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: Kentucky Power Company and Wheeling Power Company
Mitchell Power Plant Alternative Closure Demonstration

Dear Ms. Hillyer,

Kentucky Power Company (Kentucky Power) and Wheeling Power Company (Wheeling) Mitchell Power Plant (Mitchell 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 Mitchell Plant's Site Specific Alternative Deadline to Initiate Closure under 40 CFR 257.103(f)(1) for the Bottom Ash Pond (BAP) at the Mitchell Plant near Moundsville, 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 data for several landfill groundwater monitoring wells (e.g., 1103R, 1104F, 1501R, 1501F, 1503R, 1503F) are not included.
- The data collected during 2016 only are presented for 1104R, 1101F, and 1102R.

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

Laboratory data for Mitchell Plant's landfill groundwater monitoring wells MW-1103R, MW-1104F, MW-1501R, MW-1501F, MW-1503R, and MW-1503F are not included in the demonstration request because those wells produced only enough groundwater to record static water level measurements and then went dry during the purging portion of the low-flow sampling process prior to the collection of any groundwater samples. The field data sheets showing that these wells went dry during the purging process for the year 2020 are provided in attachment C. These six monitoring wells have always gone dry during purging, thus there are no historical laboratory data from the wells to show in the annual groundwater monitoring report. The first annual groundwater monitoring report, dated 1/31/2018, shows that the wells produced insufficient water for sampling through all of the background sampling events and the first detection monitoring sampling event. This report is provided in attachment D.

Groundwater samples for Mitchell Plant's landfill groundwater monitoring well MW-1104R were collected only during the first background sampling event, on 6/21/2016, because during all subsequent sampling events, the well produced only enough groundwater to record static water level measurements and then went dry during the purging portion of the low-flow sampling process prior to the collection of any groundwater samples. Thus, there are no historical laboratory data from the well to show in the annual groundwater monitoring report after 6/21/2016. Groundwater samples for Mitchell Plant's landfill groundwater monitoring wells MW-1101F and MW-1102R were collected only through the third background sampling event, on 9/28/2016 for MW-1101F and on 10/3/2016 for MW-1102R, because during all subsequent sampling events, the wells produced only enough groundwater to record static water level measurements and then went dry during the purging portion of the low-flow sampling process prior to the collection of any groundwater samples. Thus, there are no historical laboratory data from MW-1101F to show in the annual groundwater monitoring report after 9/28/2016 or from MW-1102R after 10/3/2016. The field data sheets showing that MW-1104R, MW-1101F, and MW-1102R went dry during the purging process for the year 2020 are provided in attachment C. The first annual groundwater monitoring report, dated 1/31/2018, shows that the wells produced insufficient water for sampling through subsequent background sampling events and the first detection monitoring sampling event. This report is provided in attachment D.

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

2020 Annual Groundwater Report for

Mitchell Plant's Landfill

Annual Groundwater Monitoring Report

Kentucky Power Company

Mitchell Plant

Landfill

Moundsville, WV

January 2021

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

KENTUCKY POWER℠

An AEP Company

BOUNDLESS ENERGY℠

Table of Contents

I. Overview

This *Annual Groundwater Monitoring Report* (Report) has been prepared to report the status of activities for the preceding year for the landfill at Kentucky Power Company's, a wholly owned subsidiary of American Electric Power Company (AEP), Mitchell Power Plant. The USEPA's CCR rules require that the Annual Groundwater Monitoring 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 on October 23, 2019, on May 6, 2020 and on October 21, 2020, and analyzed for Appendix III constituents, as specified in 40 CFR 257.94 and AEP's *Groundwater Sampling and Analysis Plan (2016)*;
- Groundwater monitoring data underwent various validation tests, including tests for completeness, valid values, transcription errors, and consistent units;
- Appendix III parameters were compared to prediction limits (intervals for pH) established from background data established previously;
- The statistical evaluation concluded that there were statistically significant increases (SSIs) over background of one Appendix III parameter at one well;
- Because SSIs over background of an Appendix III parameter were detected, alternative source demonstration (ASD) studies were conducted resulting in May 2020 and November 2020 ASD reports, as discussed further in Section VI of this report.
- As required by 40 CFR 257.94, groundwater samples were collected and analyzed for all Appendix III constituents during a second semiannual sampling event on October 21, 2020, but this data has not yet undergone statistical interpretation.

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 one or more SSIs over background levels (Attached as Appendix 2, where applicable);
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (Attached as Appendix 3, where applicable);

- A summary of any transition between monitoring programs, for example the date and circumstances for transitioning from detection monitoring to assessment monitoring (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 regarding the rationale for the installation/decommission (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

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

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 Mitchell 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 during the establishment of background quality and detection monitoring. Static water elevation data from each monitoring event also are shown in Appendix 1, along with the groundwater velocities, groundwater flow direction, and potentiometric maps developed after each sampling event.

V. Groundwater Quality Data Statistical Analysis

Statistical analysis of the detection monitoring samples collected on October 23, 2019 was completed on February 21, 2020. The evaluation concluded that an SSI of chloride over background levels was detected in one monitoring well. Statistical analysis of the detection monitoring samples collected on May 6, 2020 was completed on September 3, 2020. The evaluation concluded that an SSI of chloride over background levels was detected in one

monitoring well. Memoranda with the results of the statistical evaluations are provided in Appendix 2.

As required by 40 CFR 257.94, groundwater samples were collected and analyzed for all Appendix III constituents during a second semiannual sampling event on October 21, 2020. A statistical evaluation of these results will be completed in 2021.

VI. Alternative Source Demonstrations

Because SSIs over background of an Appendix III parameter were detected at Mitchell Plant's landfill, ASD studies were conducted resulting in May 2020 and November 2020 ASD reports. The reports concluded that the SSIs are not due to a release from the Mitchell Landfill, but were instead attributed to natural variation in groundwater quality. The reports are provided in Appendix 3.

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

No transition between monitoring requirements occurred in 2020; the CCR unit remained in detection monitoring over the entire year. A statement to this effect is provided in Appendix 4. 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).

Regarding defining an alternate monitoring frequency, the groundwater velocity and monitoring well production is high enough at this facility that no modification of the semiannual detection monitoring schedule is necessary.

VIII. Other Information Required

The Mitchell landfill has remained in its current status of detection monitoring. 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. Through the use of low-flow purging and sampling methodology, samples representative of uppermost aquifer groundwater were obtained and the schedule was met to support this annual groundwater report preparation. There were, however, dry wells encountered during sampling, but this did not affect the statistical evaluation or monitoring network at the landfill. The minimum requirement of one upgradient and three downgradient wells was still met.

X. A Projection of Key Activities for the Upcoming Year

Key activities for 2021 include the following:

- Detection monitoring on a semiannual schedule;

- Statistical evaluation of the detection monitoring results to determine any SSIs (or decreases with respect to pH);
- Responding to any new data received in light of CCR rule requirements;
- Preparation of the next annual groundwater report.

APPENDIX 1 - Groundwater Data Tables and Figures

Tables follow showing the groundwater monitoring data collected, the rate of groundwater flow each time groundwater was sampled, the number of samples collected per monitoring well, dates that the samples were collected, and whether each sample was collected as part of a detection monitoring or an assessment monitoring program. Figures follow showing the PE-certified groundwater monitoring network with the corresponding well identifications along with static water elevation data and groundwater flow directions each time groundwater was sampled in the form of annotated satellite images.

Table 1 - Groundwater Data Summary: MW-1101F
Mitchell - 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
6/15/2016	Background	0.042	88.3	3.87	0.22	7.4	64.3	395
8/3/2016	Background	0.380	91.0	3.30	0.21	7.4	62.1	425
9/28/2016	Background	0.054	88.6	3.73	0.26	8.7	58.1	466

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-1101F
Mitchell - LF
Appendix IV Constituents

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L
6/15/2016	Background	0.21	1.64	159	0.023	0.08	0.6	0.294	0.304	0.22	0.525	0.012	< 0.002 U	3.87	0.2	0.02 J
8/3/2016	Background	0.14	1.46	155	0.033	0.08	0.6	0.244	1.494	0.21	0.673	0.017	< 0.002 U	4.04	0.2	< 0.01 U
9/28/2016	Background	0.18	1.79	142	0.029	0.12	0.8	0.231	1.561	0.26	0.511	0.016	< 0.002 U	3.39	0.3	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-1101R
Mitchell - 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
6/15/2016	Background	0.287	6.91	8.41	1.20	8.2	76.4	741
8/3/2016	Background	0.518	5.00	10.3	1.56	8.4	76.4	750
9/28/2016	Background	0.382	6.12	13.3	1.83	8.5	43.5	43
11/16/2016	Background	1.80	19.4	15.2	2.29	8.6	32.2	801
2/14/2017	Background	0.501	2.23	15.4	2.40	8.6	32.0	806
4/12/2017	Background	0.360	4.02	14.4	2.17	8.7	39.2	798
5/24/2017	Background	0.380	1.91	15.1	2.41	8.7	28.6	793
7/25/2017	Background	0.415	1.76	15.8	2.61	8.7	28.7	788
10/11/2017	Detection	0.394	1.87	16.9	2.59	8.7	29.1	784
1/11/2018	Detection	--	1.75	--	--	--	28.8	--
4/10/2018	Detection	0.344	1.75	16.5	2.62	8.5	29.0	790
8/29/2018	Detection	0.371	2.42	16.3	2.45	9.0	29.7	783
5/1/2019	Detection	0.376	1.90	16.9	2.62	10.5	28.7	809
6/12/2019	Detection	0.371	2.03	16.2	2.38	8.8	27.4	822
10/23/2019	Detection	0.389	1.81	17.2	2.70	8.7	28.4	820
5/6/2020	Detection	0.364	2.17	15.1	2.46	8.2	23.9	828
10/21/2020	Detection	0.409	2.42	16.6	2.57	9.1	28.5	845

Notes:
mg/L: milligrams per liter
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J: Estimated value. Parameter was detected at concentration below the reporting limit
- -: Not analyzed

Table 1 - Groundwater Data Summary: MW-1101R
Mitchell - 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
6/15/2016	Background	0.82	8.11	185	0.031	0.03	1.1	0.650	0.493	1.20	1.22	0.002	0.003 J	31.8	0.5	0.05 J
8/3/2016	Background	1.10	10.8	149	0.023	0.03	1.0	0.363	0.4776	1.56	0.674	0.012	< 0.002 U	32.9	0.5	0.02 J
9/28/2016	Background	0.92	11.1	149	0.01 J	0.02	0.7	0.301	0.565	1.83	0.550	0.009	< 0.002 U	26.2	0.5	0.01 J
11/16/2016	Background	0.67	14.2	125	0.01 J	0.02 J	0.595	0.143	1.808	2.29	0.292	0.026	< 0.002 U	20.6	0.4	< 0.01 U
2/14/2017	Background	0.69	15.3	102	0.01 J	0.02 J	0.512	0.160	1.661	2.40	0.327	0.012	< 0.002 U	34.0	0.4	0.02 J
4/12/2017	Background	0.84	12.4	117	0.02 J	0.02 J	0.824	0.333	0.19	2.17	0.634	0.010	0.002 J	16.7	0.5	< 0.01 U
5/24/2017	Background	0.66	15.7	102	0.01 J	0.01 J	0.526	0.299	0.759	2.41	0.298	< 0.0002 U	< 0.002 U	14.8	0.3	< 0.01 U
7/25/2017	Background	0.62	14.5	91.3	0.01 J	0.01 J	0.377	0.126	0.977	2.61	0.235	0.009	< 0.002 U	18.3	0.3	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-1102F
Mitchell - 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
6/15/2016	Background	0.109	4.34	12.4	0.56	8.0	37.2	523
8/3/2016	Background	0.280	5.48	11.9	0.58	8.2	35.9	535
10/3/2016	Background	0.160	5.45	11.8	0.60	8.1	29.5	519
11/15/2016	Background	0.117	4.87	11.7	0.56	8.1	27.4	551
2/14/2017	Background	0.109	5.04	11.3	0.53	8.2	29.9	521
4/12/2017	Background	0.109	4.67	11.3	0.53	8.3	30.6	530
5/24/2017	Background	0.118	5.31	13.7	0.56	8.3	31.8	521
7/26/2017	Background	0.202	5.41	11.4	0.57	8.3	31.5	519
10/10/2017	Detection	0.278	4.79	12.4	0.57	8.4	32.3	526
1/11/2018	Detection	--	4.47	--	--	--	32.1	--
4/10/2018	Detection	0.109	4.40	13.4	0.63	8.2	33.2	539
8/28/2018	Detection	0.247	4.48	14.1	0.64	8.6	33.8	549
5/1/2019	Detection	0.126	4.69	15.2	0.66	9.5	37.6	577
6/12/2019	Detection	0.110	4.36	14.9	0.74	8.2	38.0	574
10/23/2019	Detection	0.114	4.46	16.3	0.68	8.3	38.8	564
1/31/2020	Detection	--	--	16.3	--	8.3	--	--
5/6/2020	Detection	0.129	4.33	16.0	0.69	8.8	33.8	574
7/15/2020	Detection	--	--	16.0	--	8.4	--	--
10/21/2020	Detection	0.147	3.81	17.3	0.76	9.0	39.2	580

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-1102F
Mitchell - 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
6/15/2016	Background	0.71	9.37	214	< 0.005 U	0.04	0.4	0.096	0.352	0.56	0.335	0.003	< 0.002 U	28.1	0.3	< 0.01 U
8/3/2016	Background	0.69	8.16	212	< 0.005 U	0.02 J	0.4	0.090	0.881	0.58	0.183	0.006	< 0.002 U	25.8	0.3	0.01 J
10/3/2016	Background	0.64	8.45	194	0.005 J	0.01 J	0.5	0.286	0.972	0.60	0.298	0.002	< 0.002 U	23.9	0.3	< 0.01 U
11/15/2016	Background	0.63	8.49	212	0.005 J	0.008 J	0.435	0.074	1.859	0.56	0.141	0.003	< 0.002 U	22.9	0.3	< 0.01 U
2/14/2017	Background	0.62	8.66	197	0.006 J	0.006 J	0.411	0.049	1.015	0.53	0.131	0.004	< 0.002 U	21.4	0.3	0.02 J
4/12/2017	Background	0.56	7.68	191	0.005 J	0.01 J	0.399	0.079	0.1825	0.53	0.135	0.005	< 0.002 U	19.3	0.3	0.01 J
5/24/2017	Background	0.60	8.76	229	0.01 J	0.02	0.807	0.203	0.3252	0.56	0.335	< 0.0002 U	< 0.002 U	20.0	0.4	0.01 J
7/26/2017	Background	0.54	7.58	205	< 0.004 U	0.01 J	0.323	0.072	0.942	0.57	0.121	0.007	< 0.002 U	34.7	0.3	0.03 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-1102R
Mitchell - 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
6/15/2016	Background	0.339	3.49	219	2.97	8.2	47.8	1,470
8/3/2016	Background	0.467	4.05	217	2.98	8.3	44.9	1,450
10/3/2016	Background	0.332	5.33	213	2.96	8.3	35.1	1,530

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-1102R
Mitchell - 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
6/15/2016	Background	2.01	2.64	292	0.02 J	0.35	0.5	0.799	0.71	2.97	0.558	0.015	< 0.002 U	68.7	0.9	0.01 J
8/3/2016	Background	1.71	3.57	356	0.128	0.14	3.0	1.75	1.217	2.98	2.82	0.021	0.007 J	66.0	1.2	0.03 J
10/3/2016	Background	1.73	3.37	441	0.307	0.17	3.9	3.01	2.828	2.96	7.24	0.028	0.007	51.4	1.9	0.03 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-1103F
Mitchell - 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
6/15/2016	Background	0.355	3.01	243	3.11	8.3	0.5	1,390
8/2/2016	Background	0.402	2.99	247	3.20	8.3	0.3	1,420
10/3/2016	Background	0.321	3.12	242	3.34	8.4	< 0.04 U	1,380
11/16/2016	Background	0.323	2.97	240	2.96	8.4	0.2	1,370
2/15/2017	Background	0.303	2.82	240	3.07	8.5	0.2	1,400
4/11/2017	Background	0.304	2.57	234	3.05	8.6	0.4	1,400
5/23/2017	Background	0.346	2.88	237	3.23	8.5	0.4	1,370
7/26/2017	Background	0.343	2.76	240	3.24	8.5	0.3	1,370
10/11/2017	Detection	0.328	3.09	247	3.17	8.6	0.5	1,390
4/11/2018	Detection	0.286	2.58	239	3.16	8.3	0.5	1,390
8/29/2018	Detection	0.332	2.76	244	3.03	8.6	0.4	1,380
5/2/2019	Detection	0.342	2.95	245	3.13	9.1	0.8	1,360
6/12/2019	Detection	0.329	2.96	233	3.55	8.3	0.9	1,410
10/23/2019	Detection	0.336	3.44	242	3.25	8.5	0.8	1,440
5/6/2020	Detection	0.358	3.48	235	2.96	8.9	0.8	1,420
10/21/2020	Detection	0.332	3.05	237	3.07	8.8	0.8	1,440

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-1103F
Mitchell - 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
6/15/2016	Background	0.16	8.03	639	0.029	0.02	1.0	0.351	1.1	3.11	0.674	0.012	< 0.002 U	10.1	0.2	0.01 J
8/2/2016	Background	0.14	7.01	704	0.026	0.01 J	0.9	0.299	0.899	3.20	0.479	0.016	< 0.002 U	2.61	0.2	< 0.01 U
10/3/2016	Background	0.04 J	5.80	558	0.01 J	0.03	0.4	0.180	1.026	3.34	0.313	0.016	< 0.004 U	2.66	0.1 J	0.01 J
11/16/2016	Background	0.10	7.71	723	0.01 J	0.009 J	0.471	0.159	1.57	2.96	0.218	0.015	< 0.002 U	2.57	0.1	< 0.01 U
2/15/2017	Background	0.03 J	7.67	631	0.009 J	0.008 J	0.336	0.147	1.416	3.07	0.213	0.016	< 0.002 U	2.81	0.09 J	0.03 J
4/11/2017	Background	0.07	8.46	618	0.006 J	0.006 J	0.262	0.102	2.183	3.05	0.088	0.015	< 0.002 U	3.19	0.1	< 0.01 U
5/23/2017	Background	0.03 J	7.85	688	0.006 J	0.007 J	0.260	0.149	1.214	3.23	0.194	0.006	< 0.002 U	2.80	0.06 J	< 0.01 U
7/26/2017	Background	0.02 J	6.81	562	< 0.004 U	0.007 J	0.112	0.136	1.798	3.24	0.103	0.015	< 0.002 U	5.46	0.07 J	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-1104R
Mitchell - 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
6/21/2016	Background	0.431	39.4	485	1.18	7.87	162	2,390

Notes:
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
SU: standard unit

Table 1 - Groundwater Data Summary: MW-1104R
Mitchell - 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
6/21/2016	Background	0.66	4.35	182	0.570	0.18	3.4	4.36	0.153	1.18	9.41	0.014	< 0.09 U	42.3	2.3	0.133

Notes:
µg/L: micrograms 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
mg/L: milligrams per liter

Table 1 - Groundwater Data Summary: MW-1502R
Mitchell - 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
6/20/2016	Background	0.268	71.5	33.4	0.18	7.3	155	474
8/9/2016	Background	0.160	95.4	34.0	0.17	7.3	187	547
9/27/2016	Background	0.376	103	39.7	0.1 J	7.4	183	560
11/9/2016	Background	0.214	87.3	25.4	0.1 J	7.4	186	551
2/15/2017	Background	0.069	90.0	167	0.16	7.5	90.1	564
4/12/2017	Background	0.075	72.2	79.5	0.16	7.6	102	507
5/23/2017	Background	0.100	73.9	52.4	0.17	7.6	118	466
7/25/2017	Background	0.158	61.7	18.8	0.20	7.3	88.6	358
10/11/2017	Detection	0.132	91.0	24.5	0.1 J	7.3	159	535
1/11/2018	Detection	--	240	--	--	--	149	--
4/10/2018	Detection	0.051	78.3	196	0.19	7.4	87.6	616
8/29/2018	Detection	0.150	95.7	99.3	0.17	7.7	167	650
5/2/2019	Detection	0.1 J	93.6	245	0.17	8.5	105	702
6/12/2019	Detection	0.127	80.7	155	0.23	7.3	114	661
10/23/2019	Detection	0.194	104	102	0.18	7.2	252	758
1/31/2020	Detection	--	--	--	--	7.4	120	474
5/6/2020	Detection	0.081	64.8	74.6	0.18	7.8	93.0	471
9/1/2020	Detection	--	--	--	--	7.2	--	--
10/21/2020	Detection	0.267	92.5	56.6	0.18	7.7	249	679

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-1502R
Mitchell - 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
6/20/2016	Background	0.22	0.28	30.6	< 0.005 U	0.005 J	0.3	0.082	0.143	0.18	0.064	0.002	< 0.09 U	3.48	8.2	0.01 J
8/9/2016	Background	0.20	0.26	34.1	< 0.005 U	0.006 J	0.3	0.068	1.029	0.17	0.089	0.010	< 0.002 U	8.71	7.4	< 0.01 U
9/27/2016	Background	0.16	0.27	38.2	< 0.005 U	0.004 J	0.4	0.076	0.429	0.1 J	0.064	0.012	< 0.002 U	8.40	8.8	< 0.01 U
11/9/2016	Background	0.20	0.84	44.2	0.062	0.009 J	1.44	0.507	2.497	0.1 J	0.764	0.006	< 0.002 U	3.19	5.3	0.03 J
2/15/2017	Background	0.13	0.24	27.7	0.006 J	< 0.004 U	1.90	0.069	2.61	0.16	0.061	0.009	< 0.002 U	1.84	4.3	0.03 J
4/12/2017	Background	0.13	0.69	29.2	0.053	0.008 J	1.20	0.426	0.613	0.16	0.630	0.015	0.002 J	1.91	4.8	0.02 J
5/23/2017	Background	0.15	0.53	32.2	0.033	< 0.005 U	0.918	0.238	0.647	0.17	0.364	0.002	< 0.002 U	2.46	4.7	0.01 J
7/25/2017	Background	0.21	0.30	19.0	0.008 J	< 0.005 U	0.196	0.082	0.6323	0.20	0.088	0.009	< 0.002 U	2.47	3.2	0.03 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: Residence Time Calculation Summary
Mitchell Landfill

Geosyntec Consultants, Inc.

CCR Management Unit	Monitoring Well Pair	Well Diameter (inches)	2020-05		2020-07		2020-10	
			Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Landfill	MW1101F/R [1]	2.0	2.4	25	2.4	25	2.4	25
	MW1102F/R [1]	2.0	1.2	49	1.0	59	1.0	64
	MW1103F/R [2]	2.0	1.8	35	1.8	34	1.8	35
	MW1104F/R [2]	2.0	1.2	52	0.7	86	0.6	107
	MW1501F/R [3]	4.0	2.2	55	2.2	54	2.3	54
	MW1502R [3]	4.0	NC	NC	NC	NC	NC	NC
	MW1503F/R [3]	4.0	1.3	96	1.4	89	1.5	84

Notes:
[1] - Sidegradient Well
[2] - Background Well
[3] - Downgradient Well
NC - No calculation can be generated

Legend

- Compliance Sampling Location
- Upgradient Sampling Location
- CCR Landfill (Approximate Limits of Waste)

Notes

- Monitoring well coordinates provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.

500 250 0 500 Feet

Site Layout
Landfill - Fish Creek Aquifer

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2018/01/26

Figure **1a**

C:\Users\mmuenich\Documents\local_projects\AEP_GIS\Mitchell\MXDs\Landfill-FC\AEP-Mitchell_LF-Fish-Creek_Site_Layout.mxd. MMuenich. 1/26/2018. Project/Phase/Task.

Legend

- Compliance Sampling Location
- Upgradient Sampling Location
- CCR Landfill (Approximate Limits of Waste)

Notes

- Monitoring well coordinates provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.

500 250 0 500 Feet

Site Layout
Landfill - Rush Run Aquifer

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2018/01/26

Figure **1b**

C:\Users\mmuenich\Documents\local_projects\AEP_GIS\Mitchell\MXDs\AEP-Mitchell_LF-Rush-Run_Site_Layout.mxd. MMuenich. 1/26/2018. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on October 22, 2019) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (AMEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500 Feet

Potentiometric Surface Map - Fish Creek
October 2019

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2019/12/13

Figure **2**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\2019\AEP-Mitchell_Landfill-FC_GW_Oct2019.mxd. ARevezzo. 12/13/2019. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on October 22, 2019) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Rush Run
October 2019

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Clumbus, Ohio | 2019/12/13

Figure **3**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\2019\AEP-Mitchell_Landfill-RR_GW_Oct2019.mxd. ARevezzo. 12/13/2019. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on May 6, 2020) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500 Feet

Potentiometric Surface Map - Fish Creek May 2020

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2020/06/08

Figure 4

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\2020\AEP-Mitchell_Landfill-FC_GW_May2020.mxd. hduff. 6/8/2020. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on May 6, 2020) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Rush Run
May 2020

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Clumbus, Ohio | 2020/06/09

Figure
5

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\2020\AEP-Mitchell_Landfill-RR_GW_May2020.mxd. hduff. 6/9/2020. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on July 15, 2020) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Fish Creek
July 2020

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2020/09/11

Figure **6**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\2020\AEP-Mitchell_Landfill-FC_GW_July2020.mxd. ARevezzo. 9/11/2020. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on July 15, 2020) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).
- No free water measured at MW-1502R in July 2020.

500 250 0 500
Feet

Potentiometric Surface Map - Rush Run
July 2020

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Clumbus, Ohio | 2020/10/26

Figure
7

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\2020\AEP-Mitchell_Landfill-RR_GW_July2020.mxd. HDuff. 10/26/2020. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on October 20, 2020) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Fish Creek
October 2020

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2020/12/29

Figure **8**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\2020\AEP-Mitchell_Landfill-FC_GW_Oct2020.mxd. HDuff. 12/29/2020. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on October 20, 2020) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Rush Run
October 2020

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Clumbus, Ohio | 2021/01/05

Figure **9**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\2020\AEP-Mitchell_Landfill-RR_GW_Oct2020.mxd. ARevezzo. 1/5/2021. Project/Phase/Task.

APPENDIX 2 - Statistical Analyses

The memoranda summarizing the February and September 2020 statistical evaluations follow.

STATISTICAL ANALYSIS SUMMARY-
Background Update Calculations
Landfill – Mitchell Plant
Moundsville, West Virginia

Submitted to

AMERICAN ELECTRIC POWER℠

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

941 Chatham Lane
Suite 103
Columbus, Ohio 43221

February 21, 2020

CHA8473

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA	Analysis of Variance
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 lined landfill (LF), an existing CCR unit at the Mitchell Power Plant located in Moundsville, West Virginia.

Eight monitoring events were completed prior to June 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, and an additional event completed in January 2018 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. Additional data were collected prior to background monitoring for the CCR Rule at the Mitchell LF, including data collected prior to placement of CCR at the LF. The historical data collected for chloride, fluoride, pH, sulfate, and total dissolved solids (TDS) were also included in the previous background calculation. The data were reviewed for outliers and trends prior to calculating upper prediction limits (UPLs) for each Appendix III parameter. Lower prediction limits (LPLs) were also established for pH. Intrawell prediction limits were selected for all parameters with a one-of-two resampling plan. The statistical analyses to establish background levels were previously documented in the January 2018 *Statistical Analysis Summary* report (Geosyntec, 2018).

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. Results for chloride and sulfate samples collected at select wells for an additional event in January 2018, which was also included in the update to background levels, are also provided 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 data used to conduct the statistical analyses described below are summarized in Table 1. Statistical analyses for the LF 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 $= \tilde{x}_{0.75} - \tilde{x}_{0.25}$

Tukey's outlier test and visual inspection indicated three potential outliers, which were removed from the dataset (Attachment B). These outliers include:

- The calcium concentration of 240 mg/L at MW-1502R from January 11, 2018;
- The pH of 10.5 at MW-1101R from May 1, 2019; and
- The pH of 8.5 from MW-1502R from May 2, 2019.

2.3.2 Establishment of Updated Background Dataset

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. Evidence at the LF shows that a minimum of 14 years would be required for water at downgradient monitoring wells to exhibit changes as a result of practices at the site. Since the lined LF has only accepted waste since 2014, the downgradient monitoring wells are representative of background conditions. 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.

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 – June 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. Statistically significant differences were found for chloride, fluoride, and TDS at MW-1102F. However, the reported concentrations were lower than the upgradient well, thus the records were updated to use the most recent portion of the record for construction of updated prediction limits, as it is assumed the changes in groundwater quality is unrelated to the unit. While the Mann-Whitney test did not note a significant difference between the two medians for chloride at MW-1502R, more recent concentrations are highly variable and appear to be increasing over time. Therefore, the previously calculated upper prediction limit will be used until additional samples are collected to better evaluate influences on the chloride concentration.

2.3.3 Updated Prediction Limits

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.

Intrawell UPLs were updated using all the historical data through June 2019 to represent background values. Intrawell LPLs were also generated for pH. As described in Section 2.3.2, the only exceptions were for chloride, fluoride, and TDS at MW-1102F which deselected historic higher measurements in favor of more conservative limits that better represent present-day groundwater quality conditions, and for chloride at MW-1502R where the original background dataset was used. The updated prediction limits are summarized in Table 3.

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 does not exceed the UPL, a second sample will not be collected. The retesting procedures allowed achieving an acceptably high statistical power to detect changes at downgradient wells for constituents evaluated using intrawell prediction limits.

2.4 Conclusions

Four detection monitoring events were completed in accordance with the CCR Rule. An additional event completed in January 2018 was also included in the new dataset. 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 using intrawell prediction limits with a one-of-two retesting procedure for all Appendix III parameters.

SECTION 3

REFERENCES

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

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

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
Mitchell - Landfill

Parameter	Unit	MW-1101R						MW-1102F					
		10/11/2017	1/11/2018	4/10/2018	8/29/2018	5/1/2019	6/12/2019	10/10/2017	1/11/2018	4/10/2018	8/28/2018	5/1/2019	6/12/2019
		2017-D1	*	2018-D1	2018-D2	2019-D1	2019-D1-R1	2017-D1	*	2018-D1	2018-D2	2019-D1	2019-D1-R1
Boron	mg/L	0.394	-	0.344	0.371	0.376	0.371	0.278	-	0.109	0.247	0.126	0.110
Calcium	mg/L	1.87	1.75	1.75	2.42	1.90	2.03	4.79	4.47	4.40	4.48	4.69	4.36
Chloride	mg/L	16.9	-	16.5	16.3	16.9	16.2	12.4	-	13.4	14.1	15.2	14.9
Fluoride	mg/L	2.59	-	2.62	2.45	2.62	2.38	0.570	-	0.630	0.640	0.660	0.740
Total Dissolved Solids	mg/L	784	-	790	783	809	822	526	-	539	549	577	574
Sulfate	mg/L	29.1	28.8	29.0	29.7	28.7	27.4	32.3	32.1	33.2	33.8	37.6	38.0
pH	SU	8.7	-	8.5	9.0	10.5	8.8	8.4	-	8.2	8.6	9.5	8.2

Parameter	Unit	MW-1103F					MW-1502R					
		10/11/2017	4/10/2018	8/29/2018	5/2/2019	6/12/2019	10/11/2017	1/11/2018	4/10/2018	8/29/2018	5/2/2019	6/12/2019
		2017-D1	2018-D1	2018-D2	2019-D1	2019-D1-R1	2017-D1	*	2018-D1	2018-D2	2019-D1	2019-D1-R1
Boron	mg/L	0.328	0.286	0.332	0.342	0.329	0.132	-	0.051	0.150	0.100 J	0.127
Calcium	mg/L	3.09	2.58	2.76	2.95	2.96	91.0	240	78.3	95.7	93.6	80.7
Chloride	mg/L	247	239	244	245	233	24.5	-	196	99.3	245	155
Fluoride	mg/L	3.17	3.16	3.03	3.13	3.55	0.100 J	-	0.190	0.170	0.170	0.230
Total Dissolved Solids	mg/L	1390	1390	1380	1360	1410	535	-	616	650	702	661
Sulfate	mg/L	0.500	0.500	0.400	0.800	0.900	159	149	87.6	167	105	114
pH	SU	8.6	8.3	8.6	9.1	8.3	7.3	-	7.4	7.7	8.5	7.3

Notes:
mg/L: milligrams per liter
SU: standard unit
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
*January 2018 data are not associated with any semiannual detection monitoring events but were included in the background update.

Table 2: Background Level Summary
Mitchell Plant - Landfill

Parameter	Unit	Description	MW-1101R	MW-1102F	MW-1502R
Boron	mg/L	Intrawell Background Value (UPL)	0.525	0.280	0.265
Calcium	mg/L	Intrawell Background Value (UPL)	6.91	5.71	109
Chloride	mg/L	Intrawell Background Value (UPL)	18.1	15.4	191
Fluoride	mg/L	Intrawell Background Value (UPL)	3.14	0.781	0.244
pH	SU	Intrawell Background Value (UPL)	9.1	9.5	7.7
		Intrawell Background Value (LPL)	7.9	7.6	7.1
Sulfate	mg/L	Intrawell Background Value (UPL)	38.4	45.0	213
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	1600	577	744

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

ATTACHMENT A

Certification by a Qualified Professional Engineer

Certification by a Qualified Professional Engineer

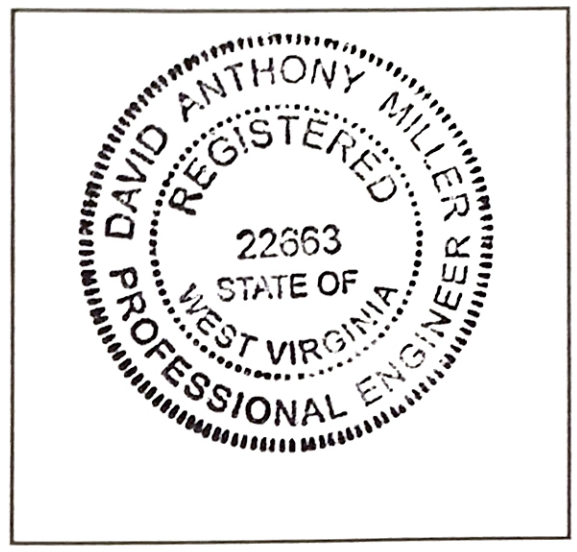
I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Mitchell Landfill CCR management area and that the requirements of 40 CFR 257.93(f) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



22663	WEST VIRGINIA	02.27.2020
License Number	Licensing State	Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING

December 11, 2019

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

RE: Background Update - Mitchell Landfill

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the background update of groundwater data for American Electric Power's Mitchell 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).

The Mitchell Landfill is a lined landfill regulated under the CCR program. Sampling for background under the CCR program at all wells began in 2016. The existing data collected prior to 2016 for chloride, fluoride, pH, sulfate and TDS is included in the screened background. Waste placement began in 2014, and based on reported groundwater flow and transport times, as well as downgradient well placement relative to the landfill, a minimum of 14 years would be required for water at downgradient wells to reflect changes should they occur as a result of practices of the site. Therefore, the statistical method is selected during the background screening was based on this information as well as the behavior of groundwater upgradient of the facility.

The monitoring well network, as provided by Geosyntec Consultants, consists of the following: upgradient wells MW_1103F, and MW_1104R; and downgradient wells MW_1101F, MW_1101R, MW_1102F, MW_1102R, MW_1502R and MW_1503F. Note that due to wells being dry at the time of sampling, only upgradient wells MW_1103F and

downgradient wells MW_1101R, MW_1102F, and MW_1502R are included in this analysis and background update.

Data were sent electronically to Groundwater Stats Consulting, and the statistical analysis 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 Appendix III detection monitoring constituents were evaluated: boron, calcium, chloride, fluoride, pH, sulfate, and TDS.

Time series plots for these parameters at all wells are provided for the purpose of evaluating 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 identify suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells.

Proposed background data at all wells were evaluated during the background screening conducted in January 2018 for the following: 1) outliers; 2) trends; 3) most appropriate statistical method for Appendix III parameters based on site characteristics of groundwater data upgradient of the facility; and 4) eligibility of downgradient wells when intrawell statistical methods are recommended. Power curves were provided to demonstrate that the selected statistical methods for Appendix III parameters comply with the USEPA Unified Guidance recommendations as discussed below.

Summary of Statistical Method:

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

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are nondetects, a nonparametric test is utilized. 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 may be 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 January 2018

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 parameters were formally tested using Tukey's box plot method and, when identified, flagged in the computer database with "o" and deselected prior to construction of statistical limits. A summary of those values was submitted with the screening.

Tukey's outlier test noted a few outliers. Any values identified as outliers are plotted in a lighter font on the time series graph. Note that while the test did not identify an outlier for TDS at well MW-1101R for the reported measurement of 43 mg/L, this value was flagged as an outlier in the database as it does not appear to represent the population based on all other reported measurements at this well. A substitution of the most recent reporting limit was applied when varying detection limits existed in data.

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.

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 several statistically significant decreasing trends as may be seen on the Trend Test Summary Table that accompanies the trend tests. A statistically significant increasing trend was noted for fluoride in well MW-1101R; however, the concentrations at this well are lower than those observed in the upgradient well and follow a similar pattern. Additionally, statistically significant increasing trends were noted for pH in upgradient well MW_1103F and downgradient well MW_1101R. Generally, when similar patterns in concentrations are observed upgradient of the facility, it is an indication that groundwater is naturally changing over time. All of the observed trends are relatively low in magnitude when compared to average concentrations; therefore, no adjustments were made to the data sets. The trend test results were submitted with the screening.

Appendix III – Determination of Spatial Variation

The Analysis of Variance (ANOVA) is typically used to statistically evaluate differences in average concentrations among multiple 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.

However, the ANOVA could not be performed for the Mitchell Landfill because there is only one upgradient well with greater than 4 reported values. Therefore, all data were further evaluated as described below for the appropriateness of intrawell testing for Appendix III parameters to accommodate the groundwater quality.

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.

Exploratory data analysis was used as a general comparison of concentrations in downgradient wells for all Appendix III parameters recommended for intrawell analyses to concentrations reported in the upgradient well. Upper tolerance limits are used in conjunction with confidence intervals to determine whether the estimated averages in downgradient wells are higher than observed levels upgradient of the facility. The upper tolerance limits were constructed to represent the extreme upper range of possible background levels at the site.

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.

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

Confidence intervals were constructed on downgradient wells having at least 4 samples for each of the Appendix III parameters, using the tolerance limits discussed above, to determine intrawell eligibility. When the entire confidence interval is above a background

standard for a given parameter, interwell methods are initially recommended as the statistical method. Therefore, only the parameters with confidence intervals which did not exceed background standards are typically eligible for intrawell prediction limits.

Confidence intervals for the above parameters were found to be within their respective background limit for all Appendix III parameters except calcium and sulfate. However, as discussed previously, the landfill is lined with waste placement beginning in 2014. Evidence shows that a minimum of 14 years would be required for water at downgradient wells to exhibit any changes if they should occur as a result of practices at the site. Because of the limited upgradient well data, implementing an interwell statistical methodology for would likely result in statistical exceedances at downgradient wells due to spatial variation, rather than from practices at the facility. Therefore, intrawell methods are recommended for all Appendix III parameters.

All available data through July 2017 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.

Natural systems continuously evolve due to physical changes made to the environment. Examples include capping a landfill, paving areas near a well, or lining a drainage channel to prevent erosion. Periodic updating of background statistical limits will be necessary to accommodate these types of changes In the interwell case, newer data will be included in background when a minimum of 2 new samples are available. In the intrawell case, data for all wells and constituents are re-evaluated when a minimum of 4 new data points are available to determine whether earlier concentrations are representative of present-day groundwater quality. In some cases, the earlier portion of data are deselected prior to construction of limits in order to provide sensitive limits that will rapidly detect changes in groundwater quality. Even though the data are excluded from the calculation, the values will continue to be reported and shown in tables and graphs.

In the event of an initial exceedance of compliance well data, the 1-of-2 resample plan allows for collection of an additional sample to determine whether the initial exceedance is confirmed. When the resample confirms the initial exceedance, a statistically significant increase (SSI) is identified and further research would be required to identify the cause of the exceedance (i.e. impact from the site, natural variation, or an off-site source). If the resample falls within the statistical limit, the initial exceedance is considered to be a false positive result and, therefore, no further action is necessary.

Background Update Summary – November 2019

Prior to updating background data sets, all Appendix III data through June 2019 were re-evaluated using Tukey's outlier test and visual screening (Figure C). Several outliers were noted and flagged. 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. An updated summary of Tukey's test results and flagged outliers follows this letter.

The Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data through July 2017 to the new compliance samples at each well through June 2019 to evaluate whether the groups are significantly different at the 99% confidence level, in which case background data may be updated with compliance data (Figure D). 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.

Statistically significant differences were found for chloride, fluoride and TDS for well MW_1102F. However, because these reported concentrations are considerably less than those reported in the upgradient well, these records were updated to use the most recent portion of the record with more stable concentrations for construction of updated prediction limits, with the assumption that the groundwater quality is changing unrelated to the facility. While no difference was noted with the Mann Whitney test at 99% confidence for chloride in downgradient well MW_1502R, more recent concentrations are highly variable and appear to be increasing over time. Therefore, this record was not updated at this time and will be re-evaluated during the next background update. 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. Additionally, a summary of well/constituent pairs using a truncated portion of their records follows this letter.

Intrawell prediction limits using all historical data through June 2019 (except for special cases discussed above), combined with a 1-of-2 resample plan, were constructed and a summary of the updated limits follows this letter (Figure E). Future compliance observations at each well will be compared to these background limits during each subsequent semi-annual sampling event.

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

For Groundwater Stats Consulting,

Kristina L. Rayner
Groundwater Statistician

Date Ranges

Date: 12/11/2019 2:42 PM

Mitchell LF Client: Geosyntec Data: Mitchell Landfill

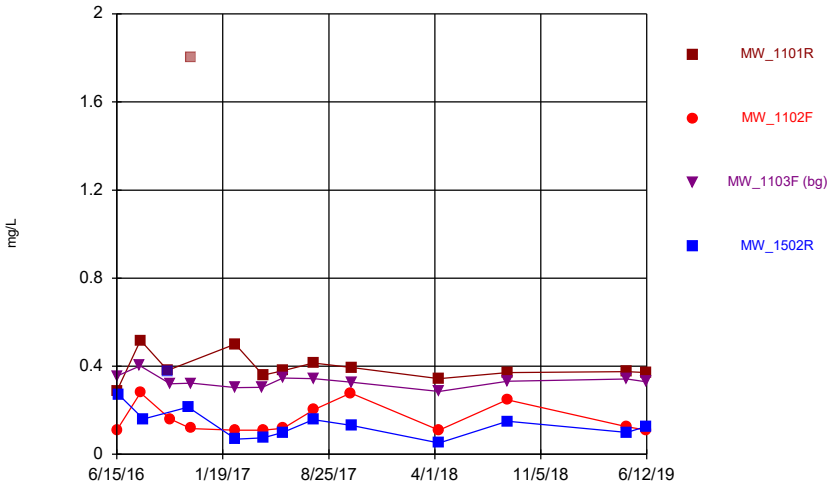
Chloride, total (mg/L)
- MW_1102F background:5/25/2016-6/12/2019
- MW_1502R background:6/20/2016-7/25/2017

Fluoride, total (mg/L)
- MW_1102F background:4/12/2017-6/12/2019

Sulfate, total (mg/L)
- MW_1103F background:8/2/2016-6/12/2019

Total Dissolved Solids [TDS] (mg/L)
- MW_1102F background:6/17/2015-6/12/2019

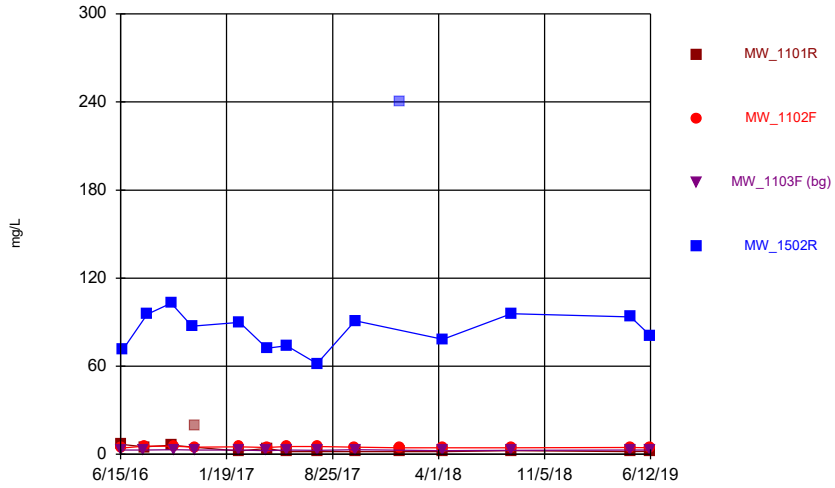
Time Series



Constituent: Boron, total Analysis Run 10/29/2019 12:55 PM View: Time Series
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

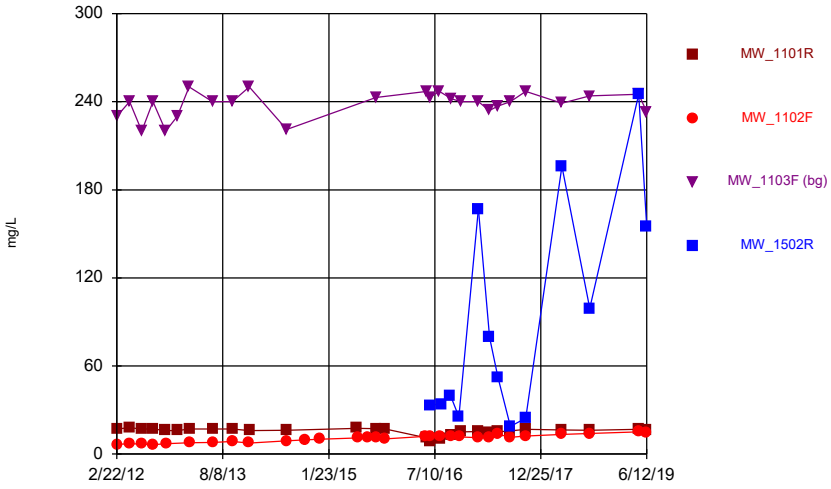
Time Series



Constituent: Calcium, total Analysis Run 10/29/2019 12:55 PM View: Time Series
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

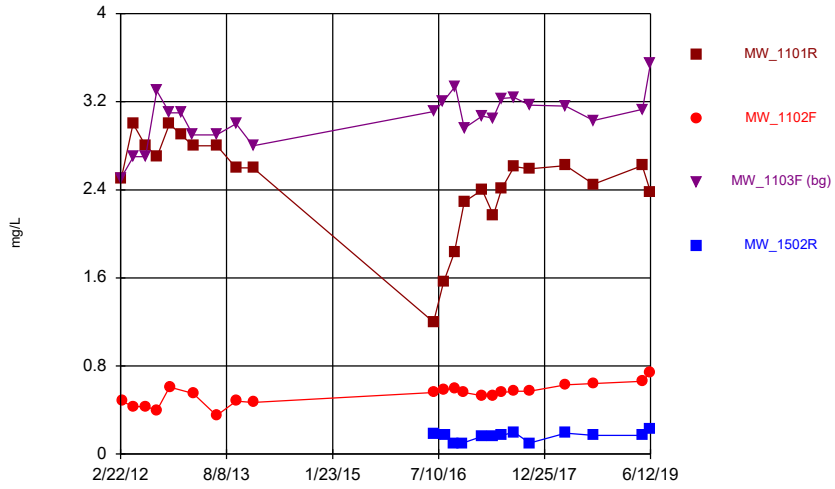
Time Series



Constituent: Chloride, total Analysis Run 10/29/2019 12:55 PM View: Time Series
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

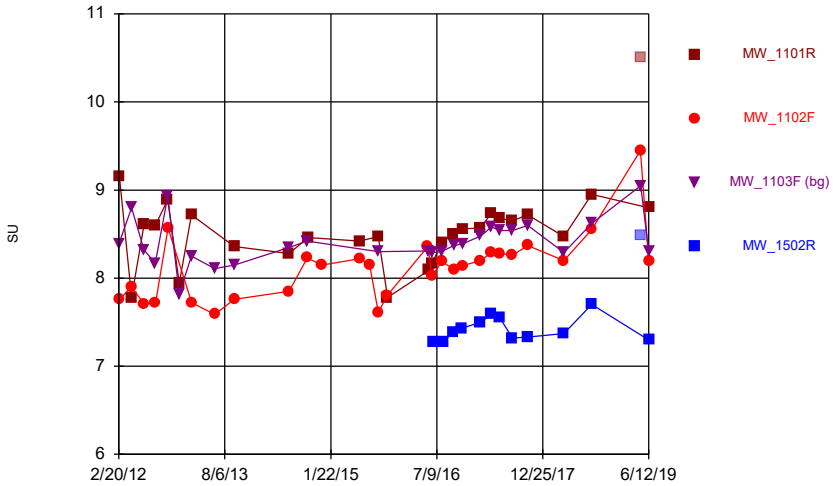
Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Time Series



Constituent: Fluoride, total Analysis Run 10/29/2019 12:55 PM View: Time Series
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

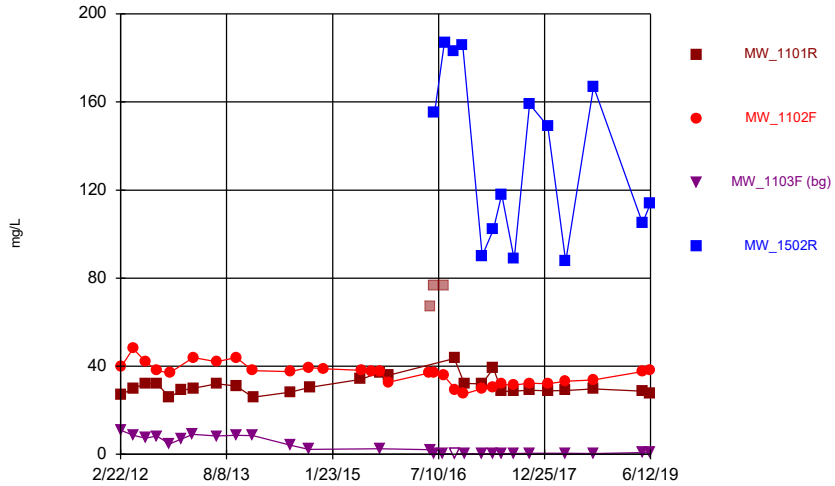
Time Series



Constituent: pH, field Analysis Run 10/29/2019 12:55 PM View: Time Series
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Hollow symbols indicate censored values.

