compressor or compressed gas cylinder using an appropriate regulator and air hose. Take care to tighten the regulator connector onto the gas cylinder (if used) to prevent leaks. Teflon tape may be used on the threads of the cylinder to provide a tighter seal. Once the air compressor or gas cylinder is connected to the pump controller, turn on the compressor or open the valve on the cylinder to begin the gas flow. Turn on the pump controller if an on/off switch is present and verify that all batteries are charged and fully operating before beginning to pump.

5. Connect the pump discharge water line to the bottom inlet port on the flow-through cell connected to the water quality meter.

6. Measure the water level again with the pump in the well before starting the pump. Start pumping the well at 200 to 500 milliliters (mL) per minute (or at lower site-specific rate if specified). The pump rate should be adjusted to cause little or no water level drawdown in the well (less than 0.3 feet below the initial static depth to water measurement) and the water level should stabilize. The water level should be monitored every 3 to 5 minutes (or as appropriate, lower flow rates may require longer time between readings) during pumping if the well diameter is of sufficient size to allow such monitoring. Care should be taken not to break pump suction or cause entrainment of air in the sample. Record pumping rate adjustments and depths to water. If necessary, pumping rates should be reduced to the minimum capabilities of the pump to avoid pumping the well dry and/or to stabilize indicator parameters. A steady flow rate should be maintained to the extent practicable. Groundwater sampling records from previous sampling events (if available) should be reviewed prior to mobilization to estimate the optimum pumping rate and anticipated drawdown for the well in order to more efficiently reach a stabilized pumping condition.

   If the recharge rate of the well is very low, alternative purging techniques should be used, which will vary based on the well construction and screen position. For wells screened across the water table, the well should be pumped dry and sampling should commence as soon as the volume in the well has recovered sufficiently to permit collection of samples. For wells screened entirely below the water table, the well should be pumped until a stabilized level (which may be below the maximum displacement goal of 0.3 feet) can be maintained and monitoring for stabilization of field indicator parameters can commence. If a lower stabilization level cannot be maintained, the well should be pumped until the drawdown is at a level slightly higher than the bentonite seal above the well screen. Sampling should commence after one well volume has been removed and the well has recovered sufficiently to permit collection of samples.

   During purging, monitor the field indicator parameters (e.g., turbidity, temperature, specific conductance, pH, etc.) every 3 to 5 minutes (or as appropriate). Field indicator parameters will be measured using a flow-through analytical cell or a clean container such as a glass beaker. Record field indicator parameters on the groundwater sampling log. The well is considered stabilized and ready for sample collection when turbidity values remain within 10% (or within 1 NTU if the turbidity reading is less than 10 NTU), the specific conductance and temperature values remain within 3%, ORP readings remain within ± 10 mV and pH remains within 0.1 units for three consecutive readings collected at 3- to 5-minute intervals (or other appropriate interval, alternate stabilization goals may exist in different geographic regions, consult the site-specific Work Plan for stabilization criteria). If the field indicator parameters do not stabilize within 1 hour of the start of purging, but the groundwater turbidity is below the goal of 50 NTU and the values for all other parameters are within 10%, the well can be sampled. If the parameters have stabilized but the turbidity is not in the range of the 50 NTU goal, the pump flow rate should be decreased to a minimum rate of 100 mL/min to reduce turbidity levels as low as possible. Dissolved oxygen is extremely susceptible to various external influences (including temperature or the presence of bubbles on the DO meter); care should be taken to minimize the agitation or other disturbance of water within the flow-through cell while collecting these measurements. If air bubbles are present on the DO probe or in the discharge tubing, remove them before taking a measurement. If dissolved oxygen values are not within acceptable range for the temperature of groundwater (Attachment 1), then again check for and remove air bubbles on probe before re-measuring. If the dissolved oxygen value is 0.00 or less, then the meter should be serviced and re-calibrated. If the dissolved oxygen values are above possible results, then the meter should be serviced and re-calibrated.

During extreme weather conditions, stabilization of field indicator parameters may be difficult to obtain. Modifications to the sampling procedures to alleviate these conditions (e.g., measuring the water temperature in the well adjacent to the pump intake) will be documented in the field notes. If other field conditions exist that preclude stabilization of certain parameters, an explanation of why the parameters did not stabilize will also be documented in the field logbook.

7. Complete the sample label(s) and cover the label(s) with clear packing tape to secure the label onto the container.

8. After the indicator parameters have stabilized, collect groundwater samples by diverting flow out of the unfiltered discharge tubing into the appropriate labeled sample container. If a flow-through analytical cell is being used to measure field parameters, the flow-through cell should be disconnected after stabilization of the field indicator parameters and prior to groundwater sample collection. Under no circumstances should analytical samples be collected from the discharge of the flow-through cell. When the container is full, tightly screw on the cap. Samples should be collected in the following order: VOCs, TOC, SVOCs, metals and cyanide, and others (or other order as defined in the site-specific Work Plan).

9. If sampling for total and filtered metals and/or PCBs, a filtered and unfiltered sample will be collected. Install an in-line, disposable 0.45-micron particle filter on the discharge tubing after the appropriate unfiltered groundwater sample has been collected. Continue to run the pump until an initial volume of "flush" water has been run through the filter in accordance with the manufacturer's directions (generally 100 to 300 mL). Collect filtered groundwater sample by diverting flow

out of the filter into the appropriately labeled sample container. When the container is full, tightly screw on the cap.

10. Secure with packing material and store at 4°C in an insulated transport container provided by the laboratory.

11. Record on the groundwater sampling log or bound field logbook the time sampling procedures were completed, any pertinent observations of the sample (e.g., physical appearance, and the presence or lack of odors or sheens), and the values of the stabilized field indicator parameters as measured during the final reading during purging (Attachment 2 – Example Sampling Log).

12. Turn off the pump and air compressor or close the gas cylinder valve if using a bladder pump set-up. Slowly remove the pump, tubing, lines, and safety cable from the well. Do not allow the tubing or lines to touch the ground or any other surfaces which could contaminate them. .

13. If tubing is to be dedicated to a well, it should be folded to a length that will allow the well to be capped and also facilitate retrieval of the tubing during later sampling events. A length of rope or string should be used to tie the tubing to the well cap. Alternatively, if tubing and safety line are to be saved and reused for sampling the well at a later date they may be coiled neatly and placed in a clean plastic bag that is clearly labeled with the well ID. Make sure the bag is tightly sealed before placing it in storage.

14. Secure the well and properly dispose of personal protective equipment (PPE) and disposable equipment.

15. Complete the procedures for packaging, shipping, and handling with associated chain-of-custody.

16. Complete decontamination procedures for flow-through analytical cell and submersible or bladder pump, as appropriate.

17. At the end of the day, perform calibration check of field instruments.

If it is not technically feasible to use the low-flow sampling method, purging and sampling of monitoring wells may be conducted using the bailer method as outlined below:

1. Don appropriate PPE (as required by the HASP).

2. Place plastic sheeting around the well.

3. Clean sampling equipment.

4. Open the well cover while standing upwind of the well. Remove well cap and place on the plastic sheeting. Insert PID probe approximately 4 to 6 inches into the casing or the well headspace and cover with gloved hand. Record the PID reading in the field log. If the well headspace reading is less than 5 PID units, proceed; if the headspace reading is greater than 5 PID units, screen the air within the breathing zone. If the breathing zone reading is less than 5 PID units, proceed. If the PID reading in the breathing zone is above 5 PID units, move upwind from well for 5 minutes to allow the volatiles to dissipate. Repeat the breathing zone test. If the reading is still above 5 PID units, don appropriate respiratory protection in accordance with the requirements of the HASP. Record all PID readings. For wells that are part of the regular weekly monitoring program and prior PID measurements have not resulted in a breathing zone reading above 5 PID units, PID measurements will be taken monthly.

5. Measure the depth to water and determine depth of well by examining drilling log data or by direct measurement. Calculate the volume of water in the well (in gallons) by using the length of the water column (in feet), multiplying by 0.163 for a 2-inch well or by 0.653 for a 4-inch well. For other well diameters, use the formula:

   Volume (in gallons) = π TIMES well radius (in feet) squared TIMES length of water column (in feet) TIMES 7.481 (gallons per cubic foot)

6. Measure a length of rope or twine at least 10 feet greater than the total depth of the well. Secure one end of the rope to the well casing and secure the other end to the bailer. Test the knots and make sure the rope will not loosen. Check bailers so that all parts are intact and will not be lost in the well.

7. Lower bailer into well and remove one well volume of water. Contain all water in appropriate containers.

8. Monitor the field indicator parameters (e.g., turbidity, temperature, specific conductance, and pH). Measure field indicator parameters using a clean container such as a glass beaker or sampling cups provided with the instrument. Record field indicator parameters on the groundwater sampling log.

9. Repeat Steps 7 and 8 until three or four well volumes have been removed. Examine the field indicator parameter data to determine if the parameters have stabilized. The well is considered stabilized and ready for sample collection when turbidity values remain within 10% (or within 1 NTU if the turbidity reading is less than 10 NTU), the specific conductance and temperature values remain

within 3%, and pH remains within □0.1 units for three consecutive readings collected once per well volume removed.

10. If the field indicator parameters have not stabilized, remove a maximum of five well volumes prior to sample collection. Alternatively, five well volumes may be removed without measuring the field indicator parameters.

11. If the recharge rate of the well is very low, wells screened across the water table may be bailed dry and sampling should commence as soon as the volume in the well has recovered sufficiently to permit collection of samples. For wells screened entirely below the water table, the well should only be bailed down to a level slightly higher than the bentonite seal above the well screen. The well should not be bailed completely dry, to maintain the integrity of the seal. Sampling should commence as soon as the well volume has recovered sufficiently to permit sample collection.

12. Following purging, allow water level in well to recharge to a sufficient level to permit sample collection.

13. Complete the sample label and cover the label with clear packing tape to secure the label onto the container.

14. Slowly lower the bailer into the screened portion of the well and carefully retrieve a filled bailer from the well causing minimal disturbance to the water and any sediment in the well.

15. The sample collection order (as appropriate) will be as follows:

    a. VOCs;

    b TOC;

    c. SVOCs;

    d. metals and cyanide; and

    e. others.

16. When sampling for volatiles, collect water samples directly from the bailer into 40-mL vials with Teflon®-lined septa.

17. For other analytical samples, remove the cap from the large glass mixing container and slowly empty the bailer into the large glass mixing container. The

sample for dissolved metals and/or filtered PCBs should either be placed directly from the bailer into a pressure filter apparatus or pumped directly from the bailer with a peristaltic pump, through an in-line filter, into the pre-preserved sample bottle.

18. Continue collecting samples until the mixing container contains a sufficient volume for all laboratory samples.

19. Mix the entire sample volume with the Teflon® stirring rod and transfer the appropriate volume into the laboratory jar(s). Secure the sample jar cap(s) tightly.

20. If sampling for total and filtered metals and/or PCBs, a filtered and unfiltered sample will be collected. Sample filtration for the filtered sample will be performed in the field using a peristaltic pump prior to preservation. Install new medical-grade silicone tubing in the pump head. Place new Teflon® tubing into the sample mixing container and attach to the intake side of pump tubing. Attach (clamp) a new 0.45-micron filter (note the filter flow direction). Turn the pump on and dispense the filtered liquid directly into the laboratory sample bottles.

21. Secure with packing material and store at 4°C in an insulated transport container provided by the laboratory.

22. After sample containers have been filled, remove one additional volume of groundwater. Measure the pH, temperature, turbidity, and conductivity. Record on the groundwater sampling log or bound field logbook the time sampling procedures were completed, any pertinent observations of the sample (e.g., physical appearance, and the presence or lack of odors or sheens), and the values of the field indicator parameters.

23. Remove bailer from well, secure well, and properly dispose of PPE and disposable equipment.

24. If a bailer is to be dedicated to a well, it should be secured inside the well above the water table, if possible. Dedicated bailers should be tied to the well cap so that inadvertent loss of the bailer will not occur when the well is opened.

25. Complete the procedures for packaging, shipping, and handling with associated chain-of-custody.

VII. Waste Management

Materials generated during groundwater sampling activities, including disposable equipment, will be placed in appropriate containers. Containerized waste will be disposed of by the client consistent with the procedures identified in the HASP.

VIII. Data Recording and Management

Initial field logs and chain-of-custody records will be transmitted to the ARCADIS PM at the end of each day unless otherwise directed by the PM. The groundwater team leader retains copies of the groundwater sampling logs.

IX. Quality Assurance

In addition to the quality control samples to be collected in accordance with this SOP, the following quality control procedures should be observed in the field:

- Collect samples from monitoring wells in order of increasing concentration, to the extent known based on review of historical site information if available.

- Equipment blanks should include the pump and tubing (if using disposable tubing) or the pump only (if using tubing dedicated to each well).

- Collect equipment blanks after wells with higher concentrations (if known) have been sampled.

- Operate all monitoring instrumentation in accordance with manufacturer's instructions and calibration procedures. Calibrate instruments at the beginning of each day and verify the calibration at the end of each day. Record all calibration activities in the field notebook.

- Clean all groundwater sampling equipment prior to use in the first well and after each subsequent well using procedures for equipment decontamination.

X. References

United States Environmental Protection Agency (USEPA). 1986. RCRA Groundwater Monitoring Technical Enforcement Guidance Document (September 1986).

