American Electric Power
1 Riverside Plaza
Columbus, OH 43215
aep.com

March 18, 2021

Submitted Electronically via Email

Ms. Kirsten Hillyer, Environmental Engineer
U.S. Environmental Protection Agency
Office of Resource Conservation & Recovery (ORCR)
Materials Recovery & Waste Management Division (MRWMD)
Cube: S-6834
Washington, DC 20460

RE: Appalachian Power Company
Mountaineer Power Plant Alternative Closure Demonstration

Dear Ms. Hillyer,

Appalachian Power Company (APCO) Mountaineer Power Plant (Mountaineer Plant) hereby submits the attached information to the U.S. Environmental Protection Agency (EPA) in response to your email to me dated Friday, March 12, 2021, requesting additional information for Mountaineer Plant's Site Specific Alternative Deadline to Initiate Closure under 40 CFR 257.103(f)(1) for the Bottom Ash Pond (BAP) at the Mountaineer Plant near New Haven, West Virginia. Your email requested additional information to address the following:

- The groundwater quality data summary tables do not include data collected during 2020
- The groundwater quality data for MW-28 (a landfill well) were not included
- Drilling logs for MW-38 and MW-39 are not included; well construction details of MW-38 and MW-39 are included

The 2020 annual groundwater monitoring reports, which include historical data tables, including groundwater data collected in 2020, for Mountaineer Plant's BAP and Landfill are included in attachments A and B, respectively.

Mountaineer Landfill's certified groundwater monitoring network does not include MW-28. Therefore, MW-28 groundwater data is not available and not included in the submittal. The Mountaineer certified groundwater monitoring network includes the following wells:

- Upgradient: MW-30 and MW-1612
- Downgradient: MW-26, MW-27, MW-38, MW-39, and MW-1611

The data for all the above mentioned wells, that are included in the network, is included in attachment B, Mountaineer Landfill 2020 Annual Groundwater Monitoring Report.

Mountaineer Landfill MW-38 and MW-39 boring logs and well construction forms are included in attachment C. Note that the boring number is not the monitoring well number. The boring number for MW-38 and MW-39 is B-0502. This single boring was used to install and construct both MW-38 and MW-39 due to their close proximity to each other. Note that Boring-0502 was also included in the original submittal for the BAP Alternative Closure Demonstration Request within the Landfill Groundwater Monitoring Network Evaluation report attachment.

In lieu of hard copies of these documents, electronic files are being submitted to you and Richard Huggins via email. If you have any questions regarding this submittal, please contact me at 614-716-2281 or damiller@aep.com.

Sincerely,

David A. Miller

David A. Miller, P.E.
Director, Land Environment & Remediation Services
Environmental Services Division

Attachments

cc: Richard Huggins – USEPA

EPA ADDITIONAL INFORMATION REQUEST

ATTACHMENT A

MOUNTAINEER PLANT BOTTOM ASH POND

2020 ANNUAL GROUNDWATER MONITORING REPORT

Annual Groundwater Monitoring Report

Appalachian Power Company

Mountaineer Plant

Bottom Ash Pond CCR Management Unit

Letart, WV

January 2021

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

APPALACHIAN POWER℠

An AEP Company

BOUNDLESS ENERGY℠

Table of Contents

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.
- Two semi-annual progress reports on selecting a remedy pursuant to § 257.97 were completed on March 20, 2020 and September 20, 2020. A remedy has not yet been selected.
- Groundwater samples were collected in March, May, and October 2020 and analyzed for Appendix III and Appendix IV constituents, as specified in 40 CFR 257.95 *et seq.* and AEP's *Groundwater Sampling and Analysis Plan (2016).*
- Analytical results for groundwater monitoring are included in **Appendix 1** along with groundwater flow rate and direction.
- Groundwater data underwent various validation tests, including tests for completeness, valid values, transcription errors, and consistent units.
- The May 2020 sampling event 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-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, MW-1606S, and MW-1607D.

- SSI for chloride 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 Fluoride above the upper prediction limit was observed at MW-1605S, MW-1606S, and MW-1607D.
- SSI for Sulfate above the upper prediction limit was observed at MW-1604S, MW-1605D, MW-1606D, and MW-1607D.
- Statistically significant decrease (SSD) for pH below the lower prediction limit was observed at MW-1607S.
- SSI for TDS 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.

- The statistical analysis for the May 2020 assessment monitoring event was completed in October 2020 and is included in **Appendix 2**.
- Notification of a statistically significant level (SSL) of constituent above groundwater protection standard (GWPS) was completed for Lithium.
- The October 2020 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 significant increase over background concentrations (Attached as **Appendix 2**, where applicable).
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (Attached as Appendix 3, where applicable). This is not applicable.
- 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**).

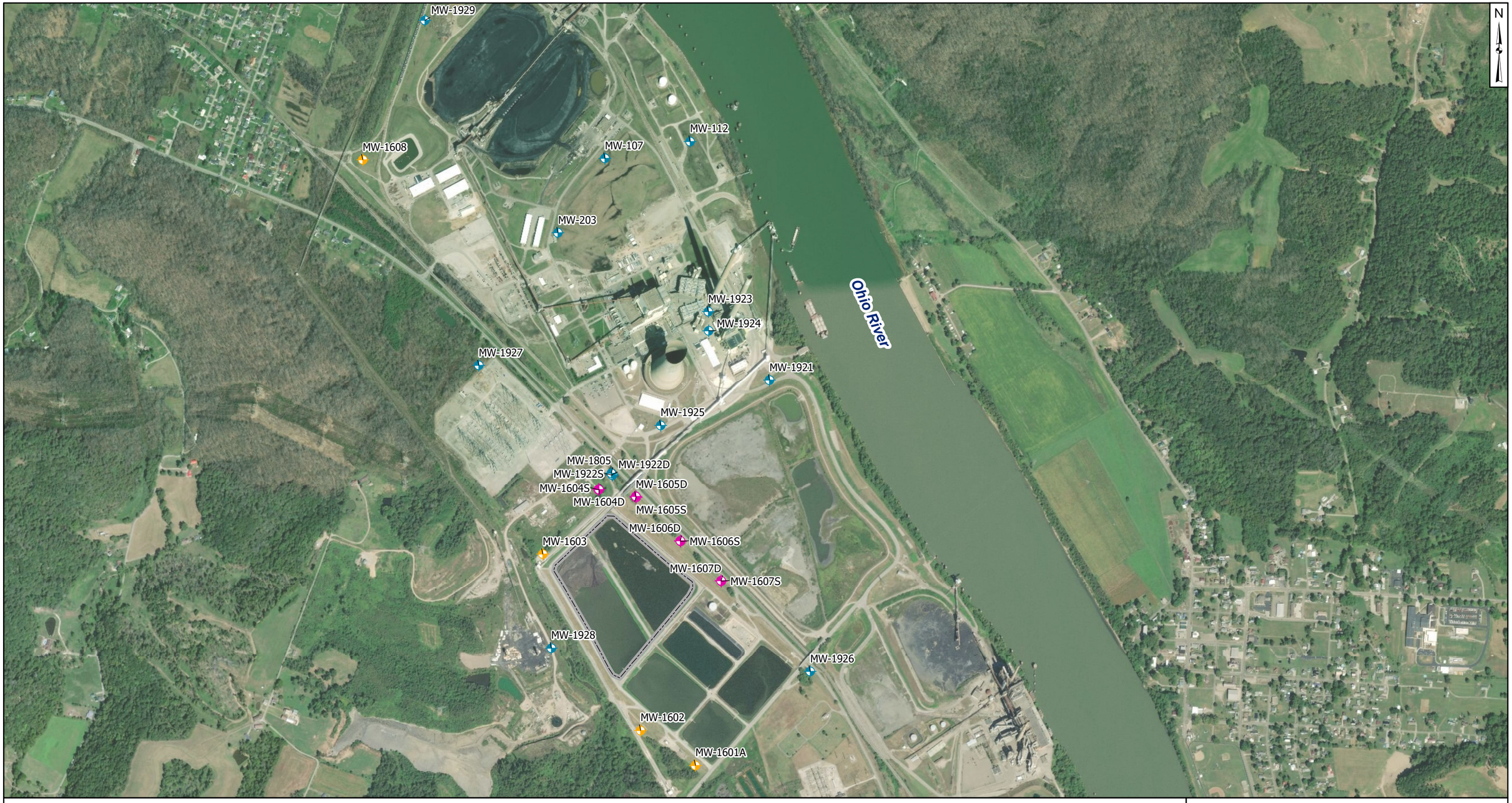
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened (Attached as Appendix 5, where applicable). This is not applicable.

- 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

The figure 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.



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 2020.

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, and assessment monitoring. Static water elevation data from each monitoring event also are shown in **Appendix 1**, along with the groundwater velocity calculations, groundwater flow direction and potentiometric maps developed after each sampling event. 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.

V. Groundwater Quality Data Statistical Analysis

Statistical analysis of the May 2020 257.95(d)(1) (assessment monitoring of all Appendix III and detected Appendix IV parameters) resulted in a SSL above the GWPS for lithium on October 2, 2020. A notice of this SSL was placed in the facility electronic operating record and on the publicly available internet site. The full statistical analysis report for this event is included in **Appendix 2**.

The October 2020 257.95(d)(1) sampling and analysis was completed. The statistical analysis for this data is ongoing and will be completed in early 2021

The notice of statistically significant levels above the groundwater protection standard that were completed in 2020 can be found in **Appendix 4** and on the publicly available internet site at https://www.aep.com/environment/ccr.

VI. Alternative Source Demonstrations

No alternative source demonstrations were completed related to the assessment monitoring sampling events and statistical analysis.

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. At this time, the selection of remedy is on-going. Two semi-annual reports describing the progress in selecting and designing the remedy were completed in March and September 2020. Semi-annual assessment monitoring sampling and analysis will continue during the assessment of corrective measures and selection of 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.

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 2020 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 2021 include:

- Assessment monitoring on a twice per year schedule;
- Continue evaluation of the selection of remedy;
- Prepare a selection of remedy semi-annual progress report;
- Responding to any new data received in light of what the CCR rule requires; and
- Preparation of the next annual groundwater report.

APPENDIX 1

Tables 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: MW-107
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-107
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	< 0.1 U	1.08	68.3	< 0.1 U	0.05 J	0.4 J	1.03	1.854	0.21	0.4 J	0.02 J	< 0.002 U	< 2 U	0.7 J	< 0.5 U
6/18/2019	Assessment	0.03 J	0.44	69.4	< 0.02 U	0.05	0.08 J	1.45	0.2284	0.22	0.04 J	< 0.009 U	< 0.002 U	< 0.4 U	0.6	< 0.1 U
9/10/2019	Assessment	0.02 J	0.44	67.8	< 0.02 U	0.04 J	0.07 J	1.08	3.5	0.19	< 0.05 U	0.00358	< 0.002 U	< 0.4 U	0.8	< 0.1 U
3/10/2020	Assessment	< 0.02 U	0.42	48.2	< 0.02 U	0.03 J	0.1 J	0.741	0.161	0.25	< 0.05 U	0.00410	< 0.002 U	< 0.4 U	0.7	< 0.1 U
5/13/2020	Assessment	0.03 J	0.59	48.1	--	0.07	0.2 J	1.90	0.524	0.26	< 0.05 U	0.00336	--	0.7 J	0.5	< 0.1 U
10/6/2020	Assessment	< 0.02 U	0.34	35.4	--	0.02 J	0.548	0.219	1.111	0.25	< 0.05 U	0.00308	< 0.002 U	< 0.4 U	1.0	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-112
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-112
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
6/19/2019	Assessment	< 0.02 U	0.40	76.9	< 0.02 U	< 0.01 U	0.2 J	0.02 J	0.0507	0.24	0.02 J	< 0.009 U	< 0.002 U	11.2	1.5	< 0.1 U
5/13/2020	Assessment	< 0.02 U	0.33	59.7	--	< 0.01 U	0.236	0.02 J	0.08899	0.29	< 0.05 U	0.00151	--	5.62	0.9	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-203
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
6/18/2019	Assessment	0.1 J	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-203
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
6/18/2019	Assessment	< 0.02 U	0.30	34.7	< 0.02 U	< 0.01 U	0.2 J	0.054	0.1139	0.22	0.113	< 0.009 U	< 0.002 U	2 J	1.4	< 0.1 U
9/11/2019	Assessment	0.02 J	0.33	31.6	< 0.02 U	< 0.01 U	0.2 J	0.139	0.381	0.22	0.2 J	0.00230	< 0.002 U	1 J	1.1	< 0.1 U
3/11/2020	Assessment	< 0.02 U	0.25	33.4	< 0.02 U	< 0.01 U	0.217	0.05 J	0.824	0.25	0.1 J	0.00237	< 0.002 U	1 J	1.4	< 0.1 U
5/13/2020	Assessment	< 0.02 U	0.29	31.0	--	< 0.01 U	0.204	0.03 J	0.4071	0.28	< 0.05 U	0.00227	--	1 J	1.1	< 0.1 U
10/6/2020	Assessment	0.03 J	0.28	24.6	--	< 0.01 U	0.360	0.107	1.568	0.32	0.226	0.00205	< 0.002 U	0.9 J	0.8	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1601A
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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 J	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
3/12/2020	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1601A
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/28/2016	Background	0.05	0.62	46.6	< 0.005 U	0.01 J	0.3	0.116	0.43758	0.17	0.132	0.002	< 0.002 U	2.61	1.3	0.053
11/1/2016	Background	0.05 J	0.61	45.2	< 0.005 U	0.02 J	1.3	0.086	2.011	0.19	0.108	0.001	< 0.002 U	2.36	1.1	0.058
12/19/2016	Background	0.05 J	0.65	47.0	< 0.005 U	0.02 J	0.806	0.282	1.544	0.18	0.383	< 0.0002 U	< 0.002 U	0.93	1.1	0.04 J
2/20/2017	Background	0.03 J	0.55	41.4	< 0.005 U	0.02 J	0.198	0.132	0.313	0.20	0.139	0.005	< 0.002 U	1.42	1.4	0.070
3/27/2017	Background	0.03 J	0.49	40.2	< 0.005 U	0.01 J	0.225	0.097	0.495	0.19	0.069	0.006	< 0.002 U	2.85	1.0	0.03 J
4/18/2017	Background	0.03 J	0.59	47.5	< 0.004 U	0.01 J	0.170	0.093	0.814	0.19	0.052	0.007	0.003 J	1.53	1.5	0.04 J
5/15/2017	Background	0.04 J	0.79	56.9	< 0.004 U	0.02 J	0.166	0.154	1.279	0.18	0.141	< 0.0002 U	< 0.002 U	2.04	1.3	0.04 J
6/12/2017	Background	0.04 J	0.61	49.0	< 0.004 U	0.02 J	0.152	0.098	0.599	0.18	0.063	0.004	< 0.002 U	1.13	1.5	0.04 J
5/10/2018	Assessment	0.03 J	0.55	63.9	< 0.004 U	0.02 J	0.153	0.083	0.767	0.16	0.034	0.004	< 0.002 U	0.99	1.5	0.03 J
9/20/2018	Assessment	0.03 J	0.58	55.3	< 0.004 U	0.02 J	0.131	0.059	0.696	0.19	0.005 J	0.004	< 0.002 U	0.76	1.1	0.04 J
4/9/2019	Assessment	< 0.1 U	0.61	52.0	< 0.1 U	< 0.05 U	0.2 J	0.2 J	1.168	0.1 J	< 0.1 U	0.02 J	< 0.002 U	< 2 U	1.1	< 0.5 U
6/20/2019	Assessment	0.03 J	0.63	63.1	< 0.02 U	0.02 J	0.314	0.03 J	0.45	0.16	0.07 J	< 0.009 U	< 0.002 U	0.9 J	1.3	< 0.1 U
9/11/2019	Assessment	0.03 J	0.62	65.3	< 0.02 U	0.02 J	0.370	0.03 J	1.168	0.14	< 0.05 U	0.00184	< 0.002 U	0.9 J	1.1	< 0.1 U
3/12/2020	Assessment	< 0.02 U	0.58	64.9	< 0.02 U	0.01 J	0.205	0.02 J	1.685	0.14	< 0.05 U	0.00183	< 0.002 U	1 J	1.4	< 0.1 U
5/15/2020	Assessment	0.03 J	0.57	67.8	--	0.02 J	0.1 J	< 0.02 U	0.553	0.16	< 0.05 U	0.00190	--	0.7 J	0.9	< 0.1 U
10/8/2020	Assessment	0.03 J	0.59	61.0	--	0.02 J	0.328	0.04 J	0.0868	0.13	< 0.05 U	0.00168	< 0.002 U	0.7 J	0.9	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1602
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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 J	99.8	11.4	0.20	6.6	221	595
6/20/2019	Assessment	0.1 J	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1602
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/28/2016	Background	0.02 J	0.40	27.1	< 0.005 U	0.02 J	0.2	0.217	0.275	0.17	0.255	0.013	< 0.002 U	0.90	0.08 J	0.092
11/1/2016	Background	0.02 J	0.35	28.7	< 0.005 U	0.02 J	0.6	0.108	2.086	0.18	0.070	0.014	< 0.002 U	1.48	0.1	0.116
12/19/2016	Background	0.02 J	0.43	28.9	< 0.005 U	0.01 J	1.65	0.225	0.7053	0.18	0.272	0.008	< 0.002 U	0.56	0.08 J	0.02 J
2/20/2017	Background	< 0.01 U	0.35	26.9	< 0.005 U	0.01 J	0.194	0.052	0.75	0.19	0.052	0.013	< 0.002 U	0.63	0.1	0.02 J
3/27/2017	Background	0.01 J	0.34	29.9	< 0.005 U	0.02 J	0.456	0.059	0.679	0.19	0.063	0.019	< 0.002 U	1.49	0.2	0.01 J
4/17/2017	Background	0.02 J	0.36	32.1	< 0.004 U	0.01 J	0.240	0.049	0.337	0.20	0.087	0.017	0.002 J	0.66	0.1	0.01 J
5/15/2017	Background	0.02 J	0.42	33.2	< 0.004 U	0.02 J	0.136	0.072	1.9116	0.19	0.078	0.009	< 0.002 U	1.28	0.1	0.04 J
6/12/2017	Background	0.03 J	0.36	33.1	< 0.004 U	0.01 J	0.408	0.066	0.2898	0.20	0.061	0.018	< 0.002 U	0.53	0.1	0.02 J
5/10/2018	Assessment	0.02 J	0.34	31.2	0.005 J	0.01 J	0.121	0.036	0.342	0.23	0.038	0.015	< 0.002 U	0.71	0.1	0.03 J
9/20/2018	Assessment	0.01 J	0.32	26.7	< 0.004 U	0.01 J	0.210	0.02 J	0.683	0.25	0.01 J	0.012	< 0.002 U	0.84	0.07 J	0.02 J
4/9/2019	Assessment	< 0.1 U	0.4 J	29.0	< 0.1 U	< 0.05 U	< 0.2 U	< 0.1 U	1.0509	0.20	< 0.1 U	0.02 J	< 0.002 U	3 J	0.2 J	< 0.5 U
6/20/2019	Assessment	0.02 J	0.33	29.5	< 0.02 U	0.01 J	0.2 J	0.03 J	0.1531	0.23	0.07 J	0.01 J	< 0.002 U	0.9 J	0.1 J	< 0.1 U
9/11/2019	Assessment	< 0.02 U	0.31	27.3	< 0.02 U	0.01 J	0.2 J	< 0.02 U	0.451	0.21	< 0.05 U	0.00979	< 0.002 U	1 J	0.1 J	< 0.1 U
3/11/2020	Assessment	< 0.02 U	0.31	28.9	< 0.02 U	< 0.01 U	0.261	< 0.02 U	0.4389	0.23	0.05 J	0.0117	< 0.002 U	1 J	0.2 J	< 0.1 U
5/15/2020	Assessment	0.02 J	0.31	30.0	--	0.01 J	0.2 J	0.04 J	0.5819	0.25	< 0.05 U	0.0126	--	0.9 J	0.09 J	< 0.1 U
10/8/2020	Assessment	0.04 J	0.33	25.7	--	0.01 J	0.311	0.04 J	0.194	0.23	< 0.05 U	0.0104	< 0.002 U	0.9 J	0.08 J	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1603
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
9/28/2016	Background	0.327	124	15.7	0.07 J	7.3	388	618
11/2/2016	Background	0.334	146	22.8	0.08 J	6.6	483	814
12/19/2016	Background	0.495	164	30.1	0.1 J	7.4	504	908
2/20/2017	Background	0.543	169	27.4	0.1 J	6.8	485	962
3/28/2017	Background	0.781	181	25.2	0.1 J	6.6	476	918
4/17/2017	Background	0.519	170	22.9	0.1 J	6.9	474	910
5/15/2017	Background	0.546	187	24.7	0.1 J	7.4	470	910
6/12/2017	Background	0.535	176	20.5	0.1 J	7.0	482	878
10/31/2017	Detection	0.360	171	13.1	0.1 J	6.6	553	872
5/10/2018	Assessment	--	--	--	0.09 J	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1603
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/28/2016	Background	0.02 J	0.36	29.5	< 0.005 U	0.02 J	0.3	0.317	0.0927	0.07 J	0.253	0.021	< 0.002 U	1.21	0.1	0.02 J
11/2/2016	Background	0.02 J	0.36	34.1	< 0.005 U	0.01 J	0.4	0.166	2.593	0.08 J	0.131	0.022	< 0.002 U	2.47	0.4	0.04 J
12/19/2016	Background	0.03 J	0.40	33.1	< 0.005 U	0.01 J	2.37	0.134	0.966	0.1 J	0.084	0.010	< 0.002 U	0.36	0.3	0.063
2/20/2017	Background	0.01 J	0.37	31.7	< 0.005 U	0.01 J	0.229	0.105	0.384	0.1 J	0.077	0.012	< 0.002 U	0.37	0.4	0.02 J
3/28/2017	Background	0.02 J	0.36	32.9	< 0.005 U	0.01 J	0.545	0.093	0.2071	0.1 J	0.080	0.020	< 0.002 U	0.72	0.2	< 0.01 U
4/17/2017	Background	0.03 J	0.52	33.7	0.005 J	0.01 J	0.304	0.377	0.6154	0.1 J	0.308	0.018	0.003 J	0.27	0.2	0.01 J
5/15/2017	Background	0.03 J	0.43	33.0	< 0.004 U	0.01 J	0.415	0.101	1.6052	0.1 J	0.079	0.012	< 0.002 U	0.71	0.1	0.02 J
6/12/2017	Background	0.03 J	0.35	32.0	< 0.004 U	0.01 J	0.963	0.085	0.776	0.1 J	0.059	0.021	< 0.002 U	0.29	0.1	0.01 J
5/10/2018	Assessment	0.02 J	0.31	41.3	0.007 J	0.01 J	0.099	0.054	0.363	0.09 J	0.042	0.021	< 0.002 U	0.14	0.2	0.02 J
9/20/2018	Assessment	0.02 J	0.26	35.9	< 0.004 U	0.01 J	0.102	0.032	0.881	0.09	0.02 J	0.022	< 0.002 U	0.07 J	0.4	0.01 J
4/9/2019	Assessment	< 0.1 U	0.56	32.4	< 0.1 U	< 0.05 U	0.4 J	0.622	2.389	0.11	0.5 J	0.030	< 0.002 U	< 2 U	0.4 J	< 0.5 U
6/20/2019	Assessment	0.03 J	0.41	30.7	< 0.02 U	0.01 J	0.249	0.204	0.2974	0.09	0.176	< 0.009 U	< 0.002 U	0.9 J	0.3	< 0.1 U
9/11/2019	Assessment	0.03 J	0.35	30.9	< 0.02 U	0.01 J	0.205	0.112	1.07	0.09	0.1 J	0.0150	< 0.002 U	0.5 J	0.2	< 0.1 U
3/11/2020	Assessment	< 0.02 U	0.29	30.4	< 0.02 U	0.01 J	0.224	0.061	2.036	0.06	0.08 J	0.0175	< 0.002 U	< 0.4 U	0.2 J	< 0.1 U
5/15/2020	Assessment	< 0.02 U	0.27	30.0	--	0.01 J	0.210	0.094	0.701	0.09	0.07 J	0.0182	--	< 0.4 U	0.2 J	< 0.1 U
10/8/2020	Assessment	0.15	0.41	26.8	--	0.01 J	0.552	0.392	0.0948	0.07	0.310	0.0142	< 0.002 U	< 0.4 U	0.2	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1604D
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1604D
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/26/2016	Background	0.14	0.48	29.1	< 0.005 U	0.14	0.4	1.76	1.38	0.18	0.106	0.059	< 0.002 U	19.8	0.9	0.235
11/1/2016	Background	0.15	0.59	28.4	< 0.005 U	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 U	0.17	0.798	1.92	1.45	0.17	0.02 J	0.045	< 0.002 U	20.8	1.0	0.283
2/21/2017	Background	0.11	0.45	26.2	< 0.005 U	0.13	0.297	1.85	0.824	0.21	0.02 J	0.050	< 0.002 U	17.4	0.7	0.264
3/28/2017	Background	0.13	0.41	28.9	< 0.005 U	0.13	0.416	1.74	0.806	0.19	0.022	0.064	< 0.002 U	18.2	0.7	0.336
4/19/2017	Background	0.12	0.49	27.9	< 0.004 U	0.09	0.323	1.60	1.537	0.20	0.584	0.051	0.003 J	17.4	0.7	0.217
5/16/2017	Background	0.13	0.54	27.5	< 0.004 U	0.10	0.079	1.60	3.489	0.18	0.027	0.052	< 0.002 U	18.1	0.5	0.231
6/13/2017	Background	0.15	0.46	27.9	< 0.008 U	0.15	0.180	1.95	1.058	0.18	0.03 J	0.058	< 0.002 U	18.3	0.8	0.256
5/9/2018	Assessment	0.04 J	0.34	32.0	< 0.004 U	0.04	0.195	0.314	0.687	0.21	0.035	0.024	< 0.002 U	2.05	1.4	0.02 J
9/19/2018	Assessment	0.04 J	0.29	37.0	< 0.004 U	0.03	0.169	0.203	0.316	0.19	0.303	0.016	< 0.002 U	1.57	3.8	0.02 J
4/9/2019	Assessment	< 0.1 U	0.4 J	42.5	< 0.1 U	0.05 J	0.2 J	0.345	0.957	0.15	< 0.1 U	0.038	< 0.002 U	< 2 U	2.0	< 0.5 U
6/19/2019	Assessment	0.04 J	0.28	52.9	< 0.02 U	0.04 J	0.212	0.242	0.1922	0.14	0.07 J	< 0.009 U	< 0.002 U	1 J	3.1	< 0.1 U
9/9/2019	Assessment	0.03 J	0.30	55.6	< 0.02 U	0.03 J	0.345	0.181	0.464	0.17	< 0.05 U	0.0188	< 0.002 U	2 J	3.4	< 0.1 U
3/10/2020	Assessment	0.02 J	0.31	34.2	< 0.02 U	0.03 J	0.311	0.138	0.834	0.22	< 0.05 U	0.0235	< 0.002 U	1 J	0.8	< 0.1 U
5/14/2020	Assessment	0.03 J	0.28	34.1	--	0.03 J	0.729	0.117	0.1393	0.25	< 0.05 U	0.0218	--	1 J	0.7	< 0.1 U
10/9/2020	Assessment	0.03 J	0.29	27.3	--	0.02 J	1.02	0.140	0.123	0.20	0.06 J	0.0190	< 0.002 U	1 J	3.0	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1604S
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

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 J	0.39	29.4	< 0.005 U	0.03	0.2	0.358	0.136	0.20	0.114	0.034	< 0.002 U	3.20	3.1	0.03 J
11/1/2016	Background	0.04 J	0.46	27.2	< 0.005 U	0.04	0.3	0.307	0.769	0.21	0.065	0.035	< 0.002 U	2.47	2.5	0.02 J
12/20/2016	Background	0.04 J	0.42	26.6	< 0.005 U	0.04	1.97	0.390	0.5256	0.19	0.093	0.023	< 0.002 U	2.71	2.7	0.03 J
2/21/2017	Background	0.03 J	0.42	26.7	< 0.005 U	0.04	0.379	0.501	0.92	0.21	0.140	0.033	< 0.002 U	2.52	2.2	0.03 J
3/28/2017	Background	0.03 J	0.37	31.6	< 0.005 U	0.03	0.692	0.308	0.585	0.20	0.055	0.042	< 0.002 U	2.53	2.2	0.119
4/19/2017	Background	0.03 J	0.44	28.9	< 0.004 U	0.04	0.158	0.317	0.722	0.21	0.051	0.041	0.003 J	2.53	1.7	0.02 J
5/16/2017	Background	0.04 J	0.51	32.2	< 0.004 U	0.04	0.098	0.317	2.577	0.19	0.100	0.033	< 0.002 U	2.54	2.0	0.04 J
6/13/2017	Background	0.03 J	0.41	28.7	< 0.004 U	0.04	0.149	0.308	0.598	0.20	0.033	0.038	< 0.002 U	2.41	2.5	0.02 J
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 U	16.2	1.0	0.220
9/19/2018	Assessment	0.13	0.32	26.6	< 0.004 U	0.15	0.093	1.88	1.159	0.22	0.02 J	0.052	< 0.002 U	15.6	0.8	0.251
4/9/2019	Assessment	0.2 J	0.54	29.1	< 0.1 U	0.27	0.3 J	2.41	1.472	0.19	< 0.1 U	0.061	< 0.002 U	17.8	1.2	< 0.5 U
6/19/2019	Assessment	0.15	0.33	29.0	< 0.02 U	0.21	0.09 J	2.16	1.256	0.16	< 0.02 U	0.032	< 0.002 U	16.6	1.0	0.3 J
9/9/2019	Assessment	0.14	0.34	29.0	< 0.02 U	0.21	0.1 J	2.14	1.15	0.20	< 0.05 U	0.0476	< 0.002 U	16.3	1.0	0.3 J
3/10/2020	Assessment	0.14	0.29	28.9	< 0.02 U	0.12	0.323	1.72	1.662	0.24	< 0.05 U	0.0390	< 0.002 U	13.7	1.2	0.2 J
5/14/2020	Assessment	0.15	0.30	29.1	--	0.19	0.1 J	1.93	1.038	0.25	< 0.05 U	0.0419	--	14.9	1.1	0.2 J
10/9/2020	Assessment	0.16	0.32	28.2	--	0.21	0.798	2.08	9.989	0.21	< 0.05 U	0.0384	< 0.002 U	15.0	0.9	0.3 J

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1605D
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1605D
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.03 J	2.29	31.5	< 0.01 U	0.04	0.1	1.91	1.06	0.18	0.080	0.085	< 0.002 U	54.6	0.2	0.06 J
11/2/2016	Background	0.03 J	2.48	30.6	< 0.01 U	0.04	0.2	1.79	1.925	0.19	0.044	0.078	< 0.002 U	52.4	0.2	0.05 J
12/20/2016	Background	0.03 J	2.26	28.2	< 0.01 U	0.04 J	2.29	1.75	2.662	0.18	0.03 J	0.063	< 0.002 U	54.7	0.3	0.05 J
2/21/2017	Background	0.04 J	2.23	25.9	< 0.005 U	0.03	0.282	1.84	1.033	0.20	0.021	0.071	< 0.002 U	46.8	0.2	0.138
3/28/2017	Background	0.04 J	2.01	27.9	< 0.005 U	0.03	0.556	1.69	0.578	0.20	0.02 J	0.086	< 0.002 U	44.6	0.2	0.090
4/18/2017	Background	0.03 J	2.25	25.8	< 0.008 U	0.02 J	0.127	1.69	0.821	0.20	0.02 J	0.077	0.002 J	43.2	0.2 J	0.04 J
5/16/2017	Background	0.03 J	2.45	26.3	< 0.004 U	0.02 J	0.099	1.63	3.433	0.20	0.01 J	0.075	< 0.002 U	48.1	0.2	0.04 J
6/13/2017	Background	0.04 J	1.99	27.2	< 0.008 U	0.04	0.120	1.86	0.668	0.17	0.02 J	0.081	< 0.002 U	45.5	0.4	0.05 J
5/9/2018	Assessment	0.03 J	2.22	21.6	< 0.004 U	0.01 J	0.067	1.51	0.523	0.23	0.02 J	0.062	< 0.002 U	46.4	0.2	0.04 J
9/19/2018	Assessment	0.04 J	2.51	25.9	< 0.004 U	0.02 J	0.229	1.80	0.759	0.22	0.01 J	0.060	< 0.002 U	47.9	0.3	0.05 J
4/9/2019	Assessment	0.04 J	2.81	26.4	< 0.02 U	0.01 J	0.06 J	1.56	0.543	0.22	0.03 J	0.075	< 0.002 U	40.6	0.2	< 0.1 U
6/19/2019	Assessment	< 0.04 U	2.67	28.6	< 0.04 U	0.02 J	0.2 J	1.65	0.831	0.19	< 0.04 U	0.02 J	< 0.002 U	40.0	0.2 J	< 0.2 U
9/10/2019	Assessment	0.03 J	2.78	33.1	< 0.02 U	0.03 J	0.04 J	1.69	1.641	0.17	< 0.05 U	0.0561	< 0.002 U	39.7	0.3	< 0.1 U
3/10/2020	Assessment	0.03 J	3.01	29.6	< 0.02 U	0.02 J	0.08 J	1.67	0.3851	0.19	< 0.05 U	0.0502	< 0.002 U	32.7	0.2 J	< 0.1 U
5/19/2020	Assessment	0.04 J	2.73	25.7	--	0.01 J	0.1 J	1.45	0.425	0.17	< 0.05 U	0.0495	--	32.8	0.2 J	< 0.1 U
10/9/2020	Assessment	< 0.02 U	3.09	23.0	--	< 0.01 U	0.208	1.43	0.8083	0.20	0.05 J	0.0439	< 0.002 U	35.7	0.09 J	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1605S
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1605S
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.16	1.38	49.6	0.02 J	0.13	0.6	3.16	0.777	0.24	2.18	0.086	< 0.002 U	25.8	1.1	0.174
11/1/2016	Background	0.07	0.93	38.2	0.009 J	0.08	0.7	1.26	2.692	0.25	0.793	0.084	< 0.002 U	23.9	0.9	0.055
12/20/2016	Background	0.07 J	0.88	37.0	< 0.01 U	0.08	2.85	0.861	0.337	0.22	0.410	0.076	< 0.002 U	22.9	0.7	0.05 J
2/21/2017	Background	0.04 J	0.86	36.0	0.007 J	0.08	0.390	1.10	0.785	0.25	0.636	0.068	< 0.002 U	17.5	1.1	0.055
3/28/2017	Background	0.03 J	0.63	32.5	< 0.005 U	0.06	0.349	0.448	0.466	0.25	0.181	0.076	< 0.002 U	15.4	1.0	0.102
4/18/2017	Background	0.06 J	0.74	31.9	< 0.008 U	0.08	0.245	0.715	0.827	0.23	0.285	0.067	0.003 J	20.8	3.0	0.04 J
5/16/2017	Background	0.06 J	0.88	33.3	< 0.008 U	0.08	0.585	0.647	2.733	0.26	0.382	0.076	< 0.002 U	18.6	1.7	0.06 J
6/13/2017	Background	0.05 J	0.75	30.8	< 0.008 U	0.08	0.387	0.708	0.611	0.24	0.541	0.071	< 0.002 U	17.8	1.7	0.05 J
5/9/2018	Assessment	0.04 J	0.50	23.5	< 0.004 U	0.06	0.083	0.518	0.3045	0.30	0.056	0.051	< 0.002 U	15.6	2.0	0.04 J
9/19/2018	Assessment	0.04 J	0.49	23.1	< 0.004 U	0.05	0.644	0.360	0.347	0.32	0.093	0.049	< 0.002 U	15.1	1.0	0.04 J
4/9/2019	Assessment	0.05 J	0.64	25.2	< 0.02 U	0.05	0.293	0.631	0.369	0.33	0.331	0.079	< 0.002 U	15.9	0.7	< 0.1 U
6/19/2019	Assessment	0.04 J	0.47	23.6	< 0.02 U	0.05 J	0.1 J	0.279	0.424	0.23	0.08 J	0.040	< 0.002 U	13.6	0.6	< 0.1 U
9/10/2019	Assessment	0.04 J	0.59	29.6	< 0.02 U	0.05 J	0.237	0.379	0.542	0.26	0.202	0.0524	< 0.002 U	14.2	0.4	< 0.1 U
3/10/2020	Assessment	0.08 J	0.62	26.5	< 0.02 U	0.04 J	0.305	0.723	0.842	0.30	0.497	0.0558	< 0.002 U	12.8	0.8	< 0.1 U
5/19/2020	Assessment	0.04 J	0.47	21.1	--	0.03 J	0.1 J	0.208	0.639	0.28	< 0.05 U	0.0523	--	12.3	0.7	< 0.1 U
10/9/2020	Assessment	0.04 J	0.47	24.6	--	0.03 J	0.266	0.195	1.4891	0.28	0.05 J	0.0470	< 0.002 U	11.2	0.5	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1606D
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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 J	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1606D
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.19	0.71	64.0	0.005 J	0.07	0.3	2.20	8.459	0.25	0.522	0.129	< 0.002 U	81.4	1.8	0.123
11/2/2016	Background	0.19	0.84	62.6	< 0.005 U	0.07	0.9	1.92	3.659	0.28	0.491	0.120	< 0.002 U	81.2	4.7	0.092
12/20/2016	Background	0.16	0.63	58.4	< 0.005 U	0.06	0.736	1.52	1.179	0.24	0.164	0.110	< 0.002 U	83.2	3.6	0.094
2/21/2017	Background	0.16	0.51	52.6	< 0.005 U	0.07	0.300	1.33	1.71	0.26	0.082	0.109	< 0.002 U	76.6	4.1	0.119
3/28/2017	Background	0.15	0.44	53.6	< 0.005 U	0.05	0.541	1.17	1.459	0.26	0.087	0.130	< 0.002 U	73.3	3.6	0.113
4/18/2017	Background	0.25	1.38	64.2	0.01 J	0.08	0.853	4.26	1.212	0.26	2.04	0.119	0.004 J	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 U	79.1	5.9	0.095
6/13/2017	Background	0.16	0.52	52.0	< 0.008 U	0.08	0.153	1.46	1.026	0.24	0.084	0.132	< 0.002 U	77.8	8.1	0.09 J
5/9/2018	Assessment	0.16	0.44	53.0	< 0.004 U	0.07	0.198	1.40	0.972	0.26	0.115	0.112	< 0.002 U	70.3	2.6	0.086
9/19/2018	Assessment	0.15	0.38	48.9	0.004 J	0.07	0.151	1.17	0.4378	0.26	0.01 J	0.107	< 0.002 U	65.3	3.3	0.108
4/8/2019	Assessment	0.15	0.35	47.3	< 0.02 U	0.07	0.1 J	1.25	0.94	0.26	0.03 J	0.124	< 0.002 U	71.8	8.1	< 0.1 U
6/19/2019	Assessment	0.14	0.37	49.4	< 0.02 U	0.09	0.07 J	1.36	0.933	0.1 J	< 0.02 U	0.058	< 0.002 U	68.3	9.6	0.1 J
9/10/2019	Assessment	0.15	0.40	51.4	< 0.02 U	0.08	0.1 J	1.09	2.2714	0.49	< 0.05 U	0.0835	< 0.002 U	68.5	1.0	< 0.1 U
3/10/2020	Assessment	0.14	0.35	45.3	< 0.02 U	0.05	0.2 J	1.11	0.946	0.27	< 0.05 U	0.0700	< 0.002 U	62.5	0.5	< 0.1 U
5/19/2020	Assessment	0.15	0.32	45.6	--	0.06	0.1 J	1.10	0.975	0.24	< 0.05 U	0.0681	--	67.0	0.5	< 0.1 U
10/8/2020	Assessment	0.14	0.36	45.6	--	0.08	0.247	1.54	0.908	0.23	< 0.05 U	0.0633	< 0.002 U	63.6	4.2	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1606S
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1606S
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.16	0.88	76.7	< 0.005 U	0.08	0.2	0.466	0.592	0.50	0.234	0.116	< 0.002 U	112	1.2	0.074
11/2/2016	Background	0.17	0.94	69.7	< 0.005 U	0.07	0.4	0.432	1.55	0.57	0.207	0.103	< 0.002 U	112	1.0	0.060
12/20/2016	Background	0.16	0.83	71.6	< 0.005 U	0.07	1.26	0.280	1.656	0.46	0.084	0.102	< 0.002 U	101	0.9	0.063
2/21/2017	Background	0.15	0.88	77.2	< 0.005 U	0.08	0.384	0.372	0.993	0.46	0.158	0.108	< 0.002 U	93.1	0.7	0.086
3/28/2017	Background	0.14	0.78	75.7	< 0.005 U	0.06	0.742	0.258	0.945	0.45	0.096	0.126	< 0.002 U	90.1	0.7	0.100
4/18/2017	Background	0.16	0.86	74.2	< 0.004 U	0.07	0.134	0.234	1.303	0.43	0.070	0.117	0.002 J	92.4	0.8	0.062
5/16/2017	Background	0.16	0.90	74.1	< 0.004 U	0.07	0.093	0.241	2.167	0.45	0.062	0.110	< 0.002 U	90.2	0.9	0.069
6/13/2017	Background	0.16	0.81	77.1	< 0.008 U	0.09	0.178	0.281	1.28	0.45	0.090	0.118	< 0.002 U	95.7	0.9	0.07 J
5/9/2018	Assessment	0.14	0.72	73.2	< 0.004 U	0.08	0.056	0.318	0.3443	0.44	0.040	0.107	< 0.002 U	70.2	2.0	0.076
9/19/2018	Assessment	0.13	0.69	64.8	0.005 J	0.06	0.297	0.260	0.439	0.46	0.02 J	0.096	< 0.002 U	70.6	2.8	0.112
4/8/2019	Assessment	0.15	0.70	63.1	< 0.02 U	0.07	0.08 J	0.320	0.595	0.54	0.107	0.117	< 0.002 U	67.7	1.4	< 0.1 U
6/19/2019	Assessment	0.15	0.63	67.2	< 0.02 U	0.08	0.08 J	0.171	1.0123	0.25	0.111	0.056	< 0.002 U	58.9	1.3	0.1 J
9/10/2019	Assessment	0.13	0.67	70.4	< 0.02 U	0.07	0.08 J	0.312	2.682	0.28	< 0.05 U	0.0877	< 0.002 U	54.9	2.7	< 0.1 U
3/10/2020	Assessment	0.13	0.62	60.9	< 0.02 U	0.07	0.1 J	0.322	0.434	0.40	0.05 J	0.0721	< 0.002 U	51.7	4.4	< 0.1 U
5/19/2020	Assessment	0.14	0.65	59.8	--	0.06	0.1 J	0.435	0.3814	0.38	< 0.05 U	0.0730	--	56.0	5.3	< 0.1 U
10/8/2020	Assessment	0.14	0.68	57.4	--	0.07	0.492	0.148	0.682	0.38	< 0.05 U	0.0701	< 0.002 U	56.4	1.9	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1607D
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1607D
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.04 J	0.91	117	< 0.005 U	0.02 J	0.3	0.439	0.86	0.54	0.179	0.068	< 0.002 U	96.2	0.1	0.05 J
11/2/2016	Background	0.03 J	1.02	155	< 0.005 U	0.02 J	0.7	0.396	3.997	0.61	0.058	0.069	< 0.002 U	91.1	0.07 J	0.04 J
12/20/2016	Background	0.03 J	1.02	168	< 0.005 U	0.005 J	2.07	0.526	1.689	0.50	0.038	0.075	< 0.002 U	89.6	0.03 J	0.04 J
2/21/2017	Background	0.03 J	1.14	133	< 0.005 U	< 0.004 U	0.090	0.481	0.883	0.51	0.041	0.072	< 0.002 U	87.7	0.03 J	0.04 J
3/29/2017	Background	0.05	1.24	140	0.008 J	0.03	0.602	0.805	1.872	0.52	0.628	0.087	0.002 J	85.9	0.5	0.062
4/18/2017	Background	0.03 J	1.00	126	< 0.004 U	< 0.005 U	0.133	0.414	1.535	0.52	0.070	0.079	0.002 J	81.8	0.05 J	0.02 J
5/16/2017	Background	0.03 J	1.11	129	< 0.004 U	< 0.005 U	0.078	0.399	1.265	0.52	0.041	0.087	< 0.002 U	91.2	0.04 J	0.02 J
6/14/2017	Background	0.03 J	0.98	131	< 0.004 U	< 0.005 U	0.141	0.439	1.764	0.49	0.124	0.088	< 0.002 U	90.8	0.03 J	0.04 J
5/10/2018	Assessment	0.03 J	1.15	73.5	< 0.004 U	< 0.005 U	0.051	0.521	1.254	0.54	0.043	0.089	< 0.002 U	80.9	< 0.03 U	0.02 J
9/20/2018	Assessment	0.03 J	1.34	92.3	< 0.004 U	< 0.005 U	0.158	0.769	0.926	0.52	0.044	0.104	< 0.002 U	83.4	< 0.03 U	0.04 J
4/8/2019	Assessment	0.03 J	1.31	75.7	< 0.02 U	< 0.01 U	0.07 J	0.778	1.3269	0.52	0.05 J	0.127	< 0.002 U	79.8	0.05 J	< 0.1 U
6/19/2019	Assessment	0.03 J	1.61	82.3	< 0.02 U	< 0.01 U	0.1 J	0.799	1.31	0.40	0.07 J	0.072	< 0.002 U	81.8	0.06 J	< 0.1 U
9/10/2019	Assessment	0.03 J	1.53	79.3	< 0.02 U	0.01 J	0.05 J	0.848	1.855	0.56	< 0.05 U	0.110	< 0.002 U	82.1	0.09 J	< 0.1 U
3/11/2020	Assessment	< 0.02 U	1.56	68.3	< 0.02 U	< 0.01 U	0.08 J	0.846	2.552	0.41	< 0.05 U	0.108	< 0.002 U	79.6	0.04 J	< 0.1 U
5/20/2020	Assessment	0.03 J	1.42	65.6	--	< 0.01 U	0.2 J	0.913	0.815	0.51	0.05 J	0.104	--	83.5	0.08 J	< 0.1 U
10/8/2020	Assessment	0.03 J	1.80	75.8	--	< 0.01 U	0.244	1.01	1.304	0.49	< 0.05 U	0.0966	< 0.002 U	83.8	0.06 J	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1607S
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
9/27/2016	Background	--	--	--	--	7.6	--	--
11/2/2016	Background	1.38	126	90.8	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1607S
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
11/2/2016	Background	0.46	1.86	56.7	0.01 J	0.06	0.8	2.59	2.504	0.32	1.40	0.098	0.003 J	50.4	7.1	0.060
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 J	0.03	0.325	1.21	1.974	0.29	0.267	0.091	< 0.002 U	41.3	9.0	0.069
3/28/2017	Background	0.43	1.17	66.8	< 0.005 U	0.02	0.390	0.942	1.153	0.28	0.134	0.110	< 0.002 U	39.2	9.2	0.052
4/18/2017	Background	0.55	1.62	67.6	0.01 J	0.06	0.514	2.60	1.632	0.30	1.25	0.102	0.003 J	45.1	8.9	0.058
5/16/2017	Background	0.50	1.17	63.7	< 0.004 U	0.03	0.226	0.851	2.408	0.29	0.159	0.094	< 0.002 U	48.1	9.1	0.05 J
6/14/2017	Background	0.48	1.10	62.9	< 0.004 U	0.03	0.200	0.936	1.017	0.27	0.138	0.106	< 0.002 U	46.1	9.4	0.05 J
5/10/2018	Assessment	0.44	0.93	71.1	< 0.004 U	0.04	0.121	1.18	1.29	0.29	0.128	0.103	< 0.002 U	43.2	11.4	0.064
9/20/2018	Assessment	0.42	0.90	80.6	< 0.004 U	0.04	0.086	0.840	0.584	0.28	0.094	0.118	< 0.002 U	41.5	8.8	0.089
4/8/2019	Assessment	0.40	0.94	72.7	< 0.02 U	0.04 J	0.376	1.21	0.723	0.26	0.09 J	0.141	< 0.002 U	37.9	7.0	< 0.1 U
6/19/2019	Assessment	0.44	0.96	81.0	< 0.02 U	0.04 J	0.428	0.990	1.121	0.19	0.108	0.075	< 0.002 U	34.6	5.6	< 0.1 U
9/10/2019	Assessment	0.41	0.87	67.7	< 0.02 U	0.05 J	0.357	0.971	2.765	0.27	0.09 J	0.0990	< 0.002 U	35.0	4.3	< 0.1 U
3/10/2020	Assessment	0.41	0.92	69.2	< 0.02 U	0.04 J	0.321	1.23	1.171	0.24	0.06 J	0.110	< 0.002 U	35.5	4.5	< 0.1 U
5/20/2020	Assessment	0.45	0.93	66.8	--	0.04 J	0.249	1.42	0.3123	0.23	0.06 J	0.105	--	35.8	5.7	< 0.1 U
10/8/2020	Assessment	0.48	0.89	64.0	--	0.03 J	0.509	1.27	1.553	0.24	0.2 J	0.0937	< 0.002 U	35.9	3.3	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1608
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1608
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.10	0.82	42.0	0.02 J	0.03	0.9	1.21	0.454	0.27	0.881	0.003	< 0.002 U	2.35	1.2	0.03 J
11/1/2016	Background	0.04 J	0.53	33.4	< 0.005 U	0.02 J	0.6	0.254	2.282	0.30	0.232	0.004	< 0.002 U	2.16	1.3	0.081
12/19/2016	Background	0.04 J	0.68	32.2	0.009 J	0.02	2.78	0.588	0.379	0.26	0.405	< 0.0002 U	< 0.002 U	1.94	1.1	0.03 J
2/22/2017	Background	0.03 J	0.52	32.4	< 0.005 U	0.01 J	0.364	0.240	1.235	0.25	0.205	0.003	< 0.002 U	1.40	1.5	0.053
3/27/2017	Background	0.03 J	0.56	31.4	< 0.005 U	0.01 J	0.335	0.330	0.417	0.24	0.274	0.006	< 0.002 U	2.49	1.3	0.04 J
4/17/2017	Background	0.04 J	0.50	35.3	< 0.004 U	0.01 J	0.223	0.196	0.1298	0.23	0.173	0.006	0.002 J	1.89	1.3	0.01 J
5/15/2017	Background	0.04 J	0.49	35.1	< 0.004 U	0.008 J	0.151	0.098	0.857	0.23	0.073	0.006	< 0.002 U	2.08	1.0	0.01 J
6/12/2017	Background	0.03 J	0.49	36.4	< 0.004 U	0.006 J	0.277	0.040	0.146	0.21	0.024	0.016	< 0.002 U	1.57	1.1	0.02 J
5/10/2018	Assessment	0.02 J	0.37	46.6	0.009 J	0.01 J	0.126	0.095	0.565	0.18	0.079	0.0003 J	< 0.002 U	0.53	0.9	0.02 J
9/20/2018	Assessment	0.03 J	0.42	42.6	< 0.004 U	0.008 J	0.264	0.052	0.55	0.21	0.037	0.004	< 0.002 U	1.18	1.2	0.02 J
4/9/2019	Assessment	0.04 J	0.56	41.2	< 0.02 U	0.02 J	0.372	0.597	0.2435	0.20	0.454	0.01 J	< 0.002 U	1 J	1.2	< 0.1 U
6/18/2019	Assessment	0.03 J	0.40	32.0	< 0.02 U	0.01 J	0.306	0.05 J	0.104	0.16	0.06 J	< 0.009 U	< 0.002 U	0.8 J	0.8	< 0.1 U
9/10/2019	Assessment	0.03 J	0.52	26.8	0.05 J	< 0.01 U	0.327	0.056	1.348	0.20	0.06 J	0.00286	< 0.002 U	1 J	1.0	< 0.1 U
3/10/2020	Assessment	< 0.02 U	0.37	30.5	< 0.02 U	< 0.01 U	0.264	0.070	0.67	0.21	0.06 J	0.00229	< 0.002 U	0.6 J	4.3	< 0.1 U
5/13/2020	Assessment	0.04 J	0.36	31.3	--	0.02 J	0.2 J	0.092	0.569	0.22	0.275	0.00241	--	0.7 J	2.1	< 0.1 U
10/6/2020	Assessment	0.09 J	0.66	30.5	--	0.05	0.707	0.659	0.0286	0.27	0.476	0.00241	< 0.002 U	2 J	1.7	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

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 J	7.5	894	1,860
9/11/2019	Assessment	6.00	273	167	0.24	7.4	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1805
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	2.14	20.3	54.3	< 0.1 U	< 0.05 U	1.00	3.31	3.12	0.36	1.21	0.043	< 0.002 U	80.1	< 0.3 U	< 0.5 U
6/19/2019	Assessment	< 0.04 U	66.3	42.4	< 0.04 U	< 0.02 U	0.2 J	4.91	1.412	0.1 J	< 0.04 U	0.032	< 0.002 U	96.2	0.1 J	< 0.2 U
9/11/2019	Assessment	0.07 J	70.4	41.9	< 0.02 U	< 0.01 U	0.415	3.39	2.7353	0.24	0.1 J	0.0426	< 0.002 U	78.0	0.1 J	< 0.1 U
3/10/2020	Assessment	0.02 J	11.4	24.3	< 0.02 U	< 0.01 U	0.2 J	0.091	1.409	0.27	< 0.05 U	0.0316	< 0.002 U	10.7	< 0.03 U	< 0.1 U
5/14/2020	Assessment	0.03 J	56.0	41.3	--	< 0.01 U	0.1 J	0.384	0.641	0.24	< 0.05 U	0.0422	--	42.7	0.1 J	< 0.1 U
10/9/2020	Assessment	< 0.02 U	80.9	32.2	--	< 0.01 U	0.326	1.01	1.5	0.19	< 0.05 U	0.0432	< 0.002 U	50.0	0.05 J	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1921
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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
9/13/2019	Assessment	0.647	79.6	33.2	0.79	7.6	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1921
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.1 J	3.36	68.0	< 0.1 U	< 0.05 U	1.13	2.64	1.678	0.77	0.944	0.075	0.002 J	478	0.4 J	< 0.5 U
6/19/2019	Assessment	0.10	1.19	51.2	< 0.02 U	< 0.01 U	0.07 J	0.860	0.276	0.87	0.06 J	0.074	< 0.002 U	502	0.2 J	< 0.1 U
9/13/2019	Assessment	0.1 J	1.25	50.8	< 0.02 U	0.03 J	0.1 J	0.692	1.228	0.79	0.08 J	0.0926	< 0.002 U	500	0.1 J	< 0.1 U
3/12/2020	Assessment	0.08 J	1.21	58.5	< 0.02 U	< 0.01 U	0.230	0.879	3.441	0.94	0.217	0.0995	< 0.002 U	461	0.1 J	< 0.1 U
5/18/2020	Assessment	0.11	1.12	54.1	--	< 0.01 U	0.2 J	0.795	1.053	0.98	0.385	0.0990	--	472	0.1 J	< 0.1 U
10/6/2020	Assessment	0.11	1.18	47.4	--	< 0.01 U	0.524	0.604	0.451	0.98	0.2 J	0.0870	< 0.002 U	472	0.1 J	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

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
9/11/2019	Assessment	0.440	96.5	32.7	0.33	7.6	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1922D
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/9/2019	Assessment	0.88	323	69.3	< 0.1 U	< 0.05 U	0.4 J	1.02	2.64	0.29	0.1 J	0.02 J	< 0.002 U	488	< 0.2 U	< 0.5 U
6/19/2019	Assessment	0.29	716	54.7	< 0.02 U	< 0.01 U	< 0.04 U	0.530	3.332	0.31	< 0.02 U	< 0.009 U	< 0.002 U	515	0.04 J	< 0.1 U
9/11/2019	Assessment	1.04	839	51.0	< 0.02 U	0.01 J	0.08 J	0.492	3.089	0.33	< 0.05 U	0.0126	< 0.002 U	478	0.06 J	< 0.1 U
3/11/2020	Assessment	0.63	1,240	72.3	< 0.02 U	< 0.01 U	0.335	0.267	3.28	0.29	0.07 J	0.0117	< 0.002 U	314	0.05 J	< 0.1 U
5/19/2020	Assessment	0.31	522	66.3	--	< 0.01 U	0.2 J	0.218	1.816	0.32	< 0.05 U	0.0110	--	289	< 0.03 U	< 0.1 U
10/8/2020	Assessment	4.91	1,040	144	--	< 0.01 U	0.351	0.326	2.815	0.30	0.07 J	0.00747	< 0.002 U	109	< 0.03 U	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

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
9/11/2019	Assessment	6.34	342	179	0.19	7.3	1,070	2,060
3/11/2020	Assessment	--	--	--	0.1 J	6.9	--	--
5/18/2020	Assessment	6.92	345	160	0.19	6.9	1,060	1,920
10/9/2020	Assessment	4.09	293	126	0.16	7.1	842	1,750

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1922S
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/9/2019	Assessment	< 0.1 U	1.95	30.7	< 0.1 U	< 0.05 U	0.3 J	1.83	2.124	0.16	0.3 J	0.082	< 0.002 U	43.5	< 0.2 U	< 0.5 U
6/20/2019	Assessment	< 0.04 U	1.89	26.9	< 0.04 U	< 0.02 U	0.2 J	1.37	1.156	0.17	0.08 J	0.03 J	< 0.002 U	36.4	0.07 J	< 0.2 U
9/11/2019	Assessment	0.02 J	1.75	26.5	< 0.02 U	< 0.01 U	0.2 J	1.23	2.945	0.19	0.1 J	0.0556	< 0.002 U	33.9	0.08 J	< 0.1 U
3/11/2020	Assessment	< 0.02 U	2.92	28.0	< 0.04 U	< 0.01 U	0.220	1.31	2.028	0.1 J	0.2 J	0.0615	< 0.002 U	32.4	0.09 J	< 0.1 U
5/18/2020	Assessment	< 0.02 U	1.79	27.4	--	< 0.01 U	0.2 J	1.52	0.821	0.19	0.06 J	0.0611	--	34.3	0.1 J	< 0.1 U
10/9/2020	Assessment	0.09 J	3.25	37.7	--	0.11	1.48	2.88	1.844	0.16	1.57	0.0551	0.002 J	30.7	0.3	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1923
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.2 J	0.55	77.6	< 0.1 U	< 0.05 U	0.3 J	0.317	0.706	0.16	0.1 J	0.223	< 0.002 U	160	23.8	< 0.5 U
6/18/2019	Assessment	0.21	0.56	72.9	< 0.02 U	0.01 J	0.353	0.657	0.836	0.16	0.255	0.135	< 0.002 U	101	14.4	< 0.1 U
9/11/2019	Assessment	0.24	0.75	86.6	< 0.02 U	0.03 J	0.541	1.01	2.099	0.13	0.543	0.137	< 0.002 U	84.2	14.0	< 0.1 U
3/12/2020	Assessment	0.15	0.58	73.3	< 0.02 U	0.02 J	0.903	0.622	0.935	0.18	0.302	0.115	< 0.002 U	70.1	5.2	< 0.1 U
5/14/2020	Assessment	0.23	0.69	79.8	--	0.02 J	0.484	0.814	0.48	0.21	0.354	0.109	--	70.9	4.1	< 0.1 U
10/6/2020	Assessment	0.18	0.62	86.4	--	0.01 J	2.13	0.747	1.241	0.27	0.434	0.177	< 0.002 U	98.0	17.8	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

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
10/6/2020	Assessment	5.27	301	159	0.40	7.1	851	1,840

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

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 J	0.91	59.8	< 0.1 U	0.2 J	0.3 J	2.29	0.921	0.42	0.3 J	0.133	< 0.002 U	89.5	1.3	< 0.5 U
6/18/2019	Assessment	0.06 J	0.55	69.5	< 0.02 U	0.05	0.1 J	2.74	1.417	0.38	0.07 J	0.087	< 0.002 U	69.0	3.6	< 0.1 U
9/11/2019	Assessment	0.07 J	0.61	54.5	< 0.02 U	0.06	0.2 J	4.10	1.719	0.44	0.218	0.102	< 0.002 U	76.7	3.5	< 0.1 U
3/12/2020	Assessment	0.09 J	0.72	46.7	< 0.1 U	0.06	0.324	6.80	0.974	0.44	0.394	0.130	< 0.002 U	92.0	1.1	< 0.1 U
5/14/2020	Assessment	0.06 J	0.66	54.5	--	0.06	0.784	3.10	1.785	0.47	0.229	0.104	--	77.6	1.1	< 0.1 U
10/6/2020	Assessment	0.09 J	1.30	55.3	--	0.09	1.64	10.3	1.013	0.40	1.14	0.113	0.003 J	82.7	0.9	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1925
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1925
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.2 J	0.88	46.6	< 0.1 U	0.06 J	0.4 J	1.65	2.726	0.33	0.4 J	0.094	< 0.002 U	76.0	6.2	< 0.5 U
6/19/2019	Assessment	0.18	0.35	48.0	< 0.02 U	0.04 J	0.1 J	1.28	1.245	0.25	0.04 J	0.095	< 0.002 U	63.5	6.3	< 0.1 U
9/10/2019	Assessment	0.20	0.41	45.0	< 0.02 U	0.06	0.1 J	1.27	1.041	0.26	0.2 J	0.0947	< 0.002 U	54.6	4.1	< 0.1 U
3/11/2020	Assessment	0.16	0.37	40.4	< 0.02 U	0.05 J	0.1 J	1.21	1.59	0.24	< 0.05 U	0.0926	< 0.002 U	56.2	2.9	< 0.1 U
5/14/2020	Assessment	0.19	0.32	36.8	--	0.04 J	0.08 J	1.07	0.91	0.34	< 0.05 U	0.0853	--	57.9	4.8	< 0.1 U
10/6/2020	Assessment	0.20	0.56	39.5	--	0.04 J	0.428	1.07	0.2096	0.29	0.09 J	0.0776	< 0.002 U	45.8	5.4	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1926
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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
9/13/2019	Assessment	0.145	87.6	8.57	0.24	7.3	26.4	396
3/12/2020	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1926
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.1 J	0.95	28.8	< 0.1 U	0.06 J	0.4 J	5.05	1.327	0.25	0.981	0.01 J	< 0.002 U	9 J	0.3 J	< 0.5 U
6/20/2019	Assessment	0.08 J	0.38	22.9	< 0.02 U	0.05	0.06 J	1.81	0.524	0.28	0.05 J	< 0.009 U	< 0.002 U	7.05	0.3	< 0.1 U
9/13/2019	Assessment	0.07 J	0.37	23.9	< 0.02 U	0.06	0.09 J	1.17	0.4608	0.24	0.07 J	0.00624	< 0.002 U	5.38	0.4	< 0.1 U
3/12/2020	Assessment	0.03 J	0.33	20.3	< 0.02 U	0.04 J	0.206	1.08	1.316	0.28	< 0.05 U	0.00675	< 0.002 U	6.16	0.2	< 0.1 U
5/18/2020	Assessment	0.08 J	0.36	23.7	--	0.05	0.2 J	1.42	0.3552	0.29	< 0.05 U	0.00744	--	5.72	0.3	< 0.1 U
10/8/2020	Assessment	0.05 J	0.32	20.0	--	0.05 J	0.323	1.03	0.379	0.26	< 0.05 U	0.00575	< 0.002 U	5.04	1.0	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

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
9/13/2019	Assessment	0.498	143	15.2	0.14	7.0	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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1927
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	0.3 J	0.4 J	63.4	< 0.1 U	< 0.05 U	< 0.2 U	0.319	1.533	0.18	0.1 J	0.03 J	< 0.002 U	7 J	0.8 J	< 0.5 U
6/20/2019	Assessment	0.15	0.28	61.5	< 0.02 U	0.05 J	0.1 J	0.251	0.866	0.13	0.03 J	< 0.009 U	< 0.002 U	2.82	0.3	< 0.1 U
9/13/2019	Assessment	0.12	0.27	58.7	< 0.02 U	0.05	0.08 J	0.225	1.415	0.14	< 0.05 U	0.00638	< 0.002 U	2 J	0.4	< 0.1 U
3/11/2020	Assessment	0.09 J	0.29	56.2	< 0.02 U	0.06	0.1 J	0.319	0.765	0.14	< 0.05 U	0.00723	< 0.002 U	2 J	0.2 J	< 0.1 U
5/14/2020	Assessment	0.14	0.29	54.4	--	0.06	0.1 J	0.434	1.19	0.17	0.08 J	0.00725	--	2 J	0.1 J	< 0.1 U
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 U	2 J	0.3	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1929
Mountaineer - BAP
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
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

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1929
Mountaineer - BAP
Appendix IV Constituents

Geosyntec Consultants, Inc.