Time Series



Constituent: Sulfate, total Analysis Run 10/29/2019 12:55 PM View: Time Series
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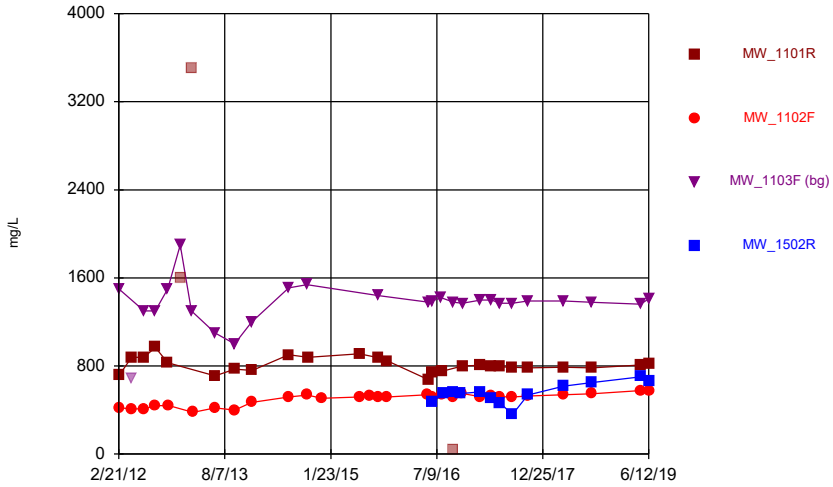
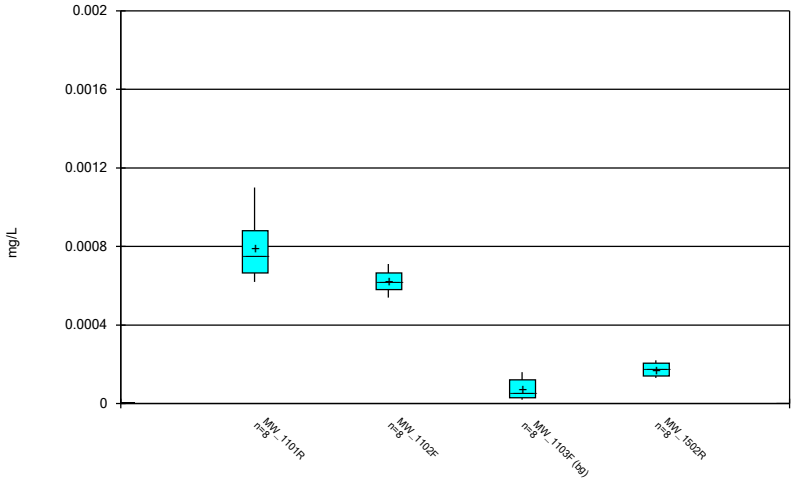
Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 10/29/2019 12:55 PM View: Time Series
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

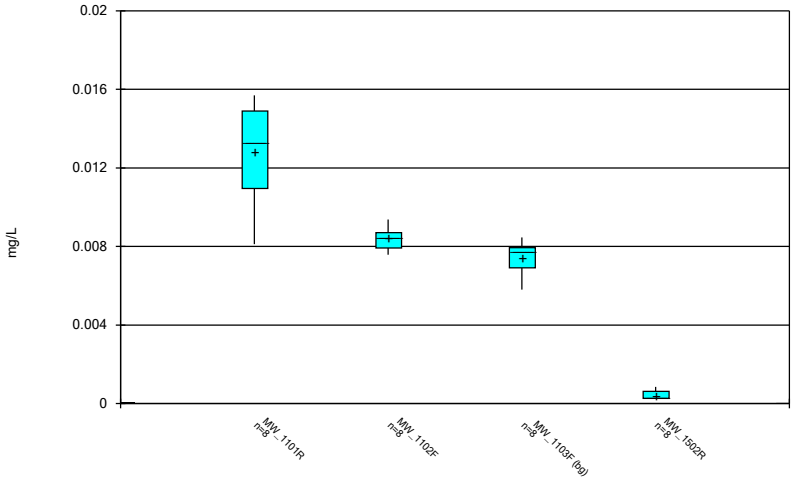
Box & Whiskers Plot



Constituent: Antimony, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

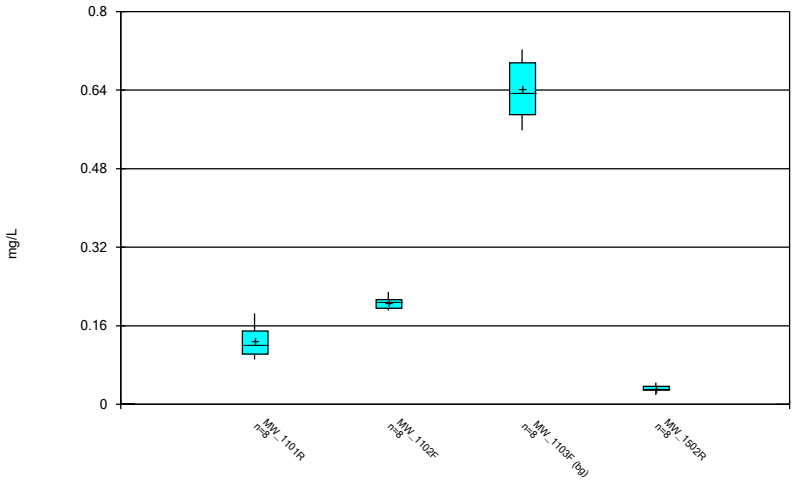
Box & Whiskers Plot



Constituent: Arsenic, Total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

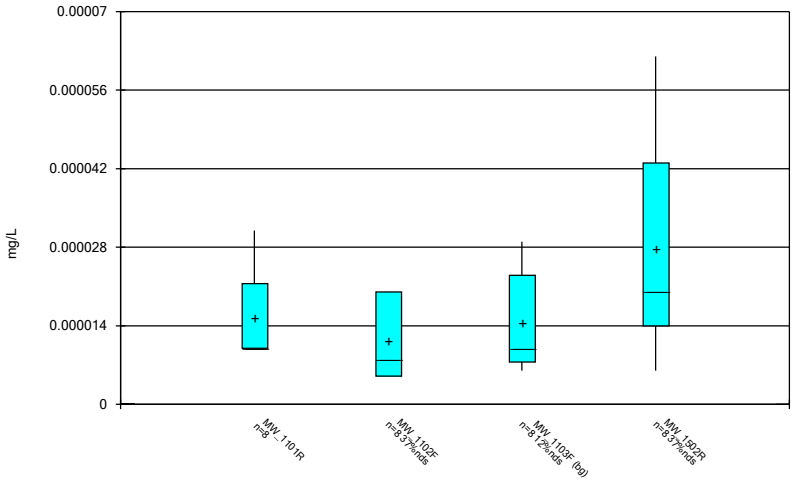
Box & Whiskers Plot



Constituent: Barium, Total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

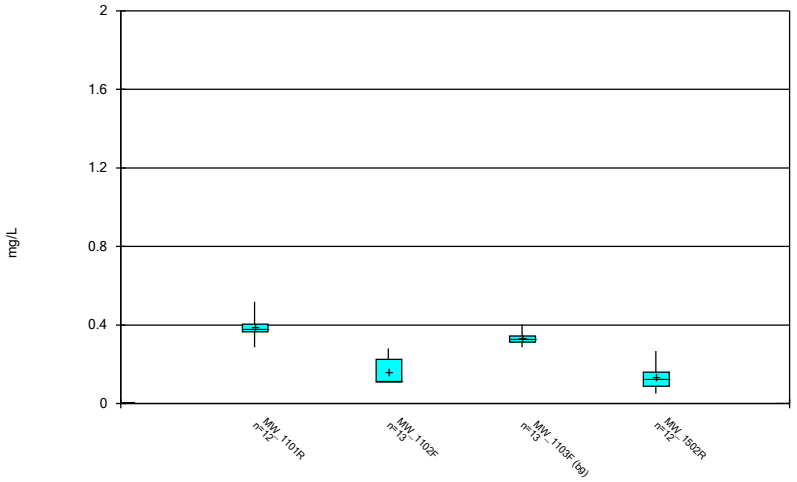
Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



Constituent: Beryllium, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

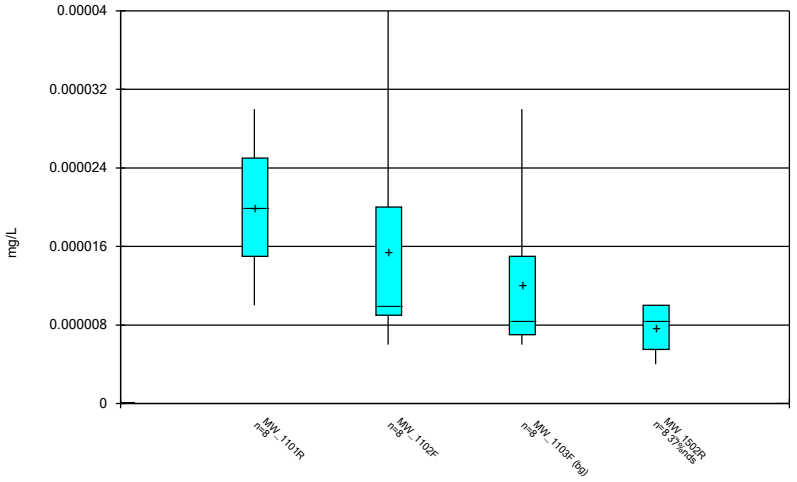
Box & Whiskers Plot



Constituent: Boron, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

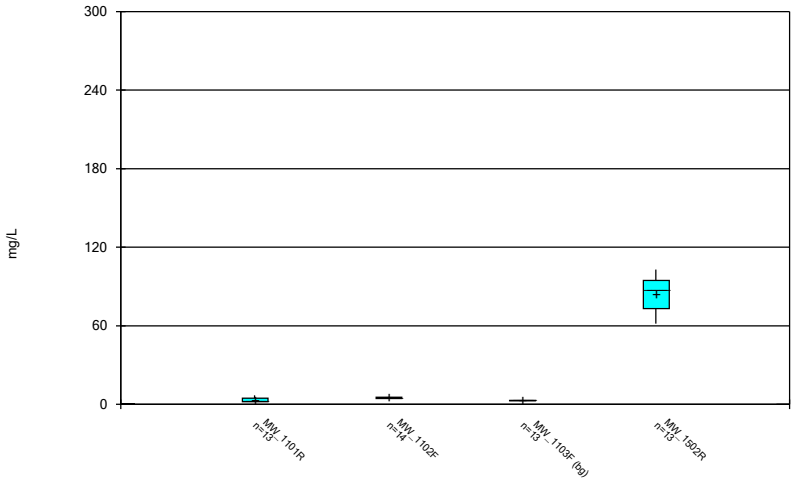
Box & Whiskers Plot



Constituent: Cadmium, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

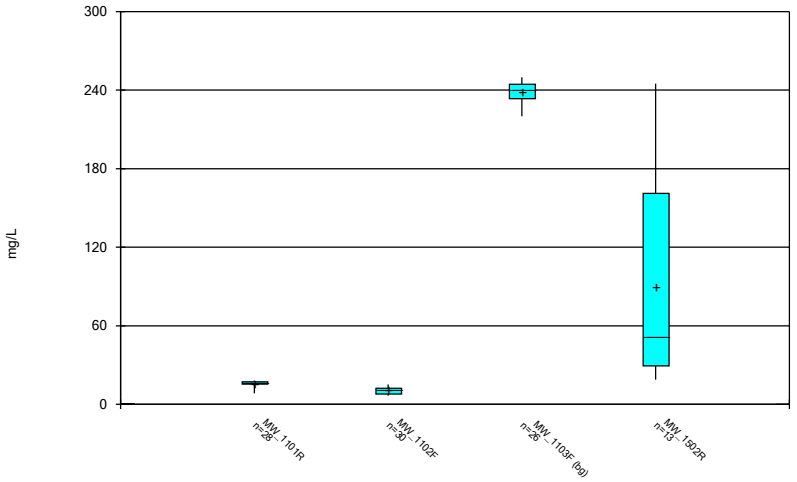
Box & Whiskers Plot



Constituent: Calcium, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

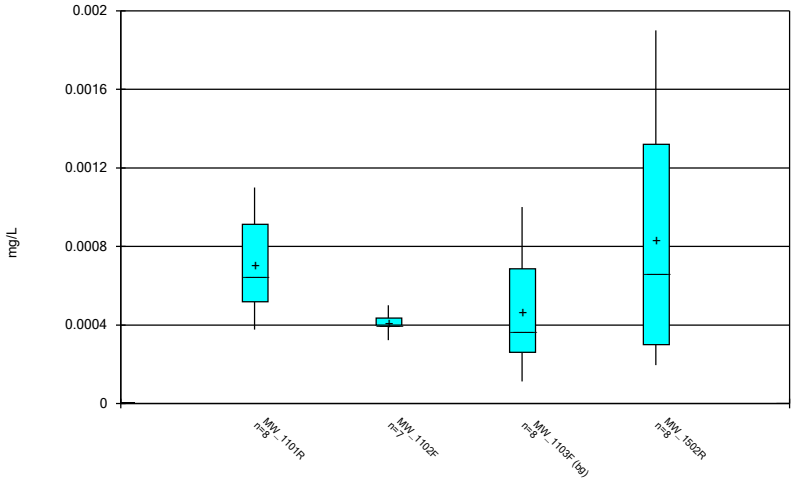
Box & Whiskers Plot



Constituent: Chloride, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

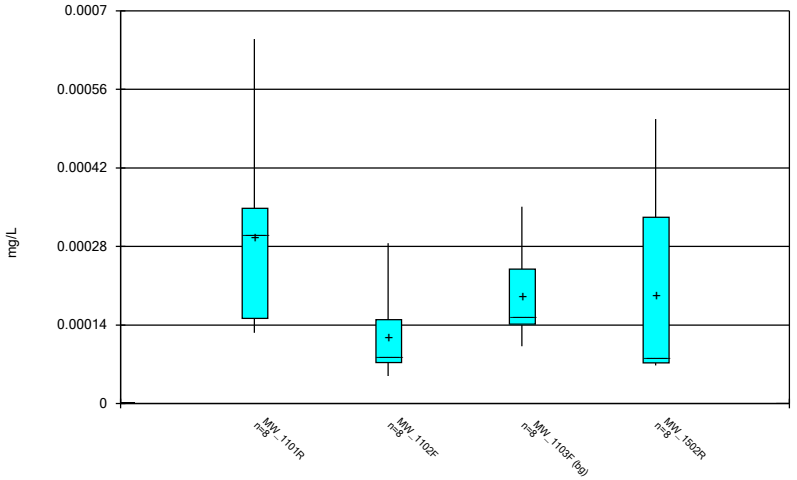
Box & Whiskers Plot



Constituent: Chromium, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

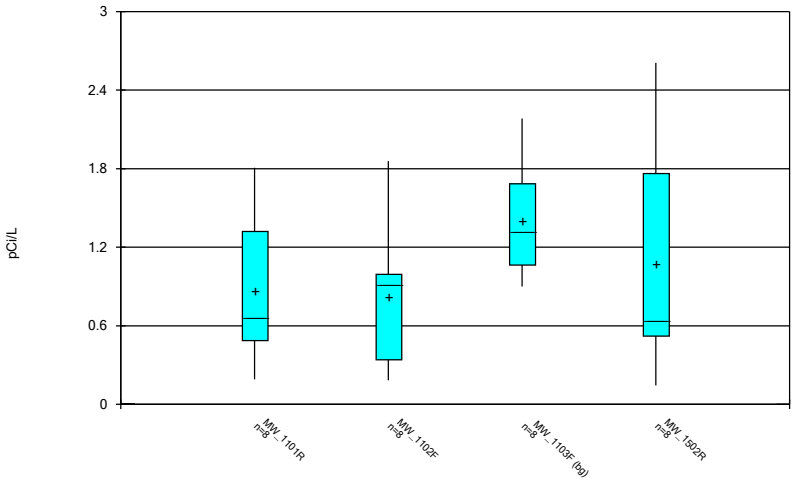
Box & Whiskers Plot



Constituent: Cobalt, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

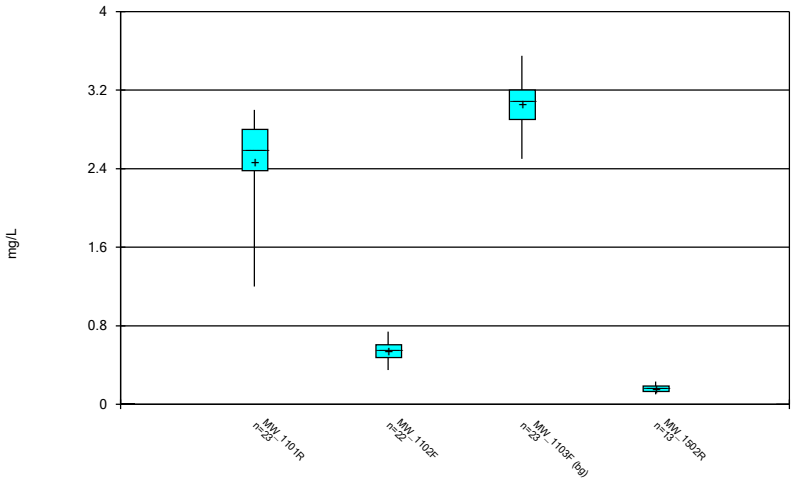
Box & Whiskers Plot



Constituent: Combined Radium Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

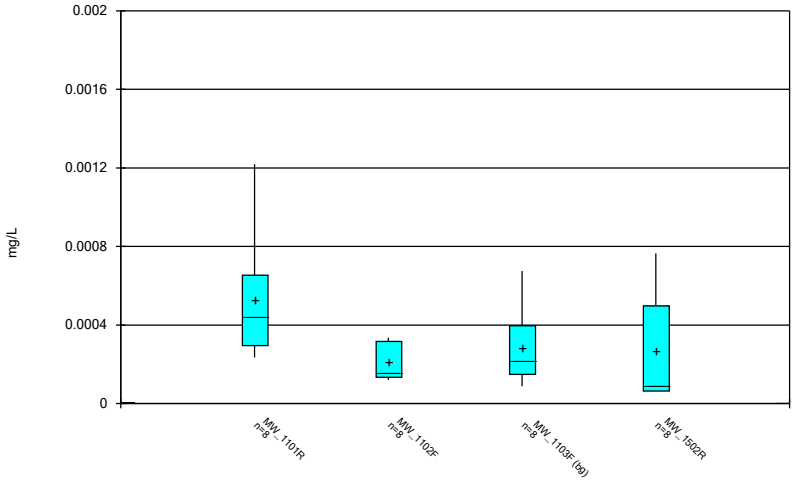
Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

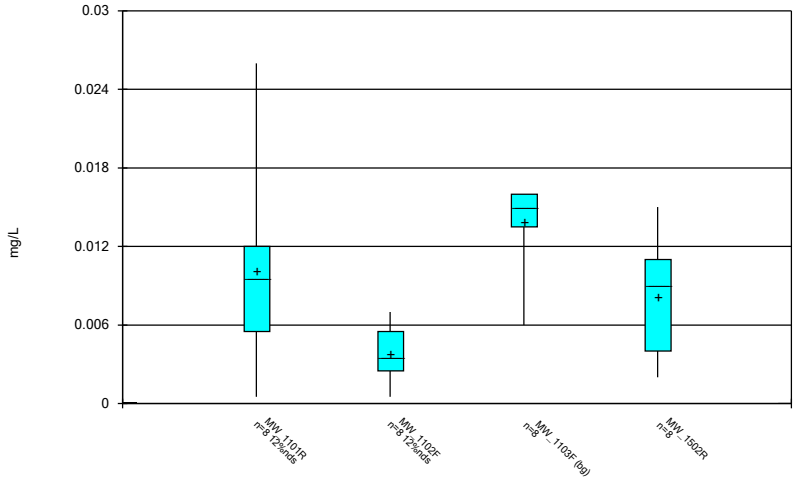
Box & Whiskers Plot



Constituent: Lead, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

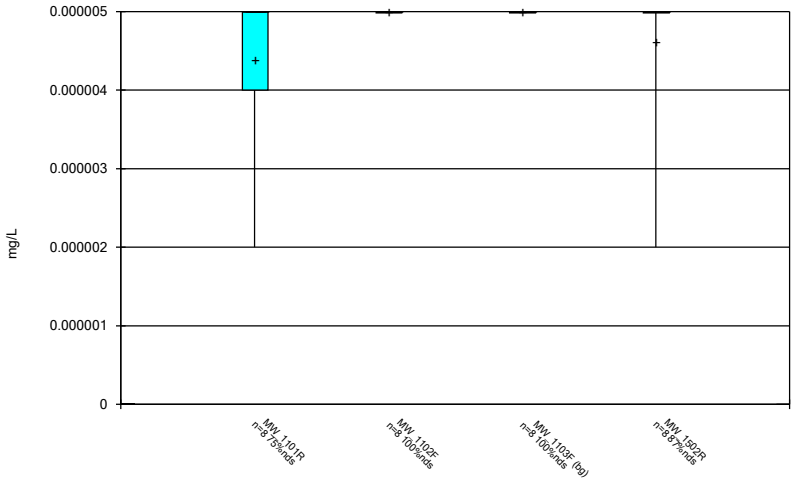
Box & Whiskers Plot



Constituent: Lithium, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

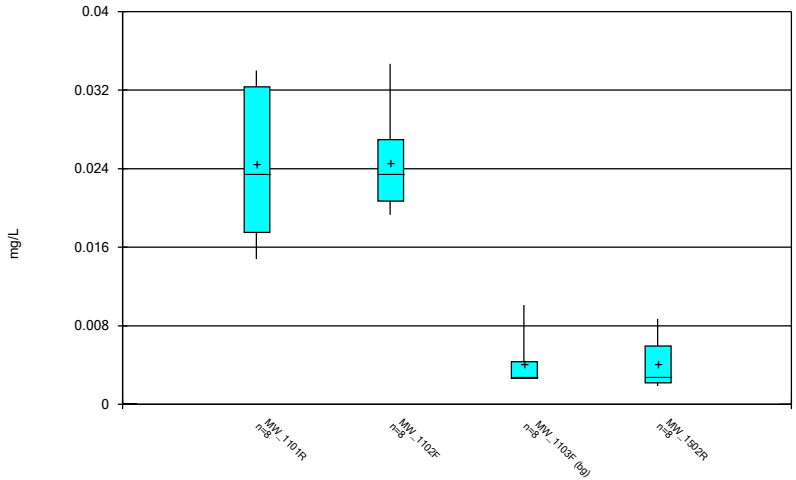
Box & Whiskers Plot



Constituent: Mercury, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

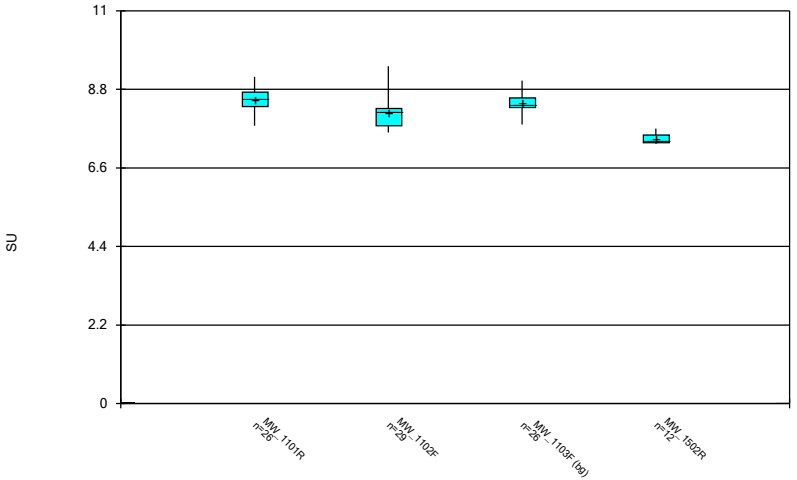
Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Box & Whiskers Plot



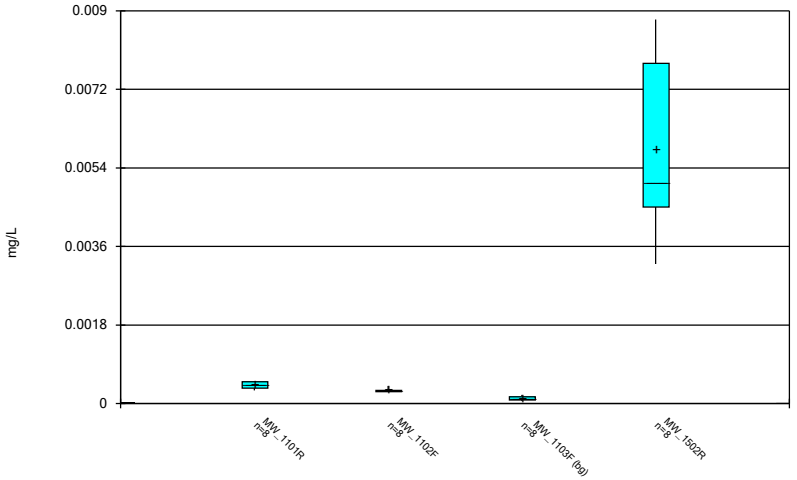
Constituent: Molybdenum, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Box & Whiskers Plot



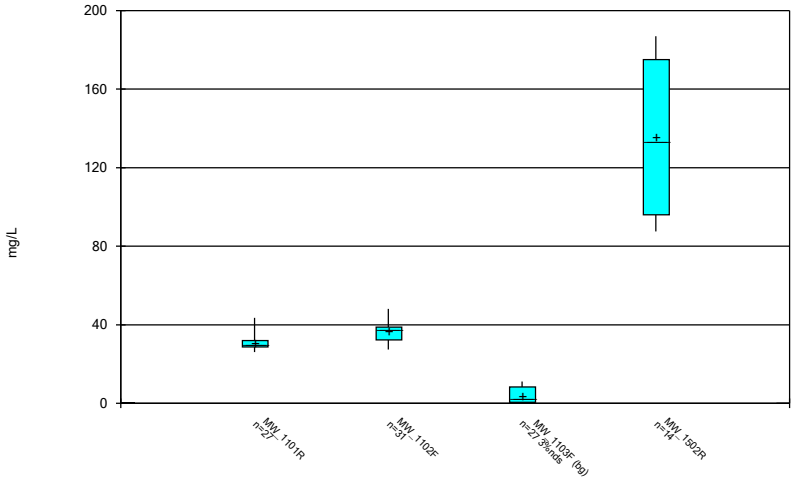
Constituent: pH, field Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Box & Whiskers Plot



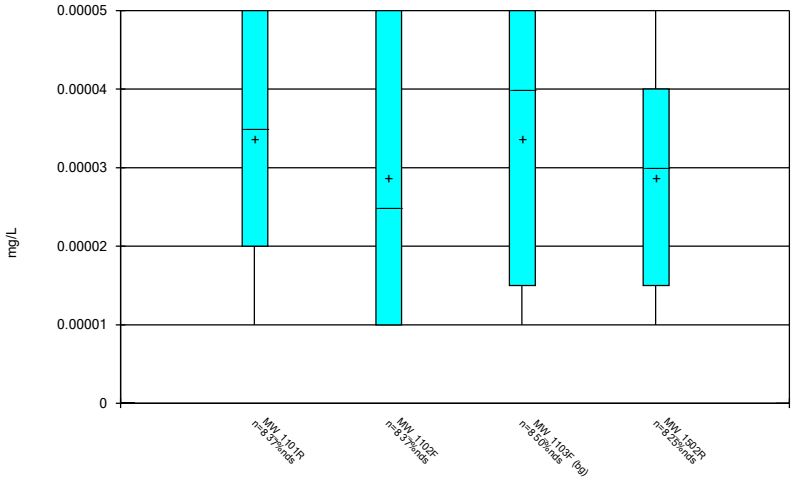
Constituent: Selenium, Total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Box & Whiskers Plot



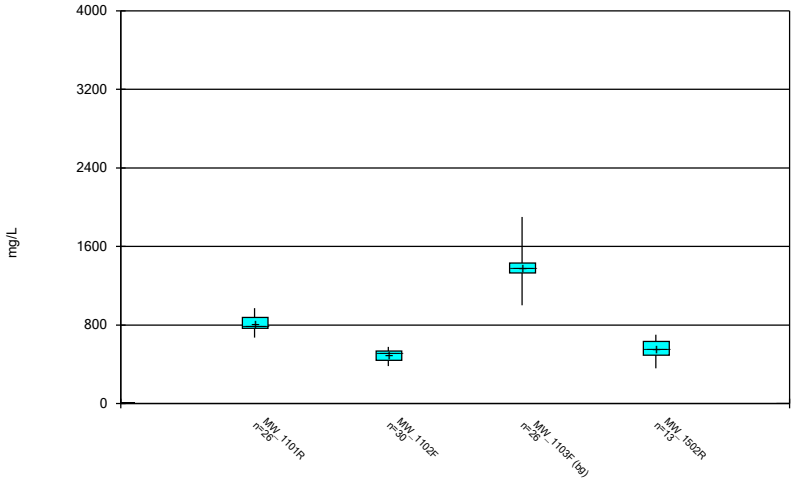
Constituent: Sulfate, total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Box & Whiskers Plot



Constituent: Thallium, Total Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Box & Whiskers Plot



Constituent: Total Dissolved Solids [TDS] Analysis Run 10/28/2019 5:28 PM View: Time Series - All Wells

Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Outlier Summary

Mitchell LF Client: Geosyntec Data: Mitchell Landfill Printed 10/29/2019, 10:36 AM

	MW_1101R Boron, total (mg/L)	MW_1502R Boron, total (mg/L)	MW_1101R Calcium, total (mg/L)	MW_1502R Calcium, total (mg/L)	MW_1101R pH, field (SU)	MW_1502R pH, field (SU)	MW_1101R Sulfate, total (mg/L)	MW_1101R Total Dissolved Solids [TDS] (mg/L)	MW_1103F Total Dissolved Solids [TDS] (mg/L)
4/26/2012									690 (o)
12/26/2012								1600 (o)	
2/21/2013								3500 (o)	
6/1/2016							67.3 (o)		
6/15/2016							76.4 (o)		
8/3/2016							76.4 (o)		
9/27/2016		0.376 (o)							
9/28/2016								43 (o)	
11/16/2016	1.8 (o)		19.4 (o)						
1/11/2018				240 (o)					
5/1/2019					10.5 (o)				
5/2/2019						8.49 (o)			

Outlier Analysis - Significant Results

Mitchell LF Client: Geosyntec Data: Mitchell Landfill Printed 10/28/2019, 4:34 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	N	Mean	Std. Dev.	Distribution	Normality Test
Boron, total (mg/L)	**MW_1101R**	**Yes**	**1.8**	**11/16/2016**	**NP**	**13**	**0.4999**	**0.3953**	**ln(x)**	**ShapiroWilk**
Calcium, total (mg/L)	**MW_1502R**	**Yes**	**240**	**1/11/2018**	**NP**	**14**	**95.31**	**43.23**	**ln(x)**	**ShapiroWilk**
pH, field (SU)	**MW_1101R**	**Yes**	**10.5**	**5/1/2019**	**NP**	**27**	**8.565**	**0.5079**	**ln(x)**	**ShapiroWilk**
pH, field (SU)	**MW_1502R**	**Yes**	**8.49**	**5/2/2019**	**NP**	**13**	**7.502**	**0.3247**	**ln(x)**	**ShapiroWilk**
Sulfate, total (mg/L)	**MW_1101R**	**Yes**	**67.3,76.4,76.4**	**6/1/2016,6/15/2016,8/3/2016**	**NP**	**30**	**35.27**	**13.54**	**ln(x)**	**ShapiroWilk**
Total Dissolved Solids [TDS] (mg/L)	**MW_1101R**	**Yes**	**1600,3500,43**	**12/26/2012,2/21/2013,9/28/2016**	**NP**	**29**	**903.9**	**544.8**	**x^(1/3)**	**ShapiroWilk**
Total Dissolved Solids [TDS] (mg/L)	**MW_1103F (bg)**	**Yes**	**690,1900**	**4/26/2012,12/26/2012**	**NP**	**27**	**1359**	**204.6**	**x^2**	**ShapiroWilk**

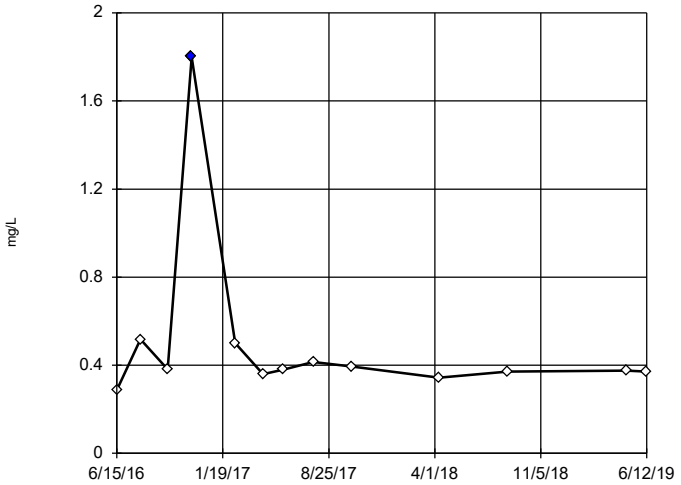
Outlier Analysis - All Results

Mitchell LF Client: Geosyntec Data: Mitchell Landfill Printed 10/28/2019, 4:35 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	N	Mean	Std. Dev.	Distribution	Normality Test
Boron, total (mg/L)	**MW_1101R**	**Yes**	**1.8**	**11/16/2016**	**NP**	**13**	**0.4999**	**0.3953**	**ln(x)**	**ShapiroWilk**
Boron, total (mg/L)	MW_1102F	No	n/a	n/a	NP	13	0.1595	0.0679	ln(x)	ShapiroWilk
Boron, total (mg/L)	MW_1103F (bg)	No	n/a	n/a	NP	13	0.3318	0.0286	ln(x)	ShapiroWilk
Boron, total (mg/L)	MW_1502R	No	n/a	n/a	NP	13	0.1523	0.08992	ln(x)	ShapiroWilk
Calcium, total (mg/L)	MW_1101R	No	n/a	n/a	NP	14	4.219	4.71	ln(x)	ShapiroWilk
Calcium, total (mg/L)	MW_1102F	No	n/a	n/a	NP	14	4.84	0.4263	ln(x)	ShapiroWilk
Calcium, total (mg/L)	MW_1103F (bg)	No	n/a	n/a	NP	13	2.882	0.1753	x^6	ShapiroWilk
Calcium, total (mg/L)	**MW_1502R**	**Yes**	**240**	**1/11/2018**	**NP**	**14**	**95.31**	**43.23**	**ln(x)**	**ShapiroWilk**
Chloride, total (mg/L)	MW_1101R	No	n/a	n/a	NP	28	15.64	2.29	x^6	ShapiroWilk
Chloride, total (mg/L)	MW_1102F	No	n/a	n/a	NP	30	10.51	2.547	normal	ShapiroWilk
Chloride, total (mg/L)	MW_1103F (bg)	No	n/a	n/a	NP	26	238.5	8.51	x^6	ShapiroWilk
Chloride, total (mg/L)	MW_1502R	No	n/a	n/a	NP	13	90	76.06	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	MW_1101R	No	n/a	n/a	NP	23	2.471	0.4385	x^4	ShapiroWilk
Fluoride, total (mg/L)	MW_1102F	No	n/a	n/a	NP	22	0.5423	0.09201	normal	ShapiroWilk
Fluoride, total (mg/L)	MW_1103F (bg)	No	n/a	n/a	NP	23	3.054	0.2331	x^3	ShapiroWilk
Fluoride, total (mg/L)	MW_1502R	No	n/a	n/a	NP	13	0.1615	0.03976	x^2	ShapiroWilk
pH, field (SU)	**MW_1101R**	**Yes**	**10.5**	**5/1/2019**	**NP**	**27**	**8.565**	**0.5079**	**ln(x)**	**ShapiroWilk**
pH, field (SU)	MW_1102F	No	n/a	n/a	NP	29	8.116	0.3742	ln(x)	ShapiroWilk
pH, field (SU)	MW_1103F (bg)	No	n/a	n/a	NP	26	8.41	0.2575	ln(x)	ShapiroWilk
pH, field (SU)	**MW_1502R**	**Yes**	**8.49**	**5/2/2019**	**NP**	**13**	**7.502**	**0.3247**	**ln(x)**	**ShapiroWilk**
Sulfate, total (mg/L)	**MW_1101R**	**Yes**	**67.3,76.4,76.4**	**6/1/2016,6/15/2016,8/3/2016**	**NP**	**30**	**35.27**	**13.54**	**ln(x)**	**ShapiroWilk**
Sulfate, total (mg/L)	MW_1102F	No	n/a	n/a	NP	31	36.54	4.74	x^(1/3)	ShapiroWilk
Sulfate, total (mg/L)	MW_1103F (bg)	No	n/a	n/a	NP	27	3.635	3.763	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	MW_1502R	No	n/a	n/a	NP	14	135.1	38.17	x^(1/3)	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	**MW_1101R**	**Yes**	**1600,3500,43**	**12/26/2012,2/21/2013,9/28/2016**	**NP**	**29**	**903.9**	**544.8**	**x^(1/3)**	**ShapiroWilk**
Total Dissolved Solids [TDS] (mg/L)	MW_1102F	No	n/a	n/a	NP	30	498.7	55.58	x^6	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	**MW_1103F (bg)**	**Yes**	**690,1900**	**4/26/2012,12/26/2012**	**NP**	**27**	**1359**	**204.6**	**x^2**	**ShapiroWilk**
Total Dissolved Solids [TDS] (mg/L)	MW_1502R	No	n/a	n/a	NP	13	553.2	92.07	x^2	ShapiroWilk

Tukey's Outlier Screening

MW_1101R



n = 13

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

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

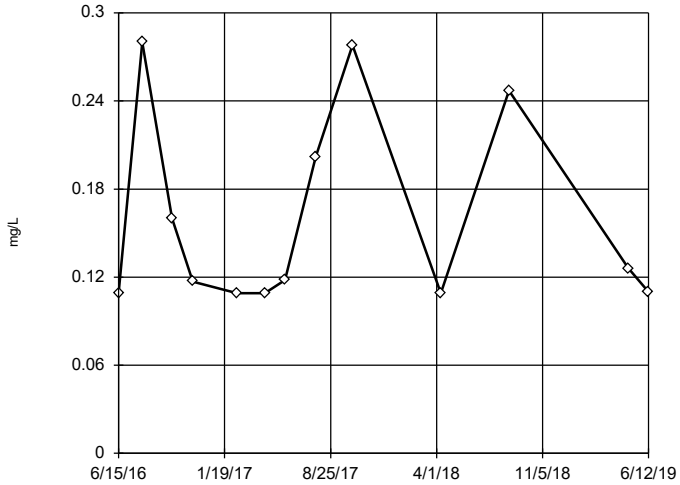
High cutoff = 0.8856, low cutoff = 0.1882, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1102F



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).

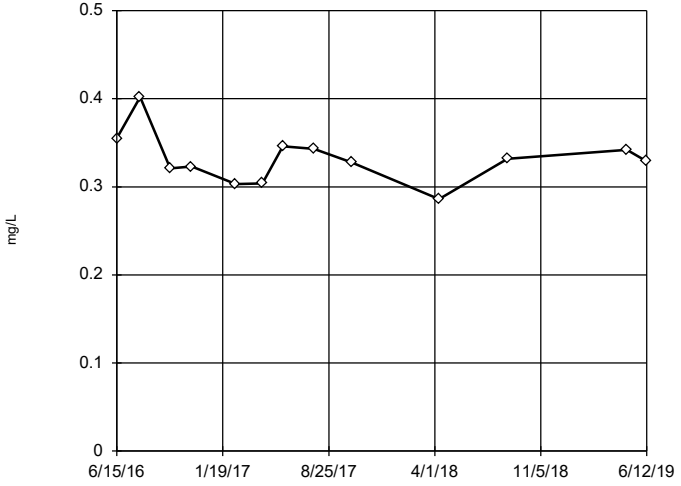
High cutoff = 1.922, low cutoff = 0.01267, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1103F (bg)



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).

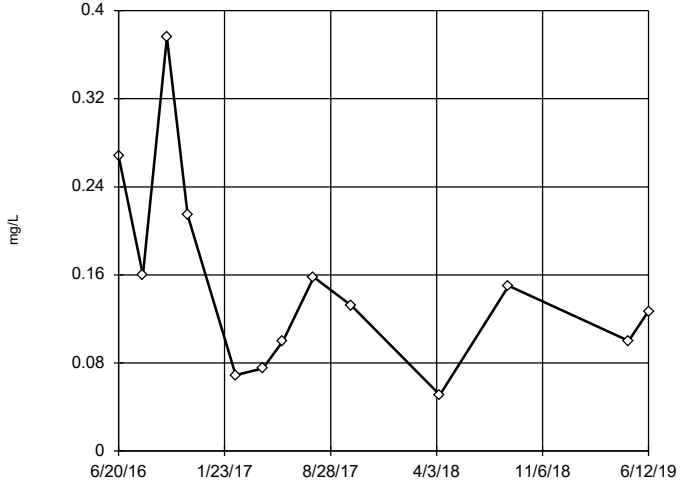
High cutoff = 0.462, low cutoff = 0.2329, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1502R



n = 13

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

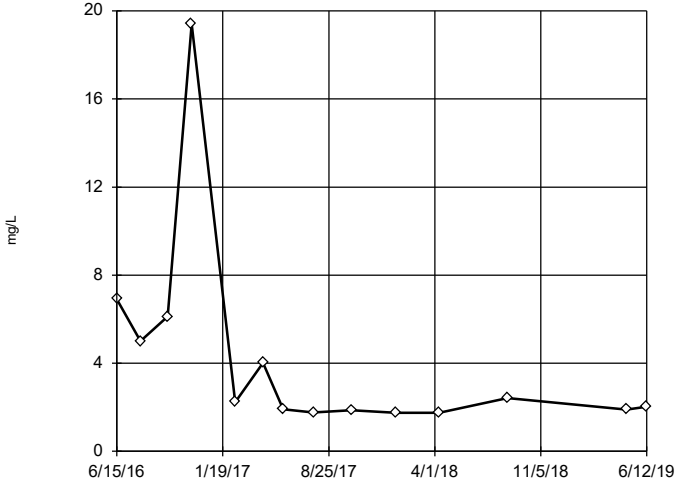
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.805, low cutoff = 0.008878, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Tukey's Outlier Screening

MW_1101R



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).

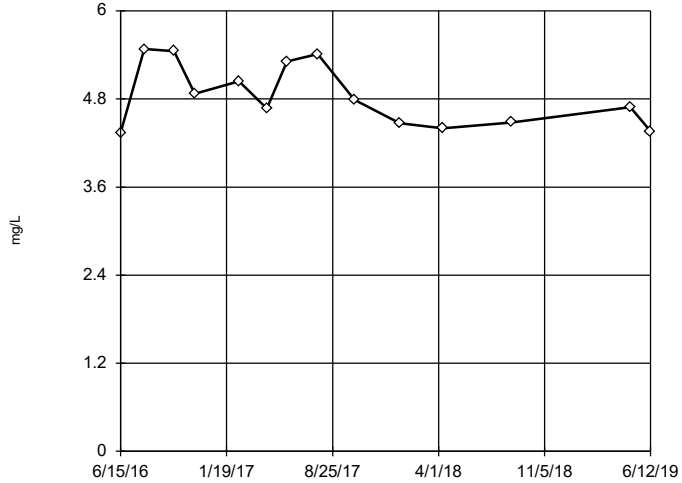
High cutoff = 156.8, low cutoff = 0.06399, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1102F



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).

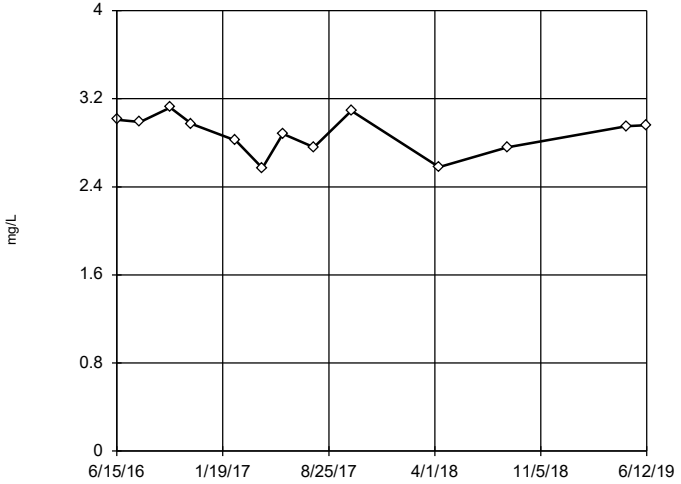
High cutoff = 9.461, low cutoff = 2.512, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1103F (bg)



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).

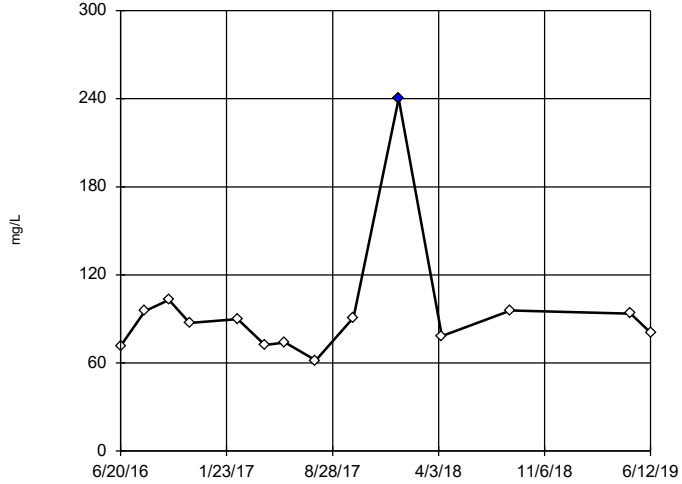
High cutoff = 3.417, low cutoff = -2.736, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1502R



n = 14

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

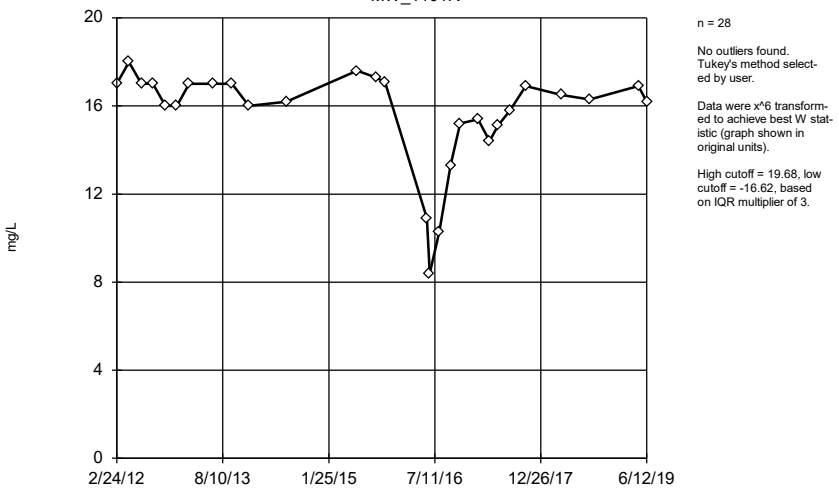
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 213.9, low cutoff = 32.63, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Tukey's Outlier Screening

MW_1101R



n = 28

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

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

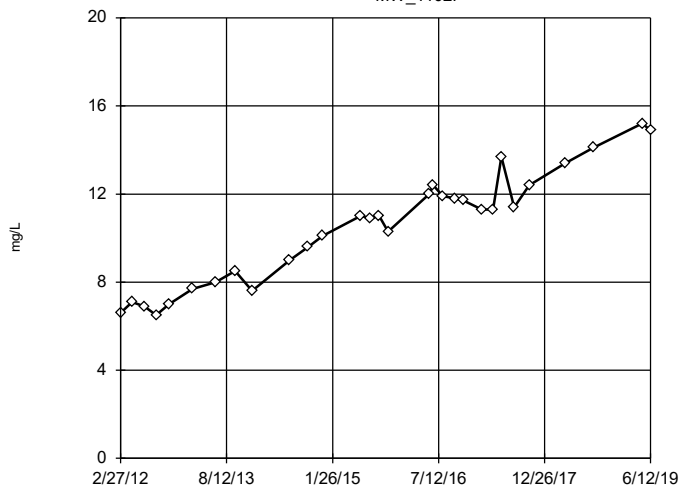
High cutoff = 19.68, low cutoff = -16.62, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1102F



n = 30

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

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

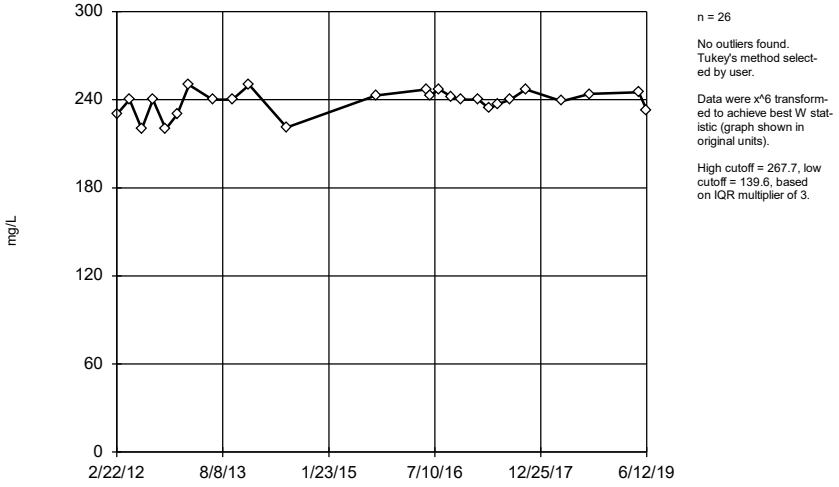
High cutoff = 25.25, low cutoff = -5.2, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1103F (bg)



n = 26

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

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

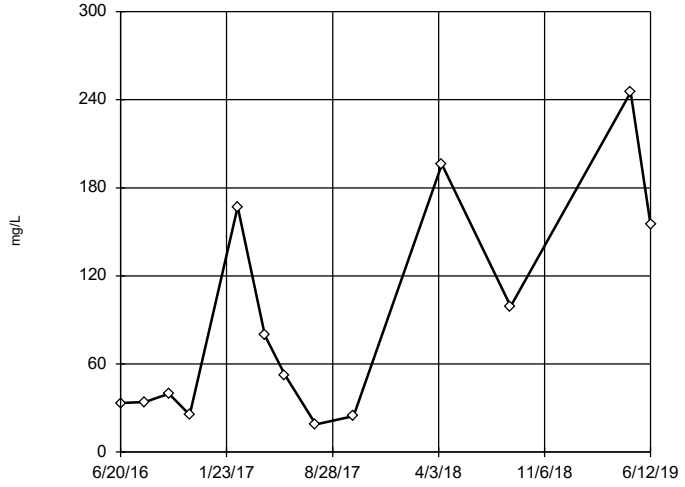
High cutoff = 267.7, low cutoff = 139.6, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1502R



n = 13

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

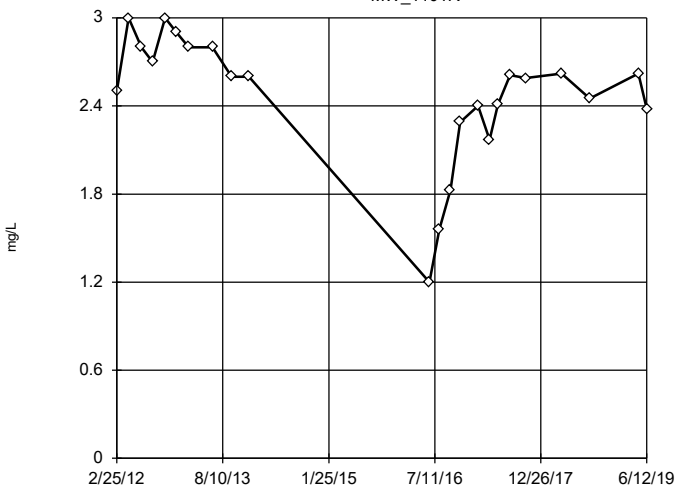
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 27116, low cutoff = 0.1728, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 10/28/2019 4:24 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Tukey's Outlier Screening

MW_1101R



n = 23

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

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

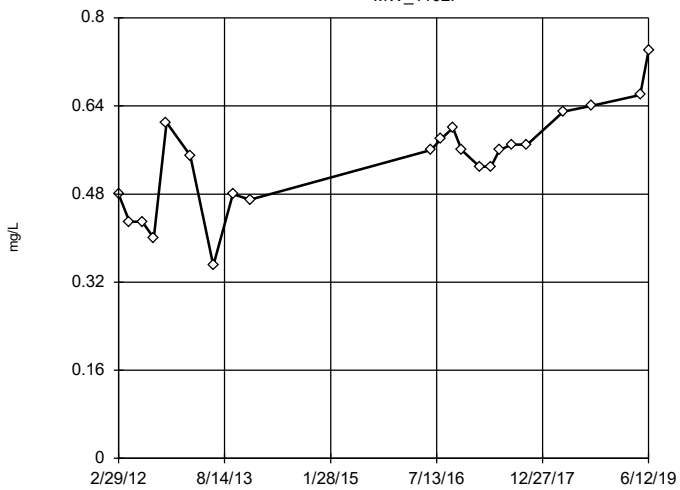
High cutoff = 3.497, low cutoff = -2.736, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1102F



n = 22

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

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

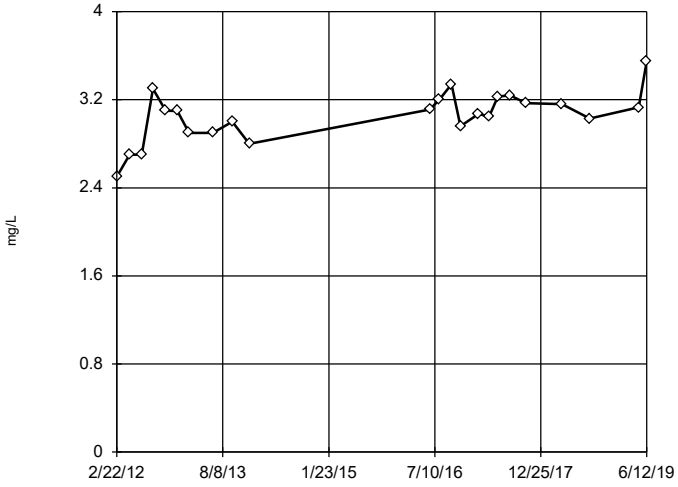
High cutoff = 0.995, low cutoff = 0.085, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1103F (bg)



n = 23

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

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

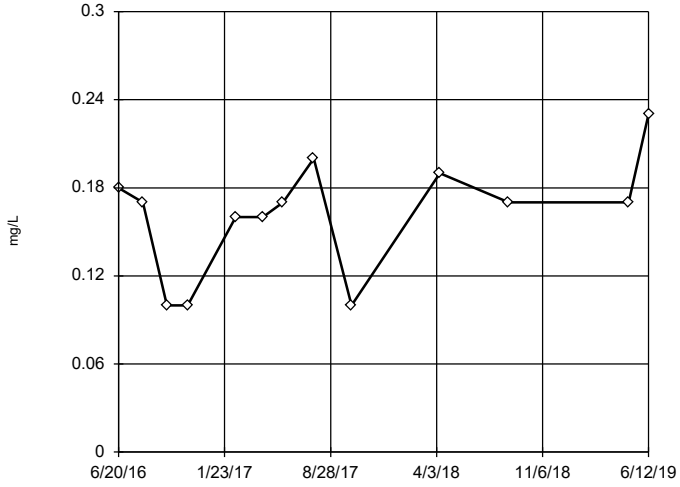
High cutoff = 3.869, low cutoff = -0.9078, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1502R



n = 13

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

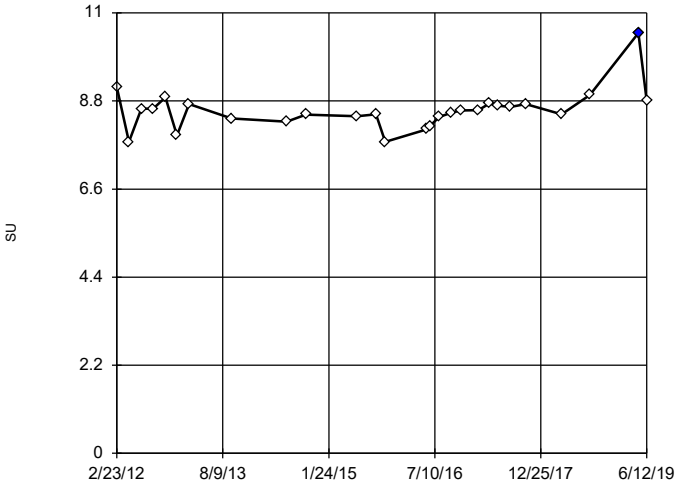
Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.2891, low cutoff = -0.1776, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Tukey's Outlier Screening

MW_1101R



n = 27

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).

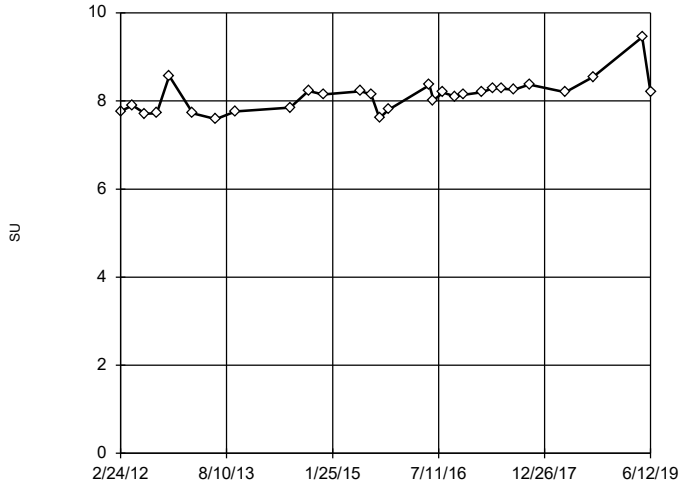
High cutoff = 9.896, low cutoff = 7.367, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1102F



n = 29

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

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

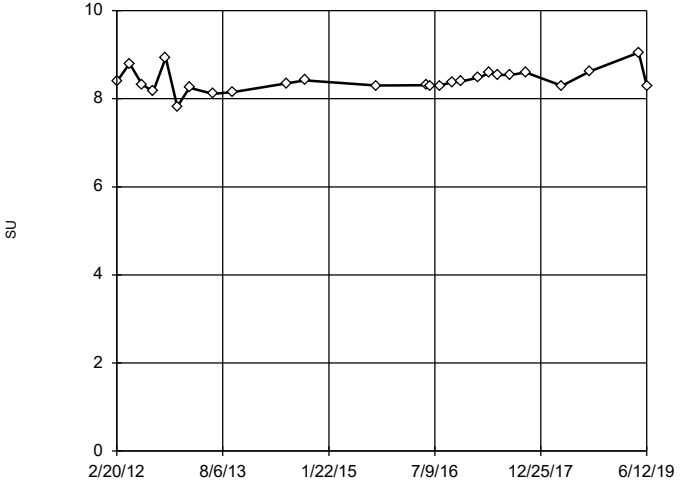
High cutoff = 9.933, low cutoff = 6.477, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1103F (bg)



n = 26

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

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

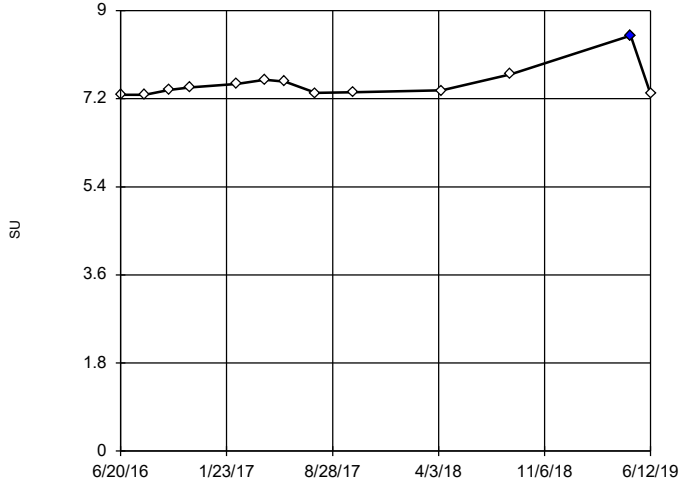
High cutoff = 9.424, low cutoff = 7.53, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1502R



n = 13

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

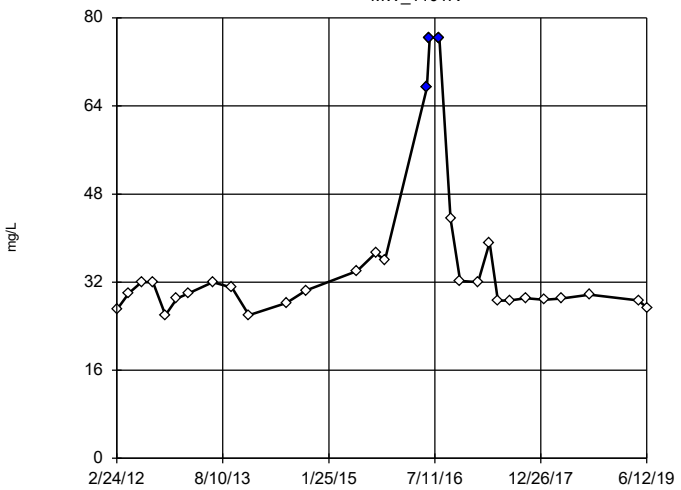
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8.407, low cutoff = 6.582, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Tukey's Outlier Screening

MW_1101R



n = 30

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

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

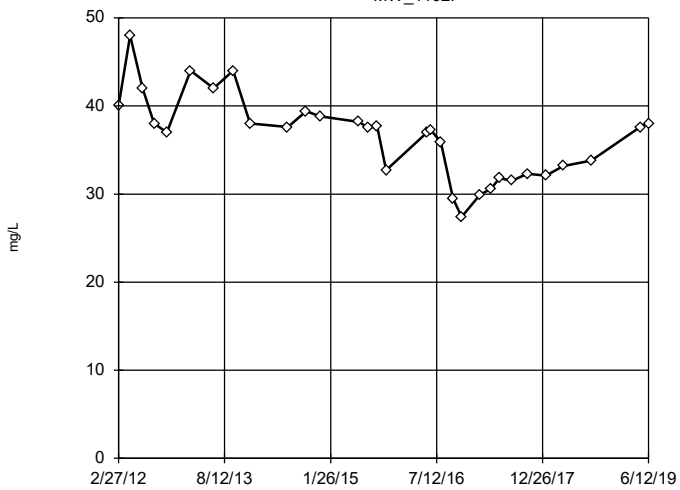
High cutoff = 63.37, low cutoff = 15.84, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1102F



n = 31

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

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

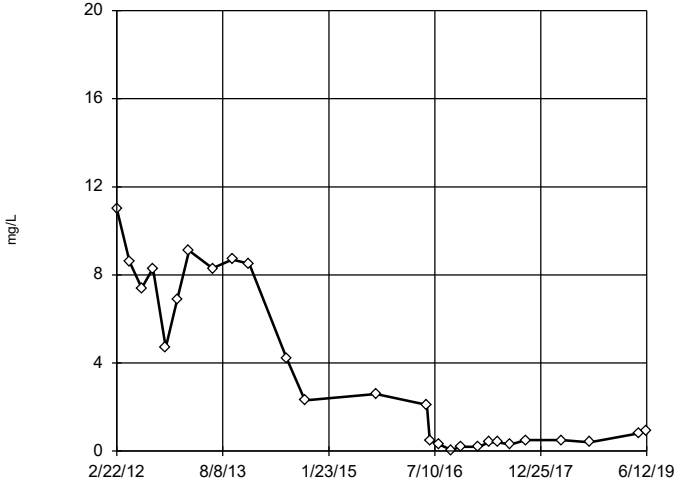
High cutoff = 63.4, low cutoff = 17.22, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1103F (bg)



n = 27

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

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

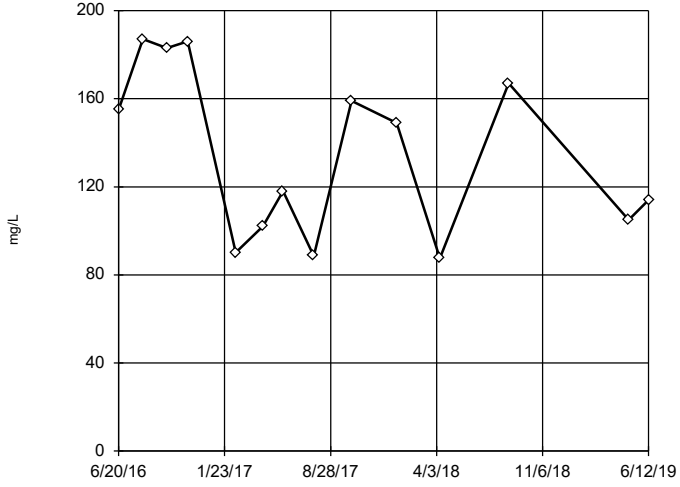
High cutoff = 74154, low cutoff = 0.00004477, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1502R



n = 14

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

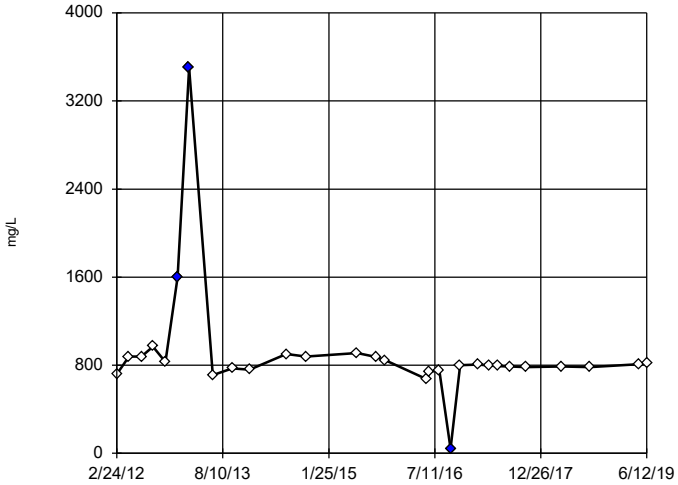
Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 644, low cutoff = 3.612, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Tukey's Outlier Screening