USEPA Region II. 1998. *Ground Water Sampling Procedure Low Stress (Low Flow) Purging and Sampling*.

USEPA. 1991. Handbook Groundwater, Volume II Methodology, Office of Research and Development, Washington, DC. USEPN62S, /6-90/016b (July, 1991).

U.S. Geological Survey (USGS). 1977. National Handbook of Recommended Methods for Water-Data Acquisition: USGS Office of Water Data Coordination. Reston, Virginia.

Attachment 1

Groundwater Sampling Log

ARCADIS Design & Consultancy for natural and built assets

GROUNDWATER SAMPLING LOG

Page ____ of ____

Project No. ______________ Well ID ______________ Date ______________

Project Name/Location ______________ Weather ______________

Measuring Pt. Description ______________ Screen Setting (ft-bmp) ______________ Casing Diameter (in.) ______________ Well Material ____ PVC ____ SS

Static Water Level (ft-bmp) ______________ Total Depth (ft-bmp) ______________ Water Column/ Gallons in Well ______________

MP Elevation ______________ Pump Intake (ft-bmp) ______________ Purge Method: Centrifugal ______ Submersible ______ Other ______ Sample Method ______________

Pump On/Off ______________ Volumes Purged ______________

Sample Time: Label ______ Start ______ End ______ Replicate/ Code No. ______________ Sampled by ______________

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (mMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance	
											Color	Odor

Constituents Sampled	Container	Number	Preservative

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.5" = 0.09 2.5" = 0.26 3.5" = 0.50 6" = 1.47
1.25" = 0.06 2" = 0.16 3" = 0.37 4" = 0.65

Well Information

Well Location: ______________ Well Locked at Arrival: Yes / No

Condition of Well: ______________ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well:

Attachment 2

Oxygen Solubility in Fresh Water

Temperature (degrees C)	Dissolved Oxygen (mg/L)
0	14.6
1	14.19
2	13.81
3	13.44
4	13.09
5	12.75
6	12.43
7	12.12
8	11.83
9	11.55
10	11.27
11	11.01
12	10.76
13	10.52
14	10.29
15	10.07
16	9.85
17	9.65
18	9.45
19	9.26
20	9.07
21	8.9
22	8.72
23	8.56
24	8.4
25	8.24
26	8.09
27	7.95
28	7.81
29	7.67
30	7.54
31	7.41
32	7.28
33	7.16
34	7.05
35	6.93

Reference: Vesilind, P.A., *Introduction to Environmental Engineering*, PWS Publishing Company, Boston, 468 pages (1996).

APPENDIX B

Chain-of-Custody, Handling, Packing and Shipping SOP

ARCADIS

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Chain-of-Custody, Handling, Packing and Shipping

Rev. #: 2

Rev Date: March 6, 2009

Approval Signatures

Prepared by: ____________________ Date: 3/6/09
Caron Koll

Reviewed by: ____________________ Date: 3/6/09
Jane Kennedy(Technical Expert)

I. Scope and Application

This Standard Operating Procedure (SOP) describes the chain-of-custody, handling, packing, and shipping procedures for the management of samples to decrease the potential for cross-contamination, tampering, mis-identification, and breakage, and to insure that samples are maintained in a controlled environment from the time of collection until receipt by the analytical laboratory.

II. Personnel Qualifications

ARCADIS field sampling personnel will have current health and safety training, including 40-hour HAZWOPER training, Department of Transportation (DOT) training, site supervisor training, and site-specific training, as needed. In addition, ARCADIS field sampling personnel will be versed in the relevant SOPs and possess the skills and experience necessary to successfully complete the desired field work.

III. Equipment List

The following list provides materials that may be required for each project. Project documents and sample collection requirements should be reviewed prior to initiating field operations:

- indelible ink pens (black or blue);
- polyethylene bags (resealable-type);
- clear packing tape, strapping tape, duct tape;
- chain of custody
- DOT shipping forms, as applicable
- custody seals or tape;
- appropriate sample containers and labels,;
- insulated coolers of adequate size for samples and sufficient ice to maintain 4°C during collection and transfer of samples;
- wet ice;
- cushioning and absorbent material (i.e., bubble wrap or bags);

- temperature blank
- sample return shipping papers and addresses; and
- field notebook.

IV. Cautions

Review project requirements and select appropriate supplies prior to field mobilization.

Insure that appropriate sample containers with applicable preservatives, coolers, and packing material have been supplied by the laboratory.

Understand the offsite transfer requirements for the facility at which samples are collected.

If overnight courier service is required schedule pick-up or know where the drop-off service center is located and the hours of operation. Prior to using air transportation, confirm air shipment is acceptable under DOT and International Air Transport Association (IATA) regulation

Schedule pick-up time for laboratory courier or know location of laboratory/service center and hours of operation.

Understand DOT and IATA shipping requirements and evaluate dangerous goods shipping regulations relative to the samples being collected (i.e. complete an ARCADIS shipping determination). Review the ARCADIS SOPs for shipping, packaging and labeling of dangerous goods. Potential samples requiring compliance with this DOT regulation include:

- Methanol preservation for Volatile Organic Compounds in soil samples
- Non-aqueous phase liquids (NAPL)

V. Health and Safety Considerations

Follow health and safety procedures outlined in the project/site Health and Safety Plan (HASP).

Use caution and appropriate cut resistant gloves when tightening lids to 40 mL vials. These vials can break while tightening and can lacerate hand. Amber vials (thinner glass) are more prone to breakage.

Some sample containers contain preservatives.

- The preservatives must be retained in the sample container and should in no instance be rinsed out.
- Preservatives may be corrosive and standard care should be exercised to reduce potential contact to personnel skin or clothing. Follow project safety procedures if spillage is observed.
- If sample container caps are broken discard the bottle. Do not use for sample collection.

VI. Procedure

Chain-of-Custody Procedures

1. Prior to collecting samples, complete the chain-of-custody record header information by filling in the project number, project name, and the name(s) of the sampling technician(s) and other relevant project information. Attachment 1 provides an example chain-o- custody record
2. Chain-of-custody information MUST be printed legibly using indelible ink (black or blue).
3. After sample collection, enter the individual sample information on the chain-of-custody:
   a. Sample Identification indicates the well number or soil location that the sample was collected from. Appropriate values for this field include well locations, grid points, or soil boring identification numbers (e.g., MW-3, X-20, SB-30). When the depth interval is included, the complete sample ID would be "SB-30 (0.5-1.0) where the depth interval is in feet. Please note it is very important that the use of hyphens in sample names and depth units (i.e., feet or inches) remain consistent for all samples entered on the chain-of-custody form. DO NOT use the apostrophe or quotes in the sample ID. Sample names may also use the abbreviations "FB," "TB," and "DUP" as prefixes or suffixes to indicate that the sample is a field blank, trip blank, or field duplicate, respectively. NOTE: The sample

nomenclature may be dictated by the project database and require unique identification for each sample collected for the project. Consult the project data management plan for additional information regarding sample identification.

b. List the date of sample collection. The date format to be followed should be mm/dd/yy (e.g., 03/07/09) or mm/dd/yyyy (e.g. 03/07/2009).

c. List the time that the sample was collected. The time value should be presented using military format. For example, 3:15 P.M. should be entered as 15:15.

d. The composite field should be checked if the sample is a composite over a period of time or from several different locations and mixed prior to placing in sample containers.

e. The "Grab". field should be marked with an "X" if the sample was collected as an individual grab sample. (e.g. monitoring well sample or soil interval).

f. Any sample preservation should be noted.

g. The analytical parameters that the samples are being analyzed for should be written legibly on the diagonal lines. As much detail as possible should be presented to allow the analytical laboratory to properly analyze the samples. For example, polychlorinated biphenyl (PCB) analyses may be represented by entering "PCBs" or "Method 8082." Multiple methods and/or analytical parameters may be combined for each column (e.g., PCBs/VOCs/SVOCs or 8082/8260/8270). These columns should also be used to present project-specific parameter lists (e.g., Appendix IX+3 target analyte list. Each sample that requires a particular parameter analysis will be identified by placing the number of containers in the appropriate analytical parameter column. For metals in particular, indicate which metals are required.

h. Number of containers for each method requested. This information may be included under the parameter or as a total for the sample based on the chain of custody form used.

i. Note which samples should be used for site specific matrix spikes.

j. Indicate any special project requirements.

k. Indicate turnaround time required.

l. Provide contact name and phone number in the event that problems are encountered when samples are received at the laboratory.

m. If available attach the Laboratory Task Order or Work Authorization forms

n. The remarks field should be used to communicate special analytical requirements to the laboratory. These requirements may be on a per sample basis such as "extract and hold sample until notified," or may be used to inform the laboratory of special reporting requirements for the entire sample delivery group (SDG). Reporting requirements that should be specified in the remarks column include: 1) turnaround time; 2) contact and address where data reports should be sent; 3) name of laboratory project manager; and 4) type of sample preservation used.

o. The "Relinquished By" field should contain the signature of the sampling technician who relinquished custody of the samples to the shipping courier or the analytical laboratory.

p. The "Date" field following the signature block indicates the date the samples were relinquished. The date format should be mm/dd/yyyy (e.g., 03/07/2005).

q. The "Time" field following the signature block indicates the time that the samples were relinquished. The time value should be presented using military format. For example, 3:15 P.M. should be entered as 15:15.

r. The "Received By" section is signed by sample courier or laboratory representative who received the samples from the sampling technician or it is signed upon laboratory receipt from the overnight courier service.

3. Complete as many chain-of-custody forms as necessary to properly document the collection and transfer of the samples to the analytical laboratory.

4. Upon completing the chain-of-custody forms, forward two copies to the analytical laboratory and retain one copy for the field records.

5. If electronic chain-of-custody forms are utilized, sign the form and make 1 copy for ARCADIS internal records and forward the original with the samples to the laboratory.

Handling Procedures

1. After completing the sample collection procedures, record the following information in the field notebook with indelible ink:

   - project number and site name;
   - sample identification code and other sample identification information, if appropriate;
   - sampling method;
   - date;
   - name of sampler(s);
   - time;
   - location (project reference);
   - location of field duplicates and both sample identifications;
   - locations that field QC samples were collected including equipment blanks, field blanks and additional sample volume for matrix spikes; and
   - any comments.

2. Complete the sample label with the following information in indelible ink:

   - sample type (e.g., surface water);
   - sample identification code and other sample identification information, if applicable;
   - analysis required;
   - date;
   - time sampled; and
   - initials of sampling personnel;

- sample matrix; and
- preservative added, if applicable.

3. Cover the label with clear packing tape to secure the label onto the container and to protect the label from liquid.

4. Confirm that all caps on the sample containers are secure and tightly closed.

5. In some instances it may be necessary to wrap the sample container cap with clear packing tape to prevent it from becoming loose.

6. For some projects individual custody seals may be required. Custody seal evidence tape may be placed on the shipping container or they may be placed on each sample container such that the cooler or cap cannot be opened without breaking the custody seal. The custody seal should be initialed and dated prior to relinquishing the samples.

Packing Procedures

Following collection, samples must be placed on wet ice to initiate cooling to 4°C immediately. Retain samples on ice until ready to pack for shipment to the laboratory.

1. Secure the outside and inside of the drain plug at the bottom of the cooler being used for sample transport with "Duct" tape.

2. Place a new large heavy duty plastic garbage bag inside each cooler

3. Place each sample bottle wrapped in bubble wrap inside the garbage bag. VOC vials may be grouped by sample in individual resealable plastic bags). If a cooler temperature blank is supplied by the laboratory, it should be packaged following the same procedures as the samples. If the laboratory did not include a temperature blank, do not add one. Place 1 to 2 inches of cushioning material (i.e., vermiculite) at the bottom of the cooler.

4. Place the sealed sample containers upright in the cooler.

5. Package ice in large resealable plastic bags and place inside the large garbage bag in the cooler. Samples placed on ice will be cooled to and maintained at a temperature of approximately 4°C.

6. Fill the remaining space in the cooler with cushioning material such as bubble wrap. The cooler must be securely packed and cushioned in an upright position and be surrounded (Note: to comply with 49 CFR 173.4, filled cooler must not exceed 64 pounds).

7. Place the completed chain-of-custody record(s) in a large resealable bag and tape the bag to the inside of the cooler lid.

8. Close the lid of the cooler and fasten with packing tape.

9. Wrap strapping tape around both ends of the cooler.

10. Mark the cooler on the outside with the following information: shipping address, return address, "Fragile, Handle with Care" labels on the top and on one side, and arrows indicating "This Side Up" on two adjacent sides.

11. Place custody seal evidence tape over front right and back left of the cooler lid, initial and date, then cover with clear plastic tape.

Note: Procedure numbers 2, 3, 5, and 6 may be modified in cases where laboratories provide customized shipping coolers. These cooler types are designed so the sample bottles and ice packs fit snugly within preformed styrofoam cushioning and insulating packing material.

Shipping Procedures

1. All samples will be delivered by an express carrier within 48 hours of sample collection. Alternatively, samples may be delivered directly to the laboratory or laboratory service center or a laboratory courier may be used for sample pickup.

2. If parameters with short holding times are required (e.g., VOCs [EnCore™ Sampler], nitrate, nitrite, ortho-phosphate and BOD), sampling personnel will take precautions to ship or deliver samples to the laboratory so that the holding times will not be exceeded.