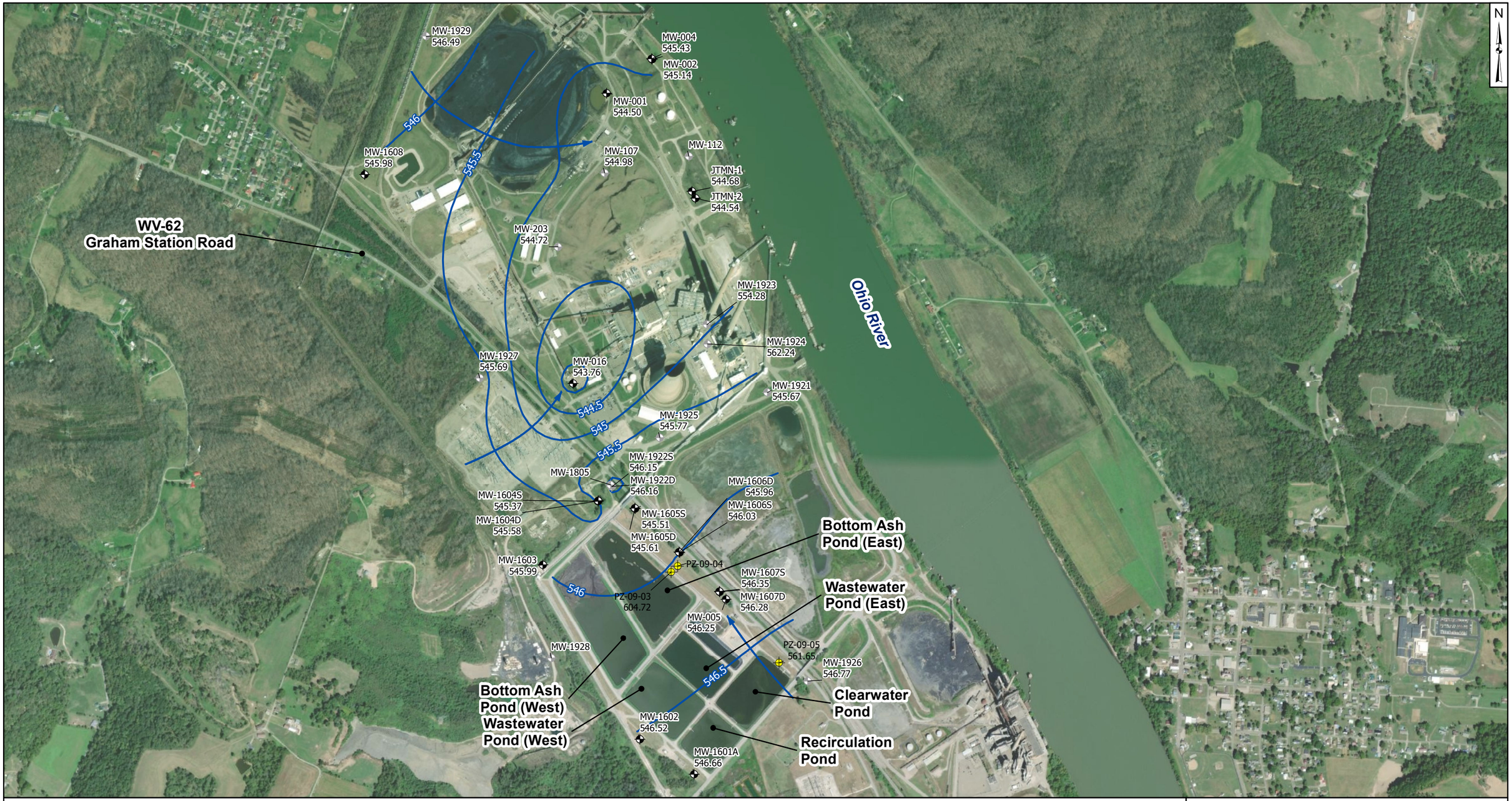
Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
4/10/2019	Assessment	< 0.1 U	0.80	56.9	< 0.1 U	< 0.05 U	0.5 J	3.03	0.823	0.19	1.15	0.01 J	< 0.002 U	< 2 U	1.3	< 0.5 U
6/18/2019	Assessment	0.02 J	0.37	47.6	< 0.02 U	0.02 J	0.2 J	0.157	0.398	0.20	0.08 J	< 0.009 U	< 0.002 U	0.7 J	1.3	< 0.1 U
9/10/2019	Assessment	0.03 J	0.47	52.1	< 0.02 U	0.01 J	0.280	0.606	2.994	0.19	0.274	0.00480	< 0.002 U	0.7 J	1.7	< 0.1 U
3/10/2020	Assessment	< 0.02 U	0.41	43.8	< 0.02 U	< 0.01 U	0.529	0.214	0.478	0.23	0.1 J	0.00382	< 0.002 U	0.5 J	0.9	< 0.1 U
5/13/2020	Assessment	0.04 J	0.79	52.1	--	0.04 J	0.584	1.81	0.88	0.23	0.870	0.00416	--	0.6 J	1.1	< 0.1 U
10/9/2020	Assessment	0.02 J	0.41	44.6	--	0.01 J	0.416	0.363	0.988	0.22	0.2 J	0.00430	< 0.002 U	0.6 J	1.8	< 0.1 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 2: Residence Time Calculation Summary - Bottom Ash Pond
Mountaineer Bottom Ash Pond

			2020-03		2020-05		2020-10	
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	74	0.8	167	0.4	63	1.0
	MW-1602 [1]	2.0	77	0.8	155	0.4	112	0.5
	MW-1603 [1]	2.0	179	0.3	197	0.3	556	0.1
	MW-1604D [2]	2.0	93	0.7	366	0.2	202	0.3
	MW-1604S [2]	2.0	140	0.4	332	0.2	485	0.1
	MW-1605D [2]	2.0	69	0.9	367	0.2	286	0.2
	MW-1605S [2]	2.0	166	0.4	367	0.2	286	0.2
	MW-1606D [2]	2.0	97	0.6	6,660	0.01	287	0.2
	MW-1606S [2]	2.0	85	0.7	226	0.3	309	0.2
	MW-1607D [2]	2.0	109	0.6	245	0.2	302	0.2
	MW-1607S [2]	2.0	136	0.4	313	0.2	236	0.3
	MW-1608 [1]	2.0	110	0.6	145	0.4	128	0.5

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



Legend

- CCR Network Monitoring Wells
- Nature and Extent Monitoring Wells
- Piezometer
- Approximate Groundwater Flow Direction
- Groundwater Elevation Contour

Notes

- Monitoring well coordinates and water level data (collected on March 9, 2020) 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.
- Water levels from piezometers were inconsistent with other local data and not used to create groundwater contours.
- MW-1805 was not gauged during the March 2020 event. MW-1928 and PZ-09-04 were dry during March 2020.
- MW-1923 and MW-1924 were not used to generate groundwater contours due to anomalous or inconsistent readings.
- Pupmping wells for plant activities were not operational during the gauging period. When operational, shallow groundwater beneath the plant flows northeast toward the Ohio River.
- Normal lower pool elevation of the Ohio River at Racine Lock and Dam is 539.5 ft amsl (USACE).

1,000 500 0 1,000 Feet

Potentiometric Surface Map - Uppermost Aquifer
March 2020

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

Geosyntec consultants

Columbus, Ohio | 2021/01/27

Figure **2**

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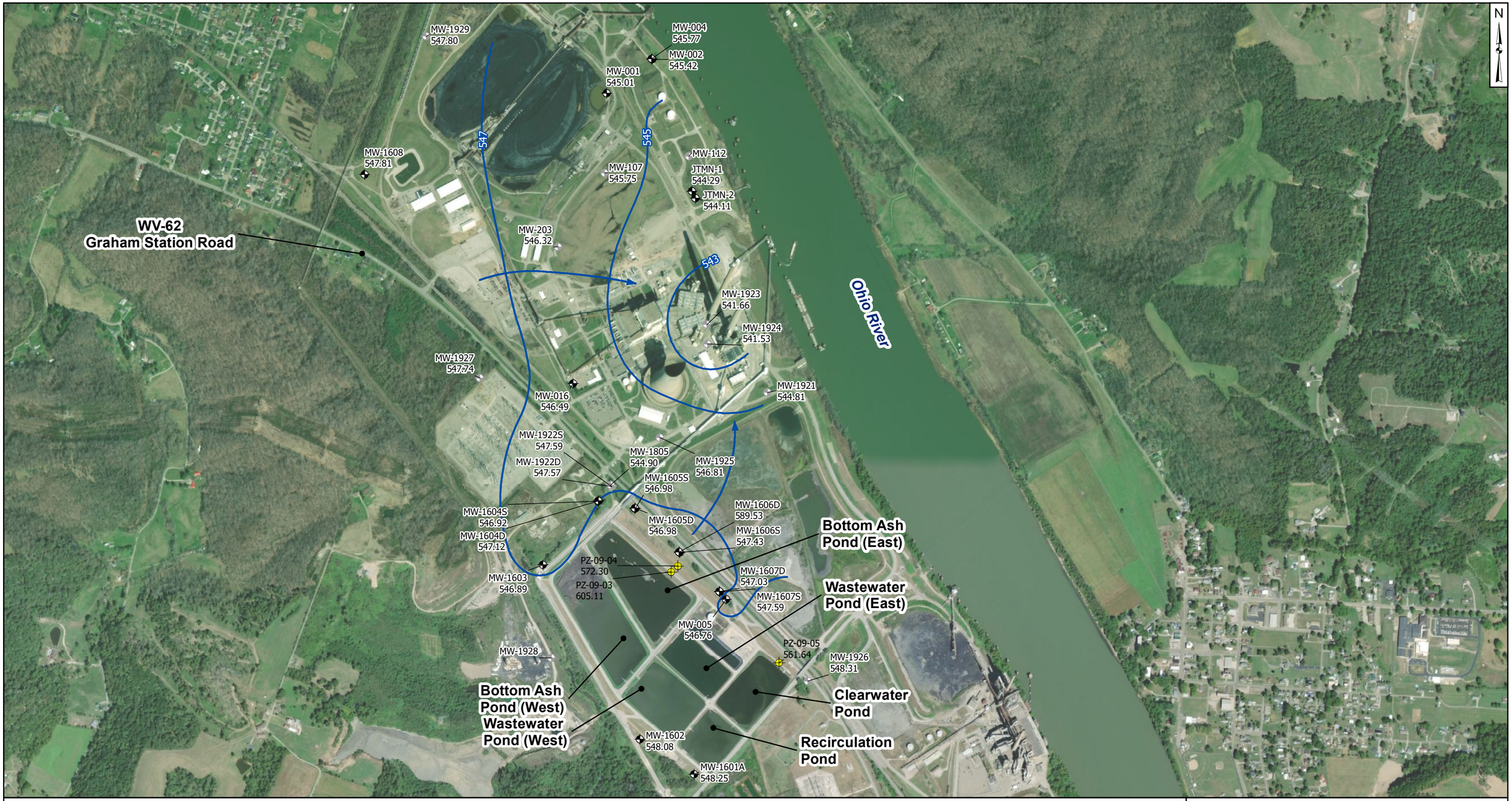

Legend

- CCR Network Monitoring Wells
- Nature and Extent Monitoring Wells
- Piezometer
- Groundwater Elevation Contour
- Approximate Groundwater Flow Direction

Notes

- Monitoring well coordinates and water level data (collected on May 12, 2020) 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.
- Water levels from piezometers were inconsistent with other local data and not used to create groundwater contours.
- MW-1606D was not used to generate groundwater contours due to inconsistent or anamalous reading.
- MW-1928 was dry during May 2020.
- Normal lower pool elevation of the Ohio River at Racine Lock and Dam is 539.5 ft amsl (USACE).
- Intermittent usage of pumping wells for plant activities impact water levels in the vicinity. In general, shallow

1,000 500 0 1,000 Feet

Potentiometric Surface Map - Uppermost Aquifer
May 2020

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

Geosyntec consultants

Columbus, Ohio | 2021/01/27

Figure **3**

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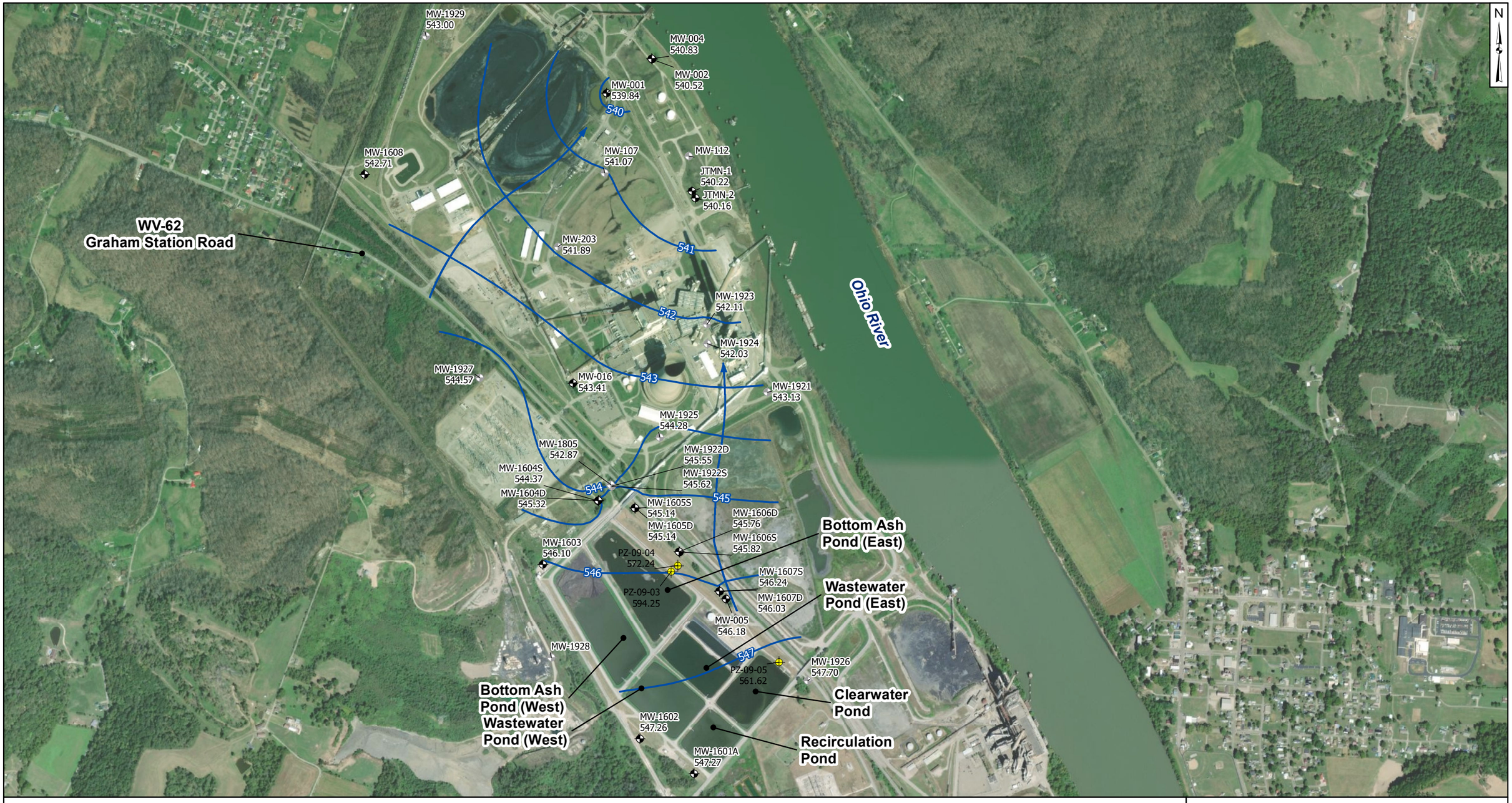

Legend

- CCR Network Monitoring Wells
- Nature and Extent Monitoring Wells
- Piezometer
- Groundwater Elevation Contour
- Approximate Groundwater Flow Direction

Notes

- Monitoring well coordinates and water level data (collected on October 5, 2020) 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.
- Water levels from piezometers were inconsistent with other local data and not used to create groundwater contours.
- MW-1924 was not used in generate groundwater contours due to anomalous or inconsistent reading.
- MW-1805 was not gauged in May 2020. MW-1928 nd PZ-09-04 were dry during October 2020.
- Normal lower pool elevation of the Ohio River at Racine Lock and Dam is 539.5 ft amsl (USACE).
- Intermittent usage of 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
October 2020

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

Geosyntec consultants

Columbus, Ohio | 2021/01/06

Figure **4**

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Appendix 2

The groundwater data statistical analyses completed in 2020 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

October 2, 2020

CHA8500

TABLE OF CONTENTS

LIST OF TABLES

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.

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. Groundwater protection standards (GWPS) were set in accordance with 40 CFR 257.95(d)(2) and a statistical evaluation of the assessment monitoring data was conducted. Statistically significant levels 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. Two assessment monitoring events were conducted at the BAP in March and May 2020 in accordance with 40 CFR 257.95. The results of these assessment events are documented in this report.

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

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Groundwater protection standards (GWPSs) were re-established for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at a statistically significant level (SSL) above the GWPS. SSLs were identified for 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, two sets of samples were collected for analysis from each upgradient and downgradient well to meet the requirements of 40 CFR 257.95(b) (March 2020) and 257.95(d)(1) (May 2020). Samples from the March 2020 event were analyzed for Appendix IV parameters only, whereas samples from the May 2020 sample event were analyzed for all Appendix III and detected Appendix IV parameters based on the results of the March event. A summary of data collected during these assessment monitoring events may be found in Table 1.

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

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.26 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

2.2 Statistical Analysis

Statistical analyses for the BAP were conducted in accordance with the January 2017 *Statistical Analysis Plan* (AEP, 2017), except where noted below. Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained in March and May 2020 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* (AEP, 2017). 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, lithium, and molybdenum. Non-parametric tolerance limits were calculated for antimony, barium, cadmium, lead, 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 0.400 mg/L at MW-1605D (0.0777 mg/L), MW-1605S (0.0753 mg/L), MW-1606D (0.123 mg/L), MW-1606S (0.114 mg/L), MW-1607D (0.101 mg/L), and MW-1607S (0.112 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 Evaluation of Potential Appendix III SSIs

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

Data collected during the May 2020 assessment monitoring event from each compliance well were compared to the prediction limits to evaluate results above background values. The results from this event and the prediction limits are summarized in Table 2. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 0.614 mg/L at MW-1604D (4.65 mg/L), MW-1604S (3.68 mg/L), MW-1605D (6.92 mg/L), MW-1605S (4.83 mg/L), MW-1606D (5.92 mg/L), MW-1606S (5.94 mg/L), MW-1607D (3.89 mg/L), and MW-1607S (3.55 mg/L).

- Calcium concentrations exceeded the interwell UPL of 200 mg/L at MW-1604D (205 mg/L), MW-1604S (250 mg/L), MW-1605D (265 mg/L), MW-1606D (270 mg/L), MW-1606S (207 mg/L), and MW-1607D (228 mg/L).

- Chloride concentrations exceeded the interwell UPL of 68.5 mg/L at MW-1604D (113 mg/L), MW-1604S (116 mg/L), MW-1605D (169 mg/L), MW-1605S (93.5 mg/L), MW-1606D (178 mg/L), MW-1606S (181 mg/L), MW-1607D (181 mg/L), and MW-1607S (172 mg/L).

- Fluoride concentrations exceeded the interwell UPL of 0.271 mg/L at MW-1605S (0.28 mg/L), MW-1606S (0.38 mg/L), and MW-1607D (0.51 mg/L).

- Sulfate concentrations exceeded the interwell UPL of 674 mg/L at MW-1604S (715 mg/L), MW-1605D (848 mg/L), MW-1606D (756 mg/L), and MW-1607D (722 mg/L).

- The pH value at MW-1607S (7.0 SU) was below the intrawell lower prediction limit (LPL) of 7.2 SU.

- TDS concentrations exceeded the interwell UPL of 1040 mg/L at MW-1604D (1390 mg/L), MW-1604S (1520 mg/L), MW-1605D (1670 mg/L), MW-1605S (1160 mg/L), MW-1606D (1600 mg/L), MW-1606S (1400 mg/L), MW-1607D (1620 mg/L), and MW-1607S (1230 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the May 2020 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 in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified no potential outliers in the March and May 2020 data. GWPSs were re-established for the Appendix IV parameters. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. SSLs were identified for lithium. Appendix III parameters were compared to established prediction limits, with exceedances identified for boron, calcium, chloride, fluoride, pH 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

American Electric Power (AEP). 2017. Statistical Analysis Plan – Mountaineer Plant. January 2017.

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

TABLES

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

Geosyntec Consultants

Parameter	Unit	MW-1601A		MW-1602		MW-1603		MW-1604D		MW-1604S		MW-1605D	
		3/12/2020	5/15/2020	3/11/2020	5/15/2020	3/11/2020	5/15/2020	3/10/2020	5/14/2020	3/10/2020	5/14/2020	3/10/2020	5/19/2020
Antimony	µg/L	0.1 U	0.03 J	0.1 U	0.02 J	0.1 U	0.1 U	0.02 J	0.03 J	0.14	0.15	0.03 J	0.04 J
Arsenic	µg/L	0.58	0.57	0.31	0.31	0.29	0.27	0.31	0.28	0.29	0.30	3.01	2.73
Barium	µg/L	64.9	67.8	28.9	30.0	30.4	30.0	34.2	34.1	28.9	29.1	29.6	25.7
Beryllium	µg/L	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-
Boron	mg/L	-	0.136	-	0.118	-	0.275	-	4.65	-	3.68	-	6.92
Cadmium	µg/L	0.01 J	0.02 J	0.05 U	0.01 J	0.01 J	0.01 J	0.03 J	0.03 J	0.12	0.19	0.02 J	0.01 J
Calcium	mg/L	-	185	-	99.2	-	161	-	205	-	250	-	265
Chloride	mg/L	-	22.7	-	9.67	-	10.7	-	113	-	116	-	169
Chromium	µg/L	0.205	0.1 J	0.261	0.2 J	0.224	0.210	0.311	0.729	0.323	0.1 J	0.08 J	0.1 J
Cobalt	µg/L	0.02 J	0.05 U	0.05 U	0.04 J	0.061	0.094	0.138	0.117	1.72	1.93	1.67	1.45
Combined Radium	pCi/L	1.685	0.553	0.4389	0.5819	2.036	0.701	0.834	0.1393	1.662	1.038	0.3851	0.425
Fluoride	mg/L	0.14	0.16	0.23	0.25	0.06	0.09	0.22	0.25	0.24	0.25	0.19 J	0.17 J
Lead	µg/L	0.2 U	0.2 U	0.05 J	0.2 U	0.08 J	0.07 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Lithium	mg/L	0.00183	0.00190	0.0117	0.0126	0.0175	0.0182	0.0235	0.0218	0.0390	0.0419	0.0502	0.0495
Mercury	µg/L	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-
Molybdenum	µg/L	1 J	0.7 J	1 J	0.9 J	2 U	2 U	1 J	1 J	13.7	14.9	32.7	32.8
Selenium	µg/L	1.4	0.9	0.2 J	0.09 J	0.2 J	0.2 J	0.8	0.7	1.2	1.1	0.2 J	0.2 J
Sulfate	mg/L	-	274	-	264	-	387	-	667	-	715	-	848
Thallium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 J	0.2 J	0.5 U	0.5 U
Total Dissolved Solids	mg/L	-	814	-	595	-	809	-	1,390	-	1,520	-	1,670
pH	SU	6.7	6.7	6.4	6.4	6.4	6.5	6.4	6.7	6.7	6.9	6.9	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 sampled

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

Parameter	Unit	MW-1605S		MW-1606D		MW-1606S		MW-1607D		MW-1607S		MW-1608	
		3/10/2020	5/19/2020	3/10/2020	5/19/2020	3/10/2020	5/19/2020	3/11/2020	5/20/2020	3/10/2020	5/20/2020	3/10/2020	5/13/2020
Antimony	µg/L	0.08 J	0.04 J	0.14	0.15	0.13	0.14	0.1 U	0.03 J	0.41	0.45	0.1 U	0.04 J
Arsenic	µg/L	0.62	0.47	0.35	0.32	0.62	0.65	1.56	1.42	0.92	0.93	0.37	0.36
Barium	µg/L	26.5	21.1	45.3	45.6	60.9	59.8	68.3	65.6	69.2	66.8	30.5	31.3
Beryllium	µg/L	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-
Boron	mg/L	-	4.83	-	5.92	-	5.94	-	3.89	-	3.55	-	0.108
Cadmium	µg/L	0.04 J	0.03 J	0.05	0.06	0.07	0.06	0.05 U	0.05 U	0.04 J	0.04 J	0.05 U	0.02 J
Calcium	mg/L	-	154	-	270	-	207	-	228	-	190	-	92.7
Chloride	mg/L	-	93.5	-	178	-	181	-	181	-	172	-	5.22
Chromium	µg/L	0.305	0.1 J	0.2 J	0.1 J	0.1 J	0.1 J	0.08 J	0.2 J	0.321	0.249	0.264	0.2 J
Cobalt	µg/L	0.723	0.208	1.11	1.10	0.322	0.435	0.846	0.913	1.23	1.42	0.070	0.092
Combined Radium	pCi/L	0.842	0.639	0.946	0.975	0.434	0.3814	2.552	0.815	1.171	0.3123	0.67	0.569
Fluoride	mg/L	0.30	0.28	0.27	0.24	0.40	0.38	0.41	0.51	0.24	0.23	0.21	0.22
Lead	µg/L	0.497	0.2 U	0.2 U	0.2 U	0.05 J	0.2 U	0.2 U	0.05 J	0.06 J	0.06 J	0.06 J	0.275
Lithium	mg/L	0.0558	0.0523	0.0700	0.0681	0.0721	0.0730	0.108	0.104	0.110	0.105	0.00229	0.00241
Mercury	µg/L	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-
Molybdenum	µg/L	12.8	12.3	62.5	67.0	51.7	56.0	79.6	83.5	35.5	35.8	0.6 J	0.7 J
Selenium	µg/L	0.8	0.7	0.5	0.5	4.4	5.3	0.04 J	0.08 J	4.5	5.7	4.3	2.1
Sulfate	mg/L	-	543	-	756	-	646	-	722	-	407	-	158
Thallium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Dissolved Solids	mg/L	-	1,160	-	1,600	-	1,400	-	1,620	-	1,230	-	440
pH	SU	6.9	6.9	7.0	7.0	6.8	6.7	7.1	7.2	6.9	7.0	6.7	6.8

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

Table 2: Groundwater Protection Standards
Mountaineer Plant - Bottom Ash Pond

Constituent Name	MCL	CCR Rule-Specified	Background Limit
Antimony, Total (mg/L)	0.006		0.0001
Arsenic, Total (mg/L)	0.01		0.00074
Barium, Total (mg/L)	2		0.068
Beryllium, Total (mg/L)	0.004		0.0001
Cadmium, Total (mg/L)	0.005		0.00003
Chromium, Total (mg/L)	0.1		0.0008
Cobalt, Total (mg/L)	n/a	0.006	0.0006
Combined Radium, Total (pCi/L)	5		2.30
Fluoride, Total (mg/L)	4		0.29
Lead, Total (mg/L)	n/a	0.015	0.00088
Lithium, Total (mg/L)	n/a	0.04	0.025
Mercury, Total (mg/L)	0.002		0.000005
Molybdenum, Total (mg/L)	n/a	0.1	0.0028
Selenium, Total (mg/L)	0.05		0.0043
Thallium, Total (mg/L)	0.002		0.0005

Notes:
Grey cell indicates calculated UTL is higher than MCL.
MCL = Maximum Contaminant Level
Calculated UTL (Upper Tolerance Limit) represents site-specific background values.
The higher of the calculated UTL or MCL/Rule-Specified Level is used as the GWPS.

Table 3: Appendix III Data Summary
Mountaineer Plant - Bottom Ash Pond

Geosyntec Consultants, Inc.

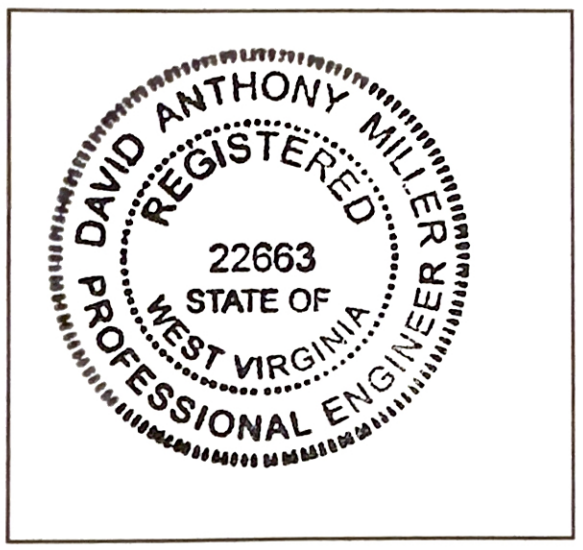
Analyte	Unit	Description	MW-1604D	MW-1604S	MW-1605D	MW-1605S	MW-1606D	MW-1606S	MW-1607D	MW-1607S
			5/14/2020	5/14/2020	5/19/2020	5/19/2020	5/19/2020	5/19/2020	5/20/2020	5/20/2020
Boron	mg/L	Interwell Background Value (UPL)	0.614							
		Analytical Result	**4.65**	**3.68**	**6.92**	**4.83**	**5.92**	**5.94**	**3.89**	**3.55**
Calcium	mg/L	Interwell Background Value (UPL)	200							
		Analytical Result	**205**	**250**	**265**	154	**270**	**207**	**228**	190
Chloride	mg/L	Interwell Background Value (UPL)	68.5							
		Analytical Result	**113**	**116**	**169**	**93.5**	**178**	**181**	**181**	**172**
Fluoride	mg/L	Interwell Background Value (UPL)	0.271							
		Analytical Result	0.25	**0.25**	0.17	**0.28**	0.24	**0.38**	**0.51**	0.23
pH	SU	Intrawell Background Value (UPL)	7.8	7.8	7.9	7.9	7.9	8.1	8.0	7.8
		Intrawell Background Value (LPL)	6.7	6.6	6.9	6.8	6.9	6.1	7.0	7.2
		Analytical Result	6.7	6.9	7.0	6.9	7.0	6.7	7.2	**7.0**
Sulfate	mg/L	Interwell Background Value (UPL)	674							
		Analytical Result	667	**715**	**848**	543	**756**	646	**722**	407
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	1,040							
		Analytical Result	**1,390**	**1,520**	**1,670**	**1,160**	**1,600**	**1,400**	**1,620**	**1,230**

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

22663
License Number

WEST VIRGINIA
Licensing State

10.06.2020
Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS CONSULTING

August 28, 2020

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

Re: Mountaineer BAP – Assessment Monitoring Report May 2020

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the Assessment Monitoring statistical analysis of groundwater data through May 2020 for American Electric Power Inc.'s Mountaineer Bottom Ash Pond. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

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

- **Upgradient wells:** 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, Groundwater Statistician and Founder of Groundwater Stats Consulting.

The CCR program consists of the following Assessment Monitoring constituents:

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

Time series plots for Appendix IV parameters are provided for all wells and are used to evaluate concentrations over time (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.

Evaluation of Appendix IV Parameters – May 2020

Interwell Tolerance limits were used to calculate background limits from all available pooled upgradient well data for Appendix IV parameters to determine the background limit for each constituent (Figure D). Background data were screened for outliers in December 2019 and extreme trending patterns that would lead to artificially elevated statistical limits. In some cases, due to the natural log transformation, Tukey's test did not identify outliers for values which were significantly higher than remaining observations in a given well. For instance, during the December 2016 sample event, high values were reported for chromium in several wells (both upgradient and downgradient). These values were flagged in the database as outliers as they did not appear to represent the population at these wells. Any flagged values may be seen on the Outlier Summary following this letter.

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

Confidence intervals were then constructed on downgradient wells for each of the Appendix IV parameters using the highest limit of the MCL, CCR-rule specified, or background as discussed above (Figure F). Only when the entire confidence interval is

above a GWPS is the well/constituent pair considered to exceed its respective standard. No confidence interval exceedances were found except for lithium in wells MW-1605D, MW1605S, MW-1606D, MW-1606S, MW-1607D and MW-1607S. A summary of the confidence interval results follows this letter.

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.

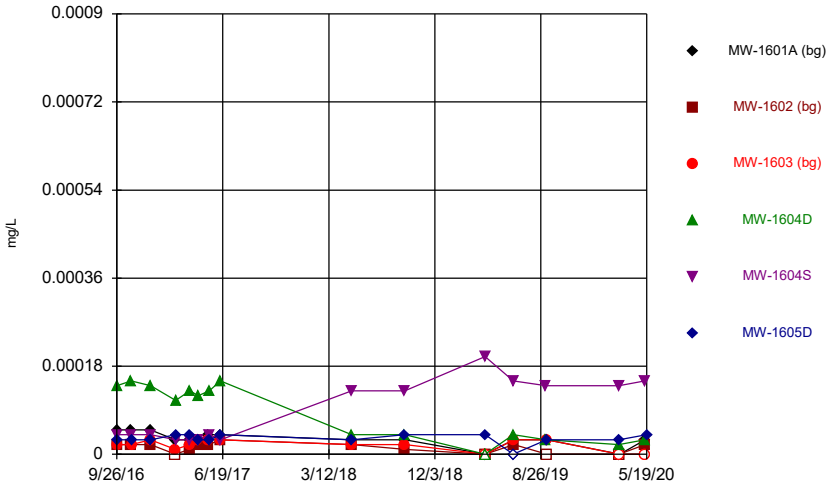
For Groundwater Stats Consulting,

Easton Rayner
Groundwater Analyst

Kristina L. Rayner
Groundwater Statistician

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

Time Series



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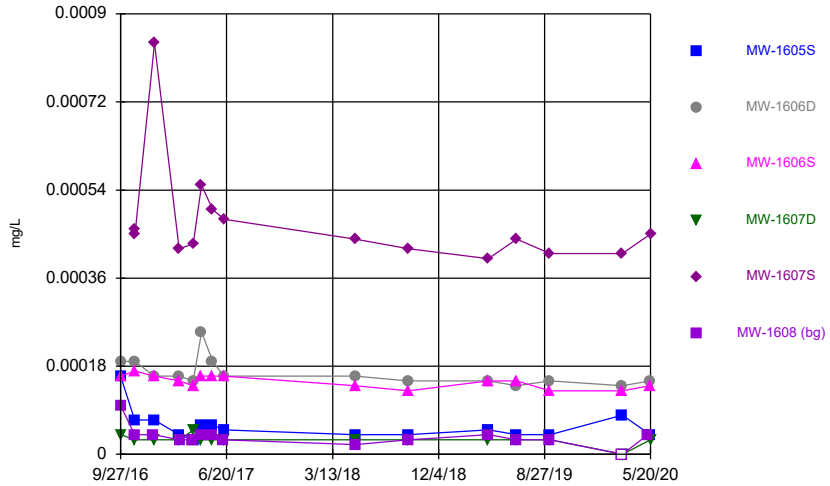
Time Series



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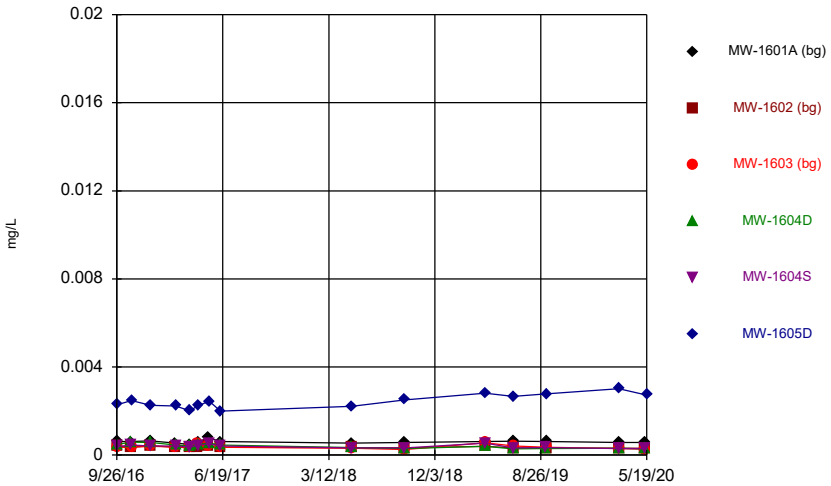

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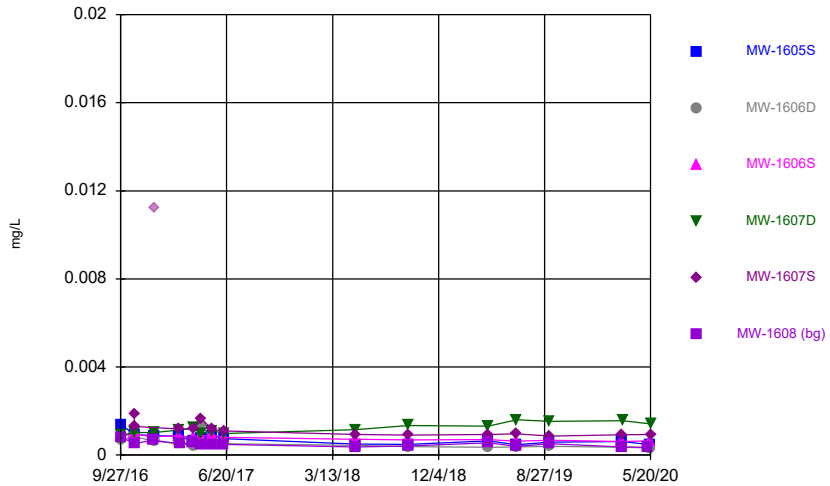

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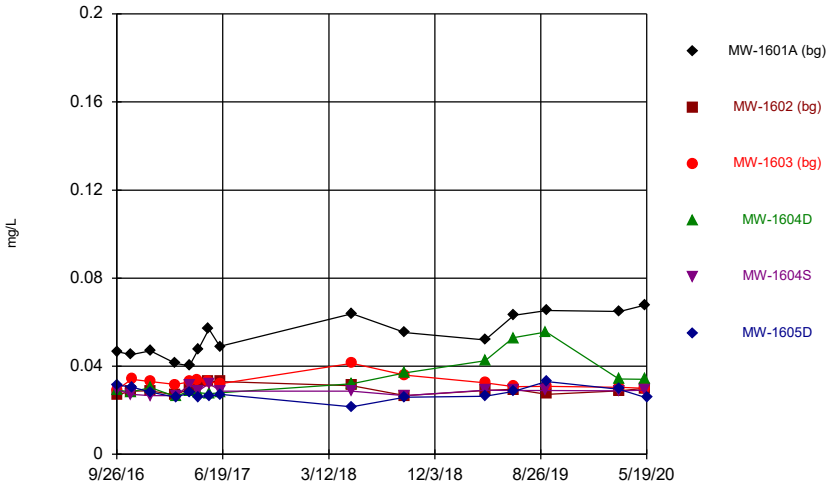

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Sanitas™ v.9.6.26g . UG

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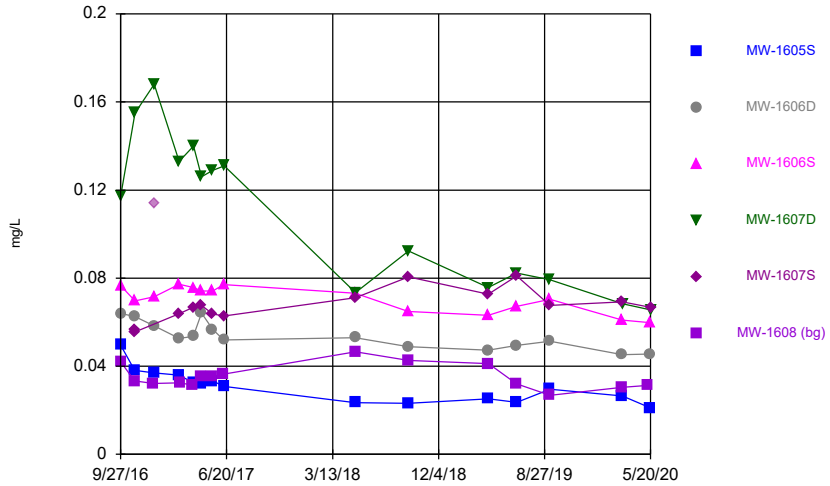

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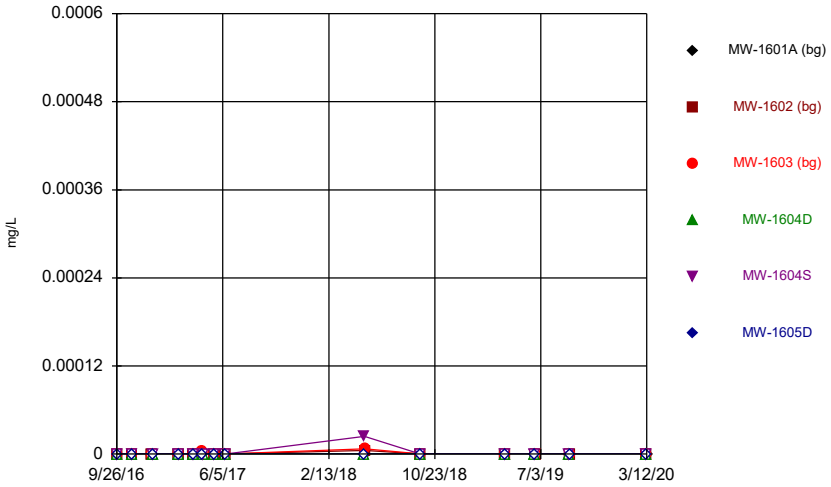
Time Series



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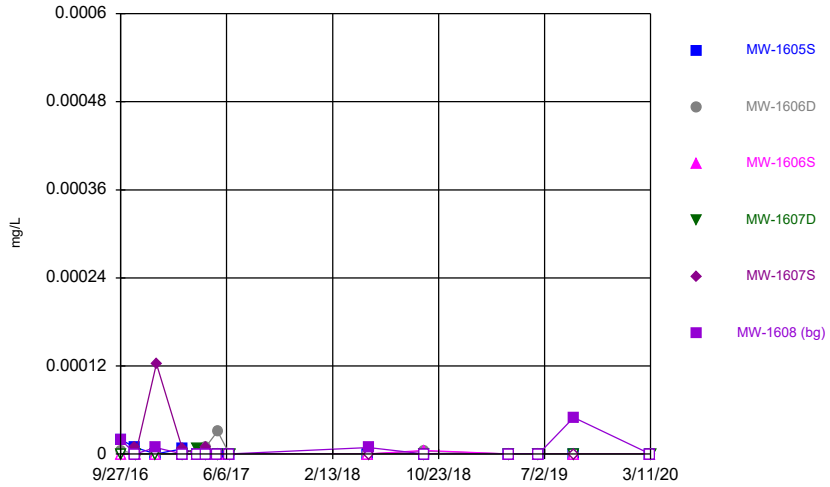
Hollow symbols indicate censored values.

Time Series



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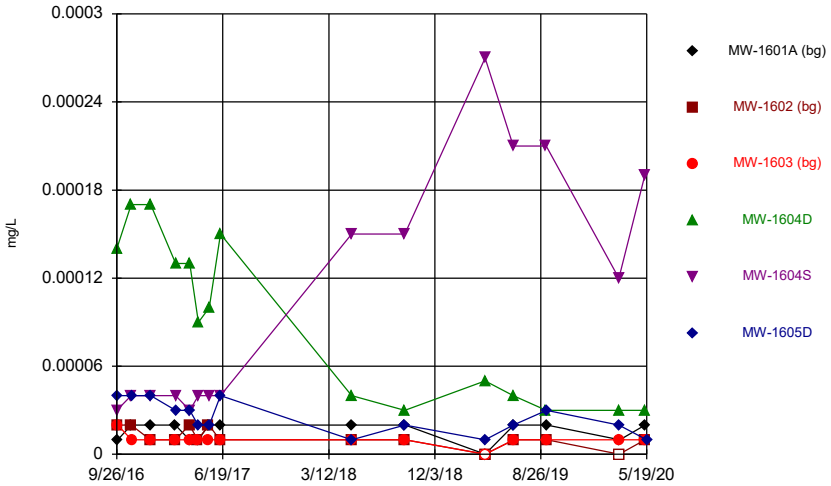
Time Series



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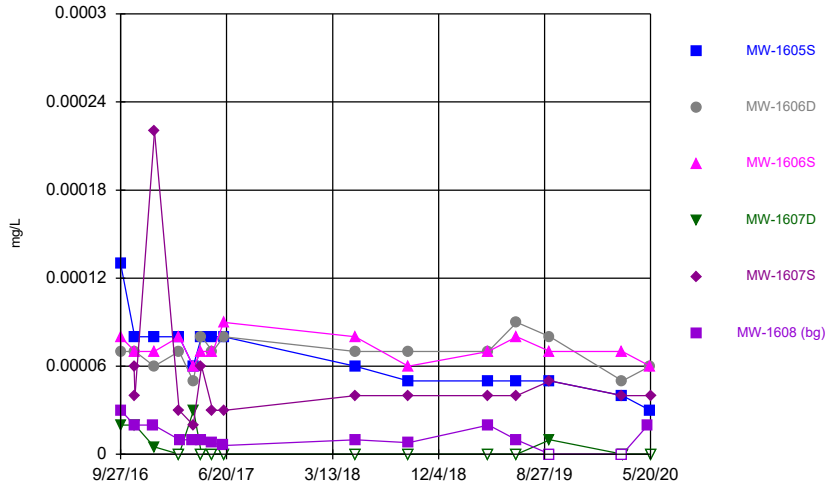

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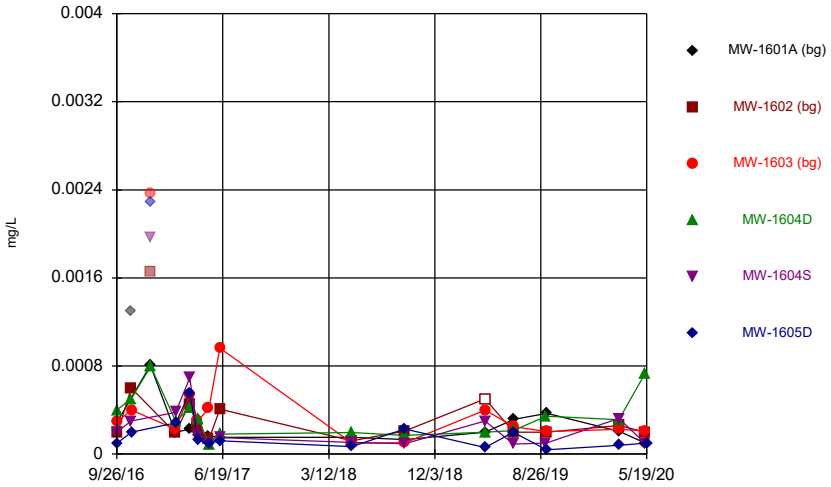
Hollow symbols indicate censored values.

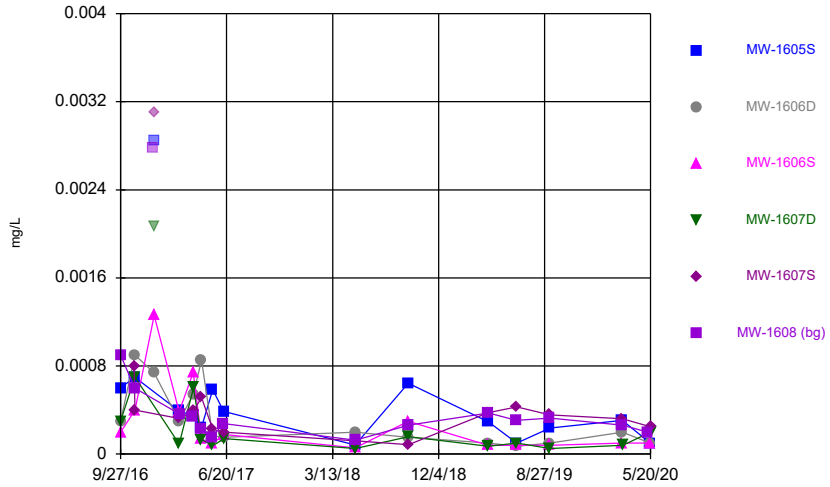
Time Series



Constituent: Chromium, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

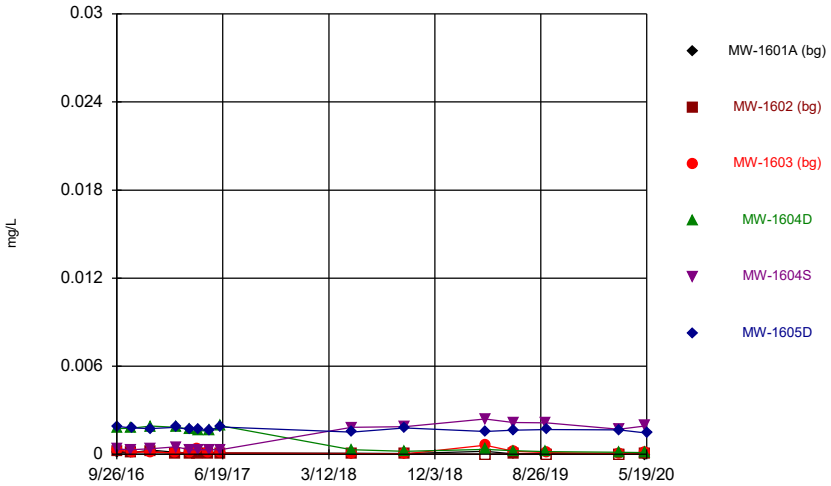
Time Series



Constituent: Chromium, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

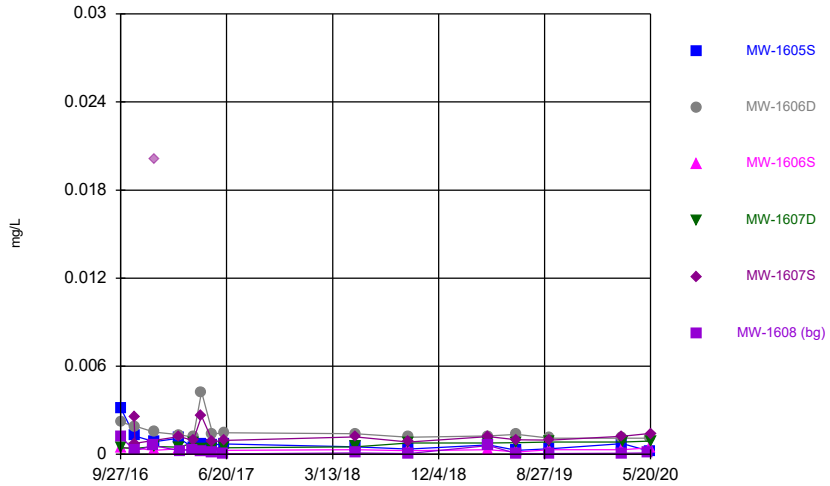
Time Series



Constituent: Cobalt, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

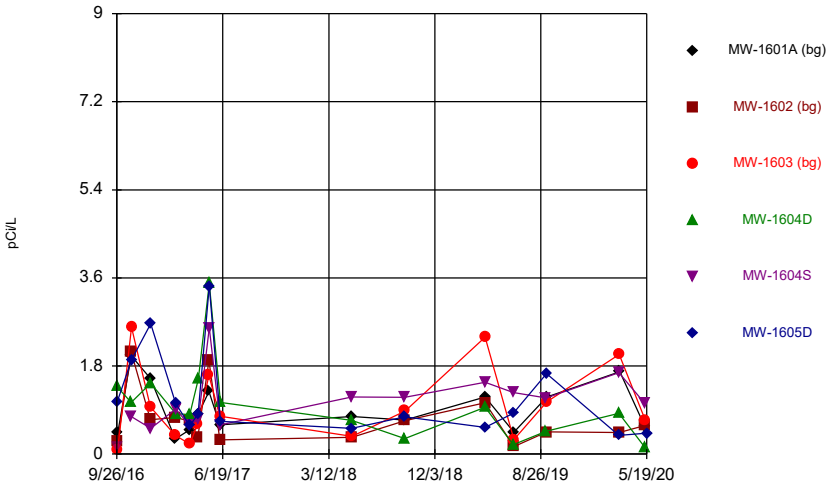
Time Series



Constituent: Cobalt, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

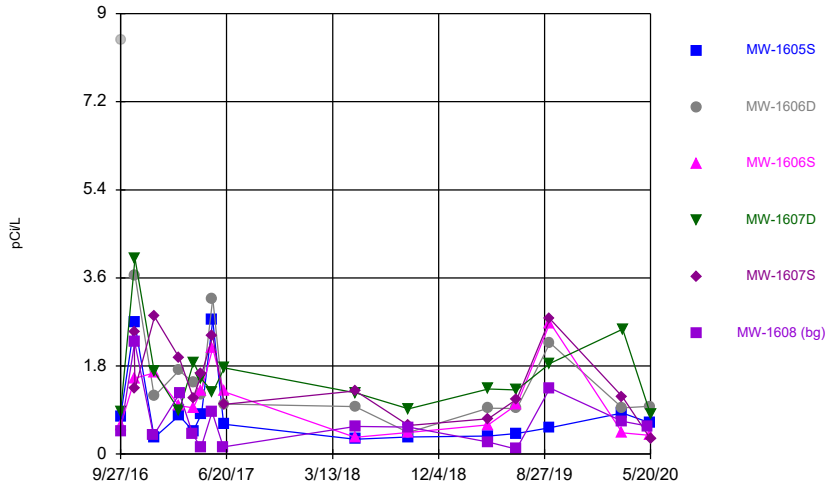
Time Series



Constituent: Combined Radium 226 + 228 Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

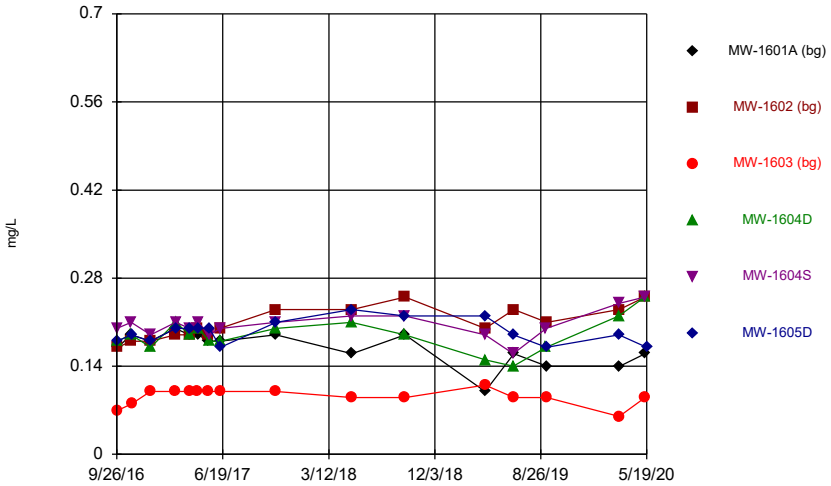
Time Series



Constituent: Combined Radium 226 + 228 Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Time Series

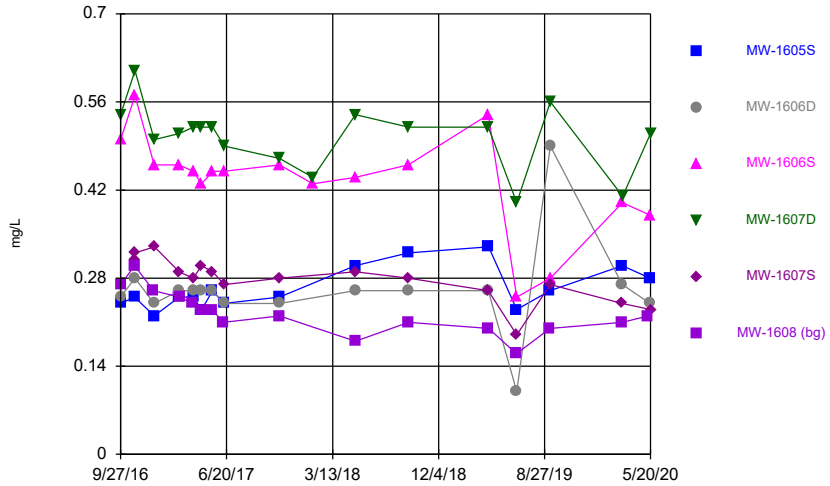


Constituent: Fluoride, total Analysis Run 8/26/2020 7:53 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Time Series



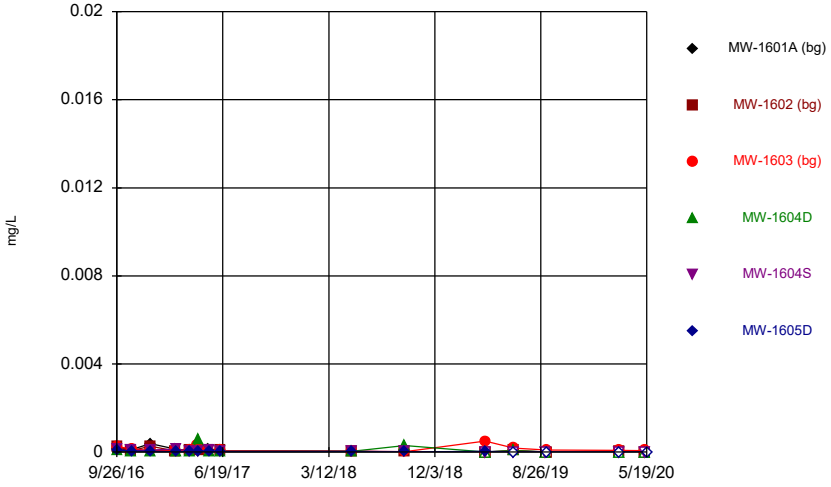
Constituent: Fluoride, total Analysis Run 8/26/2020 7:53 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Hollow symbols indicate censored values.

Time Series



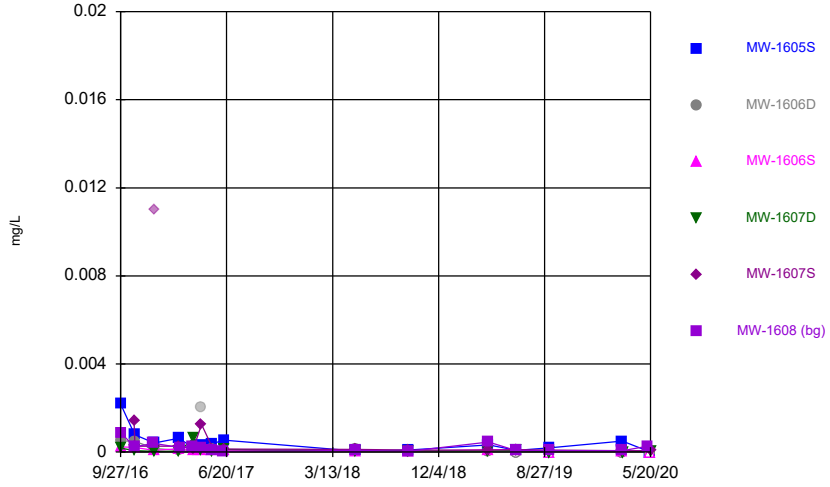
Constituent: Lead, total Analysis Run 8/26/2020 7:53 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Hollow symbols indicate censored values.