MW_1101R



n = 29

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

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

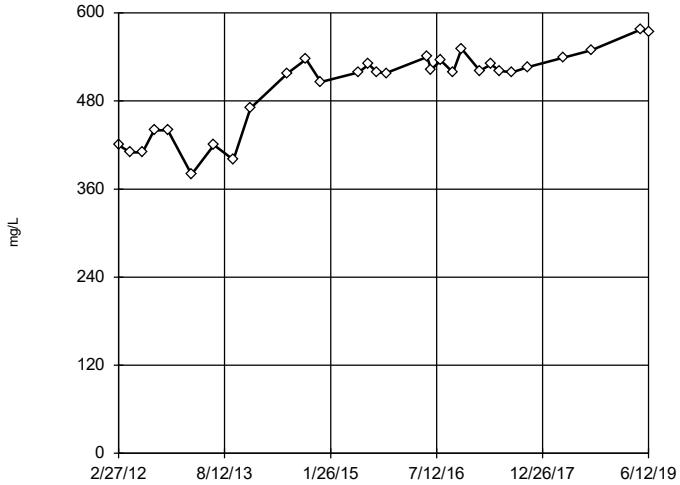
High cutoff = 1288, low cutoff = 482.9, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1102F



n = 30

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

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

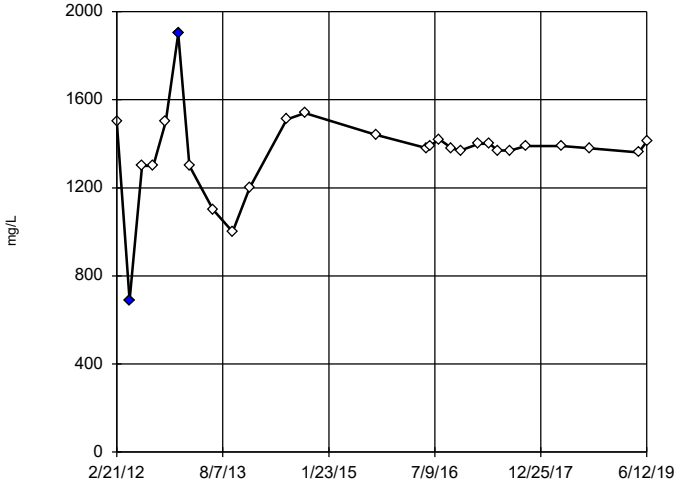
High cutoff = 646.6, low cutoff = -589.9, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1103F (bg)



n = 27

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

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

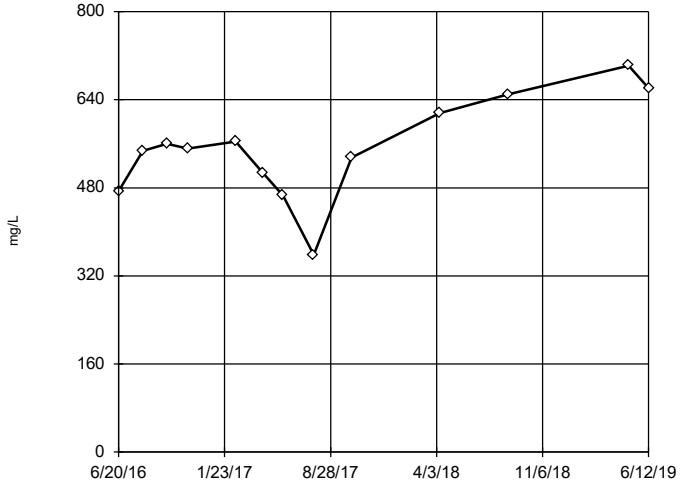
High cutoff = 1731, low cutoff = 843.1, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Tukey's Outlier Screening

MW_1502R



n = 13

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 = 938.8, low cutoff = -489.4, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/28/2019 4:25 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Mann-Whitney - Significant Results

Mitchell LF Client: Geosyntec Data: Mitchell Landfill Printed 10/29/2019, 1:10 PM

Constituent	Well	Calc.	0.01	Sig.	Method
Chloride, total (mg/L)	**MW_1102F**	**3.312**	**Yes**	**Yes**	**Mann-W**
Fluoride, total (mg/L)	**MW_1102F**	**3.023**	**Yes**	**Yes**	**Mann-W**
Total Dissolved Solids [TDS] (mg/L)	**MW_1102F**	**2.955**	**Yes**	**Yes**	**Mann-W**

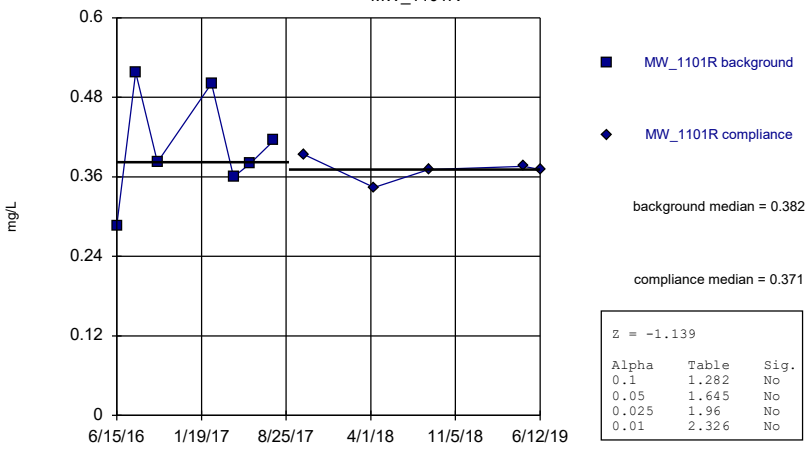
Mann-Whitney - All Results

Mitchell LF Client: Geosyntec Data: Mitchell Landfill Printed 10/29/2019, 1:10 PM

Constituent	Well	Calc.	0.01	Sig.	Method
Boron, total (mg/L)	MW_1101R	-1.139	No	No	Mann-W
Boron, total (mg/L)	MW_1102F	0.4453	No	No	Mann-W
Boron, total (mg/L)	MW_1103F (bg)	-0.6587	No	No	Mann-W
Boron, total (mg/L)	MW_1502R	-1.057	No	No	Mann-W
Calcium, total (mg/L)	MW_1101R	-2.074	No	No	Mann-W
Calcium, total (mg/L)	MW_1102F	-2.13	No	No	Mann-W
Calcium, total (mg/L)	MW_1103F (bg)	-0.4398	No	No	Mann-W
Calcium, total (mg/L)	MW_1502R	0.9515	No	No	Mann-W
Chloride, total (mg/L)	MW_1101R	0.3921	No	No	Mann-W
Chloride, total (mg/L)	**MW_1102F**	**3.312**	**Yes**	**Yes**	**Mann-W**
Chloride, total (mg/L)	MW_1103F (bg)	0.7236	No	No	Mann-W
Chloride, total (mg/L)	MW_1502R	1.537	No	No	Mann-W
Fluoride, total (mg/L)	MW_1101R	-0.2613	No	No	Mann-W
Fluoride, total (mg/L)	**MW_1102F**	**3.023**	**Yes**	**Yes**	**Mann-W**
Fluoride, total (mg/L)	MW_1103F (bg)	1.455	No	No	Mann-W
Fluoride, total (mg/L)	MW_1502R	0.8222	No	No	Mann-W
pH, field (SU)	MW_1101R	1.813	No	No	Mann-W
pH, field (SU)	MW_1102F	2.456	No	No	Mann-W
pH, field (SU)	MW_1103F (bg)	1.205	No	No	Mann-W
pH, field (SU)	MW_1502R	-0.08507	No	No	Mann-W
Sulfate, total (mg/L)	MW_1101R	-1.666	No	No	Mann-W
Sulfate, total (mg/L)	MW_1102F	-1.101	No	No	Mann-W
Sulfate, total (mg/L)	MW_1103F (bg)	-1.157	No	No	Mann-W
Sulfate, total (mg/L)	MW_1502R	-0.5809	No	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	MW_1101R	-0.4555	No	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	**MW_1102F**	**2.955**	**Yes**	**Yes**	**Mann-W**
Total Dissolved Solids [TDS] (mg/L)	MW_1103F (bg)	0	No	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	MW_1502R	2.269	No	No	Mann-W

Mann-Whitney (Wilcoxon Rank Sum)

MW_1101R



Z = -1.139

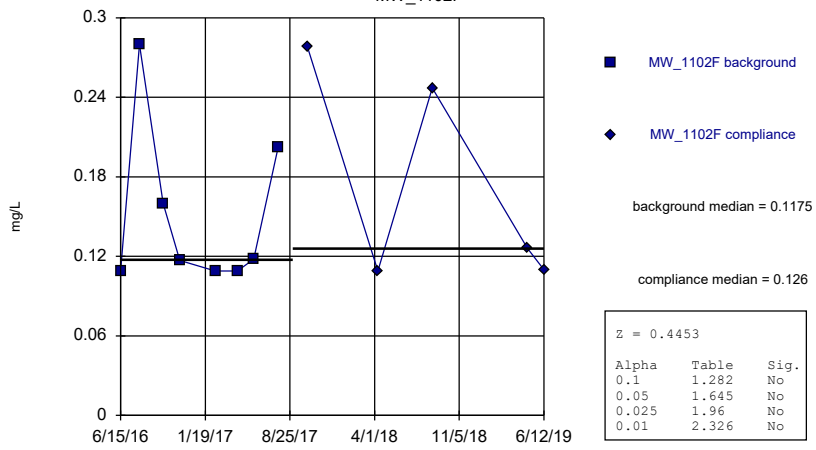
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Boron, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1102F



Z = 0.4453

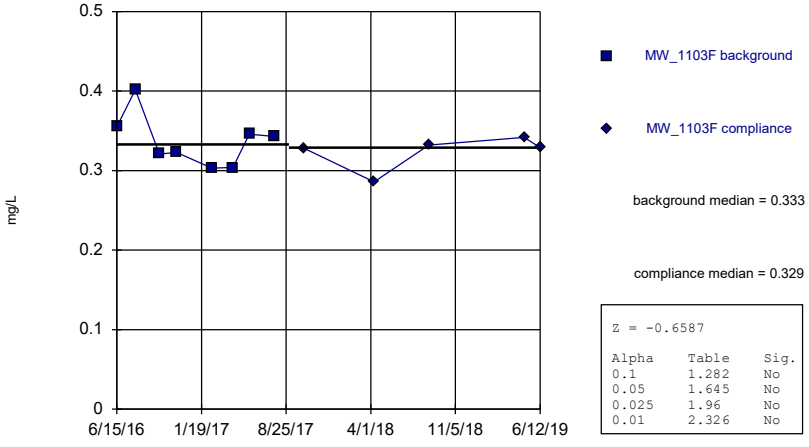
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Boron, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1103F (bg)



Z = -0.6587

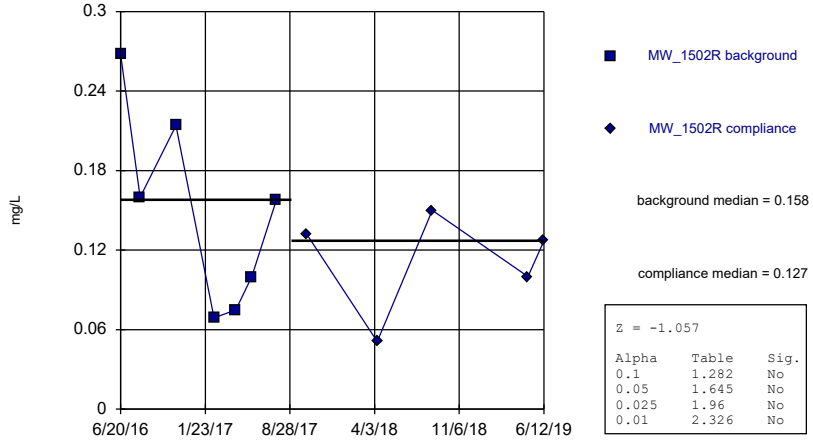
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Boron, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1502R



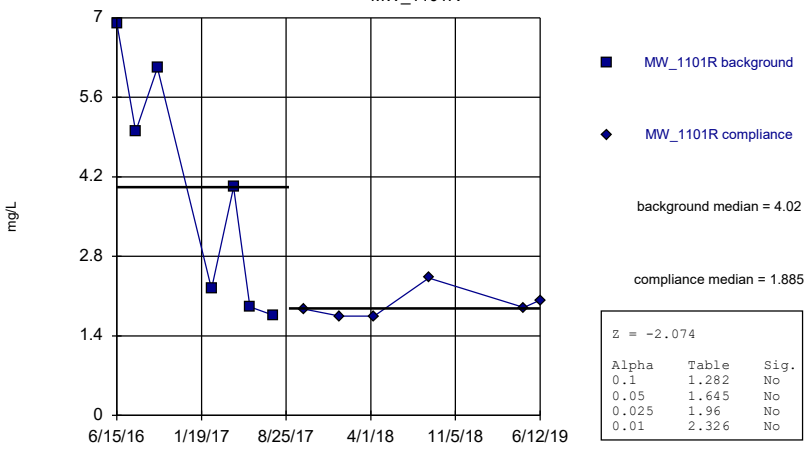
Z = -1.057

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 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW_1101R

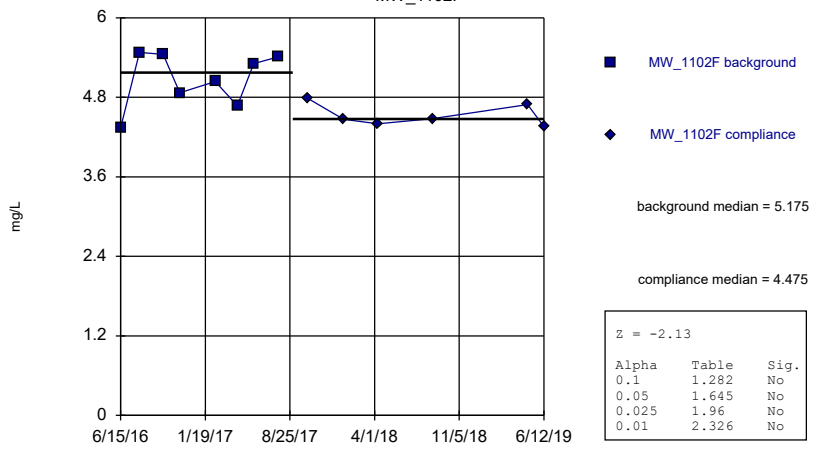


Constituent: Calcium, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1102F

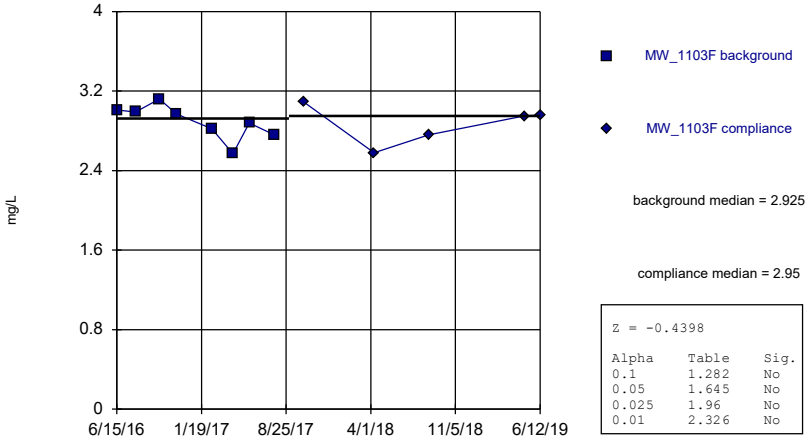


Constituent: Calcium, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1103F (bg)

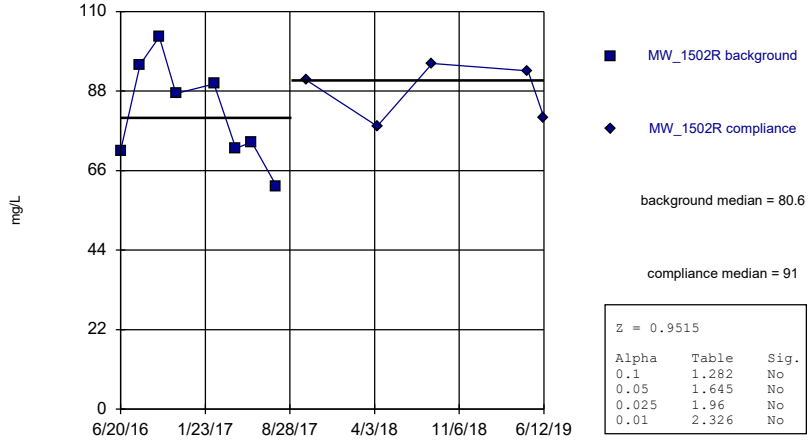


Constituent: Calcium, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

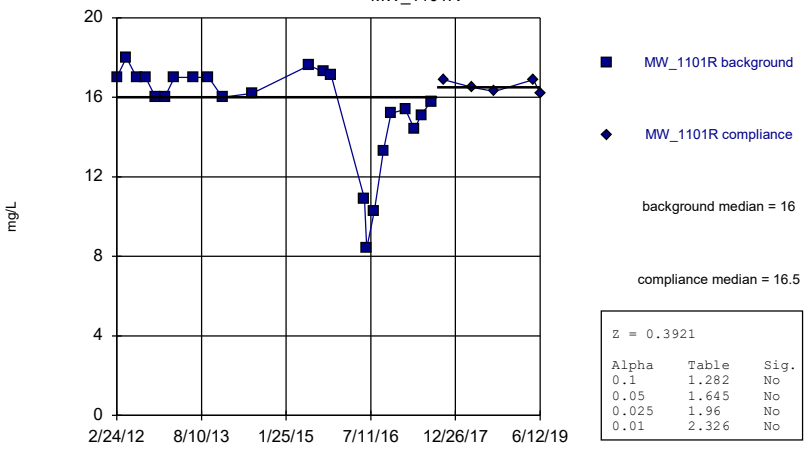
MW_1502R



Constituent: Calcium, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW_1101R

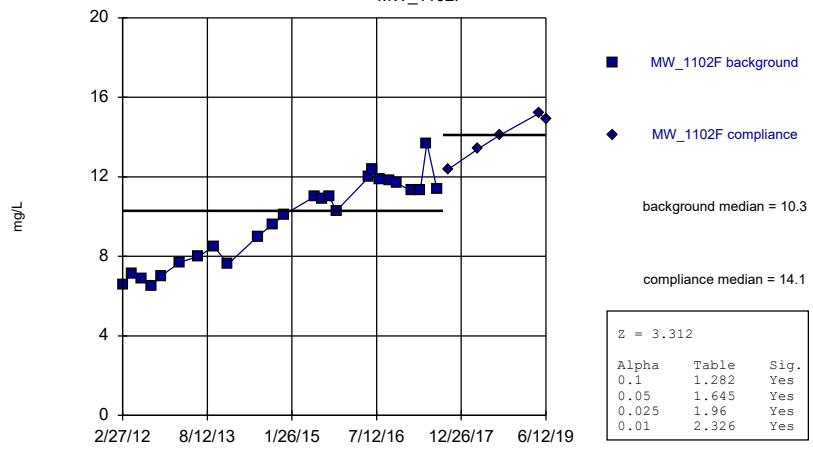


Constituent: Chloride, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1102F

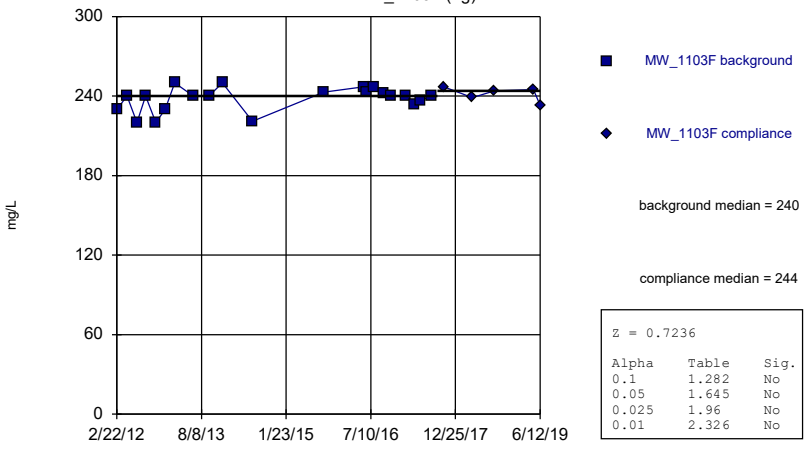


Constituent: Chloride, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1103F (bg)

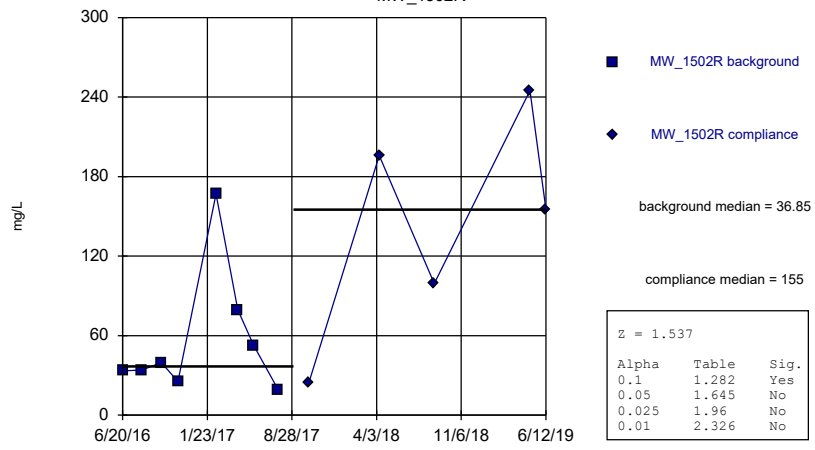


Constituent: Chloride, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

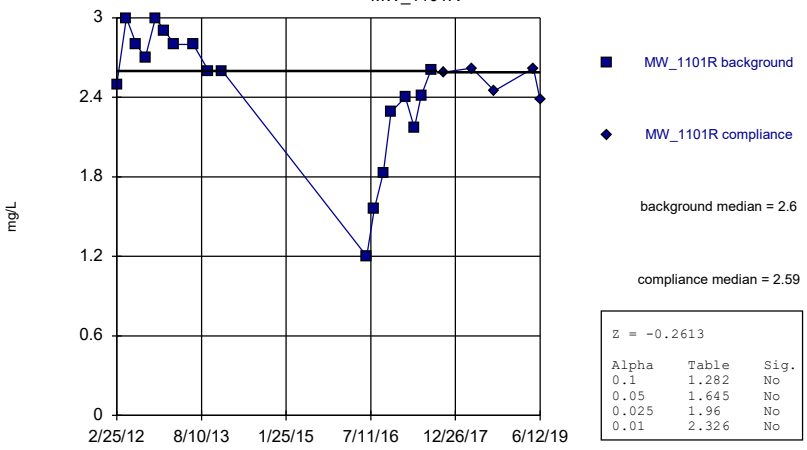
MW_1502R



Constituent: Chloride, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW_1101R



Z = -0.2613

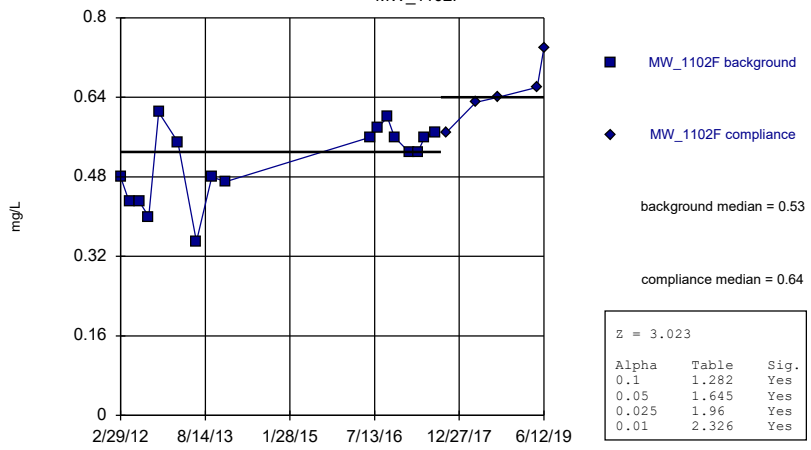
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Fluoride, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1102F



Z = 3.023

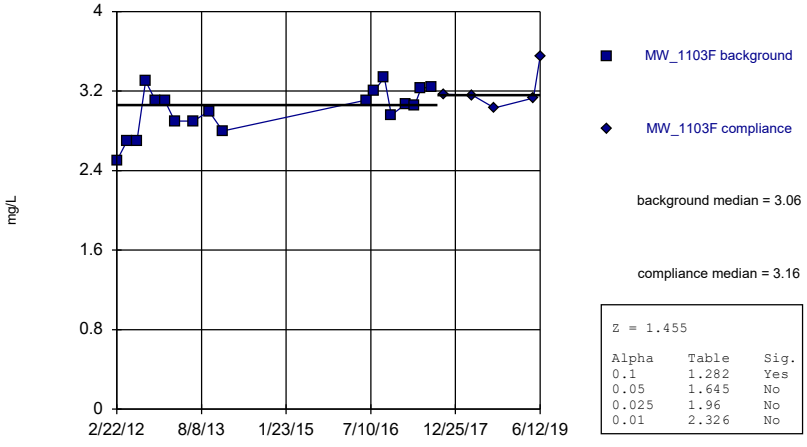
Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	Yes
0.025	1.96	Yes
0.01	2.326	Yes

Constituent: Fluoride, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1103F (bg)



Z = 1.455

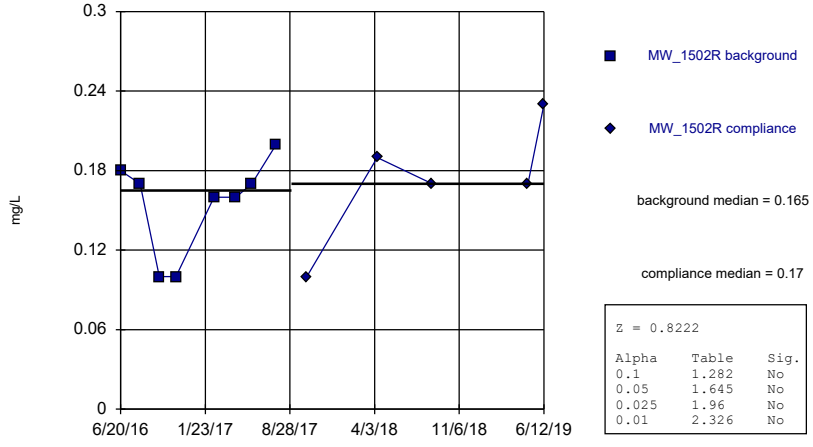
Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Fluoride, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1502R



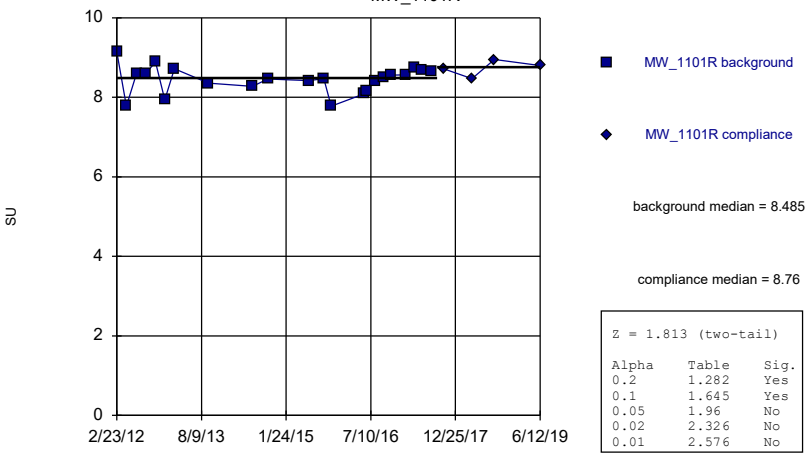
Z = 0.8222

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

Constituent: Fluoride, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW_1101R



background median = 8.485

compliance median = 8.76

Z = 1.813 (two-tail)

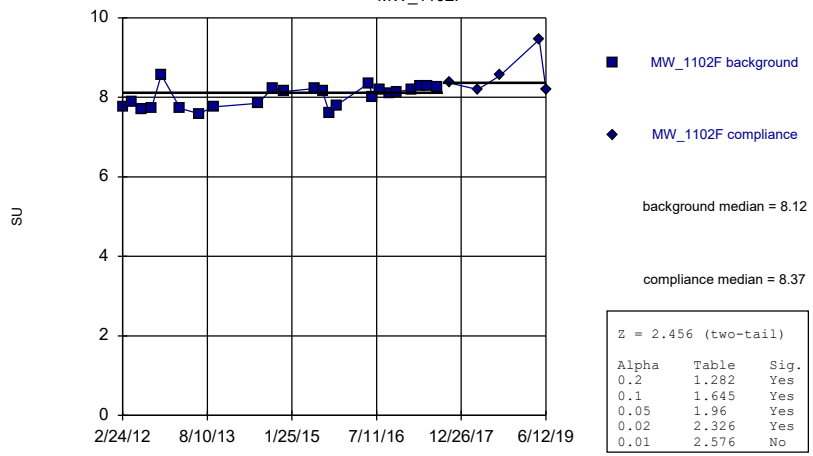
Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	Yes
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: pH, field Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1102F



background median = 8.12

compliance median = 8.37

Z = 2.456 (two-tail)

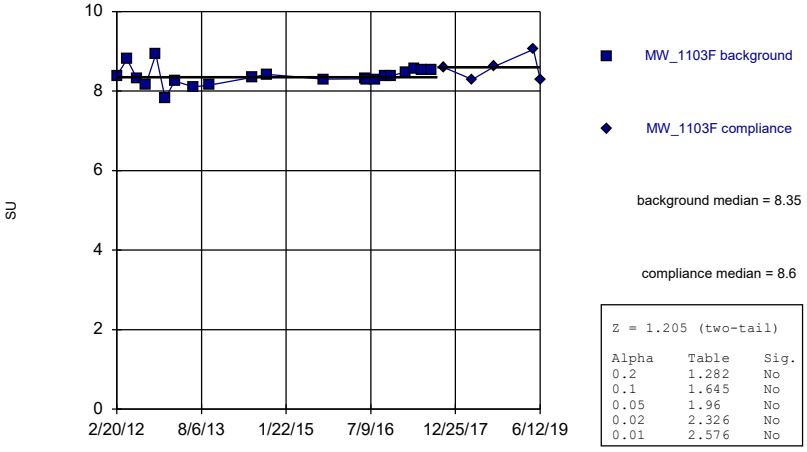
Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	Yes
0.05	1.96	Yes
0.02	2.326	Yes
0.01	2.576	No

Constituent: pH, field Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1103F (bg)



background median = 8.35

compliance median = 8.6

Z = 1.205 (two-tail)

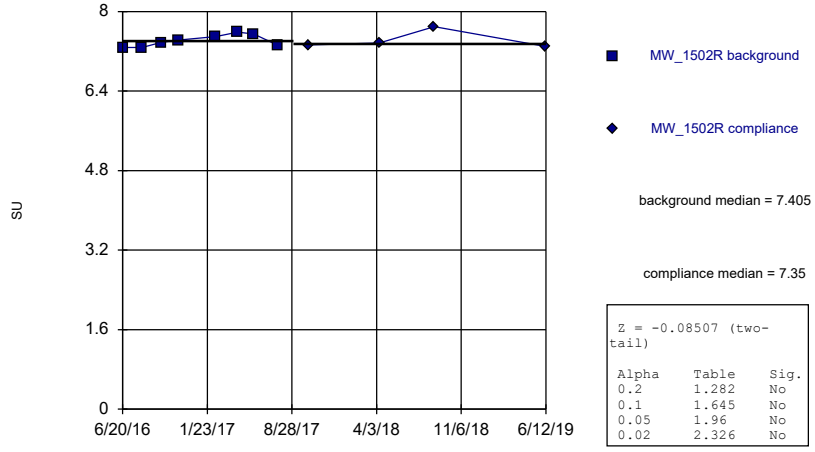
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: pH, field Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1502R



background median = 7.405

compliance median = 7.35

Z = -0.08507 (two-tail)

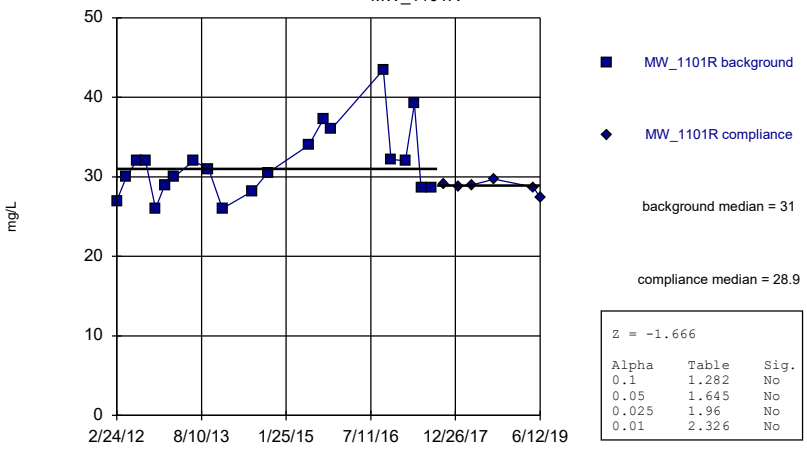
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No

Constituent: pH, field Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1101R



Z = -1.666

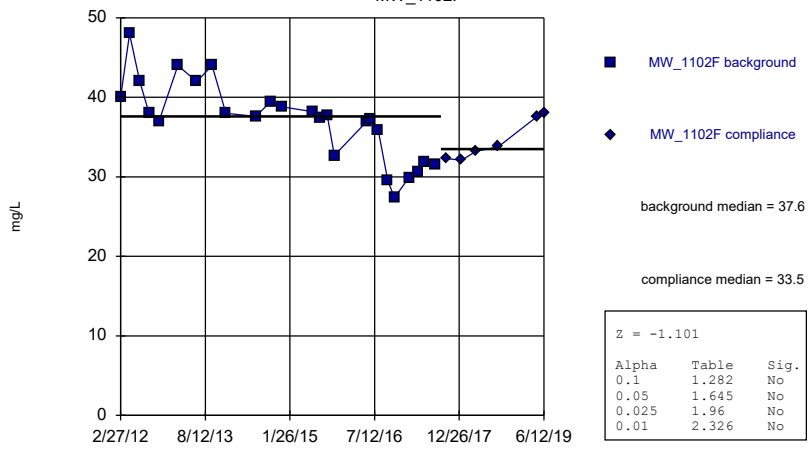
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Sulfate, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1102F



Z = -1.101

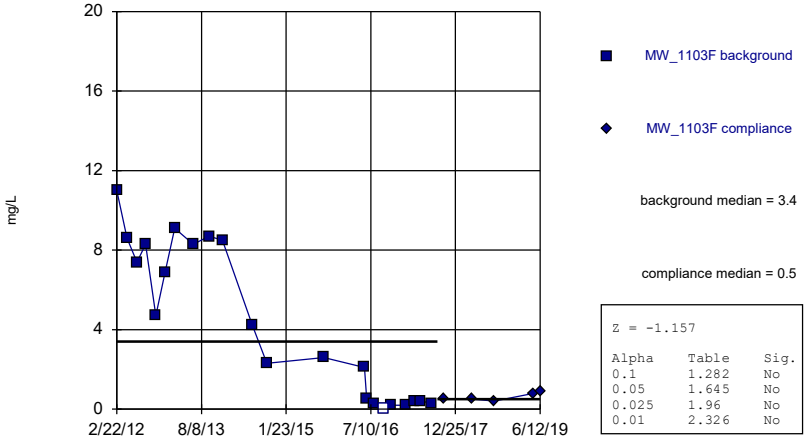
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Sulfate, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG
Hollow symbols indicate censored values.

Mann-Whitney (Wilcoxon Rank Sum)

MW_1103F (bg)



Z = -1.157

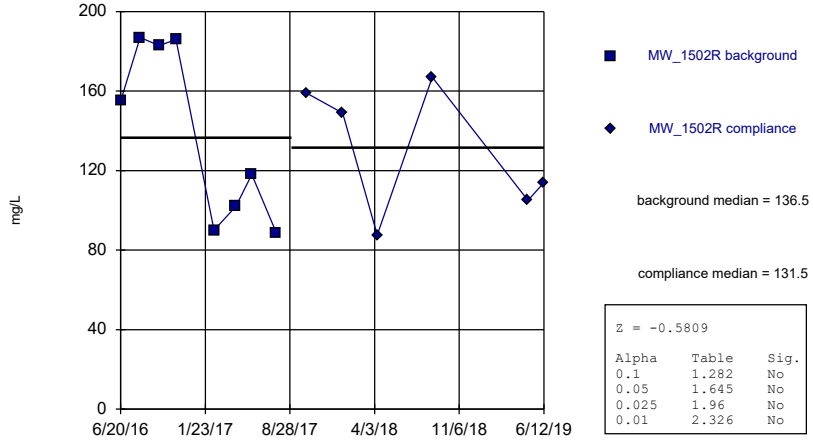
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Sulfate, total Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1502R



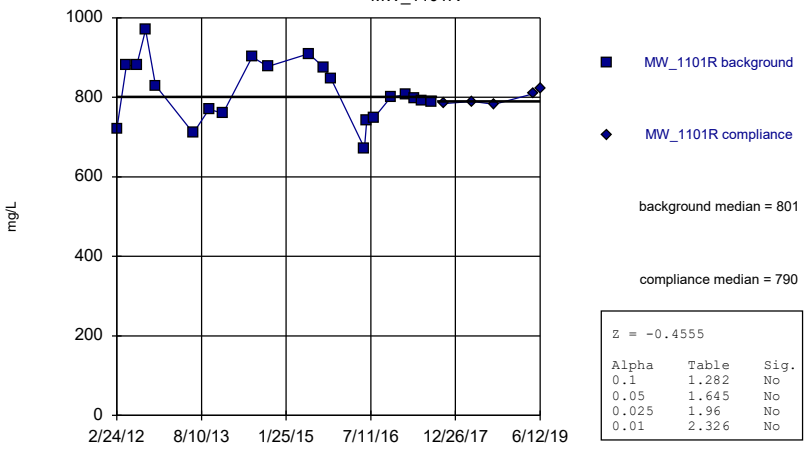
Z = -0.5809

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 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Mann-Whitney (Wilcoxon Rank Sum)

MW_1101R



background median = 801

compliance median = 790

Z = -0.4555

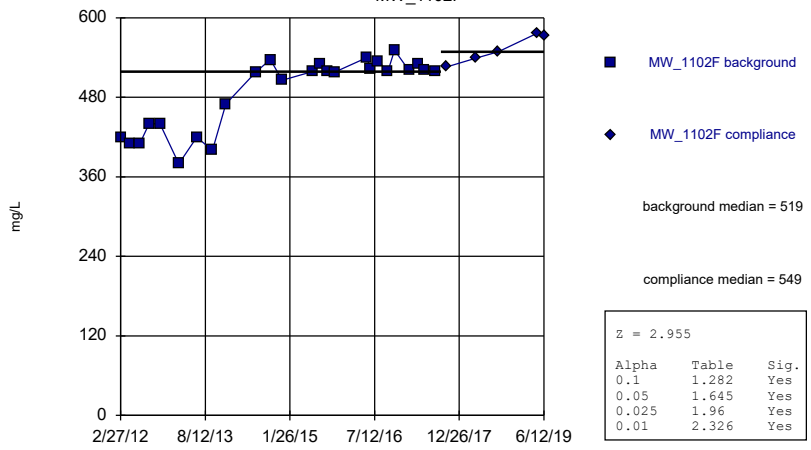
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1102F



background median = 519

compliance median = 549

Z = 2.955

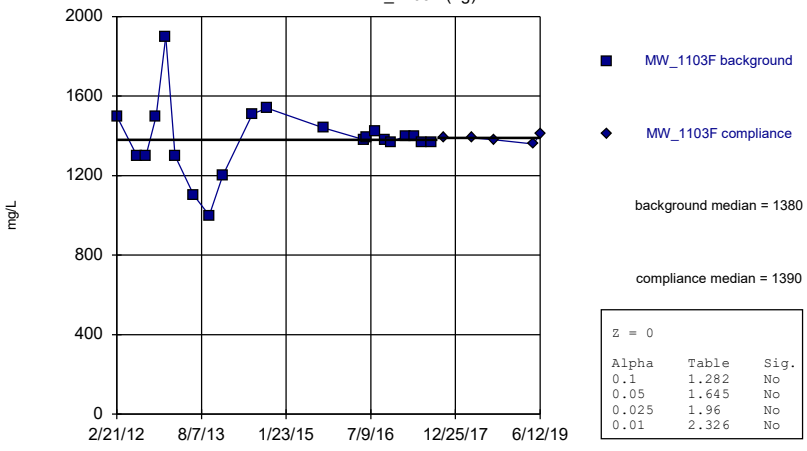
Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	Yes
0.025	1.96	Yes
0.01	2.326	Yes

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1103F (bg)



background median = 1380

compliance median = 1390

Z = 0

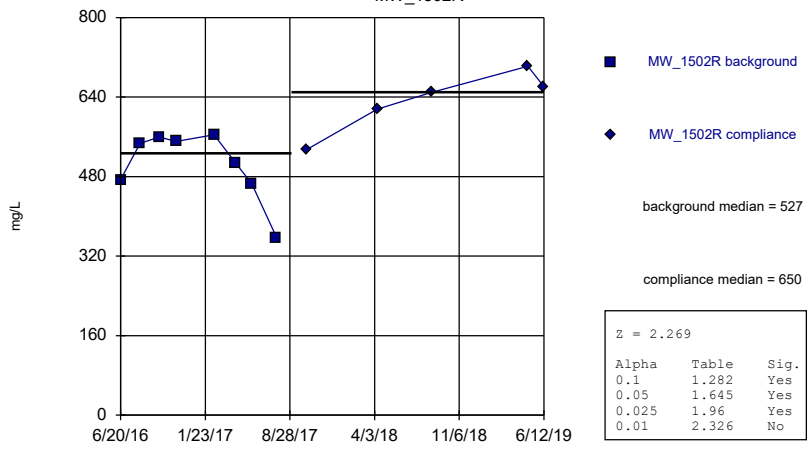
Alpha	Table	Sig.
0.1	1.282	No
0.05	1.645	No
0.025	1.96	No
0.01	2.326	No

Constituent: Total Dissolved Solids [TDS] Analysis Run 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23d Sanitas software utilized by Groundwater Stats Consulting. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1502R



background median = 527

compliance median = 650

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 10/29/2019 1:07 PM View: Mann Whitney
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

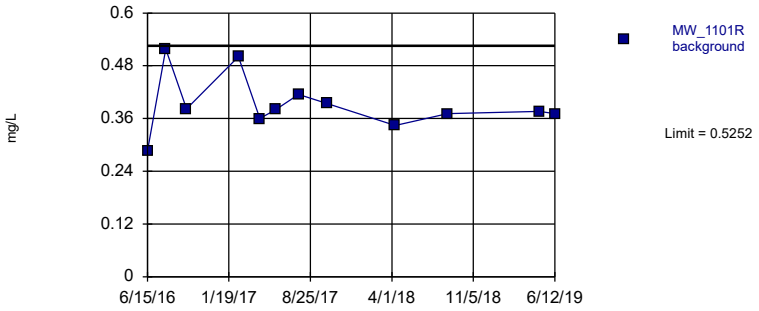
Intrawell Prediction Limit Summary

Mitchell LF Client: Geosyntec Data: Mitchell Landfill Printed 12/11/2019, 2:45 PM

Constituent	Well	Upper Lim.	Lower Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron, total (mg/L)	MW_1101R	0.5252	n/a	12	0.3916	0.06326	0	None	No	0.002505	Param Intra 1 of 2
Boron, total (mg/L)	MW_1102F	0.28	n/a	13	n/a	n/a	0	n/a	n/a	0.009692	NP Intra (normality) 1 of 2
Boron, total (mg/L)	MW_1103F	0.3912	n/a	13	0.3318	0.0286	0	None	No	0.002505	Param Intra 1 of 2
Boron, total (mg/L)	MW_1502R	0.2654	n/a	12	0.1337	0.06239	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	MW_1101R	6.91	n/a	13	n/a	n/a	0	n/a	n/a	0.009692	NP Intra (normality) 1 of 2
Calcium, total (mg/L)	MW_1102F	5.71	n/a	14	4.84	0.4263	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	MW_1103F	3.245	n/a	13	2.882	0.1753	0	None	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	MW_1502R	109.3	n/a	13	84.18	12.09	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	MW_1101R	18.1	n/a	28	1086131	472396	0	None	x^5	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	MW_1102F	15.41	n/a	14	12.68	1.338	0	None	No	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	MW_1103F	253.5	n/a	26	56970	3994	0	None	x^2	0.002505	Param Intra 1 of 2
Chloride, total (mg/L)	MW_1502R	190.8	n/a	8	7.046	2.754	0	None	sqrt(x)	0.002505	Param Intra 1 of 2
Fluoride, total (mg/L)	MW_1101R	3.137	n/a	23	6.289	1.914	0	None	x^2	0.002505	Param Intra 1 of 2
Fluoride, total (mg/L)	MW_1102F	0.7806	n/a	8	0.6125	0.0684	0	None	No	0.002505	Param Intra 1 of 2
Fluoride, total (mg/L)	MW_1103F	3.487	n/a	23	3.054	0.2331	0	None	No	0.002505	Param Intra 1 of 2
Fluoride, total (mg/L)	MW_1502R	0.2441	n/a	13	0.1615	0.03976	0	None	No	0.002505	Param Intra 1 of 2
pH, field (SU)	MW_1101R	9.104	7.877	26	8.491	0.3359	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	MW_1102F	9.45	7.59	29	n/a	n/a	0	n/a	n/a	0.004345	NP Intra (normality) 1 of 2
pH, field (SU)	MW_1103F	8.881	7.94	26	8.41	0.2575	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	MW_1502R	7.709	7.13	12	7.419	0.137	0	None	No	0.001253	Param Intra 1 of 2
Sulfate, total (mg/L)	MW_1101R	38.42	n/a	27	3.137	0.1302	0	None	x^(1/3)	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	MW_1102F	45.04	n/a	31	36.54	4.74	0	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	MW_1103F	0.9261	n/a	12	0.4125	0.2432	8.333	None	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	MW_1502R	213	n/a	14	135.1	38.17	0	None	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW_1101R	1600	n/a	27	n/a	n/a	0	n/a	n/a	0.002502	NP Intra (normality) 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW_1102F	577	n/a	18	n/a	n/a	0	n/a	n/a	0.005373	NP Intra (normality) 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW_1103F	1900	n/a	26	n/a	n/a	0	n/a	n/a	0.002667	NP Intra (normality) 1 of 2
Total Dissolved Solids [TDS] (mg/L)	MW_1502R	744.3	n/a	13	553.2	92.07	0	None	No	0.002505	Param Intra 1 of 2

Prediction Limit

Intrawell Parametric, MW_1101R



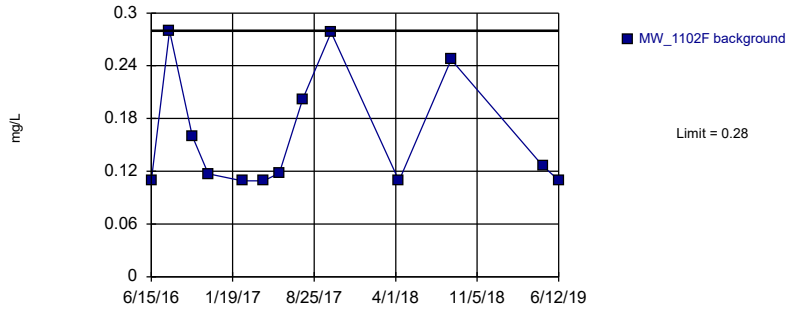
Background Data Summary: Mean=0.3916, Std. Dev.=0.06326, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8759, critical = 0.805. Kappa = 2.112 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Boron, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Non-parametric, MW_1102F



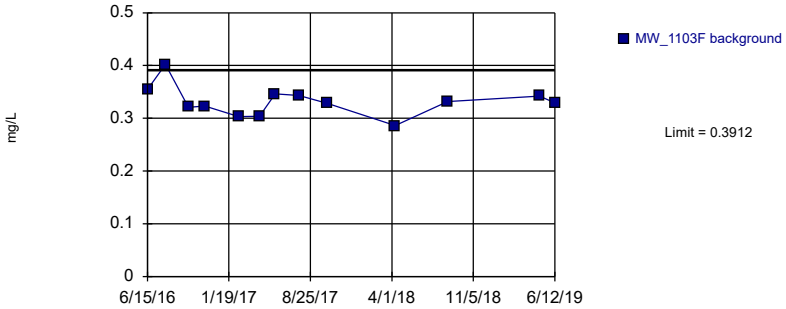
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 13 background values. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes 1 future value.

Constituent: Boron, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1103F (bg)



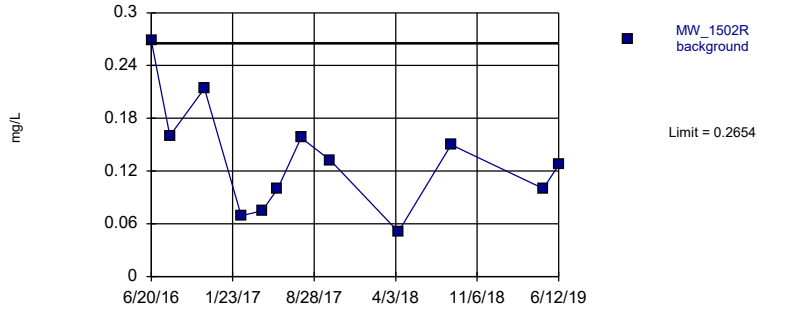
Background Data Summary: Mean=0.3318, Std. Dev.=0.0286, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9321, critical = 0.814. Kappa = 2.077 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Boron, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1502R

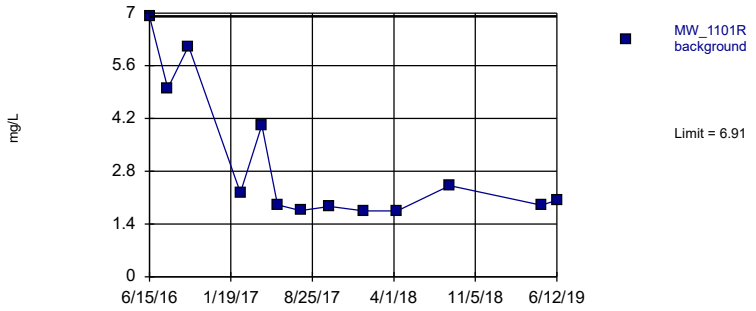


Background Data Summary: Mean=0.1337, Std. Dev.=0.06239, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9428, critical = 0.805. Kappa = 2.112 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Boron, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Prediction Limit

Intrawell Non-parametric, MW_1101R



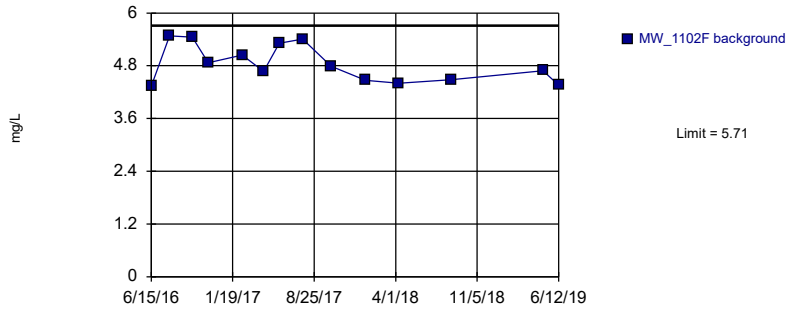
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 13 background values. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes 1 future value.

Constituent: Calcium, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1102F



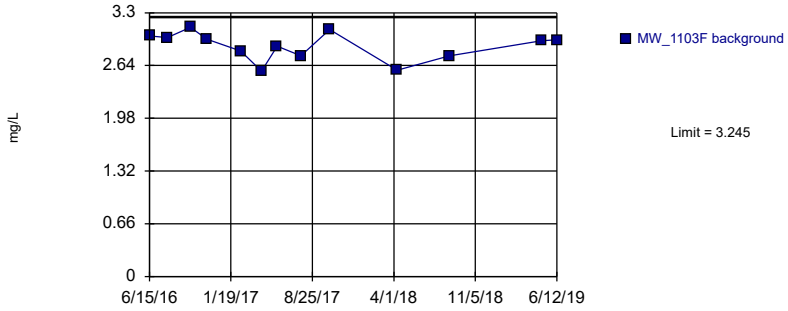
Background Data Summary: Mean=4.84, Std. Dev.=0.4263, n=14. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8855, critical = 0.825. Kappa = 2.041 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1103F (bg)



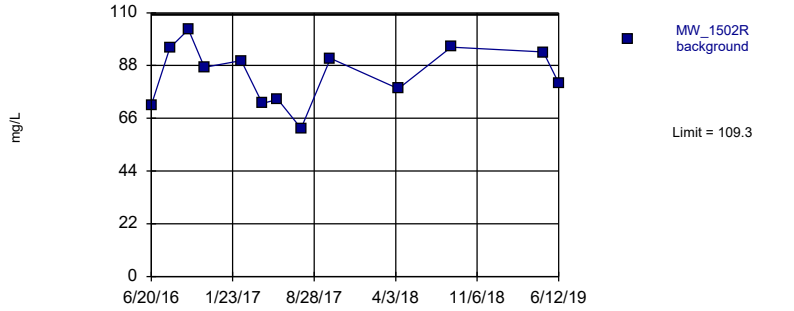
Background Data Summary: Mean=2.882, Std. Dev.=0.1753, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9275, critical = 0.814. Kappa = 2.077 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1502R

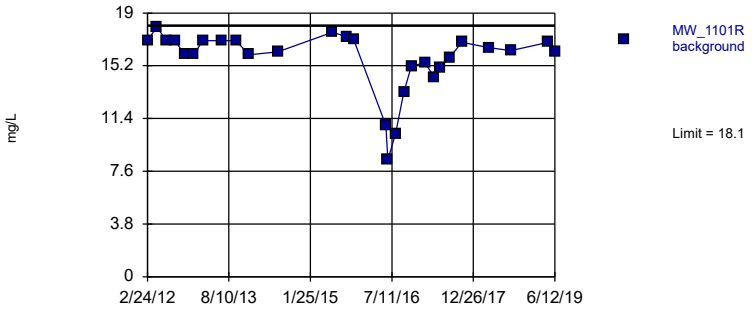


Background Data Summary: Mean=84.18, Std. Dev.=12.09, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9602, critical = 0.814. Kappa = 2.077 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Calcium, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Prediction Limit

Intrawell Parametric, MW_1101R



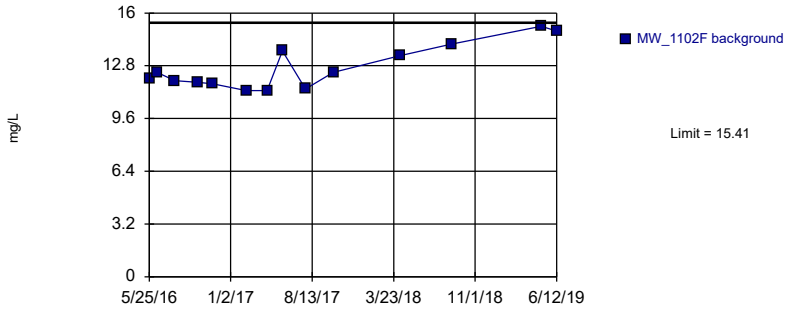
Background Data Summary (based on x^5 transformation): Mean=1086131, Std. Dev.=472396, n=28. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9175, critical = 0.896. Kappa = 1.814 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1102F



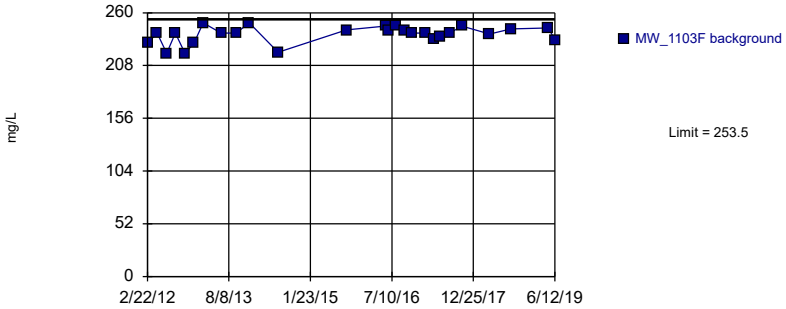
Background Data Summary: Mean=12.68, Std. Dev.=1.338, n=14. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8748, critical = 0.825. Kappa = 2.041 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Chloride, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1103F (bg)



Background Data Summary (based on square transformation): Mean=56970, Std. Dev.=3994, n=26. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8949, critical = 0.891. Kappa = 1.827 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

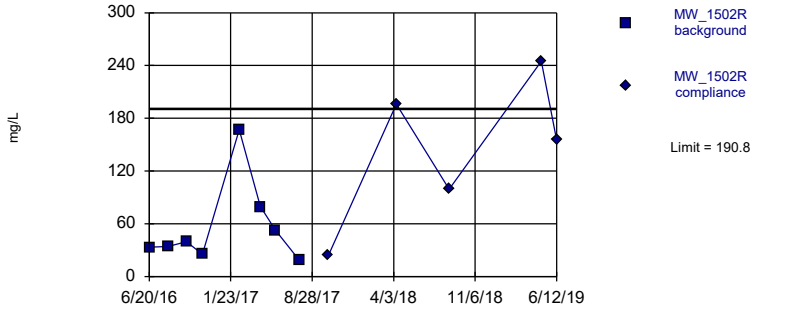
Constituent: Chloride, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Within Limit

Prediction Limit

Intrawell Parametric

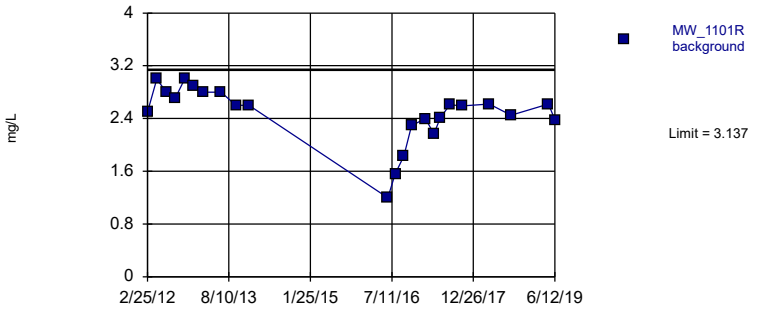


Background Data Summary (based on square root transformation): Mean=7.046, Std. Dev.=2.754, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8468, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Chloride, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Prediction Limit

Intrawell Parametric, MW_1101R



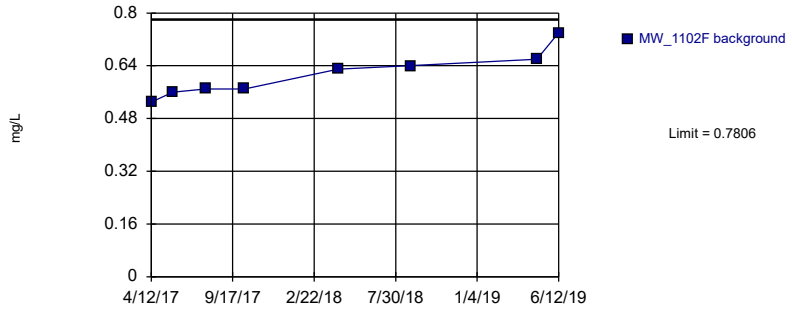
Background Data Summary (based on square transformation): Mean=6.289, Std. Dev.=1.914, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.92, critical = 0.881. Kappa = 1.857 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1102F



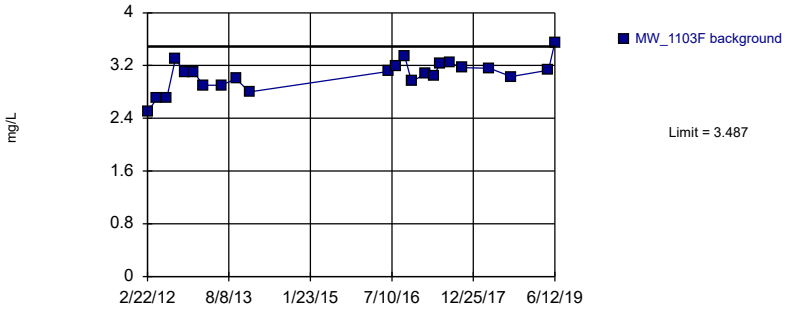
Background Data Summary: Mean=0.6125, Std. Dev.=0.0684, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9276, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1103F (bg)



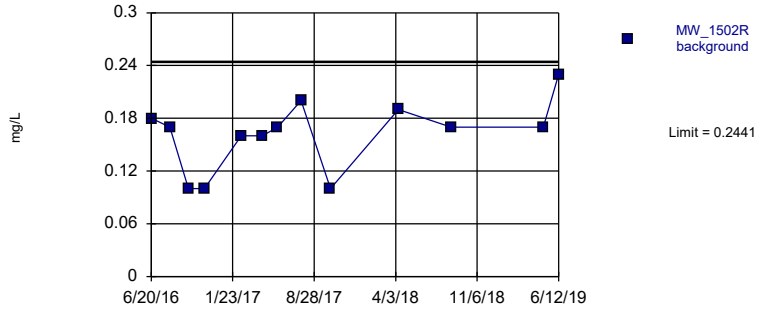
Background Data Summary: Mean=3.054, Std. Dev.=0.2331, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.974, critical = 0.881. Kappa = 1.857 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1502R

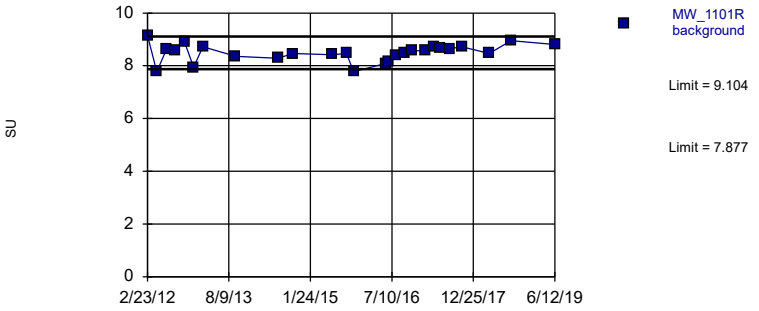


Background Data Summary: Mean=0.1615, Std. Dev.=0.03976, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8791, critical = 0.814. Kappa = 2.077 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Prediction Limit

Intrawell Parametric, MW_1101R



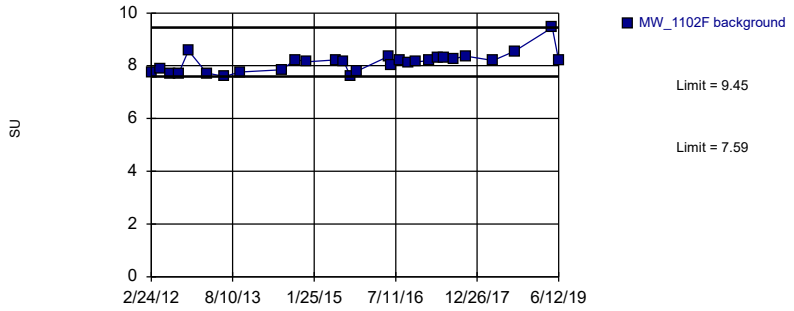
Background Data Summary: Mean=8.491, Std. Dev.=0.3359, n=26. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9587, critical = 0.891. Kappa = 1.827 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Non-parametric, MW_1102F



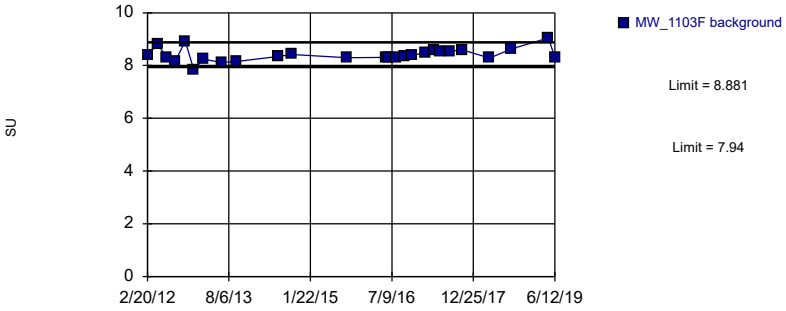
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 29 background values. Well-constituent pair annual alpha = 0.00868. Individual comparison alpha = 0.004345 (1 of 2). Assumes 1 future value.