3. Samples must be maintained at 4°C±2°C until shipment and through receipt at the laboratory

4. All shipments must be in accordance with DOT regulations and ARCADIS dangerous goods shipping SOPs.

5. When the samples are received by the laboratory, laboratory personnel will complete the chain-of-custody by recording the date and time of receipt of samples, measuring and recording the internal temperature of the shipping container, and checking the sample identification numbers on the containers to ensure they correspond with the chain-of-custody forms.

Any deviations between the chain-of-custody and the sample containers, broken containers, or temperature excursions will be communicated to ARCADIS immediately by the laboratory.

VII. Waste Management

Not applicable

VIII. Data Recording and Management

Chain-of-custody records will be transmitted to the ARCADIS PM or designee at the end of each day unless otherwise directed by the ARCADIS PM. The sampling team leader retains copies of the chain-of-custody forms for filing in . the project file. Record retention shall be in accordance with project requirements.

IX. Quality Assurance

Chain-of-custody forms will be legibly completed in accordance with the applicable project documents such as Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP), Work Plan, or other project guidance documents. A copy of the completed chain-of-custody form will be sent to the ARCADIS Project Manager or designee for review.

X. References

Not Applicable

Attachment 1

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ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #

Send Results to:

Contact & Company Name	Telephone
Address	Fax
City State Zip	E-mail Address
Project Name/Location (City, State)	Project #
Sampler's Printed Name	Sampler's Signature

Preservative										
Filtered (✓)										
# of Containers										
Container Information										

PARAMETER ANALYSIS & METHOD

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix									REMARKS

Keys

Preservation Key: A. H_2SO_4 B. HCl C. HNO_3 D. NaOH E. None F. Other ___ G. Other ___ H. Other ___

Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other ___ 10. Other ___

Matrix Key: SO - Soil W - Water T - Tissue SE - Sediment SL - Sludge A - Air NL - NAPL/Oil SW - Sample Wipe Other: ___

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished by	Received by	Relinquished by	Laboratory Received by
Lab Name	Cooler Custody Seal (✓)	Printed Name	Printed Name	Printed Name	Printed Name
☐ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature	Signature	Signature	Signature
Specify Turnaround Requirements	Sample Receipt	Firm	Firm/Courier	Firm/Courier	Firm
Shipping Tracking #	Condition/Cooler Temp: ___	Date/Time	Date/Time	Date/Time	Date/Time

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by BBL

SAMPLE CONTAINER LIST AND PRESERVATION PROTOCOL

The following container types and preservation are required for the CCR groundwater monitoring samples being sent to the Analytical Chemistry Service.

Appendix III and IV constituents

Metals (B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mo, Se, Tl)

- 250-mL bottle
- Preservation to pH<2 with HNO3
- Color Coded Red
- Does not need to be kept cold

Mercury

- 40-mL glass vial or Teflon Lined Brooks Rand Hg bottle
- Unpreserved* or preservation to pH < 2 with "trace metal grade HCl"**

  ***Unpreserved samples for mercury must be received by the laboratory within 48 hours to be properly preserved.*

  ** * Trace metal grade HCl is certified to contain no more than 0.2 ng/L mercury.*
- Does not need to be kept cold

Nonmetals (TDS, F, Cl, SO4)

- 500-mL bottle
- No preservative
- Must be stored and shipped at a temperature between 0°C and 6°C, without freezing.

Radium 226 and 228

- Two 1-L bottles (*Except for every tenth well, obtain five 1-L bottles)*
- Preservation to a pH<2 with HNO3
- Color Coded Red
- Does not need to be kept cold

Procedure to Check Operability of Redox Electrodes for ORP Measurements

Because redox potential is a characteristic of electrochemical equilibrium, it does not require standardization or calibration. However, it is desirable to check the electrode for proper operation before it is used. Solutions of known potential can be made by saturating pH buffer solutions with quinhydrone [CAS #106-34-3] using the following procedure:

1. Place 20 mL of pH 4, 7, and 10 buffer solutions into separate beakers. Saturate each buffer by stirring in a small quantity (a few crystals) of quinhydrone. (The temperature should remain ambient – do not warm the solutions to dissolve the crystals). The solution will become amber in color. As long as a few crystals are present, the solution is saturated with respect to quinhydrone. Buffers need to be made up daily to check the redox electrode.

2. Place the tip of the redox electrode (with an appropriate reference electrode if it is not a combination electrode) into the first beaker containing the quinhydrone/buffer solution. Record the millivolt reading and the temperature of the solution.

3. Rinse the electrode with deionized (DI) water and place it into the second beaker. Record the millivolt reading and the temperature of the solution. Repeat for the third beaker.

4. The measured potentials will generally be within 10 mV of the theoretical values listed below. Note, almost all reference electrodes used today are the AgCl/Ag type.

Redox Potential of Quinhydrone Solutions, mV □20 mV Reference type:	**AgCl/Ag**			**Calomel**		
Temp (□C)	20	25	30	20	25	30
pH 4	+268	+263	+258	+233	+218	+213
pH 7	+92	+86	+79	+47	+41	+34
pH 10	□84	□91	□100	□139	□136	□145

APPENDIX C

Field Equipment Decontamination SOP

ARCADIS

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Field Equipment Decontamination

Rev. #: 3

Rev Date: April 26, 2010

Approval Signatures

Prepared by: ______________________ Date: 4/26/2010
Keith Shepherd

Reviewed by: ______________________ Date: 4/26/2010
Richard Murphy (Technical Expert)

I. Scope and Application

Equipment decontamination is performed to ensure that sampling equipment that contacts a sample, or monitoring equipment that is brought into contact with environmental media to be sampled, is free from analytes of interest and/or constituents that would interfere with laboratory analysis for analytes of interest. Equipment must be cleaned prior to use for sampling or contact with environmental media to be sampled, and prior to shipment or storage. The effectiveness of the decontamination procedure should be verified by collecting and analyzing equipment blank samples.

The equipment cleaning procedures described herein includes pre-field, in the field, and post-field cleaning of sampling tools which will be conducted at an established equipment decontamination area (EDA) on site (as appropriate). Equipment that may require decontamination at a given site includes: soil sampling tools; groundwater, sediment, and surface-water sampling devices; water testing instruments; down-hole instruments; and other activity-specific sampling equipment. Non-disposable equipment will be cleaned before collecting each sample, between sampling events, and prior to leaving the site. Cleaning procedures for sampling equipment will be monitored by collecting equipment blank samples as specified in the applicable work plan or field sampling plan. Dedicated and/or disposable (not to be re-used) sampling equipment will not require decontamination.

II. Personnel Qualifications

ARCADIS field sampling personnel will have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, and site-specific training, as needed. In addition, ARCADIS field sampling personnel will be versed in the relevant SOPs and possess the skills and experience necessary to successfully complete the desired fieldwork. The project HASP and other documents will identify any other training requirements such as site specific safety training or access control requirements.

III. Equipment List

- health and safety equipment, as required in the site Health and Safety Plan (HASP)
- distilled water

- Non-phosphate detergent such as Alconox or, if sampling for phosphorus phosphorus-containing compounds, Luminox (or equivalent).
- tap water
- rinsate collection plastic containers
- DOT-approved waste shipping container(s), as specified in the work plan or field sampling plan (if decontamination waste is to be shipped for disposal)
- brushes
- large heavy-duty garbage bags
- spray bottles
- (Optional) – Isoprophyl alcohol (free of ketones) or methanol
- Ziploc-type bags
- plastic sheeting

IV. Cautions

Rinse equipment thoroughly and allow the equipment to dry before re-use or storage to prevent introducing solvent into sample medium. If manual drying of equipment is required, use clean lint-free material to wipe the equipment dry.

Store decontaminated equipment in a clean, dry environment. Do not store near combustion engine exhausts.

If equipment is damaged to the extent that decontamination is uncertain due to cracks or dents, the equipment should not be used and should be discarded or submitted for repair prior to use for sample collection.

A proper shipping determination will be performed by a DOT-trained individual for cleaning materials shipped by ARCADIS.

V. Health and Safety Considerations

Review the material safety data sheets (MSDS) for the cleaning materials used in decontamination. If solvent is used during decontamination, work in a well-ventilated area and stand upwind while applying solvent to equipment. Apply solvent in a manner that minimizes potential for exposure to workers. Follow health and safety procedures outlined in the HASP.

VI. Procedure

A designated area will be established to clean sampling equipment in the field prior to sample collection. Equipment cleaning areas will be set up within or adjacent to the specific work area, but not at a location exposed to combustion engine exhaust. Detergent solutions will be prepared in clean containers for use in equipment decontamination.

Cleaning Sampling Equipment

1. Wash the equipment/pump with potable water.

2. Wash with detergent solution (Alconox, Liquinox or equivalent) to remove all visible particulate matter and any residual oils or grease.

3. If equipment is very dirty, precleaning with a brush and tap water may be necessary.

4. (Optional) – Flush with isopropyl alcohol (free of ketones) or with methanol. This step is optional but should be considered when sampling in highly impacted media such as non-aqueous phase liquids or if equipment blanks from previous sampling events showed the potential for cross contamination of organics.

5. Rinse with distilled/deionized water.

Decontaminating Submersible Pumps

Submersible pumps may be used during well development, groundwater sampling, or other investigative activities. The pumps will be cleaned and flushed before and between uses. This cleaning process will consist of an external detergent solution wash and tap water rinse, a flush of detergent solution through the pump, followed by a flush of potable water through the pump. Flushing will be accomplished by using an appropriate container filled with detergent solution and another contained filled with potable water. The pump will run long enough to effectively flush the pump housing and hose (unless new, disposable hose is used). Caution should be exercised to avoid contact with the pump casing and water in the container while the pump is running (do not use metal drums or garbage cans) to avoid electric shock. Disconnect the pump from the power source before handling. The pump and hose should be placed on or in clean polyethylene sheeting to avoid contact with the ground surface.

VII. Waste Management

Equipment decontamination rinsate will be managed in conjunction with all other waste produced during the field sampling effort. Waste management procedures are outlined in the work plan or Waste Management Plan (WMP).

VIII. Data Recording and Management

Equipment cleaning and decontamination will be noted in the field notebook. Information will include the type of equipment cleaned, the decontamination location and any deviations from this SOP. Specific factors that should be noted include solvent used (if any), and source of water.

Any unusual field conditions should be noted if there is potential to impact the efficiency of the decontamination or subsequent sample collection.

An inventory of the solvents brought on site and used and removed from the site will be maintained in the files. Records will be maintained for any solvents used in decontamination, including lot number and expiration date.

Containers with decontamination fluids will be labeled.

IX. Quality Assurance

Equipment blanks should be collected to verify that the decontamination procedures are effective in minimizing potential for cross contamination. The equipment blank is prepared by pouring deionized water over the clean and dry tools and collecting the deionized water into appropriate sample containers. Equipment blanks should be analyzed for the same set of parameters that are performed on the field samples collected with the equipment that was cleaned. Equipment blanks are collected per equipment set, which represents all of the tools needed to collect a specific sample.

X. References

USEPA Region 9, Field Sampling Guidance #1230, Sampling Equipment Decontamination.

USEPA Region 1, Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells.

APPENDIX D

Field Log Book SOP

ARCADIS
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Field Log Book Entries

Rev. #: 0

Rev Date: 11 August 2009

Approval Signatures

Prepared by: Andrew Kanik Date: 8/11/09

Reviewed by: Michael J. Gefell Date: 8/11/09
(Technical Expert)

I. Scope and Application

This ARCADIS Standard Operating Procedure covers the entries needed in a field log book for environmental investigations.

This SOP does not address all of the entries that may be needed for a specific project, and does not address health and safety, equipment decontamination, field parameter measurements, sample preservation, chain-of-custody, or laboratory analysis. For direction on requirements in these areas, refer to other ARCADIS SOPs, the project work plans including the quality assurance project plan, sampling plan, and health and safety plan, as appropriate.

II. Personnel Qualifications

ARCADIS personnel participating in fieldwork and making entries into the field log book should have a minimum of one (1) year of field experience (or be under the supervision and accompanied in the field by someone who does) and current health and safety training including 40-hour HAZWOPER training, site supervisor training, site-specific training, first aid, and CPR, as needed. Field personnel will also be compliant with client-specific training requirements. In addition, ARCADIS field sampling personnel will be versed in the relevant SOPs and posses the required skills and experience necessary to successfully complete the desired field work.

III. Equipment List

- Field Log Book

- Ball point (medium point) pen with blue or black ink (black preferred). A fine point Sharpie pen may be used if the ink does not bleed through the page and become visible on back side of the page. If weather conditions prevent the use of a pen, indicate so in the log and use an alternate writing instrument .

- Zip-lock baggie or other weather-proof container to protect the field log book from the elements.

IV. Cautions

All entries in the field log must be legible and archivable. Do not leave the field log book exposed to the elements or other conditions that might moisten the pages and smear/dissolve the entries. When not in the field, the log book should be stored in a location that is easily accessible to field crews.

V. Health and Safety Considerations

ARCADIS field personnel will be familiar and compliant with Client-specific health and safety requirements.