Time Series

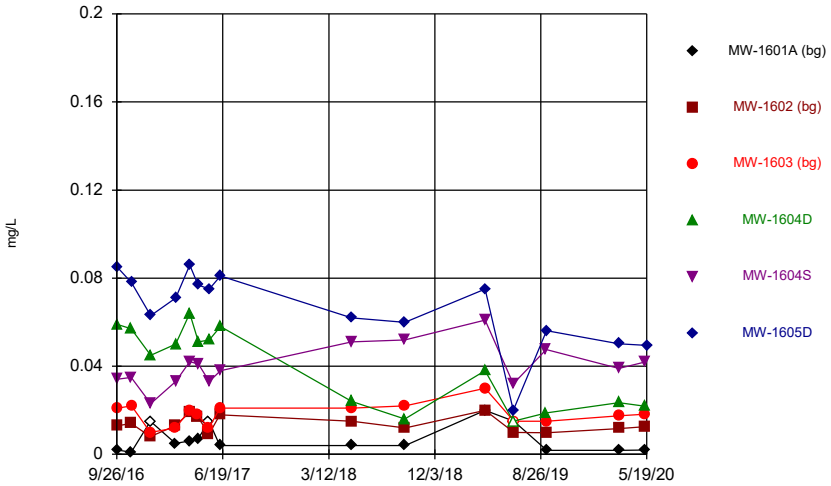


Constituent: Lead, total Analysis Run 8/26/2020 7:53 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

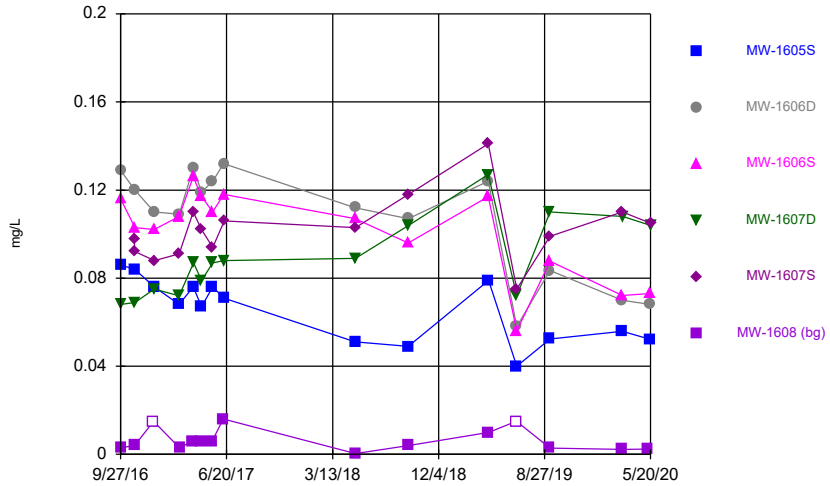
Time Series



Constituent: Lithium, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

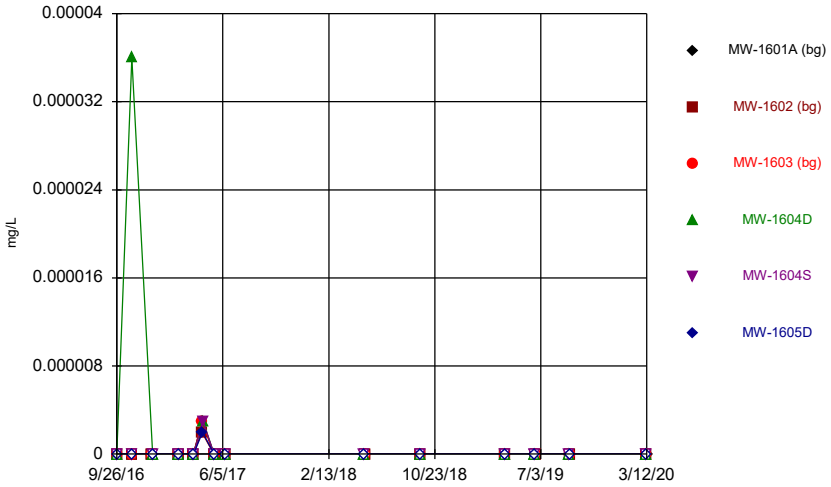
Time Series



Constituent: Lithium, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

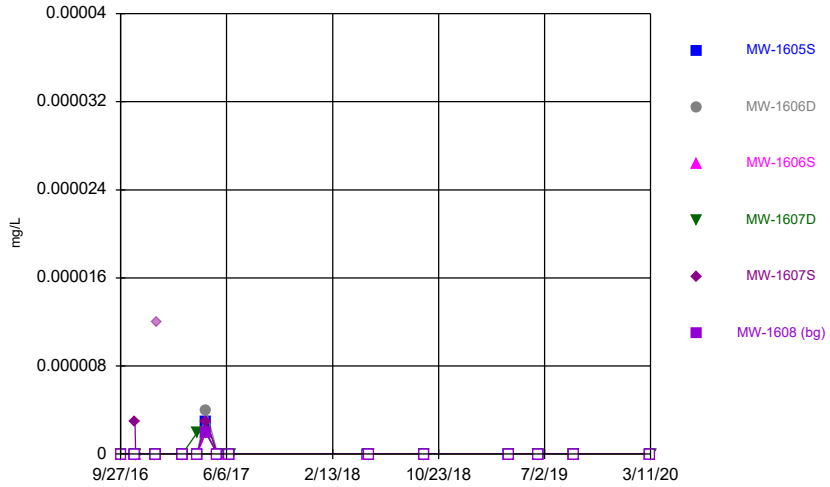
Time Series



Constituent: Mercury, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

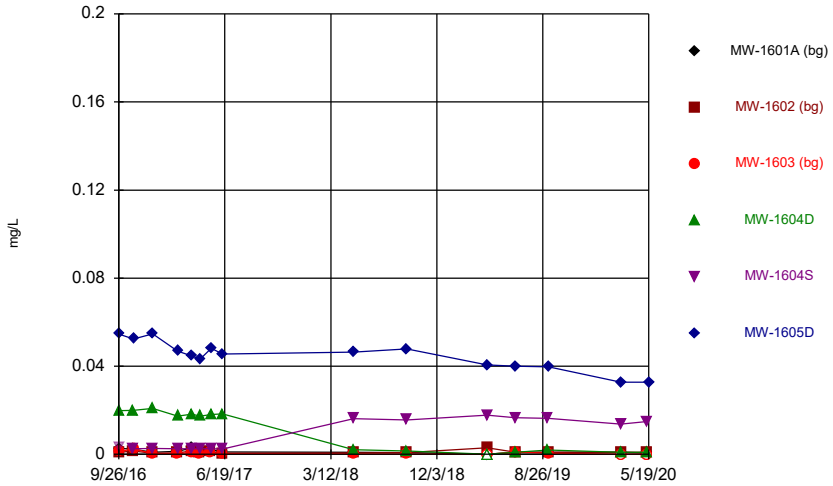
Time Series



Constituent: Mercury, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

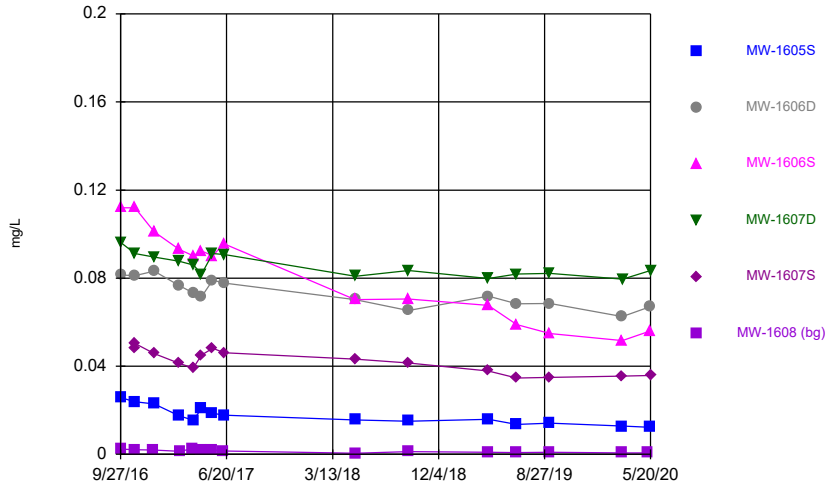
Time Series



Constituent: Molybdenum, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

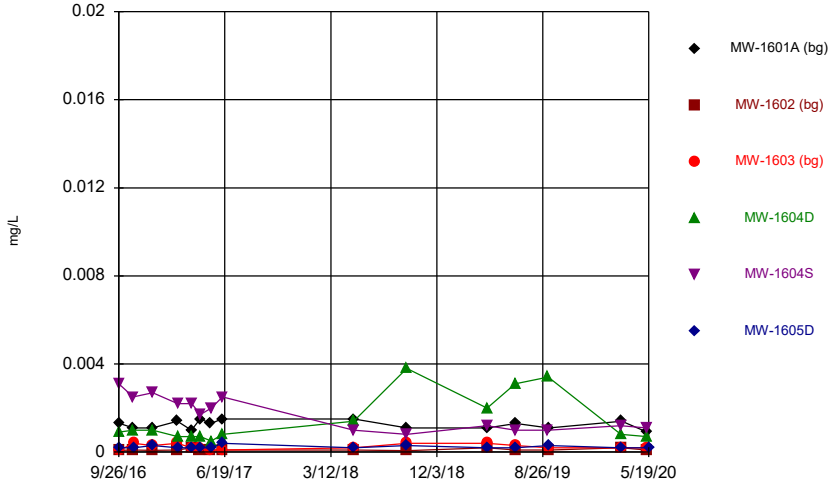
Time Series



Constituent: Molybdenum, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

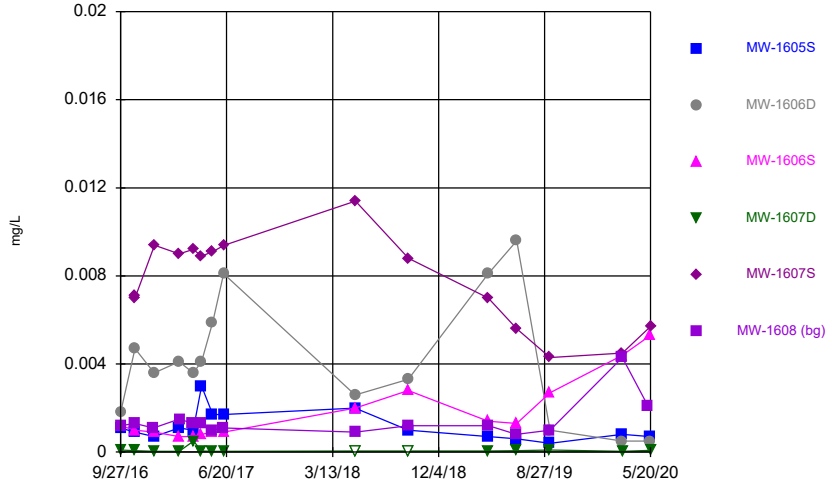
Time Series



Constituent: Selenium, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

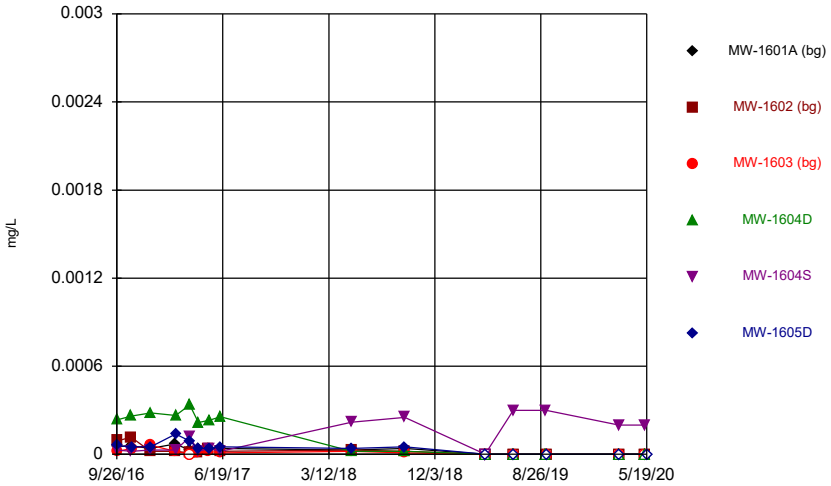
Time Series



Constituent: Selenium, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

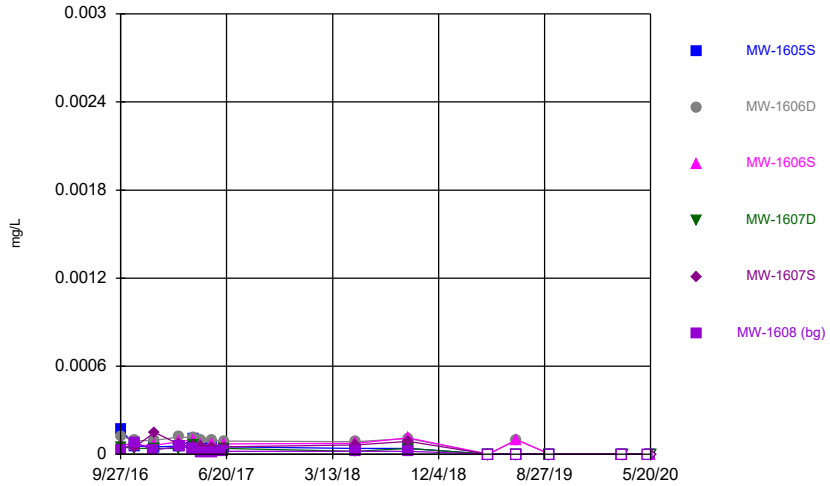
Time Series



Constituent: Thallium, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG
Hollow symbols indicate censored values.

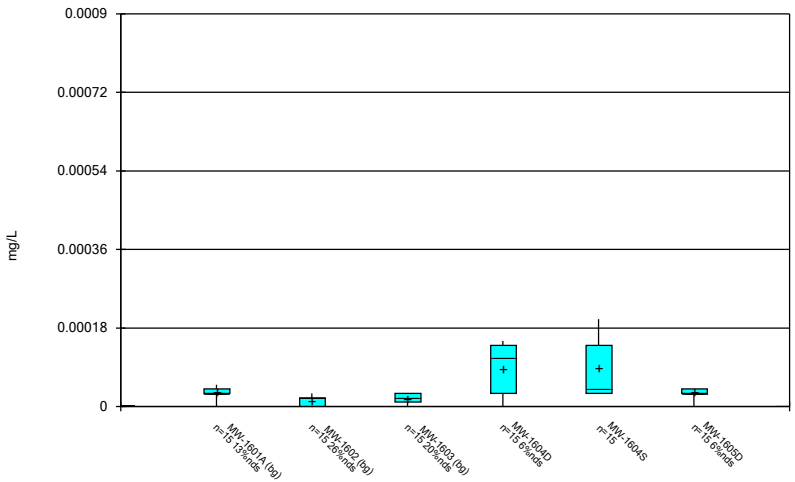
Time Series



Constituent: Thallium, total Analysis Run 8/26/2020 7:53 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

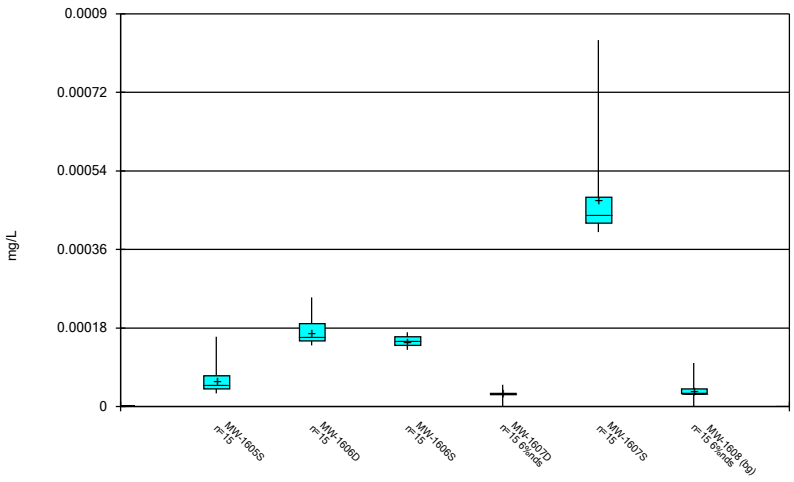
Box & Whiskers Plot



Constituent: Antimony, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

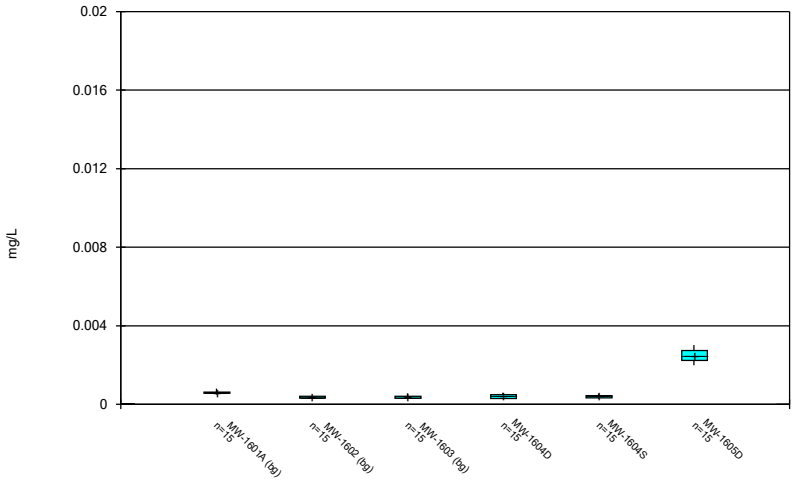
Box & Whiskers Plot



Constituent: Antimony, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

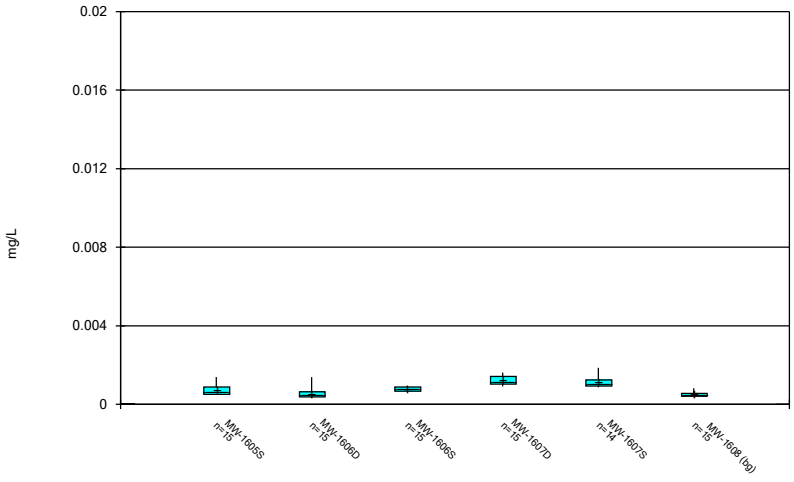
Box & Whiskers Plot



Constituent: Arsenic, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

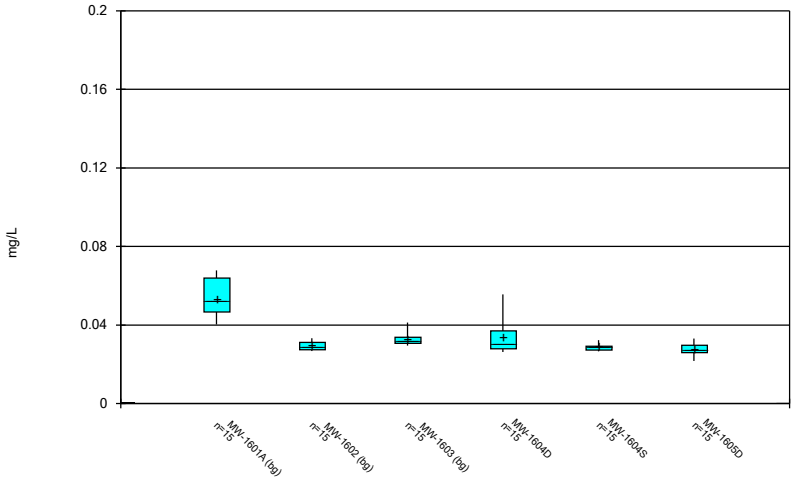
Box & Whiskers Plot



Constituent: Arsenic, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

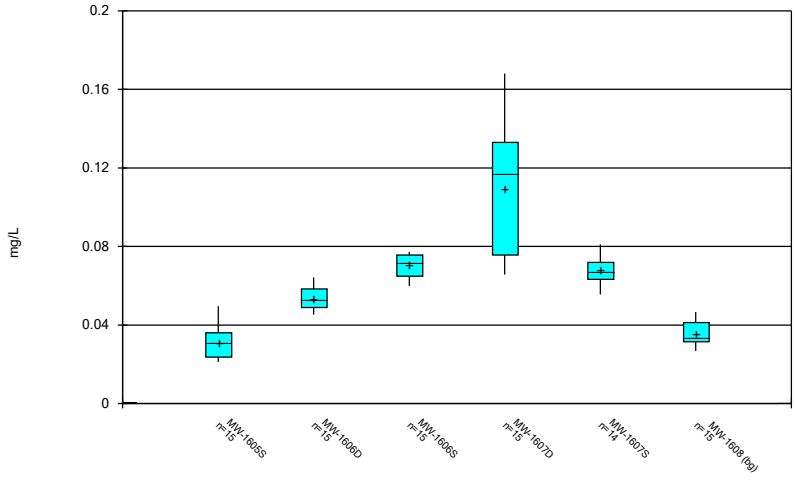


Constituent: Barium, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

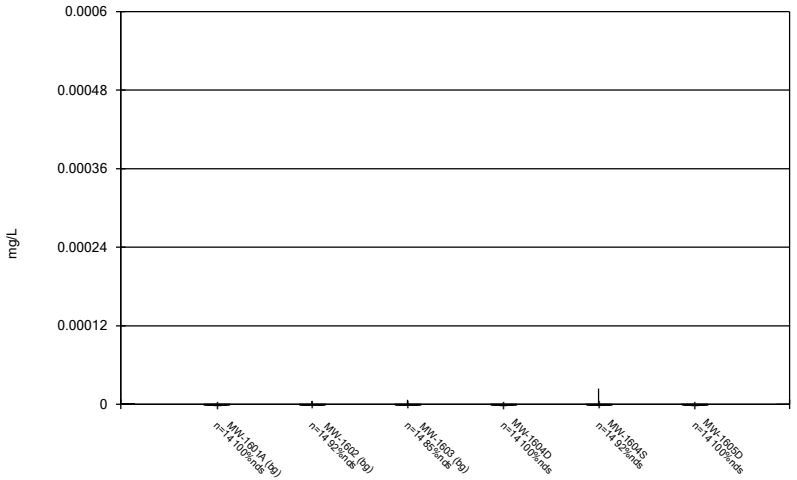


Constituent: Barium, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

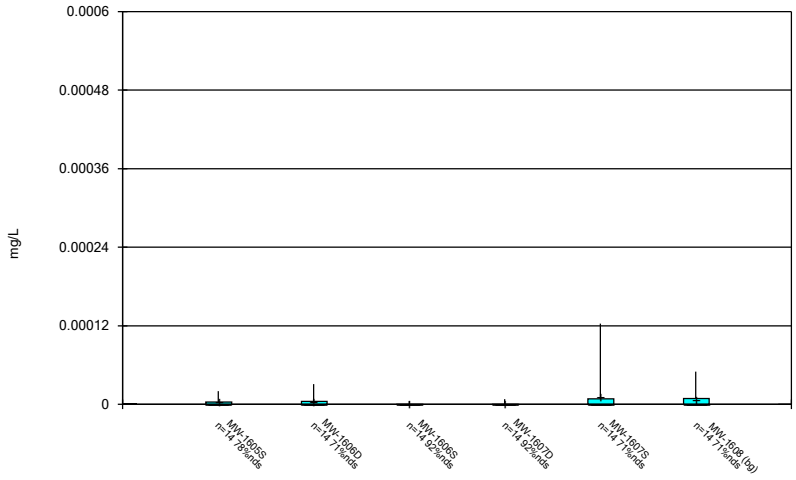


Constituent: Beryllium, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

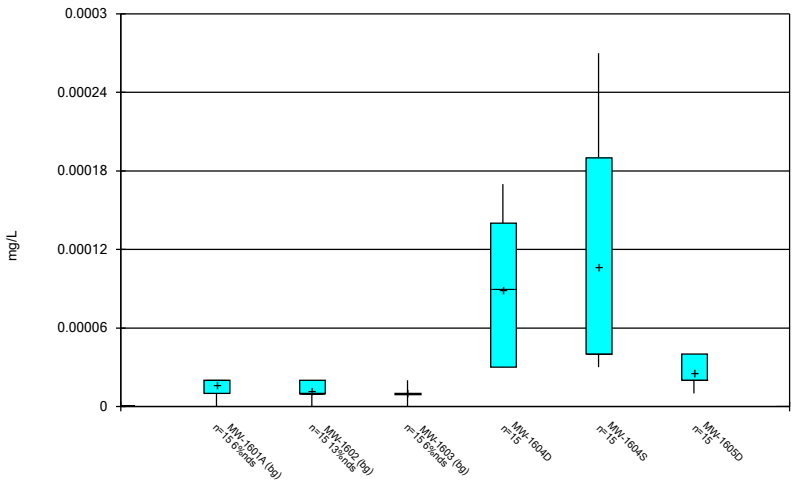


Constituent: Beryllium, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

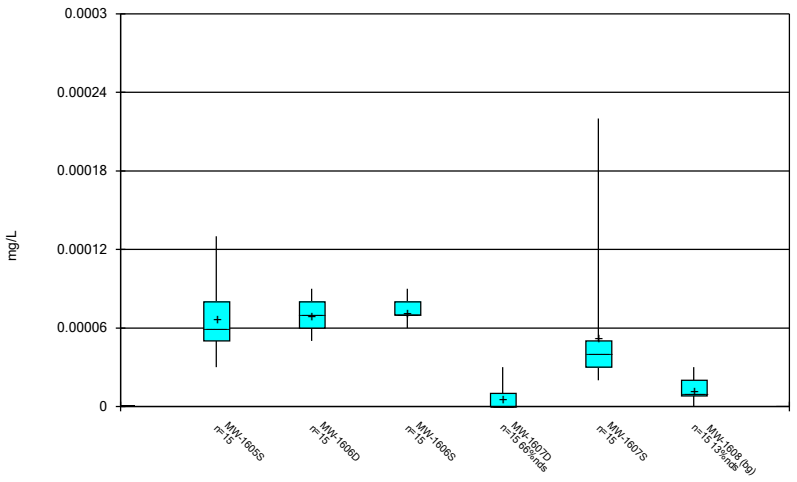
Box & Whiskers Plot



Constituent: Cadmium, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

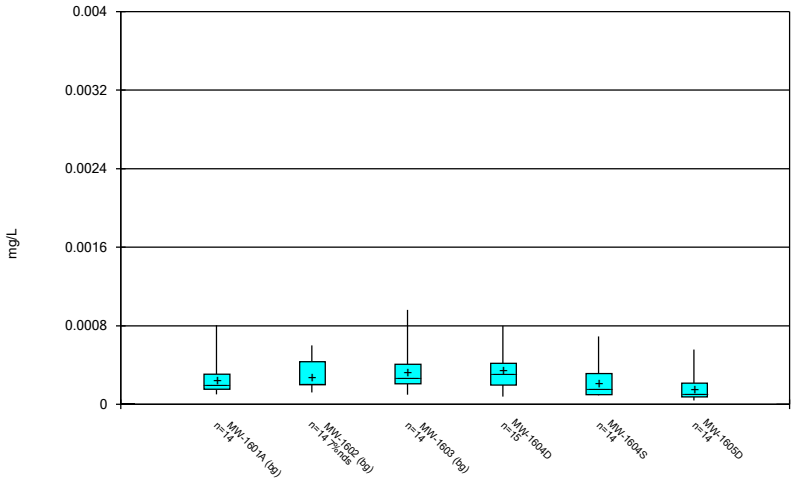
Box & Whiskers Plot



Constituent: Cadmium, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

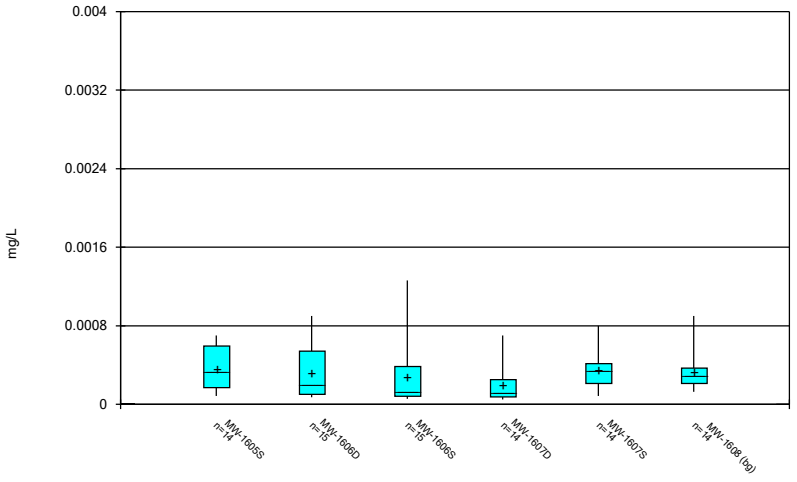
Box & Whiskers Plot



Constituent: Chromium, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

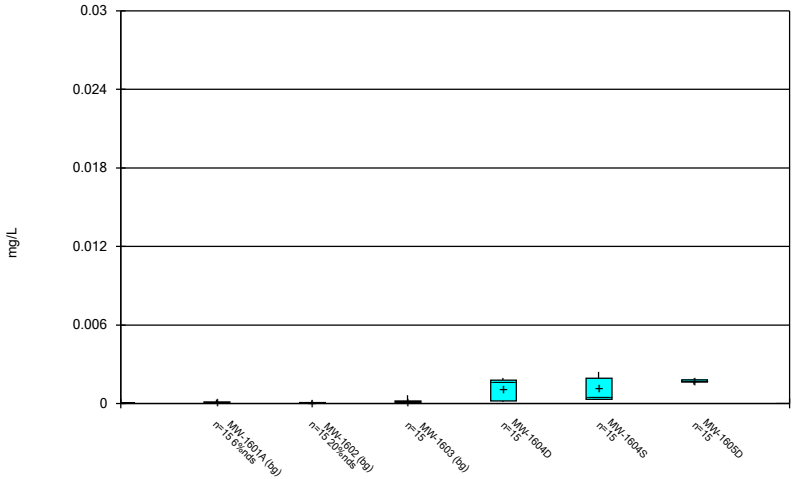
Box & Whiskers Plot



Constituent: Chromium, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

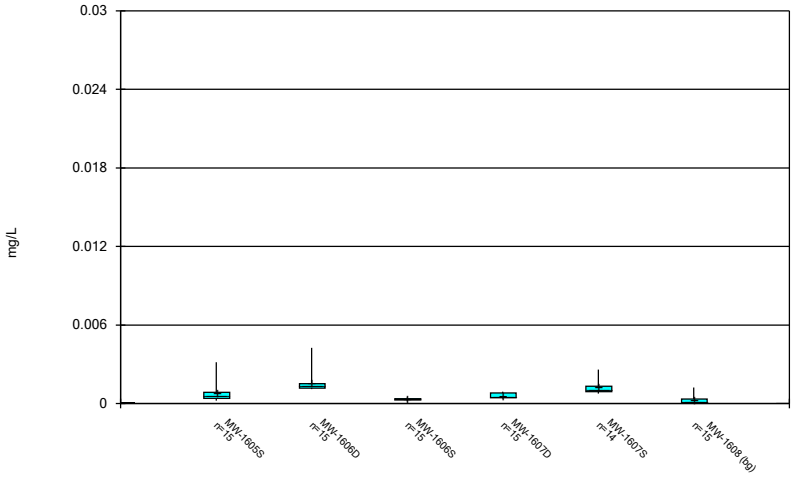
Box & Whiskers Plot



Constituent: Cobalt, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

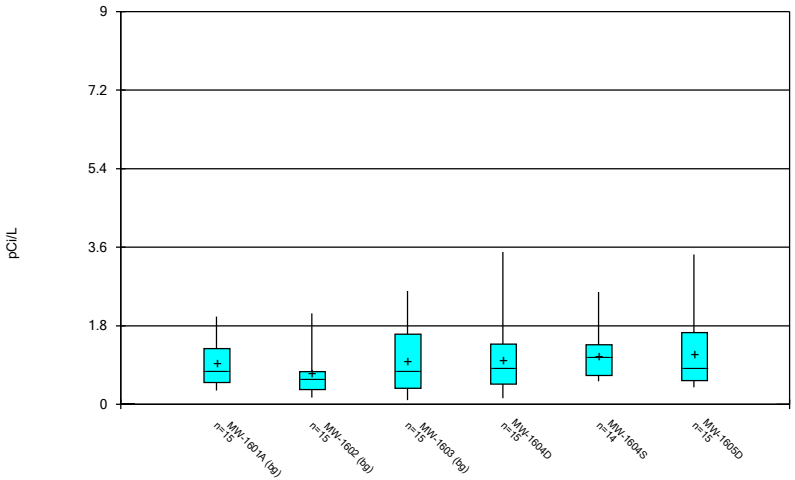
Box & Whiskers Plot



Constituent: Cobalt, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

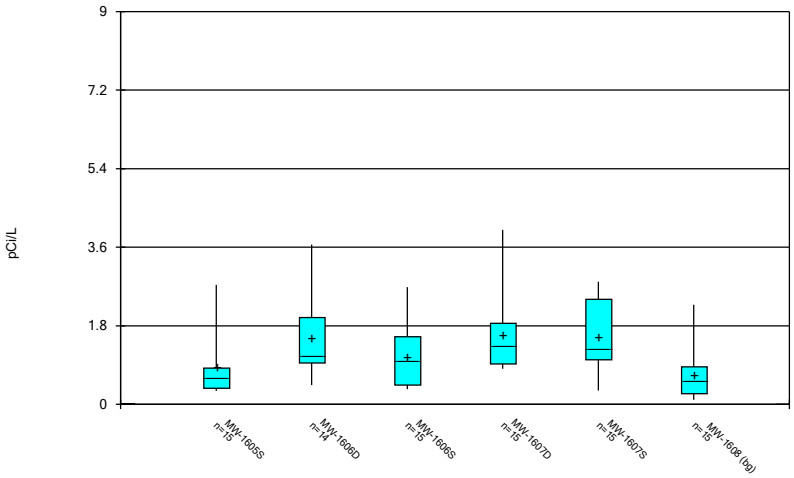
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228 Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

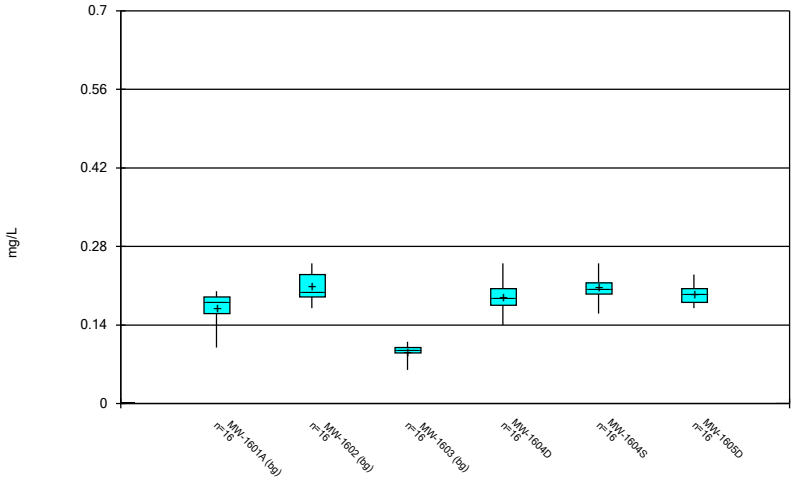
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228 Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

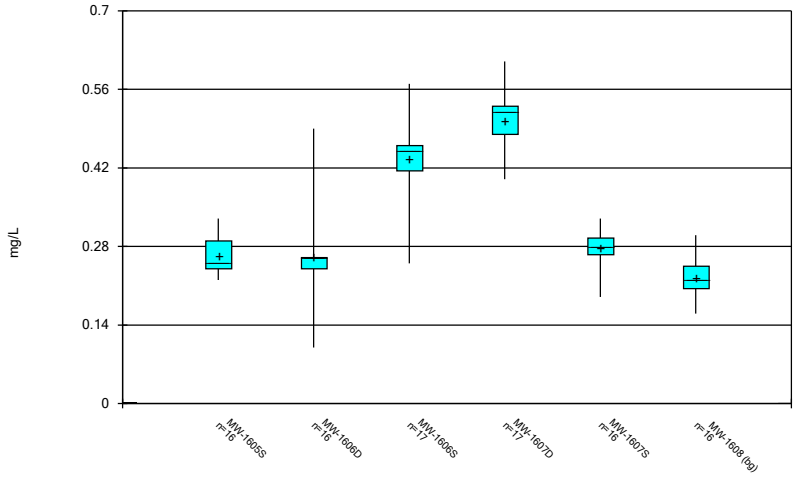
Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

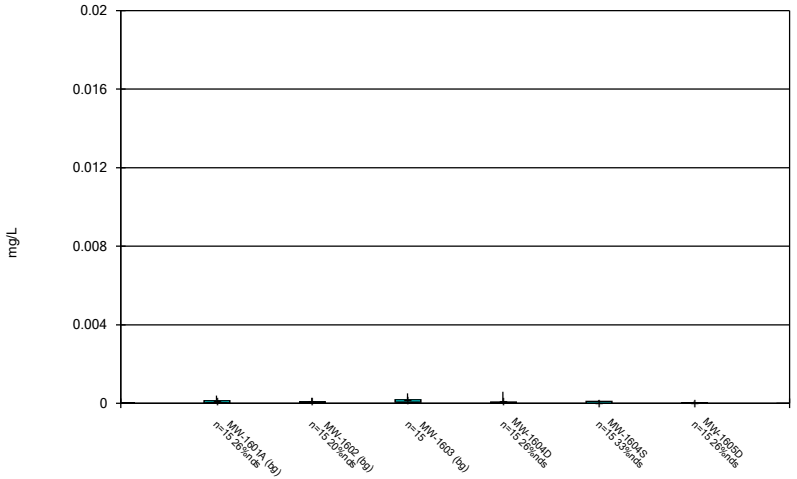
Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

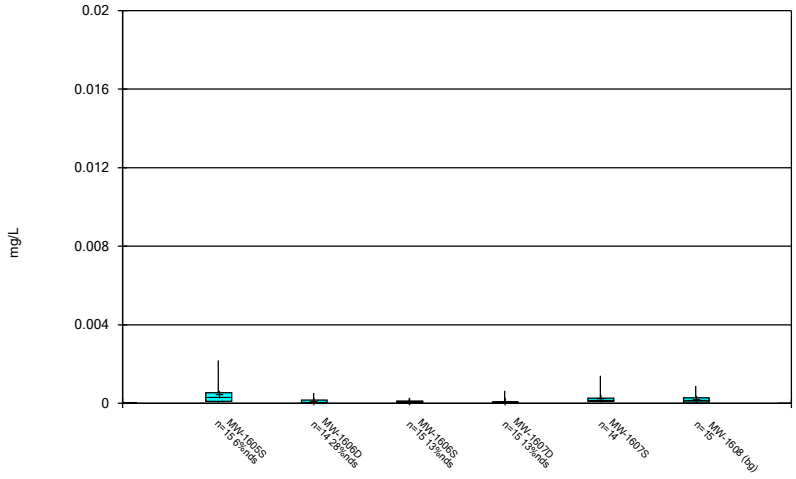
Box & Whiskers Plot



Constituent: Lead, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

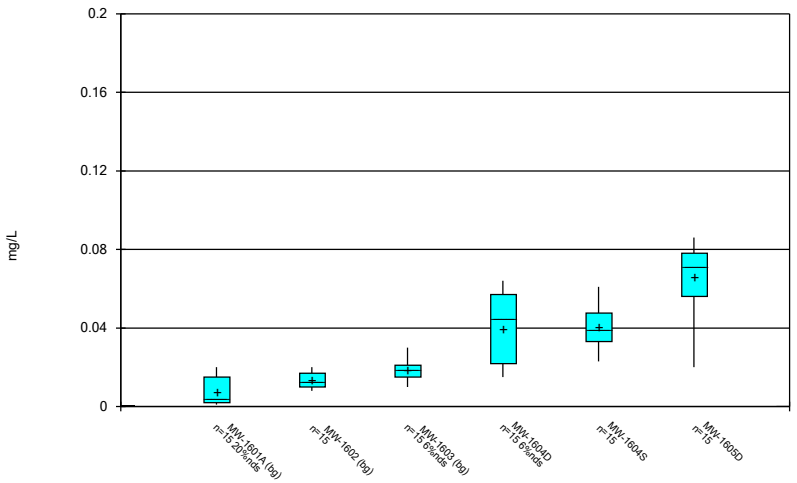
Box & Whiskers Plot



Constituent: Lead, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

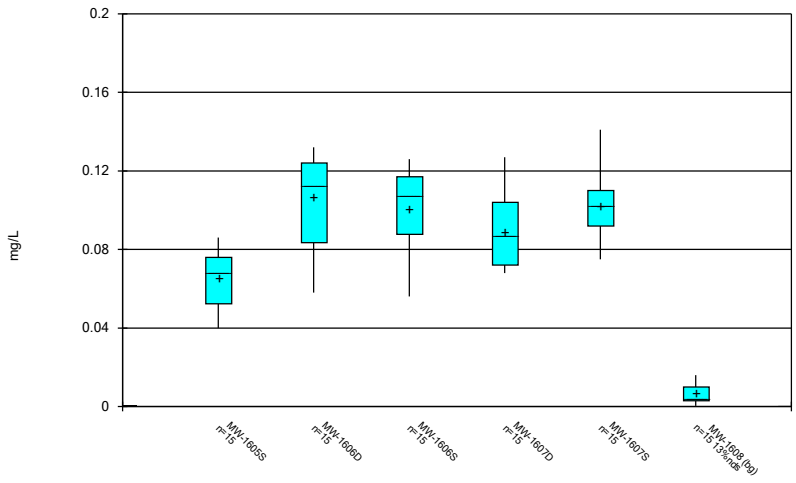


Constituent: Lithium, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

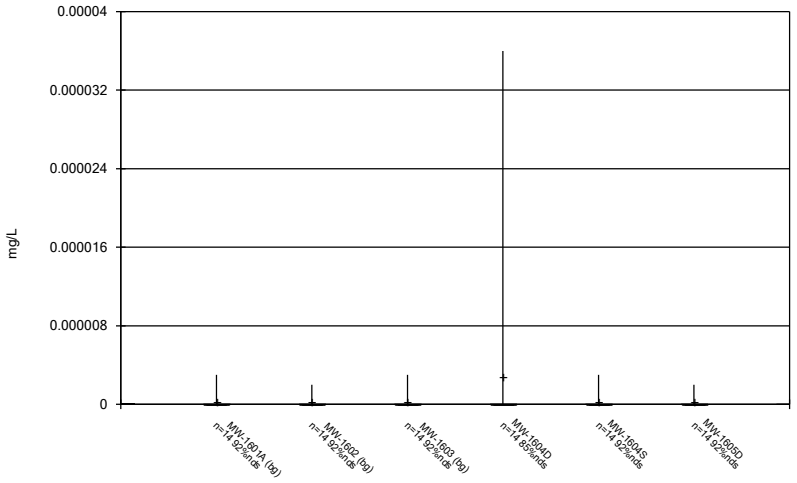


Constituent: Lithium, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

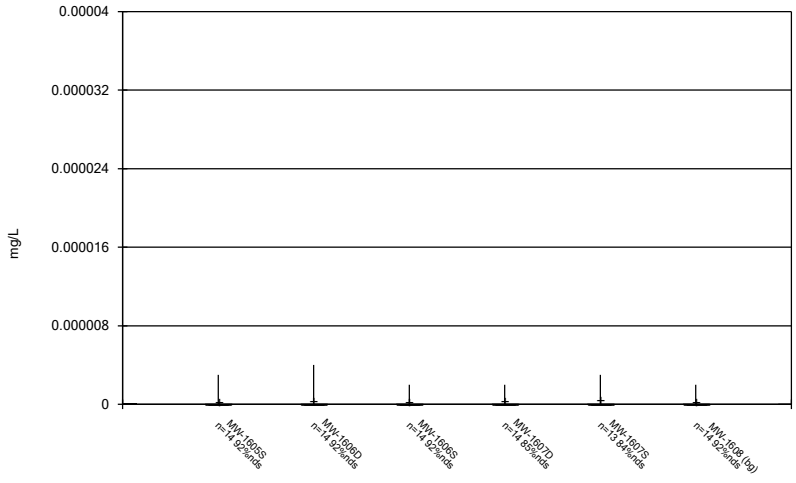


Constituent: Mercury, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

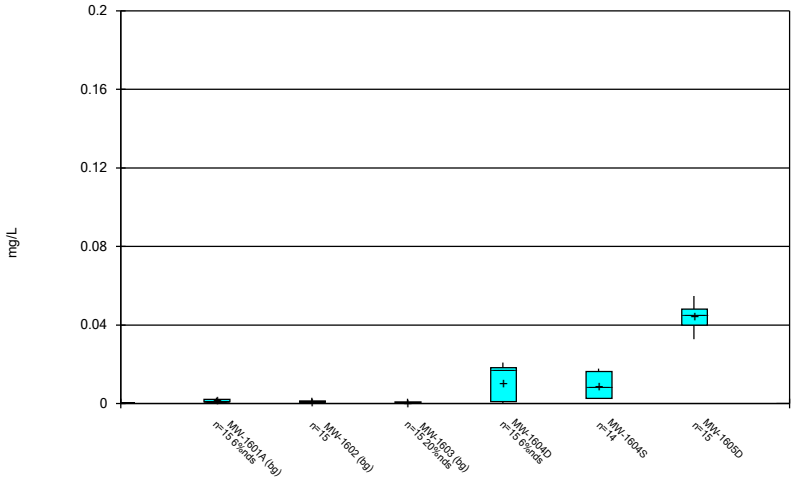


Constituent: Mercury, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

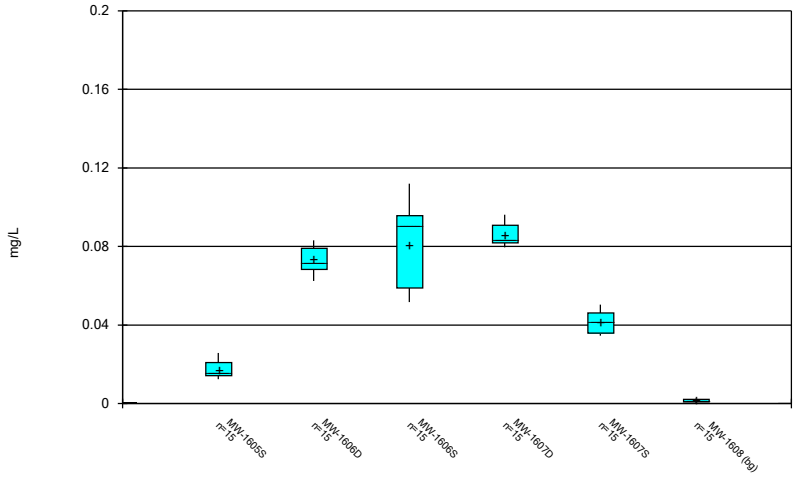


Constituent: Molybdenum, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

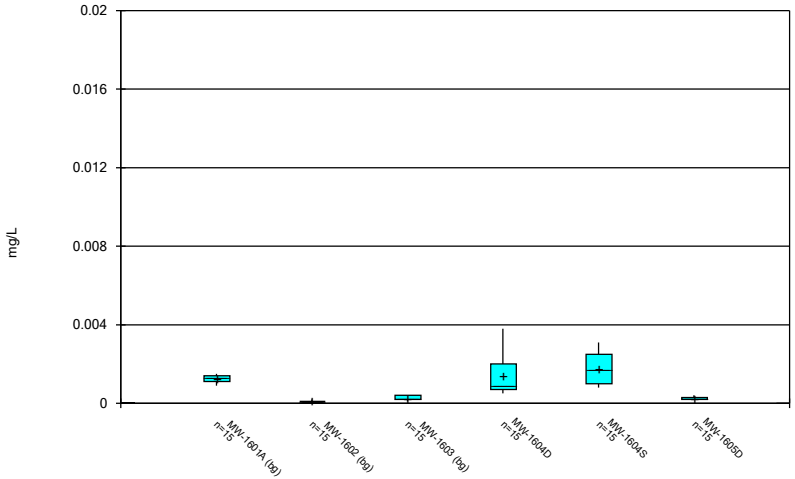


Constituent: Molybdenum, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot

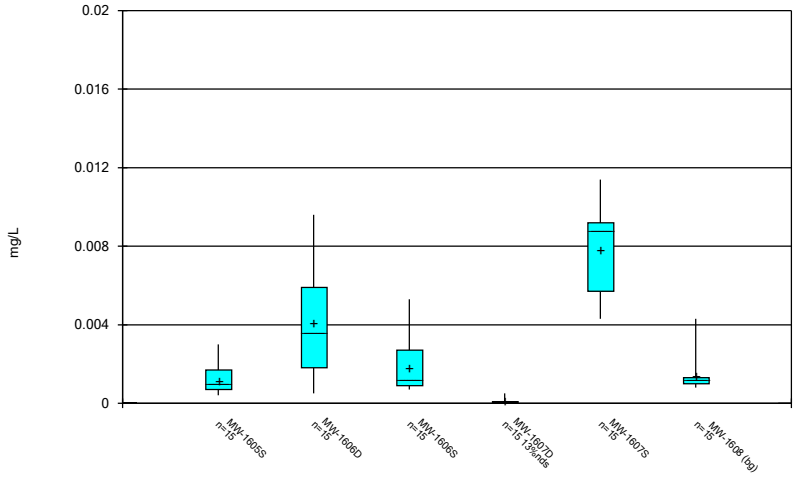


Constituent: Selenium, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

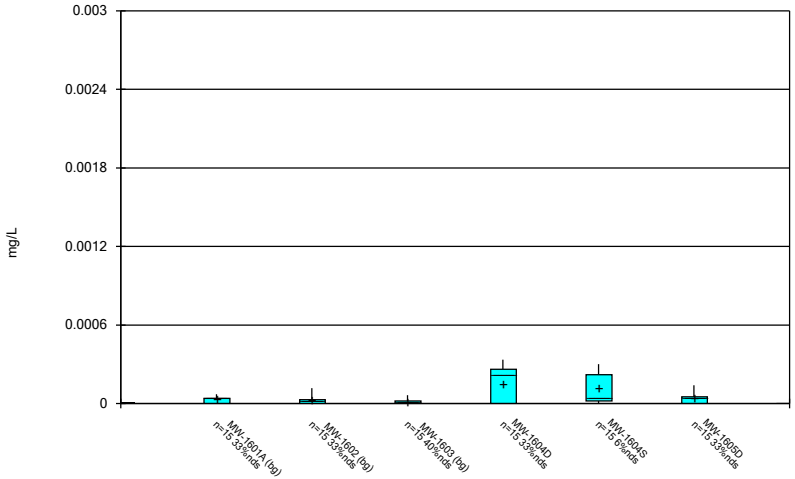
Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 8/26/2020 7:55 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

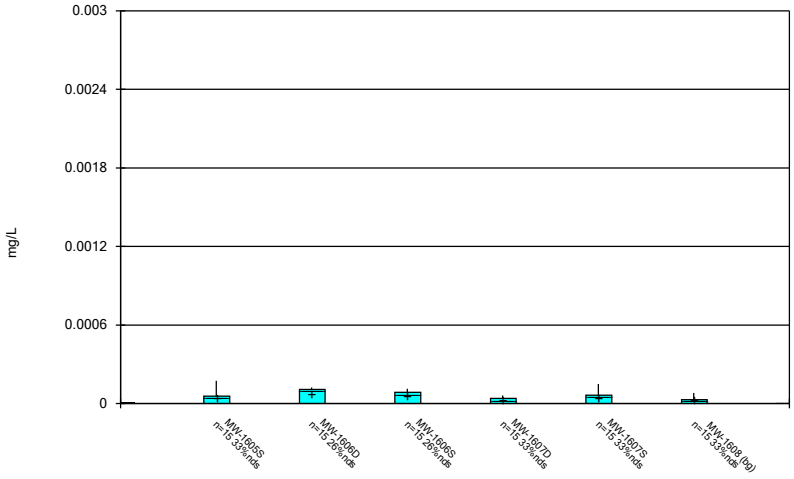
Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/26/2020 7:55 PM
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Outlier Report

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/26/2020, 8:02 PM

	MW-1607S Arsenic, total (mg/L)	MW-1607S Barium, 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)	MW-1607D Chromium, total (mg/L)	MW-1607S 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)	0.00207 (o)	
12/21/2016	0.0112 (o)	0.114 (o)								0.0031 (o)
4/18/2017										

	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-1606D Lead, total (mg/L)	MW-1607S Lead, total (mg/L)	MW-1607S Mercury, total (mg/L)	MW-1604S Molybdenum, total (mg/L)
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								
12/21/2016		0.0201 (o)				0.011 (o)	1.2E-05 (o)	
4/18/2017					0.00204 (o)			

Upper Tolerance Limits

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/28/2020, 1:24 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.00010	n/a	n/a	n/a	60	16.67	n/a	0.04607	NP Inter(normal...
Arsenic, total (mg/L)	n/a	0.00074	n/a	n/a	n/a	60	0	sqrt(x)	0.05	Inter
Barium, total (mg/L)	n/a	0.068	n/a	n/a	n/a	60	0	n/a	0.04607	NP Inter(normal...
Beryllium, total (mg/L)	n/a	0.00010	n/a	n/a	n/a	56	87.5	n/a	0.05656	NP Inter(NDs)
Cadmium, total (mg/L)	n/a	0.000030	n/a	n/a	n/a	60	10	n/a	0.04607	NP Inter(normal...
Chromium, total (mg/L)	n/a	0.00076	n/a	n/a	n/a	56	1.786	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.00062	n/a	n/a	n/a	60	6.667	ln(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	n/a	2.3	n/a	n/a	n/a	60	0	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	n/a	0.29	n/a	n/a	n/a	64	0	No	0.05	Inter
Lead, total (mg/L)	n/a	0.00088	n/a	n/a	n/a	60	11.67	n/a	0.04607	NP Inter(normal...
Lithium, total (mg/L)	n/a	0.025	n/a	n/a	n/a	60	10	No	0.05	Inter
Mercury, total (mg/L)	n/a	0.0000050	n/a	n/a	n/a	56	92.86	n/a	0.05656	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.0028	n/a	n/a	n/a	60	6.667	sqrt(x)	0.05	Inter
Selenium, total (mg/L)	n/a	0.0043	n/a	n/a	n/a	60	0	n/a	0.04607	NP Inter(normal...
Thallium, total (mg/L)	n/a	0.00050	n/a	n/a	n/a	60	35	n/a	0.04607	NP Inter(normal...

MOUNTAINEER BAP GWPS				
Constituent Name	**MCL**	**CCR Rule-Specified**	**Background Limit**	**GWPS**
Antimony, Total (mg/L)	0.006		0.0001	0.006
Arsenic, Total (mg/L)	0.01		0.00074	0.01
Barium, Total (mg/L)	2		0.068	2
Beryllium, Total (mg/L)	0.004		0.0001	0.004
Cadmium, Total (mg/L)	0.005		0.00003	0.005
Chromium, Total (mg/L)	0.1		0.00076	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.00062	0.006
Combined Radium, Total (pCi/L)	5		2.3	5
Fluoride, Total (mg/L)	4		0.29	4
Lead, Total (mg/L)	0.015		0.00088	0.015
Lithium, Total (mg/L)	n/a	0.04	0.025	0.04
Mercury, Total (mg/L)	0.002		0.000005	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0028	0.1
Selenium, Total (mg/L)	0.05		0.0043	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

Confidence Intervals - Significant Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/28/2020, 1:32 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Lithium, total (mg/L)	**MW-1605D**	**0.07771**	**0.05413**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605S**	**0.0753**	**0.05584**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606D**	**0.1228**	**0.09312**	**0.04**	**Yes**	**15**	**0**	**x^2**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606S**	**0.1142**	**0.08695**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607D**	**0.1013**	**0.07723**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607S**	**0.1123**	**0.09194**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**

Confidence Intervals - All Results

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/28/2020, 1:32 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	MW-1604D	0.00014	0.00003	0.006	No	15	6.667	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1604S	0.00015	0.00003	0.006	No	15	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1605D	0.00004	0.00003	0.006	No	15	6.667	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1605S	0.00007	0.00004	0.006	No	15	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606D	0.00019	0.00014	0.006	No	15	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1606S	0.0001575	0.0001398	0.006	No	15	0	No	0.01	Param.
Antimony, total (mg/L)	MW-1607D	0.00004	0.00003	0.006	No	15	6.667	No	0.01	NP (normality)
Antimony, total (mg/L)	MW-1607S	0.0005	0.00041	0.006	No	15	0	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW-1604D	0.0004863	0.000339	0.01	No	15	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1604S	0.0004424	0.0003402	0.01	No	15	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605D	0.002652	0.00224	0.01	No	15	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1605S	0.0008662	0.0005607	0.01	No	15	0	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1606D	0.0006638	0.0003864	0.01	No	15	0	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW-1606S	0.0008439	0.0006974	0.01	No	15	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607D	0.001378	0.001068	0.01	No	15	0	No	0.01	Param.
Arsenic, total (mg/L)	MW-1607S	0.0013	0.00092	0.01	No	14	0	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1604D	0.0425	0.0279	2	No	15	0	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1604S	0.0294	0.0267	2	No	15	0	No	0.01	NP (normality)
Barium, total (mg/L)	MW-1605D	0.02954	0.0257	2	No	15	0	No	0.01	Param.
Barium, total (mg/L)	MW-1605S	0.0359	0.02569	2	No	15	0	No	0.01	Param.
Barium, total (mg/L)	MW-1606D	0.05793	0.0494	2	No	15	0	No	0.01	Param.
Barium, total (mg/L)	MW-1606S	0.07441	0.06635	2	No	15	0	No	0.01	Param.
Barium, total (mg/L)	MW-1607D	0.1321	0.08605	2	No	15	0	No	0.01	Param.
Barium, total (mg/L)	MW-1607S	0.07281	0.06236	2	No	14	0	No	0.01	Param.
Cadmium, total (mg/L)	MW-1604D	0.00015	0.00003	0.005	No	15	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1604S	0.00021	0.00003	0.005	No	15	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1605D	0.00004	0.00001	0.005	No	15	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1605S	0.00008153	0.0000498	0.005	No	15	0	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	MW-1606D	0.00007679	0.00006188	0.005	No	15	0	No	0.01	Param.
Cadmium, total (mg/L)	MW-1606S	0.00007784	0.00006616	0.005	No	15	0	No	0.01	Param.
Cadmium, total (mg/L)	MW-1607D	0.00003	0.00002	0.005	No	15	66.67	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW-1607S	0.00006	0.00003	0.005	No	15	0	No	0.01	NP (normality)
Chromium, total (mg/L)	MW-1604D	0.0004814	0.0002058	0.1	No	15	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1604S	0.0002823	0.000112	0.1	No	14	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-1605D	0.000229	0.00007653	0.1	No	14	0	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW-1605S	0.0005047	0.0002122	0.1	No	14	0	No	0.01	Param.
Chromium, total (mg/L)	MW-1606D	0.0004075	0.0001311	0.1	No	15	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-1606S	0.0003306	0.0000952	0.1	No	15	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-1607D	0.0002451	0.00007562	0.1	No	14	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW-1607S	0.0004683	0.0002164	0.1	No	14	0	No	0.01	Param.
Cobalt, total (mg/L)	MW-1604D	0.00185	0.000181	0.006	No	15	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1604S	0.00214	0.000308	0.006	No	15	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1605D	0.001787	0.001611	0.006	No	15	0	No	0.01	Param.
Cobalt, total (mg/L)	MW-1605S	0.001067	0.0003993	0.006	No	15	0	x^(1/3)	0.01	Param.
Cobalt, total (mg/L)	MW-1606D	0.00192	0.00111	0.006	No	15	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1606S	0.0003695	0.0002575	0.006	No	15	0	No	0.01	Param.
Cobalt, total (mg/L)	MW-1607D	0.000846	0.000414	0.006	No	15	0	No	0.01	NP (normality)
Cobalt, total (mg/L)	MW-1607S	0.00142	0.000851	0.006	No	14	0	No	0.01	NP (normality)
Combined Radium 226 + 228 (pCi/L)	MW-1604D	1.418	0.4796	5	No	15	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1604S	1.438	0.7428	5	No	14	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605D	1.54	0.5881	5	No	15	0	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1605S	0.842	0.347	5	No	15	0	No	0.01	NP (normality)
Combined Radium 226 + 228 (pCi/L)	MW-1606D	1.975	0.8706	5	No	14	0	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1606S	1.562	0.621	5	No	15	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607D	2.036	1.072	5	No	15	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-1607S	2.061	0.9794	5	No	15	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1604D	0.2067	0.172	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1604S	0.2199	0.1926	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605D	0.2071	0.1829	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1605S	0.2847	0.2415	4	No	16	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1606D	0.27	0.24	4	No	16	0	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW-1606S	0.4858	0.3946	4	No	17	0	x^2	0.01	Param.
Fluoride, total (mg/L)	MW-1607D	0.5373	0.4721	4	No	17	0	No	0.01	Param.
Fluoride, total (mg/L)	MW-1607S	0.2996	0.2541	4	No	16	0	No	0.01	Param.
Lead, total (mg/L)	MW-1604D	0.000303	0.000022	0.015	No	15	26.67	No	0.01	NP (Cohens/xfrm)
Lead, total (mg/L)	MW-1604S	0.0002	0.000034	0.015	No	15	33.33	No	0.01	NP (Cohens/xfrm)
Lead, total (mg/L)	MW-1605D	0.0002	0.00001	0.015	No	15	26.67	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1605S	0.0006277	0.0001621	0.015	No	15	6.667	x^(1/3)	0.01	Param.

Confidence Intervals - All Results

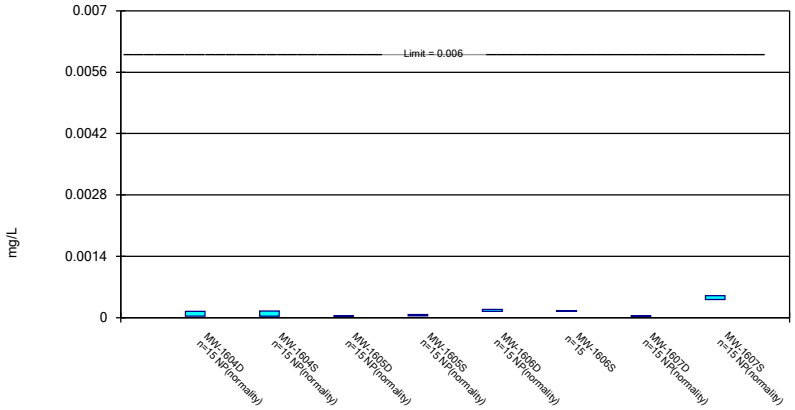
Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP Printed 8/28/2020, 1:32 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Lead, total (mg/L)	MW-1606D	0.000491	0.000082	0.015	No	14	28.57	No	0.01	NP (Cohens/xfrm)
Lead, total (mg/L)	MW-1606S	0.0001613	0.00006921	0.015	No	15	13.33	No	0.01	Param.
Lead, total (mg/L)	MW-1607D	0.0002	0.000041	0.015	No	15	13.33	No	0.01	NP (normality)
Lead, total (mg/L)	MW-1607S	0.000267	0.00009	0.015	No	14	0	No	0.01	NP (normality)
Lithium, total (mg/L)	MW-1604D	0.05284	0.03047	0.04	No	15	6.667	x^2	0.01	Param.
Lithium, total (mg/L)	MW-1604S	0.04673	0.03373	0.04	No	15	0	No	0.01	Param.
Lithium, total (mg/L)	**MW-1605D**	**0.07771**	**0.05413**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1605S**	**0.0753**	**0.05584**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606D**	**0.1228**	**0.09312**	**0.04**	**Yes**	**15**	**0**	**x^2**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1606S**	**0.1142**	**0.08695**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607D**	**0.1013**	**0.07723**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**
Lithium, total (mg/L)	**MW-1607S**	**0.1123**	**0.09194**	**0.04**	**Yes**	**15**	**0**	**No**	**0.01**	**Param.**
Molybdenum, total (mg/L)	MW-1604D	0.0198	0.001	0.1	No	15	6.667	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1604S	0.0163	0.00252	0.1	No	14	0	No	0.01	NP (normality)
Molybdenum, total (mg/L)	MW-1605D	0.04924	0.04009	0.1	No	15	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1605S	0.0203	0.01466	0.1	No	15	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1606D	0.07752	0.06885	0.1	No	15	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1606S	0.09517	0.06703	0.1	No	15	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1607D	0.08915	0.08224	0.1	No	15	0	No	0.01	Param.
Molybdenum, total (mg/L)	MW-1607S	0.04547	0.03823	0.1	No	15	0	No	0.01	Param.
Selenium, total (mg/L)	MW-1604D	0.0031	0.0007	0.05	No	15	0	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1604S	0.002257	0.001236	0.05	No	15	0	No	0.01	Param.
Selenium, total (mg/L)	MW-1605D	0.0003	0.0002	0.05	No	15	0	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1605S	0.001526	0.0007164	0.05	No	15	0	sqrt(x)	0.01	Param.
Selenium, total (mg/L)	MW-1606D	0.006	0.0022	0.05	No	15	0	No	0.01	Param.
Selenium, total (mg/L)	MW-1606S	0.002242	0.0009155	0.05	No	15	0	ln(x)	0.01	Param.
Selenium, total (mg/L)	MW-1607D	0.00009	0.00003	0.05	No	15	13.33	No	0.01	NP (normality)
Selenium, total (mg/L)	MW-1607S	0.009157	0.006363	0.05	No	15	0	No	0.01	Param.
Thallium, total (mg/L)	MW-1604D	0.0005	0.000217	0.002	No	15	33.33	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1604S	0.0003	0.00002	0.002	No	15	6.667	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605D	0.0005	0.00004	0.002	No	15	33.33	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1605S	0.0005	0.00004	0.002	No	15	33.33	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1606D	0.0005	0.000092	0.002	No	15	26.67	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1606S	0.0005	0.000063	0.002	No	15	26.67	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1607D	0.0005	0.00002	0.002	No	15	33.33	No	0.01	NP (normality)
Thallium, total (mg/L)	MW-1607S	0.0005	0.00005	0.002	No	15	33.33	No	0.01	NP (normality)

Sanitas™ v.9.6.26g . 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.



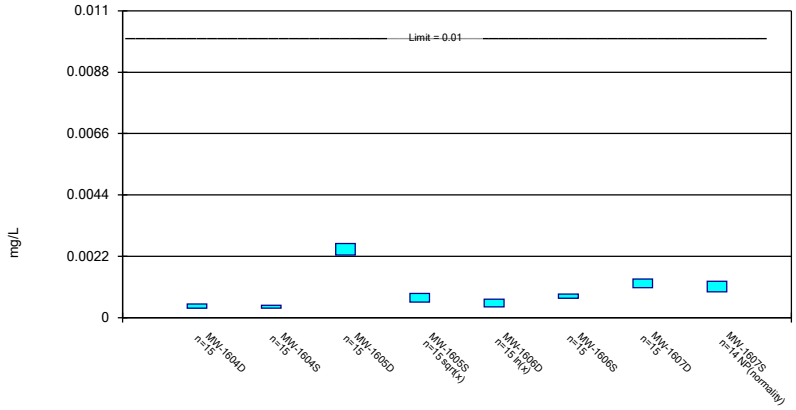
Constituent: Antimony, total Analysis Run 8/28/2020 1:30 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . 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.