Constituent: pH, field Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1103F (bg)



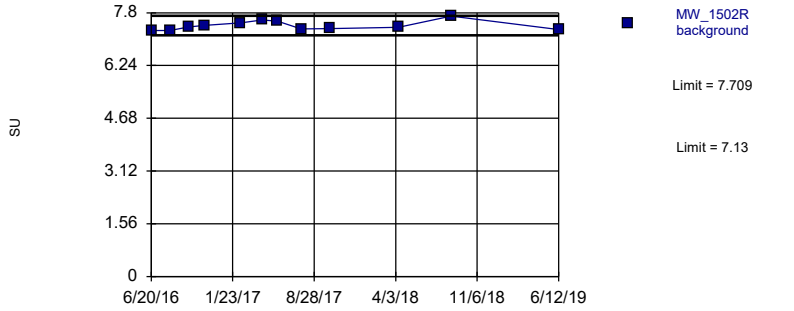
Background Data Summary: Mean=8.41, Std. Dev.=0.2575, n=26. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9446, critical = 0.891. Kappa = 1.827 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1502R

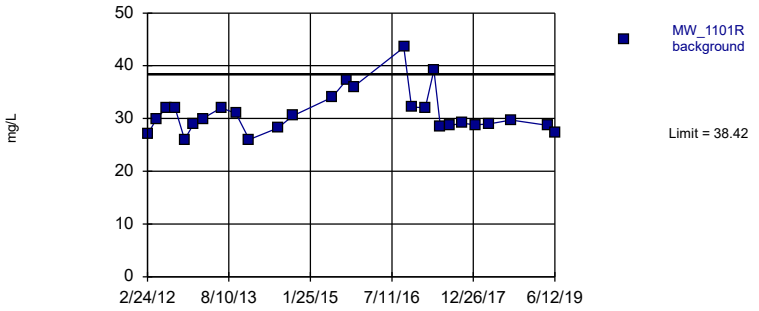


Background Data Summary: Mean=7.419, Std. Dev.=0.137, n=12. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8945, critical = 0.805. Kappa = 2.112 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Prediction Limit

Intrawell Parametric, MW_1101R

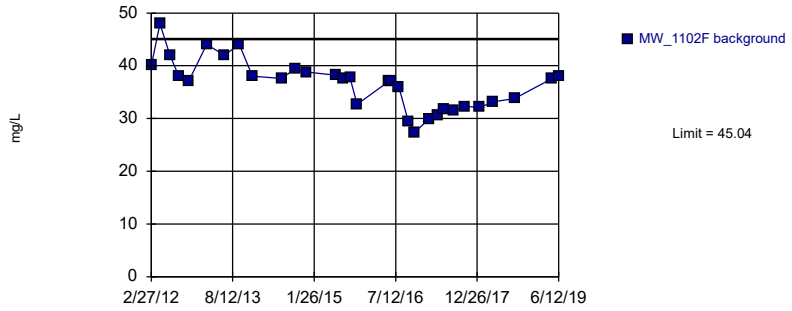


Background Data Summary (based on cube root transformation): Mean=3.137, Std. Dev.=0.1302, n=27. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8947, critical = 0.894. Kappa = 1.82 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Prediction Limit

Intrawell Parametric, MW_1102F



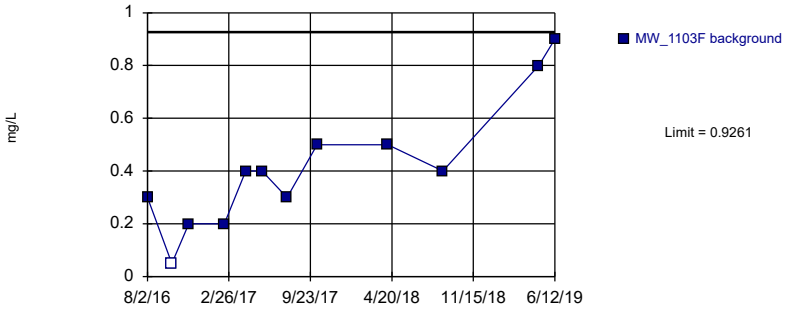
Background Data Summary: Mean=36.54, Std. Dev.=4.74, n=31. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9676, critical = 0.902. Kappa = 1.794 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Hollow symbols indicate censored values.

Prediction Limit

Intrawell Parametric, MW_1103F (bg)

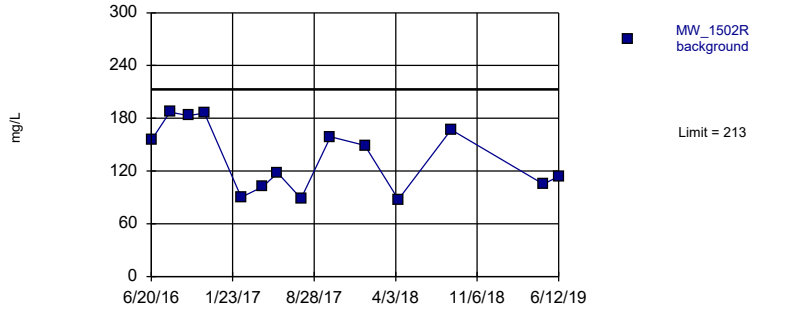


Background Data Summary: Mean=0.4125, Std. Dev.=0.2432, n=12, 8.333% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9261, critical = 0.805. Kappa = 2.112 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Prediction Limit

Intrawell Parametric, MW_1502R

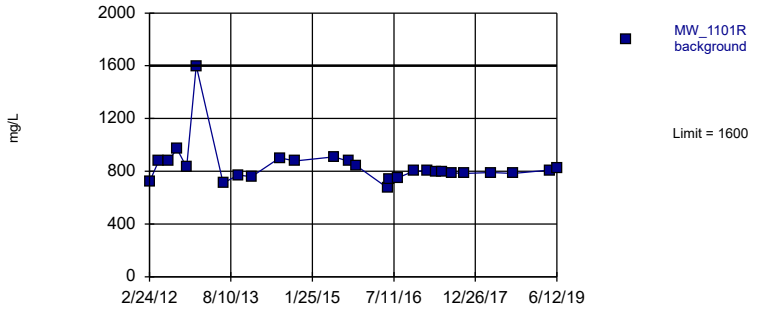


Background Data Summary: Mean=135.1, Std. Dev.=38.17, n=14. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8855, critical = 0.825. Kappa = 2.041 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Prediction Limit

Intrawell Non-parametric, MW_1101R



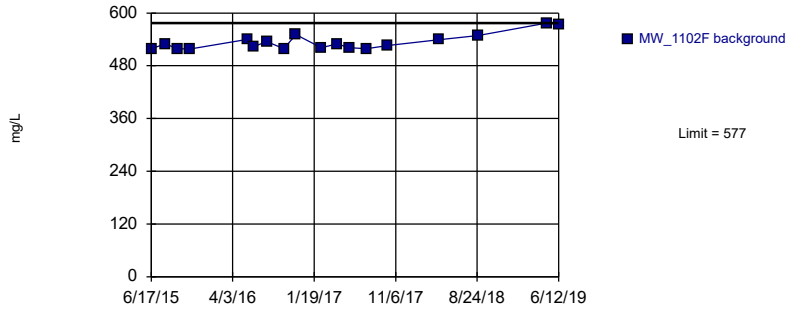
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 27 background values. Well-constituent pair annual alpha = 0.004998. Individual comparison alpha = 0.002502 (1 of 2). Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Non-parametric, MW_1102F



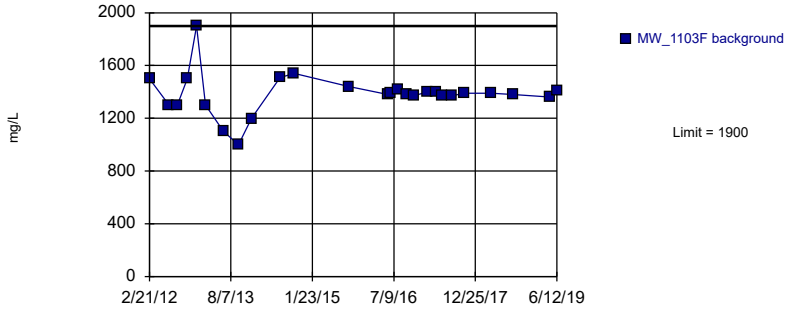
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 18 background values. Well-constituent pair annual alpha = 0.01072. Individual comparison alpha = 0.005373 (1 of 2). Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Non-parametric, MW_1103F (bg)



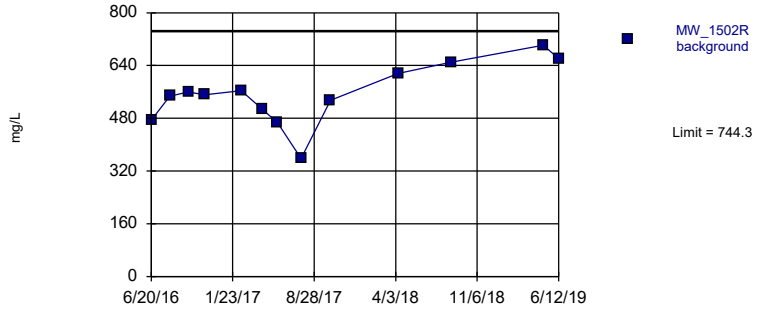
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 26 background values. Well-constituent pair annual alpha = 0.005327. Individual comparison alpha = 0.002667 (1 of 2). Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Sanitas™ v.9.6.23e Sanitas software utilized by Groundwater Stats Consulting. UG

Prediction Limit

Intrawell Parametric, MW_1502R



Background Data Summary: Mean=553.2, Std. Dev.=92.07, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.97, critical = 0.814. Kappa = 2.077 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/11/2019 2:43 PM View: PLs - Intrawell
Mitchell LF Client: Geosyntec Data: Mitchell Landfill

Geosyntec consultants

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Memorandum

Date:	September 3, 2020
To:	David Miller (AEP)
Copies to:	Bill Smith (AEP)
From:	Allison Kreinberg (Geosyntec)
Subject:	Evaluation of Detection Monitoring Data at Mitchell 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 257 Subpart D, "CCR rule"), the first semi-annual detection monitoring event at the Mitchell Landfill (LF), an existing CCR unit at the Mitchell Power Plant located in Moundsville, West Virginia was completed on May 6, 2020. Based on the results, verification sampling was completed on July 15, 2020 and September 1, 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 and the 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 February 21, 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 concluded only if both samples in a series of two exceed the UPL (or are below the LPL for pH). 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 and noted exceedances are described in the list below.

- Chloride concentrations exceeded the intrawell UPL of 15.4 mg/L in both the initial (16.0 mg/L) and second (16.0 mg/L) samples collected at MW-1102F. Therefore, an SSI over background is concluded for chloride at MW-1102F.

In response to the exceedance noted above, the Mitchell LF CCR unit will either transition to assessment monitoring or an alternative source demonstration (ASD) for chloride at MW-1102F will be conducted in accordance with 40 CFR 257.94(e)(2). If the ASD is successful, the Mitchell 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 Evaluation
Mitchell Plant - Landfill

Geosyntec Consultants, Inc.

Parameter	Units	Description	MW-1101R	MW-1102F	MW-1102F	MW-1502R	MW-1502R
			5/6/2020	5/6/2020	7/15/2020	5/6/2020	9/1/2020
Boron	mg/L	Intrawell Background Value (UPL)	0.525	0.280		0.265	
		Analytical Result	0.364	0.129	--	0.081	--
Calcium	mg/L	Intrawell Background Value (UPL)	6.91	5.71		109	
		Analytical Result	2.17	4.33	--	64.8	--
Chloride	mg/L	Intrawell Background Value (UPL)	18.1	15.4		191	
		Analytical Result	15.1	**16.0**	**16.0**	74.6	--
Fluoride	mg/L	Intrawell Background Value (UPL)	3.14	0.781		0.244	
		Analytical Result	2.46	0.69	--	0.18	--
pH	SU	Intrawell Background Value (UPL)	9.1	9.5		7.7	
		Intrawell Background Value (LPL)	7.9	7.6		7.1	
		Analytical Result	8.2	8.8	**--**	**7.8**	7.2
Sulfate	mg/L	Intrawell Background Value (UPL)	38.4	45.0		213	
		Analytical Result	23.9	33.8	--	93.0	--
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	1600	577		744	
		Analytical Result	828	574	--	471	--

Notes

UPL: Upper prediction limit

LPL: Lower prediction limit

Bold values exceed the background value.

Background values are shaded gray.

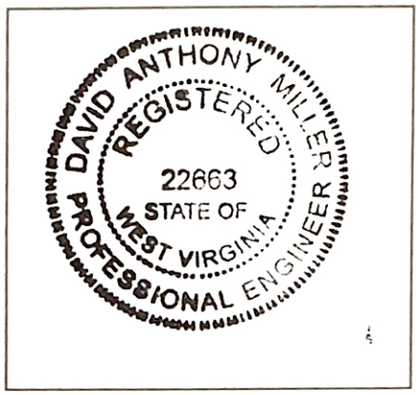
--: Not sampled

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 February 21, 2020 *Statistical Analysis Summary* report, is appropriate for evaluating the groundwater monitoring data for the Mitchell 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	09.04.2020
License Number	Licensing State	Date

APPENDIX 3 – Alternative Source Demonstrations

The May 2020 and November 2020 ASD reports follow.

APPENDIX 4 - Notices for Monitoring Program Transitions

No transition between monitoring requirements occurred in 2020; the CCR unit remained in detection monitoring over the entire year. Notices for monitoring program transitions are not applicable at this time.

APPENDIX 5 - Well Installation/Decommissioning Logs

No monitoring wells installed or decommissioned in 2020. Well installation/decommissioning logs are not applicable at this time.

EPA ADDITIONAL INFORMATION REQUEST

Attachment B

2020 Annual Groundwater Monitoring Report

for Mitchell Plant's Bottom Ash Pond

Annual Groundwater Monitoring Report

Kentucky Power Company

Mitchell Plant

Bottom Ash Pond

Moundsville, WV

January 2021

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

KENTUCKY POWER℠

An AEP Company

BOUNDLESS ENERGY℠

Table of Contents

I. Overview

This *Annual Groundwater Monitoring Report* (Report) has been prepared to report the status of activities for the preceding year for the Bottom Ash Pond at Kentucky Power Company's, a wholly owned subsidiary of American Electric Power Company (AEP), Mitchell Power Plant. The USEPA's CCR rules require that the Annual Groundwater Monitoring 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 on October 22, 2019 in accordance with 40 CFR 257.95(d)(1), and analyzed for all Appendix III constituents and those Appendix IV constituents that were detected during the previous sampling in accordance with 40 CFR 257.95(b) in June 2019. Groundwater samples were collected on March 17 and 18, 2020 and analyzed in accordance with 40 CFR 257.95(b) for all Appendix IV constituents. Groundwater samples were collected on May 5, 2020 in accordance with 40 CFR 257.95(d)(1), and analyzed for all Appendix III constituents and those Appendix IV constituents that were detected during the previous sampling in accordance with 40 CFR 257.95(b) in March 2020. Another groundwater sampling event in accordance with 40 CFR 257.95(d)(1) was initiated on October 20, 2020, but errors in sampling resulted in the omission of two monitoring parameters at some of the monitoring wells and the data set was not complete until January 2021, so data from this sampling event are not included in this report. All sampling was performed in accordance with 40 CFR 257.95 *et seq.*, and AEP's *Groundwater Sampling and Analysis Plan (2016)*;
- Groundwater monitoring data underwent various validation tests, including tests for completeness, valid values, transcription errors, and consistent units;
- Statistical analysis of the assessment monitoring samples collected in October 2019 and May 2020 was completed in February and August 2020, respectively.
- Because no statistically significant levels (SSLs) above the groundwater protection standard were detected, assessment monitoring continued.
- No alternative source demonstrations (ASDs) relative to the Appendix IV SSLs above the groundwater protection standard were conducted.
- As required by 40 CFR 257.95(d)(1), groundwater samples were collected and analyzed for all Appendix III constituents and those Appendix IV constituents that were detected during the March 2020 sampling in accordance with 40 CFR 257.95(b). This sampling was initiated in October 2020, but was not completed until January 2021 because of errors in sampling and the data has not yet undergone statistical interpretation.

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 statistically significant levels above the groundwater protection standards (Attached as Appendix 2, where applicable);
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (Attached as Appendix 3, where applicable);
- A summary of any transition between monitoring programs, for example the date and circumstances for transitioning from detection monitoring to assessment monitoring (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 regarding the rationale for the installation/decommission (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

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

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 Mitchell 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 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 velocities, groundwater flow direction, and potentiometric maps developed after each sampling event.

V. Groundwater Quality Data Statistical Analysis

Statistical analysis of the assessment monitoring samples collected on October 22, 2019 and on May 5, 2020 was completed on February 11, and August 24, 2020, respectively. No SSLs above the groundwater protection standards were identified during either analysis. The results of these statistical analyses are documented in the corresponding statistical analysis summary reports, which are provided in Appendix 2.

As required by 40 CFR 257.95(d)(1), groundwater samples were collected and analyzed for all Appendix III constituents and those Appendix IV constituents that were detected during the March 2020 sampling in accordance with 40 CFR 257.95(b). This sampling was initiated in October 2020, but was not completed until January 2021 because of errors in sampling and the data has not yet undergone statistical interpretation. Statistical analysis of this data is scheduled to be completed in February 2021.

VI. Alternative Source Demonstrations

ASDs relative to Appendix IV SSLs above the groundwater protection standard were not necessary because no SSLs above the groundwater protection standards were identified from the completed sampling events required by 40 CFR 257.95(d)(1). A statement to this effect is provided in Appendix 3.

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

No transition between monitoring requirements occurred in 2020; the CCR unit remained in assessment monitoring over the entire year. A statement to this effect is provided in Appendix 4.

The bottom ash pond would return to detection monitoring if all Appendix III and IV parameters are below background values for two consecutive monitoring events. If one or more Appendix IV parameters exceed the corresponding groundwater protection standard due to a release from the bottom ash pond, and are not demonstrated to be caused by a source other than the CCR unit or resulting from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality by means of an ASD, an assessment of corrective measures will be undertaken as required by 40 CFR 257.96.

Regarding defining an alternate monitoring frequency, the groundwater velocity and monitoring well production is high enough at this facility that no modification of the assessment monitoring schedule is necessary.

VIII. Other Information Required

The Mitchell bottom ash pond has progressed from detection monitoring to its current status in assessment monitoring. 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. Through the use of low-flow purging and sampling methodology, samples representative of uppermost aquifer groundwater were obtained 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 the following:

- Assessment monitoring on a semiannual schedule;
- Statistical evaluation of the assessment monitoring results to determine any statistically significant increases (or decreases with respect to pH) over an established groundwater protection standard, or whether the concentrations have returned below background concentrations;
- Responding to any new data received in light of CCR rule requirements;
- Preparation of the next annual groundwater report.

APPENDIX 1 - Groundwater Data Tables and Figures

Tables follow showing the groundwater monitoring data collected, the rate of groundwater flow each time groundwater was sampled, the number of samples collected per monitoring well, dates that the samples were collected, and whether each sample was collected as part of a detection monitoring or an assessment monitoring program. Figures follow showing the PE-certified groundwater monitoring network with the corresponding well identifications along with static water elevation data and groundwater flow directions each time groundwater was sampled in the form of annotated satellite images.

Table 1 - Groundwater Data Summary: MW-1504
Mitchell - 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
6/13/2016	Background	0.054	220	99.1	0.23	6.9	375	990
8/1/2016	Background	0.070	220	103	0.25	7.0	403	970
9/26/2016	Background	0.098	225	103	0.24	7.1	389	946
11/8/2016	Background	0.053	219	92.8	0.19	7.1	369	930
2/7/2017	Background	0.162	218	81.7	0.20	7.1	291	904
4/4/2017	Background	0.105	237	89.8	0.21	7.3	362	924
5/16/2017	Background	0.113	225	93.5	0.22	7.2	371	995
7/19/2017	Background	0.129	230	96.3	0.15	7.2	405	999
10/9/2017	Detection	0.114	212	93.4	0.24	7.2	392	982
4/11/2018	Assessment	0.063	204	83.6	0.19	7.0	291	842
8/22/2018	Assessment	0.096	230	91.9	0.20	7.3	372	936
5/1/2019	Assessment	0.05 J	220	81.8	0.17	8.0	317	926
6/11/2019	Assessment	0.04 J	183	78.5	0.17	7.6	261	829
10/22/2019	Assessment	0.02 J	196	85.9	0.15	7.3	242	801
3/17/2020	Assessment	--	--	--	0.15	7.1	--	--
5/5/2020	Assessment	0.04 J	230	96.2	0.12	7.5	372	1,020

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-1504
Mitchell - 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
6/13/2016	Background	0.03 J	0.73	46.2	0.01 J	0.04	0.4	0.523	0.0838	0.23	0.379	0.002	< 0.002 U	0.59	0.1	0.02 J
8/1/2016	Background	0.02 J	0.52	42.7	0.009 J	0.04	0.5	0.549	0.248	0.25	0.222	< 0.0002 U	0.002 J	0.74	0.07 J	0.02 J
9/26/2016	Background	< 0.05 U	0.38	36.7	< 0.02 U	0.03 J	0.3	0.362	0.656	0.24	0.104	0.007	< 0.002 U	2.31	0.2 J	0.1 J
11/8/2016	Background	0.02 J	0.36	38.4	< 0.005 U	0.03	0.469	0.249	1.748	0.19	0.041	0.004	< 0.002 U	0.66	< 0.03 U	0.089
2/7/2017	Background	0.02 J	0.39	33.8	< 0.005 U	0.03	0.530	0.239	0.563	0.20	0.022	0.008	< 0.002 U	0.94	< 0.03 U	0.090
4/4/2017	Background	0.02 J	0.35	40.5	< 0.005 U	0.04	0.283	0.277	0.327	0.21	0.021	0.009	< 0.002 U	0.81	0.06 J	0.110
5/16/2017	Background	0.02 J	0.46	37.3	< 0.004 U	0.04	0.250	0.319	0.3882	0.22	0.01 J	0.011	< 0.002 U	0.55	0.05 J	0.02 J
7/19/2017	Background	0.03 J	0.41	34.9	< 0.004 U	0.04	0.175	0.382	0.401	0.15	0.087	0.012	< 0.002 U	1.25	< 0.03 U	0.03 J
4/11/2018	Assessment	0.02 J	0.36	36.9	0.005 J	0.03	0.562	0.114	0.349	0.19	0.052	0.004	< 0.004 U	0.41	0.04 J	0.03 J
8/22/2018	Assessment	0.05 J	0.28	37.9	< 0.004 U	0.03	0.331	0.093	1.048	0.20	0.037	0.006	< 0.002 U	0.33	0.04 J	0.03 J
5/1/2019	Assessment	< 0.02 U	0.22	36.4	< 0.02 U	0.03 J	0.305	0.071	0.675	0.17	0.02 J	< 0.009 U	< 0.002 U	< 0.4 U	< 0.03 U	< 0.1 U
6/11/2019	Assessment	< 0.02 U	0.24	33.5	< 0.02 U	< 0.01 U	0.05 J	0.04 J	0.261	0.17	< 0.02 U	< 0.009 U	< 0.002 U	< 0.4 U	0.7	< 0.1 U
10/22/2019	Assessment	0.06 J	0.29	37.0	< 0.02 U	0.03 J	0.399	0.475	0.613	0.15	< 0.05 U	0.00448	< 0.002 U	< 0.4 U	0.05 J	< 0.1 U
3/17/2020	Assessment	< 0.02 U	0.29	48.3	< 0.02 U	0.03 J	0.238	0.04 J	0.4423	0.15	< 0.05 U	0.00441	< 0.002 U	< 0.4 U	7.3	< 0.1 U
5/5/2020	Assessment	< 0.02 U	0.26	43.8	< 0.02 U	0.03 J	0.238	0.03 J	0.758	0.12	< 0.05 U	0.00442	< 0.002 U	< 0.4 U	3.8	< 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-1505
Mitchell - 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
6/14/2016	Background	10.8	288	365	< 0.05 U	7.1	337	1,530
8/1/2016	Background	10.6	294	358	< 0.05 U	7.1	337	1,580
9/26/2016	Background	10.3	289	345	< 0.05 U	7.2	317	1,420
11/8/2016	Background	9.12	261	316	< 0.05 U	7.2	307	1,470
2/7/2017	Background	10.0	296	318	< 0.05 U	7.2	317	1,340
4/4/2017	Background	8.80	293	303	< 0.05 U	7.3	324	1,350
5/16/2017	Background	10.1	278	298	< 0.05 U	7.2	316	1,550
7/19/2017	Background	9.13	267	293	< 0.05 U	7.3	318	1,390
10/10/2017	Detection	8.70	255	287	< 0.05 U	7.2	327	1,270
12/27/2017	Detection	8.02	259	288	--	7.3	--	1,220
4/11/2018	Assessment	8.00	282	289	< 0.05 U	7.0	401	1,220
8/22/2018	Assessment	8.00	274	284	0.02 J	7.3	383	1,520
5/1/2019	Assessment	7.31	287	285	< 0.01 U	7.8	408	1,580
6/11/2019	Assessment	7.79	279	261	0.03 J	7.7	404	1,450
10/22/2019	Assessment	7.37	285	260	0.03 J	7.2	455	1,480
3/17/2020	Assessment	--	--	--	0.03 J	7.2	--	--
5/5/2020	Assessment	7.36	282	252	0.02 J	7.5	471	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-1505
Mitchell - 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
6/14/2016	Background	0.06	1.40	57.7	0.049	0.03	33.2	0.966	0.466	< 0.05 U	1.02	0.006	0.002 J	2.94	0.2	0.074
8/1/2016	Background	0.11	3.73	81.0	0.150	0.05	10.4	2.69	1.2271	< 0.05 U	3.69	0.011	0.013	0.95	0.9	0.093
9/26/2016	Background	< 0.05 U	0.79	47.2	< 0.02 U	0.03 J	0.9	0.404	0.912	< 0.05 U	0.546	0.008	< 0.002 U	7.35	0.4 J	0.464
11/8/2016	Background	0.07	2.14	63.3	0.091	0.03	7.07	1.77	1.26	< 0.05 U	2.06	0.007	0.006	0.90	0.5	0.093
2/7/2017	Background	0.04 J	1.16	51.7	0.035	0.03	9.06	0.772	1.236	< 0.05 U	0.697	0.010	0.002 J	1.21	0.5	0.102
4/4/2017	Background	0.03 J	0.41	47.2	< 0.005 U	0.02	11.0	0.509	0.4842	< 0.05 U	0.091	0.007	< 0.002 U	1.54	0.3	0.057
5/16/2017	Background	0.04 J	0.73	45.5	0.01 J	0.02	4.93	0.594	0.604	< 0.05 U	0.224	0.017	< 0.002 U	0.85	0.4	0.067
7/19/2017	Background	0.04 J	0.78	45.9	0.02 J	0.03 J	2.38	0.628	1.222	< 0.05 U	0.434	0.012	< 0.002 U	1.69	0.9	0.08 J
4/11/2018	Assessment	0.03 J	0.44	46.0	0.006 J	0.03	1.16	0.151	0.582	< 0.05 U	0.116	0.005	< 0.002 U	0.67	0.7	0.065
8/22/2018	Assessment	0.05 J	0.38	48.0	0.007 J	0.03	1.40	0.257	0.576	0.02 J	0.150	0.008	< 0.002 U	1.35	0.4	0.070
5/1/2019	Assessment	0.03 J	0.29	48.7	< 0.02 U	0.03 J	0.665	0.199	0.2396	< 0.01 U	0.07 J	< 0.009 U	< 0.002 U	0.6 J	0.9	< 0.1 U
6/11/2019	Assessment	0.03 J	0.28	49.3	< 0.02 U	0.03 J	0.849	0.155	0.526	0.03 J	0.04 J	0.01 J	< 0.002 U	0.7 J	0.4	< 0.1 U
10/22/2019	Assessment	0.03 J	0.34	49.9	< 0.02 U	0.03 J	0.450	0.143	0.759	0.03 J	< 0.05 U	0.00534	< 0.002 U	< 0.4 U	0.1 J	< 0.1 U
3/17/2020	Assessment	< 0.02 U	0.31	42.8	< 0.02 U	0.02 J	0.624	0.100	0.715	0.03 J	< 0.05 U	0.00501	< 0.002 U	< 0.4 U	0.06 J	< 0.1 U
5/5/2020	Assessment	0.03 J	0.27	48.4	< 0.02 U	0.03 J	0.291	0.096	0.7905	0.02 J	< 0.05 U	0.00493	< 0.002 U	< 0.4 U	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-1506
Mitchell - 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
6/14/2016	Background	8.04	275	422	0.07 J	7.1	315	1,640
8/2/2016	Background	9.72	299	418	0.07 J	7.0	325	1,600
9/27/2016	Background	6.77	304	428	< 0.05 U	7.2	323	1,610
11/9/2016	Background	5.50	281	392	< 0.05 U	7.4	285	1,510
2/8/2017	Background	5.70	289	395	< 0.05 U	7.3	292	1,350
4/5/2017	Background	5.59	282	389	< 0.05 U	7.4	301	1,430
5/17/2017	Background	7.11	278	393	< 0.05 U	7.3	307	1,520
7/19/2017	Background	6.26	277	379	< 0.05 U	7.3	297	1,480
10/10/2017	Detection	8.03	257	357	< 0.05 U	7.3	326	1,390
12/27/2017	Detection	6.14	264	383	--	7.3	--	1,280
4/11/2018	Assessment	5.73	275	382	< 0.05 U	7.1	347	1,300
8/22/2018	Assessment	5.91	270	369	0.05 J	7.4	349	1,590
5/1/2019	Assessment	5.24	280	331	0.03 J	7.9	347	1,360
6/11/2019	Assessment	5.27	265	315	0.05 J	7.8	335	1,370
10/22/2019	Assessment	4.49	293	364	0.04 J	7.4	354	1,330
3/17/2020	Assessment	--	--	--	0.04 J	7.3	--	--
5/5/2020	Assessment	4.07	290	379	0.03 J	7.5	337	1,530

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-1506
Mitchell - 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
6/14/2016	Background	0.07	1.65	73.0	0.053	0.04	1.1	1.31	0.488	0.07 J	1.25	0.006	0.004 J	0.74	0.2	0.070
8/2/2016	Background	0.05 J	1.01	70.4	0.026	0.04	0.8	0.799	0.67	0.07 J	0.601	0.015	0.003 J	0.68	0.09 J	0.060
9/27/2016	Background	0.05 J	1.14	62.0	0.030	0.03	1.0	0.739	1.263	< 0.05 U	0.744	0.015	0.002 J	0.55	0.2	0.064
11/9/2016	Background	0.03 J	0.64	57.4	0.01 J	0.02 J	0.959	0.251	2.196	< 0.05 U	0.272	0.008	< 0.002 U	0.45	0.07 J	0.05 J
2/8/2017	Background	0.03 J	0.62	52.9	0.008 J	0.02 J	4.28	0.305	0.4008	< 0.05 U	0.217	0.013	< 0.002 U	1.07	< 0.03 U	0.066
4/5/2017	Background	0.04 J	0.81	60.1	0.021	0.02	3.87	0.891	0.438	< 0.05 U	0.574	0.011	0.002 J	0.49	0.08 J	0.04 J
5/17/2017	Background	0.05 J	1.26	60.9	0.027	0.03	2.83	0.768	0.226	< 0.05 U	0.726	0.016	0.002 J	1.22	0.1	0.05 J
7/19/2017	Background	0.18	0.80	54.9	0.02 J	0.02 J	3.15	0.932	0.889	< 0.05 U	0.457	0.016	< 0.002 U	1.14	< 0.06 U	0.06 J
4/11/2018	Assessment	0.03 J	0.73	55.4	0.021	0.02 J	2.01	0.476	0.592	< 0.05 U	0.477	0.009	0.002 J	1.23	0.1	0.05 J
8/22/2018	Assessment	0.06	0.46	54.6	0.01 J	0.02	2.47	0.581	1.723	0.05 J	0.319	0.010	< 0.002 U	0.50	0.09 J	0.050
5/1/2019	Assessment	0.03 J	0.34	53.5	< 0.02 U	0.02 J	0.752	0.256	0.1879	0.03 J	0.135	0.02 J	< 0.002 U	2 J	0.07 J	< 0.1 U
6/11/2019	Assessment	0.03 J	0.42	49.8	< 0.02 U	0.01 J	1.11	0.290	1.009	0.05 J	0.234	< 0.009 U	< 0.002 U	0.4 J	0.04 J	< 0.1 U
10/22/2019	Assessment	0.03 J	0.37	52.7	< 0.02 U	0.02 J	0.708	0.167	0.997	0.04 J	0.1 J	0.00873	< 0.002 U	2 J	0.04 J	< 0.1 U
3/17/2020	Assessment	< 0.02 U	0.44	53.0	< 0.02 U	0.01 J	4.24	0.393	< 0.680 U	0.04 J	0.213	0.00825	< 0.002 U	1 J	0.09 J	< 0.1 U
5/5/2020	Assessment	0.02 J	0.33	52.2	< 0.02 U	0.01 J	0.592	0.162	0.478	0.03 J	0.2 J	0.00782	< 0.002 U	0.7 J	< 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-1507
Mitchell - 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
6/14/2016	Background	13.2	333	529	0.06 J	7.0	339	1,070
8/2/2016	Background	12.2	323	497	0.07 J	7.0	332	1,890
9/27/2016	Background	14.1	355	517	0.06 J	7.1	345	1,840
11/9/2016	Background	12.1	325	480	0.06 J	7.1	314	1,840
2/8/2017	Background	11.1	312	401	0.06 J	7.1	276	1,480
4/5/2017	Background	10.6	324	445	0.05 J	7.2	306	1,630
5/17/2017	Background	12.1	308	437	0.05 J	7.2	310	1,680
7/19/2017	Background	11.1	298	447	< 0.05 U	7.2	308	1,740
10/10/2017	Detection	10.7	289	430	0.06 J	7.2	316	1,660
12/27/2017	Detection	10.4	284	450	--	7.2	--	1,380
4/11/2018	Assessment	10.4	296	400	0.06 J	6.9	347	1,390
8/21/2018	Assessment	9.29	272	331	0.07	7.2	323	1,430
5/1/2019	Assessment	8.36	271	296	0.07	8.0	346	1,270
6/11/2019	Assessment	8.41	257	279	0.07	7.8	349	1,340
10/22/2019	Assessment	8.39	273	295	0.08	7.4	369	1,360
3/18/2020	Assessment	--	--	--	0.07	7.2	--	--
5/5/2020	Assessment	7.72	262	310	0.05 J	7.4	350	1,330

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-1507
Mitchell - 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
6/14/2016	Background	0.05 J	2.19	84.5	0.142	0.07	3.6	3.18	0.521	0.06 J	4.07	0.011	0.025	0.25	0.7	0.051
8/2/2016	Background	0.12	4.54	104	0.168	0.07	10.4	4.10	2.09	0.07 J	4.48	0.019	0.016	2.14	0.5	0.078
9/27/2016	Background	0.10	3.58	92.0	0.134	0.06	14.0	3.06	2.029	0.06 J	2.96	0.020	0.010	1.80	0.5	0.08 J
11/9/2016	Background	0.11	4.15	102	0.202	0.07	12.6	4.50	1.784	0.06 J	3.97	0.016	0.010	12.8	0.5	0.09 J
2/8/2017	Background	0.08	2.16	73.6	0.089	0.04	6.16	1.77	16.587	0.06 J	1.86	0.013	0.007	2.31	0.3	0.081
4/5/2017	Background	0.06	1.51	71.3	0.053	0.04	19.4	1.26	0.6	0.05 J	1.17	0.011	0.006	5.29	0.2	0.053
5/17/2017	Background	0.11	1.30	63.6	0.031	0.04	12.6	0.990	0.767	0.05 J	0.799	0.024	0.003 J	4.54	0.2	0.04 J
7/19/2017	Background	0.06 J	1.29	62.0	0.044	0.04	12.1	2.37	1.215	< 0.05 U	0.999	0.018	0.004 J	4.37	0.1 J	0.06 J
4/11/2018	Assessment	0.07	1.67	71.2	0.062	0.04	21.3	1.45	0.701	0.06 J	1.56	0.012	0.006	2.73	0.3	0.059
8/21/2018	Assessment	0.08	0.47	62.1	0.01 J	0.03	2.00	0.426	1.419	0.07	0.308	0.010	0.002 J	0.87	0.08 J	0.05 J
5/1/2019	Assessment	0.03 J	0.43	53.9	< 0.02 U	0.03 J	2.35	0.331	0.496	0.07	0.239	< 0.009 U	< 0.002 U	1 J	0.07 J	< 0.1 U
6/11/2019	Assessment	0.03 J	0.24	52.2	< 0.02 U	0.03 J	0.315	0.160	1.454	0.07	< 0.02 U	0.01 J	0.003 J	0.4 J	0.04 J	< 0.1 U
10/22/2019	Assessment	0.03 J	0.45	54.8	< 0.02 U	0.03 J	1.51	0.343	0.952	0.08	0.239	0.00814	0.003 J	< 0.4 U	0.08 J	< 0.1 U
3/18/2020	Assessment	< 0.02 U	0.44	53.0	< 0.02 U	0.03 J	2.69	0.342	0.381	0.07	0.217	0.00794	< 0.002 U	0.8 J	0.06 J	< 0.1 U
5/5/2020	Assessment	0.03 J	0.42	53.1	< 0.02 U	0.03 J	1.30	0.345	0.836	0.05 J	0.208	0.00757	< 0.002 U	0.7 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-1508
Mitchell - 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
6/14/2016	Background	0.509	204	211	0.1 J	6.9	291	1,060
8/1/2016	Background	0.690	218	237	0.1 J	7.0	302	1,100
9/26/2016	Background	1.03	215	238	0.1 J	7.0	304	1,110
11/8/2016	Background	1.36	234	227	0.08 J	7.2	304	1,140
2/8/2017	Background	1.04	236	220	0.08 J	7.1	301	1,070
4/5/2017	Background	0.780	228	215	0.08 J	7.2	311	1,070
5/16/2017	Background	0.846	218	208	0.07 J	7.1	296	1,130
7/18/2017	Background	1.00	224	214	0.06 J	7.1	305	1,110
10/9/2017	Detection	0.881	207	212	0.08 J	7.1	322	1,200
4/11/2018	Assessment	0.806	229	200	0.08	6.9	302	1,050
8/21/2018	Assessment	0.952	219	204	0.08	7.2	313	1,080
5/1/2019	Assessment	0.622	221	178	0.08	8.2	287	978
6/12/2019	Assessment	0.679	209	163	0.08	7.1	285	988
10/22/2019	Assessment	0.860	212	168	0.09	7.3	309	991
3/18/2020	Assessment	--	--	--	0.08	7.2	--	--
5/6/2020	Assessment	0.486	198	148	0.06	7.2	273	947

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-1508
Mitchell - 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
6/14/2016	Background	0.04 J	1.05	48.7	0.038	0.09	0.8	3.21	0.763	0.1 J	1.61	0.009	0.003 J	0.93	0.5	0.04 J
8/1/2016	Background	0.04 J	1.07	51.7	0.037	0.07	1.2	2.22	0.0803	0.1 J	1.34	< 0.0002 U	0.008	0.74	0.7	0.03 J
9/26/2016	Background	0.06 J	1.65	50.2	0.06 J	0.07 J	2.3	2.34	0.596	0.1 J	1.69	0.007	0.003 J	1.17	0.8	< 0.05 U
11/8/2016	Background	0.05 J	1.32	53.9	0.058	0.05	1.70	2.17	2.782	0.08 J	2.06	0.003	0.002 J	0.63	0.7	0.03 J
2/8/2017	Background	0.04 J	0.97	46.1	0.042	0.04	1.34	1.40	12.465	0.08 J	1.32	0.009	0.003 J	0.53	0.7	0.04 J
4/5/2017	Background	0.04 J	1.09	49.9	0.049	0.04	1.74	1.66	0.394	0.08 J	1.71	0.008	0.004 J	0.35	0.9	0.03 J
5/16/2017	Background	0.04 J	1.21	47.0	0.041	0.03	1.32	1.12	0.931	0.07 J	1.13	0.014	< 0.002 U	0.46	0.9	0.04 J
7/18/2017	Background	0.04 J	1.11	45.1	0.040	0.04	1.33	1.27	0.597	0.06 J	1.20	0.012	< 0.002 U	0.68	0.6	0.04 J
4/11/2018	Assessment	0.04 J	1.04	46.4	0.040	0.04	1.40	1.03	0.236	0.08	1.11	0.008	< 0.004 U	0.45	0.7	0.05 J
8/21/2018	Assessment	0.06	0.44	40.1	0.01 J	0.04	0.691	0.678	0.3152	0.08	0.384	0.007	< 0.002 U	0.25	0.4	0.03 J
5/1/2019	Assessment	0.03 J	0.60	37.4	0.02 J	0.03 J	0.735	0.637	0.636	0.08	0.540	< 0.009 U	< 0.002 U	< 0.4 U	0.3	< 0.1 U
6/12/2019	Assessment	< 0.02 U	0.41	35.2	< 0.02 U	0.03 J	0.590	0.419	0.295	0.08	0.336	< 0.009 U	< 0.002 U	< 0.4 U	0.2	< 0.1 U
10/22/2019	Assessment	0.05 J	0.35	34.8	< 0.02 U	0.03 J	1.20	0.521	1.491	0.09	0.2 J	0.00485	< 0.002 U	0.6 J	0.3	< 0.1 U
3/18/2020	Assessment	< 0.02 U	0.52	36.2	< 0.02 U	0.03 J	0.820	0.481	0.636	0.08	0.298	0.00484	< 0.002 U	0.8 J	0.1 J	< 0.1 U
5/6/2020	Assessment	< 0.02 U	0.44	35.4	< 0.02 U	0.03 J	0.654	0.413	0.5934	0.06	0.311	0.00483	< 0.002 U	0.7 J	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-1509
Mitchell - 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
6/14/2016	Background	12.4	280	435	0.16	7.0	380	1,730
8/9/2016	Background	11.6	292	401	0.16	7.1	388	1,670
9/27/2016	Background	10.6	292	371	0.1 J	7.1	418	1,540
11/8/2016	Background	8.29	258	333	0.1 J	7.1	400	1,410
2/7/2017	Background	7.65	280	360	0.15	7.1	416	1,450
4/5/2017	Background	6.22	290	358	0.1 J	7.2	416	1,560
5/17/2017	Background	7.36	284	354	0.1 J	7.2	420	1,520
7/19/2017	Background	6.54	279	346	0.1 J	7.2	418	1,560
10/10/2017	Detection	6.70	277	345	0.1 J	7.2	432	1,490
12/27/2017	Detection	6.31	271	315	--	7.1	--	1,360
4/11/2018	Assessment	6.81	272	324	0.15	6.9	488	1,390
8/21/2018	Assessment	6.97	279	323	0.14	7.2	465	1,540
5/1/2019	Assessment	8.73	287	328	0.13	8.5	429	1,480
6/11/2019	Assessment	8.37	273	311	0.13	7.8	432	1,410
10/22/2019	Assessment	8.02	273	297	0.15	7.3	468	1,420
3/18/2020	Assessment	--	--	--	0.13	7.3	--	--
5/5/2020	Assessment	10.6	262	331	0.10	7.4	402	1,390

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-1509
Mitchell - 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
6/14/2016	Background	0.03 J	0.55	64.4	0.008 J	0.03	2.5	0.514	0.816	0.16	0.102	0.0009 J	< 0.002 U	1.43	0.1	0.03 J
8/9/2016	Background	0.03 J	0.62	64.4	0.01 J	0.02	0.5	0.484	0.45569	0.16	0.251	0.015	< 0.002 U	1.00	0.1	0.03 J
9/27/2016	Background	0.03 J	0.39	61.0	< 0.005 U	0.02	4.6	0.424	2.664	0.1 J	0.024	0.018	< 0.002 U	1.07	0.2	0.04 J
11/8/2016	Background	0.03 J	0.40	62.0	< 0.005 U	0.02	0.627	0.253	0.413	0.1 J	0.006 J	0.012	< 0.002 U	0.59	0.1	0.05 J
2/7/2017	Background	0.03 J	0.50	56.7	< 0.005 U	0.02	0.650	0.130	1.399	0.15	0.056	0.011	< 0.002 U	0.66	0.09 J	0.04 J
4/5/2017	Background	0.02 J	0.33	63.5	< 0.005 U	0.02 J	1.15	0.189	0.304	0.1 J	0.01 J	0.012	< 0.002 U	0.48	0.2	0.03 J
5/17/2017	Background	0.02 J	0.56	61.5	< 0.004 U	0.01 J	1.05	0.255	1.673	0.1 J	0.02 J	0.022	0.002 J	0.56	0.2	0.03 J
7/19/2017	Background	0.03 J	0.65	58.5	0.01 J	0.01 J	0.857	0.344	1.134	0.1 J	0.220	0.017	< 0.002 U	0.80	0.2 J	0.04 J
4/11/2018	Assessment	0.03 J	0.42	52.8	0.005 J	0.01 J	0.657	0.215	0.792	0.15	0.062	0.009	0.002 J	0.34	0.2	0.057
8/21/2018	Assessment	0.09	0.33	53.8	< 0.004 U	0.008 J	0.777	0.132	0.736	0.14	0.035	0.012	< 0.002 U	0.32	0.3	0.03 J
5/1/2019	Assessment	0.03 J	0.33	47.2	< 0.02 U	0.01 J	2.28	0.324	0.4075	0.13	0.114	< 0.009 U	< 0.002 U	< 0.4 U	0.2 J	< 0.1 U
6/11/2019	Assessment	0.03 J	0.28	48.6	< 0.02 U	0.02 J	1.47	0.097	0.559	0.13	0.05 J	0.02 J	< 0.002 U	< 0.4 U	0.2	< 0.1 U
10/22/2019	Assessment	0.03 J	0.37	47.2	< 0.02 U	0.01 J	1.22	0.164	1.441	0.15	0.08 J	0.00911	< 0.002 U	< 0.4 U	0.3	< 0.1 U
3/18/2020	Assessment	< 0.02 U	0.42	45.8	< 0.02 U	< 0.01 U	0.518	0.144	0.5514	0.13	0.2 J	0.00934	< 0.002 U	< 0.4 U	0.07 J	< 0.1 U
5/5/2020	Assessment	0.03 J	0.27	43.7	< 0.02 U	< 0.01 U	0.633	0.092	1.2019	0.10	0.05 J	0.00897	< 0.002 U	0.6 J	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-1510
Mitchell - 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
6/14/2016	Background	9.36	283	334	0.06 J	7.0	358	1,520
8/2/2016	Background	9.18	294	333	0.06 J	7.0	356	1,410
9/27/2016	Background	10.1	296	338	0.05 J	7.1	367	1,410
11/9/2016	Background	9.22	280	325	< 0.05 U	7.1	332	1,420
2/8/2017	Background	10.4	281	314	0.06 J	7.2	325	1,270
4/5/2017	Background	9.23	261	303	0.06 J	7.3	313	1,330
5/17/2017	Background	10.8	249	306	0.05 J	7.2	307	1,340
7/18/2017	Background	9.86	255	311	< 0.05 U	7.2	309	1,410
10/9/2017	Detection	8.70	249	327	0.05 J	7.2	356	1,520
12/27/2017	Detection	8.83	261	339	--	7.2	--	1,300
4/12/2018	Assessment	10.4	292	322	< 0.05 U	7.0	398	1,290
8/21/2018	Assessment	9.13	268	334	0.09	7.3	428	1,550
5/1/2019	Assessment	8.83	287	325	0.10	8.1	467	1,460
6/12/2019	Assessment	8.50	266	293	0.10	6.9	469	1,430
10/22/2019	Assessment	9.30	259	283	0.11	7.2	483	1,360
3/18/2020	Assessment	--	--	--	0.11	7.4	--	--
5/6/2020	Assessment	9.14	228	252	0.10	7.4	484	1,440

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-1510
Mitchell - 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
6/14/2016	Background	0.03 J	0.72	50.8	0.02 J	0.01 J	0.6	0.257	0.331	0.06 J	0.282	0.003	< 0.002 U	0.65	0.2	0.057
8/2/2016	Background	0.03 J	0.62	49.0	0.02 J	0.009 J	0.7	0.256	1.383	0.06 J	0.269	0.016	< 0.002 U	0.92	0.2	0.02 J
9/27/2016	Background	0.03 J	0.70	48.7	0.02 J	0.009 J	0.8	0.329	0.865	0.05 J	0.333	0.014	< 0.002 U	0.45	0.2	0.04 J
11/9/2016	Background	0.02 J	0.58	44.6	0.02 J	0.01 J	0.655	0.230	0.88	< 0.05 U	0.261	0.009	< 0.002 U	0.33	0.1	0.03 J
2/8/2017	Background	0.02 J	0.47	39.5	< 0.005 U	0.005 J	0.521	0.073	6.828	0.06 J	0.066	0.013	< 0.002 U	0.42	0.08 J	0.02 J
4/5/2017	Background	0.02 J	0.36	41.4	< 0.005 U	0.006 J	2.34	0.175	1.12829	0.06 J	0.094	0.011	< 0.002 U	0.27	0.07 J	< 0.01 U
5/17/2017	Background	0.02 J	0.53	40.2	< 0.004 U	0.005 J	1.40	0.138	0.176	0.05 J	0.049	0.015	< 0.002 U	0.28	0.1	0.01 J
7/18/2017	Background	0.02 J	0.51	41.0	0.007 J	0.008 J	6.41	0.234	0.97	< 0.05 U	0.125	0.014	< 0.002 U	0.85	0.1	0.01 J
4/12/2018	Assessment	0.03 J	0.42	43.3	0.01 J	0.005 J	27.4	0.217	0.094	< 0.05 U	0.119	0.006	0.002 J	3.30	0.1	0.02 J
8/21/2018	Assessment	0.03 J	0.37	42.6	0.008 J	0.006 J	5.64	0.383	1.237	0.09	0.133	0.011	< 0.002 U	0.43	0.1	0.01 J
5/1/2019	Assessment	0.02 J	0.29	41.7	< 0.02 U	< 0.01 U	1.75	0.172	0.5725	0.10	0.105	0.01 J	< 0.002 U	< 0.4 U	0.2 J	< 0.1 U
6/12/2019	Assessment	0.02 J	0.27	41.3	< 0.02 U	< 0.01 U	0.697	0.105	0.4098	0.10	0.07 J	0.02 J	< 0.002 U	< 0.4 U	0.2 J	< 0.1 U
10/22/2019	Assessment	0.02 J	0.33	38.7	< 0.02 U	< 0.01 U	1.12	0.154	0.333	0.11	0.07 J	0.00862	< 0.002 U	< 0.4 U	0.2	< 0.1 U
3/18/2020	Assessment	< 0.02 U	0.31	38.0	< 0.02 U	< 0.01 U	2.10	0.121	0.864	0.11	0.08 J	0.00808	< 0.002 U	< 0.4 U	0.2 J	< 0.1 U
5/6/2020	Assessment	< 0.02 U	0.29	36.7	< 0.02 U	< 0.01 U	0.886	0.109	0.7374	0.10	0.07 J	0.00750	< 0.002 U	< 0.4 U	0.2 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: Residence Time Calculation Summary
Mitchell Bottom Ash Ponds

Geosyntec Consultants, Inc.

			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-1504 [1]	2.0	2.4	25.6	6.6	9.2	18.1	3.4
	MW-1505 [2]	2.0	4.3	14.1	7.3	8.4	19.5	3.1
	MW-1506 [2]	2.0	4.1	14.7	6.5	9.4	3.9	15.6
	MW-1507 [2]	2.0	5.4	11.3	12.6	4.8	9.8	6.2
	MW-1508 [3]	2.0	21.0	2.9	23.4	2.6	17.7	3.4
	MW-1509 [2]	2.0	9.2	6.6	14.5	4.2	12.8	4.8
	MW-1510 [1]	2.0	22.3	2.7	19.1	3.2	15.6	3.9

Notes:
[1] - Sidegradient Well
[2] - Downgradient Well
[3] - Upgradient Well

Monitoring Well Network

- Compliance Sampling Location
- Upgradient Sampling Location
- Bottom Ash Pond

Notes

- Monitoring well coordinates provided by AEP.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.

250 125 0 250 Feet

Site Layout
Bottom Ash Pond

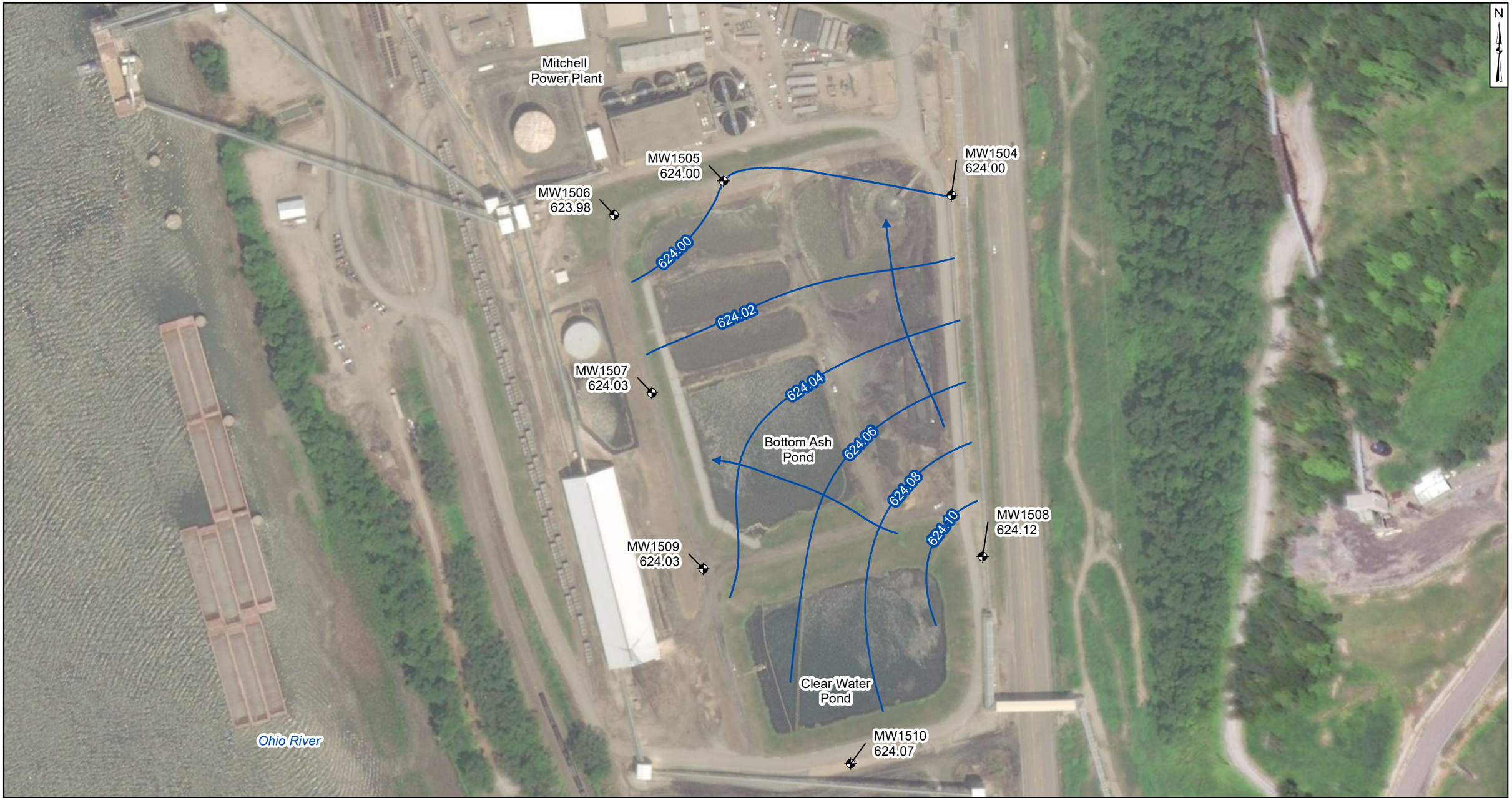
Mitchell Power Generation Plant - Bottom Ash Pond
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2018/01/26

Figure **1**

C:\Users\mmuenich\Documents\local_projects\AEP_GIS\Mitchell\MXDs\AEP-Mitchell_BAP_Site_Layout.mxd. MMuenich. 1/26/2018. Project/Phase/Task.



Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour

Notes

- Monitoring well coordinates and water level data (collected on October 22, 2019) provided by AEP.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater and river elevation units are feet above mean sea level (NAVD 88).

250 125 0 250 Feet

Potentiometric Surface Map - Uppermost Aquifer October 2019

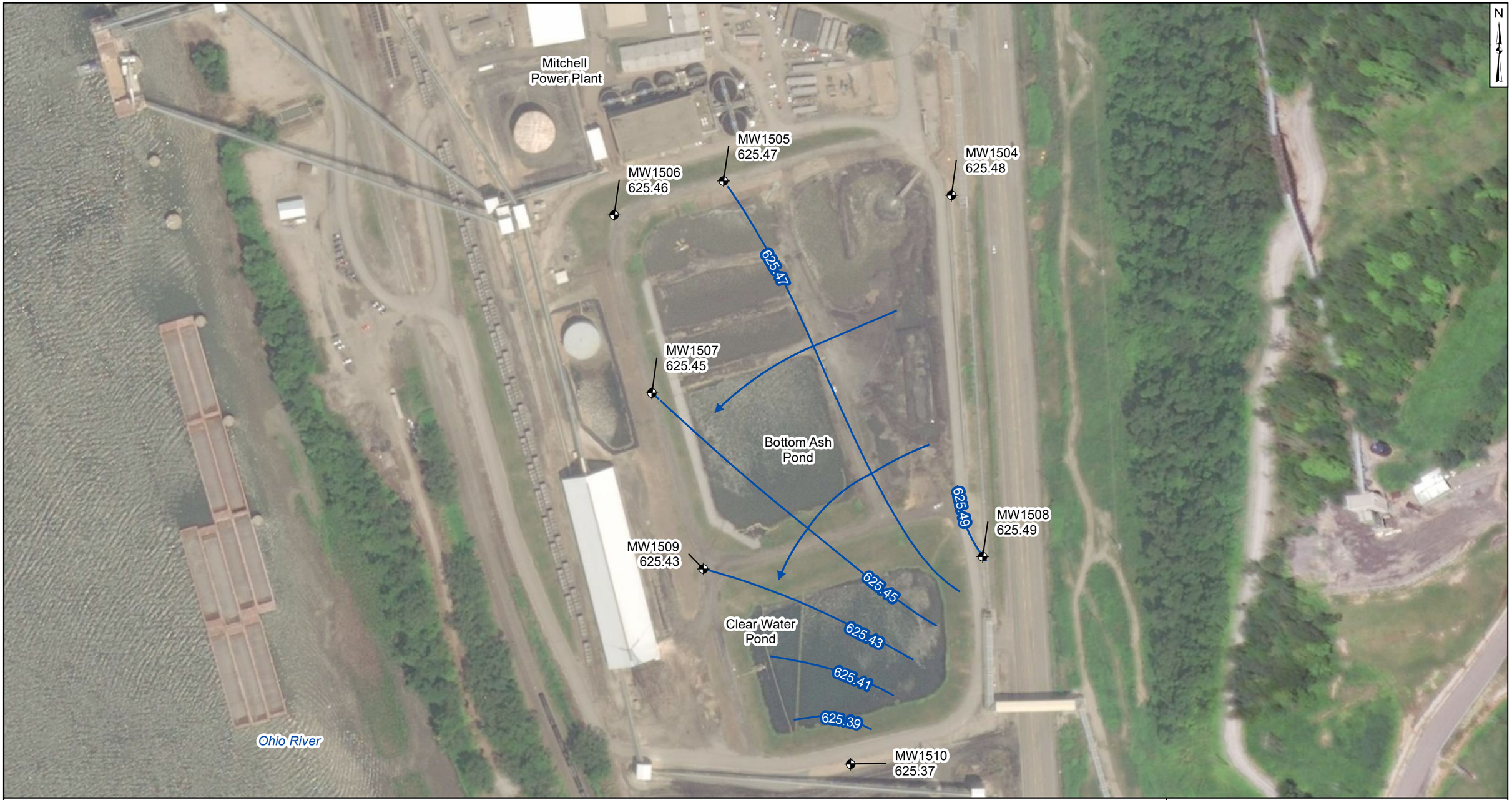
Mitchell Power Generation Plant - Bottom Ash Pond
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2019/12/11

Figure 2

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\BAP\2019\AEP-Mitchell_Pond_GW_October2019.mxd. ARevezzo. 12/11/2019. Project/Phase/Task.



Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour

Notes

- Monitoring well coordinates and water level data (collected on March 17, 2020) provided by AEP.
- Approximate Ohio River elevation was 602.40 feet at Mitchell Power Plant on March 17, 2020. Data Source: USGS Ohio River gauge at Hannibal Lock and Dan (Upper), OH.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater and river elevation units are feet above mean sea level (NAVD 88).

250 125 0 250 Feet

Potentiometric Surface Map - Uppermost Aquifer
March 2020

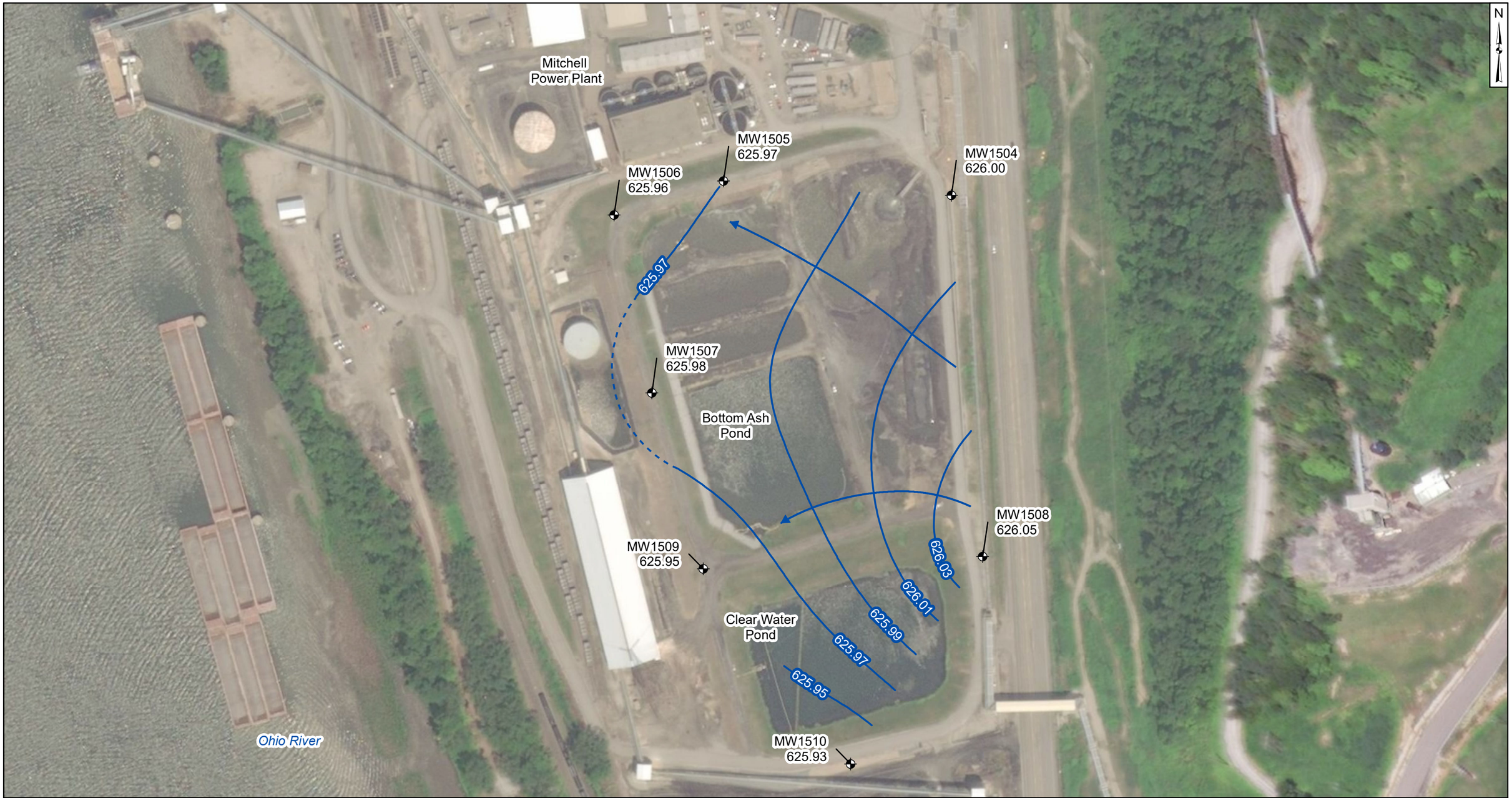
Mitchell Power Generation Plant - Bottom Ash Pond
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2020/06/10

Figure **3**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\BAP\2020\AEP-Mitchell_Pond_GW_March2020.mxd. ARevezzo. 6/10/2020. Project/Phase/Task.



Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on May 5 - 6, 2020) provided by AEP.
- Approximate Ohio River elevation was 602.37 feet at Mitchell Power Plant on May, 5, 2020. Data Source: USGS Ohio River gauge at Hannibal Lock and Dan (Upper), OH.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater and river elevation units are feet above mean sea level (NAVD 88).

250 125 0 250 Feet

Potentiometric Surface Map - Uppermost Aquifer
May 2020

Mitchell Power Generation Plant - Bottom Ash Pond
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2020/06/10

Figure **4**

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Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour

Notes

- Monitoring well coordinates and water level data (collected on October 20, 2020) provided by AEP.
- Approximate Ohio River elevation was 623.57 feet at Mitchell Power Plant on October 20, 2020. Data Source: USGS Ohio River gauge at Hannibal Lock and Dan (Upper), OH.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater and river elevation units are feet above mean sea level (NAVD 88).

250 125 0 250 Feet

Potentiometric Surface Map - Uppermost Aquifer October 2020

Mitchell Power Generation Plant - Bottom Ash Pond
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2021/01/14

Figure 5

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APPENDIX 2 - Statistical Analyses

The February and August 2020 statistical analysis summaries concluding that no SSLs were identified at the CCR unit follow.

STATISTICAL ANALYSIS SUMMARY
BOTTOM ASH POND
Mitchell Plant
Moundsville, West Virginia

Submitted to

AMERICAN ELECTRIC POWER℠

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

941 Chatham Lane
Suite 103
Columbus, Ohio 43221

February 11, 2020

CHA8473

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LIST OF ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

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

SECTION 1

EXECUTIVE SUMMARY

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

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, calcium, chloride, and total dissolved solids (TDS), at the BAP. An alternative source was not identified following the detection monitoring events; thus, the BAP has been in assessment monitoring since 2018. During the most recent assessment monitoring event, completed in May 2019, Appendix III exceedances of boron, calcium, chloride, pH, sulfate, and TDS were observed, and the unit remained in assessment monitoring. The statistical summary of the results of the May 2019 sampling event was issued in a separate report (Geosyntec, 2019). Two assessment monitoring events were conducted at the BAP in June 2019 and October 2019, in accordance with 40 CFR 257.95. Only the results of the June and October assessment events are documented in this report.

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

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 any were present at concentrations above the GWPSs. No statistically significant levels (SSLs) were identified. In addition, prediction limits were recalculated for Appendix III parameters. When compared to the revised prediction limits, concentrations for boron, calcium, chloride, fluoride, sulfate, and TDS remained above background. As a result, either the unit will remain in assessment monitoring or an alternative source demonstration (ASD) will be conducted to evaluate if the unit can return to detection monitoring. 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) (June 2019) and 257.95(d)(1) (October 2019). Samples from the June 2019 event and the October 2019 event were analyzed for all Appendix III and Appendix IV parameters. 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.9.6.23 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 June and October 2019 were screened for potential outliers; however, no outliers were identified in either set of data (Attachment B).

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. Generally, tolerance limits were calculated parametrically with 95% coverage and 95% confidence. Non-parametric tolerance limits were calculated for beryllium, cadmium, fluoride,

mercury, selenium, and thallium due to apparent non-normal distributions. 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.

No SSLs were identified at the Mitchell BAP.

2.2.3 Establishment of Appendix III Prediction Limits

Upper prediction limits (UPL) were previously established for all Appendix III parameters following the background monitoring period (Geosyntec, 2018). Intrawell tests were used to evaluate potential SSIs for fluoride and sulfate, whereas interwell tests were used to evaluate potential SSIs for boron, calcium, chloride, pH, and TDS. While interwell prediction limits have been updated periodically during the assessment monitoring period as sufficient data became available, this represents the first update to the background dataset for parameters evaluated using intrawell tests.

Mann-Whitney (Wilcoxon rank-sum) tests were performed to determine whether the newer data are affected by a release from the BAP. Because the interwell Appendix III limits and the Appendix IV GWPSs are based on data from upgradient wells which would not be expected to have been impacted by a release, these tests were used for intrawell Appendix III tests only. Mann-Whitney tests were used to compare the medians of historical data (June 2016 - July 2017) to the new compliance samples (through May 2019) for fluoride and sulfate. 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 Appendix B. Two statistically significant differences were noted which included sulfate at MW-1506 and MW-1509. Typically, when the test concludes that the medians of the two groups are significantly different, the background data are not updated to include the newer data but will be reconsidered in the future. However, in both cases while the medians were slightly different, the recent reported measurements are similar to historical measurements. Therefore, the background data were updated along with all other records.

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" values – 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.

UPLs were updated using all the historical data through May 2019 to represent background values. Lower prediction limits (LPLs) were also updated for pH. The updated prediction limits are summarized in Table 3. Intrawell tests were used to evaluate potential SSIs for fluoride and sulfate, whereas interwell tests were used to evaluate potential SSIs for boron, calcium, chloride, pH, and TDS. The UPLs were calculated for a one-of-two retesting procedure; i.e., if at least one sample in a series of two does not exceed the UPL, then it can be concluded that an SSI has not occurred. In practice, where the initial result does not exceed the UPL, a second sample will not be collected. The retesting procedures achieved an acceptably high statistical power to detect changes at downgradient wells for constituents evaluated using both interwell and intrawell prediction limits.

2.2.4 Evaluation of Potential Appendix III SSIs

The CCR rule allows CCR units to move from assessment monitoring to detection monitoring if all Appendix III and Appendix IV parameters were at or below background levels for two consecutive sampling events [40 CFR 257.95(e)]. Since no Appendix IV SSLs were identified, Appendix III results were analyzed to assess whether concentrations of Appendix III parameters at the compliance wells exceeded background concentrations.

Data collected during the June 2019 and October 2019 assessment monitoring events from each compliance well were compared to the prediction limits to assess whether the results are above background values. The results from these events and the prediction limits are summarized in Table 4. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 1.36 mg/L at MW-1505 (7.79 mg/L and 7.37 mg/L), MW-1506 (5.27 mg/L and 4.49 mg/L), MW-1507 (8.41 mg/L and 8.39 mg/L), MW-1509 (8.37 mg/L and 8.02 mg/L), and MW-1510 (8.50 mg/L and 9.30 mg/L).

- Calcium concentrations exceeded the interwell UPL of 242 mg/L at MW-1505 (279 mg/L and 285 mg/L), MW-1506 (265 mg/L and 293 mg/L), MW-1507 (257 mg/L and 273 mg/L), MW-1509 (273 mg/L and 273 mg/L), and MW-1510 (266 mg/L and 259 mg/L).

- Chloride concentrations exceeded the interwell UPL of 238 mg/L at MW-1505 (261 mg/L and 260 mg/L), MW-1506 (315 mg/L and 364 mg/L), MW-1507 (279 mg/L and 295 mg/L), MW-1509 (311 mg/L and 297 mg/L), and MW-1510 (293 mg/L and 283 mg/L).

- Fluoride concentrations exceeded the intrawell UPL of 0.10 mg/L at MW-1510 (0.11 mg/L).

- Sulfate concentrations exceeded the intrawell UPL of 408 mg/L at MW-1505 (455 mg/L).

- TDS concentrations exceeded the interwell UPL of 1194 mg/L at MW-1505 (1450 mg/L and 1480 mg/L), MW-1506 (1370 mg/L and 1330 mg/L), MW-1507 (1340 mg/L and 1360 mg/L), MW-1509 (1410 mg/L and 1420 mg/L), and MW-1510 (1430 mg/L and 1360 mg/L).

Based on these results, concentrations of Appendix III parameters exceeded background levels at compliance wells at the Mitchell BAP during assessment monitoring. As a result, the Mitchell BAP CCR unit will remain in assessment monitoring.

2.3 Conclusions

A semi-annual assessment monitoring event was conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. GWPSs were re-established for the Appendix IV parameters. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPSs. No SSLs were identified.

Revised prediction limits were calculated for Appendix III parameters. Interwell tests were used to evaluate potential SSIs for boron, calcium, chloride, pH, and TDS, whereas intrawell tests were used to evaluate potential SSIs for fluoride and sulfate. Prediction limits were recalculated using a one-of-two retesting procedure. The Appendix III results were evaluated to assess whether concentrations of Appendix III parameters exceeded background levels. Boron, calcium, chloride, fluoride, sulfate, and TDS results exceeded background levels at select downgradient wells.

Based on this evaluation, either the Mitchell BAP CCR unit will remain in assessment monitoring or an ASD will be conducted to evaluate if the unit can return to detection monitoring.

SECTION 3

REFERENCES

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

Geosyntec Consultants (Geosyntec). 2018. Statistical Analysis Summary – Bottom Ash Pond, Mitchell Plant, Moundsville, West Virginia. January 15, 2018.

Geosyntec, 2019. Statistical Analysis Summary – Bottom Ash Pond, Mitchell Plant, Moundsville, West Virginia. July 10, 2019.

TABLES

Table 1 - Groundwater Data Summary
Mitchell - Bottom Ash Pond

Geosyntec Consultants, Inc.

Component	Unit	MW-1504		MW-1505		MW-1506		MW-1507		MW-1508		MW-1509		MW-1510	
		6/11/2019	10/22/2019	6/11/2019	10/22/2019	6/11/2019	10/22/2019	6/11/2019	10/22/2019	6/12/2019	10/22/2019	6/11/2019	10/22/2019	6/12/2019	10/22/2019
Antimony	µg/L	0.100 U	0.0600	0.0300 J	0.0300	0.0300 J	0.0300	0.0300 J	0.0300	0.100 U	0.0500	0.0300 J	0.0300	0.0200 J	0.0200
Arsenic	µg/L	0.240	0.290	0.280	0.340	0.420	0.370	0.240	0.450	0.410	0.350	0.280	0.370	0.270	0.330
Barium	µg/L	33.5	37.0	49.3	49.9	49.8	52.7	52.2	54.8	35.2	34.8	48.6	47.2	41.3	38.7
Beryllium	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Boron	mg/L	0.040 J	0.02	7.79	7.37	5.27	4.49	8.41	8.39	0.679	0.860	8.37	8.02	8.50	9.30
Cadmium	µg/L	0.0500 U	0.0300	0.0300 J	0.0300	0.0100 J	0.0200	0.0300 J	0.0300	0.0300 J	0.0300	0.0200 J	0.0100	0.0500 U	0.0500 U
Calcium	mg/L	183	196	279	285	265	293	257	273	209	212	273	273	266	259
Chloride	mg/L	78.5	85.9	261	260	315	364	279	295	163	168	311	297	293	283
Chromium	µg/L	0.0500 J	0.399	0.849	0.450	1.11	0.708	0.315	1.51	0.590	1.20	1.47	1.22	0.697	1.12
Cobalt	µg/L	0.0400 J	0.475	0.155	0.143	0.290	0.167	0.160	0.343	0.419	0.521	0.0970	0.164	0.105	0.154
Combined Radium	pCi/L	0.261	0.613	0.526	0.759	1.01	0.997	1.45	0.952	0.295	1.49	0.559	1.44	0.410	0.333
Fluoride	mg/L	0.170	0.150	0.0300 J	0.0300	0.0500 J	0.0400	0.0700	0.0800	0.0800	0.0900	0.130	0.150	0.100	0.110
Lead	µg/L	0.100 U	0.200 U	0.0400 J	0.200 U	0.234	0.100	0.100 U	0.239	0.336	0.200	0.0500 J	0.0800	0.0700 J	0.0700
Lithium	mg/L	0.0300 U	0.00448	0.0100 J	0.00534	0.0300 U	0.00873	0.0100 J	0.00814	0.0300 U	0.00485	0.0200 J	0.00911	0.0200 J	0.00862
Mercury	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00300 J	0.00300	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Molybdenum	µg/L	2.00 U	2.00 U	0.700 J	2.00 U	0.400 J	2.00	0.400 J	2.00 U	2.00 U	0.600	2.00 U	2.00 U	2.00 U	2.00 U
Selenium	µg/L	0.700	0.0500	0.400	0.100	0.0400 J	0.0400	0.0400 J	0.0800	0.200	0.300	0.200	0.300	0.200 J	0.200
Total Dissolved Solids	mg/L	829	801	1450	1480	1370	1330	1340	1360	988	991	1410	1420	1430	1360
Sulfate	mg/L	261	242	404	455	335	354	349	369	285	309	432	468	469	483
Thallium	µg/L	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
pH	SU	7.60	7.30	7.70	7.20	7.80	7.40	7.80	7.40	7.10	7.30	7.80	7.30	6.90	7.20

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries 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

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

Geosyntec Consultants, Inc.

Constituent Name	MCL	CCR Rule-Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00005	0.006
Arsenic, Total (mg/L)	0.01		0.0019	0.01
Barium, Total (mg/L)	2		0.056	2
Beryllium, Total (mg/L)	0.004		0.00006	0.004
Cadmium, Total (mg/L)	0.005		0.00009	0.005
Chromium, Total (mg/L)	0.1		0.0021	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.0032	0.006
Combined Radium, Total (pCi/L)	5		2.16	5
Fluoride, Total (mg/L)	4		0.25	4
Lead, Total (mg/L)	0.015		0.0034	0.015
Lithium, Total (mg/L)	n/a	0.04	0.014	0.04
Mercury, Total (mg/L)	0.002		0.000008	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0017	0.1
Selenium, Total (mg/L)	0.05		0.0009	0.05
Thallium, Total (mg/L)	0.002		0.0002	0.002

Notes:
Grey cell indicates calculated UTL is higher than MCL.
MCL = Maximum Contaminant Level
RSL = Regional Screening Level
GWPS = Groundwater Protection Standard
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.

Parameter	Units	Limit Type	MW-1504	MW-1505	MW-1506	MW-1507	MW-1508	MW-1509	MW-1510
Boron	mg/L	UPL	1.36						
Calcium	mg/L	UPL	242						
Chloride	mg/L	UPL	238						
Fluoride	mg/L	UPL	0.275	0.03	0.1	0.09	0.1	0.17	0.1
pH	SU	UPL	8.2						
pH	SU	LPL	6.9						
Sulfate	mg/L	UPL	461.7	408	369	373	325	489	497
Total Dissolved Solids	mg/L	UPL	1194						

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

Table 4: Appendix III Data Summary
Mitchell Plant - Bottom Ash Pond

Geosyntec Consultants, Inc.

Parameter	Units	Description	MW-1505		MW-1506		MW-1507		MW-1509		MW-1510	
			6/11/2019	10/22/2019	6/11/2019	10/22/2019	6/11/2019	10/22/2019	6/11/2019	10/22/2019	6/11/2019	10/22/2019
Boron	mg/L	Interwell Background Value (UPL)	1.36									
		Detection Monitoring Result	**7.79**	**7.37**	**5.27**	**4.49**	**8.41**	**8.39**	**8.37**	**8.02**	**8.50**	**9.30**
Calcium	mg/L	Interwell Background Value (UPL)	242									
		Detection Monitoring Result	**279**	**285**	**265**	**293**	**257**	**273**	**273**	**273**	**266**	**259**
Chloride	mg/L	Interwell Background Value (UPL)	238									
		Detection Monitoring Result	**261**	**260**	**315**	**364**	**279**	**295**	**311**	**297**	**293**	**283**
Fluoride	mg/L	Intrawell Background Value (UPL)	0.03		0.10		0.09		0.17		0.10	
		Detection Monitoring Result	0.03 J	0.03 J	0.05 J	0.04 J	0.07	0.08	0.13	0.15	0.10	**0.11**
pH	SU	Interwell Background Value (UPL)	8.2									
		Interwell Background Value (LPL)	6.9									
		Detection Monitoring Result	7.7	7.2	7.8	7.4	7.8	7.4	7.8	7.3	6.9	7.2
Sulfate	mg/L	Intrawell Background Value (UPL)	408		369		373		489		497	
		Detection Monitoring Result	404	**455**	335	354	349	369	432	468	469	483
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	1194									
		Detection Monitoring Result	**1450**	**1480**	**1370**	**1330**	**1340**	**1360**	**1410**	**1420**	**1430**	**1360**

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 Mitchell 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	WEST VIRGINIA	02.18.2020
License Number	Licensing State	Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS CONSULTING

January 10, 2020

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

RE: Mitchell Bottom Ash Pond (BAP) – Background Update & Assessment Report 2019

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the background update and evaluation of groundwater data for the Fall 2019 sample event for American Electric Power Company's Mitchell 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 at each of the wells below began at Mitchell Bottom Ash Pond for the CCR program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following: upgradient wells MW-1504 and MW-1508; and downgradient wells MW-1505, MW-1506, MW-1507, MW-1509 and MW-1510.

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 CCR program consists of the following constituents:

- **Appendix III** (Detection Monitoring) **-** boron, calcium, chloride, fluoride, pH, sulfate, and TDS; and

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

Time series graphs and box plots for Appendix III and IV parameters are provided for all wells and constituents; and are used to evaluate concentrations over the entire record as well as view variation within and across wells (Figures A and B). All data were initially screened for outliers and trends in December 2017. As a result of that screening, the statistical methods implemented at this site are listed below:

Summary of Statistical Method:

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

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are nondetects, a nonparametric test is utilized. 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.

Background Update – Appendix III Parameters – December 2019

Prior to updating background data, samples were re-evaluated for all wells for intrawell parameters and all upgradient wells for interwell parameters using Tukey's outlier test and visual screening with the May 2019 samples (Figure C). When values are identified as outliers, they are flagged in the database with "o" and are deselected prior to construction of statistical limits. Tukey's test identified a few new outliers during this screening, however, none of these values appeared to be in error or significantly different enough to warrant flagging. While Tukey's test did not identify the highest values for chromium and molybdenum in wells MW-1505 and MW-1510 (as a result of the natural log transformation), these values were significantly higher than the remaining measurements at these wells and did not appear to represent the populations at these wells. These values were flagged in the database. A list of all flagged outliers follows this letter. Additionally, 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.

For constituents requiring intrawell prediction limits, the Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data through July 2017 to the new compliance samples at each well through May 2019 to evaluate whether the groups are statistically different at the 99% confidence level, in which case background data may be updated with compliance data (Figure D). Two statistically significant differences were noted which included sulfate at wells MW_1506 and MW1509.

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 both cases while the medians were slightly different, the recent reported measurements are similar to historical measurements and, therefore, were updated at this time along with all other records. 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 through May 2019, combined with a 1-of-2 resample plan, were constructed for fluoride and sulfate (Figure E).

For parameters tested using interwell analyses, the Sen's Slope/Mann-Kendall trend test was used on upgradient wells to determine whether concentrations are statistically increasing, decreasing or stable (Figure F). No statistically significant increasing or decreasing trends were noted except for: chloride decreasing in upgradient well MW-1508 and pH increasing in upgradient well MW-1504.

The magnitude of these trends, however, is low relative to the average concentrations in these wells. Therefore, no adjustments were required at this time. A summary of these results is included with the trend tests.

Interwell prediction limits, combined with a 1-of-2 resample plan, were updated using all available data from upgradient wells through May 2019 for boron, calcium, chloride, pH, and TDS (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.

Evaluation of Appendix IV Parameters

Tolerance limits were used to calculate background limits from all available pooled upgradient well data for Appendix IV parameters with a target of 95% confidence and 95% coverage to determine the background level for each constituent (Figure H). Background data are screened for outliers and extreme trending patterns that would lead to artificially elevated statistical limits. Any flagged values may be seen on the Outlier Summary following this letter.

For parametric limits the target is 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 Standards (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure I).

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 levels, or background as discussed above (Figure J). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. No exceedances were noted at any of the downgradient wells. 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 Mitchell Bottom Ash Pond. If you have any questions or comments, please feel free to contact me.

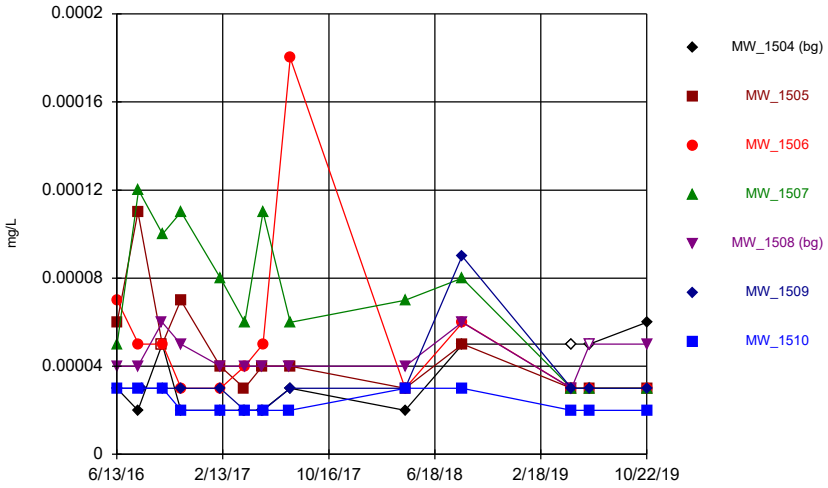
For Groundwater Stats Consulting,

Easton Rayner
Groundwater Analyst

Kristina L. Rayner
Groundwater Statistician

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Time Series



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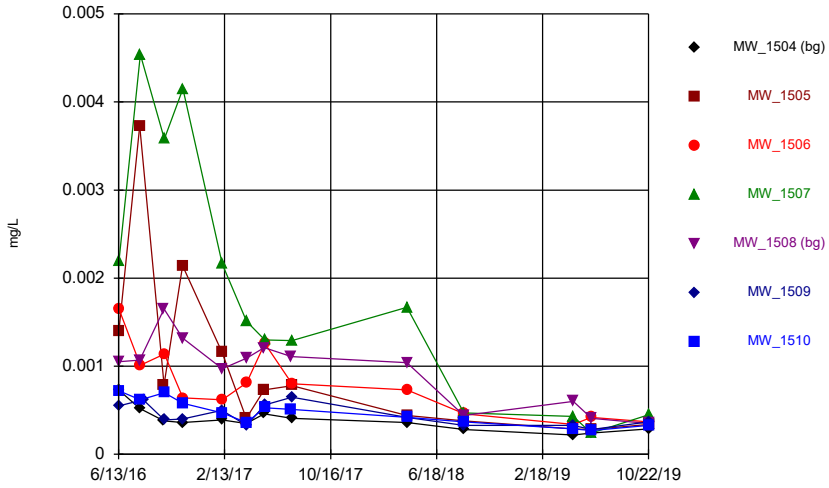
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Time Series



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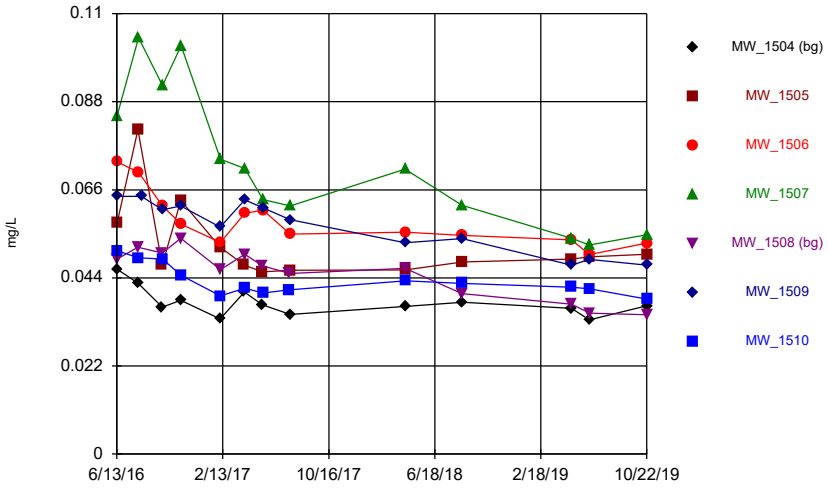
Sanitas™ v.9.6.24 . UG

Time Series



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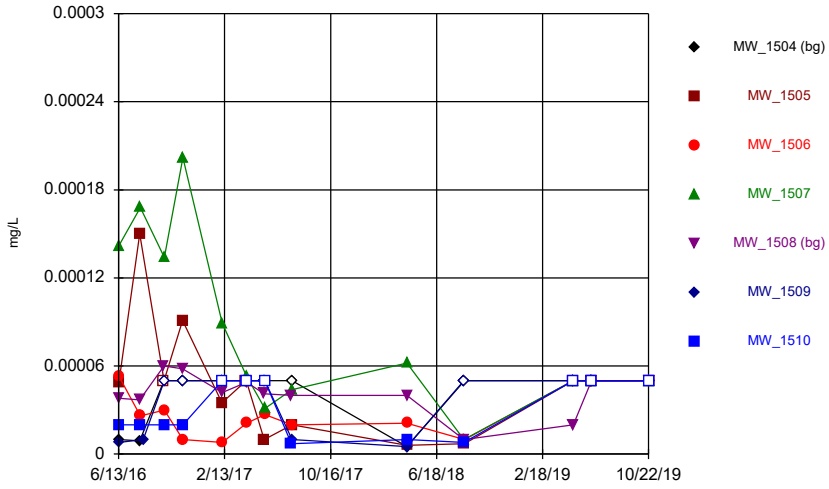
Time Series



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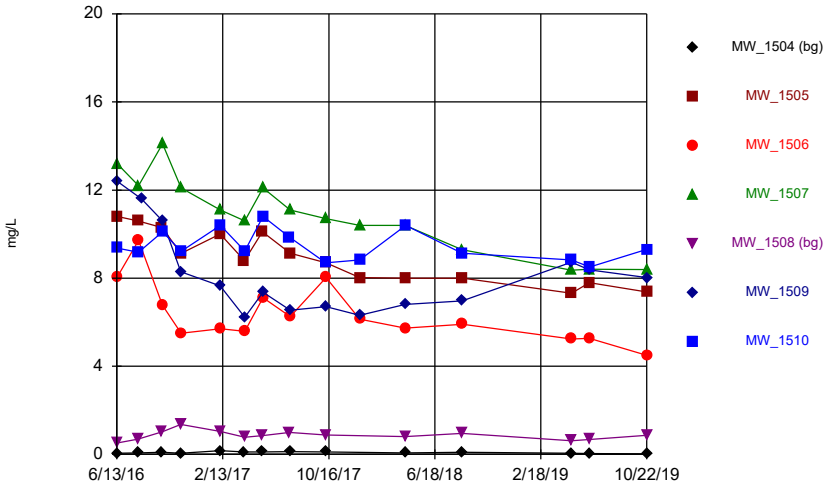
Sanitas™ v.9.6.24 . UG

Time Series



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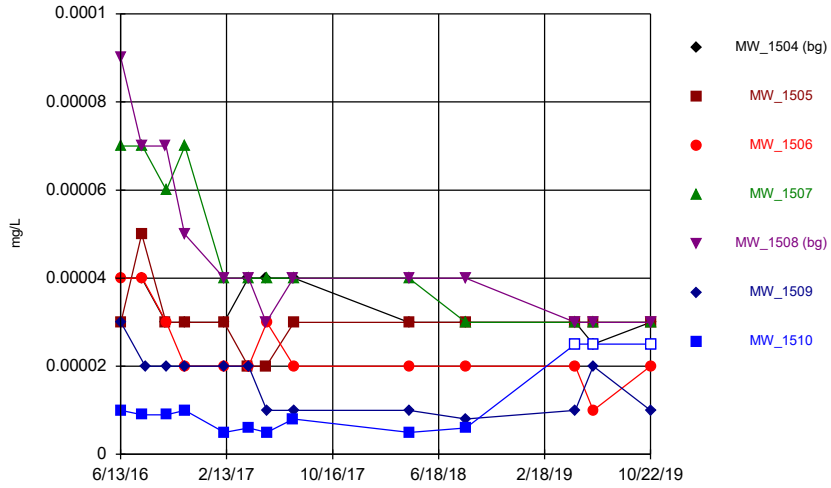
Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Time Series



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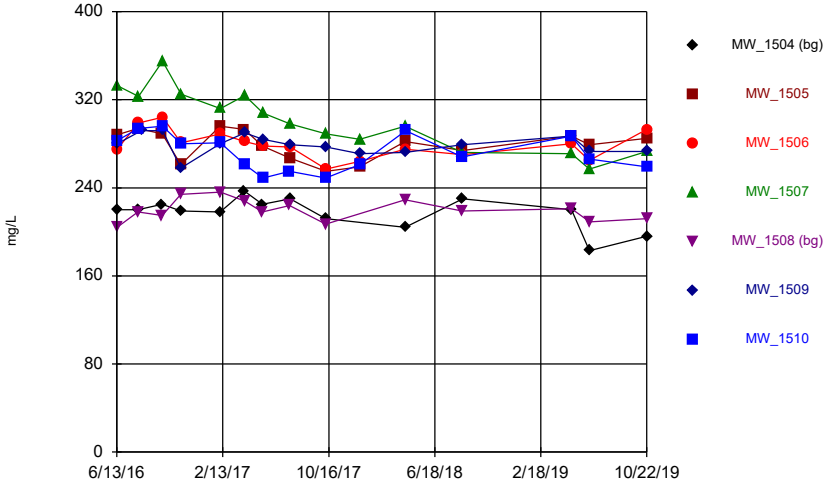
Sanitas™ v.9.6.24 . UG

Time Series



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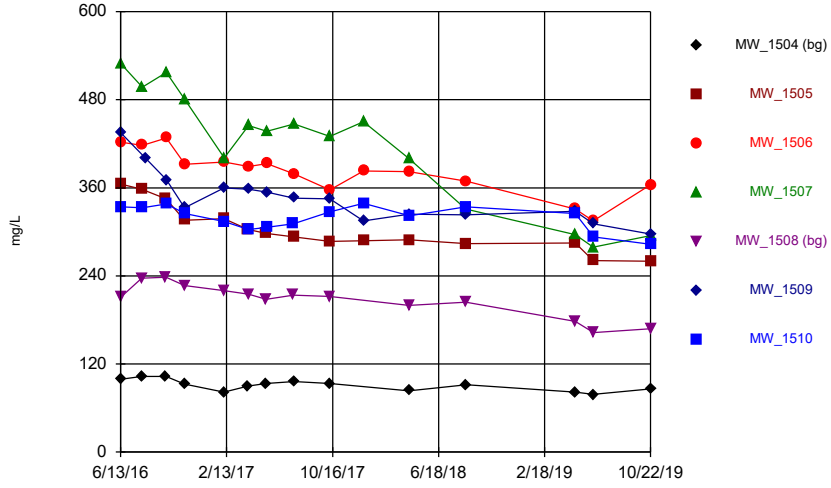
Time Series



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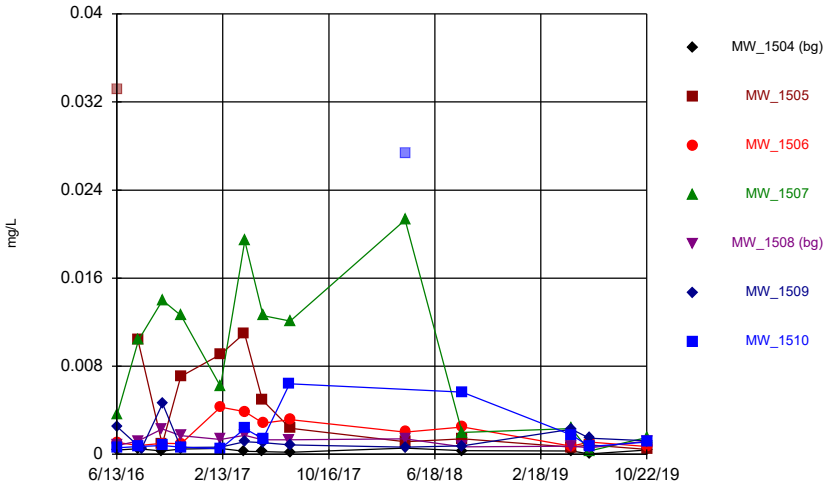
Sanitas™ v.9.6.24 . UG

Time Series



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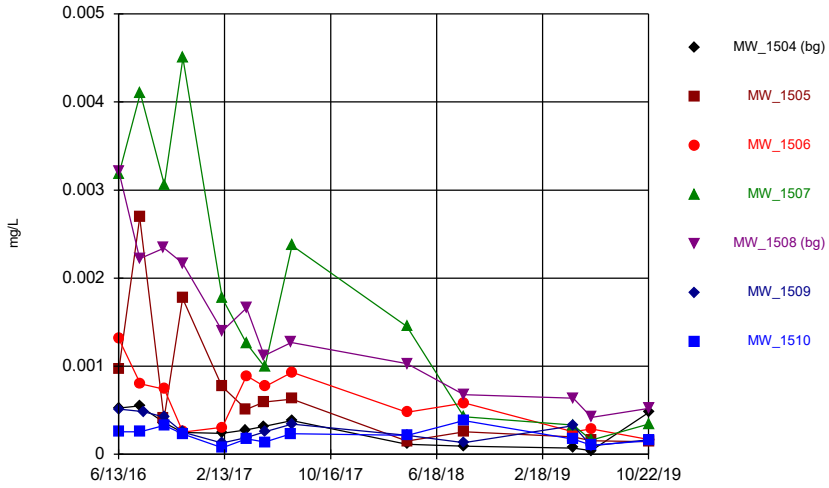
Sanitas™ v.9.6.24 . UG

Time Series



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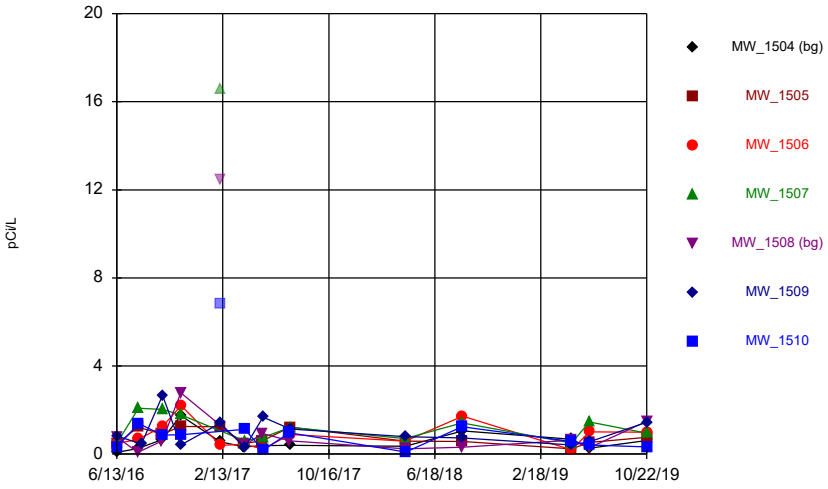
Sanitas™ v.9.6.24 . UG

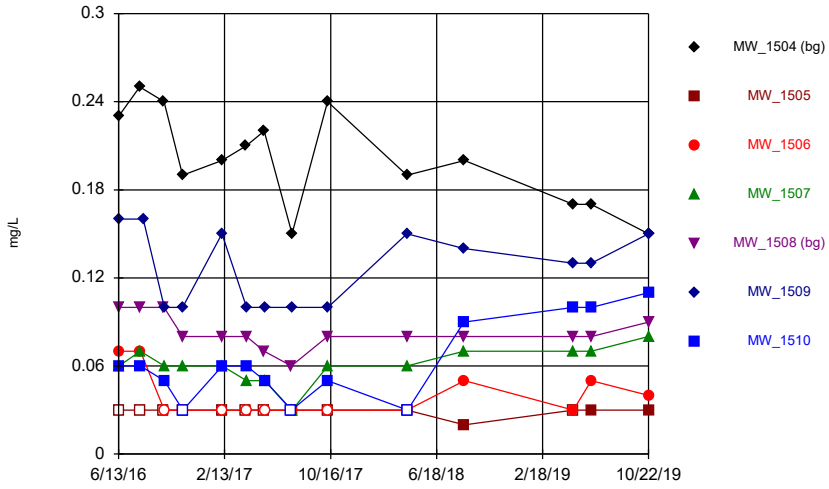
Time Series



Constituent: Combined Radium 226 + 228 Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

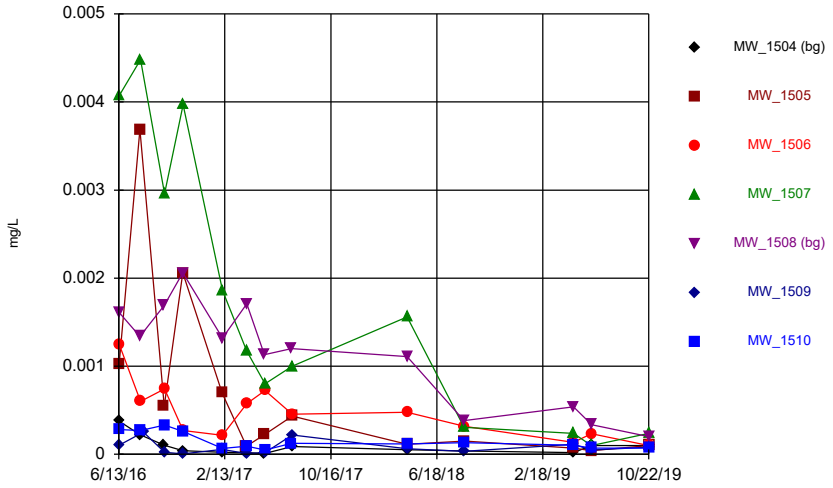
Time Series



Constituent: Fluoride, total Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

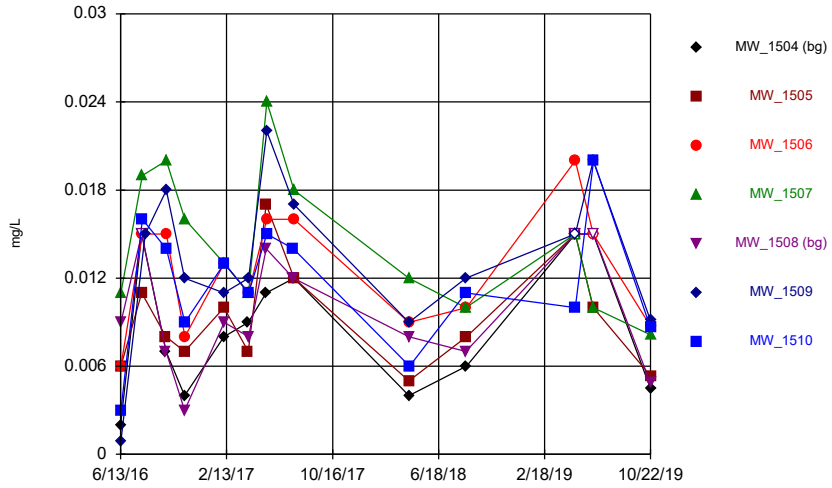
Time Series



Constituent: Lead, total Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

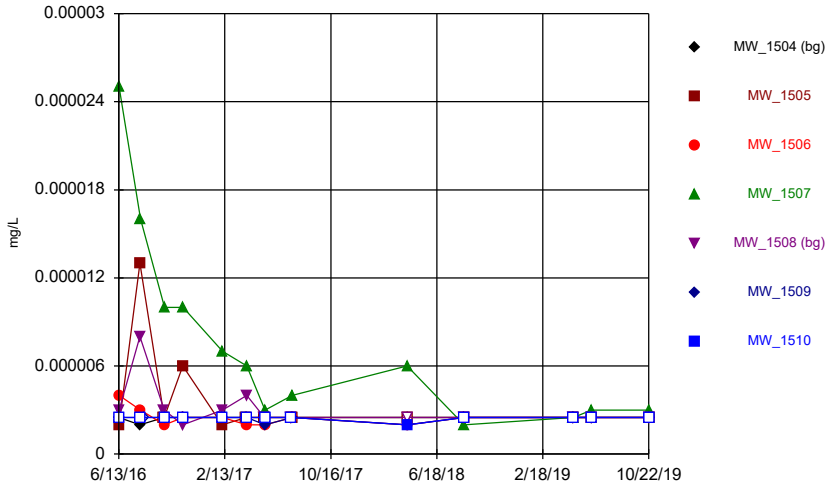
Time Series



Constituent: Lithium, total Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

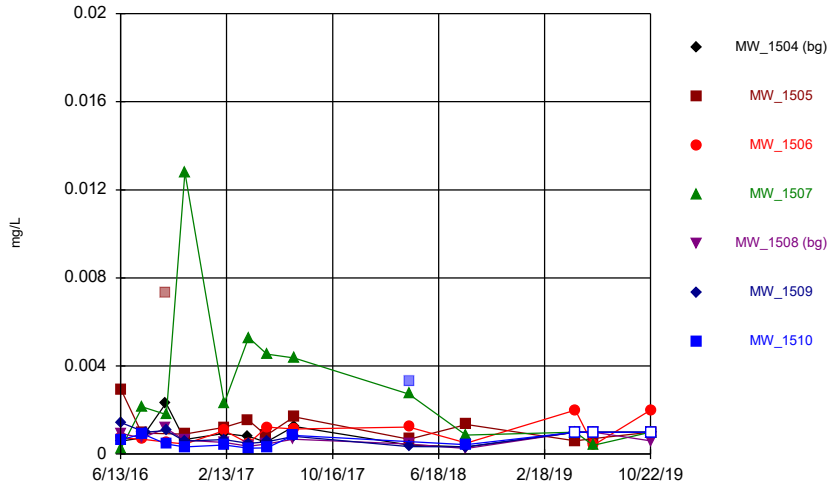
Time Series



Constituent: Mercury, total Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

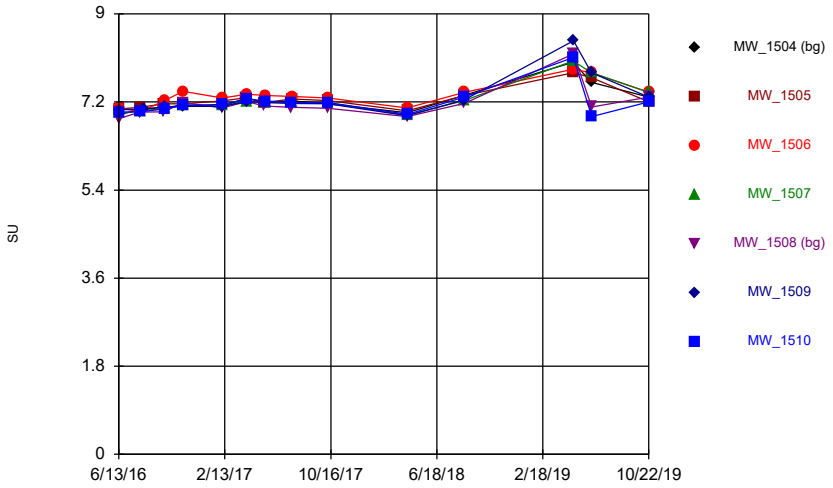
Time Series



Constituent: Molybdenum, total Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

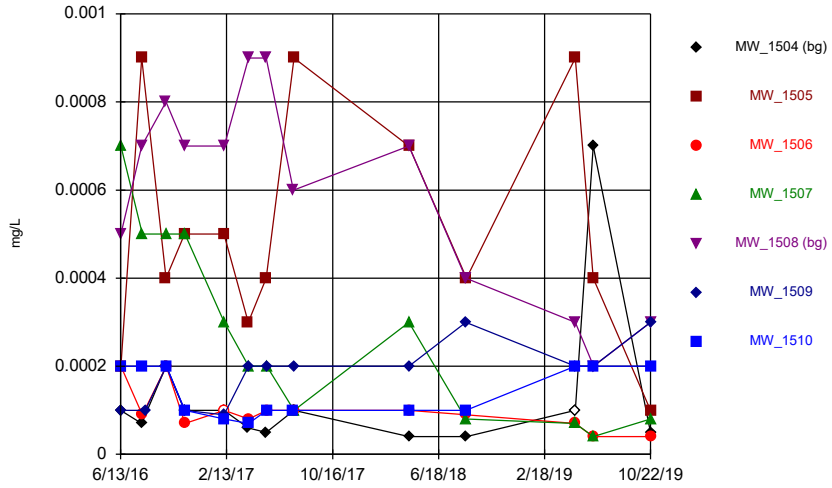
Time Series



Constituent: pH, field Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

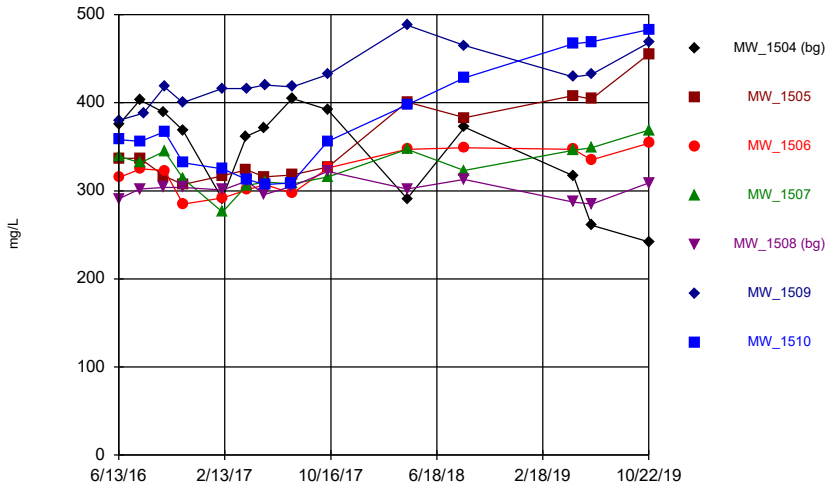
Time Series



Constituent: Selenium, total Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

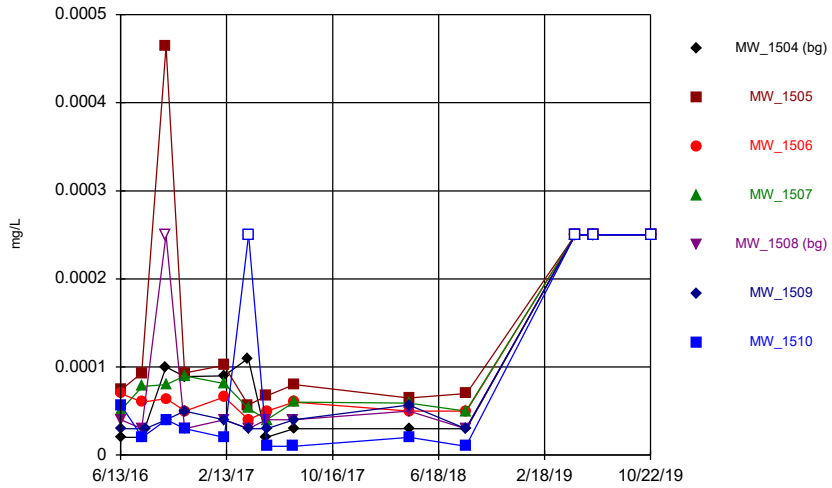
Time Series



Constituent: Sulfate, total Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

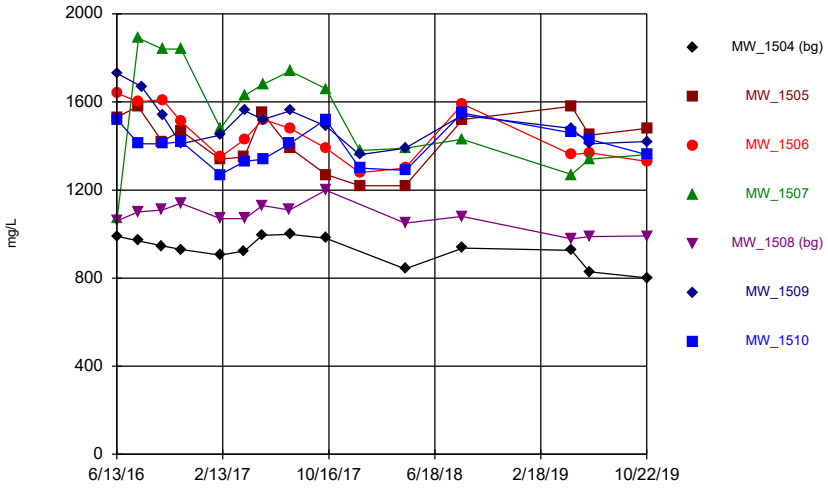
Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Time Series



Constituent: Thallium, total Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

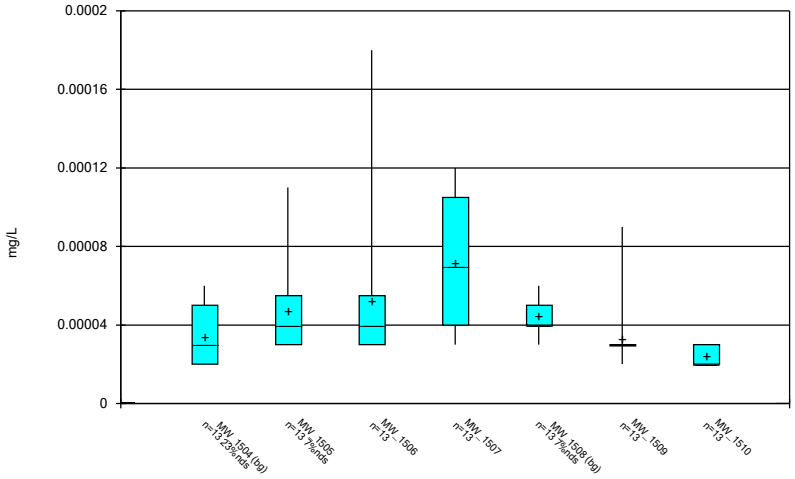
Time Series



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/27/2019 9:59 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