VI. Procedure

- Print legibly. Do not use cursive writing.
- The name of the project, project number and project location should be written in indelible ink on the outside of the field log book.
- On the inside of the front cover, write "If Found, Please Return to ARCADIS" and include the appropriate address and phone number, the name of the person to which the book is assigned, and the name of the project manager.
- Reserve the first page of the book for a Table of Contents.
- Reserve the last five (5) pages of the book for important contacts, notes, reminders, etc.
- Each day of field work, the following should be recorded in the field log book as applicable:

  a) Project Name

  b) Date and time arrived

  c) Work Site Location

  d) Names of people on-site related to the project including ARCADIS employees, visitors, subcontractor employees, agency personnel, client representative, etc.

  e) Describe the work to be performed briefly, and list the equipment on-site

  f) Indicate the health and safety (H&S) level to be used

  g) Record instrument calibrations and checks

  h) Record time and general content of H&S briefing

  i) Describe the weather conditions, including temperature, precipitation, and wind speed and direction

  j) List periodic time entries in the far left hand column of each page

  k) Minimize unused space on each page

- The tailgate meeting must be recorded in the log book and the tailgate form completed. If H&S monitoring is performed, record the time and results of initial and followup monitoring.

- Note factual observations including collection of QA/QC samples, delays, well damage, accidents, work plan deviations, instrument problems, and problem resolutions.

- Describe work performed and how documented such as photographs, sample core logs, water sampling logs, etc.

- Describe bases for field decisions including pertinent conversations with visitors, regulators, or project personnel.

- Note final instrument calibrations and checks.

- Sign the log book at the end of each day at a minimum. Draw a line to the end of the page to indicate no further entries on that page. Sign the bottom of each page if possible.

- If an entry to the log book is changed, strike out the deleted text or item with a single line such that the entry remains legible, and initial and date the change. Such changes should only be made by the same person that made the initial entry.

- Field log book entries must be made in the field at the site, not at a later time at a different location. Supplemental entries to the log book may be made at a later date. The supplemental entry must be clearly identified as such and the entry must be signed and dated as described in this SOP.

- Problems noted in the field log book must be brought to the attention of the project manager and task manager in a timely fashion. Problems may be reported in person, on the telephone, or in a written daily log form. If daily logs are prepared and you will not be able to personally give the daily log to the project manager, send the daily log via FAX or overnight courier to the project manager and task manager.

VII. Waste Management

Investigation-derived waste will be managed as described in the Investigation-Derived Waste Handling and Storage SOP. A drum/waste inventory should be maintained on a pre-designated page in the field log book.

VIII. Data Recording and Management

Each page of the field log book should be scanned for electronic/digital archiving at periodic intervals. This will ensure that copies of the field notes are available in the event the field book is lost or damaged, and that field data can be easily disseminated to others without the risk of physically sending the field log book. Field log books that are full should be archived with the project files, and readily retrievable.

IX. Quality Assurance

Be mindful that the field log book may be produced in court. All entries should be legible (as discussed above). Entries should also be in English, unless working in a country where English is not the predominant language or you are directed otherwise by the project manager.

X. References

Not Applicable

APPENDIX B

STATISTICAL ANALYSIS PLAN

APPALACHIAN POWER COMPANY

MOUNTAINEER PLANT

Prepared in compliance with USEPA's Coal Combustion Residuals Rule, 40 CFR 257.93

Revision 0: January 2017

Revision 1: January 2021

STATISTICAL ANALYSIS PLAN

Submitted to

AMERICAN ELECTRIC POWER

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January 2021
Revision 1

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LIST OF ACRONYMS AND ABBREVIATIONS

Annual Report	Annual Groundwater Monitoring and Corrective Action Report
ANOVA	analysis of variance
CCR	coal combustion residuals
CFR	Code of Federal Regulations
GWPS	groundwater protection standard
LCL	lower confidence limit
MCL	maximum contaminant level
OLS	ordinary least-squares
ORP	oxidation-reduction potential
PQL	practical quantitation limit
QC	quality control
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
ROS	regression on order statistics
SAP	Statistical Analysis Plan
SSI	statistically significant increase
SSL	statistically significant level
SWFPR	site-wide false positive rate
UCL	upper confidence limit
Unified Guidance	*Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA, 2009)
UPL	upper prediction limit
USEPA	United States Environmental Protection Agency
UTL	upper tolerance limit

SECTION 1

INTRODUCTION

In April 2015, the United States Environmental Protection Agency (USEPA) issued new regulations regarding the disposal of coal combustion residuals (CCR) in certain landfills and impoundments under 40 CFR 257, Subpart D, referred to as the “CCR rules.” Facilities regulated under the CCR rules are required to develop and sample a groundwater monitoring well network to evaluate if landfilled CCR materials are impacting downgradient groundwater quality. As part of the evaluation, the analytical data collected during the sampling events must undergo statistical analysis to identify statistically significant increases (SSIs) in analyte concentrations above background levels. A description of acceptable statistical programs is provided in USEPA’s document *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA, 2009), which is commonly referred to as the “Unified Guidance”.

The CCR rules are not prescriptive regarding what statistical analyses should be selected so that groundwater data are interpreted in a consistent manner and the results meet certification requirements. Geosyntec Consultants, Inc. (Geosyntec) prepared this Statistical Analysis Plan (SAP) on behalf of American Electric Power (AEP) to develop a logic process regarding the appropriate statistical analysis of groundwater data collected in compliance with the CCR rules. The SAP will provide a narrative description of the statistical approach and methods used in accordance with the CCR rule reporting requirements [40 CFR 257.93(f)(6)].

This SAP describes statistical procedures to be used to establish background conditions, implement detection monitoring, implement assessment monitoring (as needed), and implement corrective action monitoring (as needed).

Procedures for collecting, preserving, and shipping groundwater samples are not included in this SAP. It is assumed that samples are collected and handled in accordance with AEP’s draft *Groundwater Sampling and Analysis Plan* (AEP, 2016) and the requirements of 40 CFR 257.93 *et seq.*

SECTION 2

ANALYSES FOR REVIEWING AND PREPARING DATA

2.1 Physical Independence

Most statistical analyses require separate sampling events to be statistically independent. Statistical independence of groundwater samples is most likely to be realized when the samples are collected at time intervals that are sufficiently far apart that the samples are not from the same volume of groundwater. In such cases, the samples of groundwater are considered physically independent. To ensure physical independence, the minimum time between sampling events must be longer than the residence time of groundwater that would be collected in the monitoring well. The minimum time interval between sampling events (t_{min}) can be determined by calculating the groundwater velocity, as follows:

$$v = \frac{Ki}{n} \quad (1)$$

$$t_{min} = \frac{v}{D} \quad (2)$$

where:

$v =$	groundwater velocity
$K =$	hydraulic conductivity
$i =$	hydraulic gradient
$n =$	effective porosity
$t_{min} =$	minimum time interval between sampling events
$D =$	well bore volume (i.e., diameter of well and surrounding filter pack)

2.2 Testing for Normality

Many statistical analyses assume that the sample data are normally distributed. If such an analysis is used, the assumption of normality can be tested using the Shapiro-Wilk test (for sample sizes up to 50) or the Shapiro-Francía test (for sample sizes greater than 50). Normality can also be tested by less computationally intensive means such as graphing data on a probability plot. If the data appear not to be normally distributed (e.g., they are skewed in some fashion), then data may be transformed mathematically such that the transformed data do follow a normal distribution (e.g., lognormal distributions, Box-Cox transformations). Alternatively, a non-parametric test (i.e., a test that does not assume a particular distribution of the data) may be used. However, since non-parametric tests generally require large datasets to maintain an adequately low site-wide false positive rate (SWFPR), transforming the data is preferred.

2.3 Testing for Outliers

Outliers are extreme data points that may represent an anomaly or error. Data sets should be visually inspected for outliers using time series and/or box-and-whisker plots. While they are valuable as screening tools, visual methods are not foolproof. For example, if data are skewed according to a lognormal distribution, the boxplot screening may identify more outliers than actually exist. Typically, goodness-of-fit testing must be done on the non-outlier portion of the data to determine at what scale to test the possible outliers.

Potential outliers should be evaluated for potential sources of error (e.g., in transcription or calculation) or evidence that the data point is not representative (e.g., by examining quality control [QC] data, groundwater geochemistry, sampling procedures, etc.). Errors should be corrected prior to further statistical analysis, and data points that are flagged as non-representative should not be used in the statistical analysis. In addition, data points can be considered extreme outliers if they meet one of the following criteria:

$$x_i < \tilde{x}_{0.25} - 3 \times IQR \quad (3)$$

or

$$x_i > \tilde{x}_{0.75} + 3 \times IQR \quad (4)$$

where:

$x_i =$	individual data point
$\tilde{x}_{0.25} =$	first quartile
$\tilde{x}_{0.75} =$	third quartile
$IQR =$	the interquartile range $= \tilde{x}_{0.75} - \tilde{x}_{0.25}$

Extreme outliers may be excluded from the statistical analysis based on professional judgment. Goodness-of-fit testing may be needed to corroborate the classification of data points as extreme outliers. Flagged data and extreme outliers should still be maintained in the database and should be reevaluated as new data are collected.

2.4 Handling Duplicate or Replicate Data

Duplicate or replicate samples are often collected for QC purposes. Averaging the parent sample and duplicate sample results may give a more accurate representation of the constituent concentration at the time, but doing so would reduce the sample variability. Since many statistical tests assume that data are homoscedastic (i.e., the population variance does not change across samples), this technique is not recommended. Unless there is reason to suspect that either the parent sample or the duplicate sample is more representative of site groundwater, one of the samples should be selected at random and that value should be used in the subsequent statistical analysis. However, it should be reported when parent sample and duplicate sample results are different from a decision-making perspective, e.g., when the duplicate sample exceeds the groundwater protection standard (GWPS) but the parent sample does not.

2.5 Handling Non-Detect Data

If non-detect data are infrequent (less than 15%), half of the reporting limit (RL) can be used in place of these data without significantly altering the results of a statistical test. The RL may be either the laboratory practical quantification limit (PQL) or an established project limit which is less than the maximum contaminant level (MCL) or CCR rule-specified screening level for constituents that do not have an MCL. If non-detect data are more frequent, parametric methods that explicitly consider non-detects or non-parametric methods insensitive to the presence of non-detect data should be used. Where available, estimated results less than the RL (i.e., “J-flagged” data) should be used, and these data should be considered detections for the purposes of statistical analysis.

2.6 Deseasonalizing Data

Most statistical tests assume that data are independent and identically distributed. Datasets with seasonal or cyclic patterns violate this assumption. If seasonal trends are not corrected, the variance of the data will be overestimated, lessening the statistical power of the test. False positives may also be identified for elevated results that are caused by seasonal variation instead of a release.

At the same time, deseasonalizing data inherently assumes that the seasonal pattern will continue into the future, so care should be taken when correcting for seasonality. There should be a physical explanation for the seasonal pattern, and the seasonal pattern should be observed for at least three cycles before deseasonalizing data.

To evaluate whether a seasonal pattern exists, data should first be visually inspected on a time series plot. Observing parallel or antiparallel patterns for the same constituent across multiple wells or for multiple constituents within a single well provides greater assurance of a seasonal pattern and may be used to infer a physical explanation.

If a seasonal pattern is observed, the dataset should undergo a statistical test for seasonality before deseasonalizing the data. First, results are categorized into seasons based on the observed seasonal pattern and the frequency of sampling (e.g., summer or winter; dry season or wet season; first, second, third, or fourth quarter; etc.). Then, the Kruskal-Wallis test can be applied to the various seasonal datasets to test whether the different seasons are statistically significantly different from one another.

To deseasonalize the data, a seasonal mean should be calculated for each season based on the categorization for the dataset, and a grand mean (i.e., the overall mean of all data) should be calculated. Each result should then be corrected based on the difference between the grand mean and the seasonal mean for that result’s season. Similar to transforming apparently non-normal data, statistics should be calculated based on the deseasonalized data.

SECTION 3

DETECTION MONITORING

3.1 Establishing Background

By October 17, 2017, eight independent background samples should be collected from each monitoring well in the CCR unit groundwater monitoring system as part of the initial monitoring period [40 CFR 257.94(b)]. Background wells do not necessarily need to be hydraulically upgradient of the CCR unit, but they must not be affected by a release from the CCR unit [40 CFR 257.91(a)(1)]. The sampling frequency should be such that samples are physically independent, as described in **Section 2.1**. Samples should be analyzed for the Appendix III and Appendix IV constituents listed in **Table 1**.

Once analytical data are received, summary statistics (e.g., mean and variance) should be calculated for the background datasets. Initially, analysis should be done independently for each constituent at each well. As part of our protocol in such situations, time series plots and box plots will be prepared along with the summary statistics. The Kaplan-Meier method or robust regression on order statistics (ROS) can be used to compute summary statistics when there are large fractions (i.e., 15% to 50%) of non-detects; these methods are discussed below. If more than 50% of the data are non-detect, then summary statistics cannot be reliably calculated. Procedures for evaluating future data against these background datasets are described in **Section 3.2.1** (for detection monitoring) and **Section 4.1.1** (for assessment monitoring and corrective action monitoring).