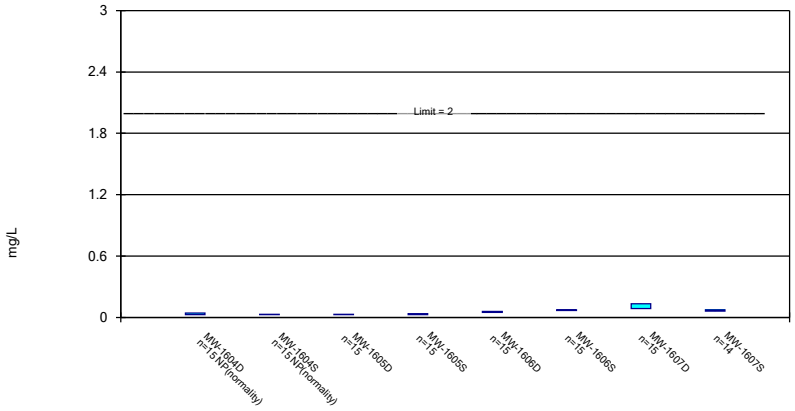
Constituent: Arsenic, total Analysis Run 8/28/2020 1:30 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Parametric and Non-Parametric (NP) Confidence Interval

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



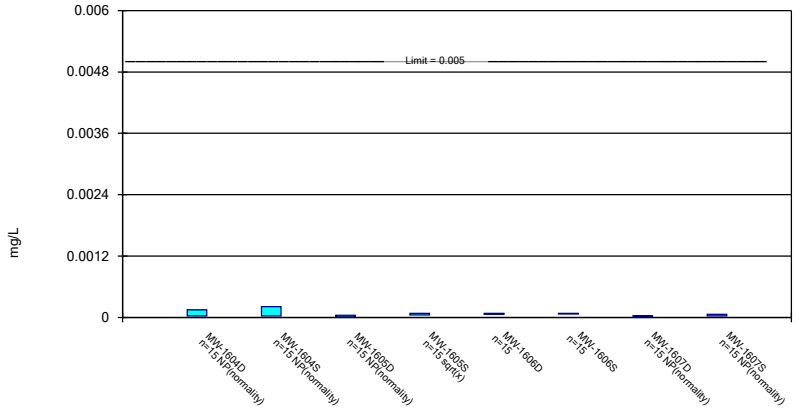
Constituent: Barium, total Analysis Run 8/28/2020 1:30 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Parametric and Non-Parametric (NP) Confidence Interval

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

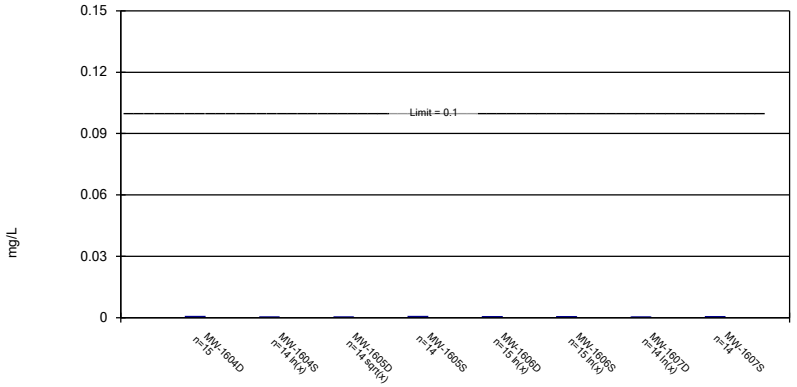


Constituent: Cadmium, total Analysis Run 8/28/2020 1:30 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Parametric Confidence Interval

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

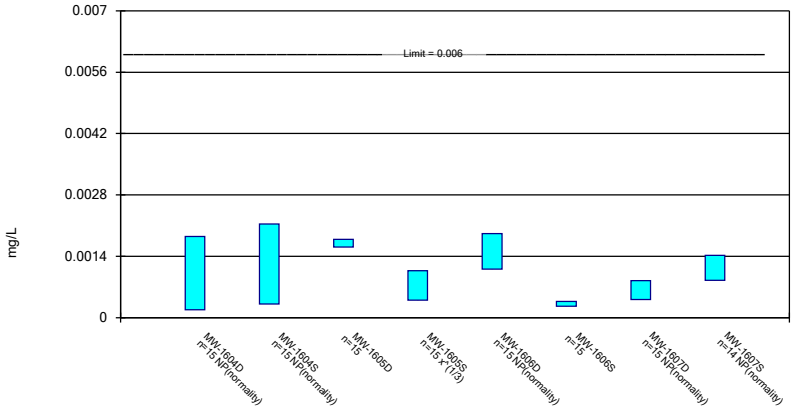


Constituent: Chromium, total Analysis Run 8/28/2020 1:30 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Parametric and Non-Parametric (NP) Confidence Interval

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

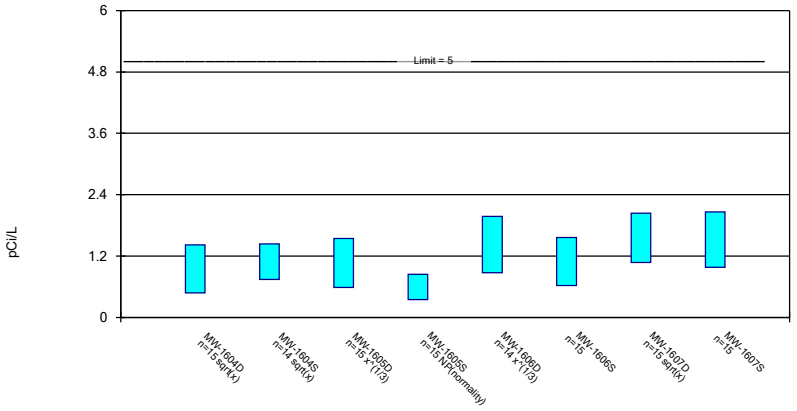


Constituent: Cobalt, total Analysis Run 8/28/2020 1:30 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Parametric and Non-Parametric (NP) Confidence Interval

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

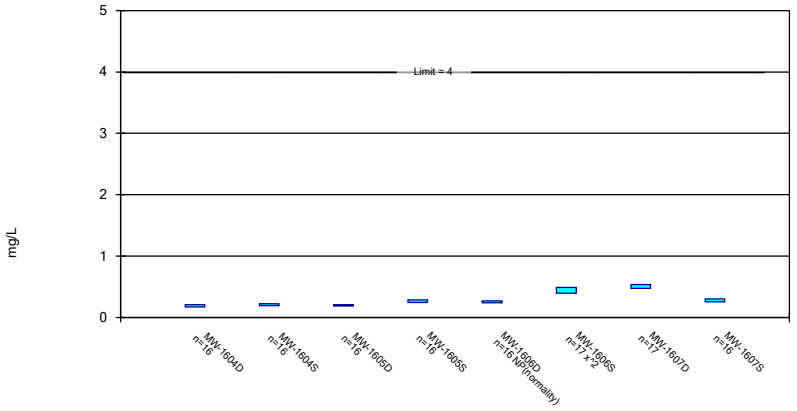


Constituent: Combined Radium 226 + 228 Analysis Run 8/28/2020 1:30 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Parametric and Non-Parametric (NP) Confidence Interval

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



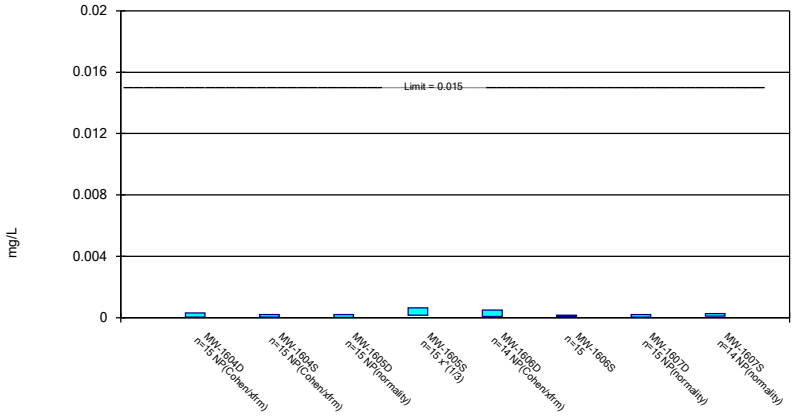
Constituent: Fluoride, total Analysis Run 8/28/2020 1:30 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Parametric and Non-Parametric (NP) Confidence Interval

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



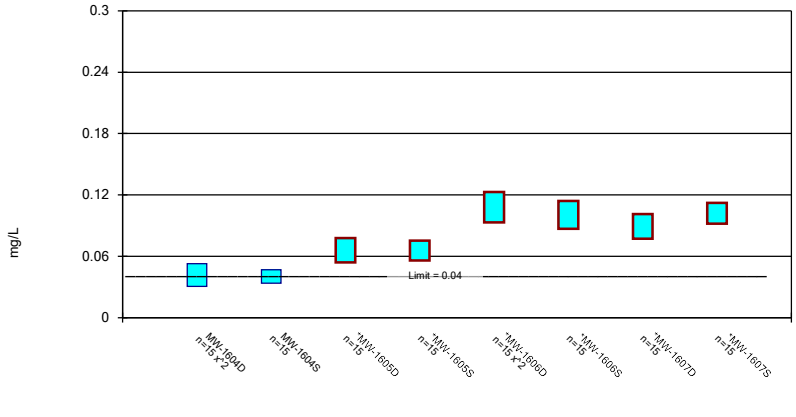
Constituent: Lead, total Analysis Run 8/28/2020 1:31 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Parametric Confidence Interval

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



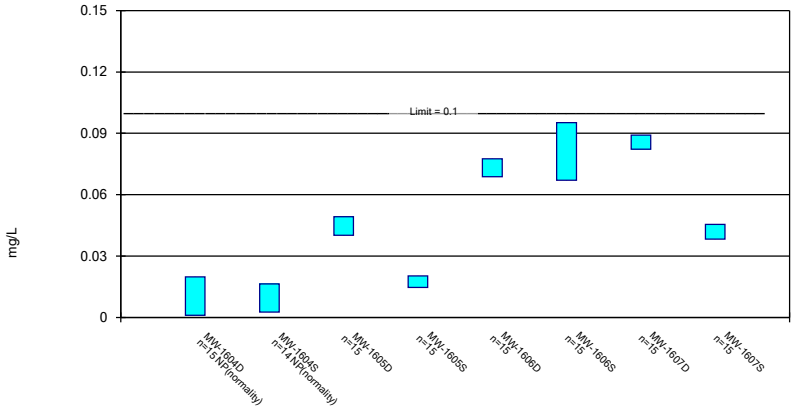
Constituent: Lithium, total Analysis Run 8/28/2020 1:31 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

Parametric and Non-Parametric (NP) Confidence Interval

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



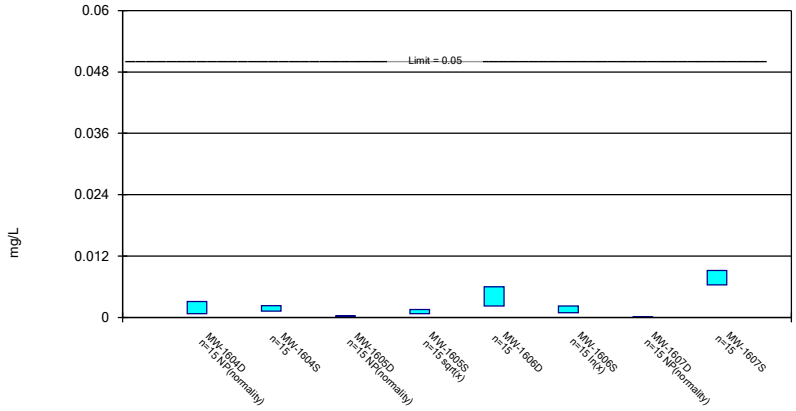
Constituent: Molybdenum, total Analysis Run 8/28/2020 1:31 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Sanitas™ v.9.6.26g . UG

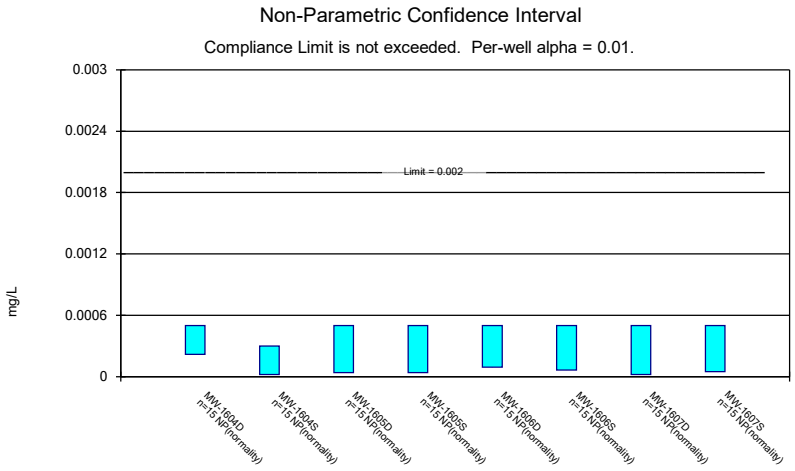
Parametric and Non-Parametric (NP) Confidence Interval

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



Constituent: Selenium, total Analysis Run 8/28/2020 1:31 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP



Constituent: Thallium, total Analysis Run 8/28/2020 1:31 PM

Mountaineer BAP Client: Geosyntec Data: Mountaineer BAP

Appendix 3

No alternative source demonstrations were completed in 2020.

Appendix 4

The notifications of an SSL above a GWPS that were posted in 2020, as determined by statistical analysis following each assessment monitoring event, and the notice of initiation 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

Bottom Ash Pond

Assessment Monitoring - 257.105(h)(6) Results Operating Record Notice

Report Date: 9/30/2019 - 10/2/2019

Sample Location	Parameters	Result	Reporting Units
BAP-MW-107	Antimony, Sb	0.02J	ug/L
BAP-MW-107	Arsenic, As	0.44	ug/L
BAP-MW-107	Barium, Ba	67.8	ug/L
BAP-MW-107	Beryllium, Be	<0.02U	ug/L
BAP-MW-107	Boron, B	0.696	mg/L
BAP-MW-107	Cadmium, Cd	0.04J	ug/L
BAP-MW-107	Calcium, Ca	316	mg/L
BAP-MW-107	Chloride, Cl	79.7	mg/L
BAP-MW-107	Chromium, Cr	0.07J	ug/L
BAP-MW-107	Cobalt, Co	1.08	ug/L
BAP-MW-107	Combined Radium	3.5	pCi/L
BAP-MW-107	Fluoride, F	0.19	mg/L
BAP-MW-107	Lead, Pb	<0.05U	ug/L
BAP-MW-107	Lithium, Li	0.00358	mg/L
BAP-MW-107	Mercury, Hg	<0.002U	ug/L
BAP-MW-107	Molybdenum, Mo	<0.4U	ug/L
BAP-MW-107	pH	7.1	STD
BAP-MW-107	Residue, Filterable, TDS	1410	mg/L
BAP-MW-107	Selenium, Se	0.8	ug/L
BAP-MW-107	Sulfate, SO4	631	mg/L
BAP-MW-107	Thallium, Tl	<0.1U	ug/L
BAP-MW-1601A	Antimony, Sb	0.03J	ug/L
BAP-MW-1601A	Arsenic, As	0.62	ug/L
BAP-MW-1601A	Barium, Ba	65.3	ug/L
BAP-MW-1601A	Beryllium, Be	<0.02U	ug/L
BAP-MW-1601A	Boron, B	0.153	mg/L
BAP-MW-1601A	Cadmium, Cd	0.02J	ug/L
BAP-MW-1601A	Calcium, Ca	164	mg/L
BAP-MW-1601A	Chloride, Cl	45.8	mg/L
BAP-MW-1601A	Chromium, Cr	0.370	ug/L
BAP-MW-1601A	Cobalt, Co	0.03J	ug/L
BAP-MW-1601A	Combined Radium	1.168	pCi/L
BAP-MW-1601A	Fluoride, F	0.14	mg/L
BAP-MW-1601A	Lead, Pb	<0.05U	ug/L
BAP-MW-1601A	Lithium, Li	0.00184	mg/L
BAP-MW-1601A	Mercury, Hg	<0.002U	ug/L
BAP-MW-1601A	Molybdenum, Mo	0.9J	ug/L
BAP-MW-1601A	pH	7	STD
BAP-MW-1601A	Residue, Filterable, TDS	749	mg/L
BAP-MW-1601A	Selenium, Se	1.1	ug/L
BAP-MW-1601A	Sulfate, SO4	221	mg/L
BAP-MW-1601A	Thallium, Tl	<0.1U	ug/L
BAP-MW-1602	Antimony, Sb	<0.02U	ug/L

Mountaineer Plant

Bottom Ash Pond

Assessment Monitoring - 257.105(h)(6) Results Operating Record Notice

Report Date: 9/30/2019 - 10/2/2019

Sample Location	Parameters	Result	Reporting Units
BAP-MW-1602	Arsenic, As	0.31	ug/L
BAP-MW-1602	Barium, Ba	27.3	ug/L
BAP-MW-1602	Beryllium, Be	<0.02U	ug/L
BAP-MW-1602	Boron, B	0.111	mg/L
BAP-MW-1602	Cadmium, Cd	0.01J	ug/L
BAP-MW-1602	Calcium, Ca	95.1	mg/L
BAP-MW-1602	Chloride, Cl	10.4	mg/L
BAP-MW-1602	Chromium, Cr	0.2J	ug/L
BAP-MW-1602	Cobalt, Co	<0.02U	ug/L
BAP-MW-1602	Combined Radium	0.451	pCi/L
BAP-MW-1602	Fluoride, F	0.21	mg/L
BAP-MW-1602	Lead, Pb	<0.05U	ug/L
BAP-MW-1602	Lithium, Li	0.00979	mg/L
BAP-MW-1602	Mercury, Hg	<0.002U	ug/L
BAP-MW-1602	Molybdenum, Mo	1J	ug/L
BAP-MW-1602	pH	6.7	STD
BAP-MW-1602	Residue, Filterable, TDS	603	mg/L
BAP-MW-1602	Selenium, Se	0.1J	ug/L
BAP-MW-1602	Sulfate, SO4	259	mg/L
BAP-MW-1602	Thallium, Tl	<0.1U	ug/L
BAP-MW-1603	Antimony, Sb	0.03J	ug/L
BAP-MW-1603	Arsenic, As	0.35	ug/L
BAP-MW-1603	Barium, Ba	30.9	ug/L
BAP-MW-1603	Beryllium, Be	<0.02U	ug/L
BAP-MW-1603	Boron, B	0.308	mg/L
BAP-MW-1603	Cadmium, Cd	0.01J	ug/L
BAP-MW-1603	Calcium, Ca	156	mg/L
BAP-MW-1603	Chloride, Cl	10.0	mg/L
BAP-MW-1603	Chromium, Cr	0.205	ug/L
BAP-MW-1603	Cobalt, Co	0.112	ug/L
BAP-MW-1603	Combined Radium	1.07	pCi/L
BAP-MW-1603	Fluoride, F	0.09	mg/L
BAP-MW-1603	Lead, Pb	0.1J	ug/L
BAP-MW-1603	Lithium, Li	0.0150	mg/L
BAP-MW-1603	Mercury, Hg	<0.002U	ug/L
BAP-MW-1603	Molybdenum, Mo	0.5J	ug/L
BAP-MW-1603	pH	6.7	STD
BAP-MW-1603	Residue, Filterable, TDS	853	mg/L
BAP-MW-1603	Selenium, Se	0.2	ug/L
BAP-MW-1603	Sulfate, SO4	421	mg/L
BAP-MW-1603	Thallium, Tl	<0.1U	ug/L
BAP-MW-1604D	Antimony, Sb	0.03J	ug/L
BAP-MW-1604D	Arsenic, As	0.30	ug/L

Mountaineer Plant

Bottom Ash Pond

Assessment Monitoring - 257.105(h)(6) Results Operating Record Notice

Report Date: 9/30/2019 - 10/2/2019

Sample Location	Parameters	Result	Reporting Units
BAP-MW-1604D	Barium, Ba	55.6	ug/L
BAP-MW-1604D	Beryllium, Be	<0.02U	ug/L
BAP-MW-1604D	Boron, B	2.18	mg/L
BAP-MW-1604D	Cadmium, Cd	0.03J	ug/L
BAP-MW-1604D	Calcium, Ca	217	mg/L
BAP-MW-1604D	Chloride, Cl	82.2	mg/L
BAP-MW-1604D	Chromium, Cr	0.345	ug/L
BAP-MW-1604D	Cobalt, Co	0.181	ug/L
BAP-MW-1604D	Combined Radium	0.464	pCi/L
BAP-MW-1604D	Fluoride, F	0.17	mg/L
BAP-MW-1604D	Lead, Pb	<0.05U	ug/L
BAP-MW-1604D	Lithium, Li	0.0188	mg/L
BAP-MW-1604D	Mercury, Hg	<0.002U	ug/L
BAP-MW-1604D	Molybdenum, Mo	2J	ug/L
BAP-MW-1604D	pH	7	STD
BAP-MW-1604D	Residue, Filterable, TDS	1210	mg/L
BAP-MW-1604D	Selenium, Se	3.4	ug/L
BAP-MW-1604D	Sulfate, SO4	551	mg/L
BAP-MW-1604D	Thallium, Tl	<0.1U	ug/L
BAP-MW-1604S	Antimony, Sb	0.14	ug/L
BAP-MW-1604S	Arsenic, As	0.34	ug/L
BAP-MW-1604S	Barium, Ba	29.0	ug/L
BAP-MW-1604S	Beryllium, Be	<0.02U	ug/L
BAP-MW-1604S	Boron, B	3.23	mg/L
BAP-MW-1604S	Cadmium, Cd	0.21	ug/L
BAP-MW-1604S	Calcium, Ca	267	mg/L
BAP-MW-1604S	Chloride, Cl	128	mg/L
BAP-MW-1604S	Chromium, Cr	0.1J	ug/L
BAP-MW-1604S	Cobalt, Co	2.14	ug/L
BAP-MW-1604S	Combined Radium	1.15	pCi/L
BAP-MW-1604S	Fluoride, F	0.20	mg/L
BAP-MW-1604S	Lead, Pb	<0.05U	ug/L
BAP-MW-1604S	Lithium, Li	0.0476	mg/L
BAP-MW-1604S	Mercury, Hg	<0.002U	ug/L
BAP-MW-1604S	Molybdenum, Mo	16.3	ug/L
BAP-MW-1604S	pH	7.3	STD
BAP-MW-1604S	Residue, Filterable, TDS	1520	mg/L
BAP-MW-1604S	Selenium, Se	1.0	ug/L
BAP-MW-1604S	Sulfate, SO4	770	mg/L
BAP-MW-1604S	Thallium, Tl	0.3J	ug/L
BAP-MW-1605D	Antimony, Sb	0.03J	ug/L
BAP-MW-1605D	Arsenic, As	2.78	ug/L
BAP-MW-1605D	Barium, Ba	33.1	ug/L

Mountaineer Plant

Bottom Ash Pond

Assessment Monitoring - 257.105(h)(6) Results Operating Record Notice

Report Date: 9/30/2019 - 10/2/2019

Sample Location	Parameters	Result	Reporting Units
BAP-MW-1605D	Beryllium, Be	<0.02U	ug/L
BAP-MW-1605D	Boron, B	8.57	mg/L
BAP-MW-1605D	Cadmium, Cd	0.03J	ug/L
BAP-MW-1605D	Calcium, Ca	283	mg/L
BAP-MW-1605D	Chloride, Cl	168	mg/L
BAP-MW-1605D	Chromium, Cr	0.04J	ug/L
BAP-MW-1605D	Cobalt, Co	1.69	ug/L
BAP-MW-1605D	Combined Radium	1.641	pCi/L
BAP-MW-1605D	Fluoride, F	0.17	mg/L
BAP-MW-1605D	Lead, Pb	<0.05U	ug/L
BAP-MW-1605D	Lithium, Li	0.0561	mg/L
BAP-MW-1605D	Mercury, Hg	<0.002U	ug/L
BAP-MW-1605D	Molybdenum, Mo	39.7	ug/L
BAP-MW-1605D	pH	7.2	STD
BAP-MW-1605D	Residue, Filterable, TDS	2050	mg/L
BAP-MW-1605D	Selenium, Se	0.3	ug/L
BAP-MW-1605D	Sulfate, SO4	974	mg/L
BAP-MW-1605D	Thallium, Tl	<0.1U	ug/L
BAP-MW-1605S	Antimony, Sb	0.04J	ug/L
BAP-MW-1605S	Arsenic, As	0.59	ug/L
BAP-MW-1605S	Barium, Ba	29.6	ug/L
BAP-MW-1605S	Beryllium, Be	<0.02U	ug/L
BAP-MW-1605S	Boron, B	8.05	mg/L
BAP-MW-1605S	Cadmium, Cd	0.05J	ug/L
BAP-MW-1605S	Calcium, Ca	174	mg/L
BAP-MW-1605S	Chloride, Cl	149	mg/L
BAP-MW-1605S	Chromium, Cr	0.237	ug/L
BAP-MW-1605S	Cobalt, Co	0.379	ug/L
BAP-MW-1605S	Combined Radium	0.542	pCi/L
BAP-MW-1605S	Fluoride, F	0.26	mg/L
BAP-MW-1605S	Lead, Pb	0.202	ug/L
BAP-MW-1605S	Lithium, Li	0.0524	mg/L
BAP-MW-1605S	Mercury, Hg	<0.002U	ug/L
BAP-MW-1605S	Molybdenum, Mo	14.2	ug/L
BAP-MW-1605S	pH	7.2	STD
BAP-MW-1605S	Residue, Filterable, TDS	1470	mg/L
BAP-MW-1605S	Selenium, Se	0.4	ug/L
BAP-MW-1605S	Sulfate, SO4	694	mg/L
BAP-MW-1605S	Thallium, Tl	<0.1U	ug/L
BAP-MW-1606D	Antimony, Sb	0.15	ug/L
BAP-MW-1606D	Arsenic, As	0.40	ug/L
BAP-MW-1606D	Barium, Ba	51.4	ug/L
BAP-MW-1606D	Beryllium, Be	<0.02U	ug/L

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Sample Location	Parameters	Result	Reporting Units
BAP-MW-1606D	Boron, B	6.38	mg/L
BAP-MW-1606D	Cadmium, Cd	0.08	ug/L
BAP-MW-1606D	Calcium, Ca	281	mg/L
BAP-MW-1606D	Chloride, Cl	244	mg/L
BAP-MW-1606D	Chromium, Cr	0.1J	ug/L
BAP-MW-1606D	Cobalt, Co	1.09	ug/L
BAP-MW-1606D	Combined Radium	2.2714	pCi/L
BAP-MW-1606D	Fluoride, F	0.49	mg/L
BAP-MW-1606D	Lead, Pb	<0.05U	ug/L
BAP-MW-1606D	Lithium, Li	0.0835	mg/L
BAP-MW-1606D	Mercury, Hg	<0.002U	ug/L
BAP-MW-1606D	Molybdenum, Mo	68.5	ug/L
BAP-MW-1606D	pH	7.4	STD
BAP-MW-1606D	Residue, Filterable, TDS	1700	mg/L
BAP-MW-1606D	Selenium, Se	1.0	ug/L
BAP-MW-1606D	Sulfate, SO4	588	mg/L
BAP-MW-1606D	Thallium, Tl	<0.1U	ug/L
BAP-MW-1606S	Antimony, Sb	0.13	ug/L
BAP-MW-1606S	Arsenic, As	0.67	ug/L
BAP-MW-1606S	Barium, Ba	70.4	ug/L
BAP-MW-1606S	Beryllium, Be	<0.02U	ug/L
BAP-MW-1606S	Boron, B	6.19	mg/L
BAP-MW-1606S	Cadmium, Cd	0.07	ug/L
BAP-MW-1606S	Calcium, Ca	229	mg/L
BAP-MW-1606S	Chloride, Cl	221	mg/L
BAP-MW-1606S	Chromium, Cr	0.08J	ug/L
BAP-MW-1606S	Cobalt, Co	0.312	ug/L
BAP-MW-1606S	Combined Radium	2.682	pCi/L
BAP-MW-1606S	Fluoride, F	0.28	mg/L
BAP-MW-1606S	Lead, Pb	<0.05U	ug/L
BAP-MW-1606S	Lithium, Li	0.0877	mg/L
BAP-MW-1606S	Mercury, Hg	<0.002U	ug/L
BAP-MW-1606S	Molybdenum, Mo	54.9	ug/L
BAP-MW-1606S	pH	7.3	STD
BAP-MW-1606S	Residue, Filterable, TDS	1460	mg/L
BAP-MW-1606S	Selenium, Se	2.7	ug/L
BAP-MW-1606S	Sulfate, SO4	705	mg/L
BAP-MW-1606S	Thallium, Tl	<0.1U	ug/L
BAP-MW-1607D	Antimony, Sb	0.03J	ug/L
BAP-MW-1607D	Arsenic, As	1.53	ug/L
BAP-MW-1607D	Barium, Ba	79.3	ug/L
BAP-MW-1607D	Beryllium, Be	<0.02U	ug/L
BAP-MW-1607D	Boron, B	3.65	mg/L

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Sample Location	Parameters	Result	Reporting Units
BAP-MW-1607D	Cadmium, Cd	0.01J	ug/L
BAP-MW-1607D	Calcium, Ca	233	mg/L
BAP-MW-1607D	Chloride, Cl	174	mg/L
BAP-MW-1607D	Chromium, Cr	0.05J	ug/L
BAP-MW-1607D	Cobalt, Co	0.848	ug/L
BAP-MW-1607D	Combined Radium	1.855	pCi/L
BAP-MW-1607D	Fluoride, F	0.56	mg/L
BAP-MW-1607D	Lead, Pb	<0.05U	ug/L
BAP-MW-1607D	Lithium, Li	0.110	mg/L
BAP-MW-1607D	Mercury, Hg	<0.002U	ug/L
BAP-MW-1607D	Molybdenum, Mo	82.1	ug/L
BAP-MW-1607D	pH	7.7	STD
BAP-MW-1607D	Residue, Filterable, TDS	1610	mg/L
BAP-MW-1607D	Selenium, Se	0.09J	ug/L
BAP-MW-1607D	Sulfate, SO4	699	mg/L
BAP-MW-1607D	Thallium, Tl	<0.1U	ug/L
BAP-MW-1607S	Antimony, Sb	0.41	ug/L
BAP-MW-1607S	Arsenic, As	0.87	ug/L
BAP-MW-1607S	Barium, Ba	67.7	ug/L
BAP-MW-1607S	Beryllium, Be	<0.02U	ug/L
BAP-MW-1607S	Boron, B	3.21	mg/L
BAP-MW-1607S	Cadmium, Cd	0.05J	ug/L
BAP-MW-1607S	Calcium, Ca	198	mg/L
BAP-MW-1607S	Chloride, Cl	167	mg/L
BAP-MW-1607S	Chromium, Cr	0.357	ug/L
BAP-MW-1607S	Cobalt, Co	0.971	ug/L
BAP-MW-1607S	Combined Radium	2.765	pCi/L
BAP-MW-1607S	Fluoride, F	0.27	mg/L
BAP-MW-1607S	Lead, Pb	0.09J	ug/L
BAP-MW-1607S	Lithium, Li	0.0990	mg/L
BAP-MW-1607S	Mercury, Hg	<0.002U	ug/L
BAP-MW-1607S	Molybdenum, Mo	35.0	ug/L
BAP-MW-1607S	pH	7.7	STD
BAP-MW-1607S	Residue, Filterable, TDS	1350	mg/L
BAP-MW-1607S	Selenium, Se	4.3	ug/L
BAP-MW-1607S	Sulfate, SO4	465	mg/L
BAP-MW-1607S	Thallium, Tl	<0.1U	ug/L
BAP-MW-1608	Antimony, Sb	0.03J	ug/L
BAP-MW-1608	Arsenic, As	0.52	ug/L
BAP-MW-1608	Barium, Ba	26.8	ug/L
BAP-MW-1608	Beryllium, Be	0.05J	ug/L
BAP-MW-1608	Boron, B	0.124	mg/L
BAP-MW-1608	Cadmium, Cd	< 0.01U	ug/L

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Sample Location	Parameters	Result	Reporting Units
BAP-MW-1608	Calcium, Ca	92.0	mg/L
BAP-MW-1608	Chloride, Cl	4.01	mg/L
BAP-MW-1608	Chromium, Cr	0.327	ug/L
BAP-MW-1608	Cobalt, Co	0.056	ug/L
BAP-MW-1608	Combined Radium	1.348	pCi/L
BAP-MW-1608	Fluoride, F	0.20	mg/L
BAP-MW-1608	Lead, Pb	0.06J	ug/L
BAP-MW-1608	Lithium, Li	0.00286	mg/L
BAP-MW-1608	Mercury, Hg	<0.002U	ug/L
BAP-MW-1608	Molybdenum, Mo	1J	ug/L
BAP-MW-1608	pH	7.1	STD
BAP-MW-1608	Residue, Filterable, TDS	369	mg/L
BAP-MW-1608	Selenium, Se	1.0	ug/L
BAP-MW-1608	Sulfate, SO4	109	mg/L
BAP-MW-1608	Thallium, Tl	<0.1U	ug/L
BAP-MW-1805	Antimony, Sb	0.07J	ug/L
BAP-MW-1805	Arsenic, As	70.4	ug/L
BAP-MW-1805	Barium, Ba	41.9	ug/L
BAP-MW-1805	Beryllium, Be	<0.02U	ug/L
BAP-MW-1805	Boron, B	6.00	mg/L
BAP-MW-1805	Cadmium, Cd	<0.01U	ug/L
BAP-MW-1805	Calcium, Ca	273	mg/L
BAP-MW-1805	Chloride, Cl	167	mg/L
BAP-MW-1805	Chromium, Cr	0.415	ug/L
BAP-MW-1805	Cobalt, Co	3.39	ug/L
BAP-MW-1805	Combined Radium	2.7353	pCi/L
BAP-MW-1805	Fluoride, F	0.24	mg/L
BAP-MW-1805	Lead, Pb	0.1J	ug/L
BAP-MW-1805	Lithium, Li	0.0426	mg/L
BAP-MW-1805	Mercury, Hg	<0.002U	ug/L
BAP-MW-1805	Molybdenum, Mo	78.0	ug/L
BAP-MW-1805	pH	7.4	STD
BAP-MW-1805	Residue, Filterable, TDS	1880	mg/L
BAP-MW-1805	Selenium, Se	0.1J	ug/L
BAP-MW-1805	Sulfate, SO4	908	mg/L
BAP-MW-1805	Thallium, Tl	<0.1U	ug/L
BAP-MW-1921	Antimony, Sb	0.1J	ug/L
BAP-MW-1921	Arsenic, As	1.25	ug/L
BAP-MW-1921	Barium, Ba	50.8	ug/L
BAP-MW-1921	Beryllium, Be	<0.02U	ug/L
BAP-MW-1921	Boron, B	0.647	mg/L
BAP-MW-1921	Cadmium, Cd	0.03J	ug/L
BAP-MW-1921	Calcium, Ca	79.6	mg/L

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Sample Location	Parameters	Result	Reporting Units
BAP-MW-1921	Chloride, Cl	33.2	mg/L
BAP-MW-1921	Chromium, Cr	0.1J	ug/L
BAP-MW-1921	Cobalt, Co	0.692	ug/L
BAP-MW-1921	Combined Radium	1.228	pCi/L
BAP-MW-1921	Fluoride, F	0.79	mg/L
BAP-MW-1921	Lead, Pb	0.08J	ug/L
BAP-MW-1921	Lithium, Li	0.0926	mg/L
BAP-MW-1921	Mercury, Hg	<0.002U	ug/L
BAP-MW-1921	Molybdenum, Mo	500	ug/L
BAP-MW-1921	pH	7.6	STD
BAP-MW-1921	Residue, Filterable, TDS	438	mg/L
BAP-MW-1921	Selenium, Se	0.1J	ug/L
BAP-MW-1921	Sulfate, SO4	131	mg/L
BAP-MW-1921	Thallium, Tl	<0.1U	ug/L
BAP-MW-1922D	Antimony, Sb	1.04	ug/L
BAP-MW-1922D	Arsenic, As	839	ug/L
BAP-MW-1922D	Barium, Ba	51.0	ug/L
BAP-MW-1922D	Beryllium, Be	<0.02U	ug/L
BAP-MW-1922D	Boron, B	0.440	mg/L
BAP-MW-1922D	Cadmium, Cd	0.01J	ug/L
BAP-MW-1922D	Calcium, Ca	96.5	mg/L
BAP-MW-1922D	Chloride, Cl	32.7	mg/L
BAP-MW-1922D	Chromium, Cr	0.08J	ug/L
BAP-MW-1922D	Cobalt, Co	0.492	ug/L
BAP-MW-1922D	Combined Radium	3.089	pCi/L
BAP-MW-1922D	Fluoride, F	0.33	mg/L
BAP-MW-1922D	Lead, Pb	<0.05U	ug/L
BAP-MW-1922D	Lithium, Li	0.0126	mg/L
BAP-MW-1922D	Mercury, Hg	<0.002U	ug/L
BAP-MW-1922D	Molybdenum, Mo	478	ug/L
BAP-MW-1922D	pH	7.6	STD
BAP-MW-1922D	Residue, Filterable, TDS	566	mg/L
BAP-MW-1922D	Selenium, Se	0.06J	ug/L
BAP-MW-1922D	Sulfate, SO4	167	mg/L
BAP-MW-1922D	Thallium, Tl	<0.1U	ug/L
BAP-MW-1922S	Antimony, Sb	0.02J	ug/L
BAP-MW-1922S	Arsenic, As	1.75	ug/L
BAP-MW-1922S	Barium, Ba	26.5	ug/L
BAP-MW-1922S	Beryllium, Be	<0.02U	ug/L
BAP-MW-1922S	Boron, B	6.34	mg/L
BAP-MW-1922S	Cadmium, Cd	<0.01U	ug/L
BAP-MW-1922S	Calcium, Ca	342	mg/L
BAP-MW-1922S	Chloride, Cl	179	mg/L

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Sample Location	Parameters	Result	Reporting Units
BAP-MW-1922S	Chromium, Cr	0.2J	ug/L
BAP-MW-1922S	Cobalt, Co	1.23	ug/L
BAP-MW-1922S	Combined Radium	2.945	pCi/L
BAP-MW-1922S	Fluoride, F	0.19	mg/L
BAP-MW-1922S	Lead, Pb	0.1J	ug/L
BAP-MW-1922S	Lithium, Li	0.0556	mg/L
BAP-MW-1922S	Mercury, Hg	<0.002U	ug/L
BAP-MW-1922S	Molybdenum, Mo	33.9	ug/L
BAP-MW-1922S	pH	7.3	STD
BAP-MW-1922S	Residue, Filterable, TDS	2060	mg/L
BAP-MW-1922S	Selenium, Se	0.08J	ug/L
BAP-MW-1922S	Sulfate, SO4	1070	mg/L
BAP-MW-1922S	Thallium, Tl	<0.1U	ug/L
BAP-MW-1923	Antimony, Sb	0.24	ug/L
BAP-MW-1923	Arsenic, As	0.75	ug/L
BAP-MW-1923	Barium, Ba	86.6	ug/L
BAP-MW-1923	Beryllium, Be	<0.02U	ug/L
BAP-MW-1923	Boron, B	0.756	mg/L
BAP-MW-1923	Cadmium, Cd	0.03J	ug/L
BAP-MW-1923	Calcium, Ca	105	mg/L
BAP-MW-1923	Chloride, Cl	38.3	mg/L
BAP-MW-1923	Chromium, Cr	0.541	ug/L
BAP-MW-1923	Cobalt, Co	1.01	ug/L
BAP-MW-1923	Combined Radium	2.099	pCi/L
BAP-MW-1923	Fluoride, F	0.13	mg/L
BAP-MW-1923	Lead, Pb	0.543	ug/L
BAP-MW-1923	Lithium, Li	0.137	mg/L
BAP-MW-1923	Mercury, Hg	<0.002U	ug/L
BAP-MW-1923	Molybdenum, Mo	84.2	ug/L
BAP-MW-1923	pH	6.8	STD
BAP-MW-1923	Residue, Filterable, TDS	545	mg/L
BAP-MW-1923	Selenium, Se	14.0	ug/L
BAP-MW-1923	Sulfate, SO4	159	mg/L
BAP-MW-1923	Thallium, Tl	<0.1U	ug/L
BAP-MW-1924	Antimony, Sb	0.07J	ug/L
BAP-MW-1924	Arsenic, As	0.61	ug/L
BAP-MW-1924	Barium, Ba	54.5	ug/L
BAP-MW-1924	Beryllium, Be	<0.02U	ug/L
BAP-MW-1924	Boron, B	4.89	mg/L
BAP-MW-1924	Cadmium, Cd	0.06	ug/L
BAP-MW-1924	Calcium, Ca	238	mg/L
BAP-MW-1924	Chloride, Cl	109	mg/L
BAP-MW-1924	Chromium, Cr	0.2J	ug/L

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Sample Location	Parameters	Result	Reporting Units
BAP-MW-1924	Cobalt, Co	4.10	ug/L
BAP-MW-1924	Combined Radium	1.719	pCi/L
BAP-MW-1924	Fluoride, F	0.44	mg/L
BAP-MW-1924	Lead, Pb	0.218	ug/L
BAP-MW-1924	Lithium, Li	0.102	mg/L
BAP-MW-1924	Mercury, Hg	<0.002U	ug/L
BAP-MW-1924	Molybdenum, Mo	76.7	ug/L
BAP-MW-1924	pH	7.1	STD
BAP-MW-1924	Residue, Filterable, TDS	1500	mg/L
BAP-MW-1924	Selenium, Se	3.5	ug/L
BAP-MW-1924	Sulfate, SO4	662	mg/L
BAP-MW-1924	Thallium, Tl	<0.1U	ug/L
BAP-MW-1925	Antimony, Sb	0.20	ug/L
BAP-MW-1925	Arsenic, As	0.41	ug/L
BAP-MW-1925	Barium, Ba	45.0	ug/L
BAP-MW-1925	Beryllium, Be	<0.02U	ug/L
BAP-MW-1925	Boron, B	5.86	mg/L
BAP-MW-1925	Cadmium, Cd	0.06	ug/L
BAP-MW-1925	Calcium, Ca	249	mg/L
BAP-MW-1925	Chloride, Cl	147	mg/L
BAP-MW-1925	Chromium, Cr	0.1J	ug/L
BAP-MW-1925	Cobalt, Co	1.27	ug/L
BAP-MW-1925	Combined Radium	1.041	pCi/L
BAP-MW-1925	Fluoride, F	0.26	mg/L
BAP-MW-1925	Lead, Pb	0.2J	ug/L
BAP-MW-1925	Lithium, Li	0.0947	mg/L
BAP-MW-1925	Mercury, Hg	<0.002U	ug/L
BAP-MW-1925	Molybdenum, Mo	54.6	ug/L
BAP-MW-1925	pH	7.2	STD
BAP-MW-1925	Residue, Filterable, TDS	1500	mg/L
BAP-MW-1925	Selenium, Se	4.1	ug/L
BAP-MW-1925	Sulfate, SO4	683	mg/L
BAP-MW-1925	Thallium, Tl	<0.1U	ug/L
BAP-MW-1926	Antimony, Sb	0.07J	ug/L
BAP-MW-1926	Arsenic, As	0.37	ug/L
BAP-MW-1926	Barium, Ba	23.9	ug/L
BAP-MW-1926	Beryllium, Be	<0.02U	ug/L
BAP-MW-1926	Boron, B	0.145	mg/L
BAP-MW-1926	Cadmium, Cd	0.06	ug/L
BAP-MW-1926	Calcium, Ca	87.6	mg/L
BAP-MW-1926	Chloride, Cl	8.57	mg/L
BAP-MW-1926	Chromium, Cr	0.09J	ug/L
BAP-MW-1926	Cobalt, Co	1.17	ug/L

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Sample Location	Parameters	Result	Reporting Units
BAP-MW-1926	Combined Radium	0.4608	pCi/L
BAP-MW-1926	Fluoride, F	0.24	mg/L
BAP-MW-1926	Lead, Pb	0.07J	ug/L
BAP-MW-1926	Lithium, Li	0.00624	mg/L
BAP-MW-1926	Mercury, Hg	<0.002U	ug/L
BAP-MW-1926	Molybdenum, Mo	5.38	ug/L
BAP-MW-1926	pH	7.3	STD
BAP-MW-1926	Residue, Filterable, TDS	396	mg/L
BAP-MW-1926	Selenium, Se	0.4	ug/L
BAP-MW-1926	Sulfate, SO4	26.4	mg/L
BAP-MW-1926	Thallium, Tl	<0.1U	ug/L
BAP-MW-1927	Antimony, Sb	0.12	ug/L
BAP-MW-1927	Arsenic, As	0.27	ug/L
BAP-MW-1927	Barium, Ba	58.7	ug/L
BAP-MW-1927	Beryllium, Be	<0.02U	ug/L
BAP-MW-1927	Boron, B	0.498	mg/L
BAP-MW-1927	Cadmium, Cd	0.05	ug/L
BAP-MW-1927	Calcium, Ca	143	mg/L
BAP-MW-1927	Chloride, Cl	15.2	mg/L
BAP-MW-1927	Chromium, Cr	0.08J	ug/L
BAP-MW-1927	Cobalt, Co	0.225	ug/L
BAP-MW-1927	Combined Radium	1.415	pCi/L
BAP-MW-1927	Fluoride, F	0.14	mg/L
BAP-MW-1927	Lead, Pb	<0.05U	ug/L
BAP-MW-1927	Lithium, Li	0.00638	mg/L
BAP-MW-1927	Mercury, Hg	<0.002U	ug/L
BAP-MW-1927	Molybdenum, Mo	2J	ug/L
BAP-MW-1927	pH	7	STD
BAP-MW-1927	Residue, Filterable, TDS	839	mg/L
BAP-MW-1927	Selenium, Se	0.4	ug/L
BAP-MW-1927	Sulfate, SO4	306	mg/L
BAP-MW-1927	Thallium, Tl	< 0.1U	ug/L
BAP-MW-1929	Antimony, Sb	0.03J	ug/L
BAP-MW-1929	Arsenic, As	0.47	ug/L
BAP-MW-1929	Barium, Ba	52.1	ug/L
BAP-MW-1929	Beryllium, Be	<0.02U	ug/L
BAP-MW-1929	Boron, B	0.236	mg/L
BAP-MW-1929	Cadmium, Cd	0.01J	ug/L
BAP-MW-1929	Calcium, Ca	113	mg/L
BAP-MW-1929	Chloride, Cl	15.1	mg/L
BAP-MW-1929	Chromium, Cr	0.280	ug/L
BAP-MW-1929	Cobalt, Co	0.606	ug/L
BAP-MW-1929	Combined Radium	2.994	pCi/L

Mountaineer Plant

Bottom Ash Pond

Assessment Monitoring - 257.105(h)(6) Results Operating Record Notice

Report Date: 9/30/2019 - 10/2/2019

Sample Location	Parameters	Result	Reporting Units
BAP-MW-1929	Fluoride, F	0.19	mg/L
BAP-MW-1929	Lead, Pb	0.274	ug/L
BAP-MW-1929	Lithium, Li	0.00480	mg/L
BAP-MW-1929	Mercury, Hg	<0.002U	ug/L
BAP-MW-1929	Molybdenum, Mo	0.7J	ug/L
BAP-MW-1929	pH	7.6	STD
BAP-MW-1929	Residue, Filterable, TDS	528	mg/L
BAP-MW-1929	Selenium, Se	1.7	ug/L
BAP-MW-1929	Sulfate, SO4	234	mg/L
BAP-MW-1929	Thallium, Tl	<0.1U	ug/L
BAP-MW-203	Antimony, Sb	0.02J	ug/L
BAP-MW-203	Arsenic, As	0.33	ug/L
BAP-MW-203	Barium, Ba	31.6	ug/L
BAP-MW-203	Beryllium, Be	<0.02U	ug/L
BAP-MW-203	Boron, B	0.104	mg/L
BAP-MW-203	Cadmium, Cd	<0.01U	ug/L
BAP-MW-203	Calcium, Ca	106	mg/L
BAP-MW-203	Chloride, Cl	10.1	mg/L
BAP-MW-203	Chromium, Cr	0.2J	ug/L
BAP-MW-203	Cobalt, Co	0.139	ug/L
BAP-MW-203	Combined Radium	0.381	pCi/L
BAP-MW-203	Fluoride, F	0.22	mg/L
BAP-MW-203	Lead, Pb	0.2J	ug/L
BAP-MW-203	Lithium, Li	0.00230	mg/L
BAP-MW-203	Mercury, Hg	<0.002U	ug/L
BAP-MW-203	Molybdenum, Mo	1J	ug/L
BAP-MW-203	pH	7.1	STD
BAP-MW-203	Residue, Filterable, TDS	435	mg/L
BAP-MW-203	Selenium, Se	1.1	ug/L
BAP-MW-203	Sulfate, SO4	65.5	mg/L
BAP-MW-203	Thallium, Tl	<0.1U	ug/L

Groundwater Data Summary
Mountaineer Plant - Bottom Ash Pond

Geosyntec Consultants

Parameter	Unit	MW-1601A		MW-1602		MW-1603		MW-1604D		MW-1604S		MW-1605D	
		3/12/2020	5/15/2020	3/11/2020	5/15/2020	3/11/2020	5/15/2020	3/10/2020	5/14/2020	3/10/2020	5/14/2020	3/10/2020	5/19/2020
Antimony	µg/L	0.1 U	0.03 J	0.1 U	0.02 J	0.1 U	0.1 U	0.02 J	0.03 J	0.14	0.15	0.03 J	0.04 J
Arsenic	µg/L	0.58	0.57	0.31	0.31	0.29	0.27	0.31	0.28	0.29	0.30	3.01	2.73
Barium	µg/L	64.9	67.8	28.9	30.0	30.4	30.0	34.2	34.1	28.9	29.1	29.6	25.7
Beryllium	µg/L	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-
Boron	mg/L	-	0.136	-	0.118	-	0.275	-	4.65	-	3.68	-	6.92
Cadmium	µg/L	0.01 J	0.02 J	0.05 U	0.01 J	0.01 J	0.01 J	0.03 J	0.03 J	0.12	0.19	0.02 J	0.01 J
Calcium	mg/L	-	185	-	99.2	-	161	-	205	-	250	-	265
Chloride	mg/L	-	22.7	-	9.67	-	10.7	-	113	-	116	-	169
Chromium	µg/L	0.205	0.1 J	0.261	0.2 J	0.224	0.210	0.311	0.729	0.323	0.1 J	0.08 J	0.1 J
Cobalt	µg/L	0.02 J	0.05 U	0.05 U	0.04 J	0.061	0.094	0.138	0.117	1.72	1.93	1.67	1.45
Combined Radium	pCi/L	1.685	0.553	0.4389	0.5819	2.036	0.701	0.834	0.1393	1.662	1.038	0.3851	0.425
Fluoride	mg/L	0.14	0.16	0.23	0.25	0.06	0.09	0.22	0.25	0.24	0.25	0.19 J	0.17 J
Lead	µg/L	0.2 U	0.2 U	0.05 J	0.2 U	0.08 J	0.07 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Lithium	mg/L	0.00183	0.00190	0.0117	0.0126	0.0175	0.0182	0.0235	0.0218	0.0390	0.0419	0.0502	0.0495
Mercury	µg/L	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-
Molybdenum	µg/L	1 J	0.7 J	1 J	0.9 J	2 U	2 U	1 J	1 J	13.7	14.9	32.7	32.8
Selenium	µg/L	1.4	0.9	0.2 J	0.09 J	0.2 J	0.2 J	0.8	0.7	1.2	1.1	0.2 J	0.2 J
Sulfate	mg/L	-	274	-	264	-	387	-	667	-	715	-	848
Thallium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 J	0.2 J	0.5 U	0.5 U
Total Dissolved Solids	mg/L	-	814	-	595	-	809	-	1,390	-	1,520	-	1,670
pH	SU	6.7	6.7	6.4	6.4	6.4	6.5	6.4	6.7	6.7	6.9	6.9	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 sampled

Groundwater Data Summary
Mountaineer Plant - Bottom Ash Pond

Parameter	Unit	MW-1605S		MW-1606D		MW-1606S		MW-1607D		MW-1607S		MW-1608	
		3/10/2020	5/19/2020	3/10/2020	5/19/2020	3/10/2020	5/19/2020	3/11/2020	5/20/2020	3/10/2020	5/20/2020	3/10/2020	5/13/2020
Antimony	µg/L	0.08 J	0.04 J	0.14	0.15	0.13	0.14	0.1 U	0.03 J	0.41	0.45	0.1 U	0.04 J
Arsenic	µg/L	0.62	0.47	0.35	0.32	0.62	0.65	1.56	1.42	0.92	0.93	0.37	0.36
Barium	µg/L	26.5	21.1	45.3	45.6	60.9	59.8	68.3	65.6	69.2	66.8	30.5	31.3
Beryllium	µg/L	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-	0.1 U	-
Boron	mg/L	-	4.83	-	5.92	-	5.94	-	3.89	-	3.55	-	0.108
Cadmium	µg/L	0.04 J	0.03 J	0.05	0.06	0.07	0.06	0.05 U	0.05 U	0.04 J	0.04 J	0.05 U	0.02 J
Calcium	mg/L	-	154	-	270	-	207	-	228	-	190	-	92.7
Chloride	mg/L	-	93.5	-	178	-	181	-	181	-	172	-	5.22
Chromium	µg/L	0.305	0.1 J	0.2 J	0.1 J	0.1 J	0.1 J	0.08 J	0.2 J	0.321	0.249	0.264	0.2 J
Cobalt	µg/L	0.723	0.208	1.11	1.10	0.322	0.435	0.846	0.913	1.23	1.42	0.070	0.092
Combined Radium	pCi/L	0.842	0.639	0.946	0.975	0.434	0.3814	2.552	0.815	1.171	0.3123	0.67	0.569
Fluoride	mg/L	0.30	0.28	0.27	0.24	0.40	0.38	0.41	0.51	0.24	0.23	0.21	0.22
Lead	µg/L	0.497	0.2 U	0.2 U	0.2 U	0.05 J	0.2 U	0.2 U	0.05 J	0.06 J	0.06 J	0.06 J	0.275
Lithium	mg/L	0.0558	0.0523	0.0700	0.0681	0.0721	0.0730	0.108	0.104	0.110	0.105	0.00229	0.00241
Mercury	µg/L	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-	0.005 U	-
Molybdenum	µg/L	12.8	12.3	62.5	67.0	51.7	56.0	79.6	83.5	35.5	35.8	0.6 J	0.7 J
Selenium	µg/L	0.8	0.7	0.5	0.5	4.4	5.3	0.04 J	0.08 J	4.5	5.7	4.3	2.1
Sulfate	mg/L	-	543	-	756	-	646	-	722	-	407	-	158
Thallium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Dissolved Solids	mg/L	-	1,160	-	1,600	-	1,400	-	1,620	-	1,230	-	440
pH	SU	6.9	6.9	7.0	7.0	6.8	6.7	7.1	7.2	6.9	7.0	6.7	6.8

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

Appendix 5

No monitoring wells were installed or decommissioned in 2020.

EPA ADDITIONAL INFORMATION REQUEST

ATTACHMENT B

MOUNTAINEER PLANT LANDFILL

2020 ANNUAL GROUNDWTER MONITORING REPORT

Annual Groundwater Monitoring Report

Appalachian Power Company

Mountaineer Plant

Landfill CCR Management Unit

Letart, WV

January 2021

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

APPALACHIAN POWER℠

An AEP Company

BOUNDLESS ENERGY℠

Table of Contents

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 landfill 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 31st.

In general, the following activities were completed in 2020:

- Groundwater samples were collected and analyzed for Appendix III constituents, as specified in 40 CFR 257.94 *et seq.* and AEP's *Groundwater Sampling and Analysis Plan (2016)*;
- Groundwater data underwent various validation tests, including tests for completeness, valid values, transcription errors, and consistent units;
- Groundwater data, flow, and velocities are included in **Appendix 1**.
- Appendix III constituents were compared to prediction intervals established from background data established previously;
- Background updates were completed for appendix III indicator parameters and are summarized in the *Statistical Analysis Summary – Background Update Calculation* (January 2020) report for Mountaineer Landfill, include in **Appendix 2**.
- No Statistically significant increases were observed in the May 2020 detection monitoring event. The complete statistical analysis for this event is included in **Appendix 2**.
- October 2020 detection monitoring data is undergoing statistical analysis and will be completed in early 2021.

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

- A map, aerial photograph or a drawing showing the CCR management unit(s), all groundwater monitoring wells and monitoring well identification numbers;
- All of the monitoring data collected, including the rate and direction of groundwater flow, plus a summary showing the number of samples collected per monitoring well, the dates the samples were collected and whether the sample was collected as part of detection monitoring or assessment monitoring programs (Attached as **Appendix 1**);
- Statistical comparison of monitoring data to determine if there have been significant increase over background concentrations (Attached as **Appendix 2**, where applicable);

- A discussion of whether any alternate source demonstration were performed, and the conclusions (Attached as **Appendix 3**, where applicable);
- A summary of any transition between monitoring program, for example the date and circumstances for transitioning from detection monitoring to assessment monitoring (Notices attached as **Appendix 4**, where applicable);
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened (Attached as **Appendix 5**, where applicable); and
- Other information required to be included in the annual report such as an alternate monitoring frequency, 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

The figure that follows depicts the PE-certified groundwater monitoring network, the monitoring well locations and their corresponding identification.

III. Monitoring Wells Installed or Decommissioned

There were no monitoring wells installed or decommissioned in 2020. The network design, as summarized in the *Groundwater Monitoring Network Design Report* (2016) and as posted at the CCR web site for Mountaineer Plant, did not change. That design report, viewable on the AEP CCR web site, discusses the facility location, the hydrogeological setting, the hydrostratigraphic units, the uppermost aquifer, downgradient monitoring well locations and the upgradient monitoring well locations.

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

Appendix 1 contains tables showing the groundwater quality data collected since background through data received in 2020. 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.

V. Groundwater Quality Data Statistical Analysis

Statistical analysis completed in 2020 of the detection monitoring samples collected and analyzed in May 2020 are included in **Appendix 2** of this report.

Samples collected in October 2020 were analyzed and results received in late 2020. The statistical analysis of these results is underway and will be completed within the 90-day timeframe allowed.

Background updates for the appendix III indicator parameters was completed and that report is also included in **Appendix 2**.

VI. Alternative Source Demonstrations

No alternative source demonstrations were completed in 2020.

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

There has been no transition between detection monitoring and assessment monitoring at Mountaineer Plant's Landfill. Detection monitoring will continue in 2021. The sampling frequency of twice per year will be maintained for the Appendix III parameters (boron, calcium, chloride, fluoride, pH, sulfate and total dissolved solids).

Statistical analysis of the October 2020 event will be completed in early 2021. If necessary, an ASD will be completed or an assessment monitoring program will be initiated.

Regarding defining an alternate monitoring frequency, the groundwater velocity and monitoring well production is high enough at this facility that no modification of the twice-per-year detection monitoring effort is needed.

Monitoring Well Network

- Downgradient Sampling Location
- Background Sampling Location
- Landfill

Notes

- Monitoring well coordinates provided by AEP.
- Site features based on information available in Little Broad Run Landfill-CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.

750 375 0 750 Feet

Site Layout
CCR Landfill

AEP Mountaineer Generating Plant
Letart, West Virginia

Geosyntec consultants

Columbus, Ohio | 2018/01/26

Figure **1**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mountaineer\AEP-Mountaineer_LF_Site_Layout.mxd. ARevezzo. 1/26/2018. CHA8423/07/08.

VIII. Description of Any Problems Encountered in 2020 and Actions Taken

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

IX. A Projection of Key Activities for the Upcoming Year

Key activities for 2021 include:

- Detection monitoring on a twice per year schedule.
- Evaluation of the detection monitoring results from a statistical analysis viewpoint, looking for any statistically significant increases, or decreases when pH is considered.
- Responding to any new data received in light of what the CCR rule requires.
- Preparation of the 2021 annual groundwater report.

APPENDIX 1 - Groundwater Data Tables and Figures

Tables follow, showing the groundwater monitoring data collected and the rate and direction of groundwater flow. The dates that the samples were collected also is shown.