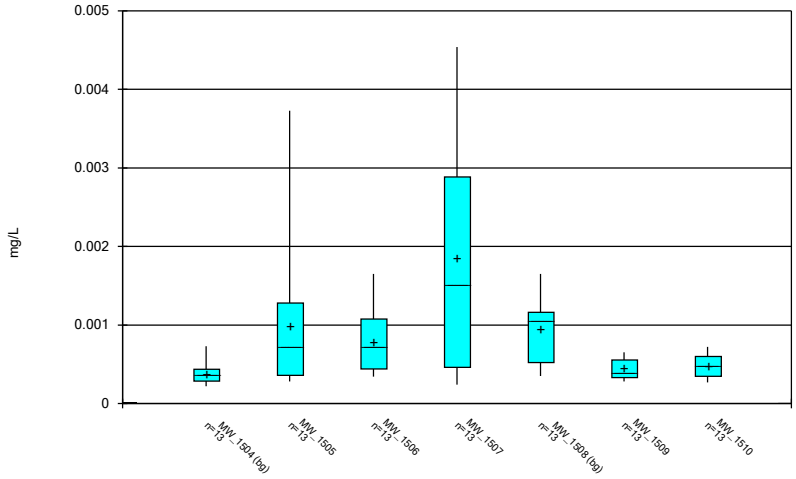
Box & Whiskers Plot



Constituent: Antimony, total Analysis Run 12/27/2019 10:00 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

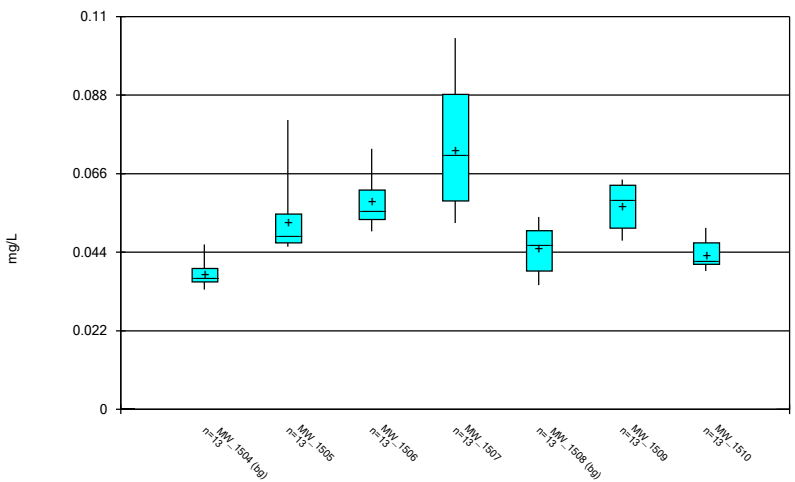
Box & Whiskers Plot



Constituent: Arsenic, total Analysis Run 12/27/2019 10:00 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

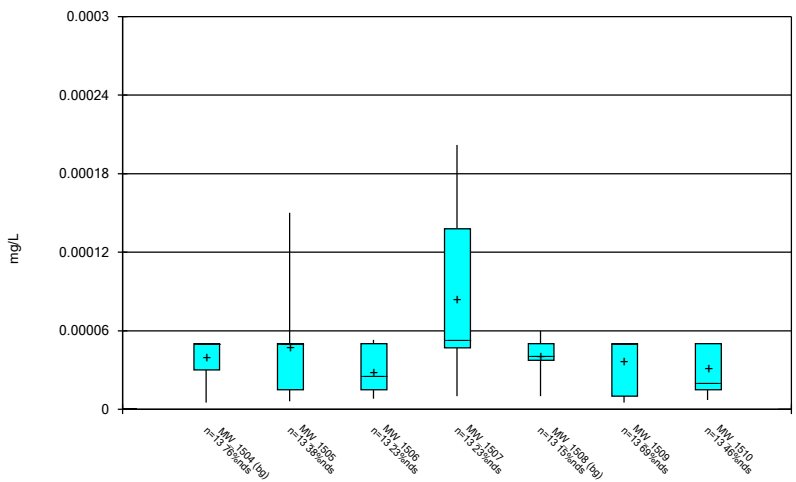
Box & Whiskers Plot



Constituent: Barium, total Analysis Run 12/27/2019 10:00 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

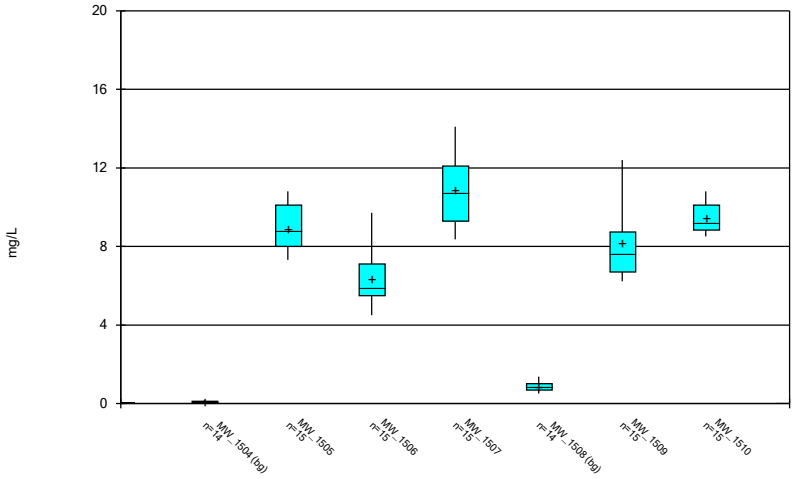
Box & Whiskers Plot



Constituent: Beryllium, total Analysis Run 12/27/2019 10:00 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

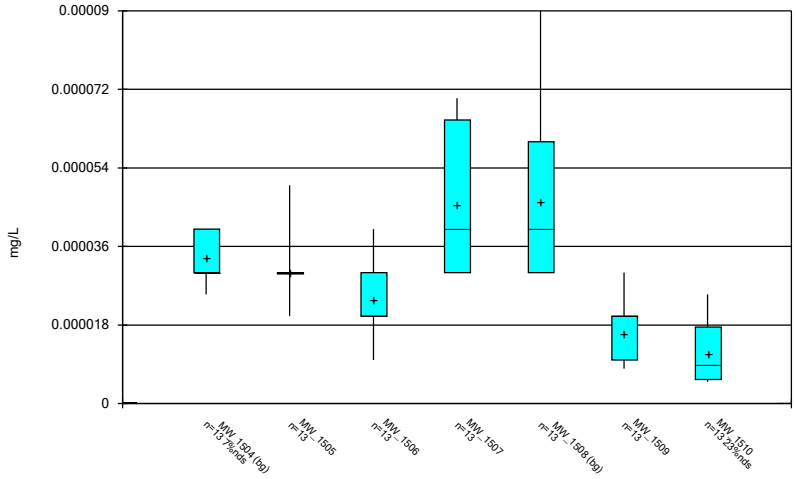
Box & Whiskers Plot



Constituent: Boron, total Analysis Run 12/27/2019 10:00 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

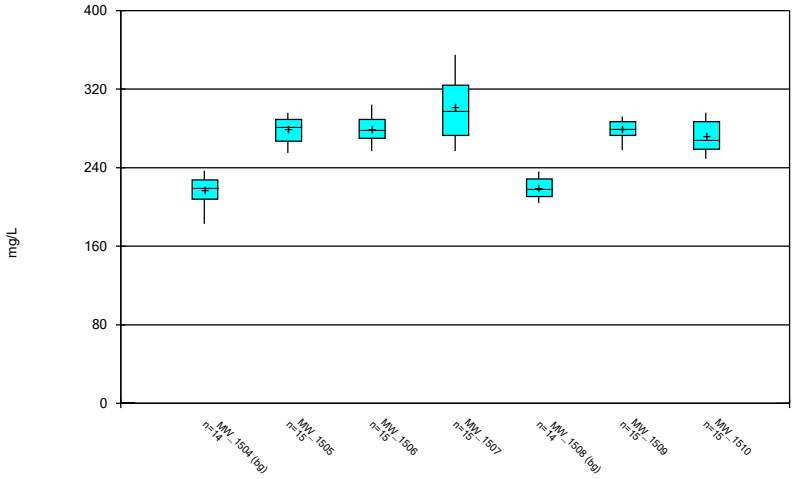
Box & Whiskers Plot



Constituent: Cadmium, total Analysis Run 12/27/2019 10:00 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

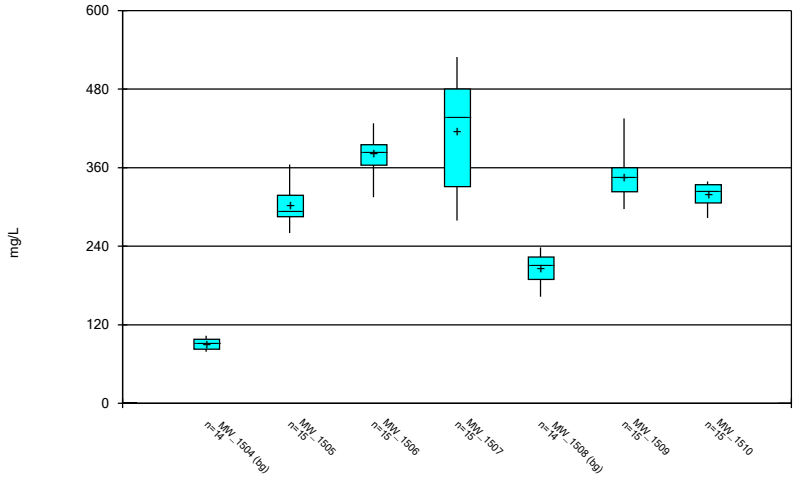
Box & Whiskers Plot



Constituent: Calcium, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

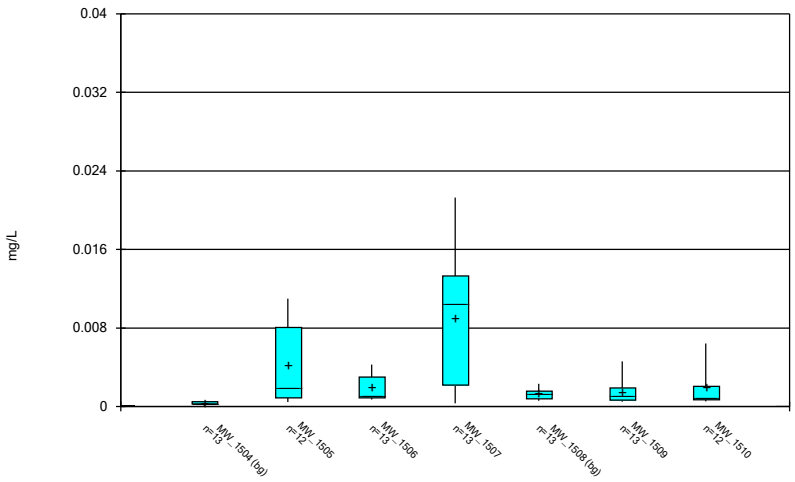
Box & Whiskers Plot



Constituent: Chloride, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

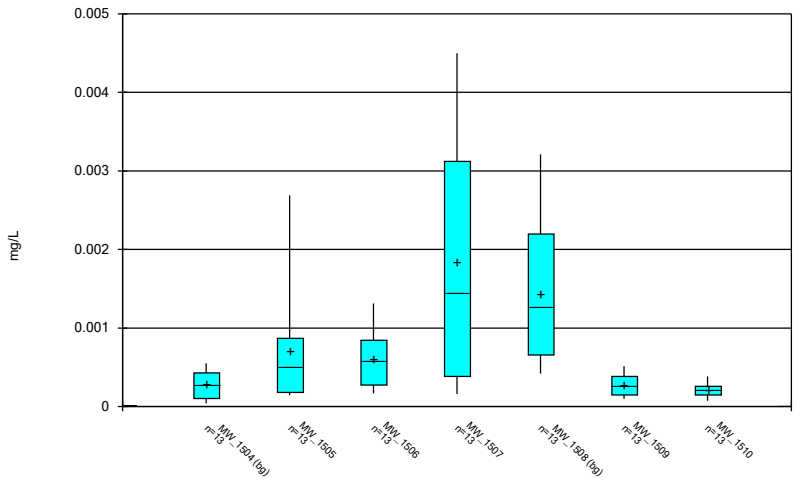
Box & Whiskers Plot



Constituent: Chromium, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

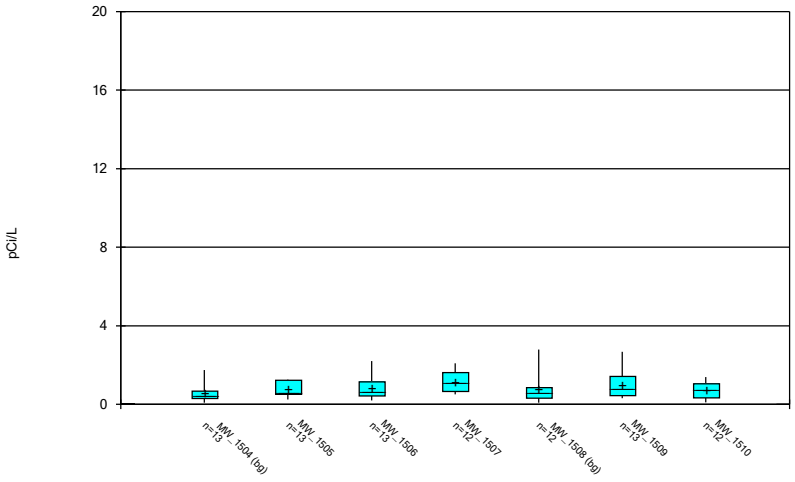
Box & Whiskers Plot



Constituent: Cobalt, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

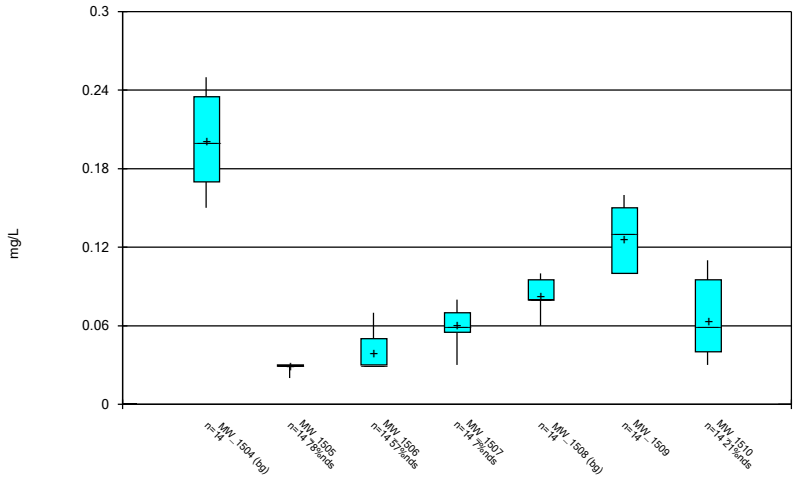
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228 Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

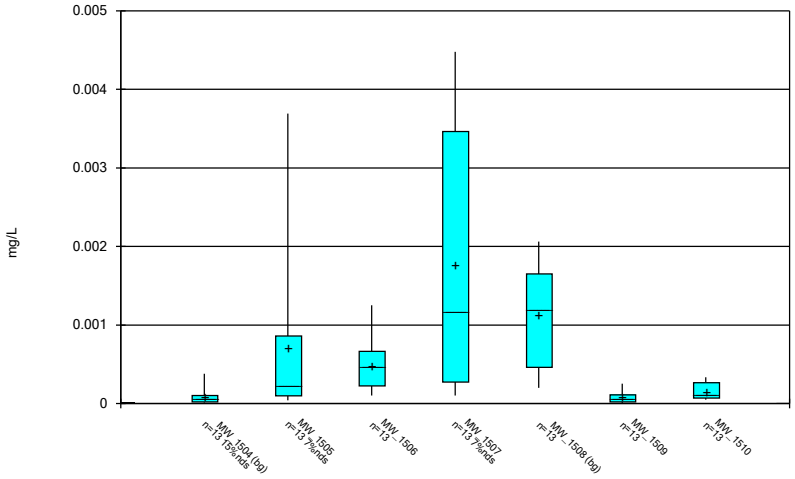
Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

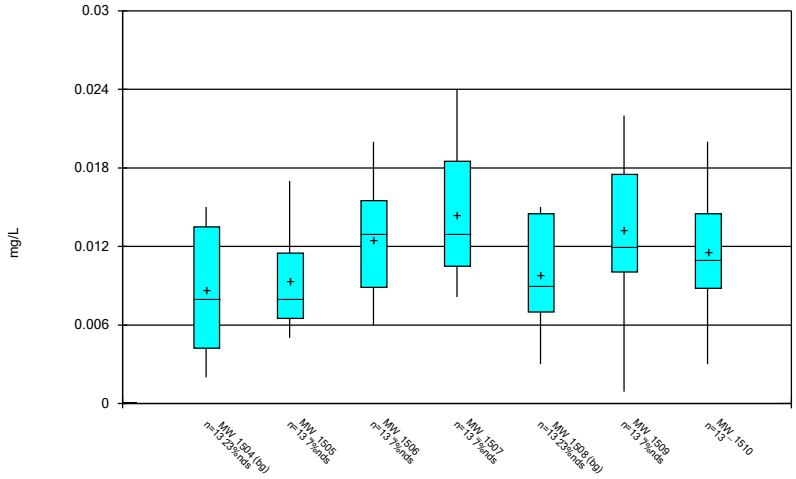
Box & Whiskers Plot



Constituent: Lead, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

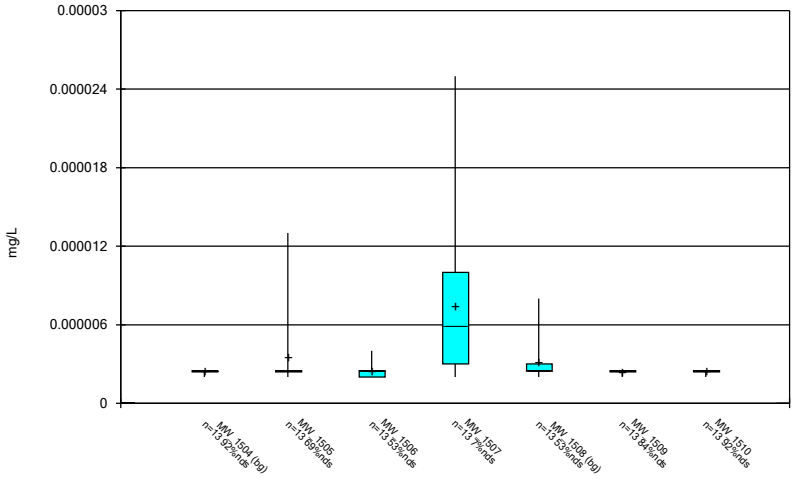
Box & Whiskers Plot



Constituent: Lithium, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

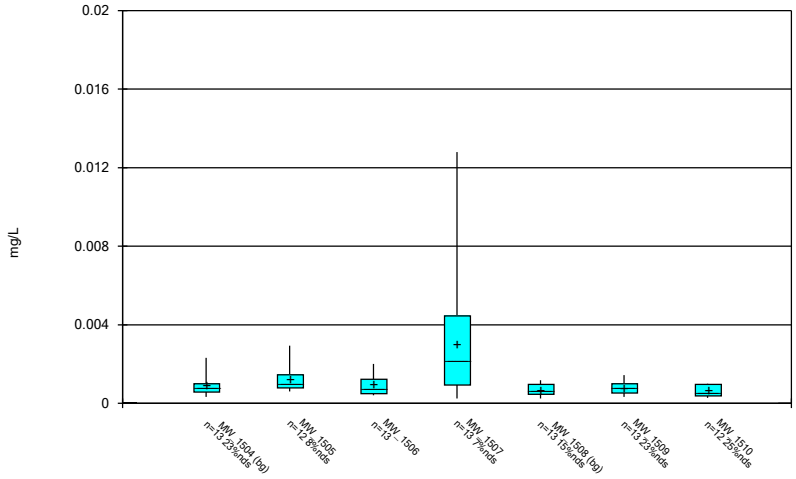
Box & Whiskers Plot



Constituent: Mercury, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

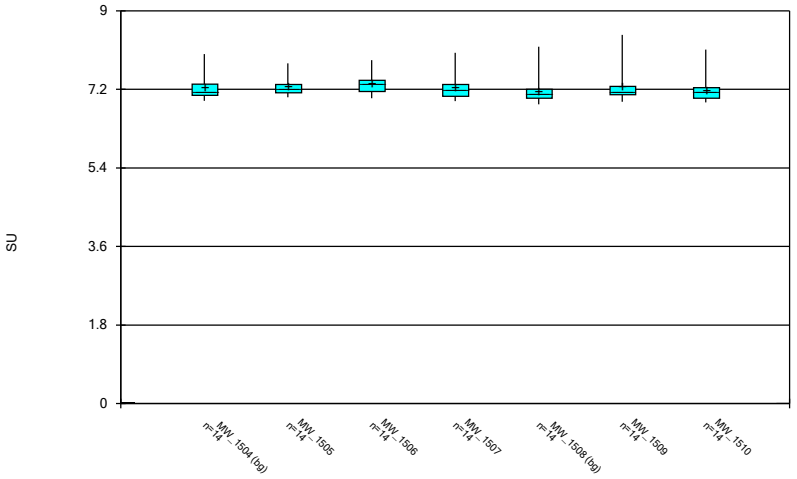
Box & Whiskers Plot



Constituent: Molybdenum, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

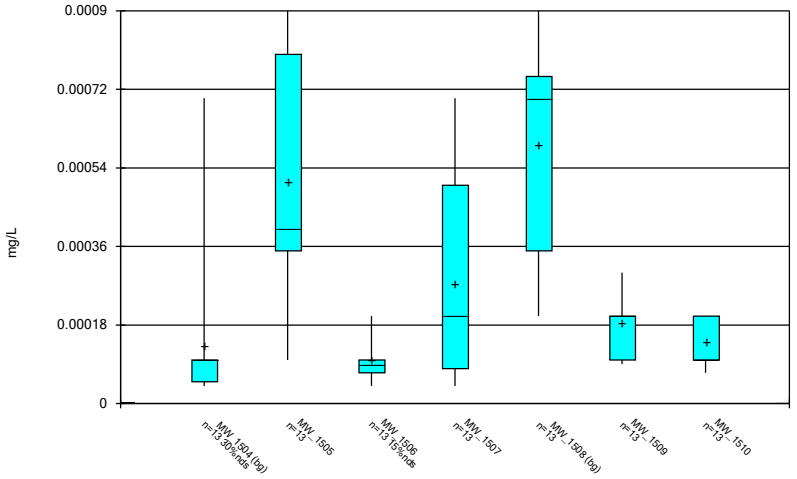
Box & Whiskers Plot



Constituent: pH, field Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

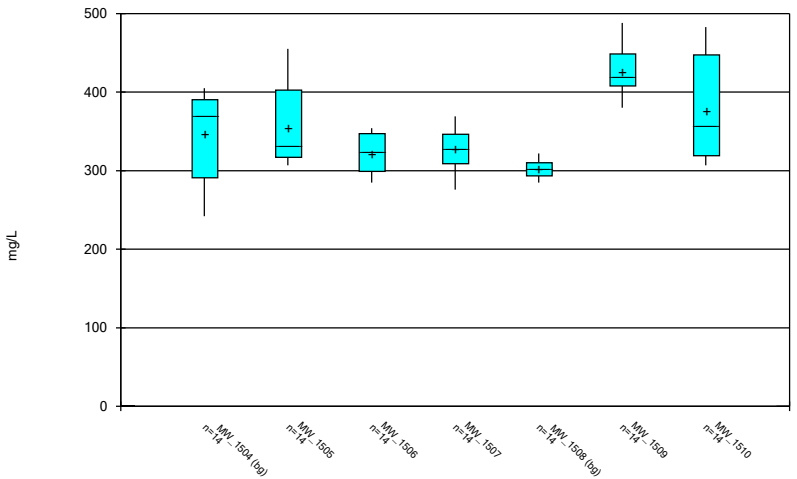
Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

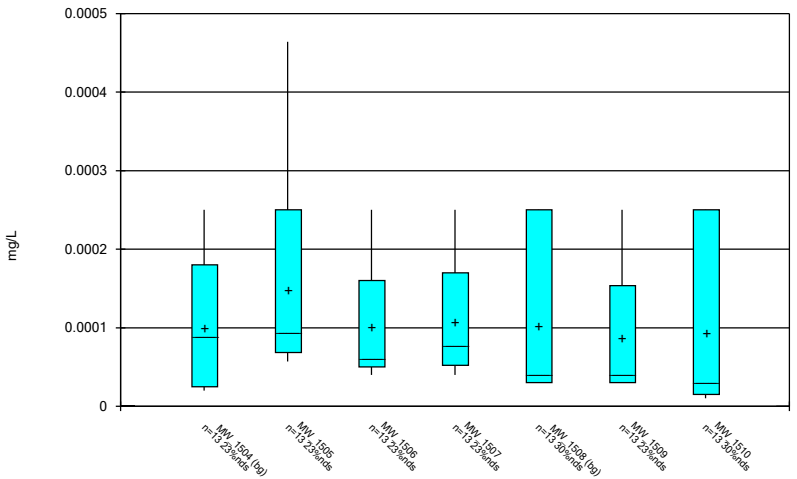
Box & Whiskers Plot



Constituent: Sulfate, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

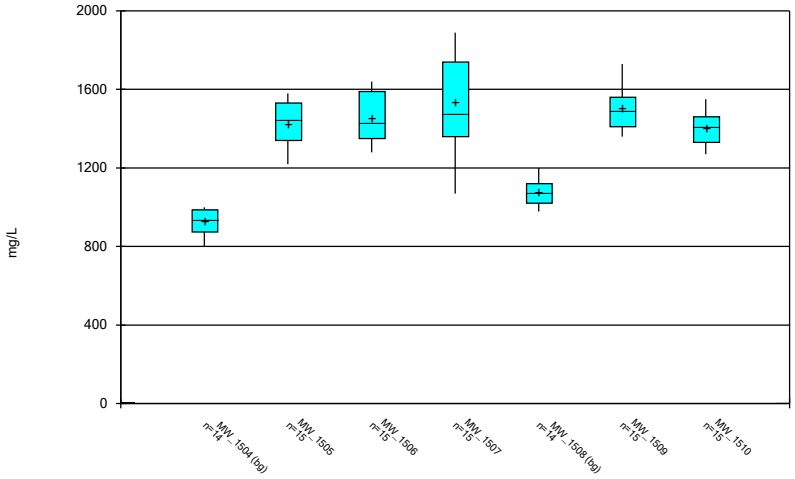
Sanitas™ v.9.6.24 . UG

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Box & Whiskers Plot



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/27/2019 10:01 AM View: All Data
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Outlier Summary

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/27/2019, 9:57 AM

	MW_1505 Chromium, total (mg/L)	MW_1510 Chromium, total (mg/L)	MW_1507 Combined Radium 226 + 228 (pCi/L)	MW_1508 Combined Radium 226 + 228 (pCi/L)	MW_1510 Combined Radium 226 + 228 (pCi/L)	MW_1505 Molybdenum, total (mg/L)	MW_1510 Molybdenum, total (mg/L)
6/14/2016	0.0332 (o)						
9/26/2016						0.00735 (o)	
2/8/2017			16.587 (o)	12.465 (o)	6.828 (o)		
4/12/2018		0.0274 (o)					0.0033 (o)

Interwell Outlier Analysis - Significant Results

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 12:35 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
pH, field (SU)	**MW_1504,M...**	**Yes**	**8.01,8.18**	**n/a w/com...**	**NP**	**NaN**	**28**	**7.201**	**0.2947**	**ln(x)**	**ShapiroWilk**

Interwell Outlier Analysis - All Results

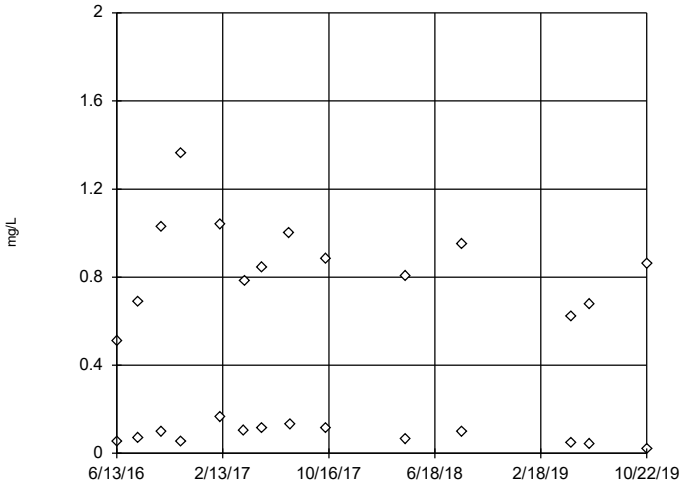
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 12:35 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Boron, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	28	0.4722	0.4236	ln(x)	ShapiroWilk
Calcium, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	28	218.3	12.15	x^6	ShapiroWilk
Chloride, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	28	148.9	61.33	ln(x)	ShapiroWilk
pH, field (SU)	**MW_1504,M...**	**Yes**	**8.01,8.18**	**n/a w/com...**	**NP**	**NaN**	**28**	**7.201**	**0.2947**	**ln(x)**	**ShapiroWilk**
Total Dissolved Solids [TDS] (m...	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	28	1002	98.35	x^2	ShapiroWilk

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 28

No outliers found.
Tukey's method select-ed by user.

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

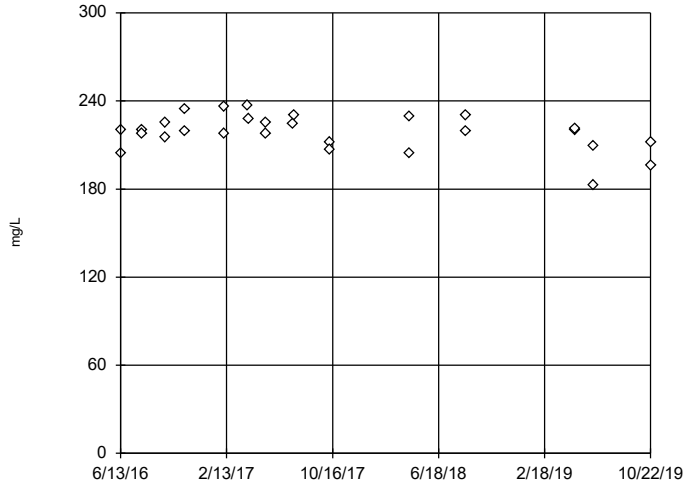
High cutoff = 960.9, low cutoff = 0.00007277, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 12/23/2019 12:33 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 28

No outliers found.
Tukey's method select-ed by user.

Data were x^6 transform-ed to achieve best W stat-istic (graph shown in original units).

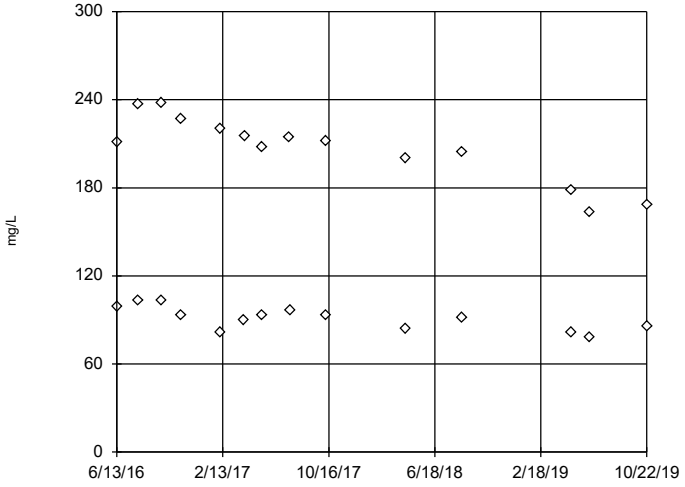
High cutoff = 253.9, low cutoff = -186.6, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 12/23/2019 12:33 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 28

No outliers found.
Tukey's method select-ed by user.

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

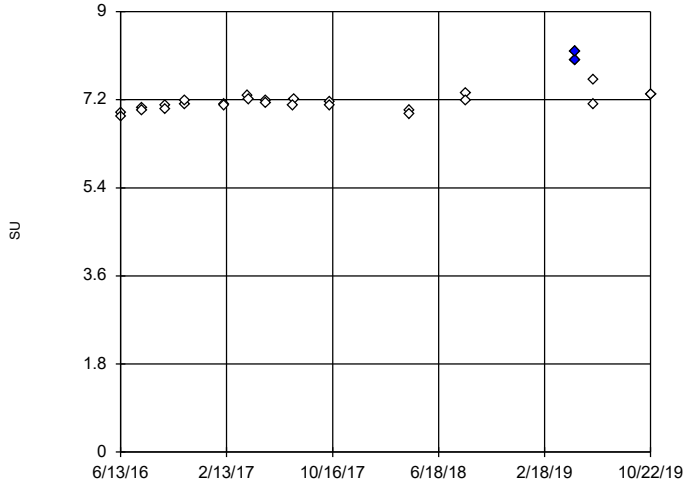
High cutoff = 2541, low cutoff = 7.688, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 12/23/2019 12:33 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 28

Outliers are drawn as solid.
Tukey's method select-ed by user.

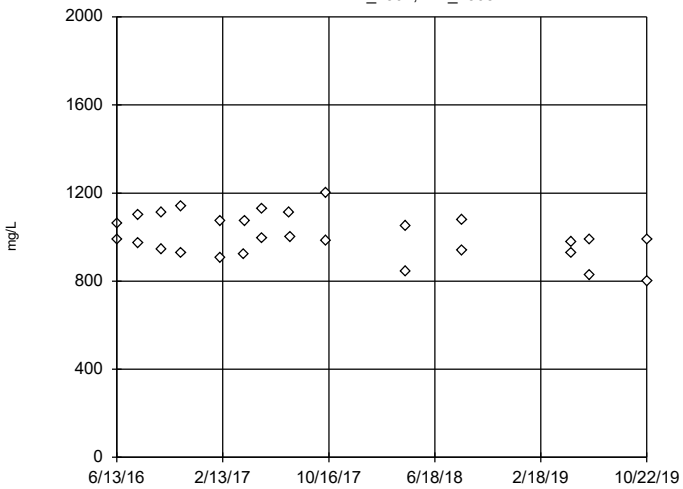
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 7.868, low cutoff = 6.501, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 12/23/2019 12:34 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 28

No outliers found. Tukey's method select-ed by user.

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

High cutoff = 1418, low cutoff = 122.6, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/23/2019 12:34 PM View: Interwell AIII

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

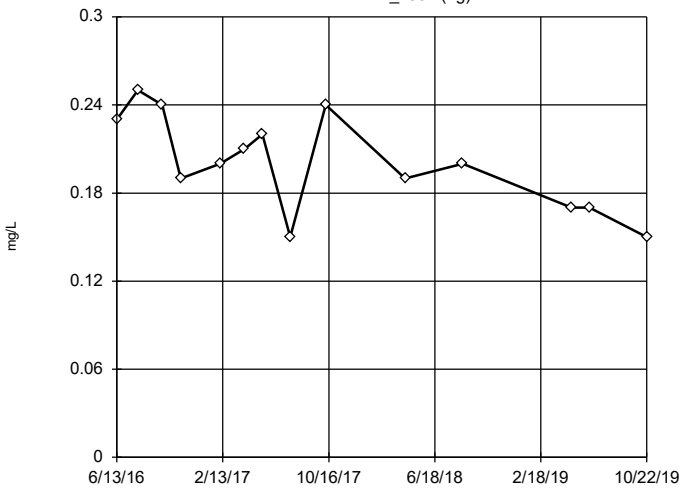
Intrawell Outlier Analysis - All Results (No Significant)

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 12:37 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Fluoride, total (mg/L)	MW_1504 (bg)	No	n/a	n/a	NP	NaN	14	0.2007	0.03293	x^2	ShapiroWilk
Fluoride, total (mg/L)	MW_1505	n/a	n/a	n/a	NP	NaN	14	0.07929	0.03407	unknown	ShapiroWilk
Fluoride, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	14	0.07929	0.02674	x^(1/3)	ShapiroWilk
Fluoride, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	14	0.06571	0.01284	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	MW_1508 (bg)	No	n/a	n/a	NP	NaN	14	0.08286	0.01139	sqrt(x)	ShapiroWilk
Fluoride, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	14	0.1264	0.0253	x^4	ShapiroWilk
Fluoride, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	14	0.07786	0.02359	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	MW_1504 (bg)	No	n/a	n/a	NP	NaN	14	345.7	54.46	x^6	ShapiroWilk
Sulfate, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	14	353.6	46.87	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	14	321.6	22.88	sqrt(x)	ShapiroWilk
Sulfate, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	14	327.1	24.02	x^3	ShapiroWilk
Sulfate, total (mg/L)	MW_1508 (bg)	No	n/a	n/a	NP	NaN	14	302.3	10.15	x^2	ShapiroWilk
Sulfate, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	14	426.4	30.14	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	14	376.3	62.34	ln(x)	ShapiroWilk

Tukey's Outlier Screening

MW_1504 (bg)



n = 14

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

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

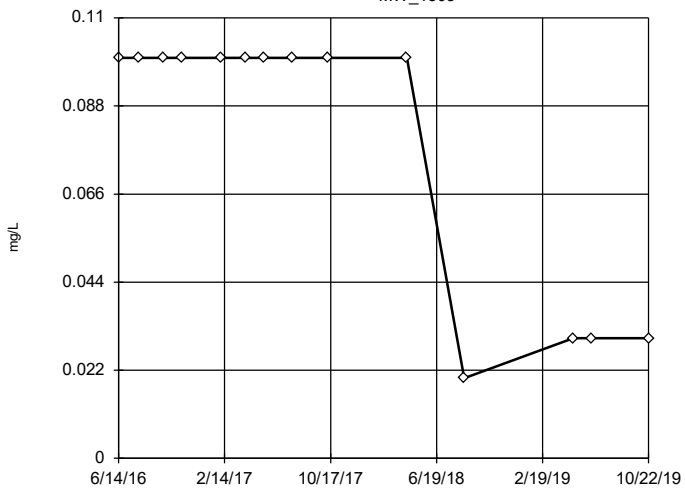
High cutoff = 0.3665, low cutoff = -0.2239, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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).

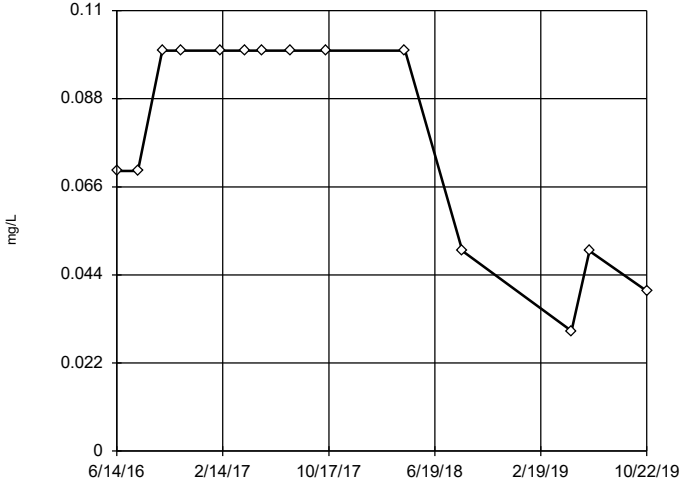
The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Fluoride, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



n = 14

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

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

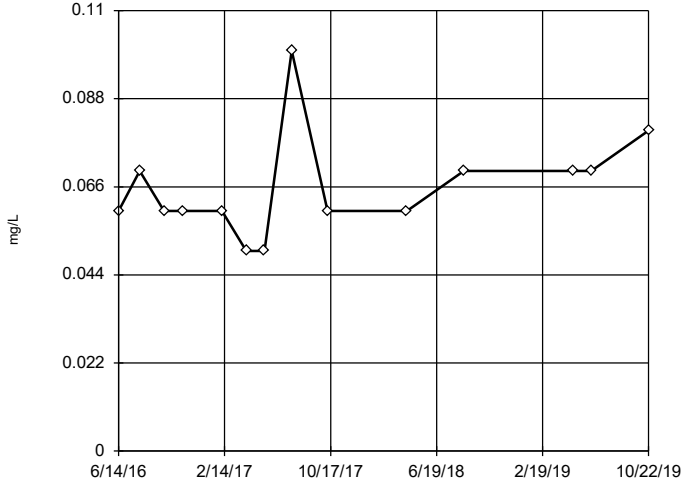
High cutoff = 0.4243, low cutoff = 0.0005341, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



n = 14

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

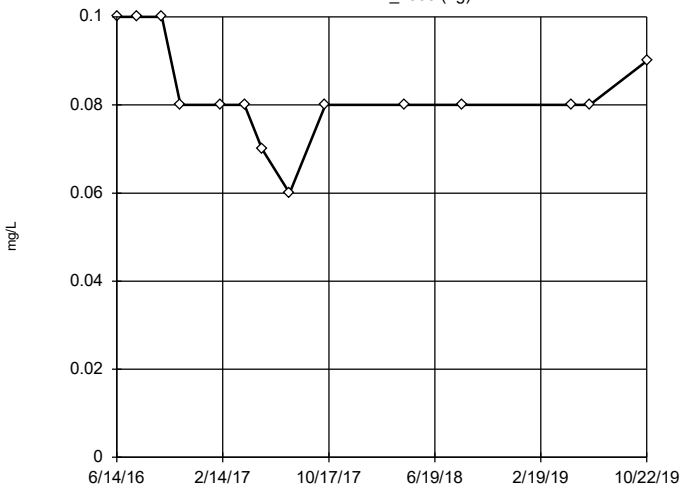
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.1112, low cutoff = 0.03778, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1508 (bg)



n = 14

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

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

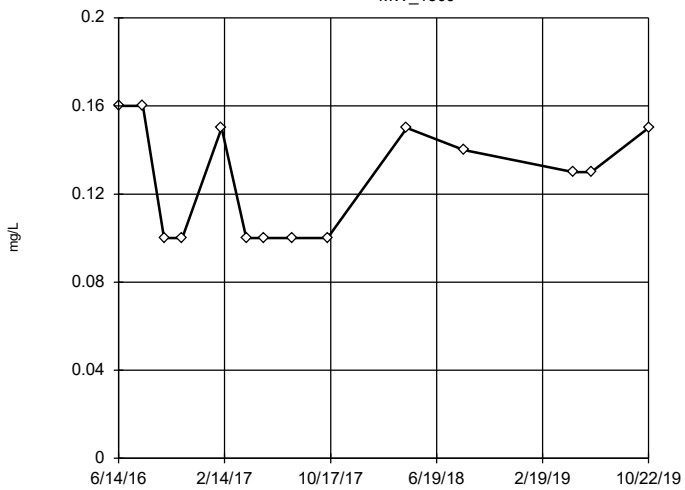
High cutoff = 0.1474, low cutoff = 0.04286, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



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).

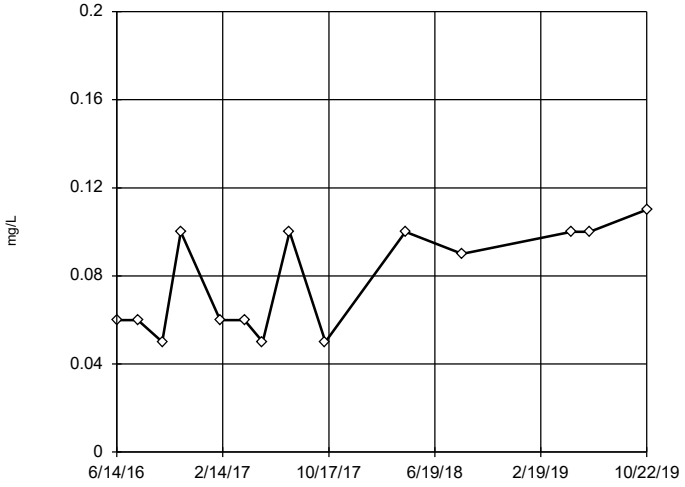
High cutoff = 0.2038, low cutoff = -0.1829, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



n = 14

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

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

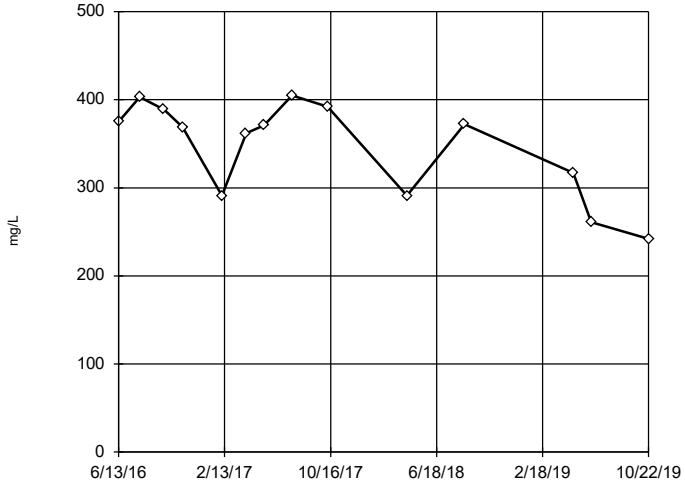
High cutoff = 0.6086, low cutoff = 0.009, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1504 (bg)



n = 14

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

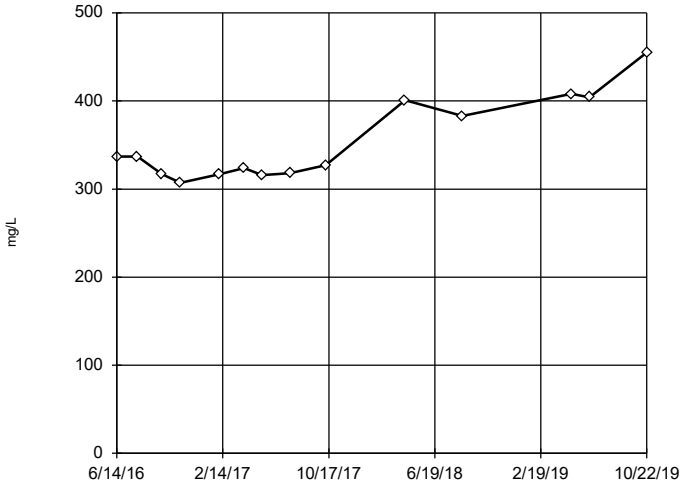
Data were x^6 transformed to achieve best W statistic (graph shown in original units).

High cutoff = 480.9, low cutoff = -449.2, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1505



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).

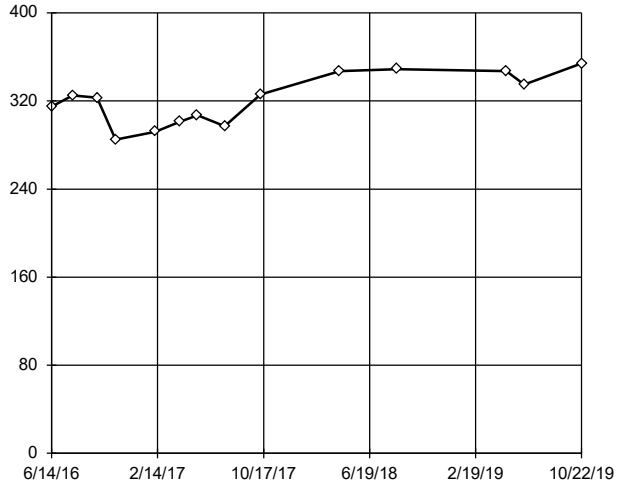
High cutoff = 823.9, low cutoff = 154.9, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



n = 14

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

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

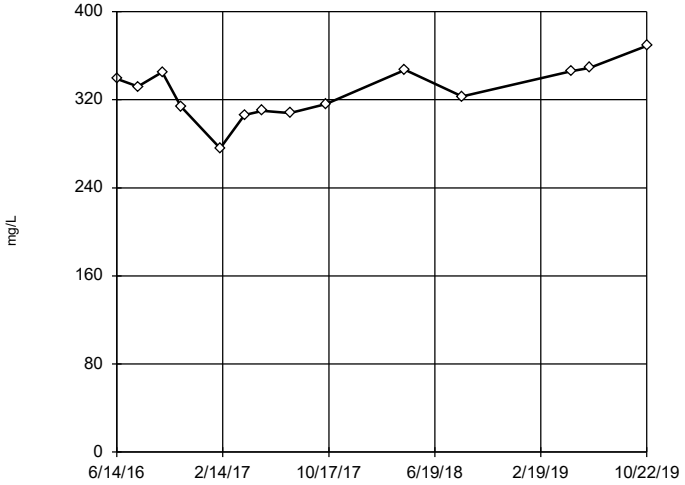
High cutoff = 512.4, low cutoff = 176.4, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



n = 14

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

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

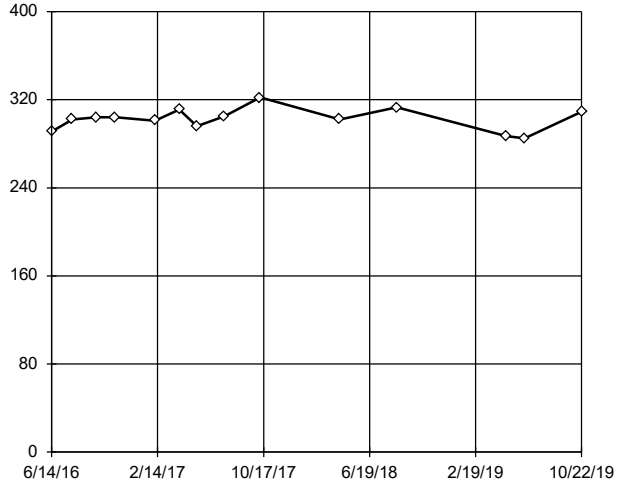
High cutoff = 427.1, low cutoff = -189.3, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1508 (bg)



n = 14

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

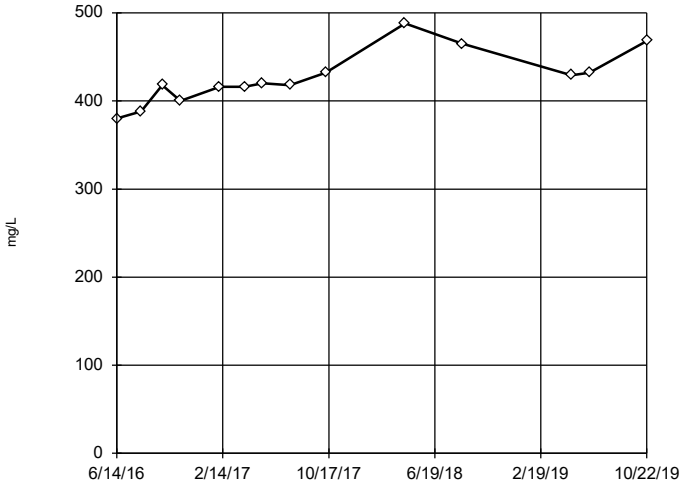
Data were square transformed to achieve best W statistic (graph shown in original units).

High cutoff = 354.9, low cutoff = 237.3, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1509



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).

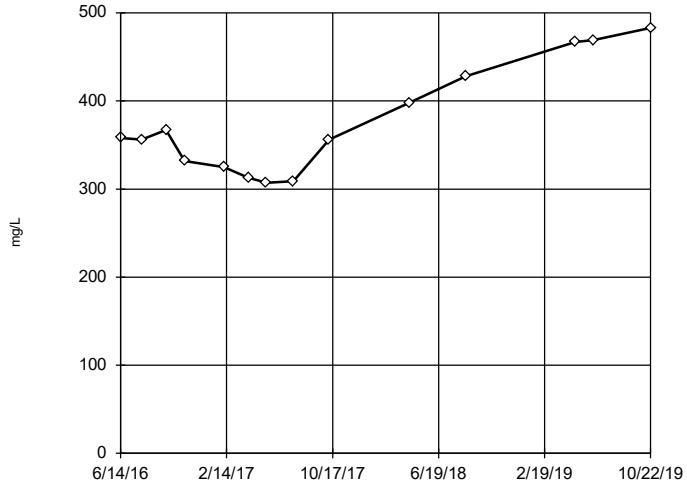
High cutoff = 594.5, low cutoff = 307.5, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



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 = 1231, low cutoff = 115.8, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 12/23/2019 12:36 PM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Appendix IV Outlier Analysis - Significant Results

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 12:44 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Mercury, total (mg/L)	**MW_1504,M...**	**Yes**	**0.000008**	**n/a w/com...**	**NP**	**NaN**	**26**	**0.000...**	**0.0000...**	**ln(x)**	**ShapiroWilk**

Appendix IV Outlier Analysis - Significant Results

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 12:44 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0000...	x^(1/3)	ShapiroWilk
Arsenic, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0004041	ln(x)	ShapiroWilk
Barium, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.04149	0.006228	ln(x)	ShapiroWilk
Beryllium, total (mg/L)	MW_1504,M...	n/a	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0000...	unknown	ShapiroWilk
Cadmium, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0000...	ln(x)	ShapiroWilk
Chromium, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0005801	x^(1/3)	ShapiroWilk
Cobalt, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0008375	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	25	0.6592	0.5945	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	28	0.1418	0.0647	ln(x)	ShapiroWilk
Lead, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0006739	ln(x)	ShapiroWilk
Lithium, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.00809	0.004519	normal	ShapiroWilk
Mercury, total (mg/L)	**MW_1504,M...**	**Yes**	**0.000008**	**n/a w/com...**	**NP**	**NaN**	**26**	**0.000...**	**0.0000...**	**ln(x)**	**ShapiroWilk**
Molybdenum, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0004126	ln(x)	ShapiroWilk
Selenium, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0003154	x^(1/3)	ShapiroWilk
Thallium, total (mg/L)	MW_1504,M...	No	n/a	n/a w/com...	NP	NaN	26	0.000...	0.0000...	ln(x)	ShapiroWilk
Antimony, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Antimony, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Antimony, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	normal	ShapiroWilk
Antimony, total (mg/L)	MW_1509	n/a	n/a	n/a	NP	NaN	13	0.000...	0.0000175	unknown	ShapiroWilk
Antimony, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	normal	ShapiroWilk
Arsenic, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.00099	0.0009835	ln(x)	ShapiroWilk
Arsenic, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	0.0003885	ln(x)	ShapiroWilk
Arsenic, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.001845	0.001442	x^(1/3)	ShapiroWilk
Arsenic, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.000...	0.0001218	ln(x)	ShapiroWilk
Arsenic, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.000...	0.0001504	x^(1/3)	ShapiroWilk
Barium, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.05242	0.009996	ln(x)	ShapiroWilk
Barium, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.05828	0.006931	ln(x)	ShapiroWilk
Barium, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.07286	0.0177	ln(x)	ShapiroWilk
Barium, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.05705	0.006493	x^5	ShapiroWilk
Barium, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.04329	0.003881	ln(x)	ShapiroWilk
Beryllium, total (mg/L)	MW_1505	n/a	n/a	n/a	NP	NaN	13	0.000...	0.0000402	unknown	ShapiroWilk
Beryllium, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	x^(1/3)	ShapiroWilk
Beryllium, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	x^(1/3)	ShapiroWilk
Beryllium, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.000...	0.0000179	ln(x)	ShapiroWilk
Beryllium, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	MW_1505	n/a	n/a	n/a	NP	NaN	13	0.00003	0.0000...	unknown	ShapiroWilk
Cadmium, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	x^(1/3)	ShapiroWilk
Cadmium, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.000016	0.0000...	x^(1/3)	ShapiroWilk
Cadmium, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Chromium, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.00642	0.008958	ln(x)	ShapiroWilk
Chromium, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.001926	0.001265	ln(x)	ShapiroWilk
Chromium, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.009103	0.006975	sqrt(x)	ShapiroWilk
Chromium, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.001411	0.001142	ln(x)	ShapiroWilk
Chromium, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.003849	0.007334	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.000...	0.0007459	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	0.0003431	sqrt(x)	ShapiroWilk
Cobalt, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.001842	0.001481	x^(1/3)	ShapiroWilk
Cobalt, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.000...	0.0001376	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	sqrt(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.7765	0.3542	x^(1/3)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.8521	0.5928	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW_1507	No	n/a	n/a	NP	NaN	12	1.169	0.5828	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.9842	0.6713	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	MW_1510	No	n/a	n/a	NP	NaN	12	0.6986	0.4356	sqrt(x)	ShapiroWilk
Fluoride, total (mg/L)	MW_1505	n/a	n/a	n/a	NP	NaN	14	0.07929	0.03407	unknown	ShapiroWilk
Fluoride, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	14	0.07929	0.02674	x^(1/3)	ShapiroWilk
Fluoride, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	14	0.06571	0.01284	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	14	0.1264	0.0253	x^4	ShapiroWilk
Fluoride, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	14	0.07786	0.02359	ln(x)	ShapiroWilk
Lead, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.000...	0.001057	ln(x)	ShapiroWilk
Lead, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	0.0003173	x^(1/3)	ShapiroWilk
Lead, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.001746	0.001597	x^(1/3)	ShapiroWilk
Lead, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Lead, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.000152	0.0000...	ln(x)	ShapiroWilk
Lithium, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.009334	0.003674	ln(x)	ShapiroWilk
Lithium, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.01252	0.004054	sqrt(x)	ShapiroWilk
Lithium, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.0144	0.004737	ln(x)	ShapiroWilk

Appendix IV Outlier Analysis - Significant Results

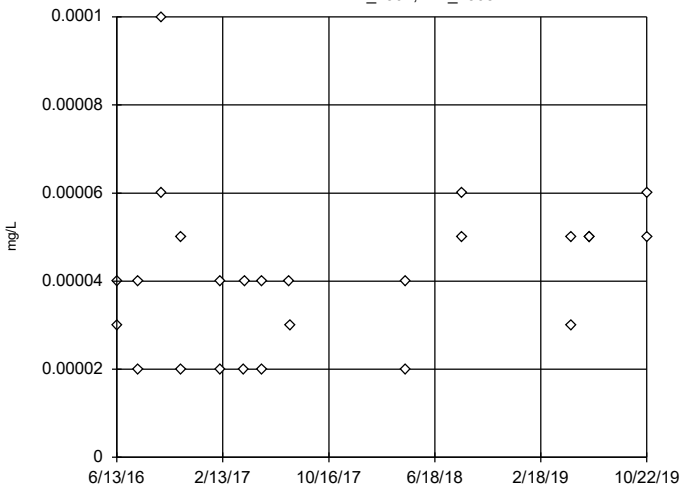
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 12:44 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Lithium, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.01331	0.005495	normal	ShapiroWilk
Lithium, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.01159	0.004465	normal	ShapiroWilk
Mercury, total (mg/L)	MW_1505	n/a	n/a	n/a	NP	NaN	13	0.000...	0.0000...	unknown	ShapiroWilk
Mercury, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	5.4e-7	ln(x)	ShapiroWilk
Mercury, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Mercury, total (mg/L)	MW_1509	n/a	n/a	n/a	NP	NaN	13	0.000...	1.9e-7	unknown	ShapiroWilk
Mercury, total (mg/L)	MW_1510	n/a	n/a	n/a	NP	NaN	13	0.000...	1.4e-7	unknown	ShapiroWilk
Molybdenum, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.001673	0.001815	ln(x)	ShapiroWilk
Molybdenum, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	0.0005515	ln(x)	ShapiroWilk
Molybdenum, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.003038	0.003355	ln(x)	ShapiroWilk
Molybdenum, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.000...	0.0003284	sqrt(x)	ShapiroWilk
Molybdenum, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.000...	0.000794	ln(x)	ShapiroWilk
Selenium, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	13	0.000...	0.000266	sqrt(x)	ShapiroWilk
Selenium, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Selenium, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.000...	0.0002139	x^(1/3)	ShapiroWilk
Selenium, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	normal	ShapiroWilk
Selenium, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.000...	0.0000563	ln(x)	ShapiroWilk
Thallium, total (mg/L)	MW_1505	No	n/a	n/a	NP	NaN	12	0.000...	0.0000...	ln(x)	ShapiroWilk
Thallium, total (mg/L)	MW_1506	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Thallium, total (mg/L)	MW_1507	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Thallium, total (mg/L)	MW_1509	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk
Thallium, total (mg/L)	MW_1510	No	n/a	n/a	NP	NaN	13	0.000...	0.0000...	ln(x)	ShapiroWilk

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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

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

High cutoff = 0.0002164, low cutoff = 2.1e-7, based on IQR multiplier of 3.