Background data will be evaluated for statistically significant temporal trends using (a) ordinary least-squares (OLS) linear regression with a *t*-test ($\alpha = 0.01$) on the slope and/or (b) the non-parametric Theil-Sen slope estimator with Mann-Kendall trend test ($\alpha = 0.05$, or 0.01 for larger datasets). Non-detect data are replaced with half the RL for these analyses. The OLS linear regression or Theil-Sen slope estimator will be used to estimate the rate of change (increasing, no change, or decreasing) over time for each constituent at each well. The *t*-test or Mann-Kendall statistic will be used to determine whether a trend is statistically significant. OLS linear regression should only be used when at most 15% of the data are non-detect, when regression residuals are normally distributed, and when the variance from the regression line does not change over time. The Theil-Sen/Mann-Kendall analysis requires at least five observations for meaningful results; at least eight observations are recommended. Note that a statistically significant increasing trend in background data (or a statistically significant decreasing trend in pH) could indicate an existing release from the CCR unit or another source, and further investigation may be needed to determine the source of this trend.

Background data will also be evaluated for statistically significant seasonal patterns and, if present, will be deseasonalized using the procedure described in **Section 2.6**.

If the trend analysis does not indicate a statistically significant trend, the proposed background data will be tested for normality using one of the methods outlined in **Section 2.2**. When data follow a normal or transformed-normal distribution (e.g. lognormal or other Box-Cox transformation), parametric methods are applied. If fewer than 15% of the data are non-detect, non-detect data may be replaced with half the RL and the mean and variance can be calculated normally. If 15% to 50% of the data are non-detect, two methods – the Kaplan-Meier or Robust ROS method – can be used to determine the sample mean and variance. Kaplan-Meier should not be used if all non-detect data have the same RL or if the maximum detected value is less than the highest RL of the non-detect data. When data do not follow a normal or transformed-normal distribution, or when more than 50% of the data are non-detect, nonparametric methods may be used.

Once the sample mean and variance are calculated for each constituent at each well (assuming no significant trends over time), the data from background wells should be compared for each constituent. The purpose of this exercise is to test for significant spatial variation and to decide between interwell and intrawell approaches. First, the equality of variance across background wells should be tested visually using box-and-whisker plots and/or analytically using Levene's test (α = 0.01). If the variances appear equal, then one-way, parametric analysis of variance (ANOVA) should be conducted across background wells (α = 0.05). If there are no statistically significant differences among the background wells, then interwell comparisons may be appropriate to evaluate SSIs.

If ANOVA indicates statistically significant differences among background wells, then spatial variability can be concluded. As with temporal trends, the existence of spatial variability could indicate an existing release from the CCR unit or another source, and further investigation may be needed to determine the source of this variability. If the spatial variability is not caused by a release from the CCR unit, then intrawell comparisons would be appropriate to evaluate SSIs.

3.2 Evaluating Statistically Significant Increases (SSIs)

After the initial eight rounds of background sampling, groundwater sampling and analysis should be conducted on a semiannual basis. The statistical evaluation of each groundwater monitoring event must be completed within 90 days of receiving the analytical results from the laboratory [40 CFR 257.93(h)(2)].

The CCR rules only require analysis of the Appendix III constituents; however, analyzing additional constituents should be considered. Turbidity, dissolved oxygen, and oxidation-reduction potential (ORP), should be measured in the field in addition to pH. Other geochemical parameters, such as alkalinity, magnesium, potassium, sodium, iron, and manganese, should also be analyzed in the laboratory periodically (e.g., once every one to four years). Both the field and laboratory geochemical parameters can help identify the cause of any apparent change in groundwater quality. Additionally, analyzing for the Appendix IV constituents periodically should be considered to ensure the background dataset for these constituents is complete and current should assessment monitoring be needed. Statistical analyses should still be limited to the Appendix III constituents to help meet the dual goals of a SWFPR less than 10% per year and an adequate statistical power.

The CCR rules specifically list four methods acceptable for statistical analysis: ANOVA, tolerance intervals, prediction intervals, and control charts [40 CFR 257.93(f)]. Of these, the Unified Guidance recommends prediction limits combined with retesting for maintaining a low SWFPR while providing high statistical power (USEPA, 2009). Control charts are also acceptable as long as parametric methods can be used (i.e., the data or transformed data are normally distributed and the frequency of non-detects is at most 50%), as there is no nonparametric counterpart to the control chart. ANOVA is not recommended as the CCR rules mandate a minimum Type I error (α) of 0.05, at which it would be difficult to maintain an annual SWFPR less than 10%.

Prediction intervals and control charts can be used for both interwell and intrawell comparisons. For interwell comparisons, the pooled data from background monitoring wells should be used for the background dataset; for intrawell comparisons, the background dataset should be a subset of historical data at each monitoring well. (See **Section 3.4** below for procedures for updating background datasets.) Interwell comparisons are preferable, but they should only be used when there are no trends and no statistically significant population differences among background wells; otherwise, a significant test result may only indicate natural spatial variability instead of an SSI.

For prediction intervals, the upper prediction limit (UPL) is calculated according to the following formula:

$$\text{UPL} = \bar{x} + ks \quad (5)$$

where:

$\bar{x} =$ mean concentration of the background dataset
$s =$ standard deviation of the background dataset
$k =$ multiplier based on the characteristics of the site and the statistical test

Values for k are chosen to maintain an SWFPR less than 10% and depend on the following: (1) number of wells, (2) number of constituents being evaluated, (3) size of the background dataset, (4) retesting regime, and (5) whether intrawell or interwell comparisons are being used. Values for k are listed in Tables 19-1, 19-2, 19-10, and 19-11 in Appendix D of the Unified Guidance (USEPA, 2009). If the k value that precisely matches site conditions does not appear in these tables, it can be estimated using the provided values by linear interpolation.

A one-of-two or one-of-three testing regime should be employed; i.e., if at least one sample in a series of two or three (respectively) does not exceed the UPL, then it can be concluded that an SSI has not occurred. In practice, if the initial result does not exceed the UPL, then no resampling is needed. If the initial result does exceed the UPL, then a resample should be collected prior to the next regularly scheduled sampling event at the monitoring well(s) and for the constituent(s) exceeding the UPL. Additional geochemical parameters, such as alkalinity, magnesium, potassium, sodium, iron, and manganese, should also be analyzed during resampling to help identify the source of the apparent increase. Enough time should elapse between the initial sample and each resample so that the samples are physically independent (**Section 2.1**). If both the initial result and the subsequent resample(s) exceed the UPL, then an SSI can be concluded.

Choosing between a one-of-two and a one-of-three testing regime should be done before conducting the statistical analysis, as the UPL calculation depends on the resampling regime selected. The choice should depend on site conditions and the size of the background dataset. First, if three physically independent samples cannot be collected in a six-month period, then a one-of-two testing regime should be used. A one-of-two testing regime may also be considered (a) if the background dataset has at least 16 data points or (b) if the CCR unit's monitoring well network has nine or fewer downgradient monitoring wells and a background dataset of at least 8 data points. Otherwise, a one-of-three testing regime should be employed to achieve an acceptably high statistical power and an acceptably low SWFPR.

If two physically independent samples cannot be collected in a six-month period, then a reduced monitoring frequency may be warranted. In this case, a demonstration must be made documenting the need for – and effectiveness of – a reduced monitoring frequency. This demonstration must be certified by a qualified professional engineer, and monitoring must still be done on at least an annual basis [40 CFR 257.94(d)].

The above procedure can be used wherever a mean and variance can be calculated for background data, including datasets that are transformed-normal and datasets where the mean and variance are calculated using the Kaplan-Meier or Robust ROS method. (Note that if data are transformed-normal, prediction intervals or control limits should first be calculated for the transformed data and then be transformed back into concentration terms.) Methods for determining prediction intervals where more than half of the background data are non-detect, where background data are neither normal nor transformed-normal, or where statistically significant trends or seasonal patterns exist are described below.

Different analyses can and should be used for different constituents and different monitoring wells within a CCR unit depending on the background data. For instance, if background wells have similar chloride data but different pH data, then interwell comparisons may be considered for chloride analysis and intrawell comparisons may be considered for pH analysis. If boron data are stable above the RL at MW-1 and mostly non-detect at MW-2, then it would be appropriate to use parametric prediction limits at MW-1 and non-parametric prediction limits at MW-2.

3.2.1 Most Background Data Are Non-Detect

If at least half of the data are non-detect, non-parametric prediction intervals with retesting should be used. In this method, the UPL is set either at the highest or at the second-highest concentration observed in the background dataset. A sufficiently large background dataset is paramount for this procedure to achieve an acceptably low SWFPR. To this end, the Kruskal-Wallis test should be performed on all background monitoring wells where at least 50% of the data for the constituent are non-detect to evaluate spatial variability. If the Kruskal-Wallis test indicates that there is no significant spatial variability among background wells, then the data from the background wells should be pooled to form a larger background dataset and thus to run an interwell test.

The choice between a one-of-two and a one-of-three testing regime should be based on the same criteria used for parametric testing, as described in **Section 3.2**. Choosing between using the highest or second-highest observed concentration as the UPL should depend in part on the size of the background dataset and the number of monitoring wells around the CCR unit. Assuming a one-of-three testing regime is used, the highest observed concentration should be used when the background dataset has fewer than 32 data points and the monitoring network has twelve or fewer wells. If there are at least thirteen wells, the highest observed concentration should be used when the background dataset has fewer than 48 data points. The second-highest observed concentration may be used for larger datasets.

If a one-of-two testing regime must be used due to aquifer conditions, then the highest observed concentration should be used (a) when the background dataset has fewer than 64 data points if there are fifteen or fewer wells or (b) when the background dataset has fewer than 88 data points if there are at least sixteen wells. The second-highest observed concentration may be used for larger data sets.

3.2.2 All Background Data Are Non-Detect

If all of the background data are non-detect, then the Double Quantification Rule should be used. According to this rule, if a sample and verification resample both exceed the PQL, then an SSI can be concluded. This can be thought of as setting the UPL at the PQL with a one-of-two testing regime. The possibility of false positives from this rule does not count against the calculated SWFPR because the false positive risk is small when all previous background data have been non-detect.

3.2.3 Background Data Are neither Normal nor Transformed-Normal

If background data are non-normal and cannot be transformed such that the transformed data do follow a normal distribution, then non-parametric prediction intervals with retesting should be used. In this method, the UPL is set either at the highest or at the second-highest concentration observed in the background dataset. A sufficiently large background dataset is paramount for this procedure to achieve an acceptably low SWFPR. To this end, the Kruskal-Wallis test should be performed on all background monitoring wells where at least 50% of the data for the constituent are non-detect to evaluate spatial variability. If the Kruskal-Wallis test indicates that there is no significant spatial variability among background wells, then the data from the background wells should be pooled to form a larger background dataset and thus to run an interwell test.

The choice between a one-of-two and a one-of-three testing regime should be based on the same criteria used for parametric testing, as described in **Section 3.2**. The choice between using the highest or second-highest observed concentration as the UPL should be based on the same considerations described in **Section 3.2.1**.

3.2.4 A Significant Temporal Trend Exists

True temporal trends in background data (i.e., absent a release from the facility or another source) are considered unlikely. Thus, a truncated dataset that does not exhibit a statistically significant trend may be used. In these cases, UPLs would be calculated as described in the previous sections.

Alternatively, if there is a significant temporal trend in the background data that is not attributable to a release, prediction limits can be constructed around a trend line. A trend line can be constructed parametrically using OLS linear regression. OLS linear regression should only be used when at most 15% of the data are non-detect, when regression residuals are normally distributed, and when the variance from the regression line does not change over time. If OLS linear regression is used, the UPL can be calculated according to the following equation:

$$\text{UPL} = \widehat{x_0} + t_{1-\alpha,n-2} * s_e * \sqrt{1 + \frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1)s_t^2}} \quad (6)$$

where:

$\widehat{x_0} =$	regression-line estimate of the mean concentration at time t_0
$t_{1-\alpha,n-2} =$	one-tailed *t*-value at a confidence of 1 – α and n – 2 degrees of freedom
$s_e =$	standard error of the regression line
$n =$	number of samples in the background dataset
$t_0 =$	date the groundwater sample being compared to the UPL was collected
$\bar{t} =$	mean of the sampling dates in the background dataset
$s_t =$	standard deviation of the sampling dates in the background dataset

The choice between a one-of-two and a one-of-three testing regime should be based on the same criteria used when there is no significant trend, as described in **Section 3.2**. The choice of α depends on the retesting regime and the number of wells within the monitoring network. If a one-of-two testing regime is employed, an α = 0.02 is recommended if there are eighteen or fewer wells and an α = 0.01 is recommended if there are at least nineteen wells within the monitoring network. If a one-of-three testing regime is employed, an α = 0.05 should be used.

3.2.5 A Significant Seasonal Pattern Exists

If a statistically significant seasonal pattern exists and if there is a physical explanation for the seasonality, the background data should be deseasonalized using the procedure described in **Section 2.6**. The background UPL should be calculated based on the deseasonalized data. Results should then be deseasonalized by subtracting the difference between the seasonal mean and the grand mean before comparing results to the UPL.

3.3 Responding to an Identified SSI

If the statistical evaluation indicates that an SSI is present, the data should be evaluated to assess whether the SSI is caused by a release from the CCR unit. If it can be shown that the SSI resulted from a release from another source, from an error in sampling or analysis, or from natural variability, then a demonstration of this must be made in writing and certified by a qualified professional engineer within 90 days of completing the statistical evaluation [40 CFR 257.94(e)(2)]. (The statistical evaluation itself must be completed within 90 days of receiving the analytical data from the laboratory.) If this demonstration is not made within 90 days of completing the statistical evaluation, then the site must begin assessment monitoring [40 CFR 257.94(e)(1)].