Table 1 - Groundwater Data Summary: MW-26
Mountaineer - LF
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
9/27/2016	Background	0.097	61.5	5.57	0.12	7.5	9.6	322
11/1/2016	Background	0.117	50.5	5.17	0.13	7.4	10.6	270
12/21/2016	Background	0.074	48.6	5.21	0.13	7.6	10.2	316
2/22/2017	Background	0.145	56.2	5.35	0.13	7.4	6.5	325
3/28/2017	Background	0.222	52.9	6.25	0.13	7.4	7.3	334
4/17/2017	Background	0.169	57.1	5.73	0.13	7.3	6.7	320
5/17/2017	Background	0.161	58.6	5.87	0.13	8.1	6.5	343
6/13/2017	Background	0.121	53.7	5.00	0.12	7.4	5.3	324
10/31/2017	Detection	0.165	54.7	5.48	0.13	7.5	5.8	346
1/22/2018	Detection	--	55.7	--	--	7.3	--	--
9/20/2018	Detection	0.214	49.4	6.04	0.16	8.0	6.3	344
11/26/2018	Detection	0.182	53.6	5.97	0.14	7.4	7.2	364
4/9/2019	Detection	0.128	62.8	6.71	0.13	7.3	7.6	370
6/18/2019	Detection	--	--	7.22	--	7.2	--	387
9/9/2019	Detection	0.099	60.2	5.80	0.14	7.4	5.7	353
5/15/2020	Detection	0.100	55.6	1.72	2.56	7.1	3.9	547
7/8/2020	Detection	--	--	--	--	7.4	--	366
10/8/2020	Detection	0.103	51.2	5.74	0.16	6.9	6.4	344

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-26
Mountaineer - LF
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.13	3.57	917	< 0.005 U	0.01 J	0.4	0.214	3.25	0.12	0.165	0.010	< 0.002 U	1.88	0.1	0.03 J
11/1/2016	Background	0.11	4.06	871	< 0.005 U	0.005 J	0.3	0.220	3.57	0.13	0.043	0.006	< 0.002 U	3.07	0.1	0.02 J
12/21/2016	Background	0.12	4.51	872	0.01 J	0.006 J	1.27	0.329	3.15	0.13	0.167	0.004	< 0.002 U	3.52	0.2	0.062
2/22/2017	Background	0.09	4.11	717	0.01 J	0.01 J	0.731	0.345	3.6	0.13	0.244	0.012	< 0.002 U	2.53	0.1	0.04 J
3/28/2017	Background	0.50	3.95	886	0.028	0.01 J	1.43	0.532	2.88	0.13	0.517	0.014	< 0.002 U	1.18	0.2	0.03 J
4/17/2017	Background	0.09	3.60	802	0.007 J	0.007 J	0.328	0.299	1.967	0.13	0.164	0.009	< 0.002 U	1.08	0.1 J	0.01 J
5/17/2017	Background	0.06	4.01	869	< 0.004 U	0.007 J	0.238	0.251	3.22	0.13	0.090	0.007	< 0.002 U	3.99	0.1	0.01 J
6/13/2017	Background	0.10	3.45	905	0.008 J	0.008 J	0.405	0.325	3.28	0.12	0.252	0.018	< 0.002 U	1.23	0.1	0.01 J

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-27
Mountaineer - LF
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
9/27/2016	Background	0.276	18.9	1.82	2.23	9.2	4.9	618
11/1/2016	Background	0.288	1.57	1.86	2.38	9.1	7.2	558
12/21/2016	Background	0.219	1.39	1.69	2.44	9.2	7.3	528
2/22/2017	Background	0.282	1.42	1.48	2.27	9.1	4.3	531
3/28/2017	Background	0.387	1.26	1.59	2.32	9.3	4.7	508
4/17/2017	Background	0.312	1.65	1.56	2.30	9.0	5.0	536
5/17/2017	Background	0.290	1.48	1.59	2.38	11.1	4.8	539
6/13/2017	Background	0.293	1.77	1.64	2.33	9.4	4.5	526
10/31/2017	Detection	0.275	1.33	1.63	2.38	9.2	4.2	544
9/20/2018	Detection	0.357	1.14	1.69	2.41	9.1	4.4	550
11/26/2018	Detection	0.292	1.20	1.52	2.37	9.0	3.6	522
4/9/2019	Detection	0.303	1.19	1.54	2.32	9.0	2.9	542
9/10/2019	Detection	0.285	1.13	1.67	2.71	9.1	3.0	530
5/15/2020	Detection	0.100	54.5	6.06	0.14	8.8	7.0	359
7/8/2020	Detection	--	1.20	1.63	--	9.1	--	--
10/8/2020	Detection	0.273	1.20	1.67	2.38	8.7	3.4	541

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-27
Mountaineer - LF
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.39	8.05	326	0.654	0.11	11.6	4.95	2.565	2.23	17.3	0.016	0.004 J	24.2	2.2	0.1 J
11/1/2016	Background	0.26	5.42	151	0.158	0.02	5.0	0.817	2.003	2.38	4.00	0.007	< 0.002 U	35.6	0.4	0.03 J
12/21/2016	Background	0.23	4.26	113	0.093	0.01 J	2.94	0.502	1.489	2.44	8.87	0.001	< 0.002 U	34.6	0.3	0.04 J
2/22/2017	Background	0.06	3.76	94.8	0.054	0.009 J	1.95	0.320	1.419	2.27	1.28	0.012	0.002 J	32.1	0.1	0.03 J
3/28/2017	Background	0.08	4.45	105	0.062	0.008 J	1.69	0.319	0.888	2.32	1.06	0.016	< 0.002 U	31.5	0.2	0.02 J
4/17/2017	Background	0.15	4.54	108	0.085	0.01 J	2.36	0.511	0.486	2.30	1.45	0.005	0.002 J	32.0	0.2	0.02 J
5/17/2017	Background	0.11	4.54	94.6	0.052	0.005 J	1.33	0.335	0.20279	2.38	0.971	0.015	< 0.002 U	31.6	0.2	0.01 J
6/13/2017	Background	0.18	4.55	102	0.082	0.01 J	2.25	0.600	0.797	2.33	1.39	0.015	< 0.002 U	30.6	0.2	0.02 J

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-30
Mountaineer - LF
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
10/26/2016	Background	0.239	16.6	250	3.42	8.7	31.5	--
11/2/2016	Background	0.240	10.9	257	3.41	8.6	19.6	1,350
12/28/2016	Background	0.250	9.91	250	3.43	8.0	19.1	1,280
2/22/2017	Background	0.257	2.76	246	3.18	8.6	11.5	1,220
3/29/2017	Background	0.344	2.54	242	3.31	8.7	0.1 J	1,270
4/19/2017	Background	0.296	2.91	247	3.28	8.5	11.2	1,210
5/17/2017	Background	0.269	2.97	247	1.34	10.1	4.4	1,290
6/13/2017	Background	0.283	4.06	255	3.28	8.9	10.8	1,170
10/31/2017	Detection	0.315	3.27	257	3.30	8.5	11.4	1,210
9/20/2018	Detection	0.315	4.69	253	3.36	8.6	13.0	1,230
11/27/2018	Detection	0.344	3.16	247	3.40	8.4	11.7	1,240
4/9/2019	Detection	0.290	2.88	245	3.32	8.4	10.6	1,260
9/10/2019	Detection	0.259	3.39	249	3.76	8.3	9.6	1,260
5/18/2020	Detection	0.271	2.95	264	3.54	8.1	10.8	1,240
10/8/2020	Detection	0.249	2.93	247	2.73	8.0	10.9	1,260

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-30
Mountaineer - LF
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
10/26/2016	Background	0.36	7.38	567	0.692	0.10	13.1	33.8	2.588	3.42	33.2	0.034	0.054	68.7	3.8	0.724
11/3/2016	Background	0.26	7.54	576	0.630	0.09	11.7	33.3	1.404	3.41	30.9	0.026	0.016	73.7	2.7	0.654
12/28/2016	Background	0.91	6.87	360	0.502	0.08	18.1	15.9	2.725	3.43	13.8	0.024	0.026	107	2.6	0.350
2/22/2017	Background	0.52	4.65	223	0.082	0.008 J	3.24	2.40	2.418	3.18	1.68	0.022	0.004 J	125	0.5	0.258
3/29/2017	Background	0.66	5.45	243	0.149	0.007 J	6.13	4.24	1.204	3.31	3.62	0.027	0.003 J	120	0.7	0.381
4/19/2017	Background	1.55	5.80	246	0.140	0.01 J	5.76	3.91	3.83	3.28	3.49	0.019	0.061	123	0.7	0.365
5/17/2017	Background	0.75	6.90	241	0.120	< 0.005 U	3.99	3.63	2.395	1.34	3.41	0.027	0.004 J	128	0.9	0.287
6/13/2017	Background	2.74	6.86	251	0.197	0.02 J	6.83	5.35	3.45	3.28	4.80	0.027	0.005 J	118	0.8	0.366

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-38
Mountaineer - LF
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
9/27/2016	Background	0.024	55.7	7.12	0.32	7.1	28.1	410
11/2/2016	Background	0.040	46.3	7.27	0.32	7.0	36.6	358
12/21/2016	Background	0.019	48.2	7.43	0.35	7.4	35.8	404
2/22/2017	Background	0.028	47.2	7.21	0.29	7.0	31.7	409
3/28/2017	Background	0.070	50.0	7.08	0.32	7.0	30.1	390
4/18/2017	Background	0.038	52.5	7.22	0.33	7.0	30.6	422
5/16/2017	Background	0.027	54.5	7.41	0.33	7.6	32.5	421
6/13/2017	Background	0.093	51.4	7.01	0.28	7.0	31.0	406
10/31/2017	Detection	0.045	56.1	7.59	0.38	7.0	28.7	460
1/22/2018	Detection	--	53.8	--	--	6.7	--	419
9/20/2018	Detection	0.068	51.2	7.31	0.36	7.4	31.5	441
11/26/2018	Detection	0.08 J	48.2	7.06	0.34	7.0	35.2	415
4/9/2019	Detection	0.04 J	52.0	7.46	0.32	6.9	27.8	427
6/18/2019	Detection	--	--	--	--	7.6	--	--
9/10/2019	Detection	0.03 J	49.9	7.45	0.35	7.7	28.2	417
10/22/2019	Detection	--	--	--	--	6.9	--	--
5/15/2020	Detection	0.02 J	48.3	7.59	0.38	6.7	31.4	421
10/8/2020	Detection	0.03 J	53.4	7.68	0.47	6.8	25.5	452

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-38
Mountaineer - LF
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/27/2016	Background	0.09	9.82	221	0.023	0.03	1.0	2.72	2.229	0.32	0.442	0.002	< 0.002 U	2.76	0.2	0.103
11/2/2016	Background	0.07	8.15	179	< 0.005 U	0.02 J	0.4	0.855	1.744	0.32	0.113	0.0009 J	< 0.002 U	2.10	0.04 J	0.04 J
12/21/2016	Background	0.05	6.62	162	< 0.005 U	0.02	1.67	0.655	2.06	0.35	0.082	< 0.0002 U	< 0.002 U	2.50	0.06 J	0.082
2/22/2017	Background	0.03 J	5.74	141	< 0.005 U	0.02	0.526	0.949	1	0.29	0.039	0.004	< 0.002 U	3.37	0.03 J	0.04 J
3/28/2017	Background	0.05 J	11.5	184	< 0.005 U	0.03	0.197	0.916	0.548	0.32	0.073	0.006	< 0.002 U	2.47	0.06 J	0.05 J
4/18/2017	Background	0.04 J	6.34	179	< 0.004 U	0.03	0.111	2.87	0.494	0.33	0.02 J	0.003	< 0.002 U	2.30	< 0.03 U	0.068
5/16/2017	Background	0.06	5.09	186	< 0.004 U	0.03	0.093	3.66	0.536	0.33	0.01 J	0.004	< 0.002 U	3.76	< 0.03 U	0.062
6/13/2017	Background	0.06	8.09	187	< 0.004 U	0.03	0.130	2.53	1.268	0.28	0.056	0.013	< 0.002 U	2.67	0.04 J	0.056

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-39
Mountaineer - LF
Appendix III Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
9/26/2016	Background	0.143	12.4	3.00	0.77	8.4	< 0.04 U	350
11/2/2016	Background	0.134	7.88	3.05	0.83	8.4	< 0.04 U	344
12/21/2016	Background	0.122	10.5	3.07	0.86	8.8	< 0.04 U	450
2/22/2017	Background	0.134	7.65	2.98	0.80	8.4	< 0.04 U	374
3/28/2017	Background	0.202	5.95	2.95	0.78	8.4	0.1 J	310
4/18/2017	Background	0.156	6.48	2.91	0.78	8.3	< 0.04 U	344
5/16/2017	Background	0.139	6.74	2.98	0.79	9.5	1.5	367
6/14/2017	Background	0.179	6.15	2.92	0.78	8.5	0.1	340
10/31/2017	Detection	0.171	7.25	3.05	0.78	8.3	0.2	385
9/20/2018	Detection	0.182	6.43	2.99	0.80	8.5	0.1 J	369
11/26/2018	Detection	0.167	6.33	2.93	0.80	8.3	0.07 J	380
4/9/2019	Detection	0.158	6.65	2.94	0.77	8.3	< 0.06 U	376
9/9/2019	Detection	0.144	6.78	3.07	0.84	8.1	< 0.06 U	369
5/15/2020	Detection	0.148	6.15	3.11	0.84	7.9	0.2 J	374
7/8/2020	Detection	--	--	--	--	8.4	--	--
10/8/2020	Detection	0.133	6.11	2.98	0.89	7.9	< 0.06 U	404

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-39
Mountaineer - LF
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/26/2016	Background	0.06	4.80	264	0.095	0.01 J	2.2	1.43	1.142	0.77	2.21	0.016	< 0.002 U	8.51	0.3	0.04 J
11/2/2016	Background	0.04 J	3.89	276	0.068	< 0.004 U	3.2	0.615	1.941	0.83	0.532	0.011	< 0.002 U	9.54	0.09 J	0.03 J
12/21/2016	Background	0.08	3.95	296	0.202	0.006 J	6.32	2.34	1.311	0.86	1.79	0.008	< 0.002 U	8.03	0.6	0.070
2/22/2017	Background	0.03 J	3.91	243	0.041	0.01 J	1.41	0.539	1.162	0.80	0.467	0.012	0.002 J	9.23	0.1	0.03 J
3/28/2017	Background	0.02 J	3.58	241	0.01 J	< 0.004 U	0.560	0.206	0.793	0.78	0.176	0.015	< 0.002 U	8.50	0.06 J	0.02 J
4/18/2017	Background	0.01 J	3.70	244	0.007 J	< 0.005 U	0.243	0.188	0.1602	0.78	0.113	0.009	< 0.002 U	8.65	0.04 J	< 0.01 U
5/16/2017	Background	0.01 J	3.88	244	0.004 J	0.02	0.221	0.174	0.611	0.79	0.073	0.017	< 0.002 U	9.39	0.04 J	< 0.01 U
6/14/2017	Background	0.02 J	3.76	247	0.008 J	< 0.005 U	0.203	0.209	0.47	0.78	0.092	0.028	< 0.002 U	9.06	0.06 J	< 0.01 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1611
Mountaineer - LF
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	0.136	25.0	8.72	0.56	7.8	17.3	382
11/2/2016	Background	0.140	22.8	9.36	0.61	7.8	22.7	388
12/20/2016	Background	0.124	22.2	9.39	0.64	7.7	21.8	380
2/22/2017	Background	0.175	22.5	9.10	0.57	7.7	18.0	381
3/28/2017	Background	0.210	22.3	8.04	0.50	7.8	15.7	326
4/18/2017	Background	0.155	22.8	8.59	0.56	7.7	17.7	388
5/16/2017	Background	0.190	23.1	9.14	0.60	8.3	18.7	392
6/12/2017	Background	0.158	22.4	9.29	0.57	7.2	19.4	384
10/31/2017	Detection	0.152	24.0	9.80	0.61	7.8	18.9	402
1/22/2018	Detection	--	22.6	--	--	7.5	--	376
9/20/2018	Detection	0.258	23.2	9.48	0.61	7.8	19.0	416
11/26/2018	Detection	0.147	21.9	9.57	0.62	7.7	18.5	387
4/9/2019	Detection	0.139	26.2	7.96	0.46	7.6	20.7	431
6/18/2019	Detection	--	22.8	9.58	--	7.9	--	--
7/10/2019	Detection	--	--	--	--	7.6	--	402
9/9/2019	Detection	0.136	26.1	10.1	0.62	7.7	17.3	402
5/15/2020	Detection	0.135	24.0	9.35	0.61	7.3	20.8	404
10/8/2020	Detection	0.124	24.8	9.44	0.64	7.3	22.2	451

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1611
Mountaineer - LF
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
9/26/2016	Background	0.03 J	1.01	165	0.046	0.02	1.4	0.370	1.258	0.56	0.482	0.004	< 0.002 U	6.97	0.07 J	0.088
11/2/2016	Background	0.03 J	0.97	156	0.030	0.01 J	0.9	0.245	2.888	0.61	0.310	0.004	< 0.002 U	5.83	0.06 J	0.03 J
12/20/2016	Background	< 0.01 U	0.74	140	< 0.005 U	< 0.004 U	2.10	0.092	0.772	0.64	0.023	0.002	< 0.002 U	5.46	< 0.03 U	< 0.01 U
2/22/2017	Background	< 0.01 U	0.75	135	0.007 J	0.006 J	0.209	0.096	0.5828	0.57	0.055	0.007	0.002 J	5.36	0.04 J	0.208
3/28/2017	Background	0.01 J	0.60	166	0.01 J	0.005 J	0.426	0.108	0.645	0.50	0.195	0.011	< 0.002 U	7.26	0.07 J	0.02 J
4/18/2017	Background	0.01 J	0.69	155	0.01 J	0.006 J	0.337	0.104	0.487	0.56	0.133	0.003	< 0.002 U	6.01	< 0.03 U	< 0.01 U
5/16/2017	Background	0.03 J	0.75	145	0.008 J	< 0.005 U	0.661	0.101	2.534	0.60	0.119	0.006	< 0.002 U	5.49	0.04 J	0.02 J
6/12/2017	Background	0.03 J	0.76	148	0.007 J	< 0.005 U	0.138	0.092	0.508	0.57	0.058	0.018	< 0.002 U	5.39	0.03 J	< 0.01 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 1 - Groundwater Data Summary: MW-1612
Mountaineer - LF
Appendix III Constituents

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
10/26/2016	Background	0.637	9.47	38.1	3.02	8.3	272	--
11/2/2016	Background	0.629	8.48	33.4	3.23	8.3	238	850
12/21/2016	Background	0.501	8.96	36.1	3.33	8.1	271	966
2/22/2017	Background	0.473	7.90	35.6	2.95	8.4	288	1,090
3/29/2017	Background	0.673	7.10	23.7	3.50	8.7	190	1,240
4/19/2017	Background	0.589	8.61	22.4	3.26	8.4	226	1,040
5/16/2017	Background	0.565	12.5	27.8	2.88	8.8	346	1,150
6/13/2017	Background	0.532	8.09	27.4	2.98	8.2	334	1,130
10/31/2017	Detection	0.457	7.22	20.2	3.53	8.2	147	914
9/20/2018	Detection	0.543	4.50	14.6	3.78	8.4	63.9	835
11/26/2018	Detection	0.413	4.25	11.5	3.91	8.0	49.2	764
4/9/2019	Detection	0.449	3.21	10.2	4.02	8.3	54.8	725
9/10/2019	Detection	0.438	4.77	11.1	4.34	8.3	31.3	786
5/18/2020	Detection	0.388	4.18	6.75	4.39	8.2	40.5	637
10/8/2020	Detection	0.351	3.43	6.36	3.92	8.3	40.0	662

Notes:
mg/L: milligrams per liter
SU: standard unit
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1612
Mountaineer - LF
Appendix IV Constituents

Geosyntec Consultants, Inc.

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
10/26/2016	Background	0.31	12.4	66.2	0.033	0.007 J	1.63	0.367	2.765	3.02	0.391	0.018	< 0.002 U	62.1	0.2	0.03 J
11/2/2016	Background	0.35	16.8	80.4	0.009 J	< 0.004 U	0.6	0.197	0.973	3.23	0.168	0.014	0.002 J	67.6	0.08 J	0.087
12/21/2016	Background	0.13	14.9	62.1	0.007 J	< 0.004 U	0.913	0.111	0.947	3.33	0.121	0.011	0.002 J	52.2	0.1	< 0.01 U
2/22/2017	Background	0.31	14.4	72.4	0.058	< 0.004 U	2.13	0.700	1.084	2.95	0.640	0.018	0.003 J	38.5	0.1	0.04 J
3/29/2017	Background	0.77	12.4	141	0.290	0.01 J	3.19	2.60	0.86	3.50	1.37	0.020	0.014	45.9	0.5	0.03 J
4/19/2017	Background	0.82	10.7	233	0.551	< 0.05 U	15.5	3.94	0.425	3.26	4.10	0.019	0.004 J	58.0	1.2	0.2 J
5/16/2017	Background	0.15	10.4	77.1	0.02 J	< 0.005 U	0.445	0.231	2.744	2.88	0.210	0.022	< 0.002 U	43.1	0.1	0.02 J
6/13/2017	Background	0.15	10.7	59.6	0.006 J	< 0.005 U	0.227	0.101	0.824	2.98	0.023	0.028	< 0.002 U	34.3	0.06 J	< 0.01 U

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
<: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL) followed by a 'U' flag.
J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed
pCi/L: picocuries per liter

Table 2: Residence Time Calculation Summary - Landfill
Mountaineer Landfill

Geosyntec Consultants, Inc.

			2020-05		2020-10	
CCR Management Unit	Monitoring Well	Well Diameter (inches)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Landfill	MW-26 [2]	2.0	1.8	33.3	1.7	35.6
	MW-27 [2]	2.0	18.9	3.2	17.8	3.4
	MW-30 [1]	2.0	5.0	12.1	5.4	11.2
	MW-38 [2]	2.0	NC	NC	NC	NC
	MW-39 [2]	2.0	16.9	3.6	18.1	3.4
	MW-1611 [2]	2.0	10.6	5.7	11.3	5.4
	MW-1612 [1]	2.0	16.1	3.8	16.2	3.8

Notes:
[1] - Background Well
[2] - Downgradient Well
NC - Not Calculated. Groundwater residence time for MW-38 could not be calculated, as it is the only monitoring well for its lithologic unit (valley alluvium) within the monitoring network.

Legend

Monitoring Wells

- Alluvium
- Hydrologic Unit 3
- Hydrologic Unit 4

Groundwater Elevation Contours

- Approximate Groundwater Flow Direction (Unit 3)
- Hydrologic Unit 3
- Hydrologic Unit 3, Inferred
- Approximate Groundwater Flow Direction (Unit 4)
- Hydrologic Unit 4

Notes

- Monitoring well coordinates and water level data (collected on May 15, 2020) provided by AEP.
- Site features based on information available in Little Broad Run Landfill-CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.
- Water level measurements from MW-25 (screened in shale below Unit 4), MW-37 (hydraulically disconnected from the rest of Unit 3), and MW-38 (screened in alluvium) were not used in ground water contouring.
- Groundwater elevation units are feet above mean sea level.

750 375 0 750 Feet

Potentiometric Surface Map - Uppermost Aquifer
May 2020

AEP Mountaineer Generating Plant - CCR Landfill
New Haven, West Virginia

Geosyntec consultants

Columbus, Ohio | 2020/06/19

Figure **2**

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Legend

Monitoring Wells

- Alluvium
- Hydrologic Unit 3
- Hydrologic Unit 4

Groundwater Elevation Contours

- Approximate Groundwater Flow Direction (Unit 3)
- Hydrologic Unit 3
- Unit 3, Inferred
- Approximate Groundwater Flow Direction (Unit 4)
- Hydrologic Unit 4

Notes

- Monitoring well coordinates and water level data (collected on October 5, 2020) provided by AEP.
- Site features based on information available in Little Broad Run Landfill-CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.
- Water level measurements from MW-25 (screened in shale below Unit 4), MW-37 (hydraulically disconnected from the rest of Unit 3), and MW-38 (screened in alluvium) were not used in ground water contouring.
- Groundwater elevation units are feet above mean sea level.

750 375 0 750 Feet

Potentiometric Surface Map - Uppermost Aquifer
October 2020

AEP Mountaineer Generating Plant - CCR Landfill
New Haven, West Virginia

Geosyntec consultants

Columbus, Ohio | 2021/01/05

Figure **3**

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APPENDIX 2 - Statistical Analyses

The statistical analyses completed in 2021 follow.

STATISTICAL ANALYSIS SUMMARY-
Background Update Calculations
Landfill - 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

January 6, 2020

CHA8473

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LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA	Analysis of Variance
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Value
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
LF	Landfill
LFB	Laboratory Fortified Blanks
LPL	Lower Prediction Limit
LRB	Laboratory Reagent Blanks
NELAP	National Environmental Laboratory Accreditation Program
PQL	Practical Quantitation Limit
QA	Quality Assurance
QC	Quality Control
SSI	Statistically Significant Increase
TDS	Total Dissolved Solids
UPL	Upper Prediction 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 257.90-257.98, "CCR rule"), groundwater monitoring has been conducted at the Landfill (LF), an existing CCR unit at the Mountaineer Power Plant located in New Haven, West Virginia.

Eight monitoring events were completed prior to October 2017 to establish background concentrations for Appendix III and Appendix IV parameters under the CCR rule. Four semiannual detection monitoring events were conducted between October 2017 and June 2019. Data from these four events, including both initial and verification results, were evaluated for inclusion in the background dataset. 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 the usability of the data.

The detection monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. The compliance data were reviewed for outliers, which were removed (when appropriate) prior to updating upper prediction limits (UPLs) for each Appendix III parameter to represent background values. Oversight on the use of statistical calculations was provided by Dr. Kirk Cameron of MacStat Consulting, Ltd. Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

SECTION 2

LANDFILL EVALUATION

2.1 Previous Background Calculations

Eight background monitoring events were completed from September 2016 through June 2017 to establish background concentrations for Appendix III and Appendix IV parameters under the CCR rule. The data were reviewed for outliers and trends prior to calculating upper prediction limits (UPLs) for each Appendix III parameter. Intrawell prediction limits were selected for boron, chloride, sulfate, and total dissolved solids (TDS) with a one-of-two resampling plan. Interwell prediction limits with a one-of-two resampling plan were constructed from the upgradient wells for calcium, fluoride, and pH. Lower prediction limits (LPLs) were also established for pH. The statistical analyses to establish background levels were previously documented in the January 2018 *Statistical Analysis Summary* report (Geosyntec, 2018). Tests for calcium and pH were revised to intrawell prediction limits based on an alternative source demonstration (ASD) certified on March 1, 2019 (Geosyntec, 2019).

2.2 Data Validation & QA/QC

Since October 2017, four semiannual detection monitoring events have been conducted at the LF. If the initial results for each detection monitoring event identified possible exceedances, verification sampling was completed on an individual well/parameter basis. Thus, a minimum of four samples were collected from each compliance well. A summary of data collected during these detection monitoring events may be found in Table 1.

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

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location 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.9.6.23 statistics software. The export was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

2.3 Statistical Analysis

The detection monitoring data used to conduct the statistical analyses described below are summarized in Table 1. Statistical analyses for the Landfill were conducted in accordance with

the January 2017 *Statistical Analysis Plan* (AEP, 2017), except where noted below. The complete statistical analysis results are included in Attachment B.

Time series plots of Appendix III parameters are included in Attachment B and were used to evaluate concentrations over time and to provide an initial screening of suspected outliers and trends. Box plots were also compiled to provide visual representation of variations between wells and within individual wells (Attachment B).

2.3.1 Outlier Evaluation

Potential outliers were evaluated using Tukey's outlier test; i.e., data points were considered potential outliers if they met one of the following criteria:

$$x_i < \tilde{x}_{0.25} - 3 \times IQR \quad (1)$$

or

$$x_i > \tilde{x}_{0.75} + 3 \times IQR \quad (2)$$

where:

$x_i =$ individual data point
$\tilde{x}_{0.25} =$ first quartile
$\tilde{x}_{0.75} =$ third quartile
$IQR =$ the interquartile range $= \tilde{x}_{0.75} - \tilde{x}_{0.25}$

Of the data collected during the detection monitoring period, one fluoride value at MW-30 was identified as a potential outlier. However, because this value was similar to the concentrations reported in neighboring wells it was not flagged as an outlier or removed from the dataset.

2.3.2 Establishment of Updated Background Levels

Analysis of variance (ANOVA) was conducted during the initial background screening to assist in identifying if intrawell tests are the most appropriate statistical approach for assessing Appendix III parameters. Intrawell tests compare compliance data from a single well to background data within the same well and are most appropriate when 1) upgradient wells exhibit spatial variation; 2) when statistical limits constructed from upgradient wells would not be conservative from a regulatory perspective; or 3) when downgradient water quality is not impacted compared to upgradient water quality for the same parameter. Periodic updating of background statistical limits is necessary as natural systems continuously change due to physical changes to the environment. For intrawell analyses, data for all wells and constituents are re-evaluated when a minimum of four new data points are available. These four (or more) new data points are used to determine if earlier concentrations are representative of present-day groundwater quality. For interwell comparisons, newer data are evaluated during each event for new outliers, and prediction limits are constructed using all available data from upgradient wells.

For intrawell comparisons, Mann-Whitney (Wilcoxon rank-sum) tests were used to compare the medians of historical data (September 2016 - June 2017) to the new compliance samples (October 2017 – July 2019). Results were evaluated to determine if the medians of the two groups were similar at the 99% confidence level. Where no significant difference was found, the new compliance data were added to the background dataset. Where a statistically significant difference was found between the medians of the two groups, the data were reviewed to evaluate the cause of the difference and to determine if adding newer data to the background dataset, replacing the background dataset with the newer data, or continuing to use the existing background dataset was most appropriate. If the differences appeared to have been caused by a release, then the previous background dataset would have continued to be used.

The complete Mann-Whitney test results and a summary of the significant findings can be found in Attachment B. Significant differences were found between the two groups for TDS in downgradient well MW-26. Upon review of the differences between the two groups, it was found that TDS concentrations at downgradient well MW-26 were lower than those reported in at least one upgradient well, and therefore the background data were updated to include the compliance data for TDS at MW-26.

For interwell predictions limits for fluoride a Sen's Slope/Mann Kendall trend test was used to evaluate data at upgradient wells. This analysis identifies statistically significant increasing or decreasing trends. The trend analysis results indicated that the data are consistent over time with no statistically significant increasing or decreasing trends (Attachment B)

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.

2.3.3 Updated Prediction Limits

Intrawell upper prediction limits (UPLs) were updated using all the historical data through July 2019 to represent background values. Intrawell lower prediction limits (LPLs) were also generated for pH. The updated prediction limits are summarized in Table 2.

The intrawell UPLs were calculated for a one-of-two retesting procedure; i.e., if at least one sample in a series of two does not exceed the UPL, then it can be concluded that an SSI has not occurred. In practice, where the initial result did not exceed the UPL, a second sample will not be collected.

The retesting procedures are intended to achieve an acceptably high statistical power to detect changes at downgradient wells for constituents evaluated using intrawell prediction limits.

Interwell prediction limits pool upgradient data to establish a background limit for an individual constituent. Interwell UPLs, with a one-of-two resample plan, were updated using all available data from upgradient wells for the same time period for fluoride. The updated prediction limits are summarized in Table 2.

2.4 Conclusions

Four detection monitoring events were completed in accordance with the CCR Rule. The laboratory and field data from these events were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. Mann-Whitney tests were completed to evaluate whether data from the detection monitoring events could be added to the existing background dataset. Where appropriate, the background datasets were updated, and UPLs and LPLs were recalculated. Intrawell tests using a one-of-two retesting procedure were selected and updated for Appendix III parameters boron, calcium, chloride, pH, sulfate, and TDS. For fluoride, an interwell test using a one-of-two retesting procedure was selected and updated with the most current data.

SECTION 3

REFERENCES

American Electric Power (AEP). 2017. Statistical Analysis Plan – Mountaineer Plant. January 2017.

Geosyntec Consultants, 2018. Statistical Analysis Summary. Landfill – Mountaineer Plant. January 2018.

Geosyntec Consultants, 2019. Alternative Source Demonstration – Federal CCR Rule. Mountaineer Plant Landfill. March.

United States Environmental Protection Agency (USEPA). 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. EPA 530/R-09-007. March 2009.

TABLES

Table 1: Groundwater Data Summary
Mountaineer - Landfill

Parameter	Unit	MW-1611							MW-1612			
		10/31/2017	1/22/2018	9/20/2018	11/26/2018	4/9/2019	6/18/2019	7/10/2019	10/30/2017	9/20/2018	11/26/2018	4/9/2019
		2017-D1	2017-D1-R1	2018-D1	2018-D2	2019-D1	2019-D1-R1	2019-D1-R1	2017-D1	2018-D1	2018-D2	2019-D1
Boron	mg/L	0.152	-	0.258	0.147	0.139	-	-	0.457	0.543	0.413	0.449
Calcium	mg/L	24.0	22.6	23.2	21.9	26.2	22.8	-	7.22	4.50	4.25	3.21
Chloride	mg/L	9.80	-	9.48	9.57	7.96	9.58	-	20.2	14.6	11.5	10.2
Fluoride	mg/L	0.610	-	0.610	0.620	0.460	-	-	3.53	3.78	3.91	4.02
Total Dissolved Solids	mg/L	402	376	416	387	431	-	402	914	835	764	725
Sulfate	mg/L	18.9	-	19.0	18.5	20.7	-	-	147	63.9	49.2	54.8
pH	SU	7.8	7.5	7.8	7.7	7.6	7.9	7.6	8.2	8.4	8.0	8.3

Parameter	Unit	MW-26						MW-27				MW-30			
		10/31/2017	1/22/2018	9/20/2018	11/26/2018	4/9/2019	6/18/2019	10/31/2017	9/20/2018	11/26/2018	4/9/2019	10/30/2017	9/20/2018	11/27/2018	4/9/2019
		2017-D1	2017-D1-R1	2018-D1	2018-D2	2019-D1	2019-D1-R1	2017-D1	2018-D1	2018-D2	2019-D1	2017-D1	2018-D1	2018-D2	2019-D1
Boron	mg/L	0.165	-	0.214	0.182	0.128	-	0.275	0.357	0.292	0.303	0.315	0.315	0.344	0.290
Calcium	mg/L	54.7	55.7	49.4	53.6	62.8	-	1.33	1.14	1.20	1.19	3.27	4.69	3.16	2.88
Chloride	mg/L	5.48	-	6.04	5.97	6.71	7.22	1.63	1.69	1.52	1.54	257	253	247	245
Fluoride	mg/L	0.130	-	0.160	0.140	0.130	-	2.38	2.41	2.37	2.32	3.30	3.36	3.40	3.32
Total Dissolved Solids	mg/L	346	-	344	364	370	387	544	550	522	542	1210	1230	1240	1260
Sulfate	mg/L	5.80	-	6.30	7.20	7.60	-	4.20	4.40	3.60	2.90	11.4	13.0	11.7	10.6
pH	SU	7.5	7.3	8.0	7.4	7.3	7.2	9.2	9.1	9.0	9.0	8.5	8.6	8.4	8.4

Parameter	Unit	MW-38						MW-39			
		10/31/2017	1/22/2018	9/20/2018	11/26/2018	4/9/2019	6/18/2019	10/31/2017	9/20/2018	11/26/2018	4/9/2019
		2017-D1	2017-D1-R1	2018-D1	2018-D2	2019-D1	2019-D1-R1	2017-D1	2018-D1	2018-D2	2019-D1
Boron	mg/L	0.045	-	0.068	0.080 J	0.040 J	-	0.171	0.182	0.167	0.158
Calcium	mg/L	56.1	53.8	51.2	48.2	52.0	-	7.25	6.43	6.33	6.65
Chloride	mg/L	7.59	-	7.31	7.06	7.46	-	3.05	2.99	2.93	2.94
Fluoride	mg/L	0.380	-	0.360	0.340	0.320	-	0.780	0.800	0.800	0.770
Total Dissolved Solids	mg/L	460	419	441	415	427	-	385	369	380	376
Sulfate	mg/L	28.7	-	31.5	35.2	27.8	-	0.200	0.100 J	0.070 J	0.400 U
pH	SU	7.0	6.7	7.4	7.0	6.9	7.6	8.3	8.5	8.3	8.3

Notes:
mg/L: milligrams per liter
SU: standard unit
U: Parameter was not present in concentrations above the method detection limit and is reported as the reporting limit
J: Estimated value. Parameter was detected in concentrations below the reporting limit
-: Not Measured
D1: First semi-annual detection monitoring event of the year
D2: Second semi-annual detection monitoring event of the year
R1: First verification event associated with detection monitoring round

Table 2: Background Level Summary
Mountaineer - Landfill

Geosyntec Consultants, Inc.

Parameter	Units	Description	MW-1611	MW-26	MW-27	MW-38	MW-39
Boron	mg/L	Intrawell Background UPL	0.254	0.254	0.395	0.104	0.213
Calcium	mg/L	Intrawell Background UPL	26.2	64.9	1.89	58.6	12.4
Chloride	mg/L	Intrawell Background UPL	10.4	7.27	1.90	7.69	3.11
Fluoride	mg/L	Interwell Background UPL	3.91				
pH	SU	Intrawell Background UPL	8.1	8.0	9.5	7.6	8.8
		Intrawell Background LPL	7.3	7.2	8.8	6.6	8.1
Sulfate	mg/L	Intrawell Background UPL	23.5	11.5	7.79	38.5	0.200
Total Dissolved Solids	mg/L	Intrawell Background UPL	441	402	606	469	445

Notes:
UPL: Upper prediction limit
LPL: Lower prediction limit

ATTACHMENT A

Certification by a Qualified Professional Engineer

Certification by a Qualified Professional Engineer

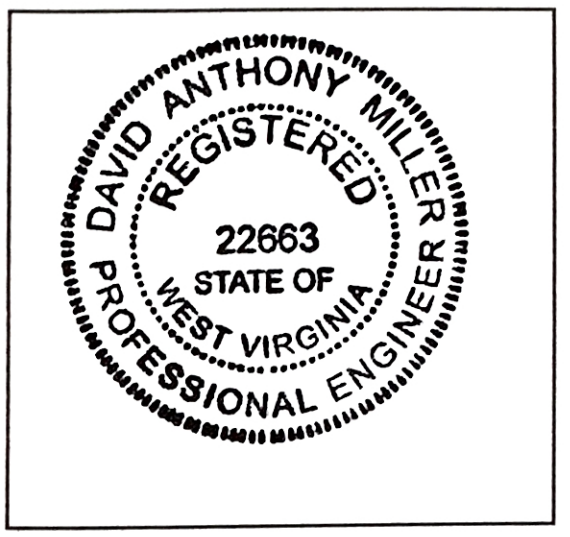
I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Mountaineer Landfill CCR management area and that the requirements of 40 CFR 257.93(f) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



22663	WEST VIRGINIA	01.13.2020
License Number	Licensing State	Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING

November 22, 2019

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

RE: July 2019 Background Update – Mountaineer Landfill

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the screening for the proposed background update of prediction limits with data through July 2019 for American Electric Power's Mountaineer Landfill. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

Sampling began at Mountaineer Landfill for the CCR program in 2016, and 8 background samples were initially collected at each of the groundwater monitoring wells. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells**: MW-1612 and MW-30; and
- **Downgradient wells:** MW-1611, MW-26, MW-27, MW-38, and MW-39.

Data were sent electronically to Groundwater Stats Consulting, and the background update report was reviewed by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to Groundwater Stats Consulting.

The following CCR Detection Monitoring constituents were evaluated:

- **Appendix III Parameters**: boron, calcium, chloride, fluoride, pH, sulfate, and TDS

Time series plots for Appendix III at all wells are provided for the purpose of screening data at these wells (Figure A). Additionally, box plots are included for all constituents at upgradient and downgradient wells (Figure B). The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells.

Data at all wells were evaluated during the initial background screening conducted in December 2017 for the following: 1) outliers; 2) trends; 3) most appropriate statistical method for Appendix III parameters based on site characteristics of groundwater data upgradient of the facility; and 4) eligibility of downgradient wells when intrawell statistical methods are recommended.

Summary of Statistical Method:

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

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are nondetects, a nonparametric test is utilized. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction limits.

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

- Nonparametric prediction limits are used on data containing greater than 50% nondetects.

Summary of Background Screening Conducted in December 2017

Outlier Evaluation

Time series plots are used to identify suspected outliers, or extreme values that would result in limits that are not conservative from a regulatory perspective, in proposed background data. Suspected outliers at all wells for Appendix III were formally tested using Tukey's box plot method and, when identified, flagged in the computer database with "o" and deselected prior to construction of statistical limits. Those analyses were included in the background screening report.

Tukey's outlier test noted a few outliers. Any values flagged as outliers are plotted in a lighter font on the time series graph. The pH values reported during the May 2017 sample event were, reportedly, due to instrumentation error. The test identified two outliers for boron in well MW-27; an outlier for calcium in well MW-1611; a low outlier for pH in well MW-1611; and an outlier for TDS in well MW-1611. However, these values were not flagged due to all concentrations being consistent over time and similar to concentrations in neighboring wells. A substitution of the most recent reporting limit was applied when varying detection limits existed in data.

As mentioned above, 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.

No true seasonal patterns were observed on the time series plots for any of the detected data; therefore, no deseasonalizing adjustments were made to the data. When seasonal patterns are observed, data may be deseasonalized so that the resulting limits will correctly account for the seasonality as a predictable pattern rather than random variation or a release. It was noted that for the majority of constituents evaluated, the highest concentrations are reported in the upgradient wells.

While trends may be visual, a quantification of the trend and its significance is needed. The Sen's Slope/Mann Kendall trend test was used to evaluate all data at each well to identify statistically significant increasing or decreasing trends. In the absence of suspected contamination, significant trending data are typically not included as part of the background data used for construction of prediction limits. This step serves to eliminate the trend and, thus, reduce variation in background. When statistically

significant decreasing trends are present, earlier data are evaluated to determine whether earlier concentration levels are significantly different than current reported concentrations and will be deselected as necessary. When the historical records of data are truncated for the reasons above, a summary report will be provided to show the date ranges used in construction of the statistical limits.

The results of the trend analyses showed all data are consistent over time with no statistically significant increasing trends. A few statistically significant decreasing trends were noted; however, the magnitudes of the trends were low relative to the average concentrations, as may be seen on the Trend Test Summary table. It was noted that boron, sulfate, and TDS concentrations are found to have the highest concentrations in the upgradient wells. No adjustments to any data sets were required at this time.

Appendix III – Determination of Spatial Variation

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

Appendix III - Statistical Limits

Intrawell limits constructed from carefully screened background data from within each well serve to provide statistical limits that are conservative (i.e. lower) from a regulatory perspective, and that will rapidly identify a change in more recent compliance data from within a given well. This statistical method removes the element of variation from across wells and eliminates the chance of mistaking natural spatial variation for a release from the facility. Prior to performing intrawell prediction limits, several steps are required to reasonably demonstrate downgradient water quality does not have existing impacts from the practices of the facility.

In cases where downgradient average concentrations are higher than observed concentrations upgradient for a given constituent, an independent study and hydrogeological investigation would be required to identify local geochemical

conditions and expected groundwater quality for the region to justify an intrawell approach. Such an assessment is beyond the scope of services provided by Groundwater Stats Consulting. When there is not an obvious explanation for observed concentration differences in downgradient wells relative to reported concentrations in upgradient wells, interwell prediction limits will initially be selected for the statistical method until further evidence shows that concentrations are due to natural variation rather than a result of the facility.

Confidence Intervals for boron, chloride, sulfate, and TDS were found to be within their respective background limits and are, therefore, eligible for intrawell prediction limits. Interwell prediction limits were initially recommended for calcium, fluoride, and pH. However, additional studies provided by Geosyntec Consultants support natural variation in groundwater for calcium and pH; therefore, interwell methods will be used for fluoride only.

All available data through June 2017, for parameters mentioned above, at each well were used to establish intrawell background limits based on a 1-of-2 resample plan that will be used for future comparisons. Interwell prediction limits for fluoride as described above, combined with a 1-of-2 resample plan, were constructed from upgradient wells.

Natural systems continuously evolve due to physical changes made to the environment. Examples include capping a landfill, paving areas near a well, or lining a drainage channel to prevent erosion. Periodic updating of background statistical limits will be necessary to accommodate these types of changes. In the intrawell case, data are evaluated when at least 4 new compliance values are available. In the interwell case, newer data are carefully evaluated during each event for new outliers, and prediction limits are constructed using all available data from upgradient wells.

October 2019 - Background Update

Data were re-evaluated using Tukey's outlier test and visual screening with the July 2019 samples. Fluoride is tested using interwell prediction limits and, therefore, only upgradient wells were tested for outliers for this constituent (Figure C). All other Appendix III parameters, which use intrawell prediction limits, were tested for each well (Figure C). In addition to the pH values previously flagged as outliers due to reported instrumentation error for those samples, a low value was noted for fluoride in MW-30 and high values were noted for calcium in well MW-27 and sulfate in well MW-39. These values were flagged in the database as outliers. Tukey's also identified a high value for fluoride in the pooled upgradient well data; however, this value was similar to concentrations reported in neighboring wells and was not flagged as an outlier in the

database. A similar occurrence was present for TDS in well MW-27, but this value was not flagged in the database as an outlier. It is consistent with the other reported values in this well and the concentrations overall are significantly less than those reported in at least one upgradient well. However, a high sulfate value in well MW-39 was not identified by Tukey's due to the natural log transformation, but this value was flagged as an outlier as this sample did not appear to represent the population for this well/constituent pair.

For constituents requiring intrawell prediction limits, 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 July 2019 to evaluate whether the groups are statistically different at the 99% confidence level, in which case background data may not be updated with more recent compliance data (Figure D). Statistically significant differences were found for TDS in well MW-26.

Typically, when the test concludes that the medians of the two groups are significantly different, particularly in the downgradient wells, the background are not updated to include the newer data but will be reconsidered in the future. However, in the case of TDS at well MW-26, concentrations are lower than those reported in at least one upgradient well and were, therefore, updated. A summary of these results follows this letter and the test results are included with the Mann Whitney test section at the end of this report.

Intrawell prediction limits using all historical data reported through July 2019, combined with a 1-of-2 resample plan, were constructed and a summary of the updated limits follows this letter (Figure E).

The Sen's Slope/Mann Kendall trend test was used to evaluate data at upgradient wells for fluoride to identify statistically significant increasing or decreasing trends. The results of the trend analyses showed all data are consistent over time with no statistically significant increasing or decreasing trends (Figure F).

Interwell prediction limits, combined with a 1-of-2 resample plan, were updated using all available data from upgradient wells for the same time period for fluoride (Figure G). 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.

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

For Groundwater Stats Consulting,

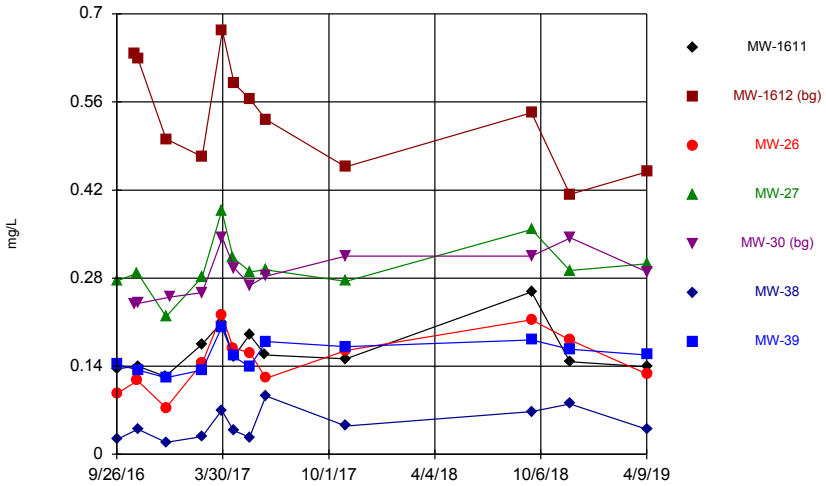
Andrew T. Collins
Groundwater Analyst

Kristina L. Rayner
Groundwater Statistician

FIGURE A: TIME SERIES

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Time Series

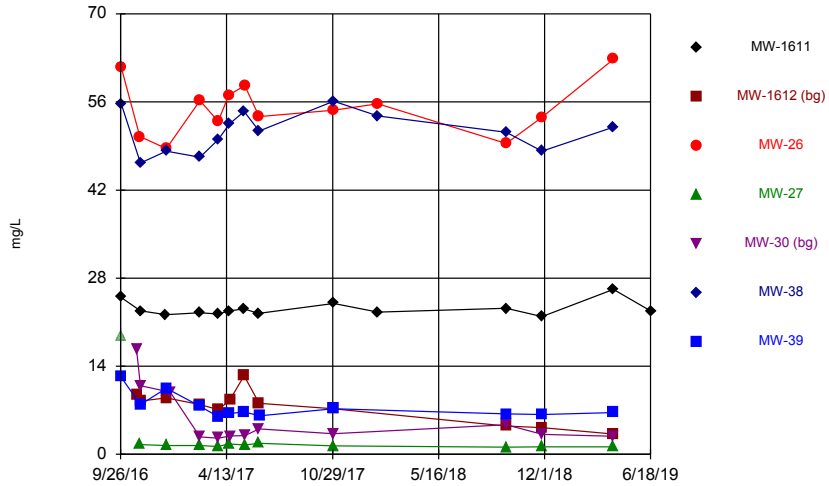


Constituent: Boron, total Analysis Run 11/22/2019 9:04 AM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Time Series

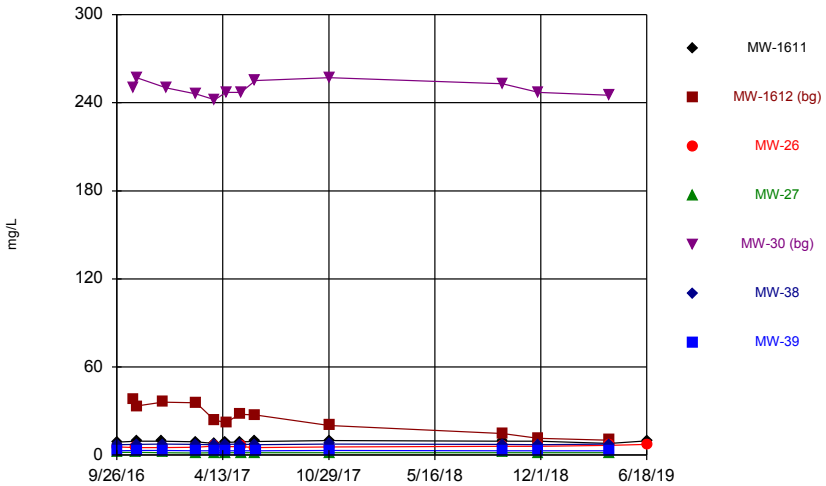


Constituent: Calcium, total Analysis Run 11/22/2019 9:04 AM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Time Series

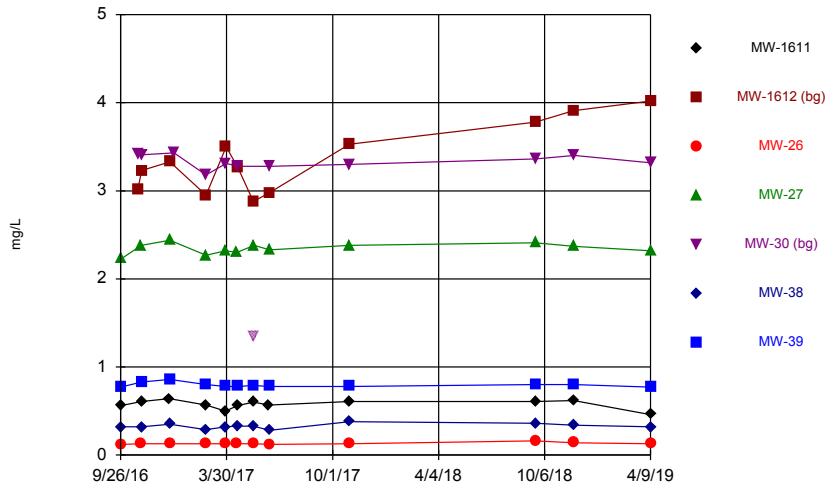


Constituent: Chloride, total Analysis Run 11/22/2019 9:04 AM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Time Series

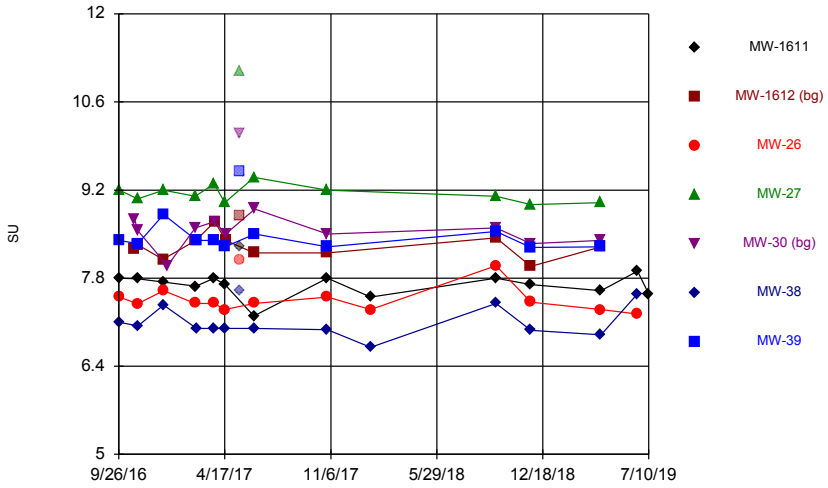


Constituent: Fluoride, total Analysis Run 11/22/2019 9:04 AM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Time Series



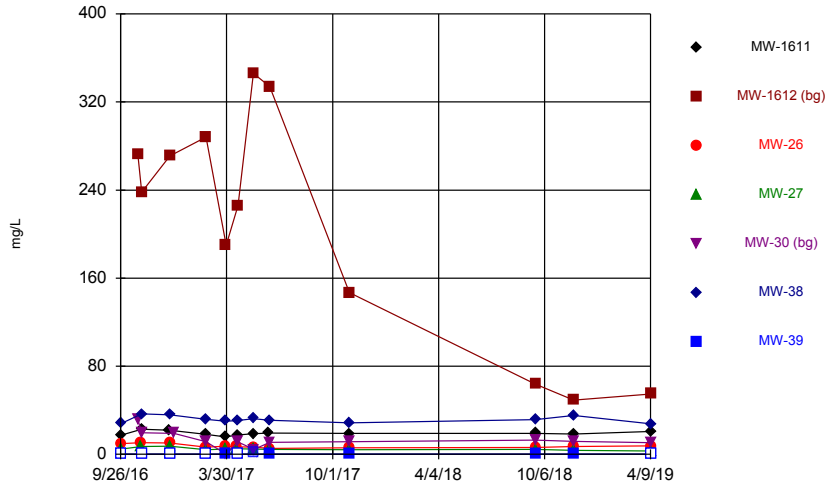
Constituent: pH, field Analysis Run 11/22/2019 9:04 AM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Hollow symbols indicate censored values.

Time Series

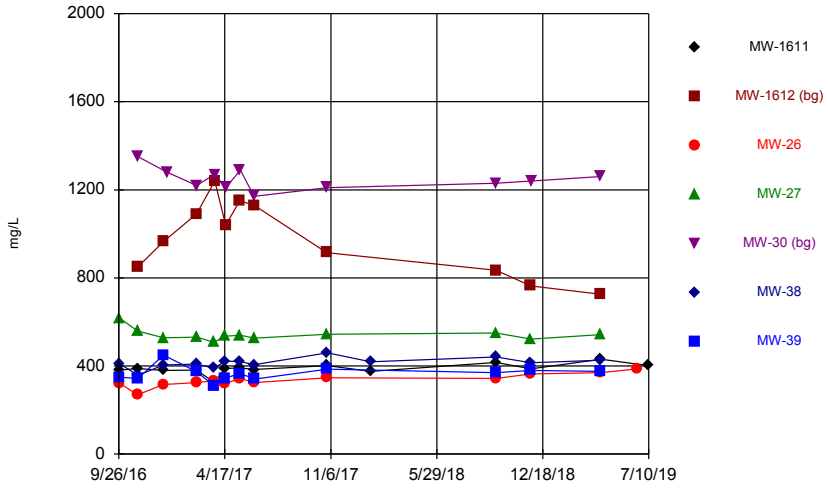


Constituent: Sulfate, total Analysis Run 11/22/2019 9:04 AM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Time Series

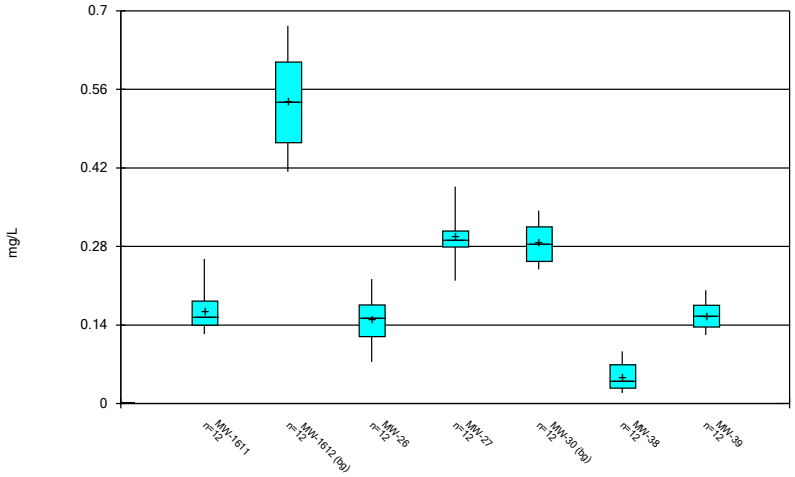


Constituent: Total Dissolved Solids [TDS] Analysis Run 11/22/2019 9:04 AM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

FIGURE B: BOX PLOTS

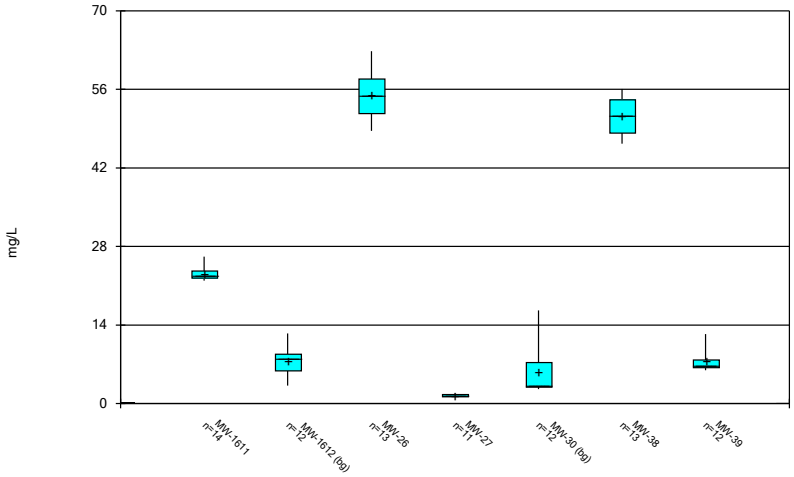
Box & Whiskers Plot



Constituent: Boron, total Analysis Run 11/22/2019 9:07 AM
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

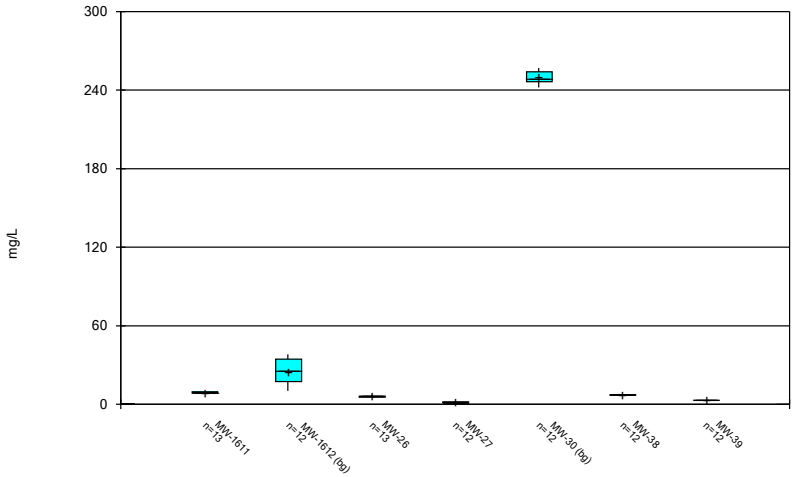
Box & Whiskers Plot



Constituent: Calcium, total Analysis Run 11/22/2019 9:07 AM
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

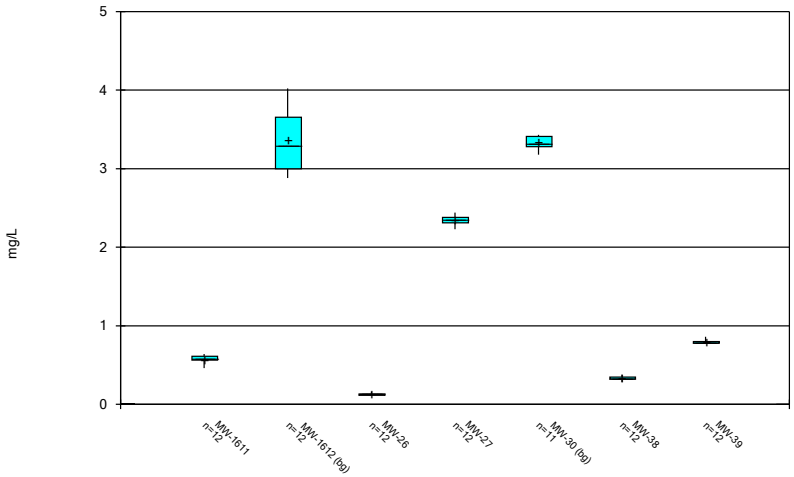
Box & Whiskers Plot



Constituent: Chloride, total Analysis Run 11/22/2019 9:07 AM
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

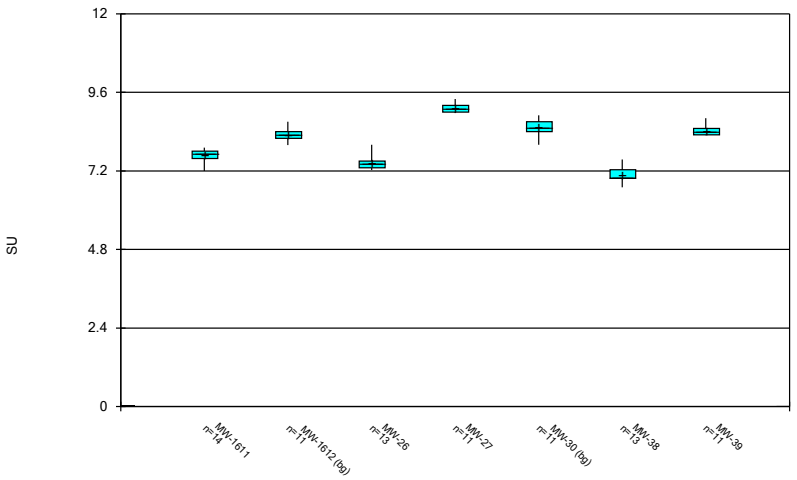
Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Box & Whiskers Plot



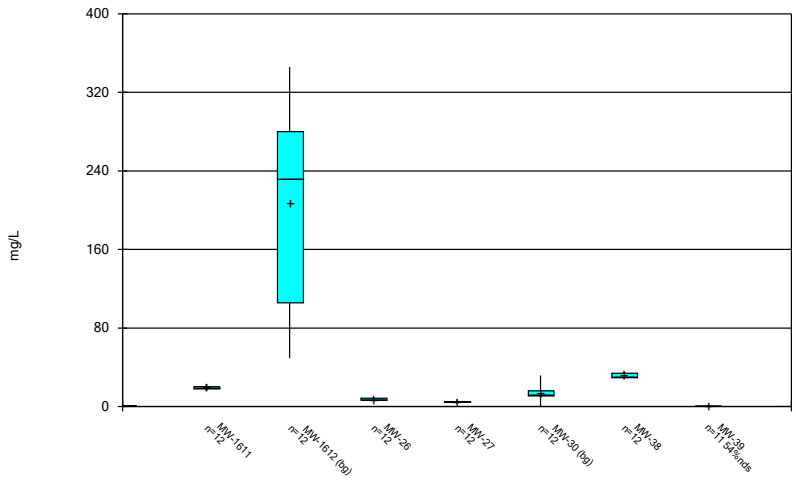
Constituent: Fluoride, total Analysis Run 11/22/2019 9:07 AM
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Box & Whiskers Plot



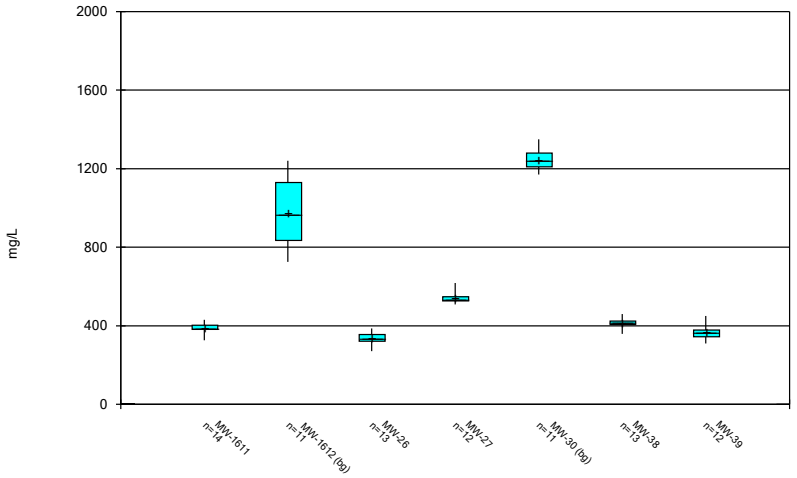
Constituent: pH, field Analysis Run 11/22/2019 9:07 AM
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Box & Whiskers Plot



Constituent: Sulfate, total Analysis Run 11/22/2019 9:07 AM
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Box & Whiskers Plot



Constituent: Total Dissolved Solids [TDS] Analysis Run 11/22/2019 9:07 AM
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

FIGURE C: OUTLIER SUMMARY

Outlier Summary

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill Printed 11/22/2019, 9:10 AM

	MW-27 Calcium, total (mg/L)	MW-30 Fluoride, total (mg/L)	MW-1611 pH, field (SU)	MW-1612 pH, field (SU)	MW-26 pH, field (SU)	MW-27 pH, field (SU)	MW-30 pH, field (SU)	MW-38 pH, field (SU)	MW-39 pH, field (SU)	MW-39 Sulfate, total (mg/L)
9/27/2016	18.9 (o)									
5/16/2017			8.3 (o)	8.8 (o)				7.6 (o)	9.5 (o)	1.5 (o)
5/17/2017		1.34 (o)			8.09 (o)	11.1 (o)	10.1 (o)			

Upgradient Outlier Analysis - All Results

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill Printed 10/7/2019, 4:23 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Fluoride, total (mg/L)	**MW-1612,MW-30**	**Yes**	**4.02,1.34**	**n/a w/combined bg**	**NP**	**NaN**	**24**	**3.268**	**0.493**	**x^4**	**ShapiroWilk**

Outlier Analysis - Significant Results

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill Printed 10/7/2019, 4:21 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Calcium, total (mg/L)	**MW-27**	**Yes**	**18.9**	**9/27/2016**	**NP**	**NaN**	**12**	**2.858**	**5.056**	**ln(x)**	**ShapiroWilk**
pH, field (SU)	**MW-27**	**Yes**	**11.1**	**5/17/2017**	**NP**	**NaN**	**12**	**9.303**	**0.5805**	**ln(x)**	**ShapiroWilk**
pH, field (SU)	**MW-30 (bg)**	**Yes**	**10.1**	**5/17/2017**	**NP**	**NaN**	**12**	**8.662**	**0.5053**	**ln(x)**	**ShapiroWilk**
pH, field (SU)	**MW-39**	**Yes**	**9.5**	**5/16/2017**	**NP**	**NaN**	**12**	**8.508**	**0.3456**	**ln(x)**	**ShapiroWilk**
Total Dissolved Solids [TDS] (mg/L)	**MW-27**	**Yes**	**618**	**9/27/2016**	**NP**	**NaN**	**12**	**541.8**	**27.43**	**ln(x)**	**ShapiroWilk**