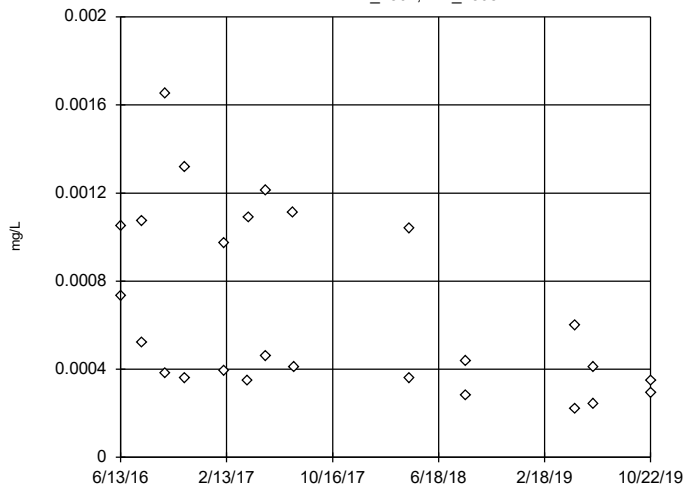
Constituent: Antimony, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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 = 0.02822, low cutoff = 0.00001333, based on IQR multiplier of 3.

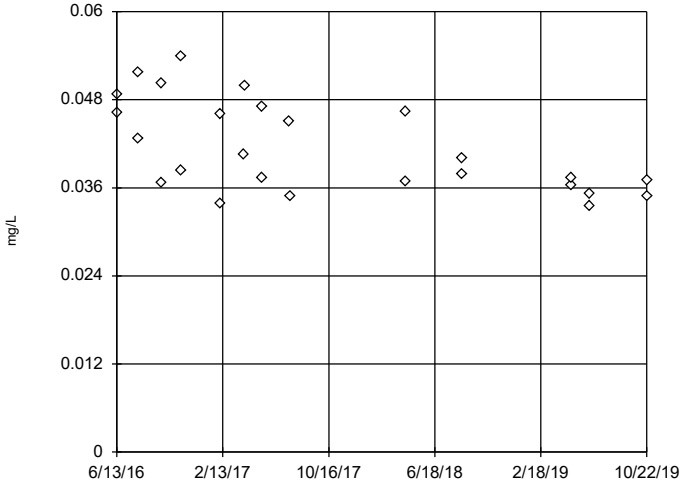
Constituent: Arsenic, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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 = 0.0974, low cutoff = 0.01752, based on IQR multiplier of 3.

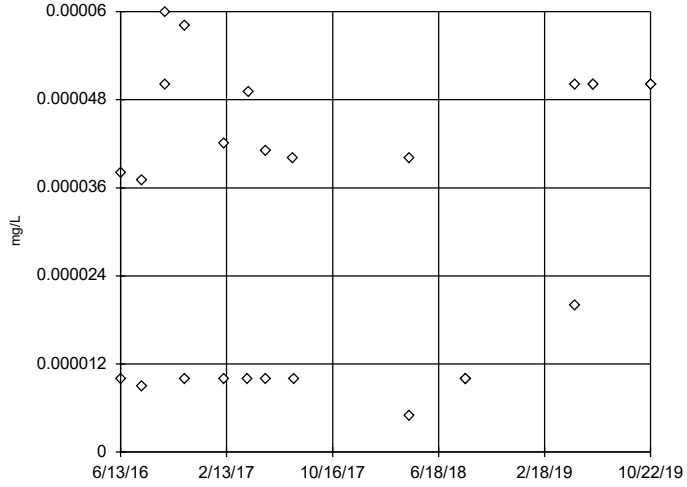
Constituent: Barium, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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

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

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

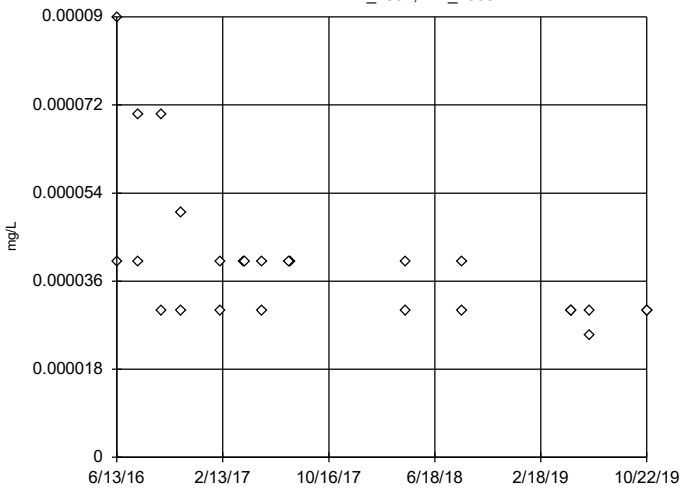
Constituent: Beryllium, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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 = 0.00009481, low cutoff = 0.00001266, based on IQR multiplier of 3.

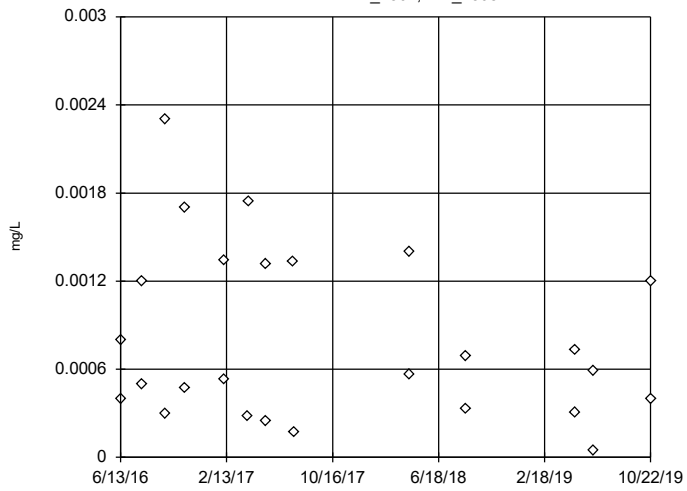
Constituent: Cadmium, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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

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

High cutoff = 0.01291, low cutoff = -0.0001806, based on IQR multiplier of 3.

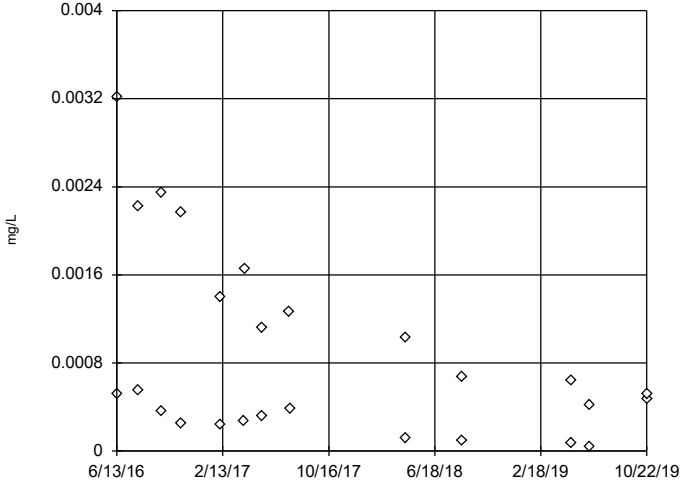
Constituent: Chromium, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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 = 0.1745, low cutoff = 0.000002007, based on IQR multiplier of 3.

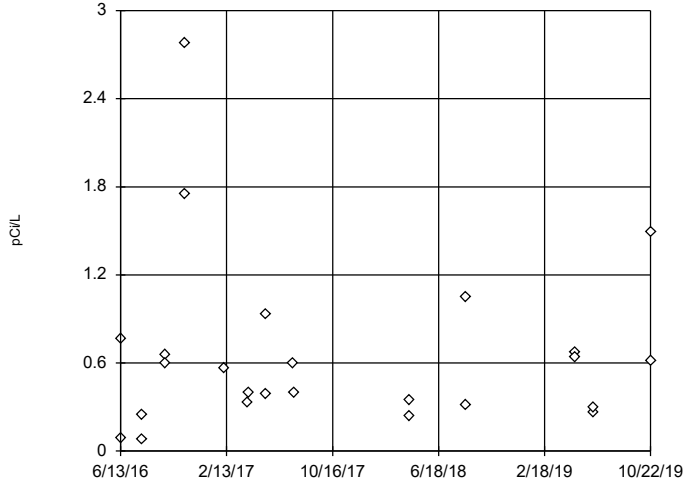
Constituent: Cobalt, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 25

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 = 9.364, low cutoff = 0.02336, based on IQR multiplier of 3.

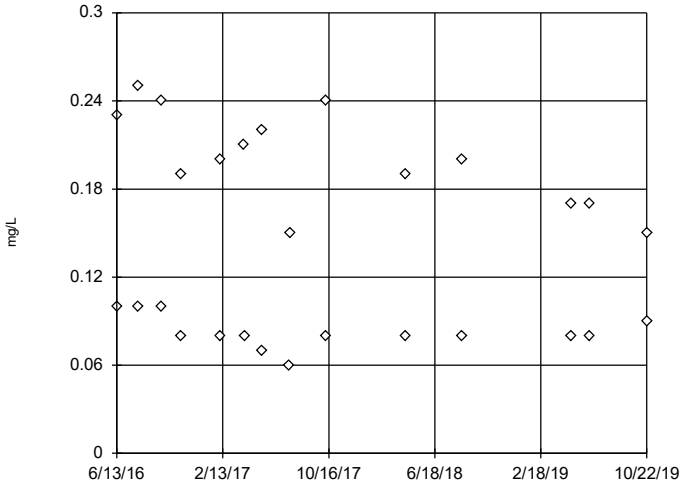
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 28

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 = 3.125, low cutoff = 0.00512, based on IQR multiplier of 3.

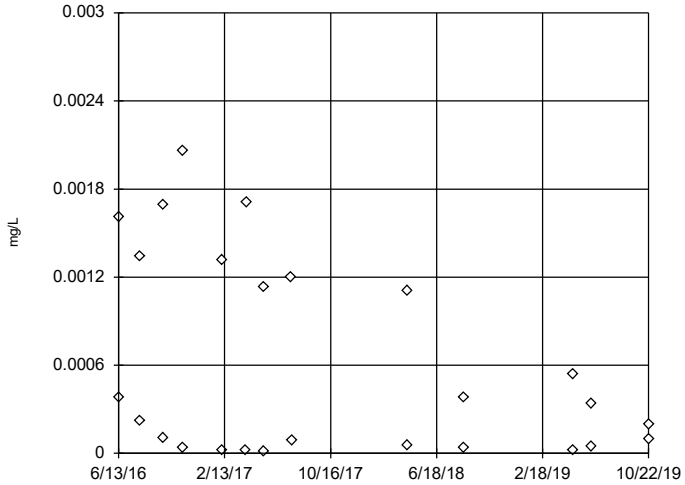
Constituent: Fluoride, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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 = 27.03, low cutoff = 2.1e-9, based on IQR multiplier of 3.

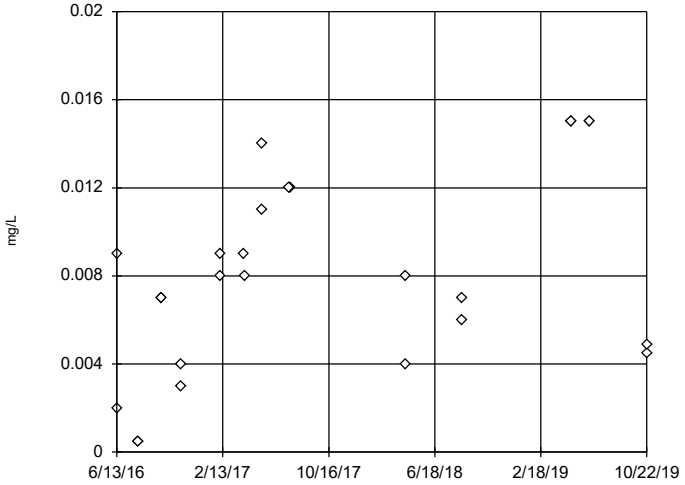
Constituent: Lead, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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

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

High cutoff = 0.03528, low cutoff = -0.01904, based on IQR multiplier of 3.

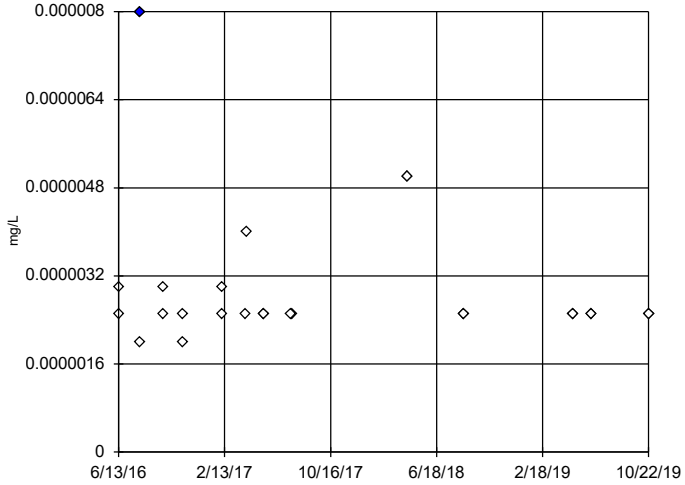
Constituent: Lithium, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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

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

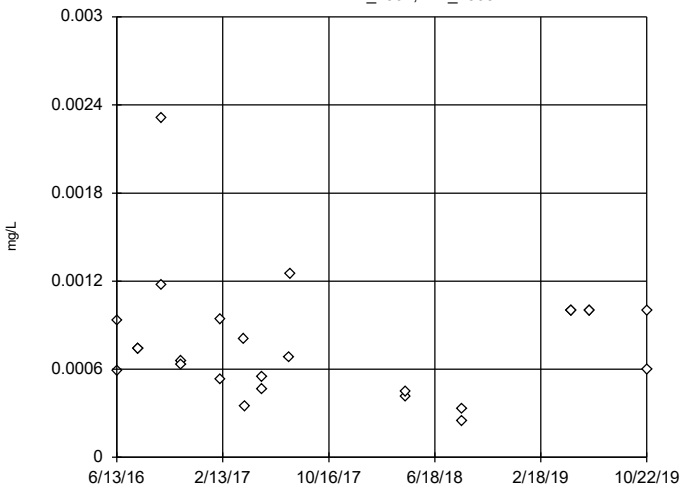
High cutoff = 0.000005184, low cutoff = 0.000001447, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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 = 0.008307, low cutoff = 0.00005944, based on IQR multiplier of 3.

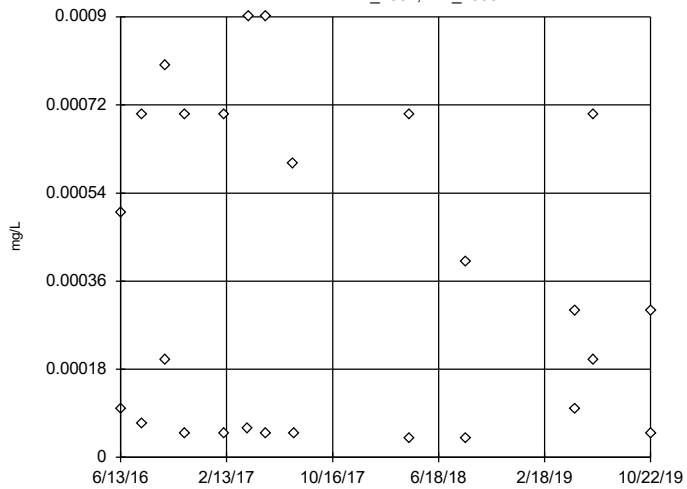
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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

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

High cutoff = 0.01464, low cutoff = -0.001686, based on IQR multiplier of 3.

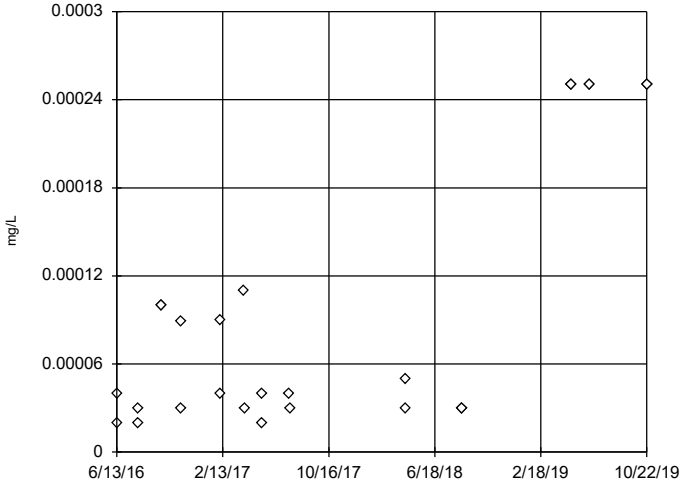
Constituent: Selenium, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening, Pooled Background

MW_1504,MW_1508



n = 26

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 = 0.02801, low cutoff = 1.8e-7, based on IQR multiplier of 3.

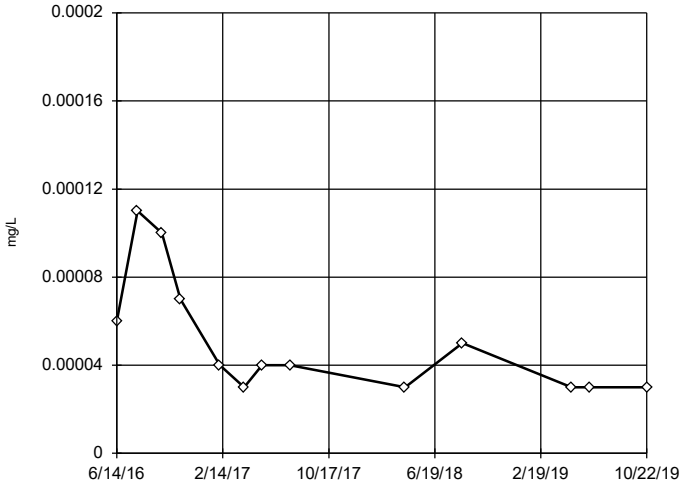
Constituent: Thallium, total Analysis Run 12/23/2019 12:39 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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 = 0.0006533, low cutoff = 0.000002976, based on IQR multiplier of 3.

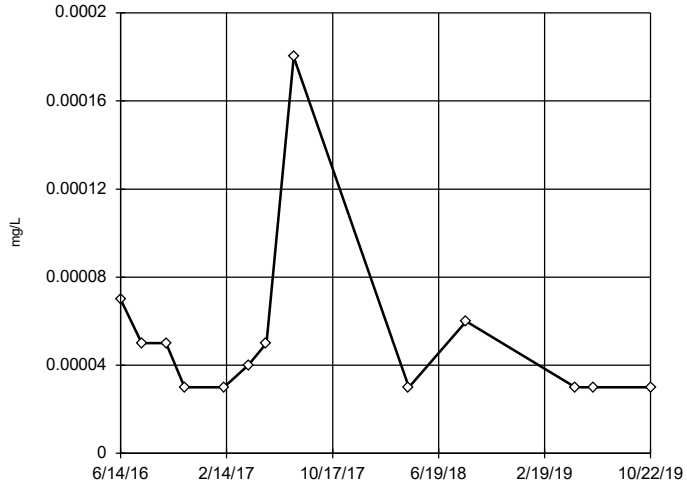
Constituent: Antimony, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



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 = 0.0003333, low cutoff = 0.00000493, based on IQR multiplier of 3.

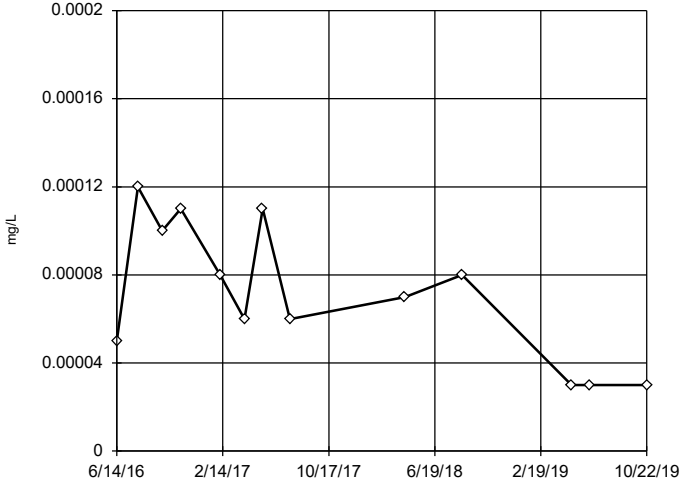
Constituent: Antimony, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



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 = 0.0003, low cutoff = -0.000155, based on IQR multiplier of 3.

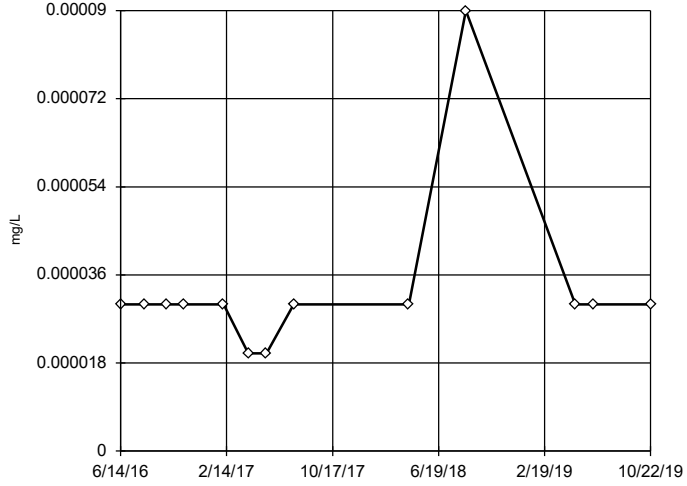
Constituent: Antimony, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



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).

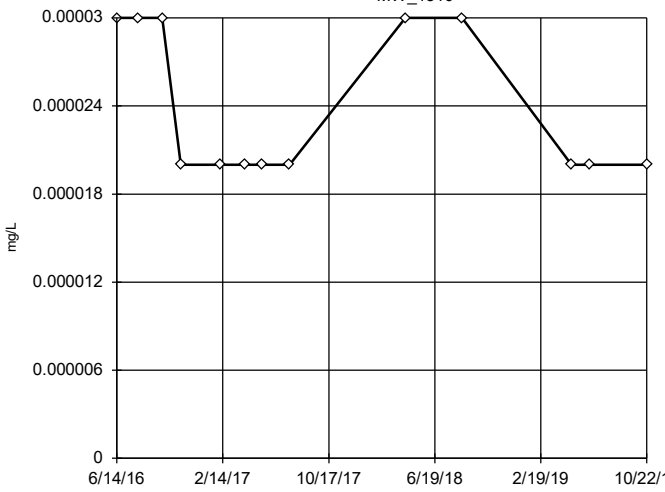
The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Antimony, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1510



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 = 0.00006, low cutoff = -0.00001, based on IQR multiplier of 3.

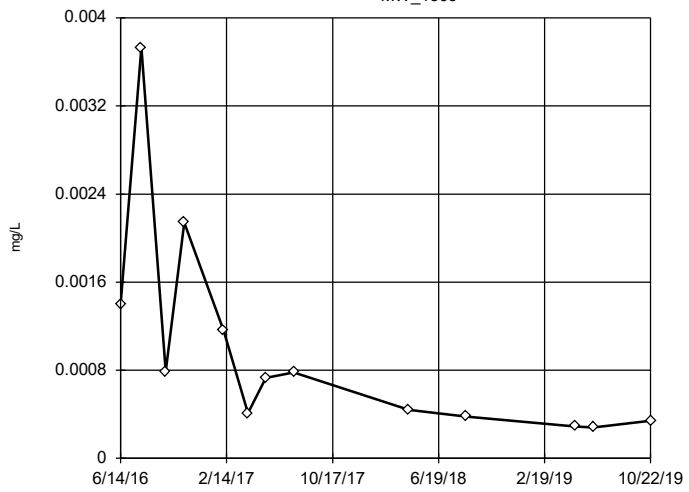
Constituent: Antimony, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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 = 0.05679, low cutoff = 0.000008066, based on IQR multiplier of 3.

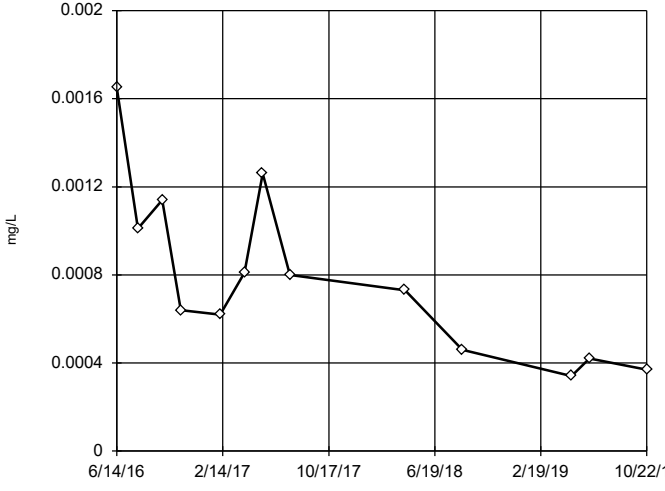
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



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 = 0.01561, low cutoff = 0.00003021, based on IQR multiplier of 3.

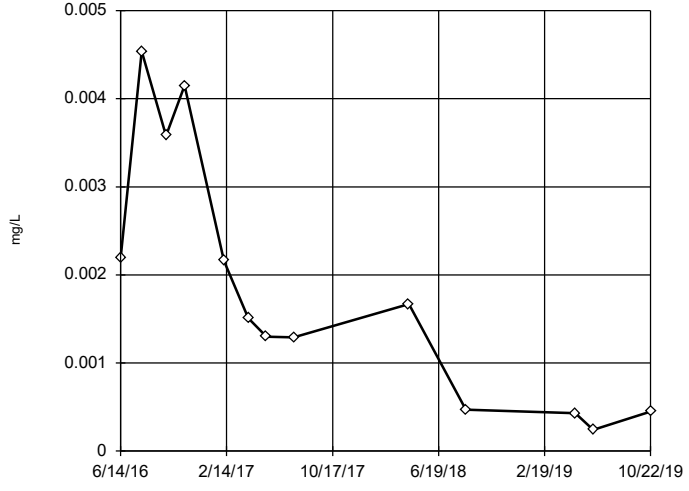
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



n = 13

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

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

High cutoff = 0.0373, low cutoff = -0.001541, based on IQR multiplier of 3.

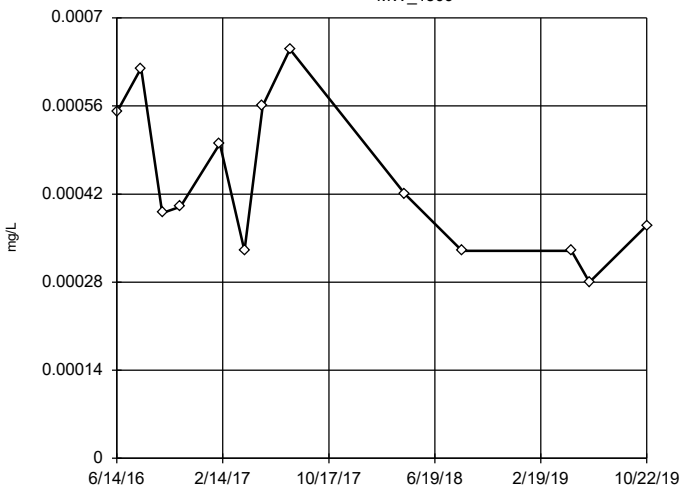
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



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 = 0.00264, low cutoff = 0.00006938, based on IQR multiplier of 3.

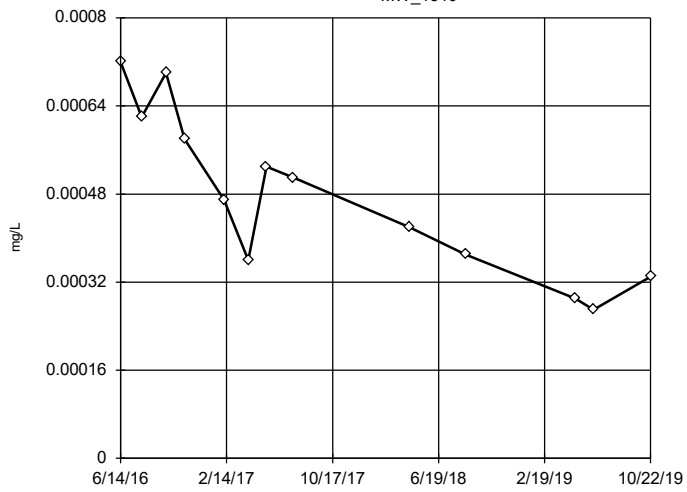
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



n = 13

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

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

High cutoff = 0.002047, low cutoff = 0.00002076, based on IQR multiplier of 3.

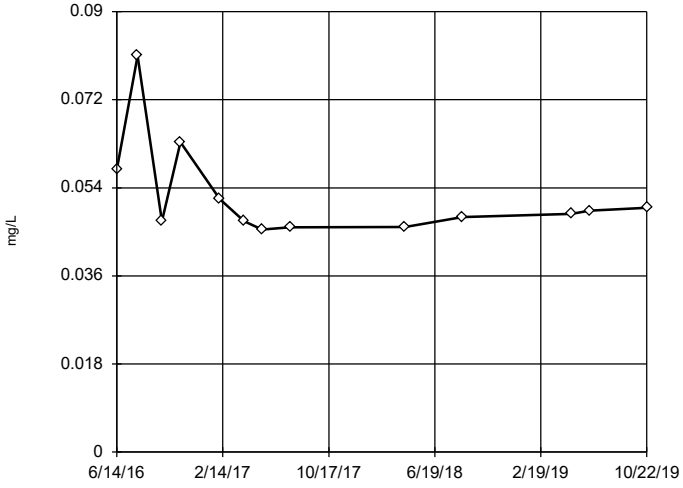
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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 = 0.08796, low cutoff = 0.02893, based on IQR multiplier of 3.

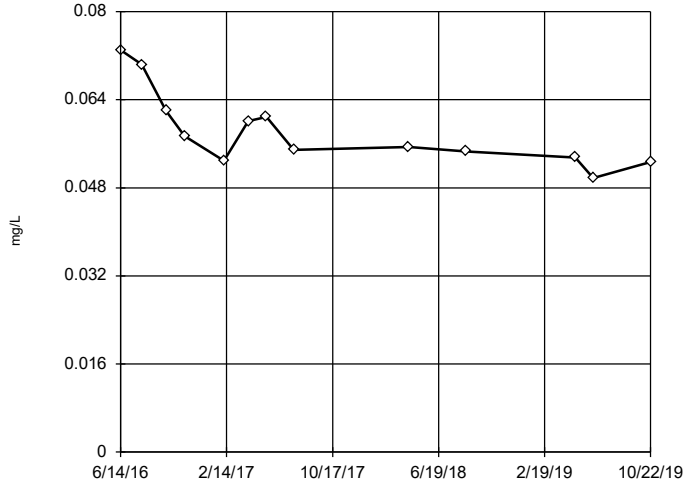
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



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 = 0.09469, low cutoff = 0.03452, based on IQR multiplier of 3.

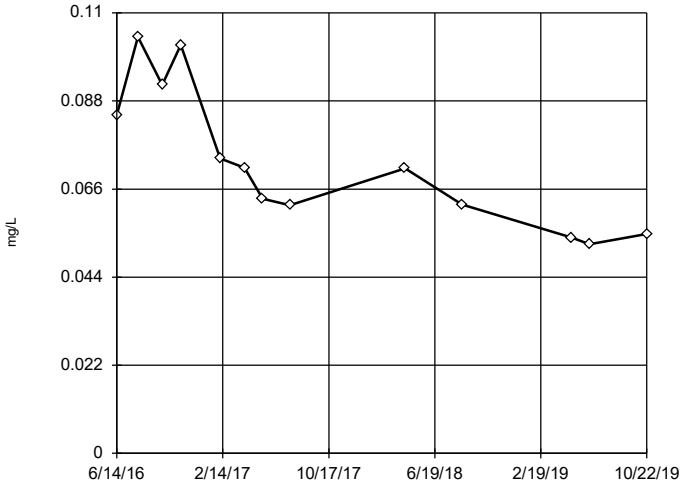
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



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 = 0.3052, low cutoff = 0.01684, based on IQR multiplier of 3.

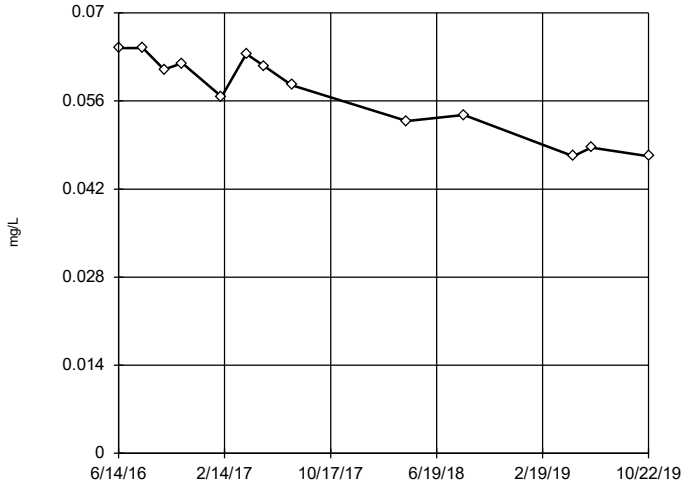
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



n = 13

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

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

High cutoff = 0.07793, low cutoff = -0.06896, based on IQR multiplier of 3.

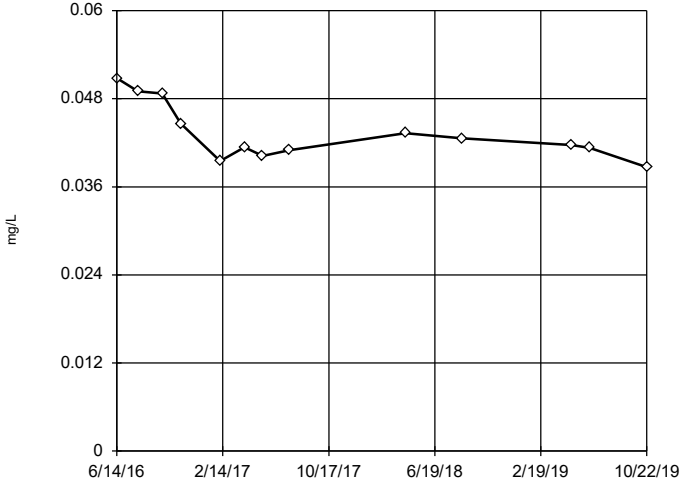
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



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 = 0.0705, low cutoff = 0.02684, based on IQR multiplier of 3.

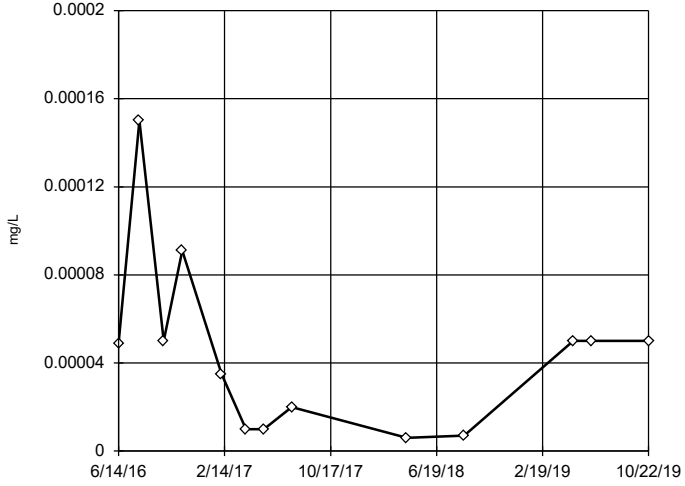
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



n = 13

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

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

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

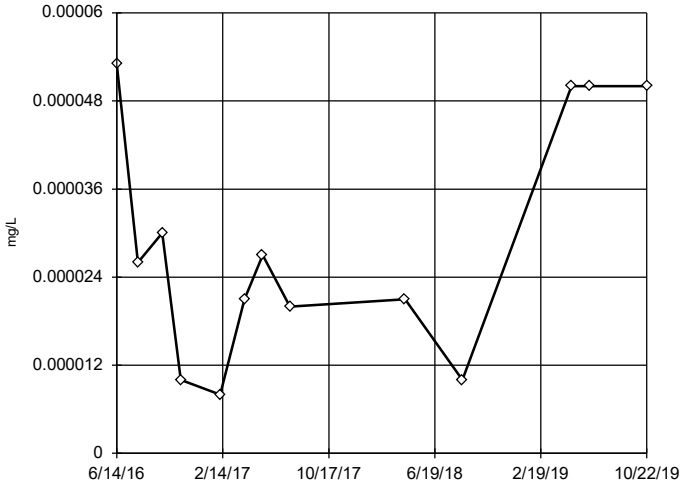
Constituent: Beryllium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



n = 13

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

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

High cutoff = 0.0004106, low cutoff = -0.000002271, based on IQR multiplier of 3.

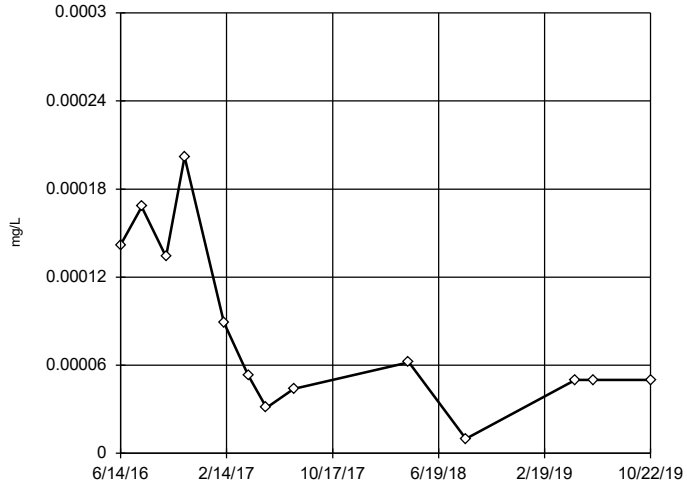
Constituent: Beryllium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



n = 13

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

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

High cutoff = 0.0009548, low cutoff = -0.000001234, based on IQR multiplier of 3.

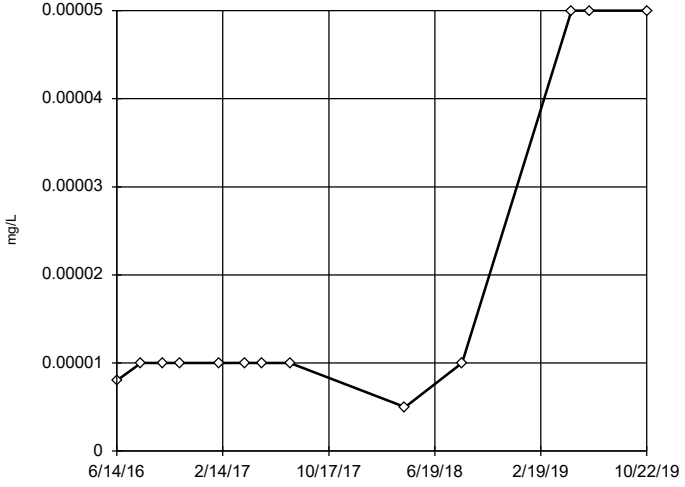
Constituent: Beryllium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



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 = 0.00025, low cutoff = 8.9e-7, based on IQR multiplier of 3.

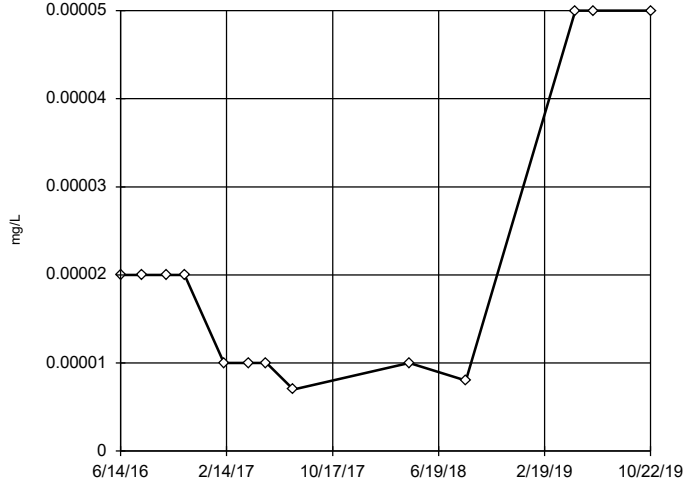
Constituent: Beryllium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



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).

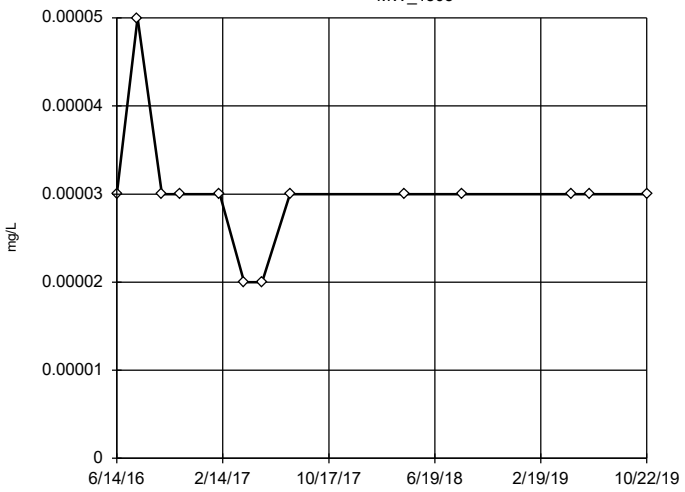
High cutoff = 0.001, low cutoff = 3.2e-7, based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1505



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).

The results were invalidated, because the lower and upper quartiles are equal.

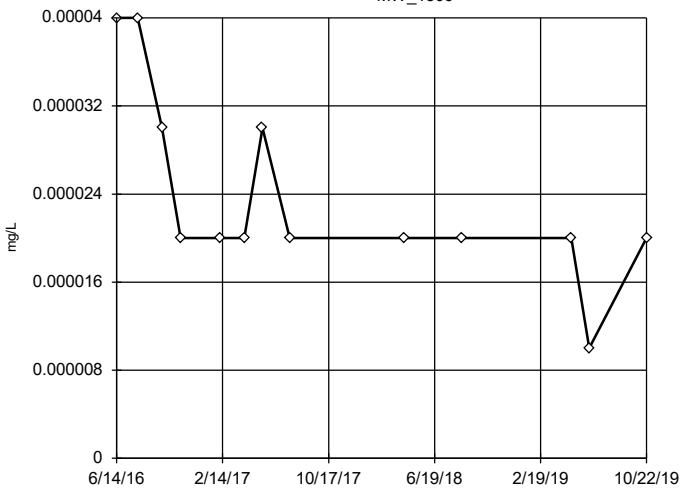
Constituent: Cadmium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



n = 13

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

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

High cutoff = 0.00007872, low cutoff = 0.000003624, based on IQR multiplier of 3.

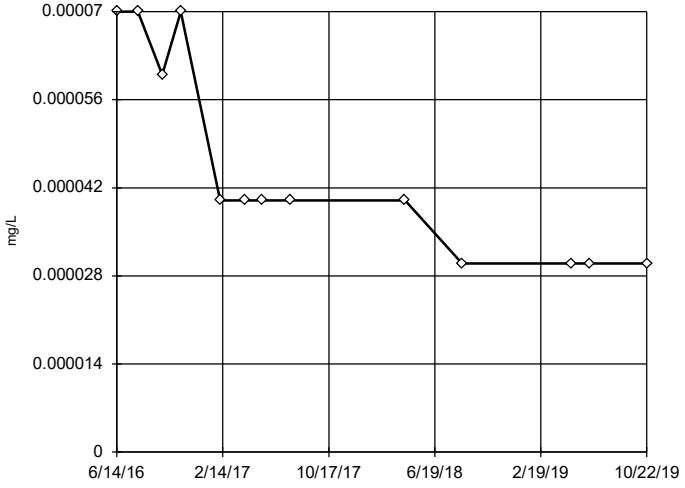
Constituent: Cadmium, total Analysis Run 12/23/2019 12:40 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



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 = 0.0006533, low cutoff = 0.000002976, based on IQR multiplier of 3.

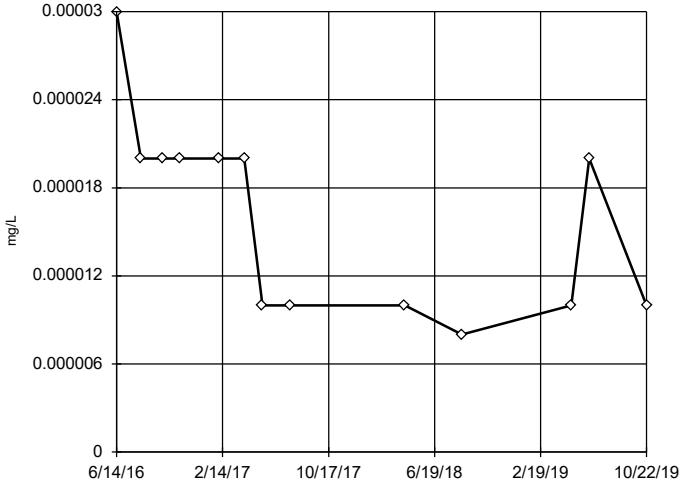
Constituent: Cadmium, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



n = 13

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

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

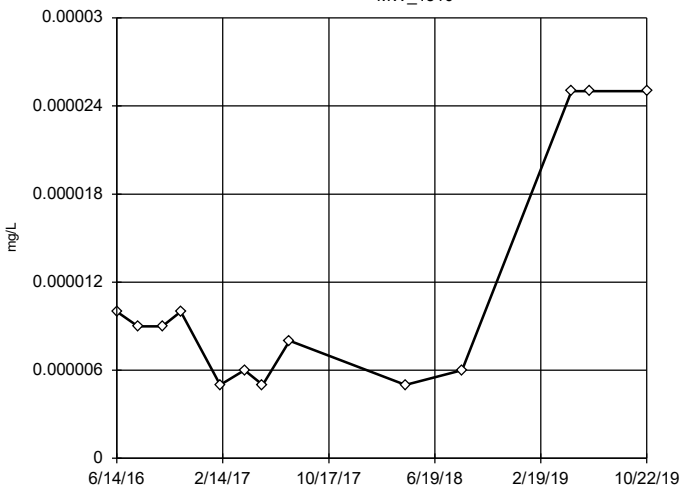
High cutoff = 0.00008486, low cutoff = 1.1e-7, based on IQR multiplier of 3.

Constituent: Cadmium, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1510



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).

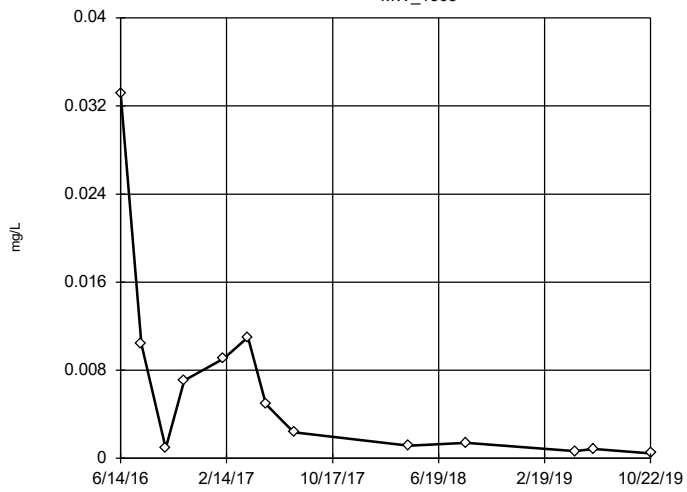
High cutoff = 0.0003804, low cutoff = 2.3e-7, based on IQR multiplier of 3.

Constituent: Cadmium, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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).

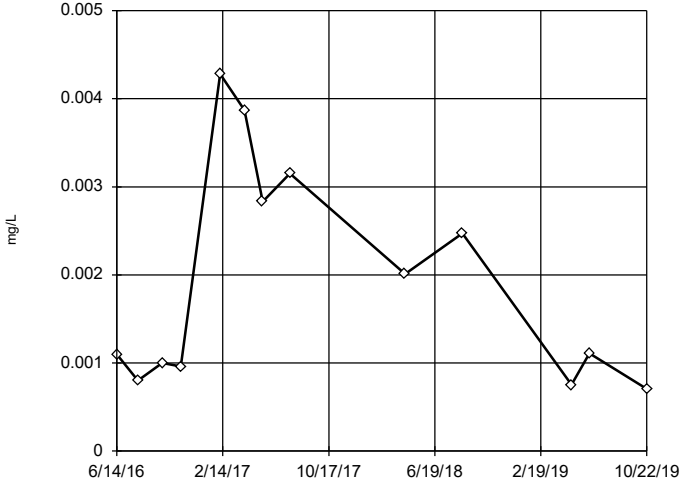
High cutoff = 13.29, low cutoff = 6.4e-7, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



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).

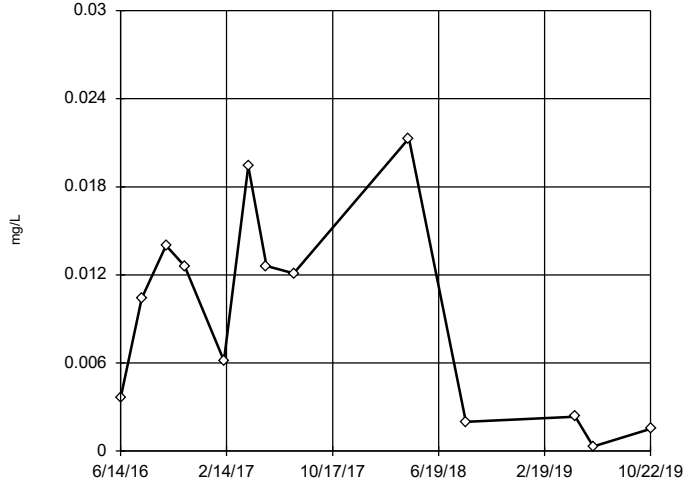
High cutoff = 0.1183, low cutoff = 0.00002211, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



n = 13

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

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

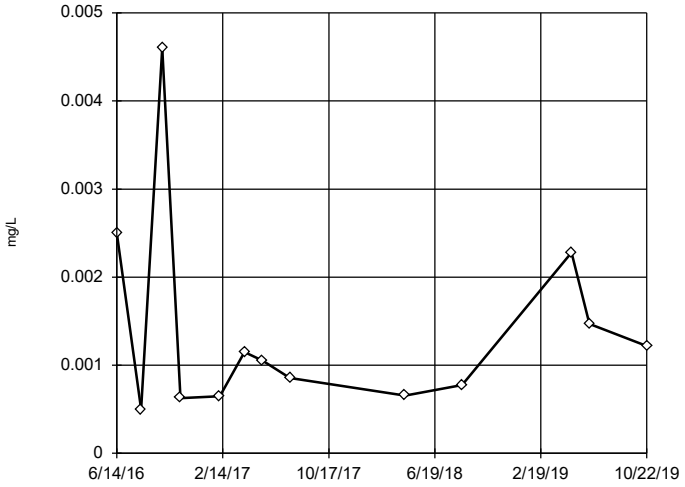
High cutoff = 0.1033, low cutoff = -0.02543, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



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 = 0.04025, low cutoff = 0.00002972, based on IQR multiplier of 3.

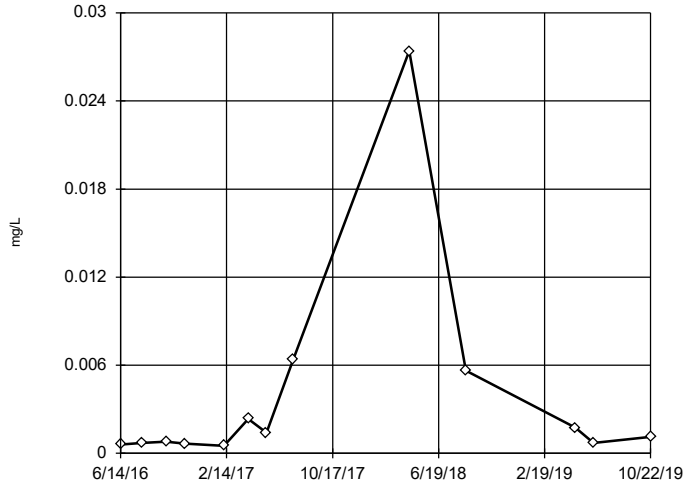
Constituent: Chromium, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



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 = 0.5646, low cutoff = 0.000004347, based on IQR multiplier of 3.

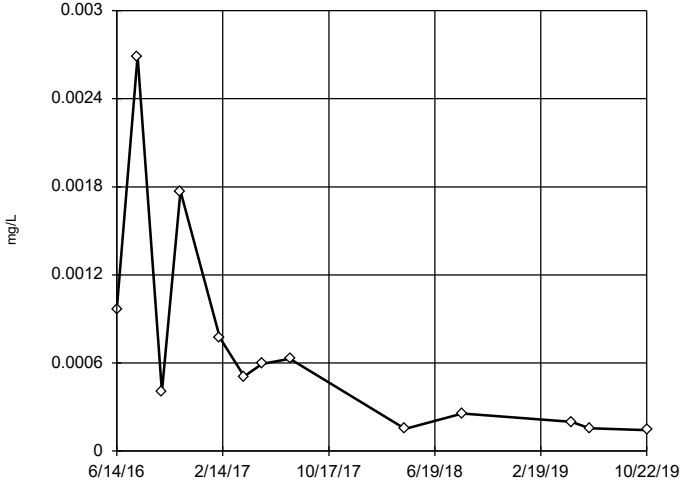
Constituent: Chromium, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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 = 0.1027, low cutoff = 0.000001477, based on IQR multiplier of 3.

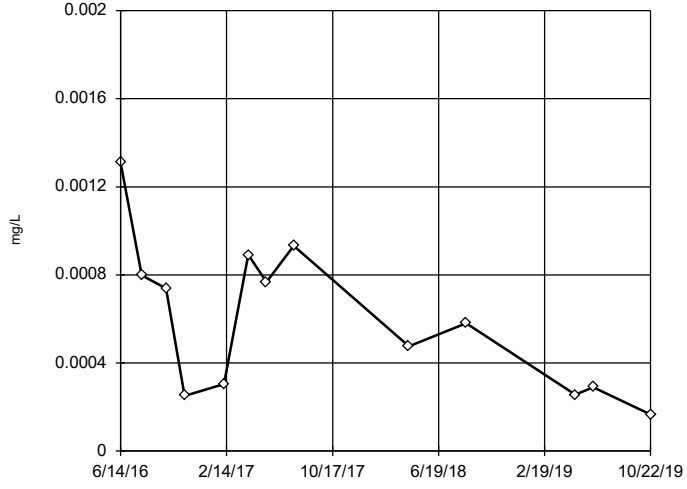
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



n = 13

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

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

High cutoff = 0.004447, low cutoff = -0.0004459, based on IQR multiplier of 3.

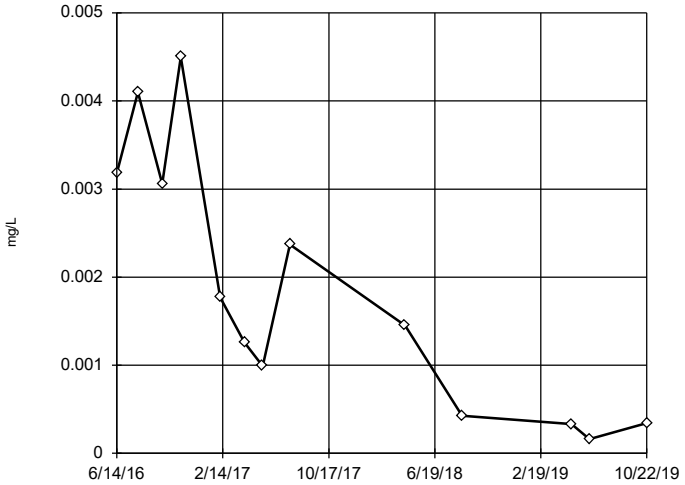
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



n = 13

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

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

High cutoff = 0.04927, low cutoff = -0.003233, based on IQR multiplier of 3.

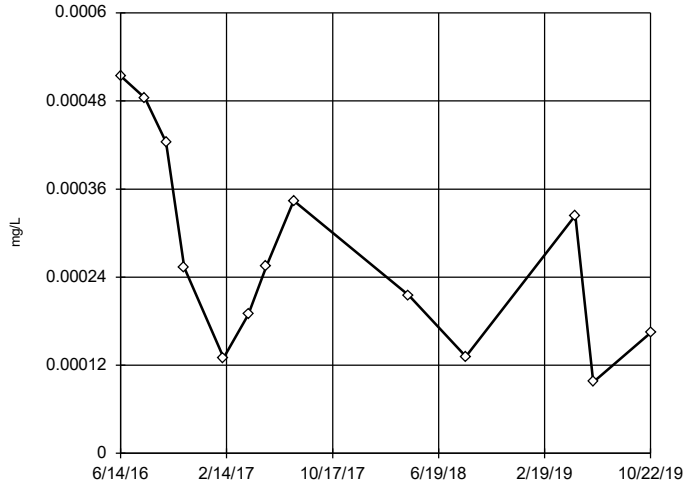
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



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 = 0.006679, low cutoff = 0.000008413, based on IQR multiplier of 3.

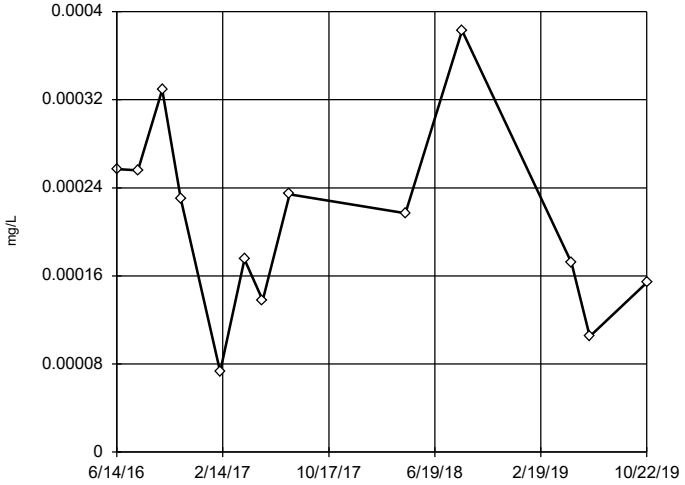
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



n = 13

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

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

High cutoff = 0.0007743, low cutoff = 7.1e-8, based on IQR multiplier of 3.