3.4 Updating Background

As recommended in the Unified Guidance, background values should be updated every four to eight measurements, assuming no confirmed SSI is identified (USEPA, 2009). (See **Section 4.4** for procedures for updating background if an SSI has been identified.) A Student's *t*-test or the nonparametric Mann-Whitney test (also known as the Wilcoxon rank-sum test) should be conducted to compare the set of new data points against the existing background dataset, as appropriate. An $\alpha = 0.05$ is recommended given the relatively small size of the datasets, particularly if background is updated every four measurements and particularly if the nonparametric Mann-Whitney test is used. However, an α as low as 0.01 may be used if the existing background dataset is sufficiently large (i.e., contains at least five data points) or if Student's *t*-test is used.

If the *t*-test or Mann-Whitney test does not indicate significant differences, the new data should be combined with the existing background data to calculate an updated UPL. Increasing the size of the background dataset will increase the power of subsequent statistical tests.

If the *t*-test or Mann-Whitney test indicates a statistically significant difference between the two populations, then the data should not be combined with the existing background data until further review determines the cause of the difference. If the differences appear to be caused by a release, then the previous background dataset should continue to be used. Absent evidence of a release, the new dataset should be considered more representative of present-day groundwater conditions and used for background. Note that the *t*-test or Mann-Whitney test is used to compare new data to the existing background dataset for the purposes of updating background. The tests are not used to determine whether an SSI is present or whether a release has occurred.

Periodically, spatial variability among background wells may be re-assessed to determine whether using an interwell or intrawell comparison is appropriate on a constituent-by-constituent basis, as outlined in **Section 3.1**.

SECTION 4

ASSESSMENT MONITORING

A CCR unit must begin assessment monitoring if an SSI is identified and is not attributed to some cause besides a release from the CCR unit. Assessment monitoring must begin within 90 days of identifying the SSI. During this 90-day period, the monitoring well network must be sampled for all Appendix IV constituents [40 CFR 257.95(b)]. Within 90 days of obtaining the results from this sampling event, all of the CCR unit wells must be sampled for all Appendix III constituents and those Appendix IV constituents that were detected during the initial assessment monitoring event [40 CFR 257.95(d)(1)].

After these initial assessment monitoring events, the CCR unit wells must be sampled for all Appendix III constituents and previously detected Appendix IV constituents on a semiannual basis [40 CFR 257.95(d)(1)]. Additionally, the CCR unit wells must be sampled for all Appendix IV constituents on an annual basis [40 CFR 257.95(b)].

As with detection monitoring, if physically independent samples cannot be collected on a semiannual basis, then a reduced monitoring frequency may be warranted. A demonstration must be made documenting the need for – and effectiveness of – a reduced monitoring frequency. This demonstration must be certified by a qualified professional engineer, and monitoring must still be done on at least an annual basis [40 CFR 257.95(c)].

GWPSs must be established for each detected Appendix IV constituent. The GWPS shall be the greater of the background concentration and the MCL established by the USEPA for that constituent. There is no established MCL for cobalt, lead, lithium, and molybdenum. For these constituents, the CCR rules specify a screening level that can be used in place of the MCL. For these constituents, the GWPS shall be the greater of the background concentration and the CCR rule-specified screening level [40 CFR 257.95(h)]. An upper tolerance limit (UTL) with 95% confidence and 95% coverage is often used as the representative background concentration.

A single site-wide GWPS would be recommended for each constituent based on pooled background data, even if natural spatial variability exists. If background data are not pooled, background concentrations and consequently GWPSs would vary from well to well. One difficulty with this approach is that concentrations at one monitoring well may exceed the location-specific GWPS and still be below levels considered as natural background at other locations within the site. The pooled background is often more interpretable and less cumbersome for developing a single background-based GWPS per constituent.

To determine whether a move to corrective action is warranted, a confidence interval constructed on recent data at each compliance monitoring well should be compared to the site-wide GWPS. When the lower confidence limit (LCL) of this interval exceeds the GWPS, an assessment of corrective measures may be justified.

When corrective action is not warranted, to return from assessment monitoring to detection monitoring, the CCR rules specify that all Appendix III and IV constituents must be at or below background levels for two consecutive sampling events [40 CFR 257.95(e)]. Procedures for comparing results to background are described in **Section 4.2**.

4.1 Comparing Data to the GWPS

As stated in **Section 4**, the GWPS is set at the MCL (or CCR rule-specified screening level for cobalt, lead, lithium, and molybdenum) or a value based on background data, whichever is greater. The UTL calculated from the background dataset is often used as the background value.

Tolerance intervals are similar to prediction intervals. However, whereas prediction intervals represent a range where a future result is expected to lie, tolerance intervals represent a range where a proportion of the population is expected to lie. Tolerance intervals have both an associated coverage (i.e., the proportion of the population covered by the tolerance interval) and an associated confidence. A coverage of 95% ($\gamma = 0.95$) and a confidence of 95% ($\alpha = 0.05$) are typically used.

The UTL is calculated similarly to the UPL:

$$\mathrm{UTL} = \bar{x} + \tau s \quad (7)$$

Similar to the UPL calculation, $\bar{x}$ is the mean concentration and s is the standard deviation of the background dataset. However, in this case the multiplier τ is different from that of the UPL calculation and is a function of the chosen coverage and confidence and the size of the background dataset. Values of τ are tabulated in Table 17-3 in Appendix D of the Unified Guidance (USEPA, 2009). As with prediction limits, if the τ value that precisely matches site conditions does not appear in these tables, it can be estimated using the provided values by linear interpolation.

Once a GWPS is established, new data must be evaluated to determine whether they are statistically significantly higher than the GWPS. The statistical analyses listed in 40 CFR 257.93(f) are appropriate for comparing new data to a background dataset but are not appropriate for comparing new data to a fixed standard. For these cases, the Unified Guidance recommends using confidence intervals around the mean or median (USEPA, 2009).

Evaluations should be done for each detected Appendix IV constituent at each well. Data from different wells should not be pooled. When selecting which data to include in the recent dataset, time series plots of concentration data at each well should be created and visually inspected. Only data that exhibit the same behavior as recent data should be included. For instance, if the last eight arsenic results cluster around 9 µg/L and the previous eight results cluster around 4 µg/L, then only the eight most recent results should be used in the statistical analysis. Similarly, if chromium concentrations steadily increased over the last ten samples and were stable previously, then the statistical analysis should only use the ten most recent results and (since they are steadily increasing) should involve constructing a confidence interval around a trend line.

At the same time, datasets should also be sufficiently large to maintain statistical power. As many data points that exhibit the same behavior as recent data as possible should be included, including data collected prior to assessment monitoring (e.g., during the initial eight monitoring events). Ideally, datasets should have at least eight data points; in no case should a dataset have fewer than four data points.

If at least 50% of the recent dataset is non-detect, then a parametric confidence interval should not be used, and the procedure in **Section 4.1.1** should be followed.

New data will be evaluated for statistically significant temporal trends using (1) OLS linear regression with a *t*-test ($\alpha = 0.01$) on the slope and/or (2) the non-parametric Theil-Sen slope estimator with Mann-Kendall trend test ($\alpha = 0.05$, or 0.01 for larger datasets). Non-detect data are replaced with half the RL for these analyses. The OLS linear regression or Theil-Sen slope estimator will be used to estimate the rate of change (increasing, no change, or decreasing) over time for each constituent at each well. The *t*-test or Mann-Kendall statistic will be used to determine whether a trend is statistically significant. OLS linear regression should only be used when at most 15% of the data are non-detect, when regression residuals are normally distributed, and when the variance from the regression line does not change over time. The Theil-Sen/Mann-Kendall analysis requires at least five observations for meaningful results; at least eight observations are recommended. If a significant temporal trend exists, then a confidence interval around the trend line should be constructed as outlined in **Section 4.1.3**.

If the trend analysis does not indicate a statistically significant trend, then the mean and variance should be calculated. If fewer than 15% of the data are non-detect, then the non-detect data can be replaced with half the RL and the mean and variance can be calculated normally. Tolerance intervals are sensitive to the choice of population distribution. Normality should be confirmed using the Shapiro-Wilk (or Shapiro-Francía) test and/or probability plots, as described in **Section 2.2**. If data appear not to be normally distributed, data should be transformed so that the transformed data are normally distributed.

Two methods – the Kaplan-Meier or Robust ROS method – can be used to determine the sample mean and variance when 15% to 50% of the data are non-detect. Kaplan-Meier should not be used if all non-detect data have the same RL or if the maximum detected value is less than the highest RL of the non-detect data.

When most of the data are detections, data are normally distributed, and there is no significant temporal trend, the LCL is calculated according to the following equation:

$$\text{LCL} = \bar{x} - t_{1-\alpha,n-1} * \frac{s}{\sqrt{n}} \quad (8)$$

where:

$\bar{x} =$	mean concentration of the recent dataset
$t_{1-\alpha,n-1} =$	one-tailed *t*-value at a confidence of 1 – α and at n – 1 degrees of freedom
$s =$	standard deviation of the recent dataset
$n =$	number of samples in the recent dataset

The *t* value must be chosen in such a way to balance the competing goals of a low false-positive rate and a high statistical power. The Unified Guidance recommends that the statistical test have at least 80% power ($1 - \beta = 0.8$) when the underlying mean concentration is twice the MCL (USEPA, 2009). Values of the minimum α (from which *t* values can be determined) are tabulated for this criterion for various values of *n* in Table 22-2 in Appendix D of the Unified Guidance (USEPA, 2009). The selected α should be the maximum of the value in Table 22-2 and 0.01.

If data are transformed normal, the LCL should first be calculated for the transformed data and then be transformed back into concentration terms. Correction factors are available but are not expected to be required. Alternatively, a non-parametric LCL can be used, as described in **Section 4.1.2**.

If data are non-normal and cannot be transformed such that the transformed data do follow a normal distribution, then a non-parametric LCL should be used, as described in **Section 4.1.2**.

If the LCL exceeds the GWPS, then a statistically significant exceedance can be concluded. If this occurs, the owner/operator is required to take several actions, including potentially moving the facility to corrective action, as described in **Section 4.3**.

4.1.1 Most Data Are Non-Detect

If background data are mostly non-detect, non-parametric tolerance intervals should be used. In these cases, the UTL is set at either the highest or second-highest concentration observed in the background dataset. If all background data are non-detect, then the UTL would default to the RL. The highest or second-highest observed concentration (or RL) effectively becomes the GWPS when this value is greater than the MCL (or CCR rule-specified screening level for cobalt, lead, lithium, and molybdenum). However, if most background data are non-detect, then detected concentrations are likely less than the MCL (or CCR rule-specified screening level), and the GWPS will be set at the MCL (or CCR rule-specified screening level).

If recent data are mostly non-detect, non-parametric confidence intervals can be constructed around the median by ranking the data from least to greatest and setting the LCL equal to one of the lower values of data. The confidence can be calculated based on the rank of the data point used and the sample size. Confidence values are tabulated in Table 21-11 in Appendix D of the Unified Guidance for sample sizes up to 20 (USEPA, 2009).

However, if most of the recent data are non-detect, then the data point selected for the LCL will also be non-detect. If the RL is less than the GWPS, then no statistically significant exceedance has occurred.

GWPSs should only be determined for detected Appendix IV constituents [40 CFR 257.95(d)(2)]. If all the data for a constituent are non-detect, no statistical evaluation need be performed.

4.1.2 Data Are neither Normal nor Transformed-Normal

If background data are non-normal and cannot be transformed such that the transformed data do follow a normal distribution, then non-parametric tolerance intervals should be used. In these cases, the UTL is set at either the highest or second-highest concentration observed in the background dataset.

If recent data are non-normal and cannot be transformed such that the transformed data do follow a normal distribution, non-parametric confidence intervals can be constructed around the median by ranking the data from least to greatest and setting the LCL equal to one of the lower values of data. The confidence can be calculated based on the rank of the data point used and the sample size. Confidence values are tabulated in Table 21-11 in Appendix D of the Unified Guidance for sample sizes up to 20 (USEPA, 2009).

4.1.3 A Significant Temporal Trend Exists

If recent data show a significant temporal trend, then an LCL below the trend line can be calculated according to the following equation:

$$\text{LCL} = \widehat{x_0} - \sqrt{2s_e^2 * F_{1-2\alpha,2,n-2} * \left(\frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1)s_t^2}\right)} \quad (9)$$

where:

$\widehat{x_0} =$ regression-line estimate of the mean concentration at time t_0
$s_e =$ standard error of the regression line
$F_{1-2\alpha,2,n-2} =$ upper (1 - 2α)th percentage point from an F-distribution with 2 and n – 2 degrees of freedom
$n =$ number of samples in the recent dataset
$t_0 =$ date of the most recent groundwater sample
$\bar{t} =$ mean of the sampling dates in the recent dataset
$s_t =$ standard deviation of the sampling dates in the recent dataset

Note that the LCL is a function of time; to assess current compliance, the date of the most recent sample should be used for t_0. If and only if the LCL is greater than the GWPS at this time, then a statistically significant exceedance can be concluded. This equation can also be used to assess when the LCL will exceed the GWPS (assuming the current trend continues).