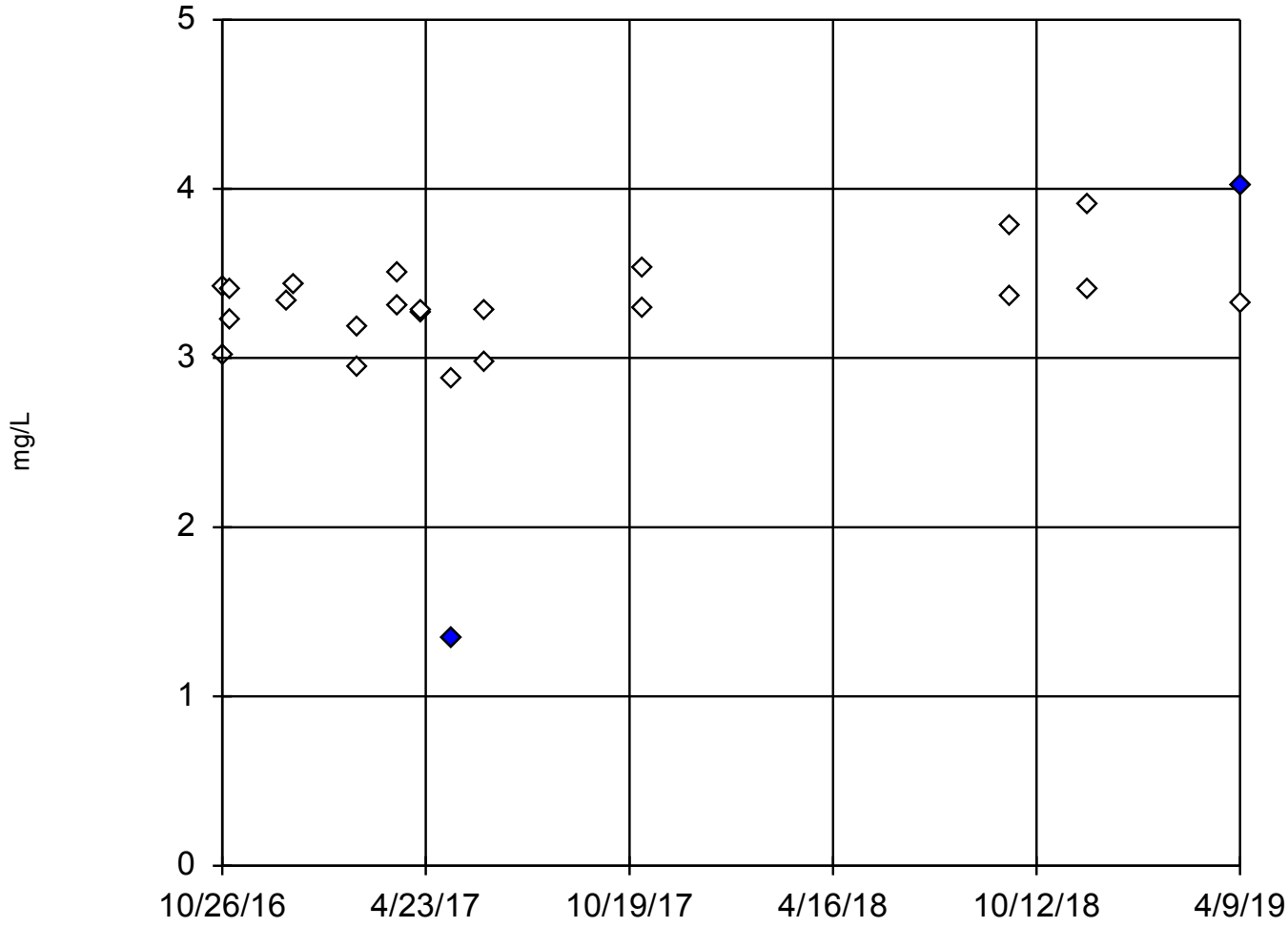
Outlier Analysis - All Results

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill Printed 10/7/2019, 4:21 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Boron, total (mg/L)	MW-1611	No	n/a	n/a	NP	NaN	12	0.1653	0.03797	ln(x)	ShapiroWilk
Boron, total (mg/L)	MW-1612 (bg)	No	n/a	n/a	NP	NaN	12	0.5384	0.08279	x^(1/3)	ShapiroWilk
Boron, total (mg/L)	MW-26	No	n/a	n/a	NP	NaN	12	0.1496	0.04475	normal	ShapiroWilk
Boron, total (mg/L)	MW-27	No	n/a	n/a	NP	NaN	12	0.2978	0.04195	ln(x)	ShapiroWilk
Boron, total (mg/L)	MW-30 (bg)	No	n/a	n/a	NP	NaN	12	0.2868	0.03727	ln(x)	ShapiroWilk
Boron, total (mg/L)	MW-38	No	n/a	n/a	NP	NaN	12	0.04767	0.02417	ln(x)	ShapiroWilk
Boron, total (mg/L)	MW-39	No	n/a	n/a	NP	NaN	12	0.1573	0.02381	ln(x)	ShapiroWilk
Calcium, total (mg/L)	MW-1611	No	n/a	n/a	NP	NaN	14	23.13	1.186	ln(x)	ShapiroWilk
Calcium, total (mg/L)	MW-1612 (bg)	No	n/a	n/a	NP	NaN	12	7.524	2.557	normal	ShapiroWilk
Calcium, total (mg/L)	MW-26	No	n/a	n/a	NP	NaN	13	55.02	4.312	ln(x)	ShapiroWilk
Calcium, total (mg/L)	**MW-27**	**Yes**	**18.9**	**9/27/2016**	**NP**	**NaN**	**12**	**2.858**	**5.056**	**ln(x)**	**ShapiroWilk**
Calcium, total (mg/L)	MW-30 (bg)	No	n/a	n/a	NP	NaN	12	5.554	4.484	ln(x)	ShapiroWilk
Calcium, total (mg/L)	MW-38	No	n/a	n/a	NP	NaN	13	51.32	3.209	normal	ShapiroWilk
Calcium, total (mg/L)	MW-39	No	n/a	n/a	NP	NaN	12	7.534	1.961	ln(x)	ShapiroWilk
Chloride, total (mg/L)	MW-1611	No	n/a	n/a	NP	NaN	13	9.078	0.5843	x^6	ShapiroWilk
Chloride, total (mg/L)	MW-1612 (bg)	No	n/a	n/a	NP	NaN	12	25.08	9.687	normal	ShapiroWilk
Chloride, total (mg/L)	MW-26	No	n/a	n/a	NP	NaN	13	5.813	0.638	ln(x)	ShapiroWilk
Chloride, total (mg/L)	MW-27	No	n/a	n/a	NP	NaN	12	1.634	0.1156	ln(x)	ShapiroWilk
Chloride, total (mg/L)	MW-30 (bg)	No	n/a	n/a	NP	NaN	12	249.7	4.887	ln(x)	ShapiroWilk
Chloride, total (mg/L)	MW-38	No	n/a	n/a	NP	NaN	12	7.264	0.1812	ln(x)	ShapiroWilk
Chloride, total (mg/L)	MW-39	No	n/a	n/a	NP	NaN	12	2.981	0.05384	ln(x)	ShapiroWilk
pH, field (SU)	MW-1611	No	n/a	n/a	NP	NaN	15	7.724	0.2343	ln(x)	ShapiroWilk
pH, field (SU)	MW-1612 (bg)	No	n/a	n/a	NP	NaN	12	8.344	0.2304	ln(x)	ShapiroWilk
pH, field (SU)	MW-26	No	n/a	n/a	NP	NaN	14	7.488	0.2553	ln(x)	ShapiroWilk
pH, field (SU)	**MW-27**	**Yes**	**11.1**	**5/17/2017**	**NP**	**NaN**	**12**	**9.303**	**0.5805**	**ln(x)**	**ShapiroWilk**
pH, field (SU)	**MW-30 (bg)**	**Yes**	**10.1**	**5/17/2017**	**NP**	**NaN**	**12**	**8.662**	**0.5053**	**ln(x)**	**ShapiroWilk**
pH, field (SU)	MW-38	No	n/a	n/a	NP	NaN	14	7.115	0.2612	ln(x)	ShapiroWilk
pH, field (SU)	**MW-39**	**Yes**	**9.5**	**5/16/2017**	**NP**	**NaN**	**12**	**8.508**	**0.3456**	**ln(x)**	**ShapiroWilk**
Sulfate, total (mg/L)	MW-1611	No	n/a	n/a	NP	NaN	12	19.03	1.94	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	MW-1612 (bg)	No	n/a	n/a	NP	NaN	12	206.7	106.2	x^2	ShapiroWilk
Sulfate, total (mg/L)	MW-26	No	n/a	n/a	NP	NaN	12	7.467	1.739	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	MW-27	No	n/a	n/a	NP	NaN	12	4.817	1.278	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	MW-30 (bg)	No	n/a	n/a	NP	NaN	12	12.91	7.883	normal	ShapiroWilk
Sulfate, total (mg/L)	MW-38	No	n/a	n/a	NP	NaN	12	31.63	2.941	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	MW-39	No	n/a	n/a	NP	NaN	12	0.21	0.4099	ln(x)	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	MW-1611	No	n/a	n/a	NP	NaN	14	388.2	23.52	x^4	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	MW-1612 (bg)	No	n/a	n/a	NP	NaN	11	973.1	169.8	normal	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	MW-26	No	n/a	n/a	NP	NaN	13	335.8	29.2	x^3	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	**MW-27**	**Yes**	**618**	**9/27/2016**	**NP**	**NaN**	**12**	**541.8**	**27.43**	**ln(x)**	**ShapiroWilk**
Total Dissolved Solids [TDS] (mg/L)	MW-30 (bg)	No	n/a	n/a	NP	NaN	11	1248	48.95	ln(x)	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	MW-38	No	n/a	n/a	NP	NaN	13	414	24.27	x^3	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	MW-39	No	n/a	n/a	NP	NaN	12	365.8	34.14	ln(x)	ShapiroWilk

Tukey's Outlier Screening, Pooled Background

MW-1612,MW-30



n = 24

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

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

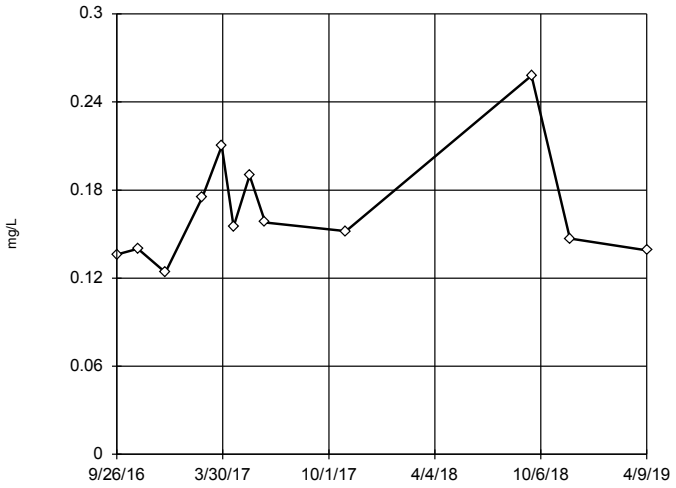
High cutoff = 3.91, low cutoff = 1.75, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 10/7/2019 4:23 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-1611



n = 12

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 = 0.4073, low cutoff = 0.06246, based on IQR multiplier of 3.

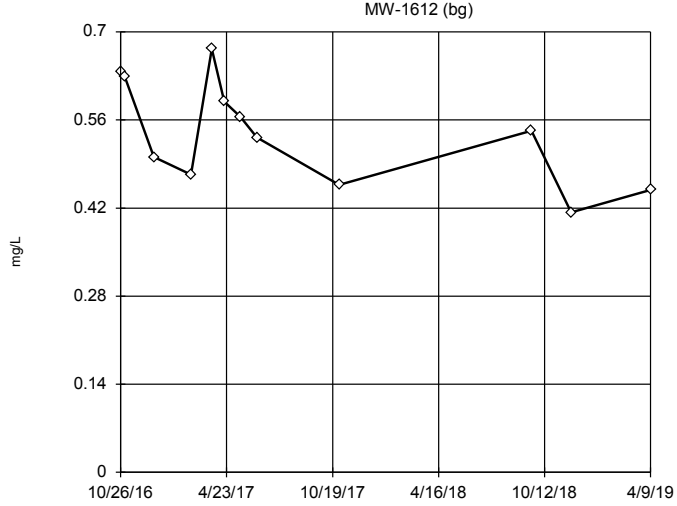
Constituent: Boron, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-1612 (bg)



n = 12

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

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

High cutoff = 1.211, low cutoff = 0.1721, based on IQR multiplier of 3.

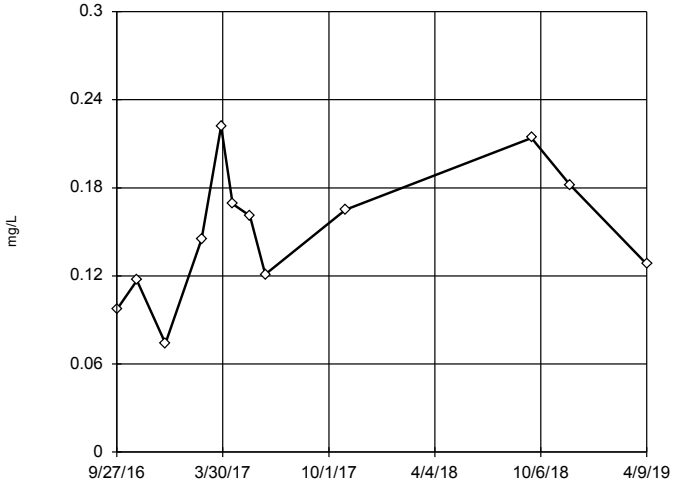
Constituent: Boron, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-26



n = 12

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

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

High cutoff = 0.345, low cutoff = -0.0505, based on IQR multiplier of 3.

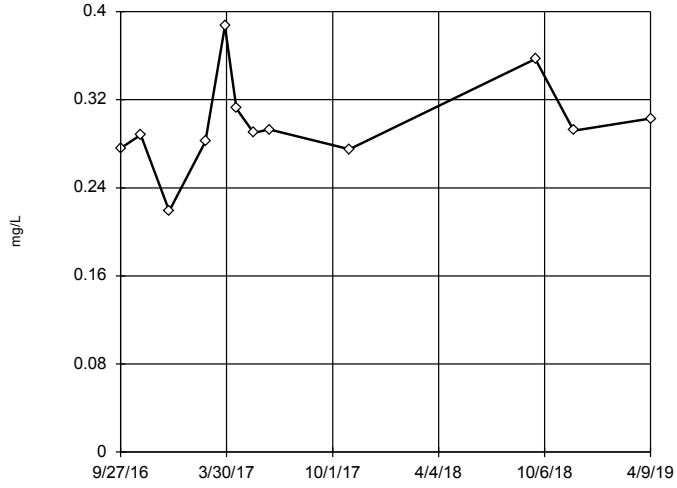
Constituent: Boron, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-27



n = 12

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

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

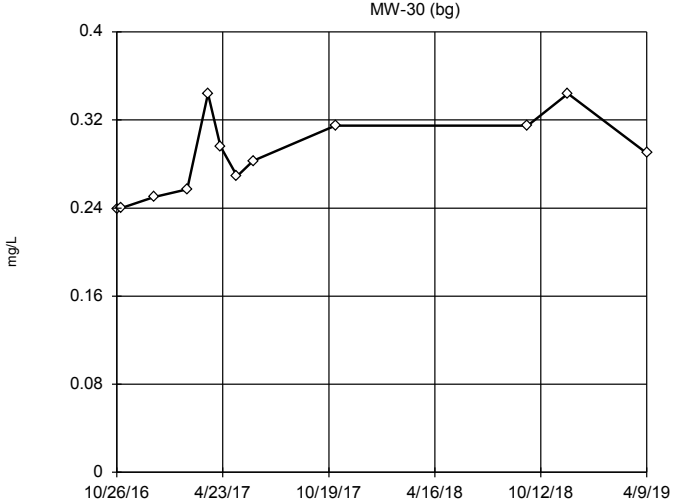
High cutoff = 0.4116, low cutoff = 0.2084, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-30 (bg)



n = 12

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 = 0.6046, low cutoff = 0.1321, based on IQR multiplier of 3.

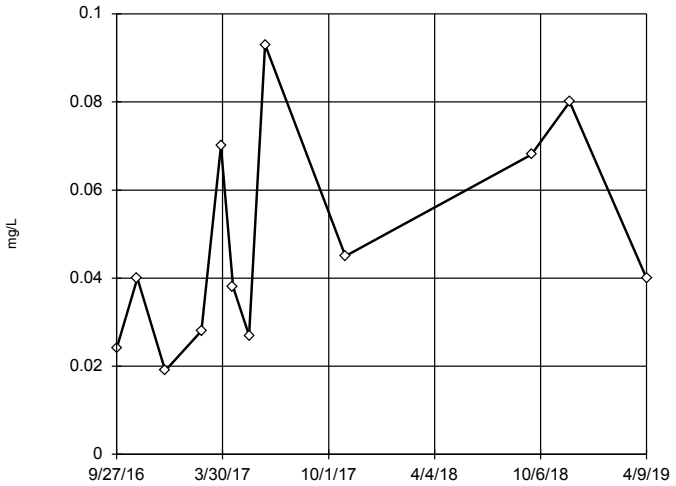
Constituent: Boron, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-38



n = 12

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

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

High cutoff = 1.09, low cutoff = 0.00174, based on IQR multiplier of 3.

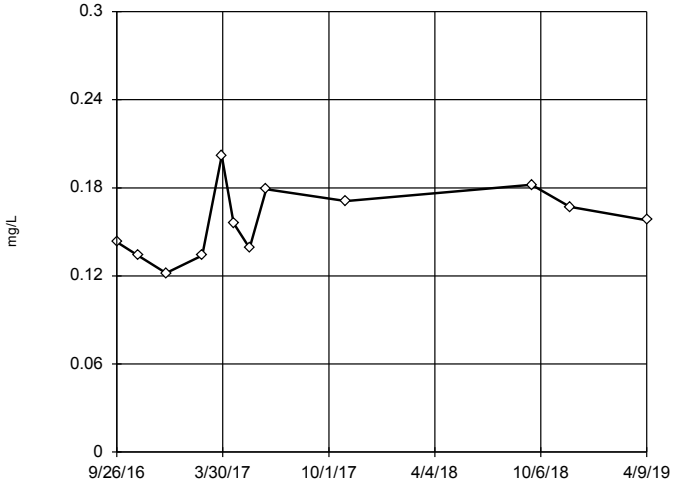
Constituent: Boron, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-39



n = 12

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 = 0.3686, low cutoff = 0.06478, based on IQR multiplier of 3.

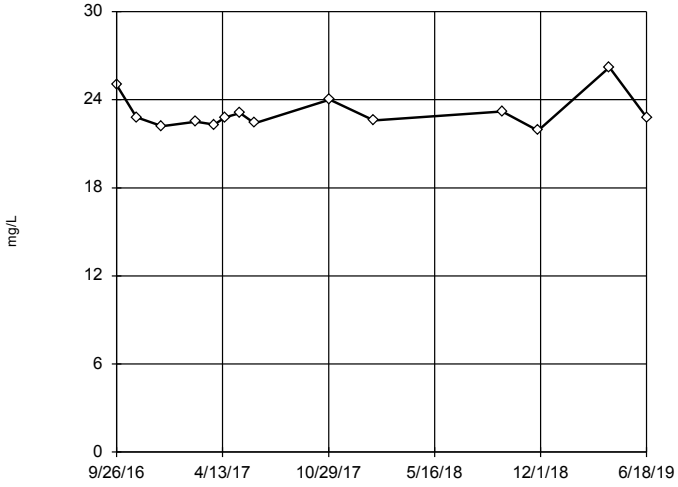
Constituent: Boron, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-1611



n = 14

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

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

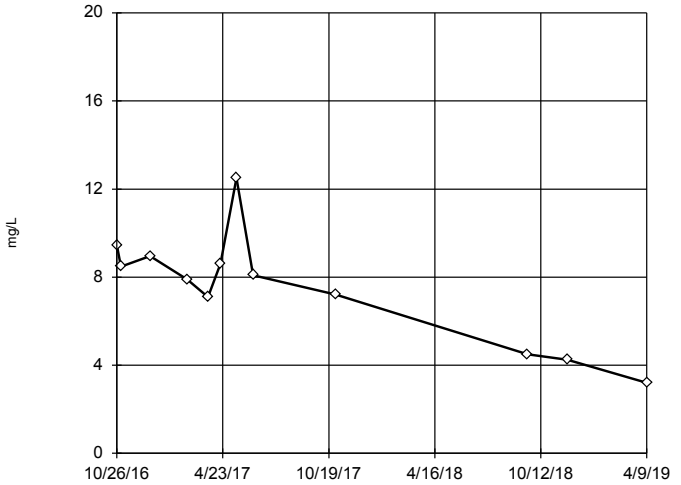
High cutoff = 27.77, low cutoff = 18.99, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-1612 (bg)



n = 12

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

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

High cutoff = 17.74, low cutoff = -3.155, based on IQR multiplier of 3.

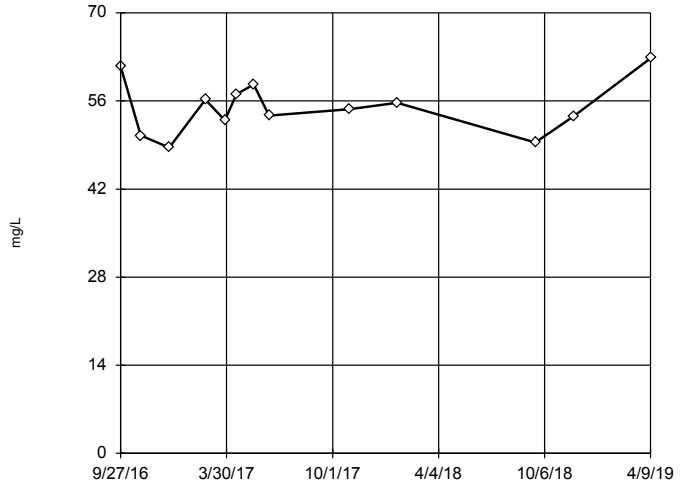
Constituent: Calcium, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-26



n = 13

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 = 81.09, low cutoff = 36.87, based on IQR multiplier of 3.

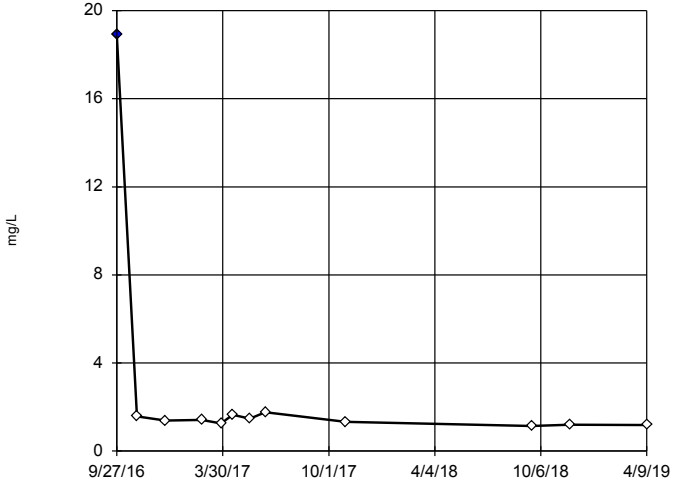
Constituent: Calcium, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-27



n = 12

Outlier is drawn as solid. Tukey's method selected by user.

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

High cutoff = 3.609, low cutoff = 0.5483, based on IQR multiplier of 3.

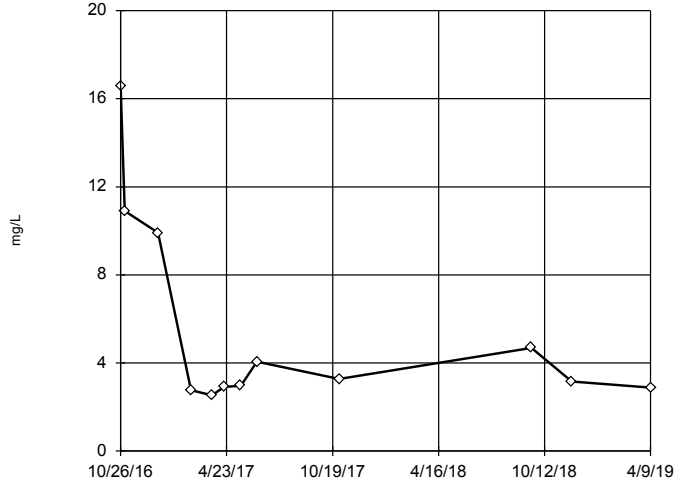
Constituent: Calcium, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-30 (bg)



n = 12

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

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

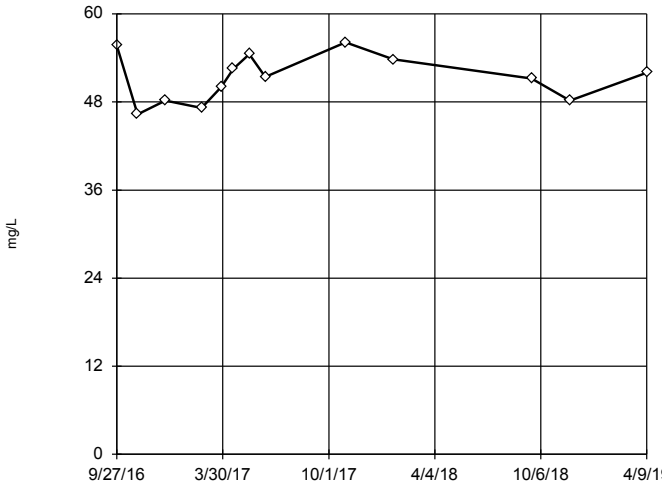
High cutoff = 89.04, low cutoff = 0.2217, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-38



n = 13

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

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

High cutoff = 72, low cutoff = 30.35, based on IQR multiplier of 3.

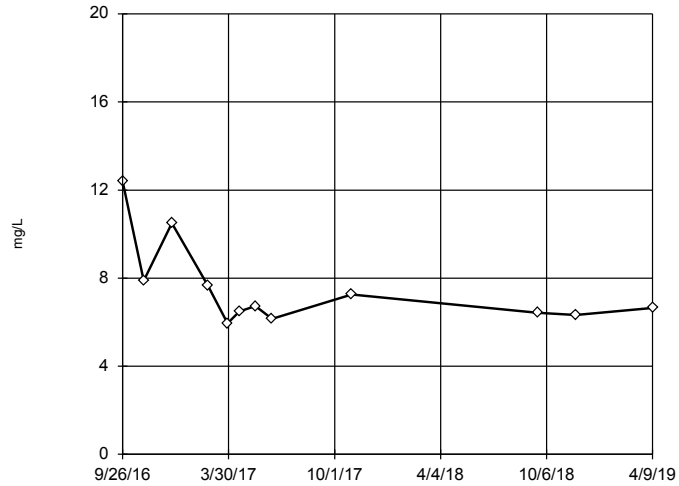
Constituent: Calcium, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-39



n = 12

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 = 13.99, low cutoff = 3.54, based on IQR multiplier of 3.

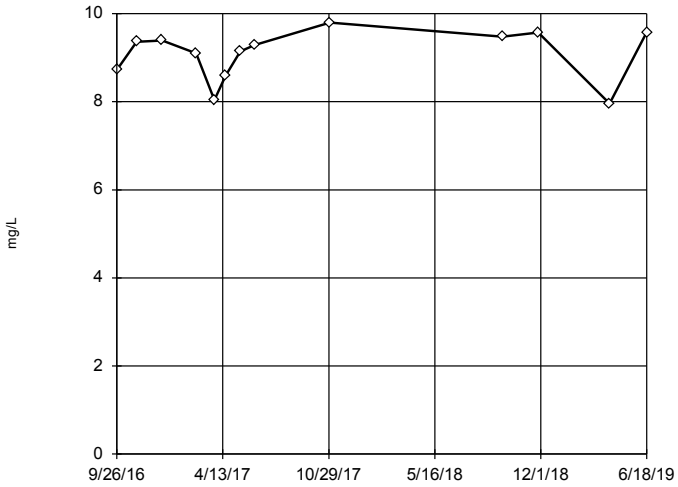
Constituent: Calcium, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-1611



n = 13

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

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

High cutoff = 10.95, low cutoff = -9.074, based on IQR multiplier of 3.

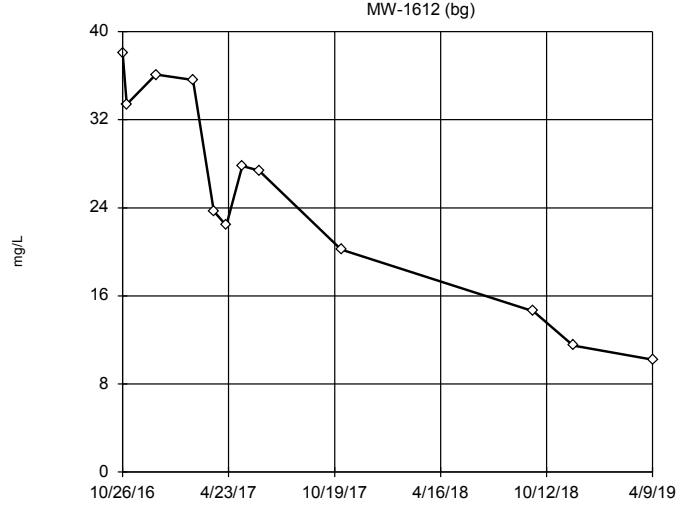
Constituent: Chloride, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-1612 (bg)



n = 12

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

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

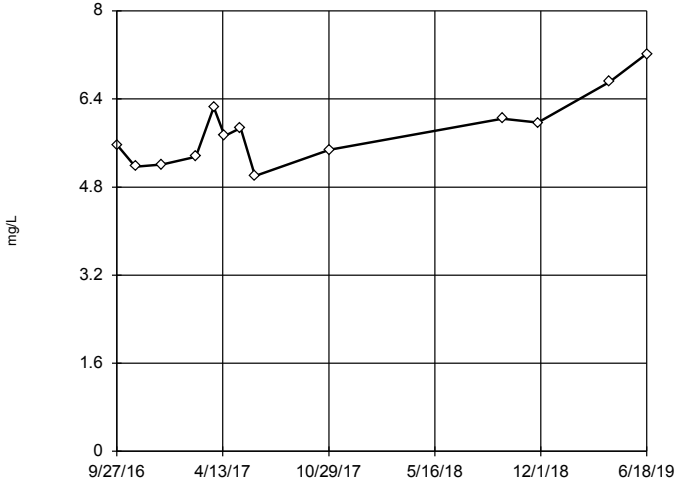
High cutoff = 85.8, low cutoff = -33.9, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-26



n = 13

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 = 9.684, low cutoff = 3.35, based on IQR multiplier of 3.

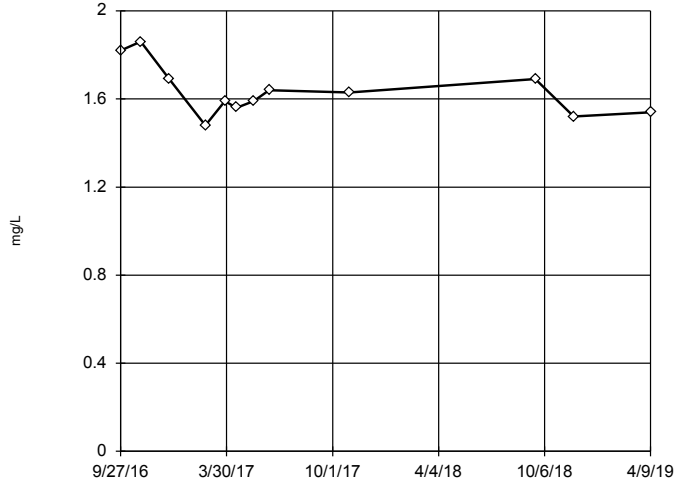
Constituent: Chloride, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-27



n = 12

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

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

High cutoff = 2.191, low cutoff = 1.196, based on IQR multiplier of 3.

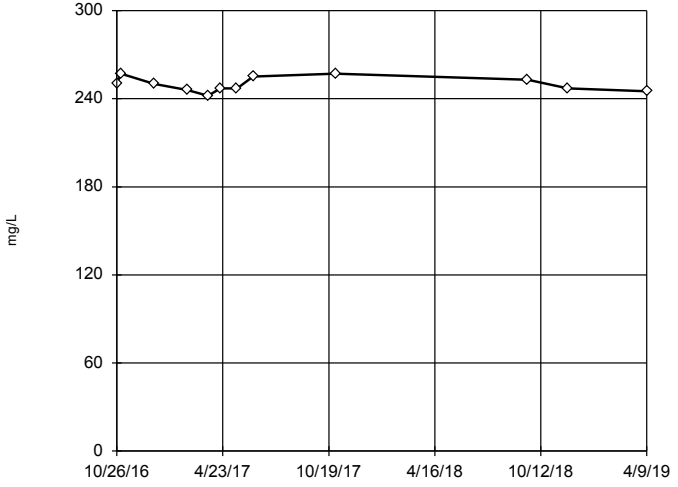
Constituent: Chloride, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-30 (bg)



n = 12

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 = 277.9, low cutoff = 225.3, based on IQR multiplier of 3.

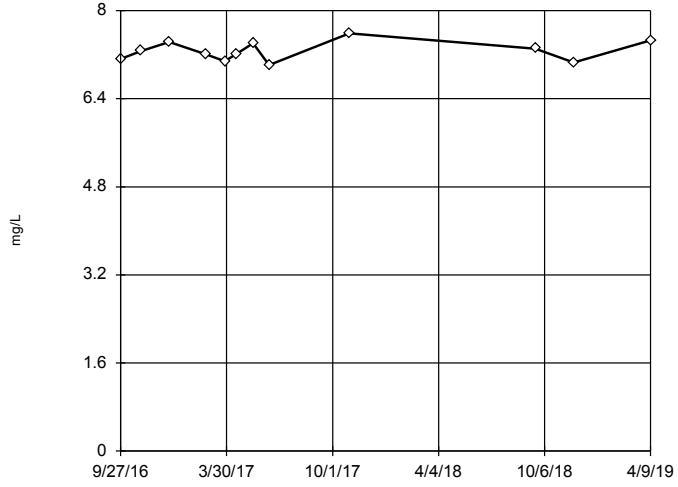
Constituent: Chloride, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-38



n = 12

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

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

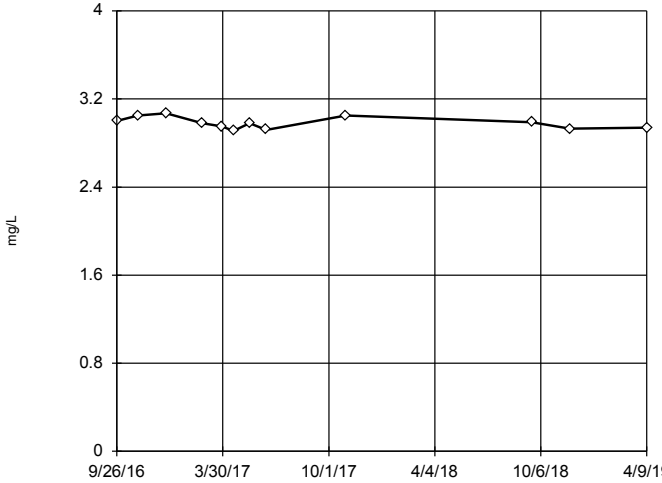
High cutoff = 8.469, low cutoff = 6.22, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-39



n = 12

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

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

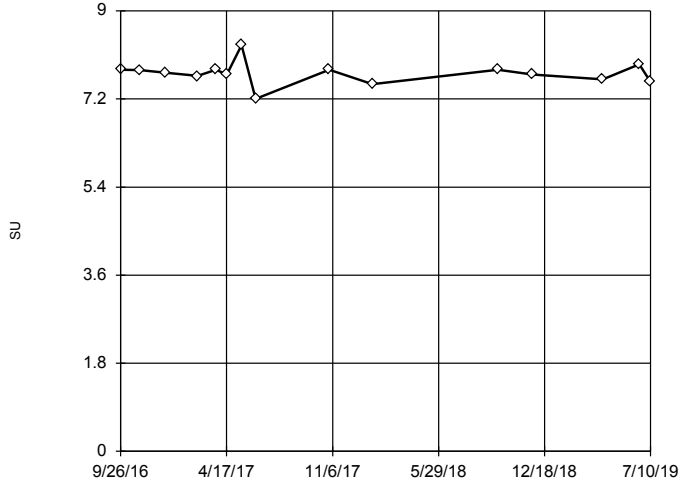
High cutoff = 3.311, low cutoff = 2.681, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-1611



n = 15

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

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

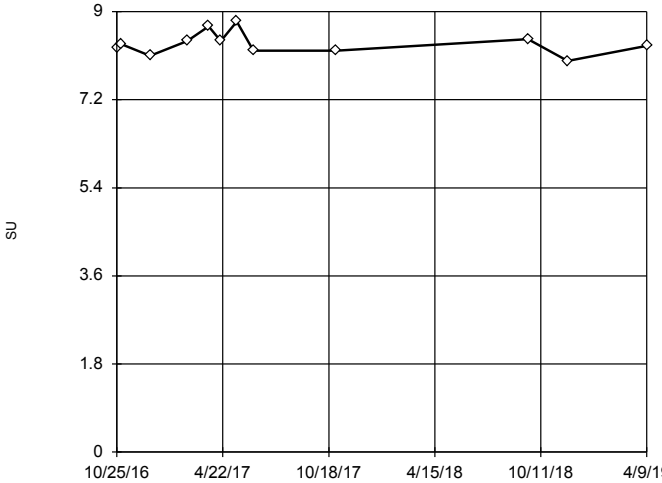
High cutoff = 8.432, low cutoff = 7.03, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-1612 (bg)



n = 12

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

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

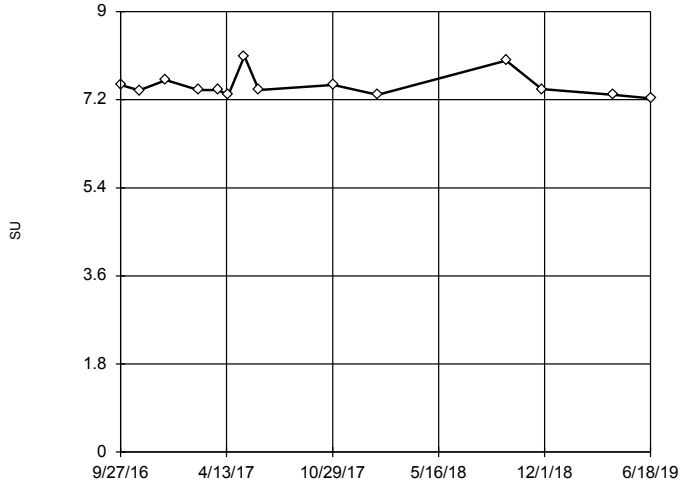
High cutoff = 9.116, low cutoff = 7.574, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-26



n = 14

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

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

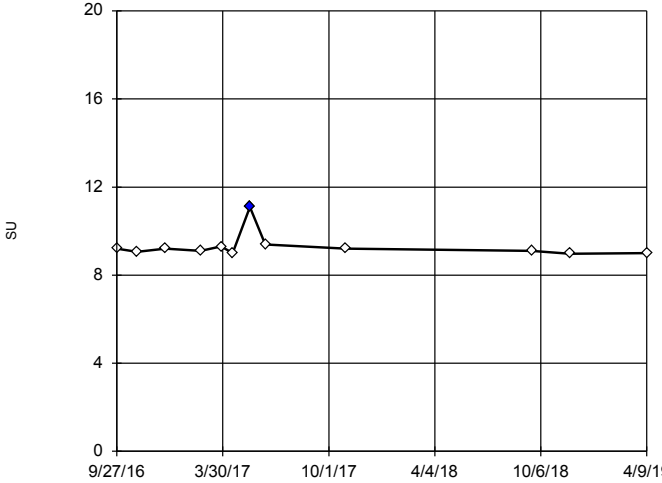
High cutoff = 8.352, low cutoff = 6.599, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-27



n = 12

Outlier is drawn as solid. Tukey's method selected by user.

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

High cutoff = 9.942, low cutoff = 8.401, based on IQR multiplier of 3.

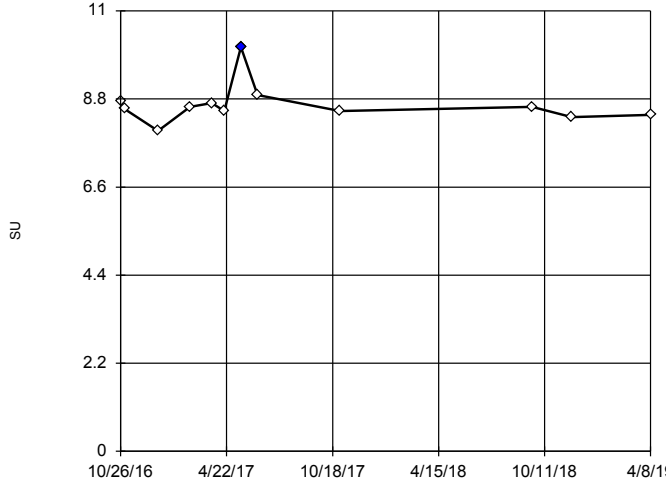
Constituent: pH, field Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-30 (bg)



n = 12

Outlier is drawn as solid. Tukey's method selected by user.

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

High cutoff = 9.583, low cutoff = 7.689, based on IQR multiplier of 3.

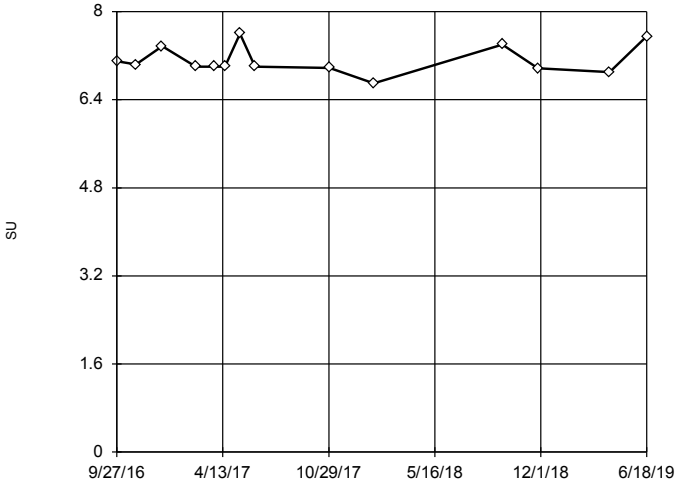
Constituent: pH, field Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-38



n = 14

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

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

High cutoff = 8.765, low cutoff = 5.877, based on IQR multiplier of 3.

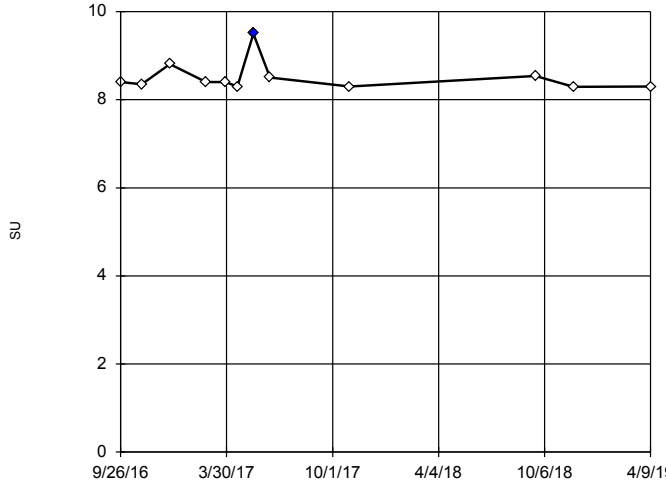
Constituent: pH, field Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-39



n = 12

Outlier is drawn as solid. Tukey's method selected by user.

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

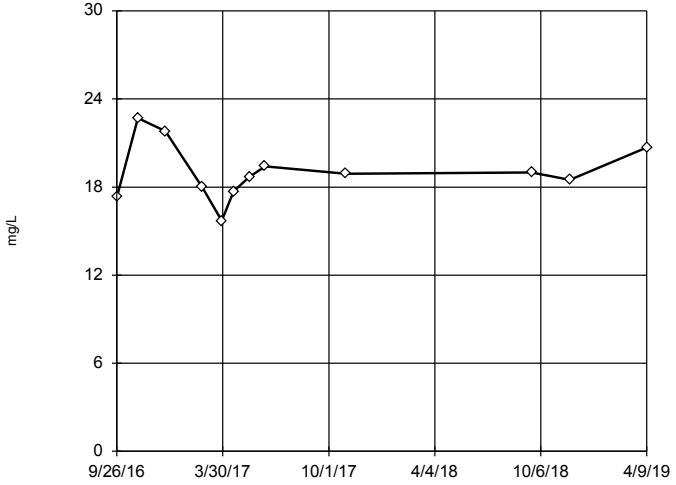
High cutoff = 9.216, low cutoff = 7.674, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-1611



n = 12

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 = 28.36, low cutoff = 12.61, based on IQR multiplier of 3.

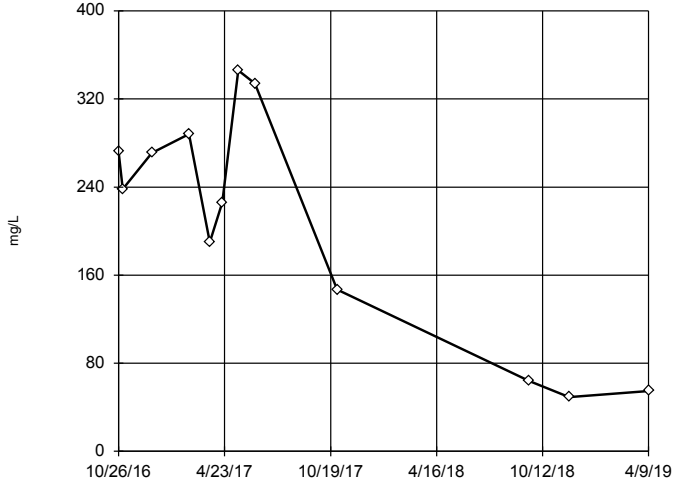
Constituent: Sulfate, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-1612 (bg)



n = 12

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

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

High cutoff = 524.7, low cutoff = -429, based on IQR multiplier of 3.

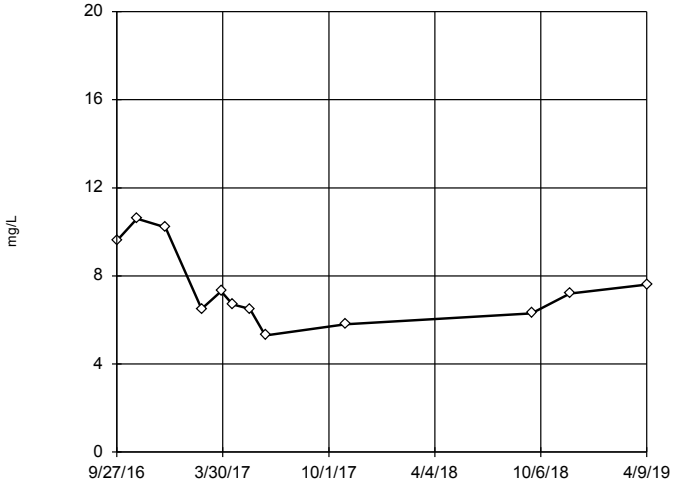
Constituent: Sulfate, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-26



n = 12

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 = 20.31, low cutoff = 2.691, based on IQR multiplier of 3.

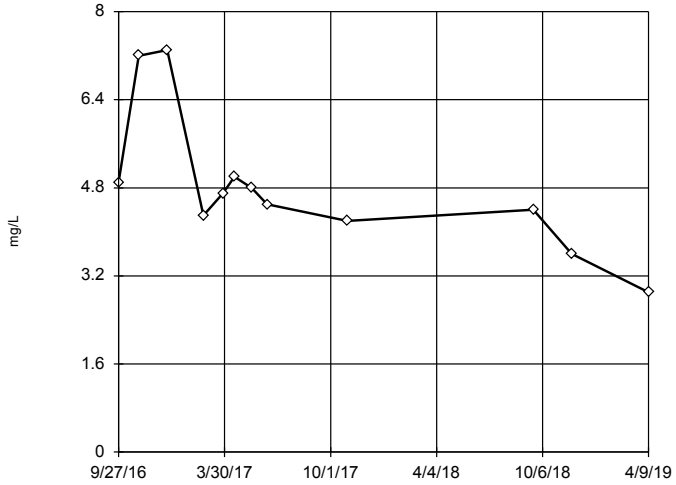
Constituent: Sulfate, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-27



n = 12

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

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

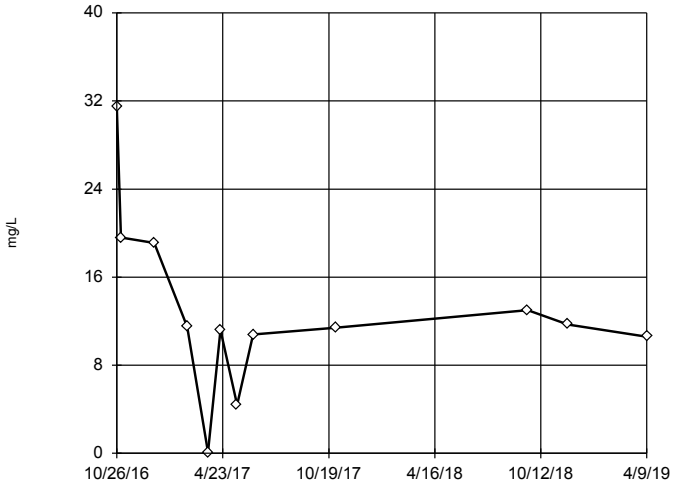
High cutoff = 7.821, low cutoff = 2.69, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-30 (bg)



n = 12

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

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

High cutoff = 32.1, low cutoff = -5.35, based on IQR multiplier of 3.

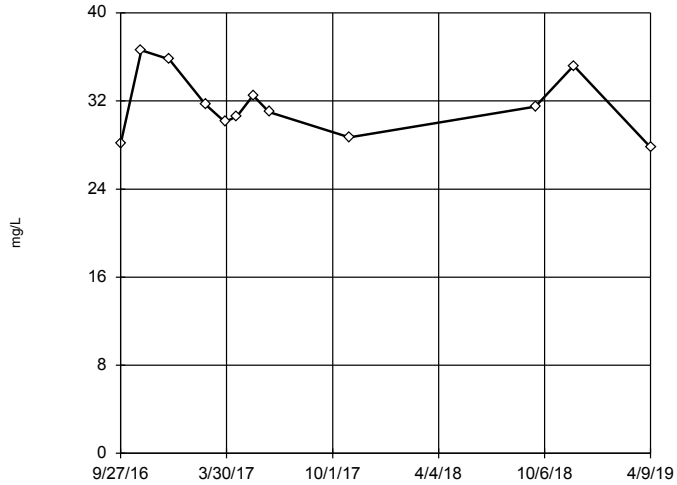
Constituent: Sulfate, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-38



n = 12

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 = 51.54, low cutoff = 19.29, based on IQR multiplier of 3.

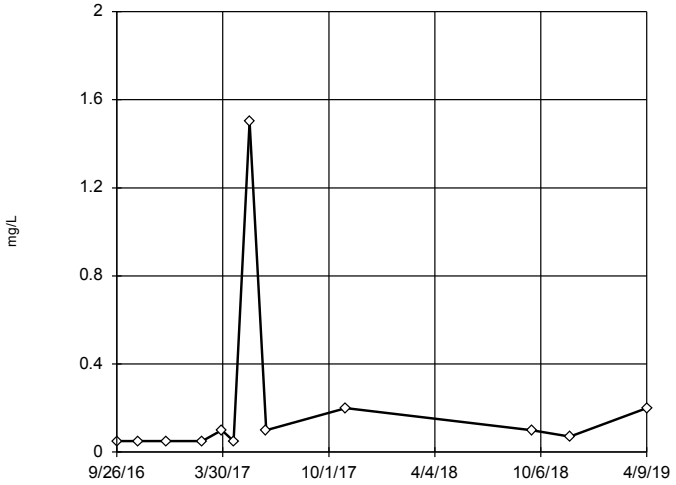
Constituent: Sulfate, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-39



n = 12

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 = 3.2, low cutoff = 0.00221, based on IQR multiplier of 3.

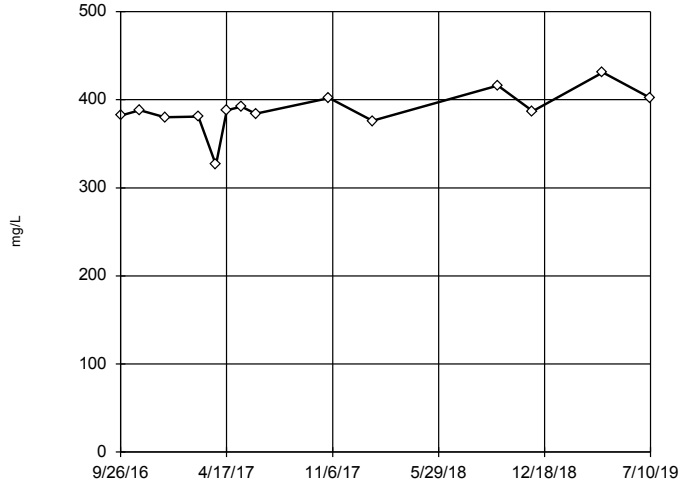
Constituent: Sulfate, total Analysis Run 10/7/2019 4:18 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-1611



n = 14

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

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

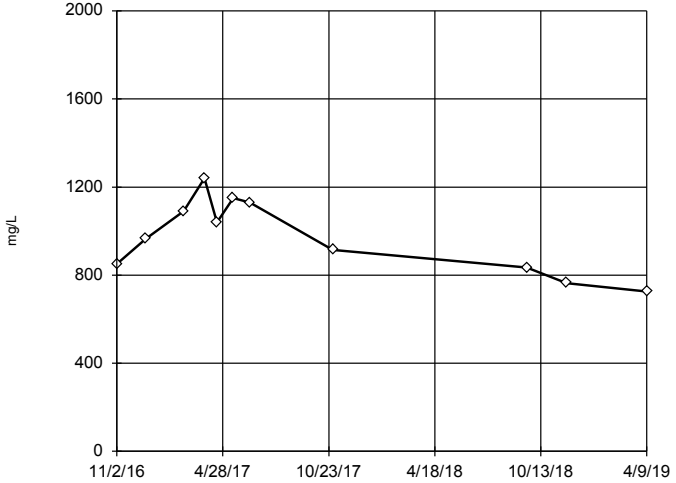
High cutoff = 451.6, low cutoff = 272.3, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/7/2019 4:19 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-1612 (bg)



n = 11

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

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

High cutoff = 2015, low cutoff = -50, based on IQR multiplier of 3.

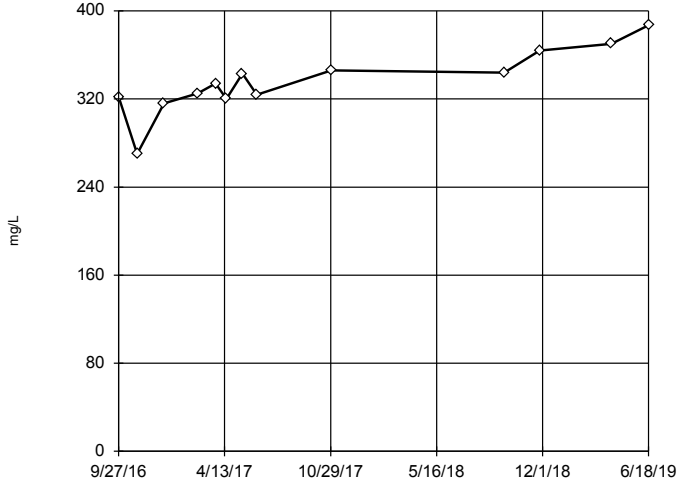
Constituent: Total Dissolved Solids [TDS] Analysis Run 10/7/2019 4:19 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-26



n = 13

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

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

High cutoff = 431, low cutoff = -129.4, based on IQR multiplier of 3.

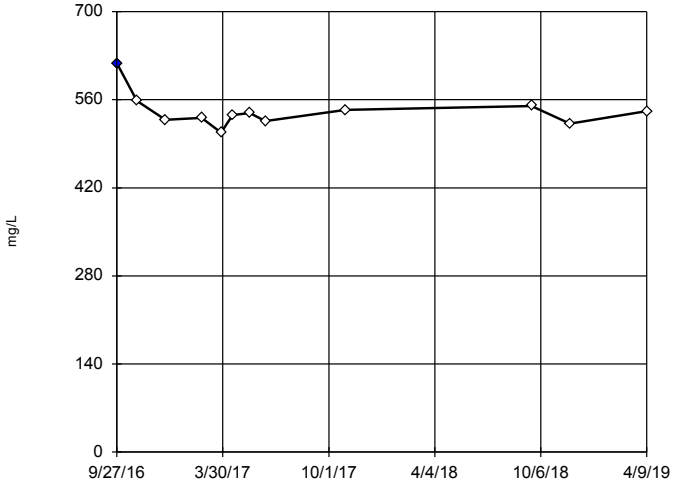
Constituent: Total Dissolved Solids [TDS] Analysis Run 10/7/2019 4:19 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-27



n = 12

Outlier is drawn as solid. Tukey's method selected by user.

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

High cutoff = 611.6, low cutoff = 471.3, based on IQR multiplier of 3.

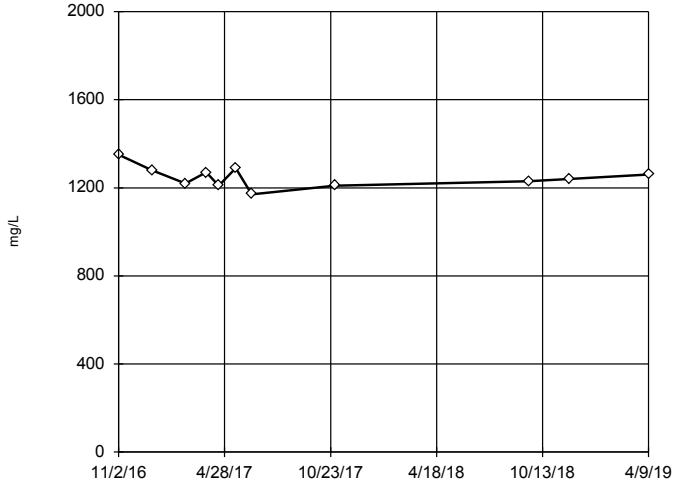
Constituent: Total Dissolved Solids [TDS] Analysis Run 10/7/2019 4:19 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-30 (bg)



n = 11

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

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

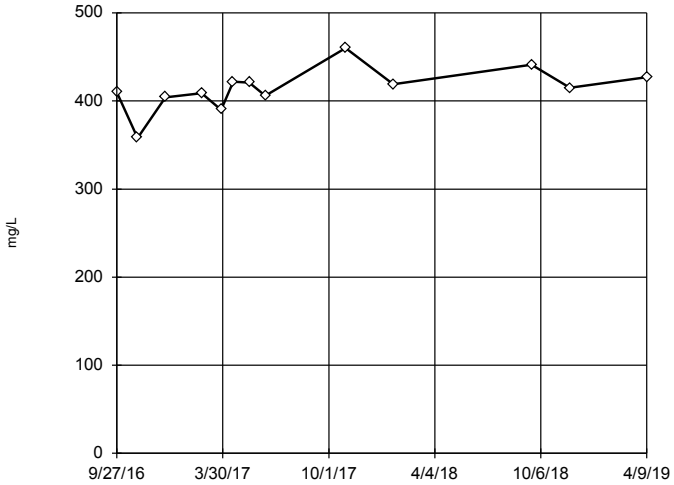
High cutoff = 1515, low cutoff = 1022, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/7/2019 4:19 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Tukey's Outlier Screening

MW-38



n = 13

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

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

High cutoff = 474.3, low cutoff = 330.9, based on IQR multiplier of 3.

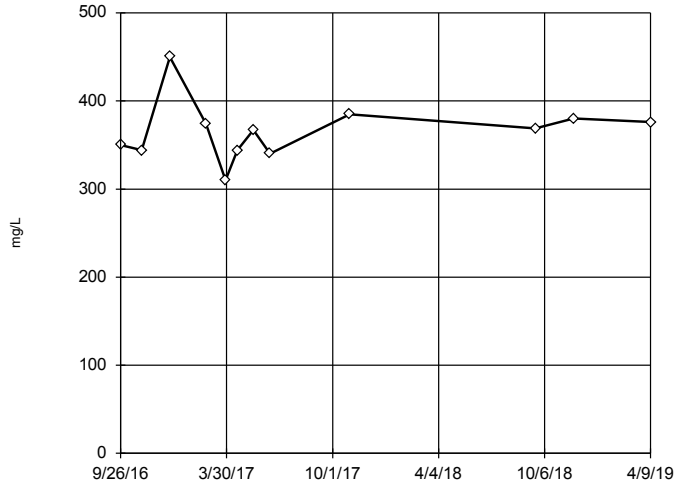
Constituent: Total Dissolved Solids [TDS] Analysis Run 10/7/2019 4:19 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW-39



n = 12

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 = 501.5, low cutoff = 259.3, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/7/2019 4:19 PM

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

FIGURE D: MANN-WHITNEY ANALYSIS

Welch's t-test/Mann-Whitney - Significant Results

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill Printed 10/15/2019, 2:40 PM

Constituent	Well	Calc.	0.01	Method
Total Dissolved Solids [TDS] (mg/L)	**MW-26**	**2.855**	**Yes**	**Mann-W**

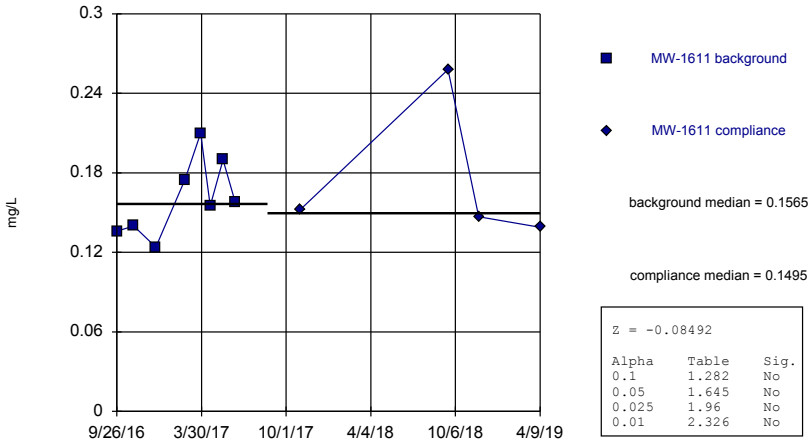
Welch's t-test/Mann-Whitney - All Results

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill Printed 10/15/2019, 2:40 PM

Constituent	Well	Calc.	0.01	Method
Boron, total (mg/L)	MW-1611	-0.08492	No	Mann-W
Boron, total (mg/L)	MW-1612 (bg)	-2.293	No	Mann-W
Boron, total (mg/L)	MW-26	1.274	No	Mann-W
Boron, total (mg/L)	MW-27	0.4246	No	Mann-W
Boron, total (mg/L)	MW-30 (bg)	1.875	No	Mann-W
Boron, total (mg/L)	MW-38	1.361	No	Mann-W
Boron, total (mg/L)	MW-39	1.446	No	Mann-W
Calcium, total (mg/L)	MW-1611	0.8429	No	Mann-W
Calcium, total (mg/L)	MW-1612 (bg)	-2.633	No	Mann-W
Calcium, total (mg/L)	MW-26	-0.07319	No	Mann-W
Calcium, total (mg/L)	MW-27	-2.551	No	Mann-W
Calcium, total (mg/L)	MW-30 (bg)	-0.2548	No	Mann-W
Calcium, total (mg/L)	MW-38	0.7329	No	Mann-W
Calcium, total (mg/L)	MW-39	-0.9341	No	Mann-W
Chloride, total (mg/L)	MW-1611	1.683	No	Mann-W
Chloride, total (mg/L)	MW-1612 (bg)	-2.802	No	Mann-W
Chloride, total (mg/L)	MW-26	1.976	No	Mann-W
Chloride, total (mg/L)	MW-27	-0.8522	No	Mann-W
Chloride, total (mg/L)	MW-30 (bg)	0.1717	No	Mann-W
Chloride, total (mg/L)	MW-38	1.104	No	Mann-W
Chloride, total (mg/L)	MW-39	-0.1704	No	Mann-W
pH, field (SU)	MW-1611	-0.4675	No	Mann-W
pH, field (SU)	MW-1612 (bg)	-1.023	No	Mann-W
pH, field (SU)	MW-26	-0.7824	No	Mann-W
pH, field (SU)	MW-27	-1.631	No	Mann-W
pH, field (SU)	MW-30 (bg)	-1.619	No	Mann-W
pH, field (SU)	MW-38	-1.371	No	Mann-W
pH, field (SU)	MW-39	-1.637	No	Mann-W
Sulfate, total (mg/L)	MW-1611	0.5944	No	Mann-W
Sulfate, total (mg/L)	MW-1612 (bg)	-2.802	No	Mann-W
Sulfate, total (mg/L)	MW-26	-0.9358	No	Mann-W
Sulfate, total (mg/L)	MW-27	-2.633	No	Mann-W
Sulfate, total (mg/L)	MW-30 (bg)	-0.08492	No	Mann-W
Sulfate, total (mg/L)	MW-38	-0.9341	No	Mann-W
Sulfate, total (mg/L)	MW-39	-1.458	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	MW-1611	1.747	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	MW-1612 (bg)	-2.551	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	**MW-26**	**2.855**	**Yes**	**Mann-W**
Total Dissolved Solids [TDS] (mg/L)	MW-27	0.4246	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	MW-30 (bg)	-0.7577	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	MW-38	2.269	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	MW-39	1.786	No	Mann-W

Mann-Whitney (Wilcoxon Rank Sum)

MW-1611



background median = 0.1565

compliance median = 0.1495

Z = -0.08492

Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

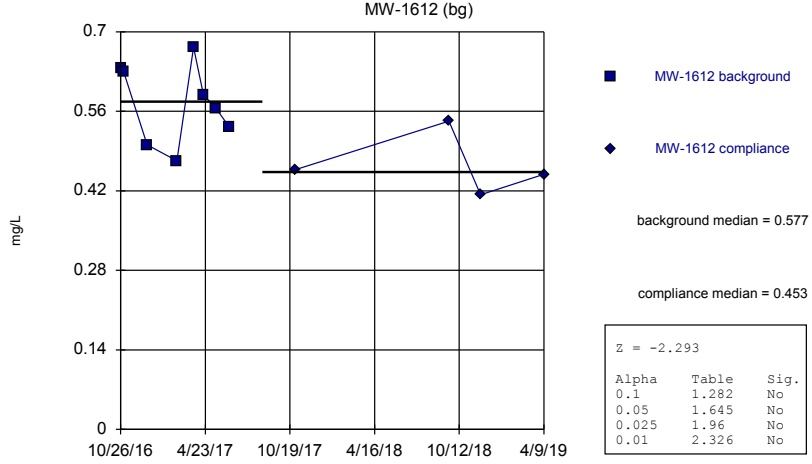
Constituent: Boron, total Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-1612 (bg)



background median = 0.577

compliance median = 0.453

Z = -2.293

Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

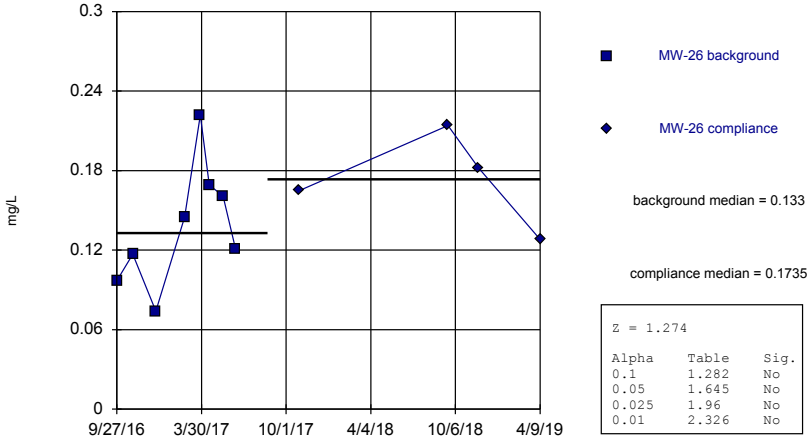
Constituent: Boron, total Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-26



background median = 0.133

compliance median = 0.1735

Z = 1.274

Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

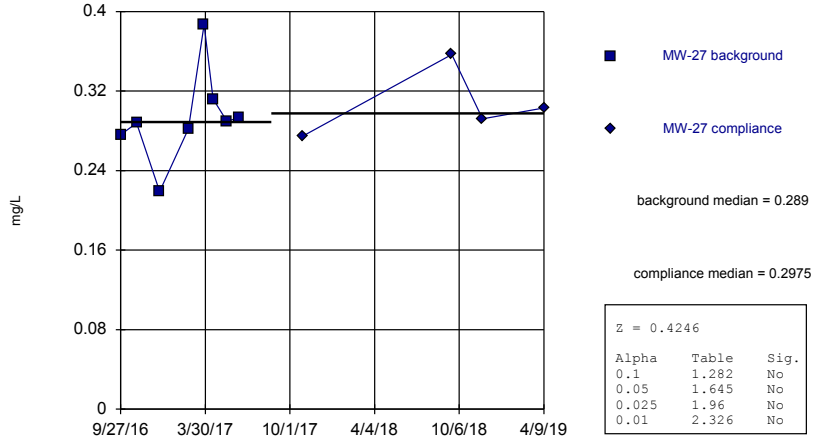
Constituent: Boron, total Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-27



background median = 0.289

compliance median = 0.2975

Z = 0.4246

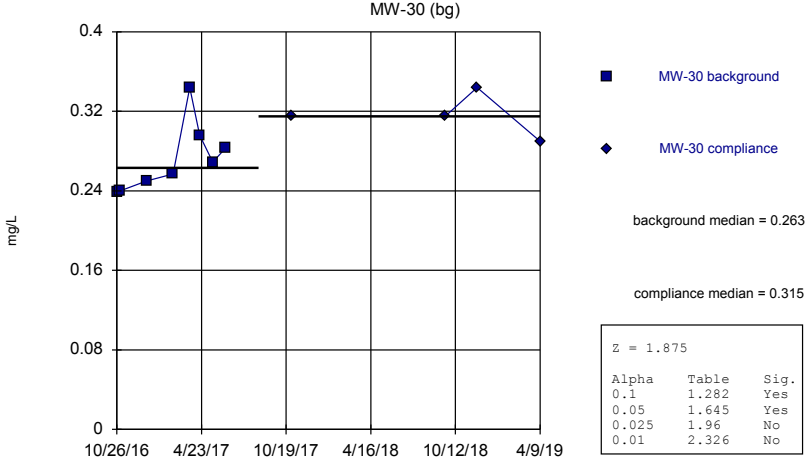
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Boron, total Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW-30 (bg)

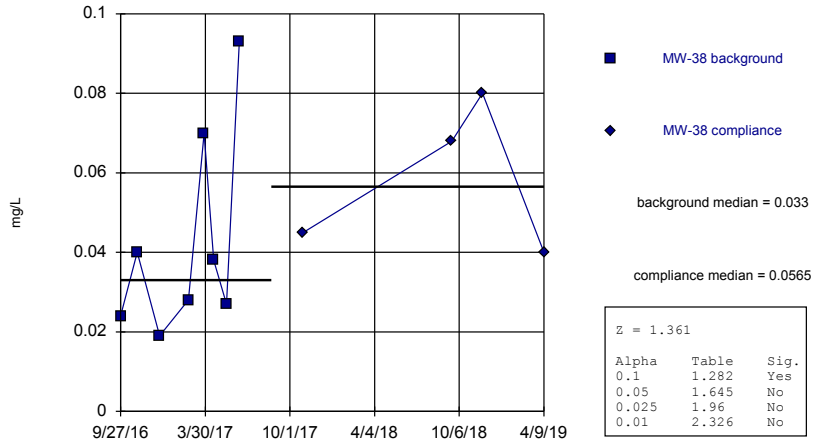


Constituent: Boron, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-38

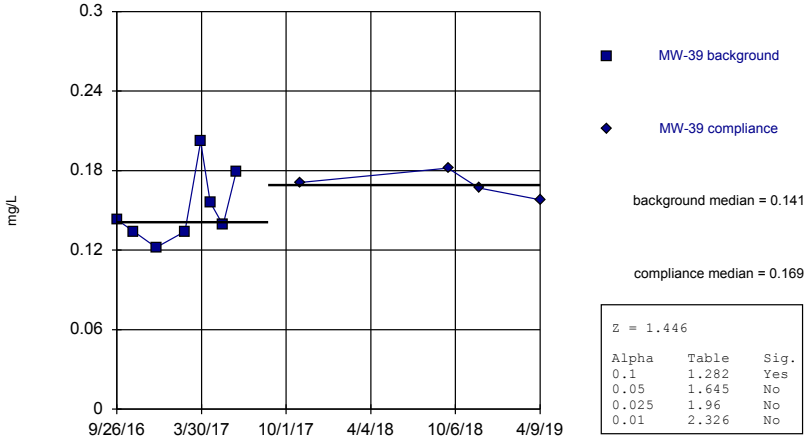


Constituent: Boron, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-39

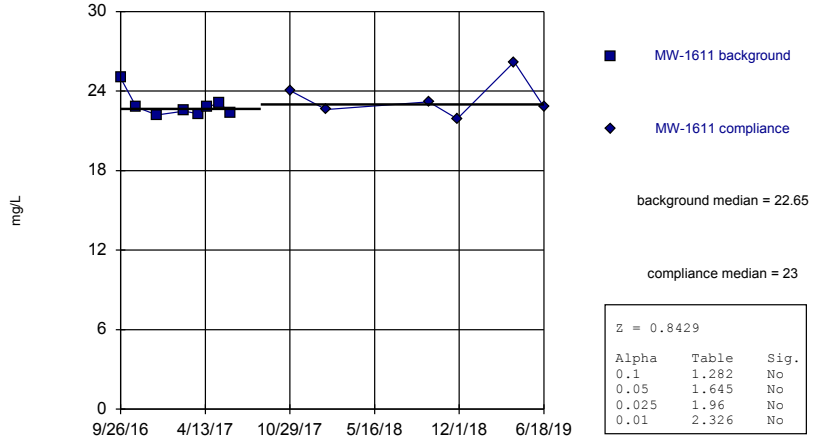


Constituent: Boron, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

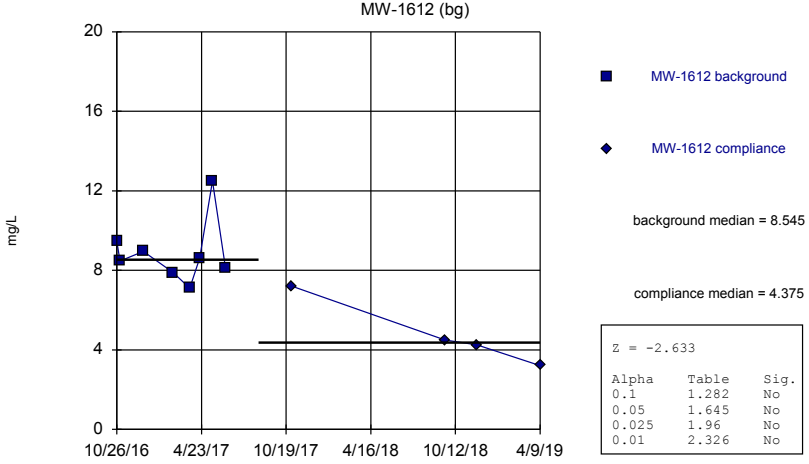
MW-1611



Constituent: Calcium, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW-1612 (bg)

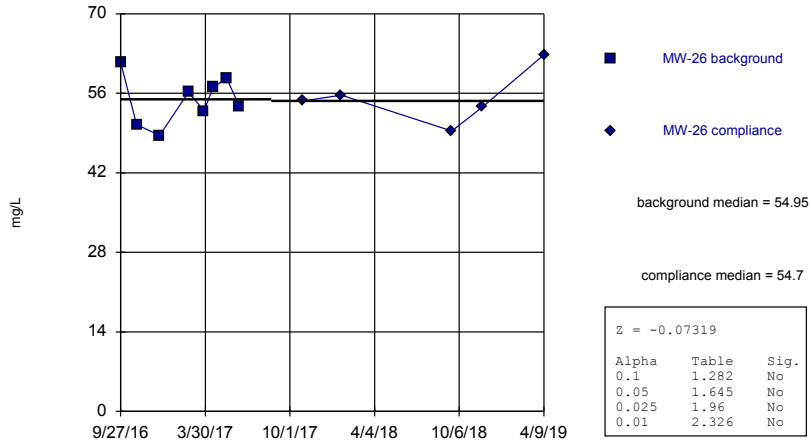


Constituent: Calcium, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-26

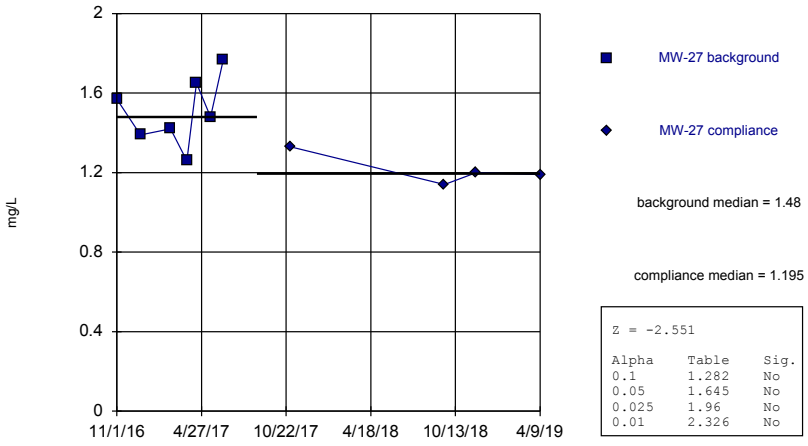


Constituent: Calcium, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-27

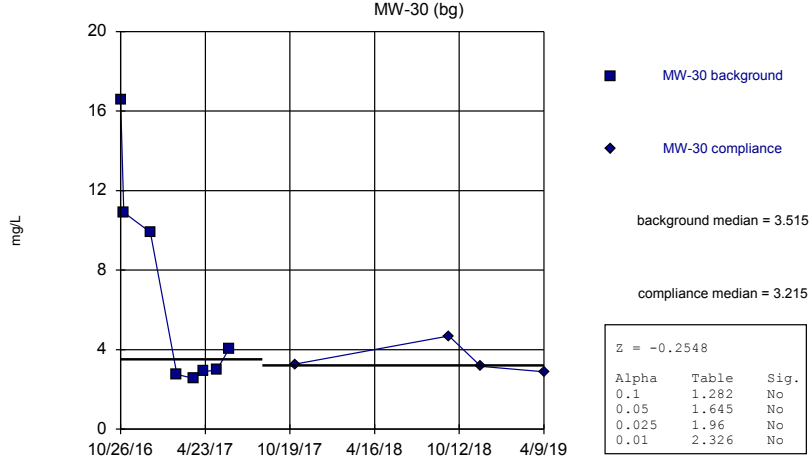


Constituent: Calcium, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

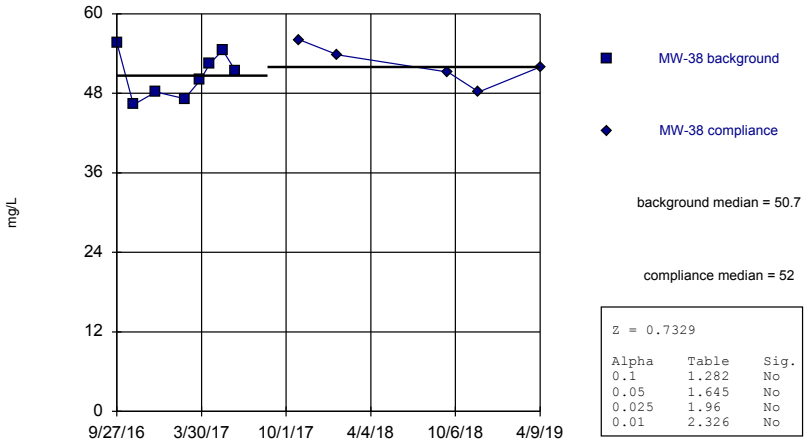
MW-30 (bg)



Constituent: Calcium, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW-38



Z = 0.7329

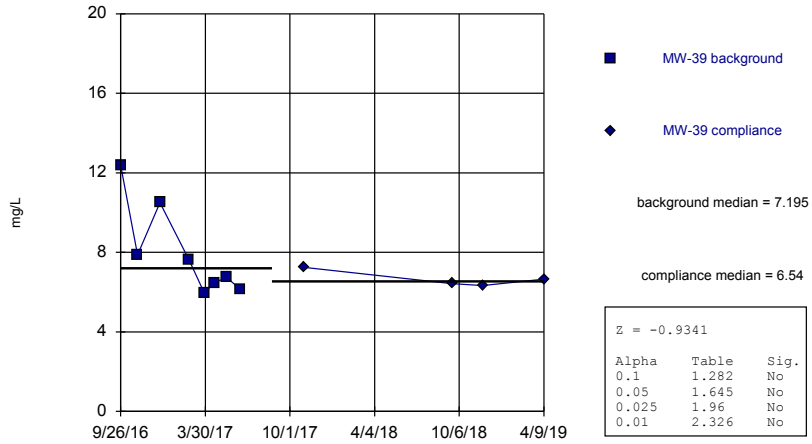
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Calcium, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-39



Z = -0.9341

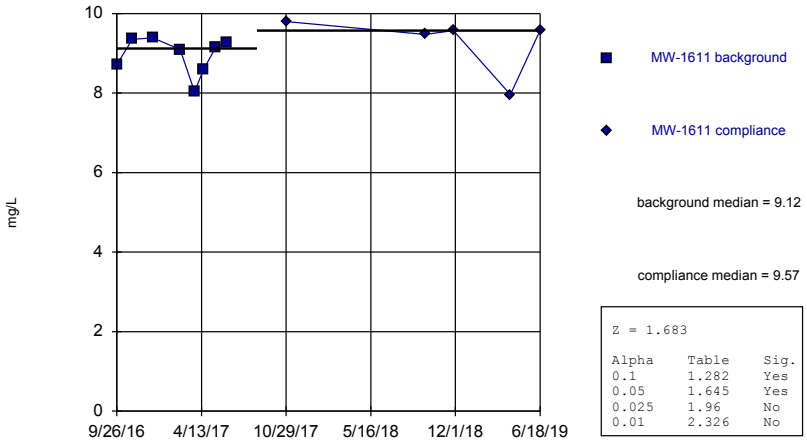
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Calcium, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-1611



Z = 1.683

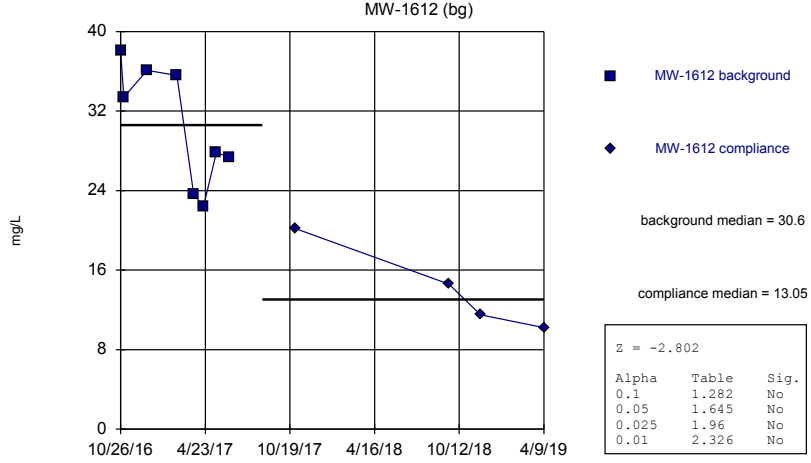
Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	Yes
0.025	1.96	No
0.01	2.326	No

Constituent: Chloride, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-1612 (bg)



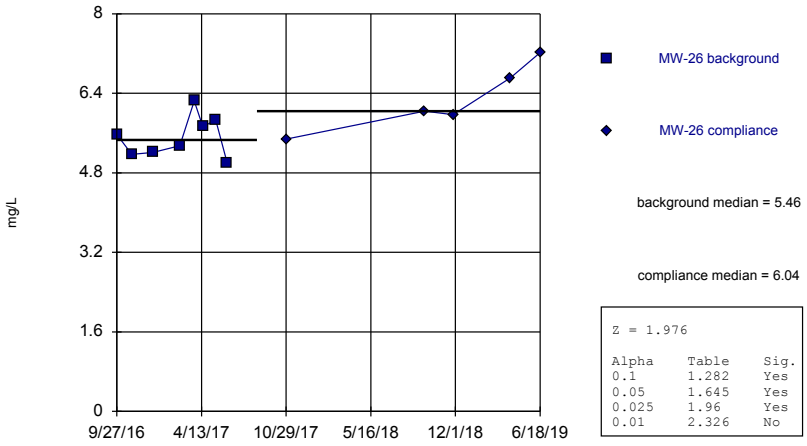
Z = -2.802

Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Chloride, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW-26



background median = 5.46

compliance median = 6.04

Z = 1.976

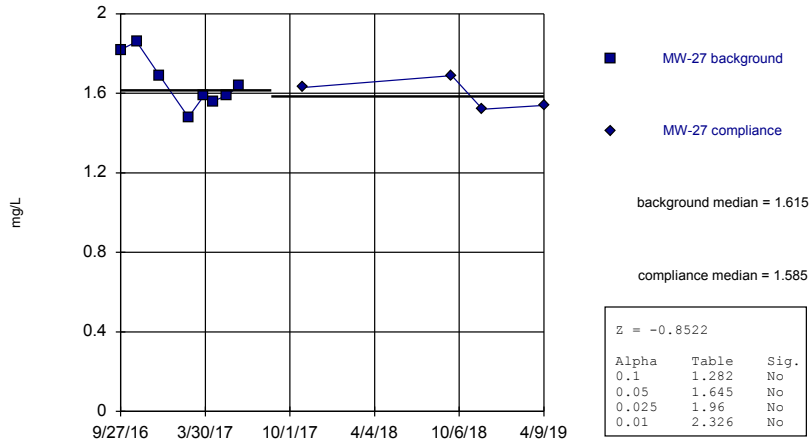
Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	Yes
0.025	1.96	Yes
0.01	2.326	No

Constituent: Chloride, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-27



background median = 1.615

compliance median = 1.585

Z = -0.8522

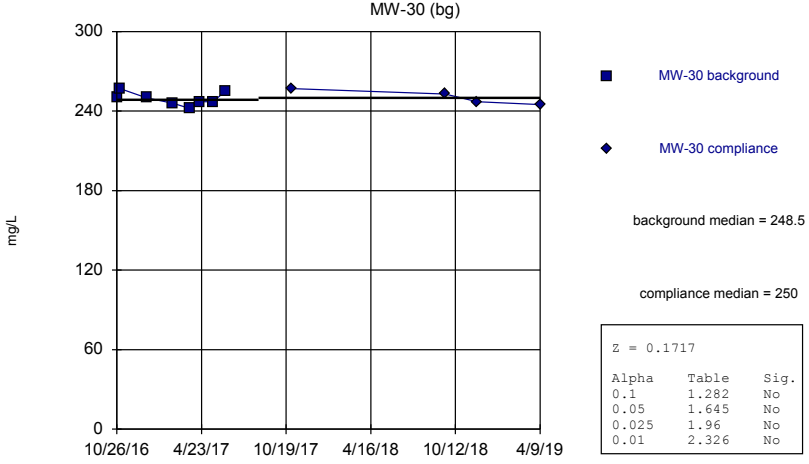
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Chloride, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-30 (bg)



background median = 248.5

compliance median = 250

Z = 0.1717

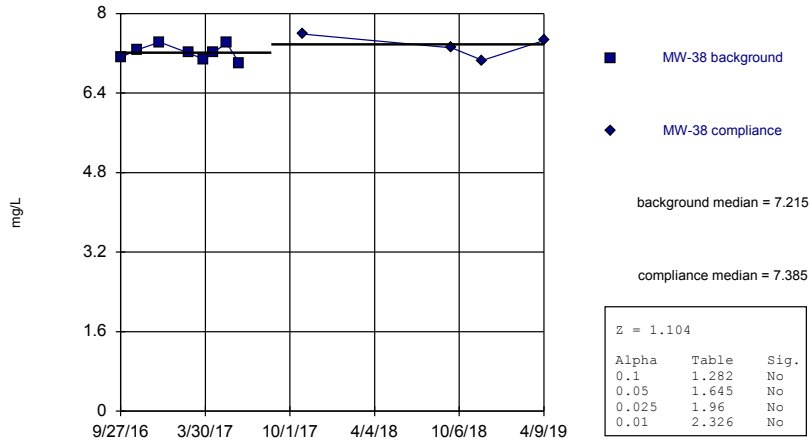
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Chloride, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-38



background median = 7.215

compliance median = 7.385

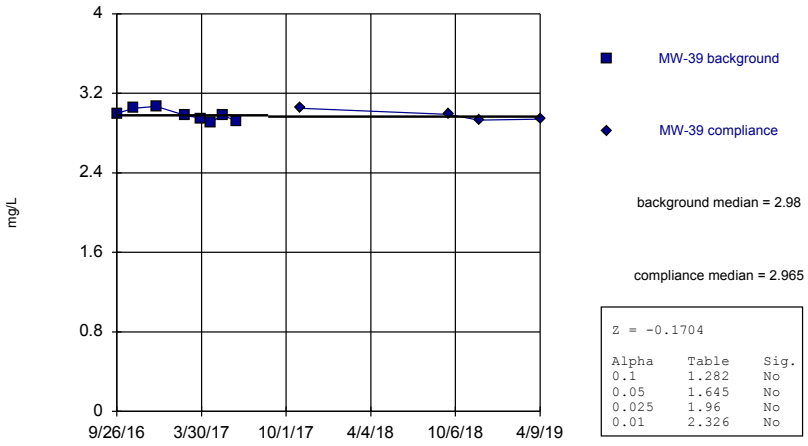
Z = 1.104

Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Chloride, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW-39



Z = -0.1704

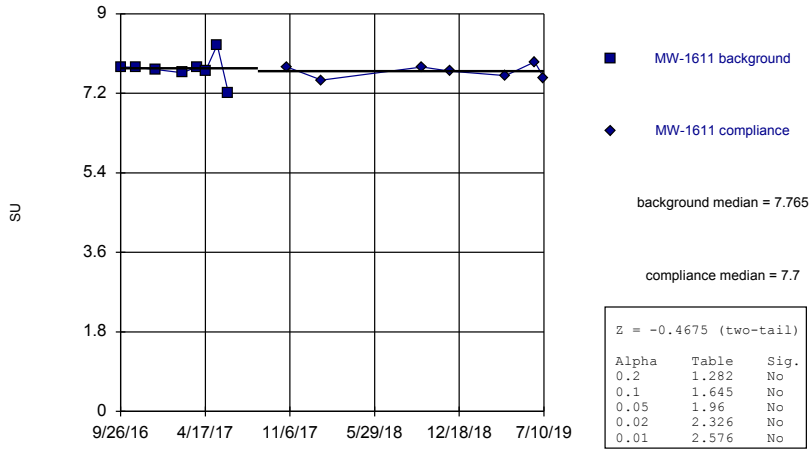
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Chloride, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-1611



Z = -0.4675 (two-tail)

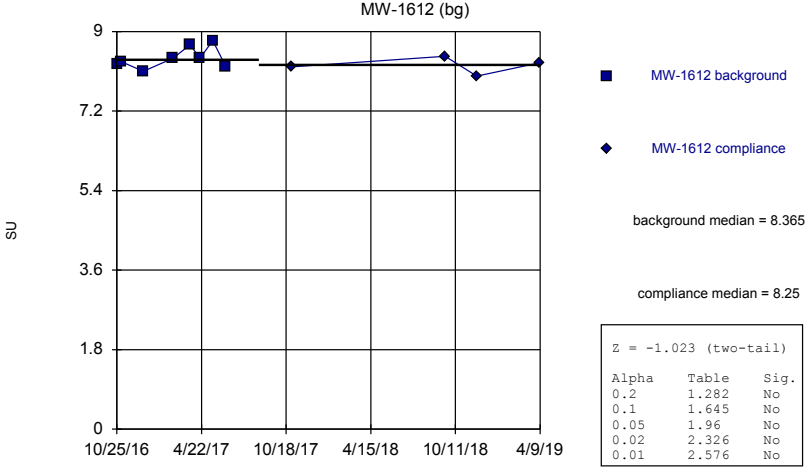
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: pH, field Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-1612 (bg)



Z = -1.023 (two-tail)

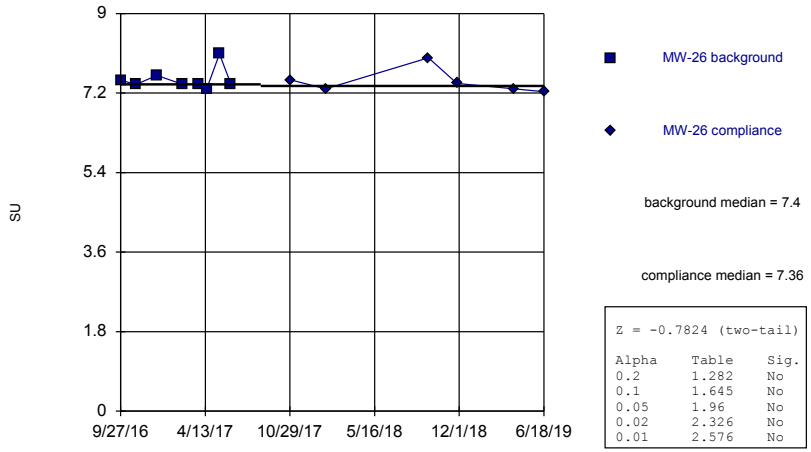
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: pH, field Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-26



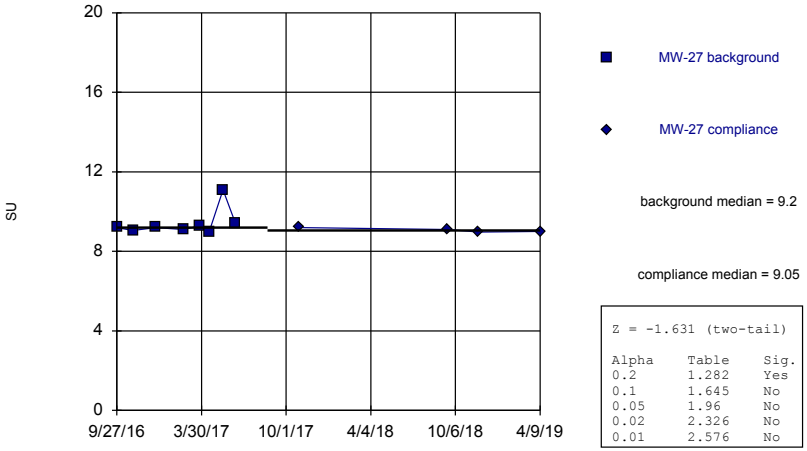
Z = -0.7824 (two-tail)

Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: pH, field Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW-27



background median = 9.2

compliance median = 9.05

Z = -1.631 (two-tail)

Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

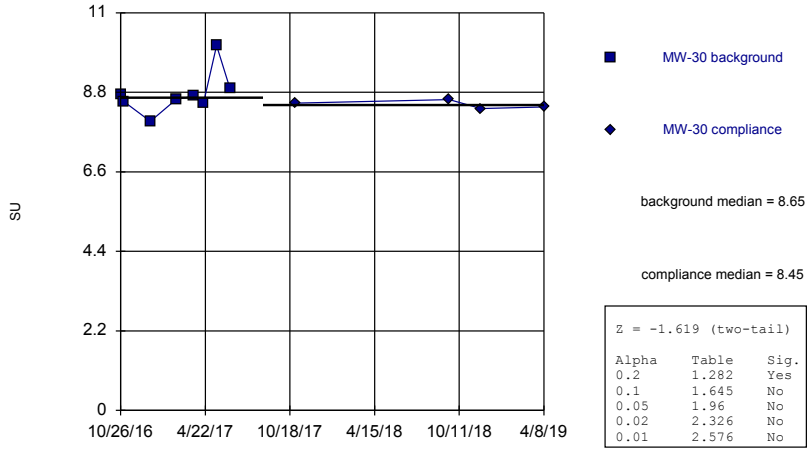
Constituent: pH, field Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-30 (bg)



background median = 8.65

compliance median = 8.45

Z = -1.619 (two-tail)

Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

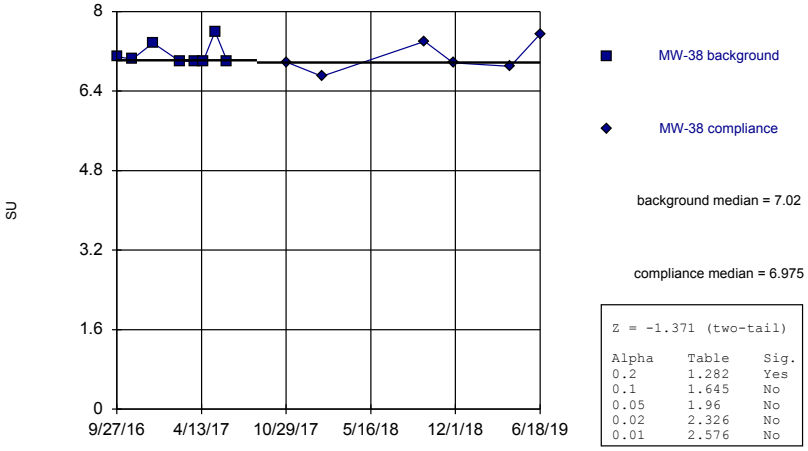
Constituent: pH, field Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-38



background median = 7.02

compliance median = 6.975

Z = -1.371 (two-tail)

Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

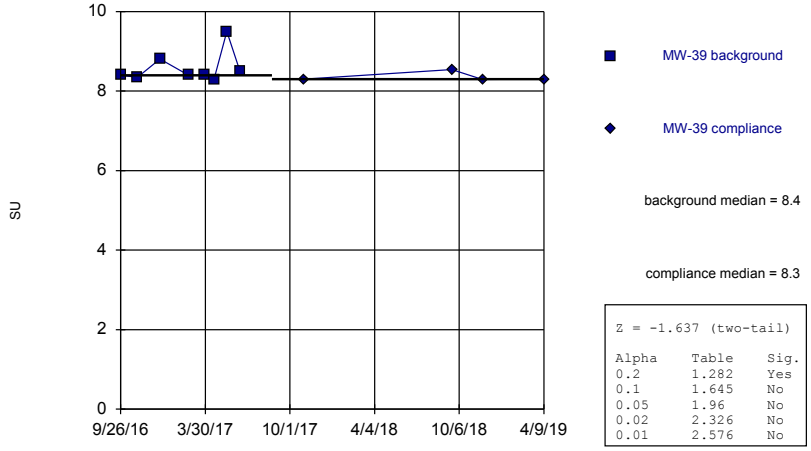
Constituent: pH, field Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-39



background median = 8.4

compliance median = 8.3

Z = -1.637 (two-tail)

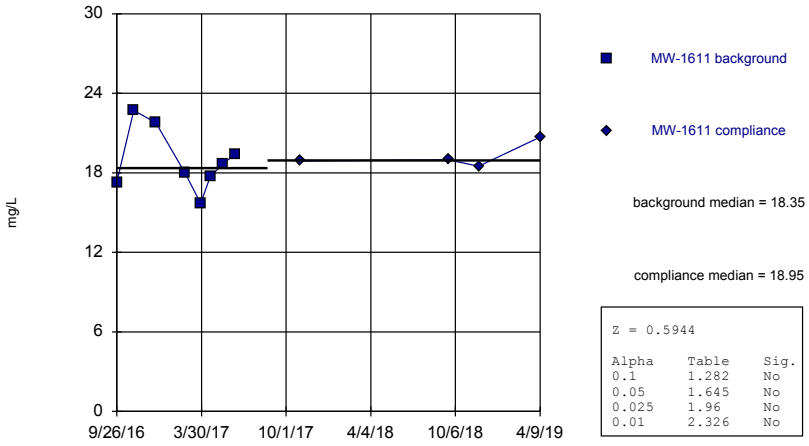
Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: pH, field Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW-1611



Z = 0.5944

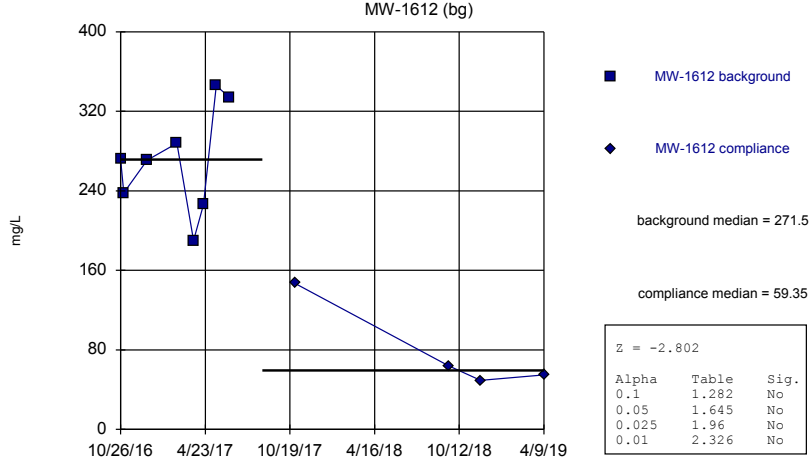
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Sulfate, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-1612 (bg)



Z = -2.802

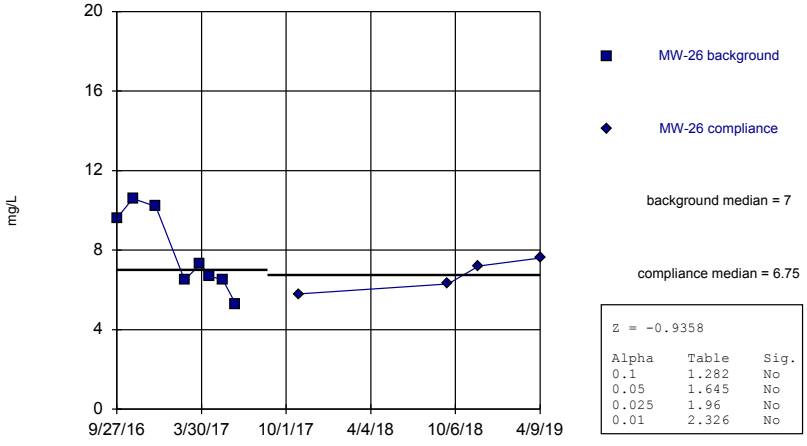
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Sulfate, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-26



Z = -0.9358

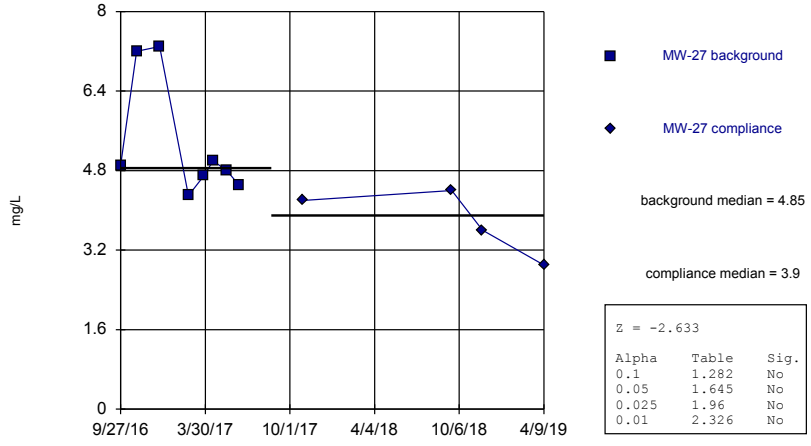
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Sulfate, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-27



Z = -2.633

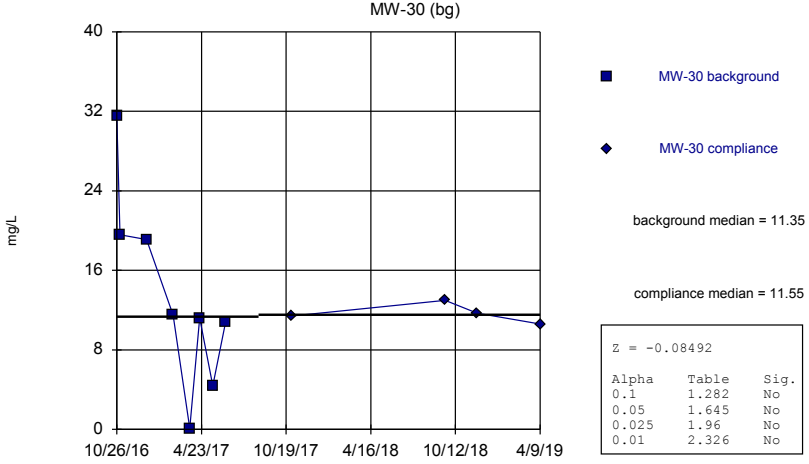
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Sulfate, total Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-30 (bg)



background median = 11.35

compliance median = 11.55

Z = -0.08492		
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

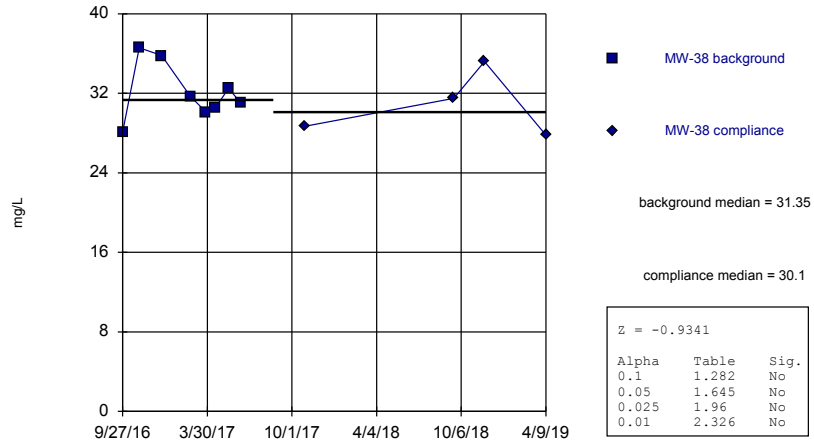
Constituent: Sulfate, total Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-38



background median = 31.35

compliance median = 30.1

Z = -0.9341		
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Sulfate, total Analysis Run 10/15/2019 2:38 PM View: Intrawell

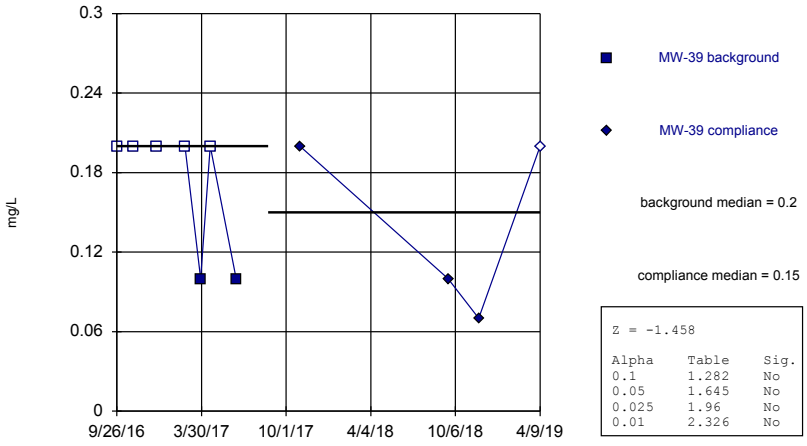
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Hollow symbols indicate censored values.

Mann-Whitney (Wilcoxon Rank Sum)

MW-39



background median = 0.2

compliance median = 0.15

Z = -1.458		
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

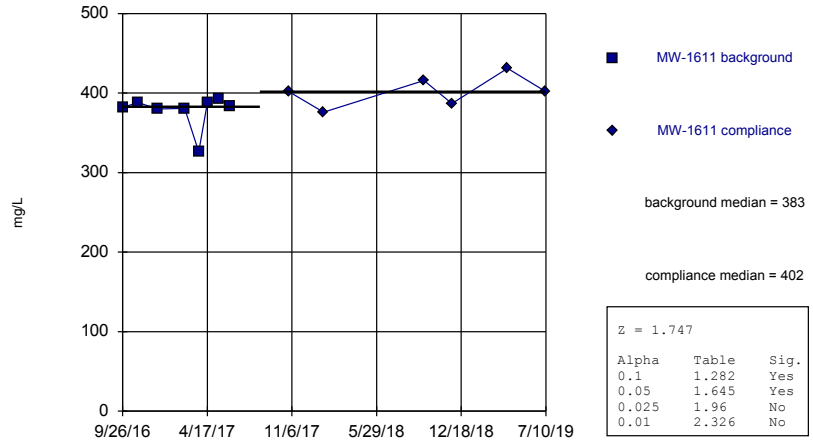
Constituent: Sulfate, total Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-1611



background median = 383

compliance median = 402

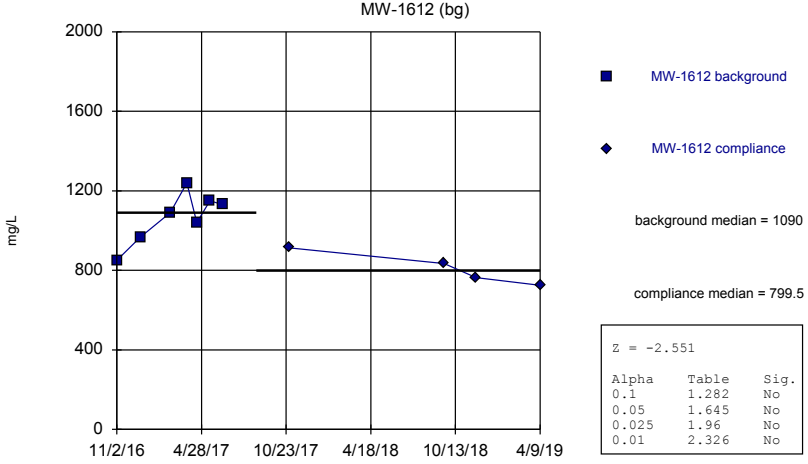
Z = 1.747		
Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	Yes
0.025	1.96	No
0.01	2.326	No

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/15/2019 2:38 PM View: Intrawell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW-1612 (bg)



background median = 1090

compliance median = 799.5

Z = -2.551

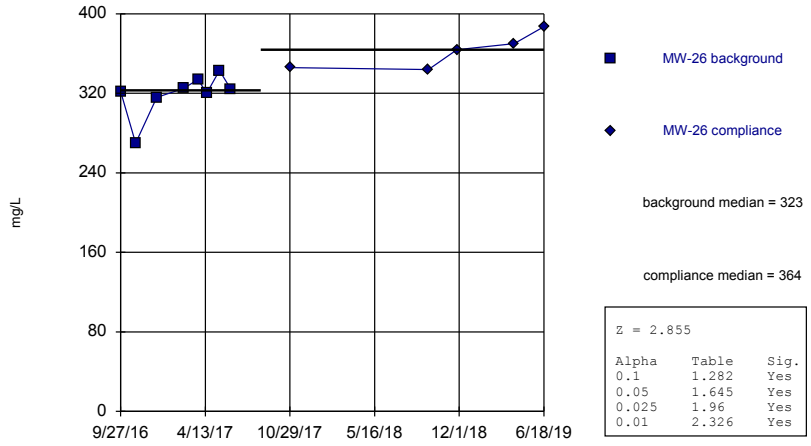
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-26



background median = 323

compliance median = 364

Z = 2.855

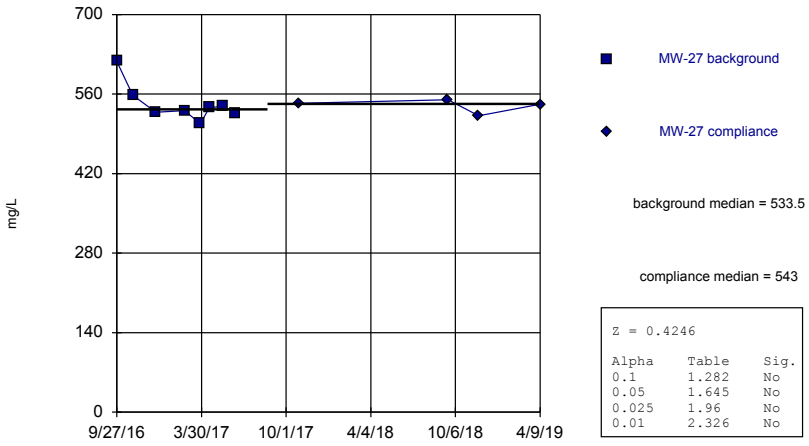
Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	Yes
0.025	1.96	Yes
0.01	2.326	Yes

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-27



background median = 533.5

compliance median = 543

Z = 0.4246

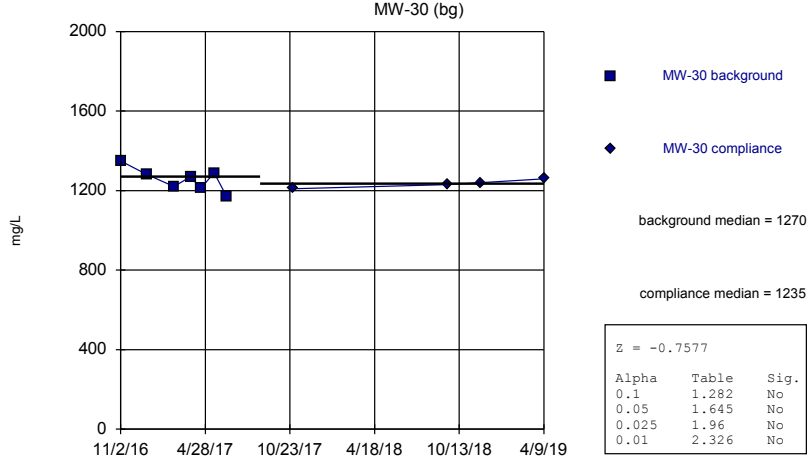
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-30 (bg)



background median = 1270

compliance median = 1235

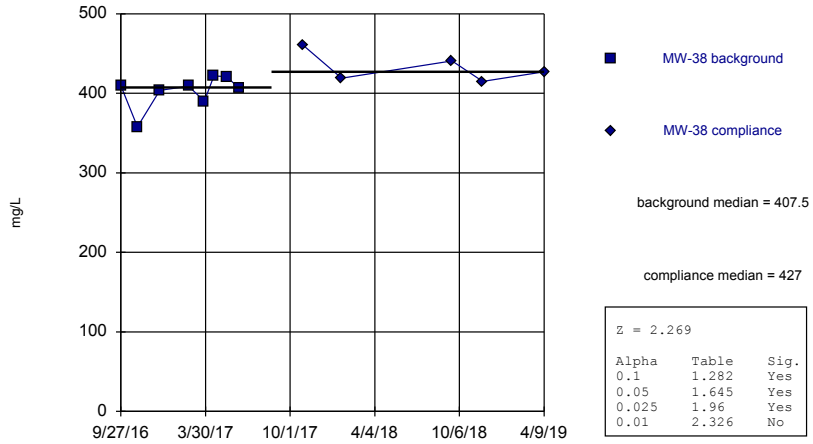
Z = -0.7577

Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW-38



Z = 2.269

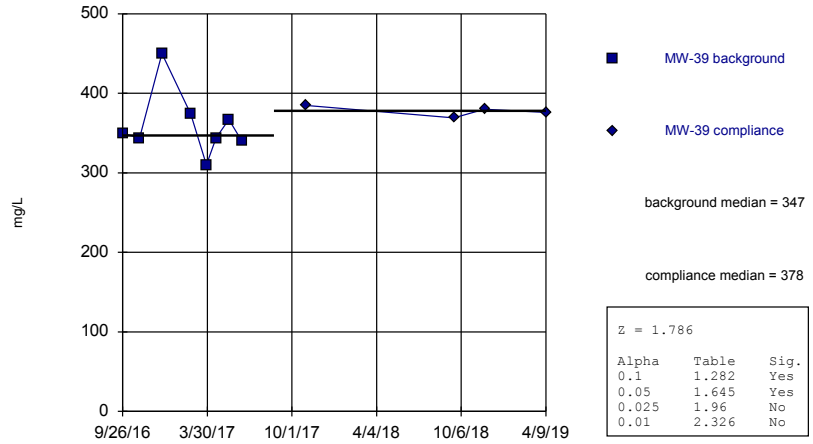
Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	Yes
0.025	1.96	Yes
0.01	2.326	No

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-39



Z = 1.786

Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	Yes
0.025	1.96	No
0.01	2.326	No

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/15/2019 2:38 PM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

FIGURE E: INTRAWELL PREDICTION LIMITS

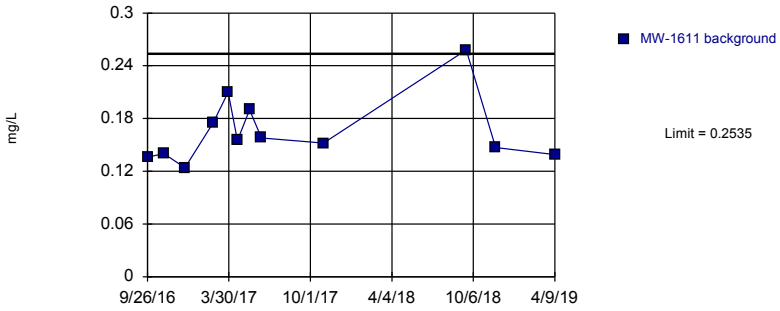
Intrawell Prediction Limit Summary Table - All Results

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill Printed 11/22/2019, 9:16 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron, total (mg/L)	MW-1611	0.2535	n/a	n/a	1 future	n/a	12	0.1653	0.03797	0	None	No	0.001504	Param Intra 1 of 2
Boron, total (mg/L)	MW-1612	0.7307	n/a	n/a	1 future	n/a	12	0.5384	0.08279	0	None	No	0.001504	Param Intra 1 of 2
Boron, total (mg/L)	MW-26	0.2535	n/a	n/a	1 future	n/a	12	0.1496	0.04475	0	None	No	0.001504	Param Intra 1 of 2
Boron, total (mg/L)	MW-27	0.3952	n/a	n/a	1 future	n/a	12	0.2978	0.04195	0	None	No	0.001504	Param Intra 1 of 2
Boron, total (mg/L)	MW-30	0.3734	n/a	n/a	1 future	n/a	12	0.2868	0.03727	0	None	No	0.001504	Param Intra 1 of 2
Boron, total (mg/L)	MW-38	0.1038	n/a	n/a	1 future	n/a	12	0.04767	0.02417	0	None	No	0.001504	Param Intra 1 of 2
Boron, total (mg/L)	MW-39	0.2125	n/a	n/a	1 future	n/a	12	0.1573	0.02381	0	None	No	0.001504	Param Intra 1 of 2
Calcium, total (mg/L)	MW-1611	26.2	n/a	n/a	1 future	n/a	14	n/a	n/a	0	n/a	n/a	0.008612	NP Intra (normality) 1 of 2
Calcium, total (mg/L)	MW-1612	13.46	n/a	n/a	1 future	n/a	12	7.524	2.557	0	None	No	0.001504	Param Intra 1 of 2
Calcium, total (mg/L)	MW-26	64.85	n/a	n/a	1 future	n/a	13	55.02	4.312	0	None	No	0.001504	Param Intra 1 of 2
Calcium, total (mg/L)	MW-27	1.887	n/a	n/a	1 future	n/a	11	1.4	0.2028	0	None	No	0.001504	Param Intra 1 of 2
Calcium, total (mg/L)	MW-30	16.6	n/a	n/a	1 future	n/a	12	n/a	n/a	0	n/a	n/a	0.01077	NP Intra (normality) 1 of 2
Calcium, total (mg/L)	MW-38	58.63	n/a	n/a	1 future	n/a	13	51.32	3.209	0	None	No	0.001504	Param Intra 1 of 2
Calcium, total (mg/L)	MW-39	12.4	n/a	n/a	1 future	n/a	12	n/a	n/a	0	n/a	n/a	0.01077	NP Intra (normality) 1 of 2
Chloride, total (mg/L)	MW-1611	10.41	n/a	n/a	1 future	n/a	13	9.078	0.5843	0	None	No	0.001504	Param Intra 1 of 2
Chloride, total (mg/L)	MW-1612	47.58	n/a	n/a	1 future	n/a	12	25.08	9.687	0	None	No	0.001504	Param Intra 1 of 2
Chloride, total (mg/L)	MW-26	7.267	n/a	n/a	1 future	n/a	13	5.813	0.638	0	None	No	0.001504	Param Intra 1 of 2
Chloride, total (mg/L)	MW-27	1.902	n/a	n/a	1 future	n/a	12	1.634	0.1156	0	None	No	0.001504	Param Intra 1 of 2
Chloride, total (mg/L)	MW-30	261	n/a	n/a	1 future	n/a	12	249.7	4.887	0	None	No	0.001504	Param Intra 1 of 2
Chloride, total (mg/L)	MW-38	7.685	n/a	n/a	1 future	n/a	12	7.264	0.1812	0	None	No	0.001504	Param Intra 1 of 2
Chloride, total (mg/L)	MW-39	3.106	n/a	n/a	1 future	n/a	12	2.981	0.05384	0	None	No	0.001504	Param Intra 1 of 2
pH, field (SU)	MW-1611	8.081	7.284	n/a	1 future	n/a	14	7.683	0.1783	0	None	No	0.000752	Param Intra 1 of 2
pH, field (SU)	MW-1612	8.756	7.849	n/a	1 future	n/a	11	8.303	0.1891	0	None	No	0.000752	Param Intra 1 of 2
pH, field (SU)	MW-26	8	7.23	n/a	1 future	n/a	13	n/a	n/a	0	n/a	n/a	0.01938	NP Intra (normality) 1 of 2
pH, field (SU)	MW-27	9.463	8.816	n/a	1 future	n/a	11	9.139	0.1348	0	None	No	0.000752	Param Intra 1 of 2
pH, field (SU)	MW-30	9.095	7.967	n/a	1 future	n/a	11	8.531	0.235	0	None	No	0.000752	Param Intra 1 of 2
pH, field (SU)	MW-38	7.601	6.554	n/a	1 future	n/a	13	7.078	0.2298	0	None	No	0.000752	Param Intra 1 of 2
pH, field (SU)	MW-39	8.79	8.058	n/a	1 future	n/a	11	2.13	0.01812	0	None	ln(x)	0.000752	Param Intra 1 of 2
Sulfate, total (mg/L)	MW-1611	23.54	n/a	n/a	1 future	n/a	12	19.03	1.94	0	None	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW-1612	453.3	n/a	n/a	1 future	n/a	12	206.7	106.2	0	None	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW-26	11.5	n/a	n/a	1 future	n/a	12	7.467	1.739	0	None	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW-27	7.785	n/a	n/a	1 future	n/a	12	4.817	1.278	0	None	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW-30	31.21	n/a	n/a	1 future	n/a	12	12.91	7.883	0	None	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW-38	38.46	n/a	n/a	1 future	n/a	12	31.63	2.941	0	None	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW-39	0.2	n/a	n/a	1 future	n/a	11	n/a	n/a	54.55	n/a	n/a	0.01276	NP Intra (NDs) 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW-1611	440.8	n/a	n/a	1 future	n/a	14	388.2	23.52	0	None	No	0.001504	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW-1612	1381	n/a	n/a	1 future	n/a	11	973.1	169.8	0	None	No	0.001504	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW-26	402.3	n/a	n/a	1 future	n/a	13	335.8	29.2	0	None	No	0.001504	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW-27	605.7	n/a	n/a	1 future	n/a	12	23.27	0.5773	0	None	sqrt(x)	0.001504	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW-30	1366	n/a	n/a	1 future	n/a	11	1248	48.95	0	None	No	0.001504	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW-38	469.3	n/a	n/a	1 future	n/a	13	414	24.27	0	None	No	0.001504	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW-39	445	n/a	n/a	1 future	n/a	12	365.8	34.14	0	None	No	0.001504	Param Intra 1 of 2

Prediction Limit

Intrawell Parametric, MW-1611



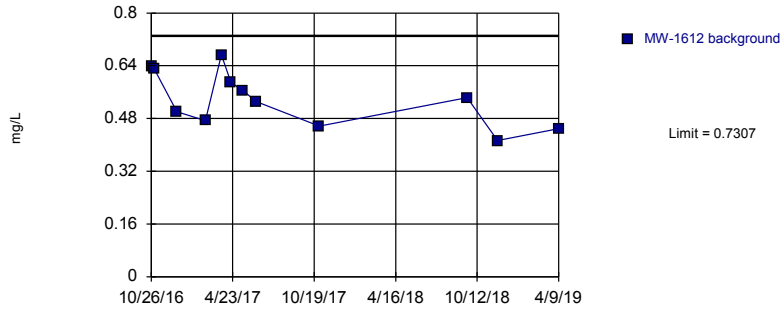
Background Data Summary: Mean=0.1653, Std. Dev.=0.03797, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.857, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Boron, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1612 (bg)



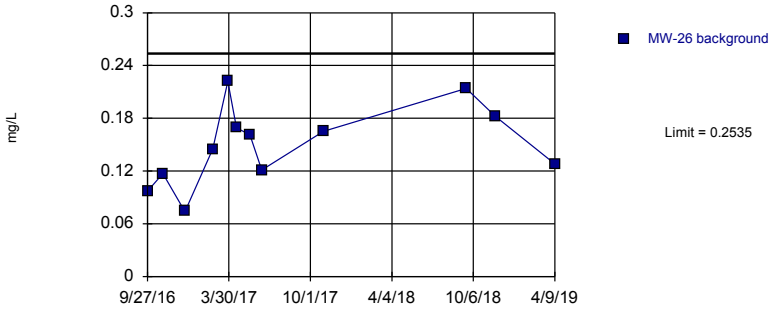
Background Data Summary: Mean=0.5384, Std. Dev.=0.08279, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9659, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Boron, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-26



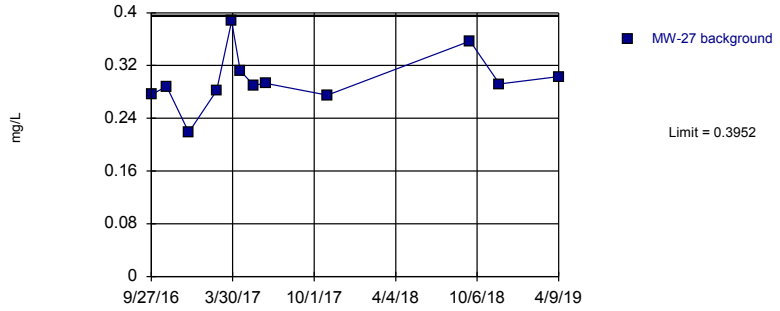
Background Data Summary: Mean=0.1496, Std. Dev.=0.04475, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9767, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Boron, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-27

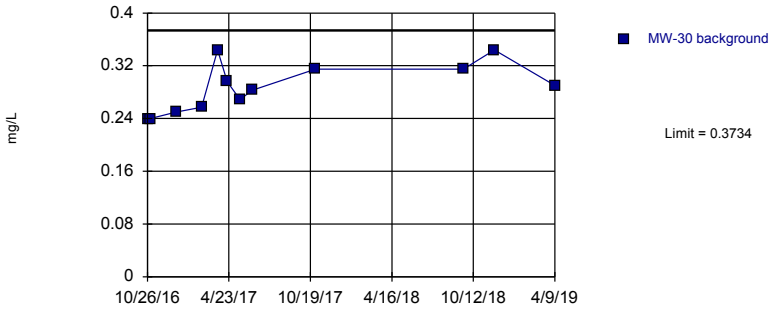


Background Data Summary: Mean=0.2978, Std. Dev.=0.04195, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8939, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Boron, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-30 (bg)



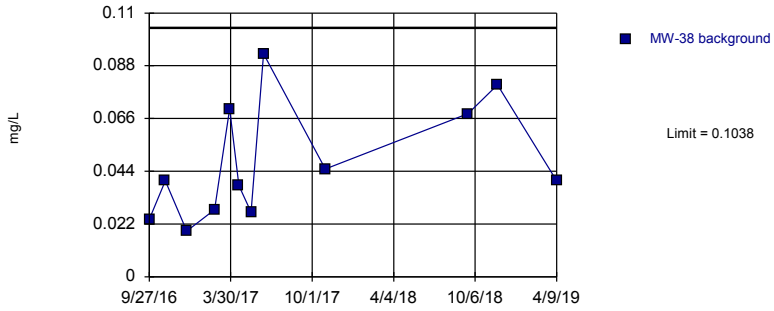
Background Data Summary: Mean=0.2868, Std. Dev.=0.03727, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9304, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Boron, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-38



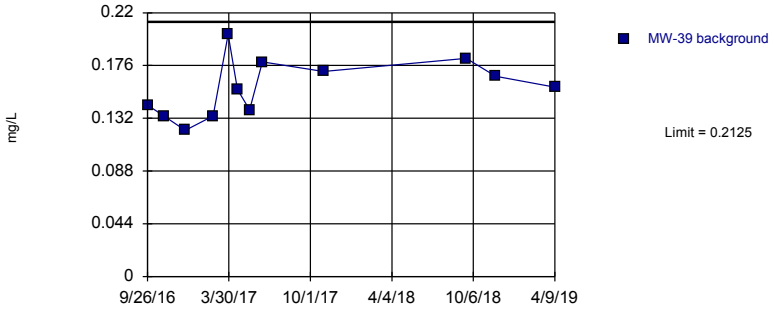
Background Data Summary: Mean=0.04767, Std. Dev.=0.02417, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9039, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Boron, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-39



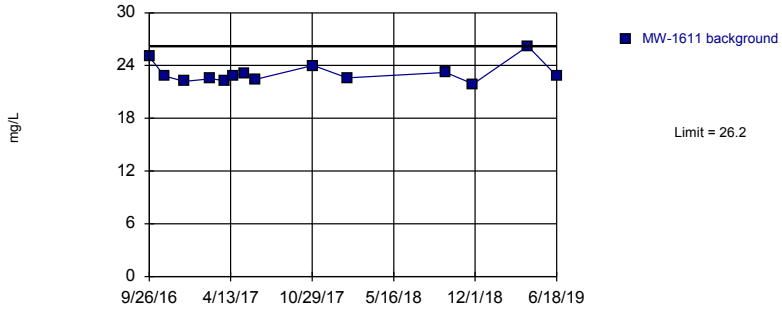
Background Data Summary: Mean=0.1573, Std. Dev.=0.02381, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9677, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Boron, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Non-parametric, MW-1611

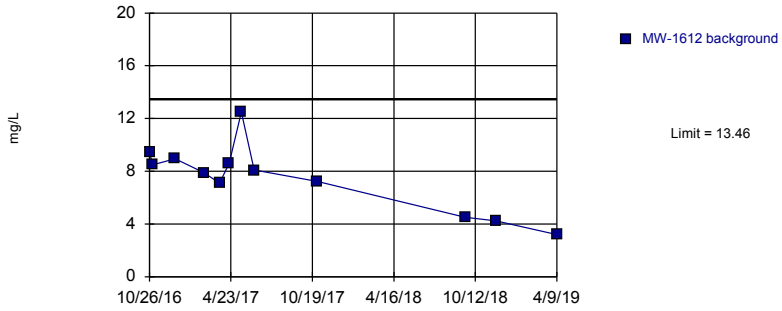


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 14 background values. Well-constituent pair annual alpha = 0.01715. Individual comparison alpha = 0.008612 (1 of 2). Assumes 1 future value.