The same α that would have been selected if there were no significant trend (as described in **Section 4.1**) should be used here to determine the proper *F* value.

If the Theil-Sen method is used to determine the trend line, a computationally intensive technique known as bootstrapping can be used to determine the LCL. This procedure is described in Section 21.3.2 of the Unified Guidance (USEPA, 2009).

4.1.4 A Significant Seasonal Pattern Exists

If a statistically significant seasonal pattern exists in the background data and if there is a physical explanation for the seasonality, the background data should be deseasonalized using the procedure described in **Section 2.6**. The background-based UTL should be calculated based on the deseasonalized data, and the GWPS should be set at the MCL (or CCR rule-specified screening level) or the background-based UTL, whichever is greater.

Similarly, if a statistically significant seasonal pattern exists in compliance well data and if there is a physical explanation for the seasonality, the compliance well data should be deseasonalized using the procedure described in **Section 2.6**. The LCL to be compared to the GWPS should be calculated based on the deseasonalized compliance well data.

4.2 Comparing Data to Background

Assessment monitoring data must be compared to the GWPS (the higher of the MCL, CCR rule-specified level, or background level) to assess whether corrective action is warranted at the CCR unit (i.e. the LCL exceeds the GWPS). Additionally, assessment monitoring data may be compared to background data to assess whether the CCR unit can move from assessment monitoring back to detection monitoring.

To return from assessment monitoring to detection monitoring, the CCR rules specify that all Appendix III and IV constituents must be at or below background levels for two consecutive sampling events [40 CFR 257.95(e)]. However, the analysis of all Appendix III and IV constituents is not required for every monitoring event. Therefore, all Appendix III and IV constituents should be collected during two consecutive sampling events on a periodic basis (e.g., every two to four years) and/or when statistical evaluation of assessment monitoring data suggests groundwater concentrations are at or below background levels.

A UTL can be used to represent "a reasonable maximum on likely background concentrations" for Appendix III and IV constituents (USEPA, 2009). As described previously, UTLs can be determined parametrically or non-parametrically. For the parametric intervals, the UTL is calculated according to Equation 7. Non-parametric UTLs can be determined by setting the UTL to the highest or second-highest measured background value. If all background data are non-detect, then non-detect results in compliance wells can be considered statistically similar to background. If a temporal trend in background data exists and is not attributable to a release, background data can be truncated so that no significant temporal trend is evident.

To determine whether Appendix III and IV constituents are at or below background levels, a confidence interval constructed on recent data at each compliance monitoring well should be compared to the background UTL for each constituent. When the upper confidence limit (UCL) is below the background UTL, then it can be concluded that concentrations are at or below background. If UCLs are less than background UTLs for every constituent at every monitoring well for two consecutive events, then the CCR unit may return to detection monitoring.

When most of the data are detections, data are normally distributed, and there is no significant temporal trend, the UCL is calculated according to the following equation:

$$\text{UCL} = \bar{x} + t_{1-\alpha,n-1} * \frac{s}{\sqrt{n}} \quad (10)$$

where:

$\bar{x} =$ mean concentration of the recent dataset
$t_{1-\alpha,n-1} =$ one-tailed *t*-value at a confidence of $1 - \alpha$ and at $n - 1$ degrees of freedom
$s =$ standard deviation of the recent dataset
$n =$ number of samples in the recent dataset

If recent data are mostly non-detect or are non-normal and cannot be transformed such that the transformed data follow a normal distribution, non-parametric confidence intervals can be constructed around the median by ranking the data from least to greatest and setting the UCL equal to one of the higher values of data. The confidence can be calculated based on the rank of the data point used and the sample size. Confidence values are tabulated in Table 21-11 in Appendix D of the Unified Guidance for sample sizes up to 20 (USEPA, 2009).

If recent data show a significant temporal trend, then a UCL above the trend line can be calculated according to the following equation:

$$\mathrm{UCL} = \widehat{x_0} + \sqrt{2s_e^2 * F_{1-2\alpha,2,n-2} * \left(\frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1)s_t^2}\right)} \quad (11)$$

where:

$\widehat{x_0} =$ regression-line estimate of the mean concentration at time t_0
$s_e =$ standard error of the regression line
$F_{1-2\alpha,2,n-2} =$ upper (1 - 2α)th percentage point from an F-distribution with 2 and n – 2 degrees of freedom
$n =$ number of samples in the recent dataset
$t_0 =$ date of the most recent groundwater sample
$\bar{t} =$ mean of the sampling dates in the recent dataset
$s_t =$ standard deviation of the sampling dates in the recent dataset

In all cases, the choice of τ and α (for parametric UTLs and UCLs, respectively), the choice of the highest or second-highest data point (for non-parametric UTLs and UCLs), etc. should be made based on sound statistical judgment and site characteristics (e.g., size of datasets, number of monitoring wells, etc.).

4.3 Required Responses to the Results of the Statistical Evaluation

If the statistical evaluation demonstrates that the concentrations of all Appendix III and Appendix IV constituents are at or below background levels for two consecutive sampling events, then the CCR unit may return to detection monitoring [40 CFR 257.95(e)]. A notification that the CCR unit is returning to detection monitoring must be placed in the facility's operating record.

If the statistical evaluation demonstrates that some Appendix III or Appendix IV constituents are at concentrations above background levels but there are no statistically significant exceedances of GWPSs, then the CCR unit must remain in assessment monitoring [40 CFR 257.95(f)].

If the statistical evaluation demonstrates that an Appendix IV constituent is present at a statistically significant level (SSL) above its GWPS (i.e., if the LCL exceeds the GWPS), then the owner/operator must:

- Include a notification in the facility's operating record that identifies the constituents exceeding GWPSs [40 CFR 257.95(g)];
- Characterize the nature and extent of the release, including installing monitoring wells needed to delineate the plume, installing a monitoring well at the downgradient property boundary, quantifying the nature and the amount of the release, and sampling all wells for Appendix III and detected Appendix IV constituents [40 CFR 257.95(g)(1)];
- If the plume has migrated off-site, notify property owners overlying the plume [40 CFR 257.95(g)(2)]; and
- Either begin an assessment of corrective measures or demonstrate that the SSL is not due to a release from the CCR unit within 90 days of completing the statistical evaluation [40 CFR 257.95(g)(3)]. This demonstration must be made in writing and certified by a qualified professional engineer. The CCR rules require the previous three actions to be taken even if it can be demonstrated that the SSL is not due to a release from the CCR unit.

Reporting requirements for assessment monitoring are summarized in **Section 6.2**.

4.4 Updating Background

Care should be taken when updating background during assessment monitoring since, by definition, an SSI over background has already occurred. Data that appear to be affected by a release from the CCR unit should not be included in updated background datasets. However, it may be possible to update some background datasets (e.g., constituents not associated with a release, wells upgradient of the CCR unit, etc.). Formal updating of Appendix III constituents may be considered when there are at least four new points.

Data should be reviewed every four to eight measurements to assess the possibility of updating background datasets. Professional judgment should first be applied; any data that appear to be affected by a release should be excluded from the background update, even if there is no statistically significant difference between the new data and the existing background data.

For data that appear not to be affected by a release, a Student's *t*-test or Mann-Whitney test should be conducted to compare the set of new data points against the existing background dataset. If the *t*-test or Mann-Whitney test corroborates that there are no significant differences, the new data should be combined with the existing background data to create an updated and expanded background dataset. Increasing the size of the background dataset will increase the power of subsequent statistical tests.

If the *t*-test or Mann-Whitney test indicates a statistically significant difference between the two datasets, then it should be considered that the difference results from a release and the existing background dataset should continue to be used. If and only if there is evidence to suggest that the difference is not related to a release from the CCR unit, then the newer set of measurements should be used for background so that resulting statistical limits are representative of present-day groundwater quality conditions.

Periodically, spatial variability among background wells may be re-assessed to determine whether using an interwell or intrawell comparison is appropriate on a constituent-by-constituent basis, as outlined in **Section 3.1**.

SECTION 5

CORRECTIVE ACTION MONITORING

A CCR unit must begin an assessment of corrective measures if an SSL is identified and is not attributed to some cause other than a release from the CCR unit. The assessment of corrective measures must begin within 90 days of identifying the SSL [40 CFR 257.95(g)(3)]. Based on the results of the corrective measures assessment, a remedy must be selected as soon as feasible [40 CFR 257.97(a)]. A schedule for implementing and completing the remedial activities must be included in the remedy selection [40 CFR 257.97(d)]. The owner/operator must begin remedial activities within 90 days of selecting a remedy, and a corrective action groundwater monitoring program must be implemented based on the schedule established as part of the remedy selection [40 CFR 257.98(a)].

The corrective action monitoring program must:

- Meet the requirements of an assessment monitoring program [40 CFR 257.98(a)(1)(i)];
- Document the effectiveness of the remedy [40 CFR 257.98(a)(1)(ii)]; and
- Demonstrate compliance with the GWPS [40 CFR 257.98(a)(1)(iii)].

The statistical methods used in corrective action monitoring are similar to those used in assessment monitoring. For each detected Appendix IV constituent, a GWPS is set at the MCL (or CCR rule-specified screening level for cobalt, lead, lithium, and molybdenum) or a value based on background data, whichever is greater. A confidence interval is constructed based on recent data at each compliance well, and the confidence interval is compared to the site-wide GWPS. However, in assessment monitoring, the presumption is that a release has not occurred, and a release is concluded when average concentrations are higher than the GWPS (i.e., when the *lower* confidence limit [LCL] is *greater* than the GWPS). If a CCR unit is in corrective action monitoring, then evidence of a release has already been identified. Therefore, in corrective action monitoring, the presumption is that a release has occurred, and the conclusion that the remedy has successfully decreased concentrations below the GWPS is made when average concentrations are less than the GWPS (i.e., when the *upper* confidence limit [UCL] is *less* than the GWPS). (Note that this presumption only applies to well-constituent pairs where an SSL has previously been identified. Well-constituent pairs in assessment monitoring where an SSL has not been identified effectively remain in assessment monitoring until the entire unit returns to detection monitoring.)

A remedy is considered complete when, among other things, confidence intervals constructed for Appendix IV constituents for wells identified with SSLs have not exceeded the GWPS for three consecutive years [40 CFR 257.98(c)(2)]. In this instance, a return to assessment monitoring would be warranted.

Upon completion of the remedy, the owner/operator must prepare a notification stating that the remedy is complete. The notification must be certified by a qualified professional engineer or approved by the State Director or USEPA and placed in the operating record [40 CFR 257.98(e)]. Otherwise, the owner/operator should follow the reporting requirements for assessment monitoring, as summarized in **Section 6.2**.

5.1 Comparing Data to the GWPS

As stated in **Section 5**, the GWPS is set at the MCL (or CCR rule-specified screening level for cobalt, lead, lithium, and molybdenum) or a value based on background data, whichever is greater. The UTL calculated from the background dataset is often used as the background value. The UTL is calculated as described in **Section 4.1**. Methods for updating background are described in **Section 4.4**.

For well-constituent pairs in corrective action monitoring, new data must be evaluated to determine whether they are statistically significantly lower than the GWPS. The statistical analyses listed in 40 CFR 257.93(f) are appropriate for comparing new data to a background dataset but are not appropriate for comparing new data to a fixed standard. For these cases, the Unified Guidance recommends using confidence intervals around the mean or median (USEPA, 2009).

When selecting which data to include in the recent dataset, time series plots of concentration data at each well should be created and visually inspected. Only data that exhibit the same behavior as recent data should be included. For instance, if the last eight arsenic results cluster around 9 µg/L and the previous eight results cluster around 4 µg/L, then only the eight most recent results should be used in the statistical analysis. Similarly, if chromium concentrations steadily increased over the last ten samples and were stable previously, then the statistical analysis should only use the ten most recent results and (since they are steadily increasing) should involve constructing a confidence interval around a trend line.

At the same time, datasets should also be sufficiently large to maintain statistical power. As many data points that exhibit the same behavior as recent data as possible should be included, including data collected prior to assessment monitoring (e.g., during the initial eight monitoring events). Ideally, datasets should have at least eight data points; in no case should a dataset have fewer than four data points.

If at least 50% of the recent dataset is non-detect, then a parametric confidence interval should not be used, and the procedure in **Section 5.1.1** should be followed.

New data will be evaluated for statistically significant temporal trends using (1) OLS linear regression with a *t*-test ($\alpha = 0.01$) on the slope and/or (2) the non-parametric Theil-Sen slope estimator with Mann-Kendall trend test ($\alpha = 0.05$, or 0.01 for larger datasets). Non-detect data are replaced with half the RL for these analyses. The OLS linear regression or Theil-Sen slope estimator will be used to estimate the rate of change (increasing, no change, or decreasing) over time for each constituent at each well. The *t*-test or Mann-Kendall statistic will be used to determine whether a trend is statistically significant. OLS linear regression should only be used when at most 15% of the data are non-detect, when regression residuals are normally distributed, and when the variance from the regression line does not change over time. The Theil-Sen/Mann-Kendall analysis requires at least five observations for meaningful results; at least eight observations are recommended. If a significant temporal trend exists, then a confidence interval around the trend line should be constructed as outlined in **Section 5.1.3**.