Constituent: Calcium, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-1612 (bg)

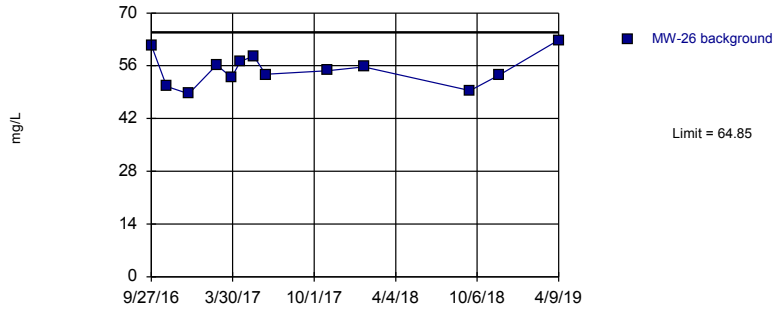


Background Data Summary: Mean=7.524, Std. Dev.=2.557, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9419, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-26

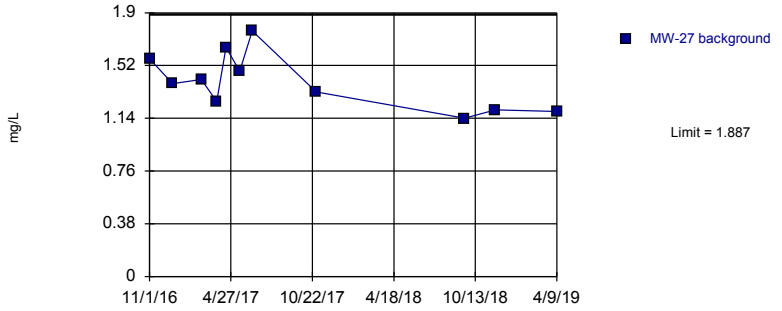


Background Data Summary: Mean=55.02, Std. Dev.=4.312, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9682, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-27

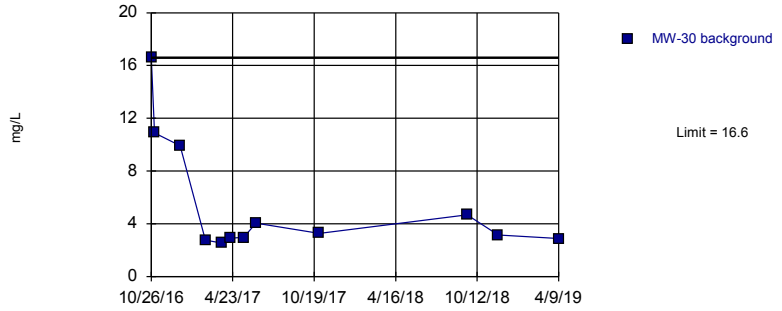


Background Data Summary: Mean=1.4, Std. Dev.=0.2028, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9546, critical = 0.792. Kappa = 2.4 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Non-parametric, MW-30 (bg)

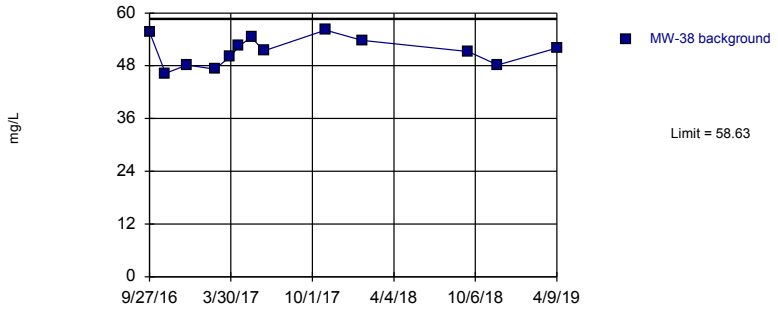


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 12 background values. Well-constituent pair annual alpha = 0.02143. Individual comparison alpha = 0.01077 (1 of 2). Assumes 1 future value.

Constituent: Calcium, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-38

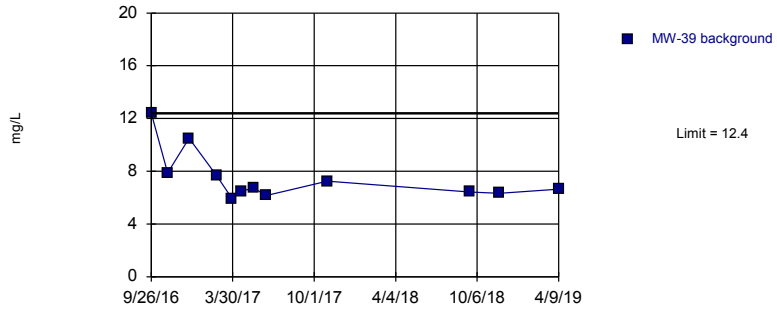


Background Data Summary: Mean=51.32, Std. Dev.=3.209, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9565, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Non-parametric, MW-39

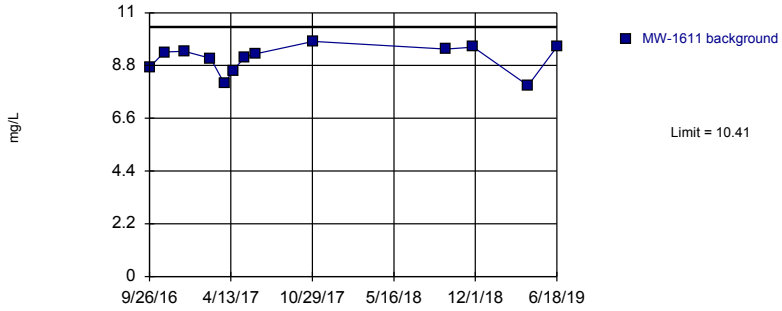


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 12 background values. Well-constituent pair annual alpha = 0.02143. Individual comparison alpha = 0.01077 (1 of 2). Assumes 1 future value.

Constituent: Calcium, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-1611

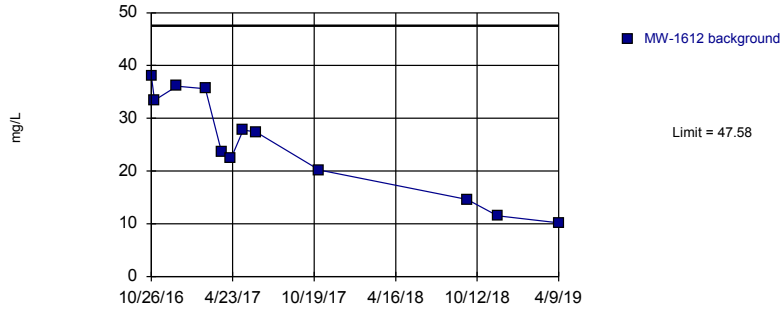


Background Data Summary: Mean=9.078, Std. Dev.=0.5843, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8886, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-1612 (bg)

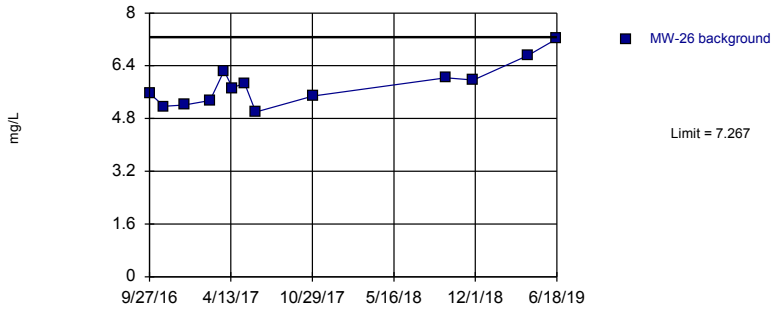


Background Data Summary: Mean=25.08, Std. Dev.=9.687, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9363, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-26

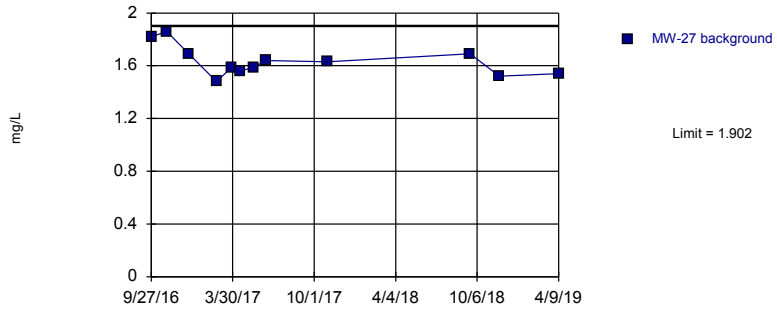


Background Data Summary: Mean=5.813, Std. Dev.=0.638, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.938, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-27

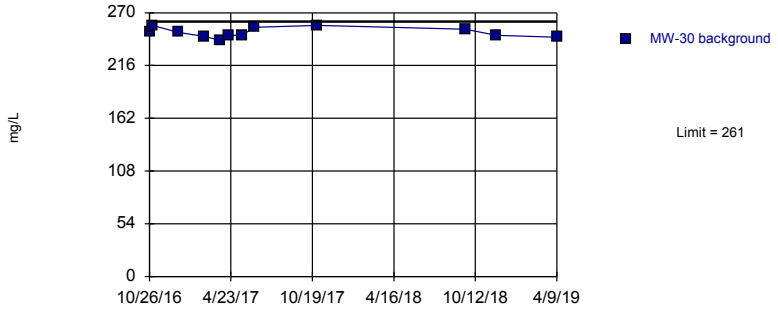


Background Data Summary: Mean=1.634, Std. Dev.=0.1156, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9292, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-30 (bg)

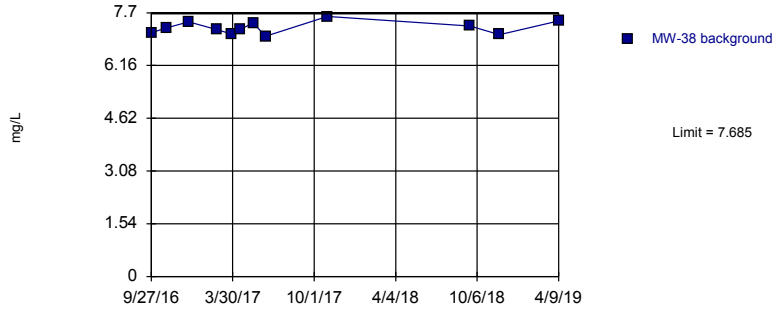


Background Data Summary: Mean=249.7, Std. Dev.=4.887, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9305, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-38

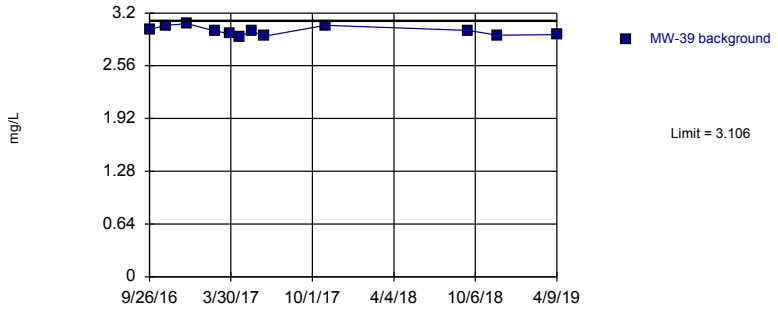


Background Data Summary: Mean=7.264, Std. Dev.=0.1812, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9616, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-39

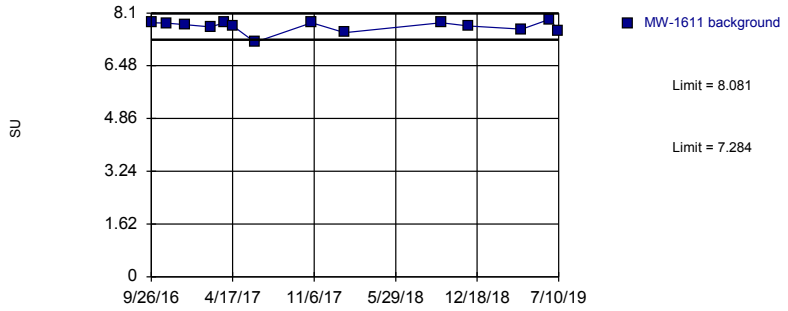


Background Data Summary: Mean=2.981, Std. Dev.=0.05384, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9297, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-1611

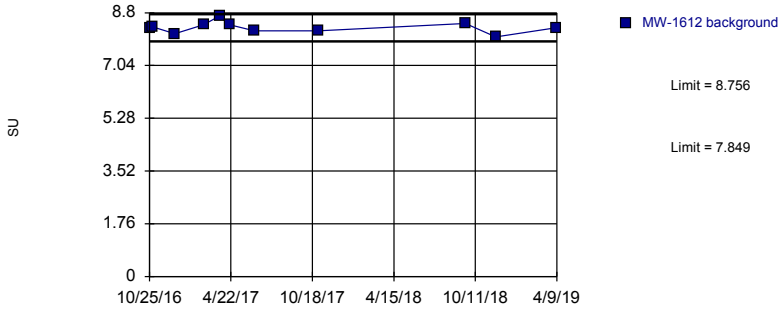


Background Data Summary: Mean=7.683, Std. Dev.=0.1783, n=14. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8528, critical = 0.825. Kappa = 2.236 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: pH, field Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-1612 (bg)

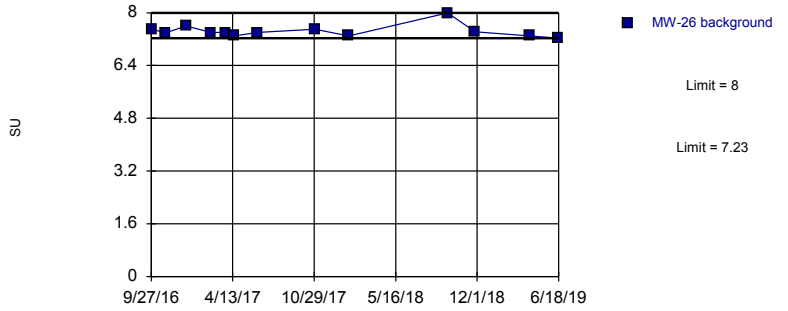


Background Data Summary: Mean=8.303, Std. Dev.=0.1891, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9684, critical = 0.792. Kappa = 2.4 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: pH, field Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Non-parametric, MW-26

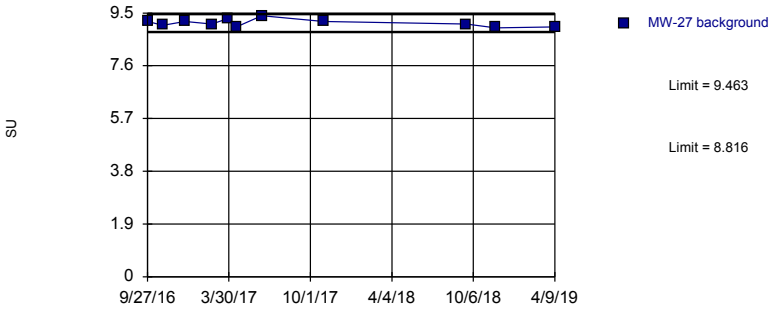


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 13 background values. Well-constituent pair annual alpha = 0.03858. Individual comparison alpha = 0.01938 (1 of 2). Assumes 1 future value.

Constituent: pH, field Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-27



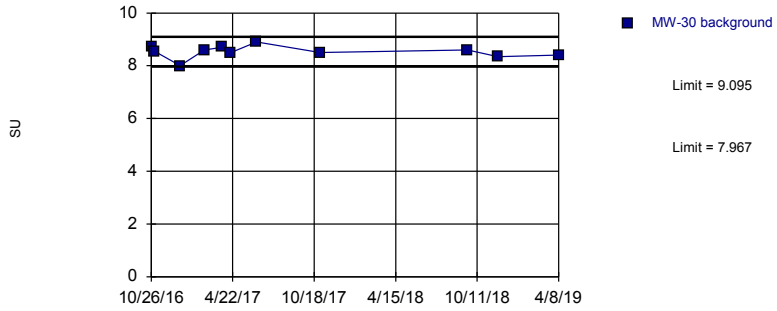
Background Data Summary: Mean=9.139, Std. Dev.=0.1348, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9363, critical = 0.792. Kappa = 2.4 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: pH, field Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-30 (bg)



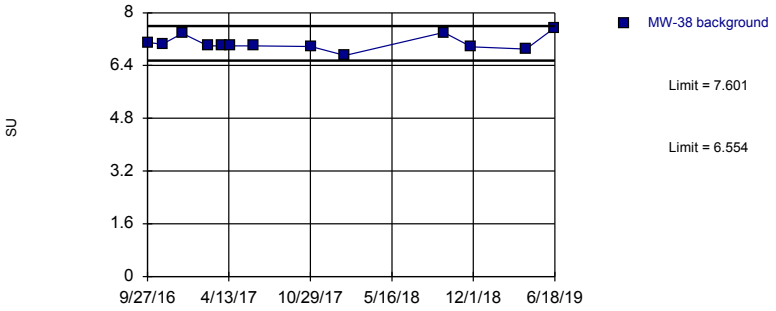
Background Data Summary: Mean=8.531, Std. Dev.=0.235, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9453, critical = 0.792. Kappa = 2.4 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: pH, field Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-38



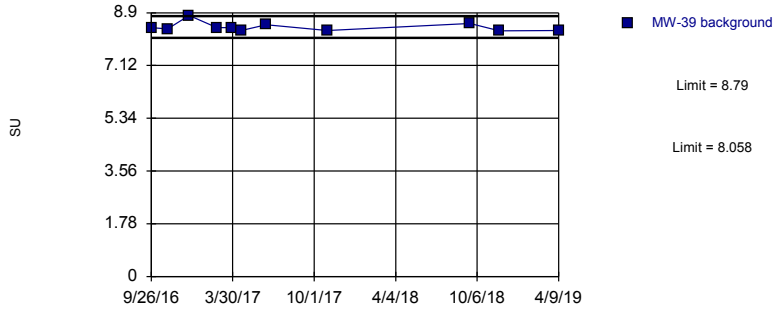
Background Data Summary: Mean=7.078, Std. Dev.=0.2298, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8713, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: pH, field Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-39

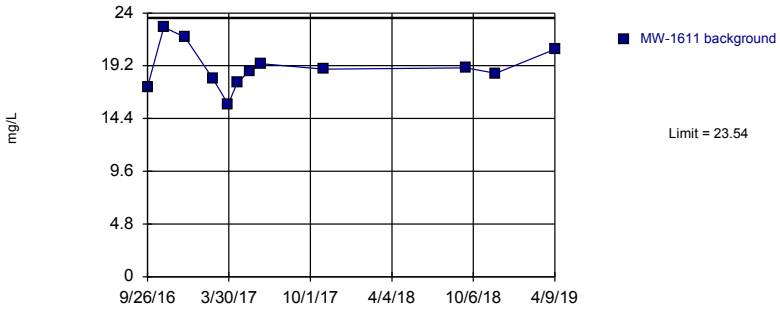


Background Data Summary (based on natural log transformation): Mean=2.13, Std. Dev.=0.01812, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.793, critical = 0.792. Kappa = 2.4 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: pH, field Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-1611



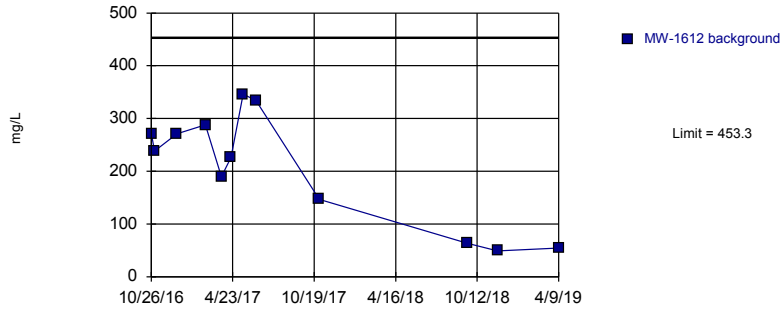
Background Data Summary: Mean=19.03, Std. Dev.=1.94, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9612, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-1612 (bg)



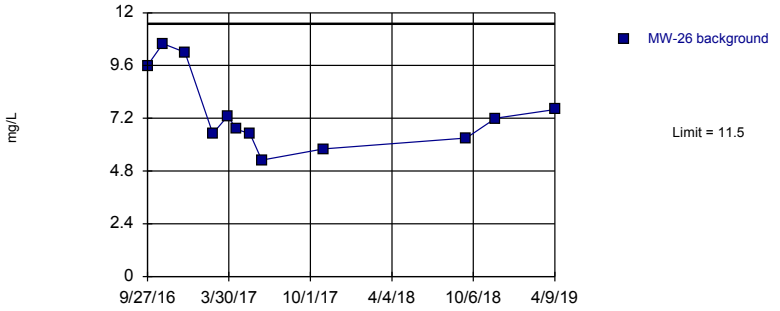
Background Data Summary: Mean=206.7, Std. Dev.=106.2, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9076, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-26



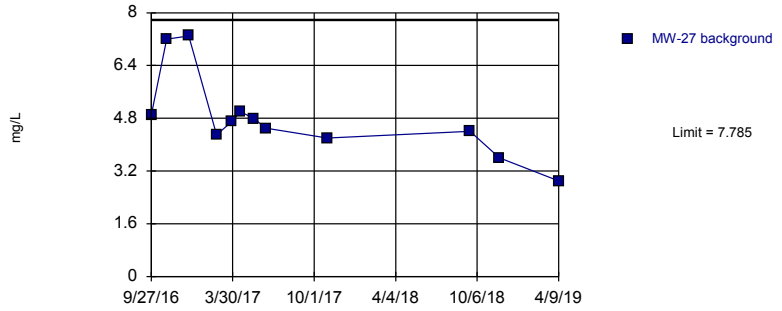
Background Data Summary: Mean=7.467, Std. Dev.=1.739, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8779, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-27

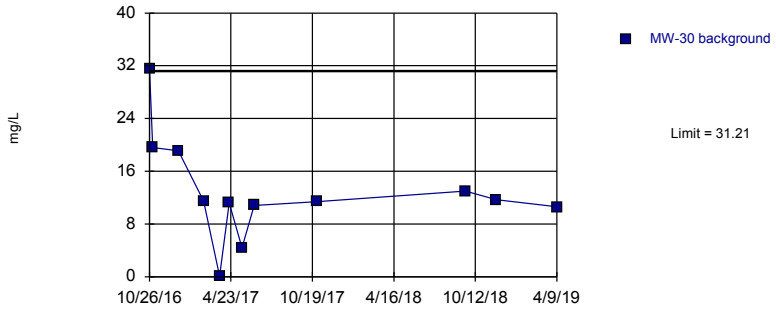


Background Data Summary: Mean=4.817, Std. Dev.=1.278, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.86, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 11/22/2019 9:12 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-30 (bg)

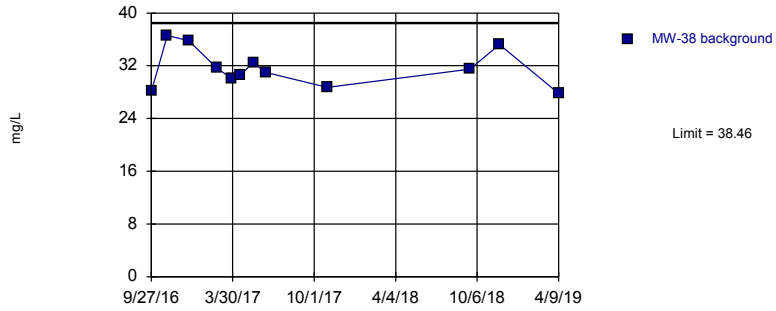


Background Data Summary: Mean=12.91, Std. Dev.=7.883, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.888, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-38



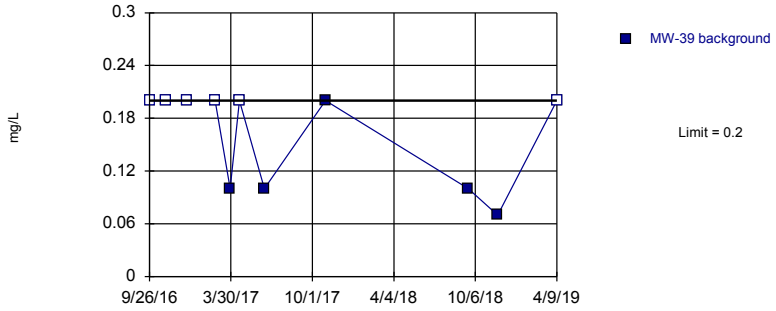
Background Data Summary: Mean=31.63, Std. Dev.=2.941, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9291, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Hollow symbols indicate censored values.

Prediction Limit

Intrawell Non-parametric, MW-39

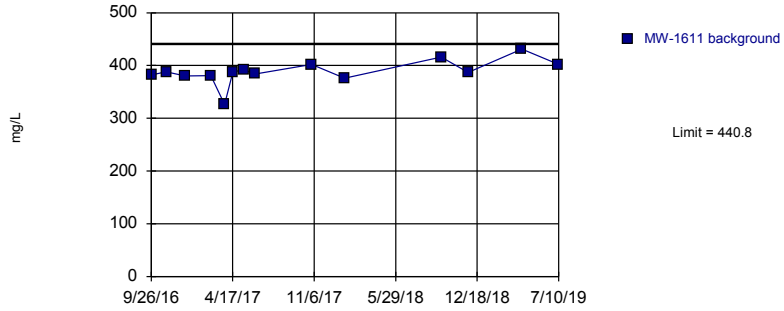


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 11 background values. 54.55% NDs. Well-constituent pair annual alpha = 0.02537. Individual comparison alpha = 0.01276 (1 of 2). Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-1611

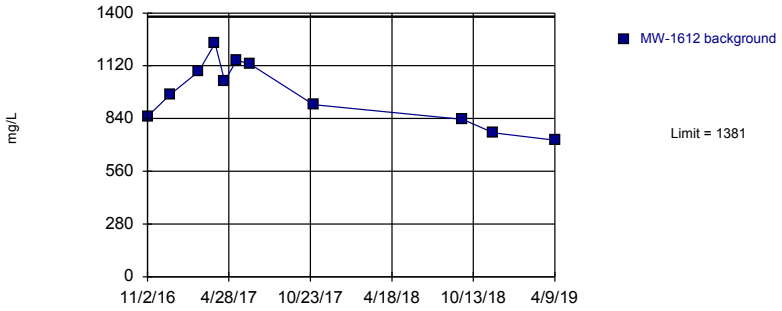


Background Data Summary: Mean=388.2, Std. Dev.=23.52, n=14. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.871, critical = 0.825. Kappa = 2.236 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-1612 (bg)



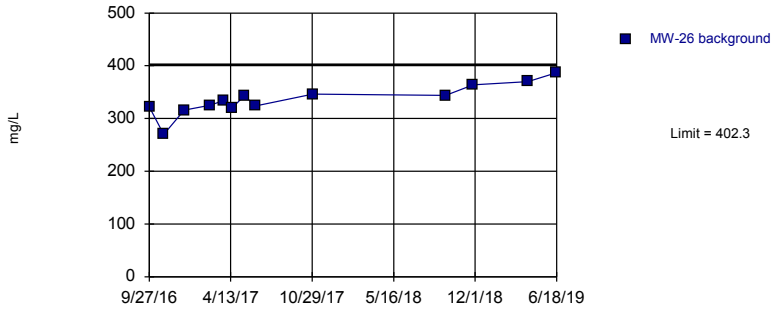
Background Data Summary: Mean=973.1, Std. Dev.=169.8, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9601, critical = 0.792. Kappa = 2.4 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-26



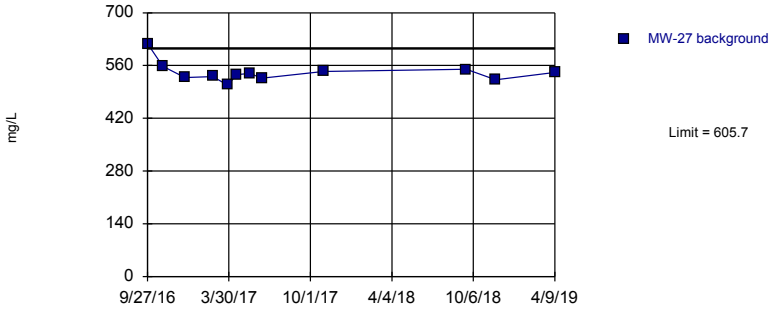
Background Data Summary: Mean=335.8, Std. Dev.=29.2, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.949, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-27



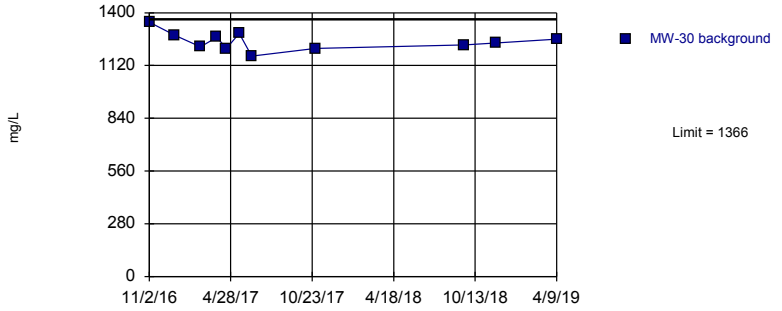
Background Data Summary (based on square root transformation): Mean=23.27, Std. Dev.=0.5773, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8148, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-30 (bg)

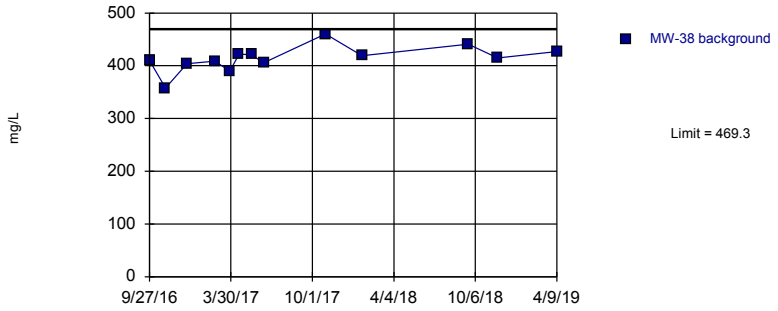


Background Data Summary: Mean=1248, Std. Dev.=48.95, n=11. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9691, critical = 0.792. Kappa = 2.4 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Prediction Limit

Intrawell Parametric, MW-38



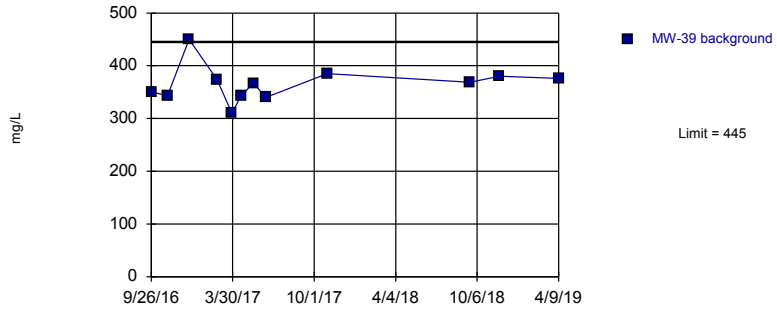
Background Data Summary: Mean=414, Std. Dev.=24.27, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9442, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW-39



Background Data Summary: Mean=365.8, Std. Dev.=34.14, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8998, critical = 0.805. Kappa = 2.322 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 11/22/2019 9:13 AM View: Intrawell
Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

FIGURE F: TREND TESTS

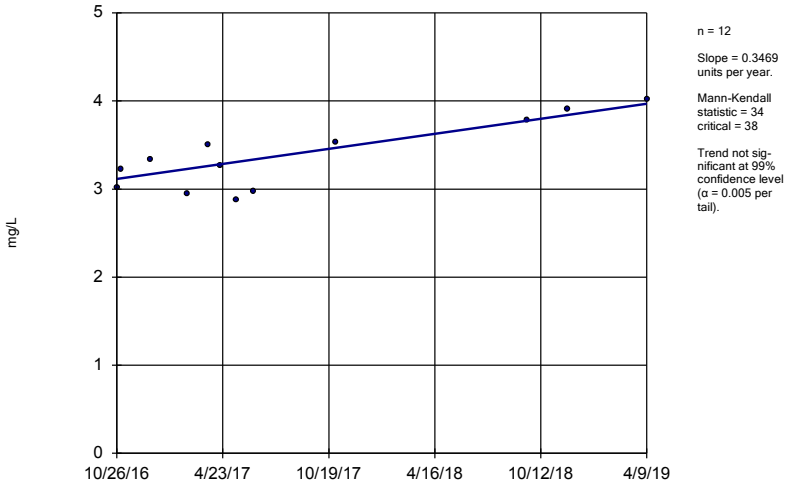
Interwell Trend Tests Summary Table - All Results

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill Printed 10/15/2019, 2:27 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Fluoride, total (mg/L)	MW-1612 (bg)	0.3469	34	38	No	12	0	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	MW-30 (bg)	-0.01567	-6	-34	No	11	0	n/a	n/a	0.01	NP

Sen's Slope Estimator

MW-1612 (bg)



n = 12

Slope = 0.3469 units per year.

Mann-Kendall statistic = 34 critical = 38

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

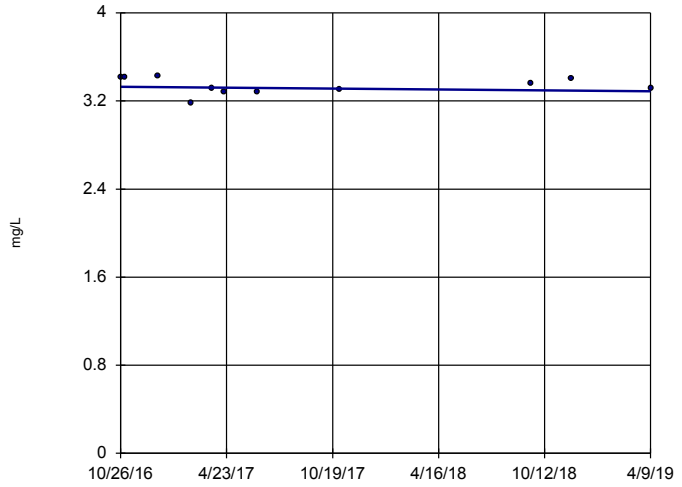
Constituent: Fluoride, total Analysis Run 10/15/2019 2:27 PM View: Interwell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

Sanitas™ v.9.6.23 Groundwater Stats Consulting. UG

Sen's Slope Estimator

MW-30 (bg)



n = 11

Slope = -0.01567 units per year.

Mann-Kendall statistic = -6 critical = -34

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

Constituent: Fluoride, total Analysis Run 10/15/2019 2:27 PM View: Interwell

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill

FIGURE G: INTERWELL PREDICTION LIMITS

Interwell Prediction Limit Summary Table - All Results

Mountaineer Landfill Client: Geosyntec Data: Mountaineer Landfill Printed 10/15/2019, 2:32 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Fluoride, total (mg/L)	n/a	3.912	n/a	n/a	5 future	n/a	23	3.351	0.279	0	None	No	0.001504	Param Inter 1 of 2

Geosyntec consultants

941 Chatham Lane, Suite 103
Columbus, Ohio 43212
PH 614.468.0415
FAX 614.468.0416
www.geosyntec.com

Memorandum

Date:	August 3, 2020
To:	David Miller (AEP)
Copies to:	Benjamin Kepchar (AEP)
From:	Allison Kreinberg (Geosyntec)
Subject:	Evaluation of Detection Monitoring Data at Mountaineer Plant's Landfill (LF)

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 Subpart D, "CCR rule"), the first semi-annual detection monitoring event of 2020 at the Landfill (LF), an existing CCR unit at the Mountaineer Power Plant located in New Haven, West Virginia, was completed on May 15, 2020. Based on the results, verification sampling was completed on July 8, 2020.

Background values for the LF were previously calculated in January 2018. After a minimum of four detection monitoring events, the results of those events were compared to the existing background dataset, and the background dataset was updated as appropriate. Revised upper prediction limits (UPLs) were calculated for each Appendix III parameter to represent background values. Lower prediction limits (LPLs) were also calculated for pH. Details on the calculation of these revised background values are described in Geosyntec's *Statistical Analysis Summary* report, dated January 6, 2020.

To achieve an acceptably high statistical power while maintaining a site-wide false-positive rate (SWFPR) of 10% per year or less, prediction limits were calculated based on a one-of-two retesting procedure. With this procedure, a statistically significant increase (SSI) is only concluded if both samples in a series of two exceeds the UPL. In practice, if the initial result did not exceed the UPL, a second sample was not collected or analyzed.

Detection monitoring results and the relevant background values are compared in Table 1. No SSIs were observed at the Mountaineer LF CCR unit, and as a result the Mountaineer LF will remain in detection monitoring.

The statistical analysis was conducted within 90 days of completion of sampling and analysis in accordance with 40 CFR 257.93(h)(2). A certification of these statistics by a qualified professional engineer is provided in Attachment A.

Table 1: Detection Monitoring Data Evalation
Mountaineer - Landfill

Geosyntec Consultants, Inc.

Parameter	Unit	Description	MW-26		MW-27		MW-38	MW-39		MW-1611
			5/15/2020	7/8/2020	5/15/2020	7/8/2020	5/15/2020	5/15/2020	7/8/2020	5/15/2020
Boron	mg/L	Intrawell Background Value (UPL)	0.254		0.395		0.104	0.213		0.254
		Analytical Result	0.100	--	0.100	--	0.02	0.148	--	0.135
Calcium	mg/L	Intrawell Background Value (UPL)	64.9		1.89		58.6	12.4		26.2
		Analytical Result	55.6	--	**54.5**	1.20	44.7	6.15	--	24.0
Chloride	mg/L	Intrawell Background Value (UPL)	7.27		1.90		7.69	3.11		10.4
		Analytical Result	1.72	--	**6.06**	1.63	7.50	3.11	--	9.35
Fluoride	mg/L	Interwell Background Value (UPL)	3.91							
		Analytical Result	2.56	--	0.14	--	0.35	0.84	--	0.61
pH	SU	Intrawell Background Value (UPL)	8.0		9.5		7.6	8.8		8.1
		Intrawell Background Value (LPL)	7.2		8.8		6.6	8.1		7.3
		Analytical Result	**7.1**	7.4	8.8	9.1	6.7	**7.9**	8.4	7.3
Sulfate	mg/L	Intrawell Background Value (UPL)	11.5		7.79		38.5	0.200		23.5
		Analytical Result	3.9	--	7.0	--	33.5	0.2	--	20.8
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	402		606		469	445		441
		Analytical Result	**547**	366	359	--	404	374	--	404

Notes:
UPL: Upper prediction limit
LPL: Lower prediction limit
Bold values exceed the background value.
Background values are shaded gray.
--: Not analyzed

ATTACHMENT A

Certification by a Qualified Professional Engineer

CERTIFICATION BY QUALIFIED PROFESSIONAL ENGINEER

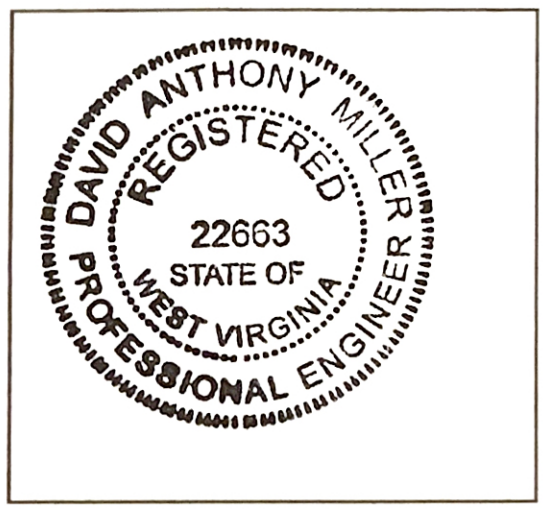
I certify that the selected statistical method, described above and in the January 6, 2020 *Statistical Analysis Summary* report, is appropriate for evaluating the groundwater monitoring data for the Mountaineer LF CCR management area and that the requirements of 40 CFR 257.93(f) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



22663	WEST VIRGINIA	08.07.2020
License Number	Licensing State	Date

APPENDIX 3 – Alternative Source Demonstrations

No alternative source demonstrations were necessary in 2020.

APPENDIX 4 - Notices for Monitoring Program Transitions

Not applicable at this time.

APPENDIX 5 - Well Installation/Decommissioning Logs

Not applicable at this time.

EPA ADDITIONAL INFORMATION REQUEST

ATTACHMENT C

MOUNTAINEER PLANT LANDFILL

MONITORING WELLS MW-38 AND MW-39 BORING LOG AND CONSTRUCTION FORMS

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER _____

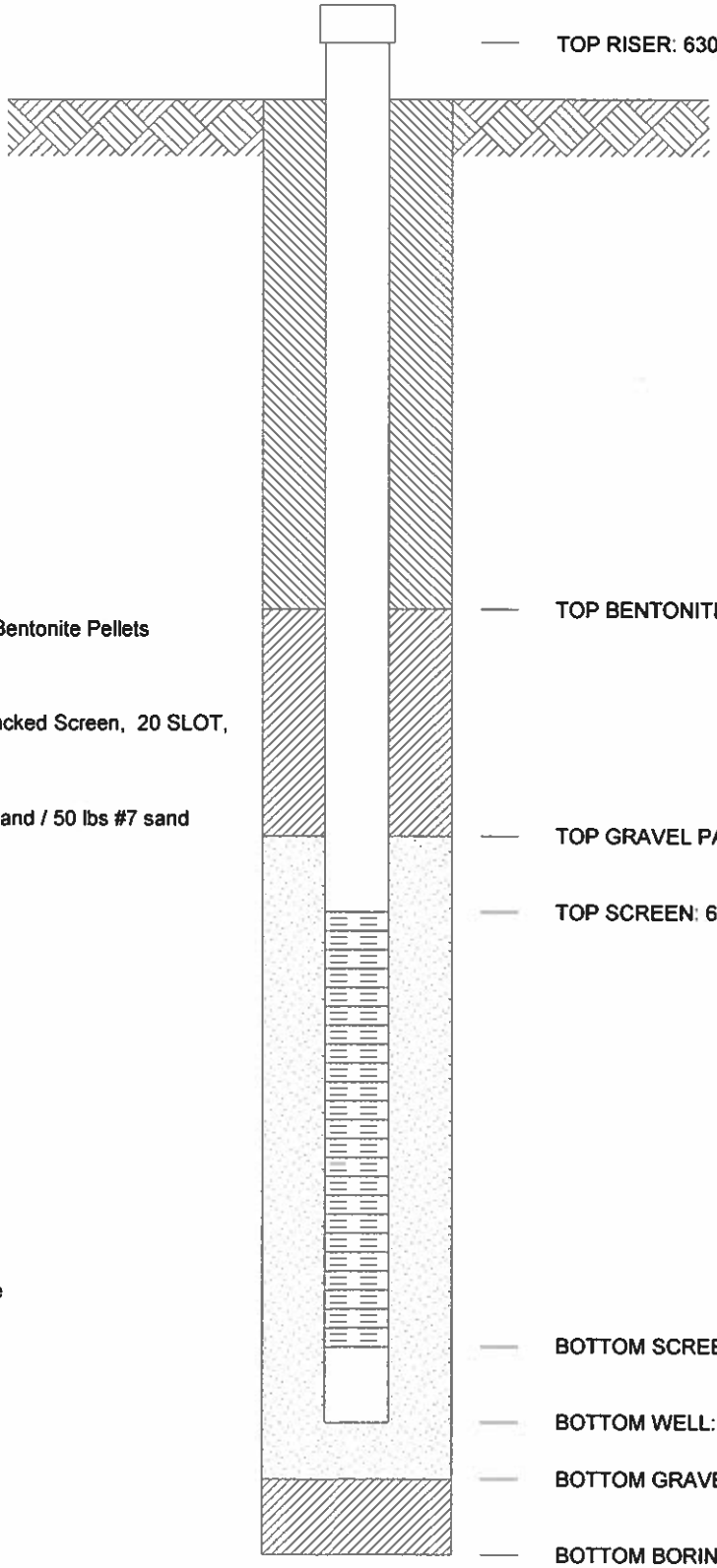
COMPANY **APPALACHIAN POWER COMPANY** WELL No. **MW-38** BORING No. **B-0502** INSTALLED **9/8/05**

PROJECT **MOUNTAINEER PLANT**

COORDINATES **N 713,736.0 E 1,732,795.5**

SYSTEM **State Plane using NAD27**

GROUND ELEVATION 627.70 FT.



GROUT SEAL: Hole Plug

BENTONITE SEAL: 125 lbs Bentonite Pellets

SCREEN: 2.0" dia., 15' Prepacked Screen, 20 SLOT, 15.0'

GRAVEL PACK: 750 lbs #4 sand / 50 lbs #7 sand

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH: 23'

NOTES:
- SWL = Dry @ installation
- Drilled with 6.25" HSA's
- Hydrated pellets
- Bladder pump set @ 22.4'
- Hole plug from 3.8' to grade

WELL LOG LBRSI.GPJ AEP.GDT 12/8/05

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

MONITORING WELL CONSTRUCTION

JOB NUMBER _____

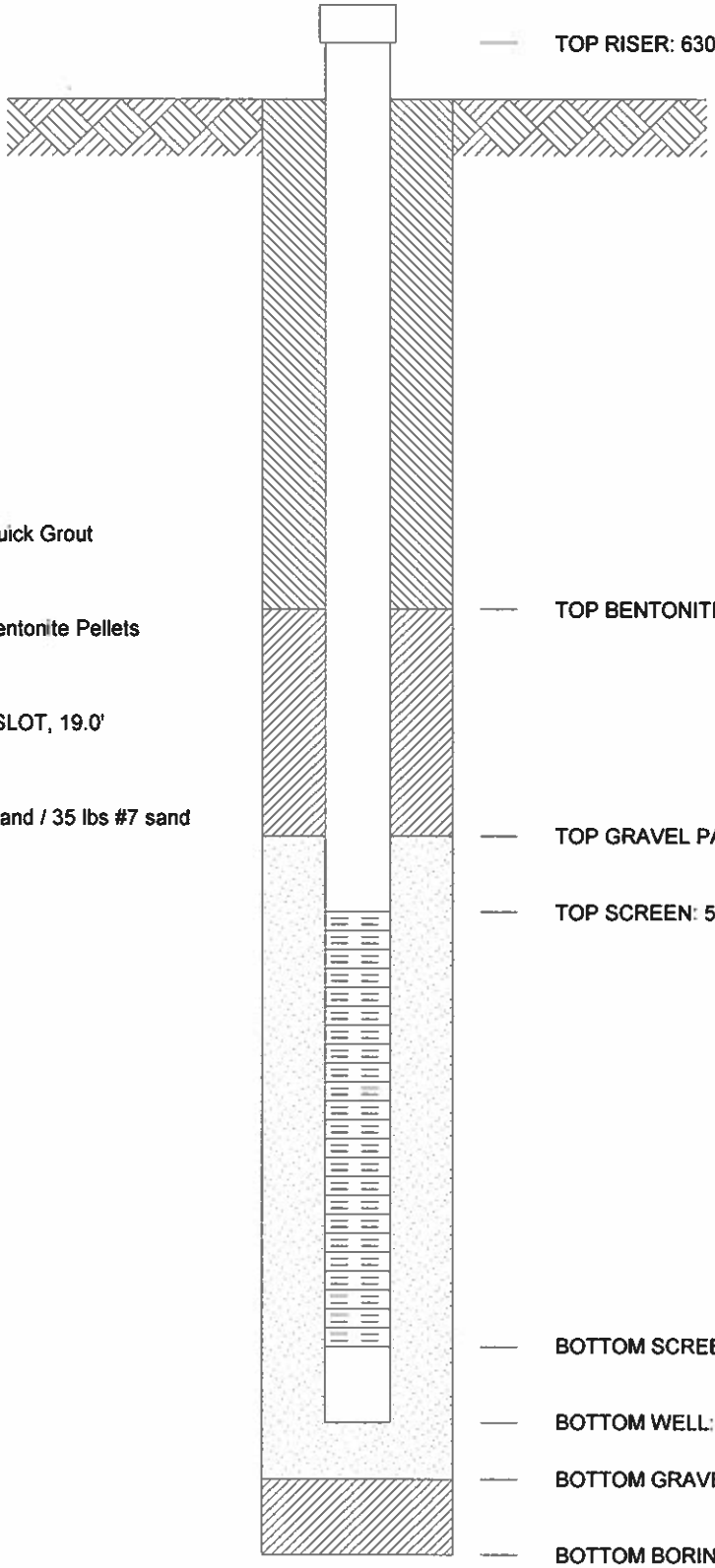
COMPANY **APPALACHIAN POWER COMPANY** WELL No. **MW-39** BORING No. **B-0502** INSTALLED **9/7/05**

PROJECT **MOUNTAINEER PLANT**

COORDINATES **N 713,734.6 E 1,732,787.2**

SYSTEM **State Plane using NAD27**

GROUND ELEVATION 627.70 FT.



GROUT SEAL: 50 Gallons Quick Grout

BENTONITE SEAL: 50 lbs Bentonite Pellets

SCREEN: 2.0" dia., PVC 20 SLOT, 19.0'

GRAVEL PACK: 300 lbs #4 sand / 35 lbs #7 sand

RISER PIPE: 2.0, dia., PVC

SPACERS, DEPTH: 50', 20'

NOTES:
- SWL = 12.4' @ installation
- Drilled with 6" rotary wash
- Bladder pump set @ 53.5'

WELL LOG LBRSI.GPJ AEP.GDT 12/8/05

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER _____

COMPANY **APPALACHIAN POWER COMPANY**

PROJECT **MOUNTAINEER PLANT**

COORDINATES _____

GROUND ELEVATION _____ SYSTEM _____

WATER LEVEL	▽ 3.8	▼ 3.8	▼ 4.1
TIME	8:00AM	12:30PM	8:30AM
DATE	1/5/05	1/11/05	1/13/05

BORING NO. **B0502** DATE **8/24/05** SHEET **1** OF **9**

BORING START **1/4/05** BORING FINISH **6/23/05**

PIEZOMETER TYPE _____ WELL TYPE **GM**

HGT. RISER ABOVE GROUND _____ DIA **1"**

DEPTH TO TOP OF WELL SCREEN _____ BOTTOM _____

WELL DEVELOPMENT _____ BACKFILL **BENSEAL**

FIELD PARTY **MCR / CB** RIG **BK-81**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	2-3-3	0.8					**MEDIUM STIFF 5YR 5/6 LIGHT BROWN SILTY CLAY** 3.5 tsf, moist		Grounding procedures not in use on this boring. Using well / fire protection water from Mountaineer Plant to drill with. Deconned on 01/04/05 using Mountaineer water and liqui-nox with drill pump. SWL @ 3.8' on 1/5/05 with HSA's to 24.0' SWL @ 3.8' on 1/11/05 with HSA's on bedrock. SWL @ 4.1' on 1/13/05 with NQ hole to 183.2' SWL @ 7.1' on 6/23/05 with NQ hole to 230.2'
2	SS	1.5	3.0	2-2-3	0.6					**MEDIUM STIFF 5YR 5/6 LIGHT BROWN SILTY CLAY** 1.5 tsf, w/ trace of fine sand, moist		
3	SS	3.0	4.5	1-2-2	0.5							
4	SS	4.5	6.0	2-5-7	1.5		5			**STIFF 5YR 5/6 LIGHT BROWN CLAY** 1.75 tsf, moist		
5	SS	6.0	7.5	2-5-7	1.5							
6	SS	7.5	9.0	1-3-5	1.5					**STIFF 5YR 5/6 LIGHT BROWN CLAY** 1.25 tsf, moist		
7	SS	9.0	10.5	2-4-5	1.5					**STIFF 5YR 5/6 LIGHT BROWN CLAY** 2.0 tsf, moist		
8	SS	10.5	12.0	2-3-6	1.5		10			**STIFF 10YR 6/2 PALE YELLOWISH BROWN CLAY** 1.75 tsf, moist		
9	SS	12.0	13.5	2-4-6	1.4					**STIFF 10YR 6/2 PALE YELLOWISH BROWN CLAY** 1.5 tsf, moist		
10	SS	13.5	15.0	2-5-6	1.5					**STIFF 10YR 6/2 PALE YELLOWISH BROWN CLAY** 2.25 tsf, moist		
11	SS	15.0	16.5	3-3-5	1.4		15			**STIFF 5G 6/1 GREENISH GRAY CLAY** 1.75 tsf, w/ trace of fine sand, moist		
12	SS	16.5	18.0	3-5-7	1.0					**STIFF 10YR 6/6 DARK YELLOWISH ORANGE CLAY** 1.5 tsf, moist		
13	SS	18.0	19.5	2-3-6	1.2					**STIFF 5YR 4/4 MODERATE BROWN CLAY** 1.5 tsf, moist		
14	SS	19.5	21.0	4-5-6	0.9					**STIFF 5YR 4/4 MODERATE BROWN CLAY** 1.75 tsf, moist		
15	SS	21.0	22.5	4-5-7	1.2		20			**STIFF 5GY 4/1 DARK GREENISH GRAY CLAY** 1.5 tsf, moist		
16	SS	22.5	24.0	2-5-7	1.2					**STIFF 5GY 4/1 DARK GREENISH GRAY CLAY** 1.5 tsf, w/ trace of fine sand, moist		
17	SS	24.0	25.5	1-3-4	1.3					**MEDIUM STIFF 10YR 6/6 DARK**		

TYPE OF CASING USED

X	NQ-2 ROCK CORE	
X	6" x 3.25 HSA	
	9" x 6.25 HSA	
	HW CASING ADVANCER	4"
	NW CASING	3"
	SW CASING	6"
	AIR HAMMER	8"

Continued Next Page

PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

RECORDER **MCR / CB**

AEP LBRSI.GPJ AEP.GDT 8/24/05

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER _____

COMPANY **APPALACHIAN POWER COMPANY** BORING NO. **B0502** DATE **8/24/05** SHEET **2** OF **9**

PROJECT **MOUNTAINEER PLANT** BORING START **1/4/05** BORING FINISH **6/23/05**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
18	SS	25.5	27.0	3-5-12	1.2					**YELLOWISH ORANGE CLAY** 2.25 tsf, w/ some shale fragments, moist		
19	SS	27.0	27.3	50/.3	0.2					**VERY STIFF 10G 6/2 PALE GREEN SHALEY CLAY** 2.0 tsf, moist		
20	SS	28.5	28.9	50/.4	0.5					**HARD 10G 6/2 PALE GREEN SHALEY CLAY** Moist		
21	NQ2	29.5	35.7		5.3	100	30			**5B 5/1 MEDIUM BLUISH GRAY CLAY SHALE** Soft broken area from 37.0' to 37.4'		Auger refusal @ 29.5'; started coring.
22	NQ2	35.7	45.7		9.3	90	35					
23	NQ2	45.7	55.7		4.4	30	40			**5R 4/2 GRAYISH RED CLAY SHALE**		Reason for poor recovery - Core lifter stuck in end of inner tube and washed core away
24	NQ2	55.7	65.7		9.8	87	45					
							50					
							55			**5B 5/1 MEDIUM BLUISH GRAY CLAY**		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER _____

COMPANY **APPALACHIAN POWER COMPANY** BORING NO. **B0502** DATE **8/24/05** SHEET **3** OF **9**

PROJECT **MOUNTAINEER PLANT** BORING START **1/4/05** BORING FINISH **6/23/05**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
							60			**SHALE**		
							65					
25	NQ2	65.7	75.7		10.0	100						
							70					
										5B 7/1 LIGHT BLUISH GRAY FINE to MEDIUM GRAIN SANDSTONE		
26	NQ2	75.7	85.7		10.0	100	75					
							80					
27	NQ2	85.7	95.7		10.0	100	85					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER _____

COMPANY **APPALACHIAN POWER COMPANY** BORING NO. **B0502** DATE **8/24/05** SHEET **4** OF **9**

PROJECT **MOUNTAINEER PLANT** BORING START **1/4/05** BORING FINISH **6/23/05**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
							95			**5B 5/1 MEDIUM BLUISH GRAY CLAY SHALE** Area w/ numerous calcite deposits @ 92-93.6'		
28	NQ2	95.7	105.7		10.0	91				**5B 7/1 LIGHT BLUISH GRAY FINE to MEDIUM GRAIN SANDSTONE**		
							100					
							105			**5B 5/1 MEDIUM BLUISH GRAY CLAY SHALE**		
29	NQ2	105.7	115.7		10.0	100				**5B 7/1 LIGHT BLUISH GRAY FINE to MEDIUM GRAIN SANDSTONE**		
							110					
							115					
30	NQ2	115.7	125.7		10.0	100				**5B 7/1 LIGHT BLUISH GRAY COARSE GRAIN SANDSTONE** w/ cross bedding throughout		
							120					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER _____

COMPANY **APPALACHIAN POWER COMPANY** BORING NO. **B0502** DATE **8/24/05** SHEET **5** OF **9**

PROJECT **MOUNTAINEER PLANT** BORING START **1/4/05** BORING FINISH **6/23/05**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
							125					
31	NQ2	125.7	135.7		10.0	85						
							130					
32	NQ2	135.7	145.7		10.0	97	135					
							140			**High angle fracture @ 142.2' w/ clay shale**		
33	NQ2	145.7	155.7		10.0	83	145					
							150			**COAL**		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER

COMPANY **APPALACHIAN POWER COMPANY** BORING NO. **B0502** DATE **8/24/05** SHEET **6** OF **9**

PROJECT **MOUNTAINEER PLANT** BORING START **1/4/05** BORING FINISH **6/23/05**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
34	NQ2	155.7	165.7		10.0	100	160			**N4 MEDIUM DARK GRAY CLAY SHALE**		
35	NQ2	165.7	175.7		10.0	84	165			**5B 5/1 MEDIUM BLUISH GRAY CLAY SHALE**		
36	NQ2	175.7	183.2		7.5	91	170			**5G 4/1 DARK GREENISH GRAY CLAY SHALE**		
37	NQ2	183.2	185.2		2.2	64	175			**5B 5/1 MEDIUM BLUISH GRAY CLAY SHALE** **Fracture @ 184.2'**		Flushed boring with approx. 1000 gallons of water when boring stopped @ 183.2' on 1/12/05. SWL @ 8.8' on 6/22/05 with NQ hole to 183.2' Hole open to 175' Deconned rig & tools on 6/21/05 with water
38	NQ2	185.2	191.2		3.9	85	180					
							185					

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER _____

COMPANY **APPALACHIAN POWER COMPANY** BORING NO. **B0502** DATE **8/24/05** SHEET **7** OF **9**

PROJECT **MOUNTAINEER PLANT** BORING START **1/4/05** BORING FINISH **6/23/05**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
												and liqui-nox. Resumed drilling on 6/22/05
39	NQ2	191.2	200.2		9.2	78	190			**Fracture @ 189.7'**		Picked up 0.2' of core from previous run.
							195			**Soft area @ 196.1' to 196.9'**		
40	NQ2	200.2	210.2		9.8	76	200			**5B 5/1 MEDIUM BLUISH GRAY CLAY SHALE w/ 5R 4/2 GRAYISH RED LENSES**		
										Fracture @ 203.1'		
							205			**5B 5/1 MEDIUM BLUISH GRAY SILTY CLAY SHALE** Hard		
41	NQ2	210.2	220.2		10	96	210					
							215			**5B 5/1 MEDIUM BLUISH GRAY SILTY FINE GRAIN SANDSTONE**		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER _____

COMPANY **APPALACHIAN POWER COMPANY** BORING NO. **B0502** DATE **8/24/05** SHEET **8** OF **9**

PROJECT **MOUNTAINEER PLANT** BORING START **1/4/05** BORING FINISH **6/23/05**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
42	NQ2	220.2	230.2		9.7	93				**Soft area @ 224.3'**		
							225			**5B 5/1 MEDIUM BLUISH GRAY CLAY SHALE** Hard		
43	NQ2	230.2	240.2		10.1	70	230			**5B 5/1 MEDIUM BLUISH GRAY SILTY CLAY SHALE** Hard **Soft area @ 232.0'**		Picked up 0.1' of core from previous run.
							235					
44	NQ2	240.2	250.2		9.9	96	240			**5B 5/1 MEDIUM BLUISH GRAY CLAY SHALE** Hard		
										5B 7/1 LIGHT BLUISH GRAY MEDIUM GRAIN SANDSTONE w/ COAL STREAKS THROUGHOUT		
							245					
										CLAY SHALE AREA @ 248.3 - 248.4'		
										5B 7/1 LIGHT BLUISH GRAY MEDIUM GRAIN SANDSTONE w/ COAL STREAKS THROUGHOUT		
							250					Stopped boring @ 250.2' on 6/23/05. Flushed boring with approx. 700 gallons

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER _____

COMPANY **APPALACHIAN POWER COMPANY** BORING NO. **B0502** DATE **8/24/05** SHEET **9** OF **9**

PROJECT **MOUNTAINEER PLANT** BORING START **1/4/05** BORING FINISH **6/23/05**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	SAMPLE DEPTH IN FEET TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
												of water. Boring was geo-physical logged on 6/29/05. Installation of 1" geomon well (MW-42) will be done at a later date.

AEP LBRSI.GPJ AEP.GDT 8/24/05