If the trend analysis does not indicate a statistically significant trend, then the mean and variance should be calculated. If fewer than 15% of the data are non-detect, then the non-detect data can be replaced with half the RL and the mean and variance can be calculated normally. Tolerance intervals are sensitive to the choice of population distribution. Normality should be confirmed using the Shapiro-Wilk (or Shapiro-Francía) test and/or probability plots, as described in **Section 2.2**. If data appear not to be normally distributed, data should be transformed so that the transformed data are normally distributed.

Two methods – the Kaplan-Meier or Robust ROS method – can be used to determine the sample mean and variance when 15% to 50% of the data are non-detect. Kaplan-Meier should not be used if all non-detect data have the same RL or if the maximum detected value is less than the highest RL of the non-detect data.

When most of the data are detections, data are normally distributed, and there is no significant temporal trend, the UCL is calculated according to the following equation:

$$\mathrm{UCL} = \bar{x} + t_{1-\alpha,n-1} * \frac{s}{\sqrt{n}} \quad (10)$$

where:

$\bar{x} =$	mean concentration of the recent dataset
$t_{1-\alpha,n-1} =$	one-tailed *t*-value at a confidence of 1 – α and at n – 1 degrees of freedom
$s =$	standard deviation of the recent dataset
$n =$	number of samples in the recent dataset

The *t* value must be chosen in such a way to balance the competing goals of a low false-positive rate and a high statistical power. The Unified Guidance recommends that the statistical test have at least 80% power ($1 - \beta = 0.8$) when the underlying mean concentration is twice the MCL (USEPA, 2009). Values of the minimum α (from which *t* values can be determined) are tabulated for this criterion for various values of *n* in Table 22-2 in Appendix D of the Unified Guidance (USEPA, 2009). The selected α should be the maximum of the value in Table 22-2 and 0.01.

If data are transformed normal, the UCL should first be calculated for the transformed data and then be transformed back into concentration terms. Correction factors are available but are not expected to be required. Alternatively, a non-parametric LCL can be used, as described in **Section 5.1.2**.

If data are non-normal and cannot be transformed such that the transformed data do follow a normal distribution, then a non-parametric LCL should be used, as described in **Section 5.1.2**.

5.1.1 Most Data Are Non-Detect

If recent data are mostly non-detect, non-parametric confidence intervals can be constructed around the median by ranking the data from least to greatest and setting the UCL equal to one of the higher values of data. The confidence can be calculated based on the rank of the data point used and the sample size. Confidence values are tabulated in Table 21-11 in Appendix D of the Unified Guidance for sample sizes up to 20 (USEPA, 2009).

5.1.2 Data Are neither Normal nor Transformed-Normal

If recent data are non-normal and cannot be transformed such that the transformed data do follow a normal distribution, non-parametric confidence intervals can be constructed around the median by ranking the data from least to greatest and setting the UCL equal to one of the higher values of data. The confidence can be calculated based on the rank of the data point used and the sample size. Confidence values are tabulated in Table 21-11 in Appendix D of the Unified Guidance for sample sizes up to 20 (USEPA, 2009).

5.1.3 A Significant Temporal Trend Exists

If recent data show a significant temporal trend, then a UCL above the trend line can be calculated according to the following equation:

$$\mathrm{UCL} = \widehat{x_0} + \sqrt{2s_e^2 * F_{1-2\alpha,2,n-2} * \left(\frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1)s_t^2}\right)} \quad (11)$$

where:

$\widehat{x_0} =$ regression-line estimate of the mean concentration at time t_0
$s_e =$ standard error of the regression line
$F_{1-2\alpha,2,n-2} =$ upper (1 - 2α)th percentage point from an F-distribution with 2 and n – 2 degrees of freedom
$n =$ number of samples in the recent dataset
$t_0 =$ date of the most recent groundwater sample
$\bar{t} =$ mean of the sampling dates in the recent dataset
$s_t =$ standard deviation of the sampling dates in the recent dataset

Note that the UCL is a function of time; to assess current compliance, the date of the most recent sample should be used for t_0. If and only if the UCL is less than the GWPS at this time, then it can be concluded that the remedy has successfully decreased concentrations below the GWPS. This equation can also be used to assess when the UCL will decrease below the GWPS (assuming the current trend continues).

The same α that would have been selected if there were no significant trend (as described in **Section 5.1**) should be used here to determine the proper *F* value.

If the Theil-Sen method is used to determine the trend line, a computationally intensive technique known as bootstrapping can be used to determine the UCL. This procedure is described in Section 21.3.2 of the Unified Guidance (USEPA, 2009).

5.1.4 A Significant Seasonal Pattern Exists

If a statistically significant seasonal pattern exists in compliance well data and if there is a physical explanation for the seasonality, the compliance well data should be deseasonalized using the procedure described in **Section 2.6**. The UCL to be compared to the GWPS should be calculated based on the deseasonalized compliance well data.

SECTION 6

REPORTING REQUIREMENTS

The CCR rule specifies reporting requirements throughout the monitoring process. Throughout the process, the required documentation is required to be posted both to the site's operating record and to a public internet set for review. As required by 40 CFR 257.93(f)(6), the chosen statistical methods described within this SAP are certified by a qualified professional engineer as appropriate for groundwater evaluation (**Section 7**).

By January 31 of each year, all existing facilities must submit an Annual Groundwater Monitoring and Corrective Action Report (Annual Report) [40 CFR 257.90(e)]. The Annual Report should be prepared and posted to both the site operating record and the public internet site. A notification should be sent to the State Director (and/or appropriate tribal authority) once the Annual Report is available.

The Annual Report should document site status, summarize key actions taken, describe problems encountered and their resolutions, and project key actions to be taken for the following year. The Annual Report should also include:

- A figure showing the CCR unit and the monitoring well network [40 CFR 257.90(e)(1)];
- An identification of monitoring wells installed or abandoned during the preceding year and the rationale for doing so [40 CFR 257.90(e)(2)];
- A summary of groundwater samples collected, which wells were sampled, what dates the samples were collected, and whether the samples were collected for detection monitoring, assessment monitoring, or corrective action monitoring [40 CFR 257.90(e)(3)]; and
- A discussion of any transition between monitoring programs (i.e., detection monitoring vs. assessment monitoring vs. corrective action monitoring) [40 CFR 257.90(e)(4)].

If appropriate, the Annual Report should detail a demonstration for an alternative groundwater sampling frequency. If no SSIs are identified during each sampling event, an updated Annual Report should be submitted yearly. If SSIs are identified, additional reporting requirements are summarized below.

6.1 Detection Monitoring

If SSIs are identified, the facility should demonstrate within 90 days of the detection, where possible, that SSIs over background are not due to a release from the facility, along with a certification by a qualified professional engineer that the information is accurate. If the SSIs over background are attributed to a release from the facility, the facility should prepare and place on the operating record within 90 days a notification stating that an assessment monitoring program has been established [40 CFR 257.94(e)(3)].

6.2 Assessment Monitoring

If an assessment monitoring program is in place, the Annual Report must also include [40 CFR 257.95(d)(3)]:

- Analytical results for Appendix III and detected Appendix IV constituents,
- Background concentrations for all Appendix III and Appendix IV constituents, and
- GWPSs established for detected Appendix IV constituents.

The semiannual analytical results for Appendix III and detected Appendix IV constituents must also be posted to the facility's operating record within 90 days of receipt [40 CFR 257.95(d)(1)].

If a constituent is detected at an SSL above its GWPS, a notification must be reported to the site's operating record. Additionally, the facility must notify any person who owns or resides on land that directly overlies any part of an off-site contaminant plume and record the notifications in the facility's operating record. Within 90 days, the facility must either initiate an assessment of corrective measures or demonstrate that the SSL is not due to a release from the CCR unit. The demonstration must be supported by a report certified by a qualified professional engineer [40 CFR 257.95(g)].

If statistics are performed by mid-October 2017 for the first compliance event, one or more resamples would normally be collected and re-analyzed within 90 days. By the end of January 2018, the initial exceedance will be either confirmed or determined to be a false positive. If it is confirmed, then assessment monitoring must be initiated within 90 days, which would fall at the same time as the next regular semi-annual event. In that case, the semi-annual event (March/April timeframe) would be for both assessment and detection monitoring (if assessment monitoring was initiated).

If the facility determines it may return to detection monitoring, the facility should issue a notification to the operating record and public site within 30 days.

6.3 Corrective Action Monitoring

If a corrective action monitoring program is in place, it must meet the requirements of an assessment monitoring program [40 CFR 257.98(a)(1)(i)]. Thus, the reporting requirements for corrective action monitoring will be similar to assessment monitoring, as described in **Section 6.2**. Upon completion of the remedy, the facility must prepare a notification that the remedy has been completed. The notification must be certified by a qualified professional engineer or approved by the State Director or USEPA and placed in the operating record [40 CFR 257.98(e)]

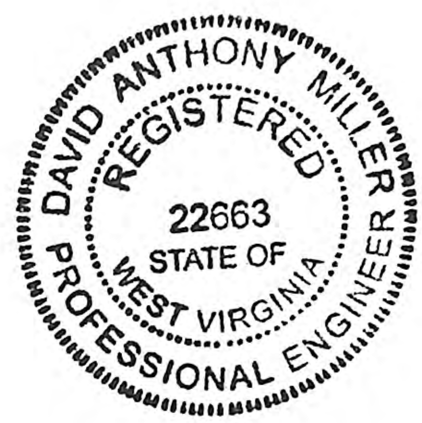
SECTION 7

CERTIFICATION BY QUALIFIED PROFESSIONAL ENGINEER

By means of this certification, I certify that I am a qualified professional engineer as defined in 40 CFR 257.53, that I have reviewed this SAP, and that the statistical methods described therein are appropriate and meet the requirements of 40 CFR 257.93.

DAVID ANTHONY MILLER

Printed Name of Qualified Professional Engineer



David Anthony Miller

Signature

22663	WEST VIRGINIA	01.22.2021
Registration No.	Registration State	Date

SECTION 8

REFERENCES

American Electric Power. 2016. Draft Groundwater Sampling and Analysis Plan. April 1, 2016.

Criteria for Classification of Solid Waste Disposal Facilities and Practices. 40 CFR §257. (2016).

Electric Power Research Institute. 2015. Groundwater Monitoring Guidance for the Coal Combustion Residuals Rule. Palo Alto, CA. 3002006287.

Environmental Protection Agency. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. EPA 530/R-09-007.

Table 1

Monitored Constituents Under the CCR Rules

Appendix III to 40 CFR 257 – Constituents for Detection Monitoring

Boron
Calcium
Chloride
Fluoride
pH
Sulfate
Total Dissolved Solids (TDS)

Appendix IV to 40 CFR 257 – Constituents for Assessment Monitoring

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Fluoride
Lead
Lithium
Mercury
Molybdenum
Selenium
Thallium
Radium 226 and 228 combined

APPENDIX A

RECORD OF REVISIONS

Revision 1 (January 2021)

- Added statistical procedures used to implement corrective action monitoring (Section 5) and reporting requirements for corrective action monitoring (Section 6.3).

- Added references to CCR rule-specified screening levels for constituents that do not have an MCL (i.e., cobalt, lead, lithium, and molybdenum) in Sections 2.5, 4, 4.1, and 5.1.

- Removed text from Section 4 regarding a potential assessment monitoring approach for constituents that do not have an MCL because the CCR rule was revised to specify screening levels for these constituents.

- Added statistical procedures used to evaluate whether a seasonal pattern exists and to deseasonalize data (Sections 2.6, 3.2.5, 4.1.4, and 5.1.4).

- Specified that the Mann-Kendall trend test can use an α of 0.01 for sufficiently large datasets (Sections 3.1, 4.1, and 5.1).

- Removed references to control limits in Section 3.2 because prediction limits are generally being used to conduct detection monitoring.

- Removed references to using trend tests to evaluate SSIs at the end of Section 3.2 because prediction limits are generally being used to conduct detection monitoring.

- Clarified that non-parametric limits should be used when data are non-normal and cannot be transformed such that the transformed data do follow a normal distribution (Sections 3.2.3, 4.1.2, and 5.1.2).

- Referred to the Wilcoxon rank-sum/Mann-Whitney test as the Mann-Whitney test to match the statistical output from Sanitas (Sections 3.4 and 4.4).

- Clarified that a background dataset that contains at least five data points is sufficiently large to use an α as low as 0.01 to conduct the Mann-Whitney test as part of a background update, in line with recommendations in the Unified Guidance (Section 3.4).

- Clarified the procedure to be used if the Mann-Whitney test indicates a statistically significant difference between existing background data and newer data (Sections 3.4 and 4.4).

- Clarified that spatial variability among background wells may be assessed periodically as part of a background update because spatial variability is evaluated when background values are initially established (Sections 3.4 and 4.4).

- Clarified that UPLs are used to establish background values for Appendix III constituents and UTLs are used to establish background values for Appendix IV constituents (Section 4.2).

- Added statistical procedures to determine when Appendix III and Appendix IV concentrations are at or below background to evaluate whether units in assessment monitoring may return to detection monitoring (Section 4.2).

- Generally replaced “parameter” with “constituent”.

- Added references to the Unified Guidance and the CCR rule throughout the document.

- Made minor grammatical and stylistic changes throughout the document.