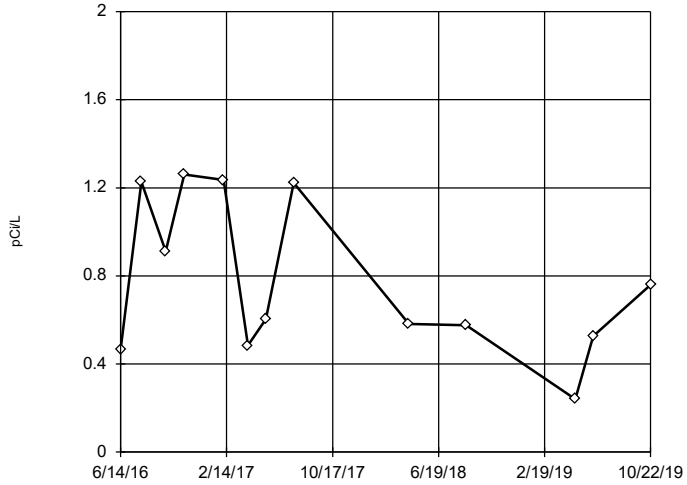
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



n = 13

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 = 6.759, low cutoff = -0.00001491, based on IQR multiplier of 3.

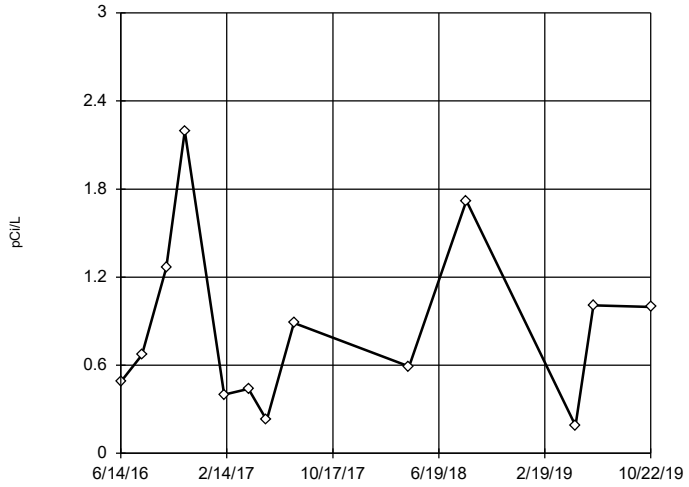
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



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 = 22.08, low cutoff = 0.02142, based on IQR multiplier of 3.

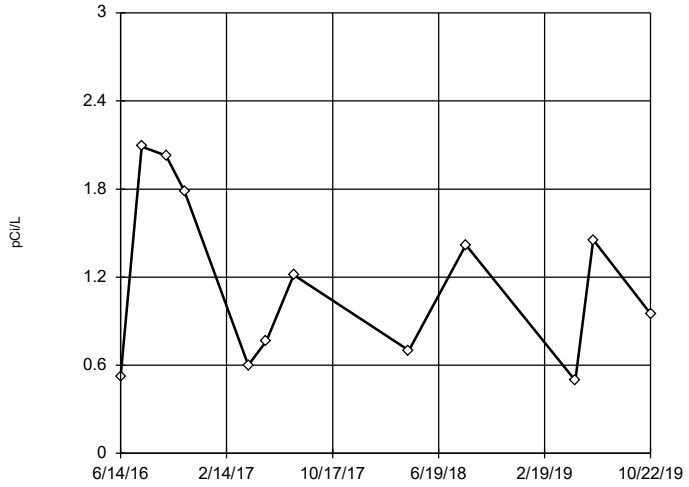
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



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 = 24.67, low cutoff = 0.04234, based on IQR multiplier of 3.

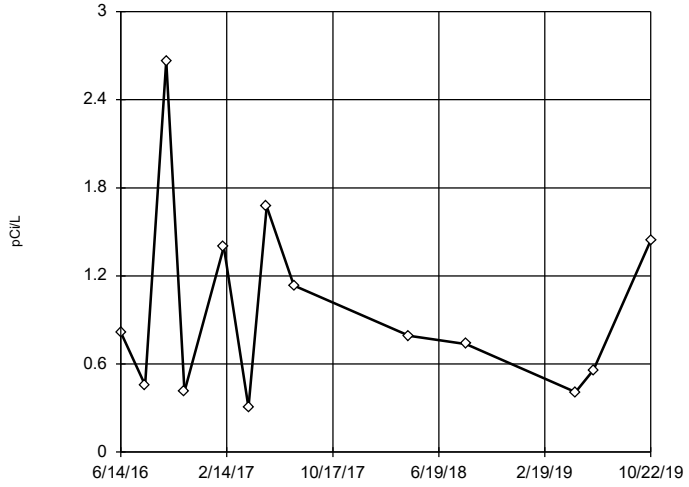
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



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 = 49.78, low cutoff = 0.01237, based on IQR multiplier of 3.

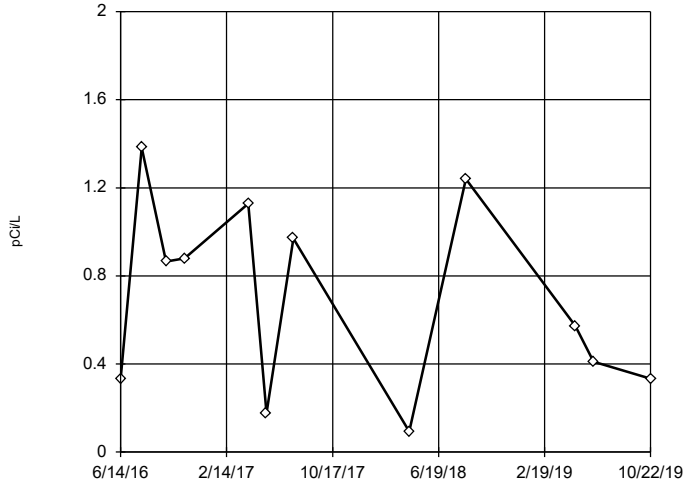
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



n = 12

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

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

High cutoff = 5.596, low cutoff = -0.5866, based on IQR multiplier of 3.

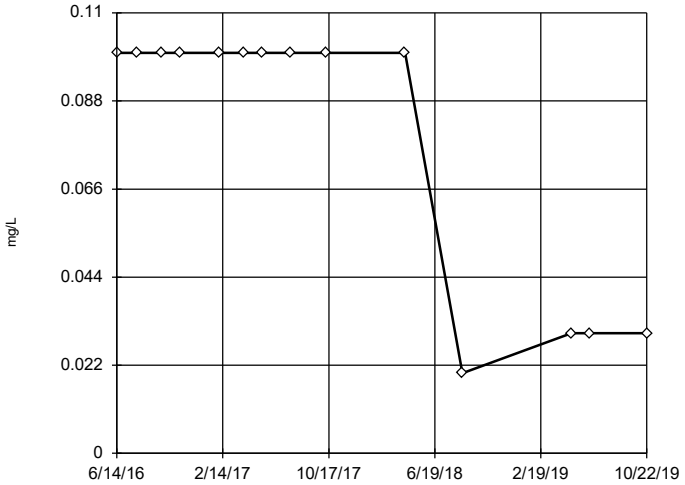
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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).

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

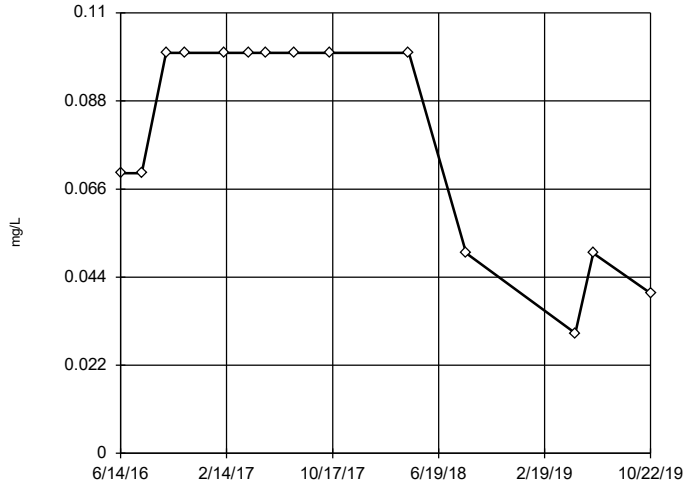
Constituent: Fluoride, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



n = 14

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

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

High cutoff = 0.4243, low cutoff = 0.0005341, based on IQR multiplier of 3.

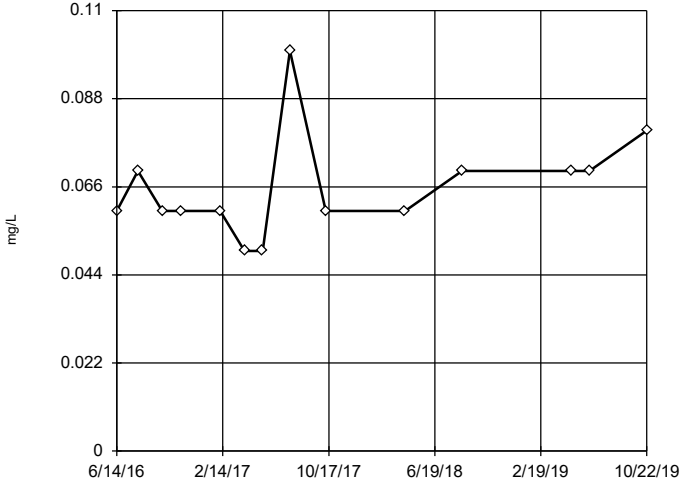
Constituent: Fluoride, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



n = 14

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

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

High cutoff = 0.1112, low cutoff = 0.03778, based on IQR multiplier of 3.

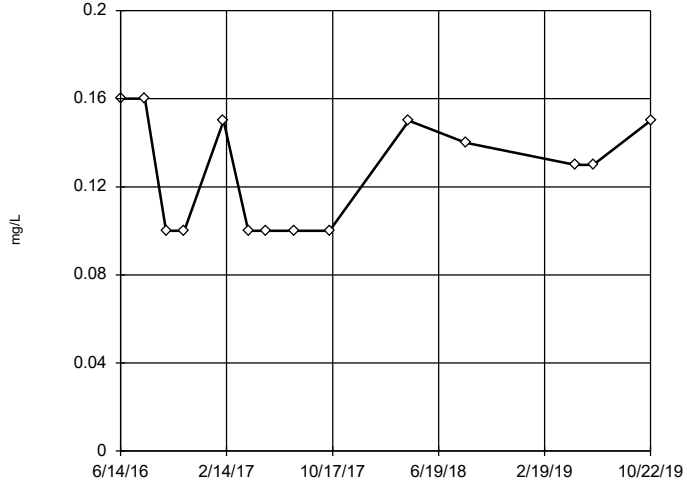
Constituent: Fluoride, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



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).

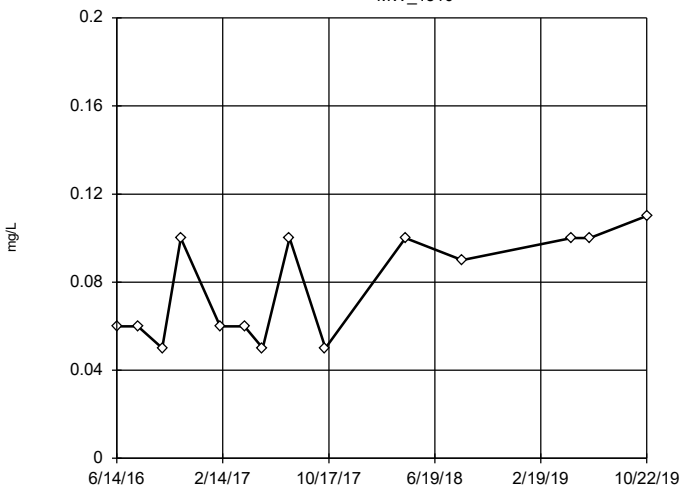
High cutoff = 0.2038, low cutoff = -0.1829, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/23/2019 12:41 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1510



n = 14

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

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

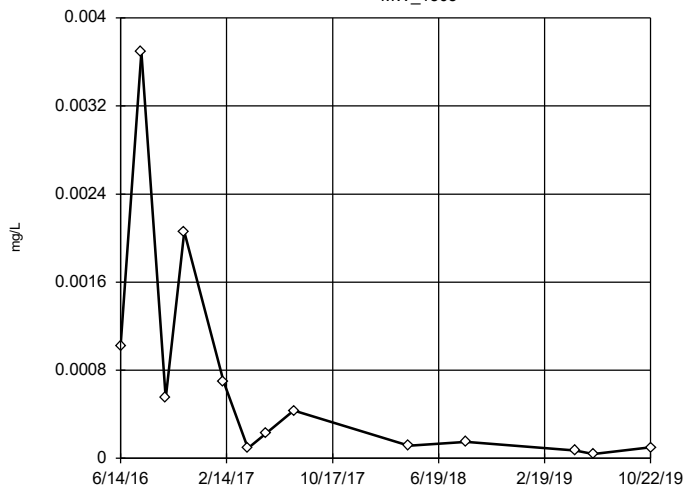
High cutoff = 0.6086, low cutoff = 0.009, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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).

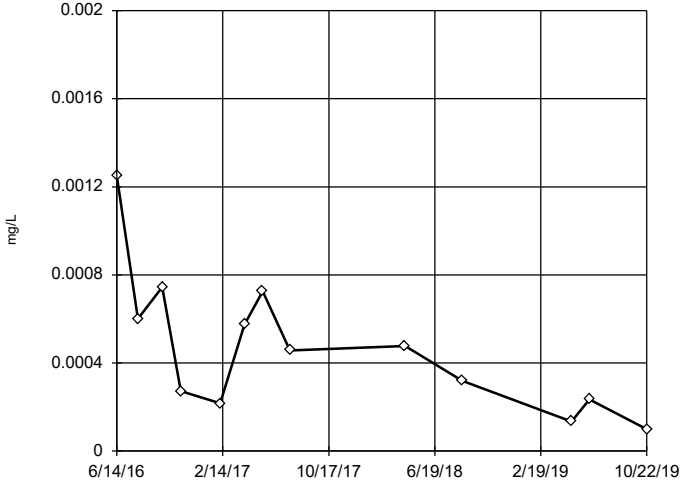
High cutoff = 0.5822, low cutoff = 1.4e-7, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



n = 13

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

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

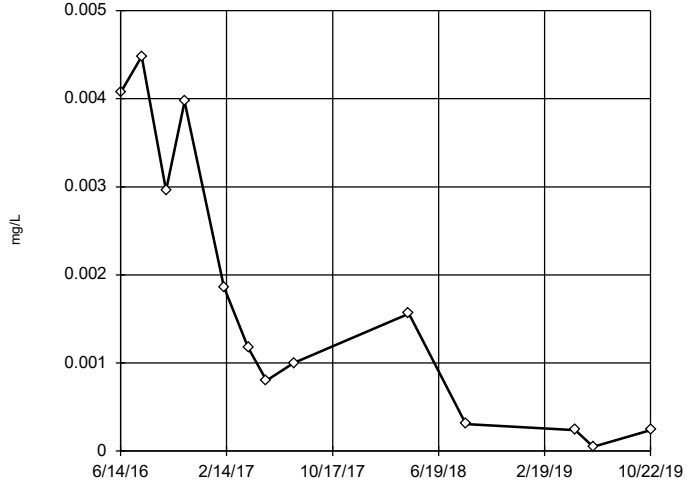
High cutoff = 0.004571, low cutoff = -0.000005803, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



n = 13

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

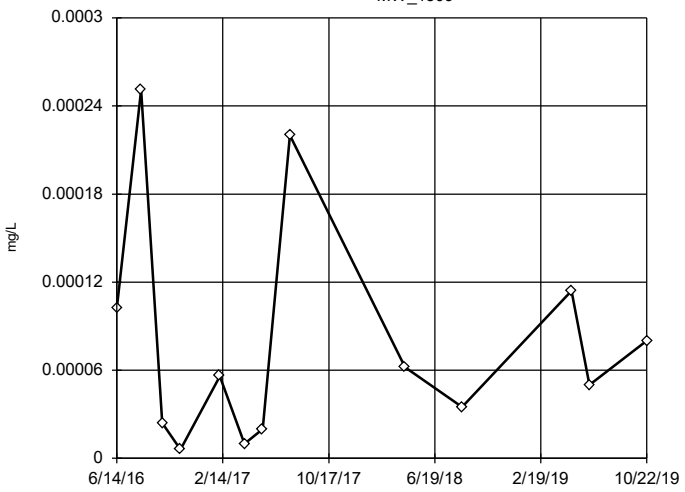
Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.06865, low cutoff = -0.007268, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1509



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).

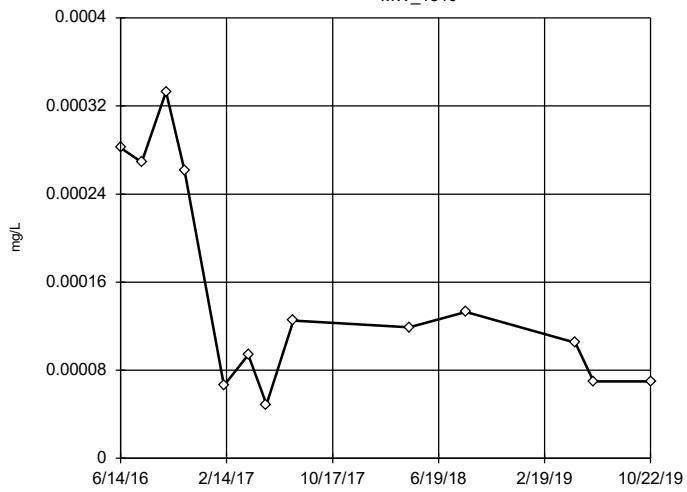
High cutoff = 0.01286, low cutoff = 1.8e-7, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



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).

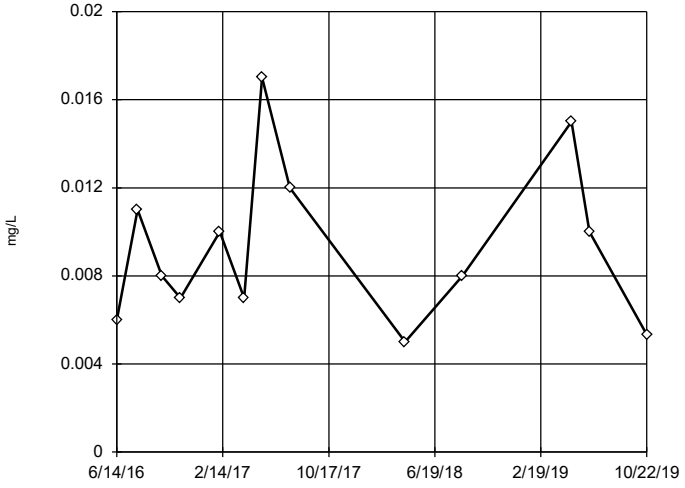
High cutoff = 0.01437, low cutoff = 0.000001291, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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).

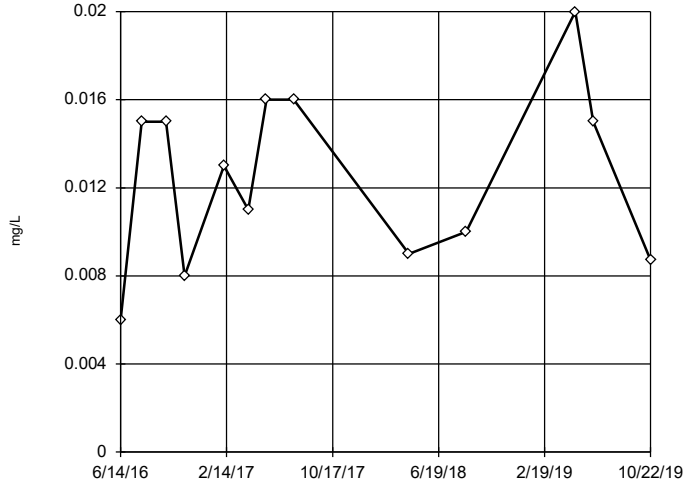
High cutoff = 0.06401, low cutoff = 0.001163, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



n = 13

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

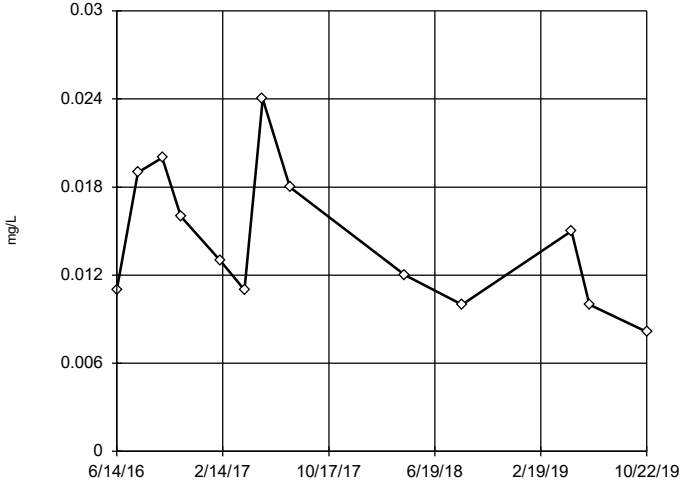
Data were square root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.04643, low cutoff = 0.000009968, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1507



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).

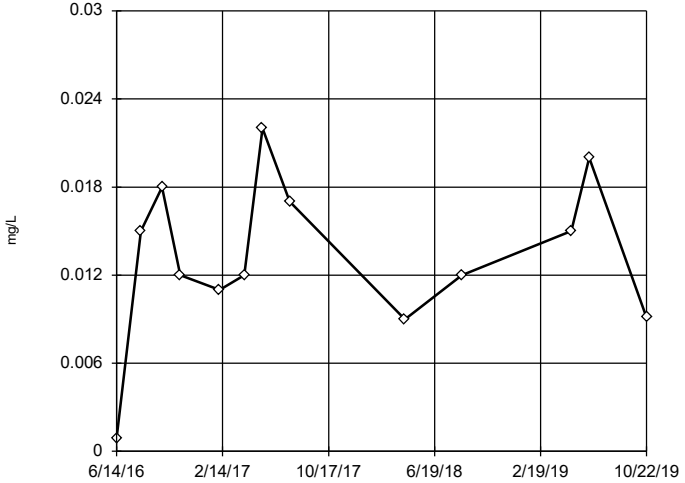
High cutoff = 0.1014, low cutoff = 0.001913, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



n = 13

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

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

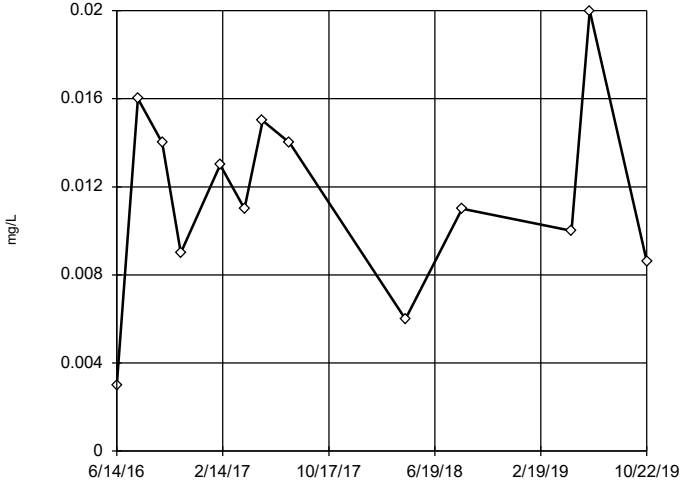
High cutoff = 0.03984, low cutoff = -0.01228, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



n = 13

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

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

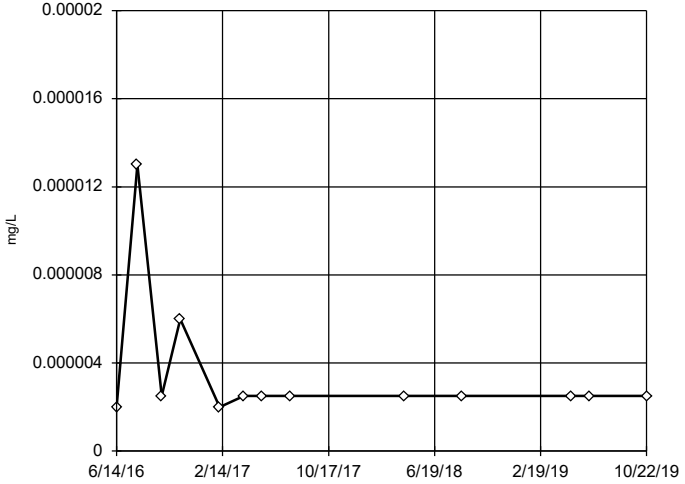
High cutoff = 0.03157, low cutoff = -0.00826, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 12/23/2019 12:41 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



n = 13

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

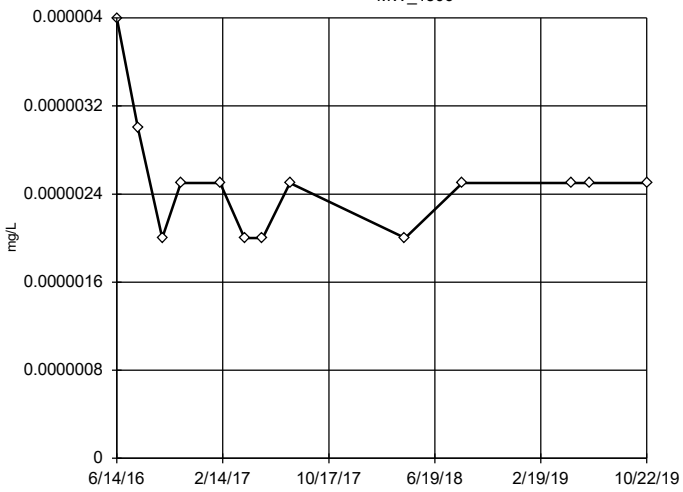
Data were natural log transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Mercury, total Analysis Run 12/23/2019 12:42 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1506



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 = 0.000004883, low cutoff = 0.000001024, based on IQR multiplier of 3.

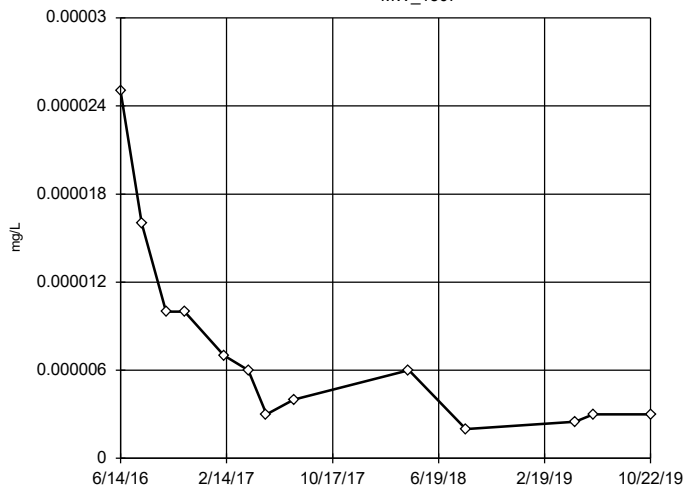
Constituent: Mercury, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



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 = 0.0003704, low cutoff = 8.1e-8, based on IQR multiplier of 3.

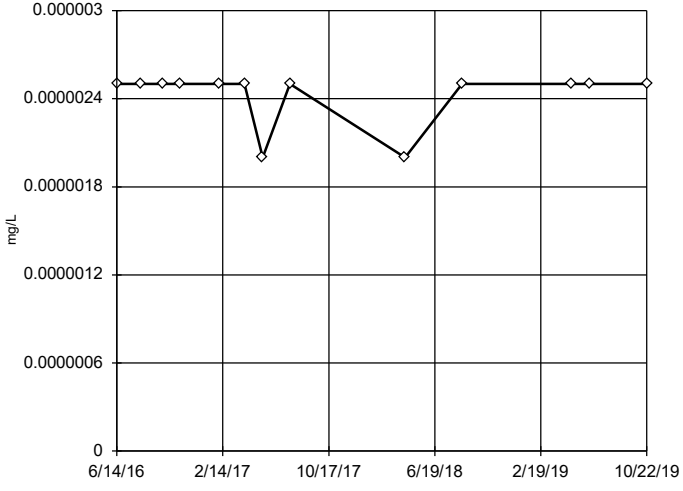
Constituent: Mercury, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



n = 13

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

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

The results were invalidated, because the lower and upper quartiles are equal.

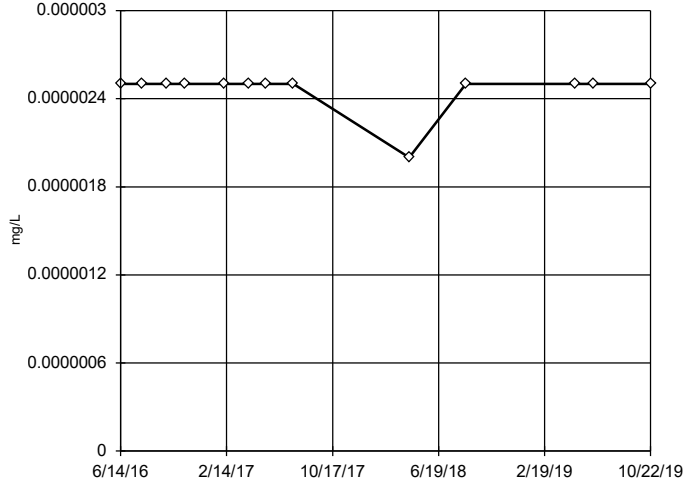
Constituent: Mercury, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



n = 13

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

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

The results were invalidated, because the lower and upper quartiles are equal.

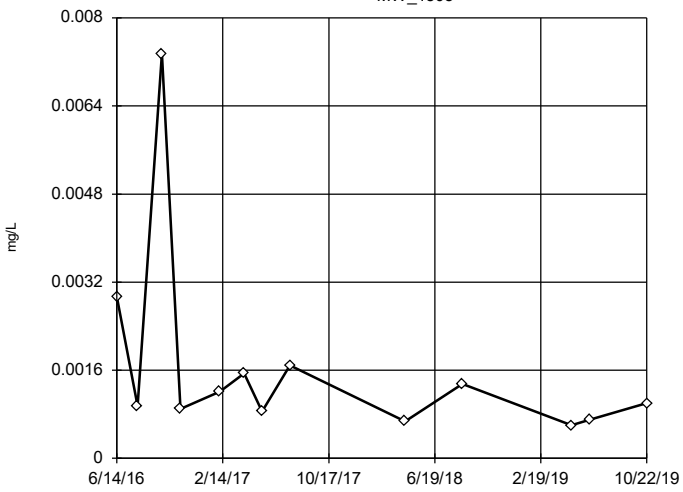
Constituent: Mercury, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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 = 0.01476, low cutoff = 0.00008432, based on IQR multiplier of 3.

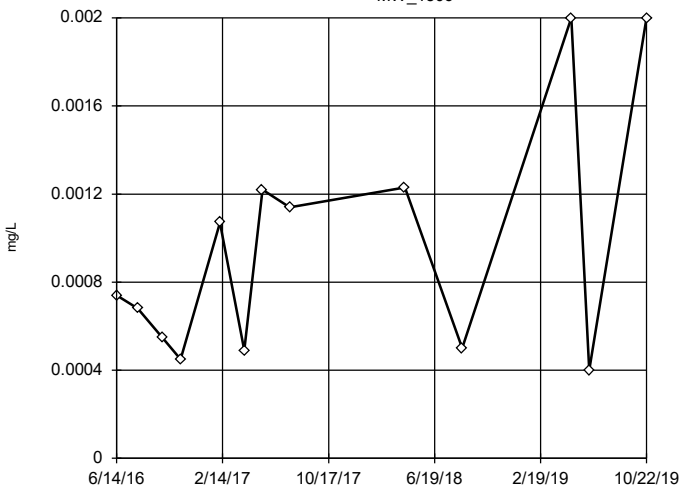
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



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 = 0.01857, low cutoff = 0.00003265, based on IQR multiplier of 3.

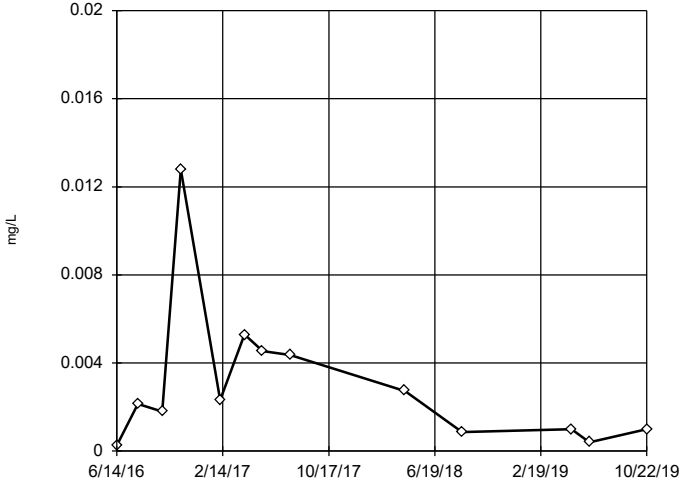
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



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 = 0.4851, low cutoff = 0.000008565, based on IQR multiplier of 3.

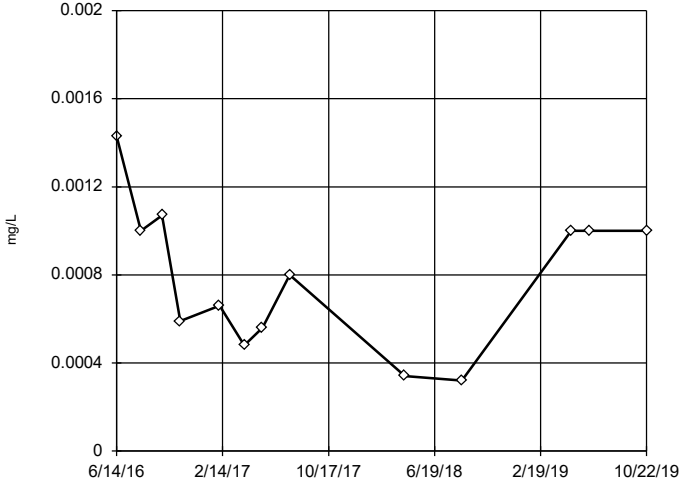
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



n = 13

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

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

High cutoff = 0.003379, low cutoff = -0.00001385, based on IQR multiplier of 3.

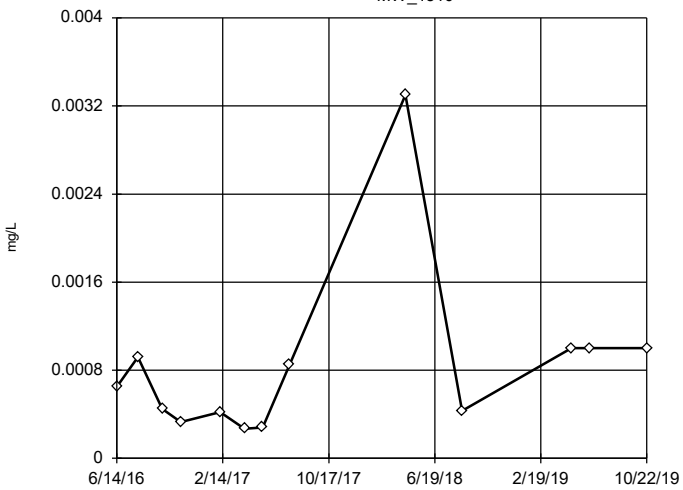
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



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 = 0.01938, low cutoff = 0.00001921, based on IQR multiplier of 3.

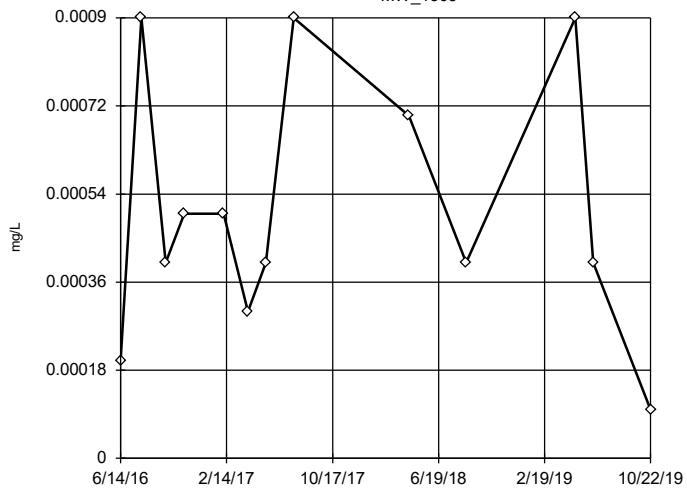
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



n = 13

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

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

High cutoff = 0.003242, low cutoff = -0.0001009, based on IQR multiplier of 3.

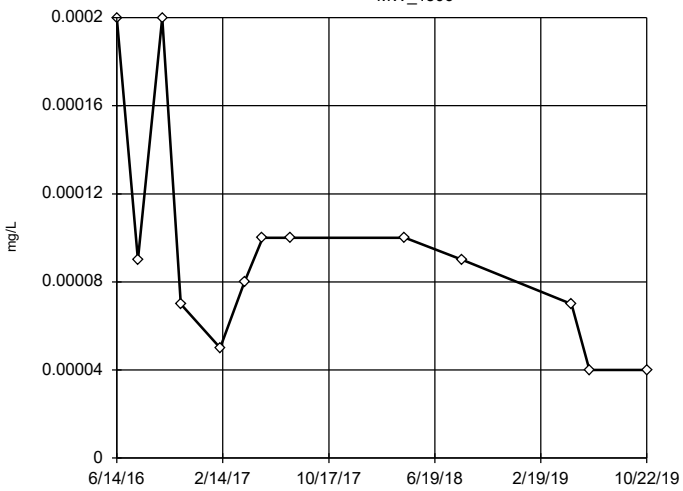
Constituent: Selenium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



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 = 0.0004829, low cutoff = 0.00001225, based on IQR multiplier of 3.

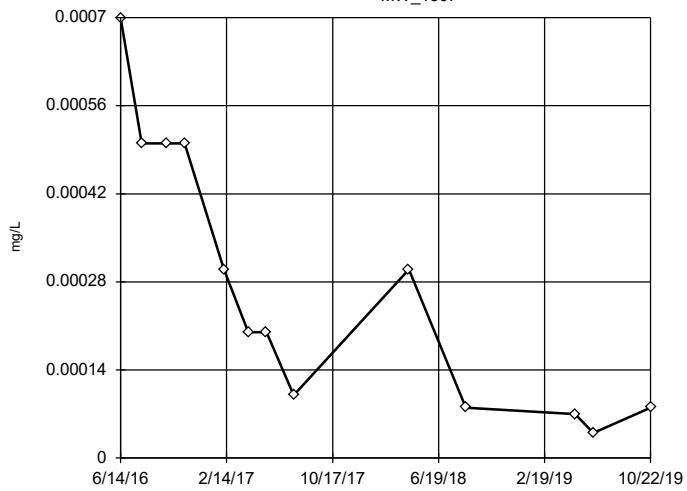
Constituent: Selenium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1507



n = 13

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

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

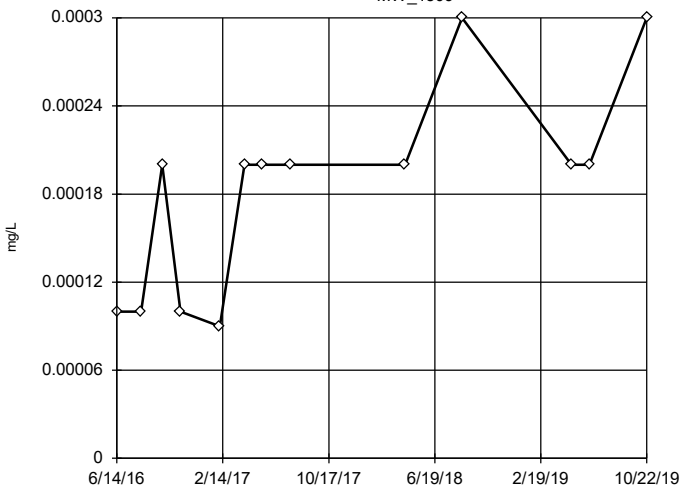
High cutoff = 0.006667, low cutoff = -0.0002843, based on IQR multiplier of 3.

Constituent: Selenium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1509



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 = 0.0005, low cutoff = -0.0002, based on IQR multiplier of 3.

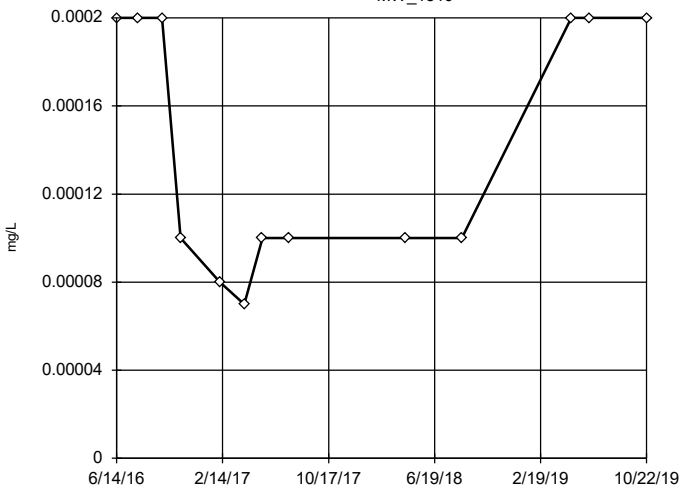
Constituent: Selenium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



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 = 0.0016, low cutoff = 0.0000125, based on IQR multiplier of 3.

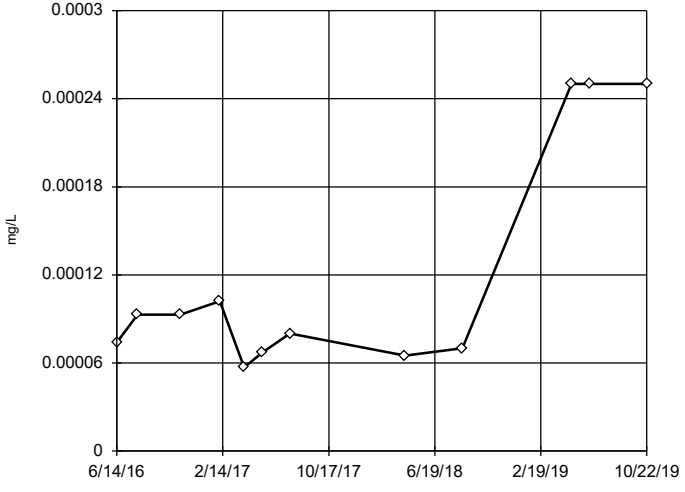
Constituent: Selenium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1505



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 = 0.002025, low cutoff = 0.000005402, based on IQR multiplier of 3.

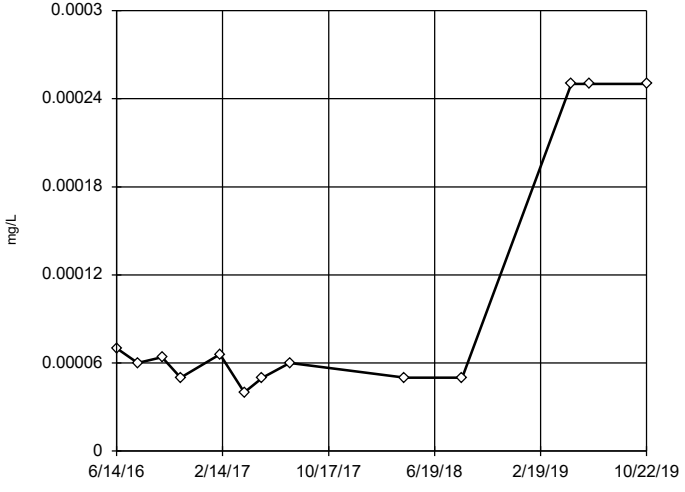
Constituent: Thallium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1506



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).

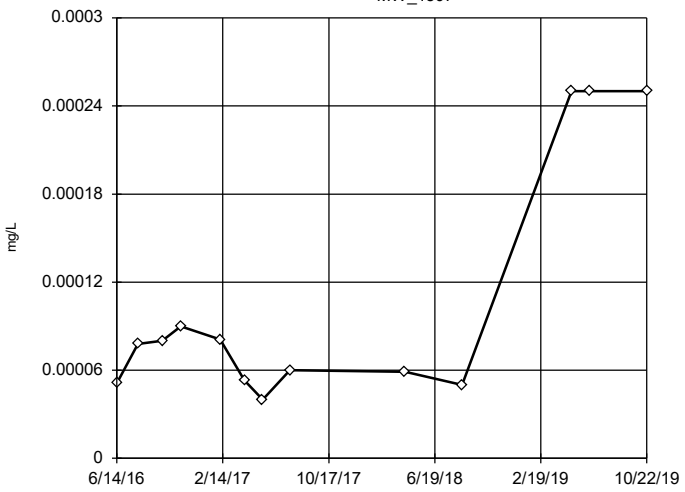
High cutoff = 0.00245, low cutoff = 0.0000027, based on IQR multiplier of 3.

Constituent: Thallium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Tukey's Outlier Screening

MW_1507



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 = 0.003602, low cutoff = 0.000002165, based on IQR multiplier of 3.

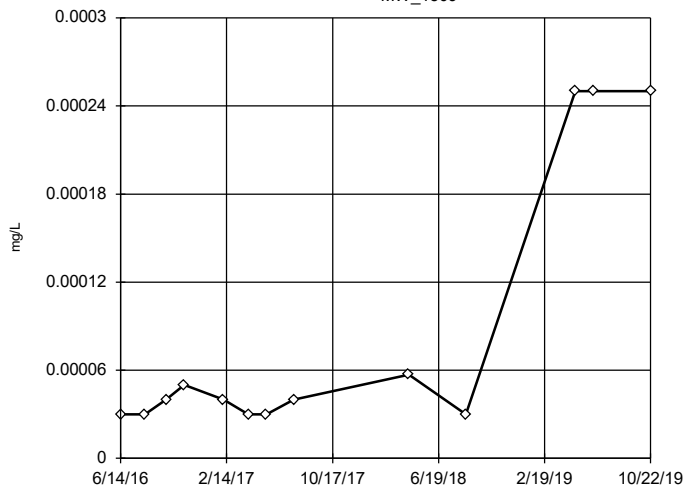
Constituent: Thallium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1509



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 = 0.007521, low cutoff = 4.8e-7, based on IQR multiplier of 3.

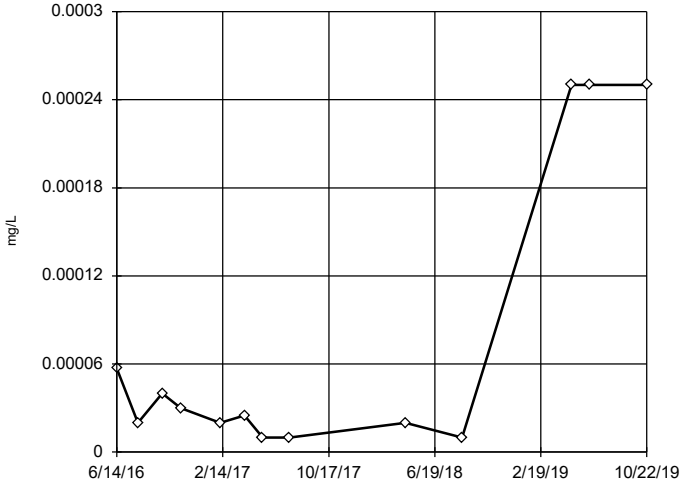
Constituent: Thallium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Tukey's Outlier Screening

MW_1510



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 = 0.07179, low cutoff = 2.4e-8, based on IQR multiplier of 3.

Constituent: Thallium, total Analysis Run 12/23/2019 12:42 PM View: AIV

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Mann-Whitney - Significant Results

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/27/2019, 9:40 AM

Constituent	Well	Calc.	0.01	Method
Sulfate, total (mg/L)	**MW_1506**	**2.858**	**Yes**	**Mann-W**
Sulfate, total (mg/L)	**MW_1509**	**2.866**	**Yes**	**Mann-W**

Mann-Whitney - All Results

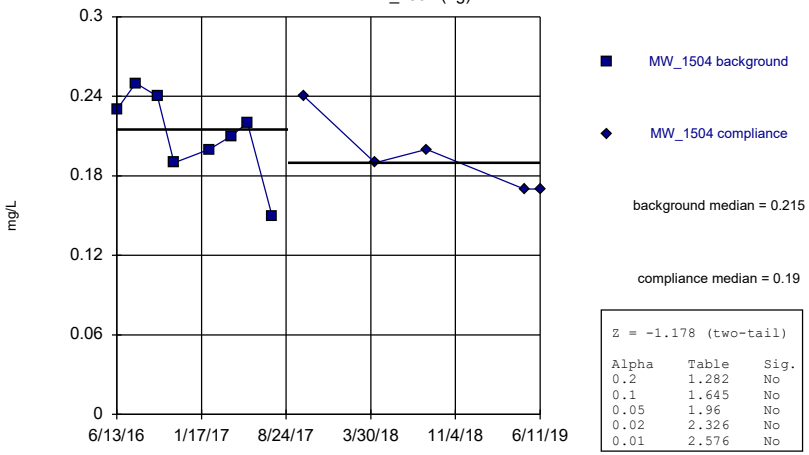
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/27/2019, 9:40 AM

Constituent	Well	Calc.	0.01	Method
Fluoride, total (mg/L)	MW_1504 (bg)	-1.178	No	Mann-W
Fluoride, total (mg/L)	MW_1505	-0....	No	Mann-W
Fluoride, total (mg/L)	MW_1506	-1.759	No	Mann-W
Fluoride, total (mg/L)	MW_1507	1.096	No	Mann-W
Fluoride, total (mg/L)	MW_1508 (bg)	-0....	No	Mann-W
Fluoride, total (mg/L)	MW_1509	0.3867	No	Mann-W
Fluoride, total (mg/L)	MW_1510	0.827	No	Mann-W
Sulfate, total (mg/L)	MW_1504 (bg)	-1.319	No	Mann-W
Sulfate, total (mg/L)	MW_1505	2.569	No	Mann-W
Sulfate, total (mg/L)	**MW_1506**	**2.858**	**Yes**	**Mann-W**
Sulfate, total (mg/L)	MW_1507	1.976	No	Mann-W
Sulfate, total (mg/L)	MW_1508 (bg)	-0....	No	Mann-W
Sulfate, total (mg/L)	**MW_1509**	**2.866**	**Yes**	**Mann-W**
Sulfate, total (mg/L)	MW_1510	2.492	No	Mann-W

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1504 (bg)



Z = -1.178 (two-tail)

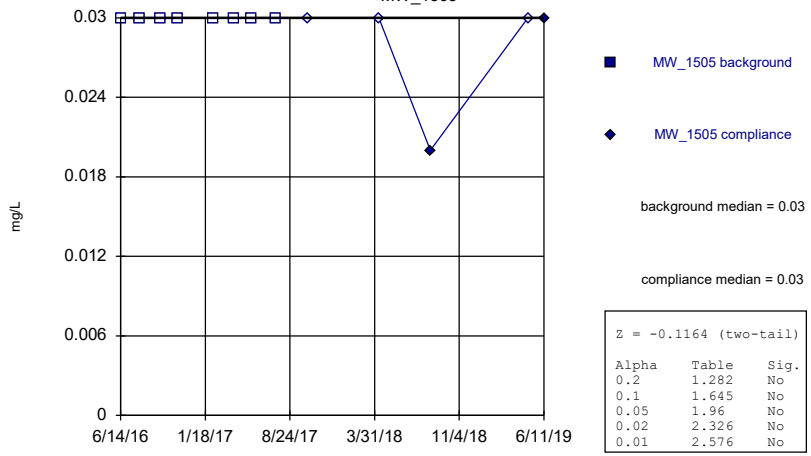
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: Fluoride, total Analysis Run 12/27/2019 9:38 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Mann-Whitney (Wilcoxon Rank Sum)

MW_1505



Z = -0.1164 (two-tail)

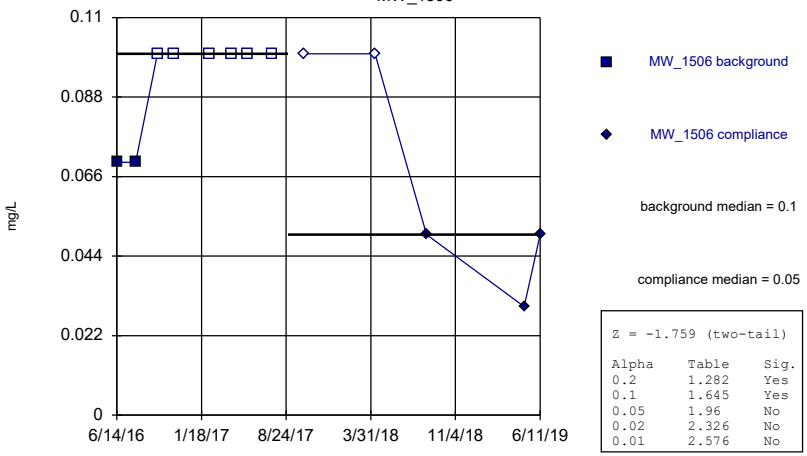
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: Fluoride, total Analysis Run 12/27/2019 9:38 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Mann-Whitney (Wilcoxon Rank Sum)

MW_1506



Z = -1.759 (two-tail)

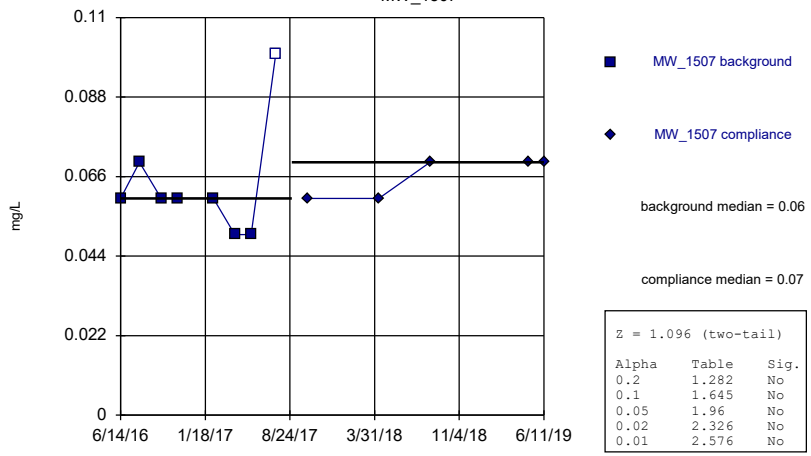
Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	Yes
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: Fluoride, total Analysis Run 12/27/2019 9:38 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Mann-Whitney (Wilcoxon Rank Sum)

MW_1507



Z = 1.096 (two-tail)

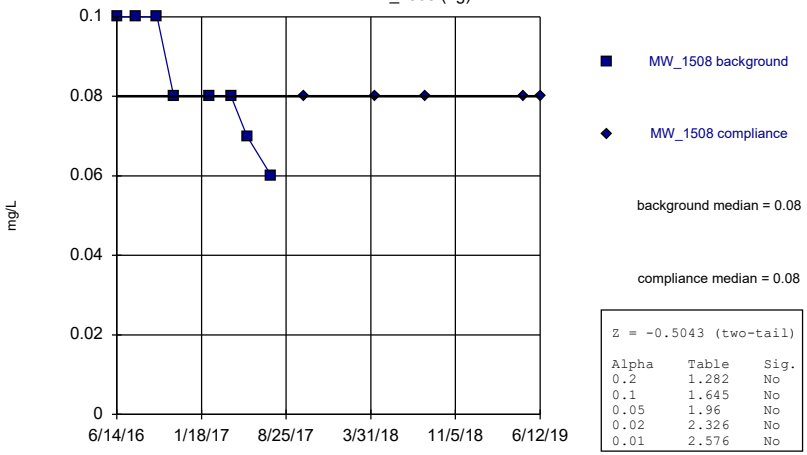
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: Fluoride, total Analysis Run 12/27/2019 9:38 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1508 (bg)



Z = -0.5043 (two-tail)

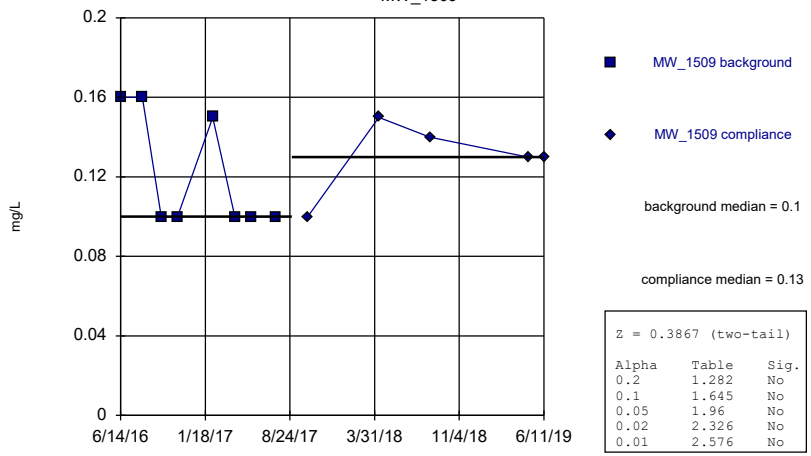
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: Fluoride, total Analysis Run 12/27/2019 9:38 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1509



Z = 0.3867 (two-tail)

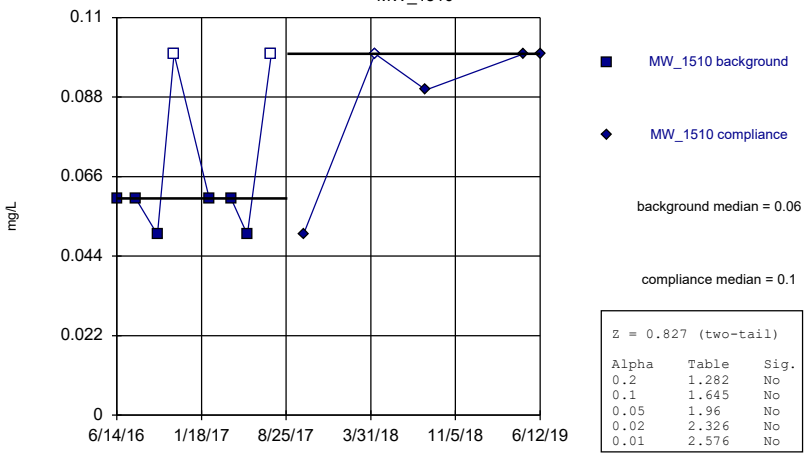
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: Fluoride, total Analysis Run 12/27/2019 9:38 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Mann-Whitney (Wilcoxon Rank Sum)

MW_1510



Z = 0.827 (two-tail)

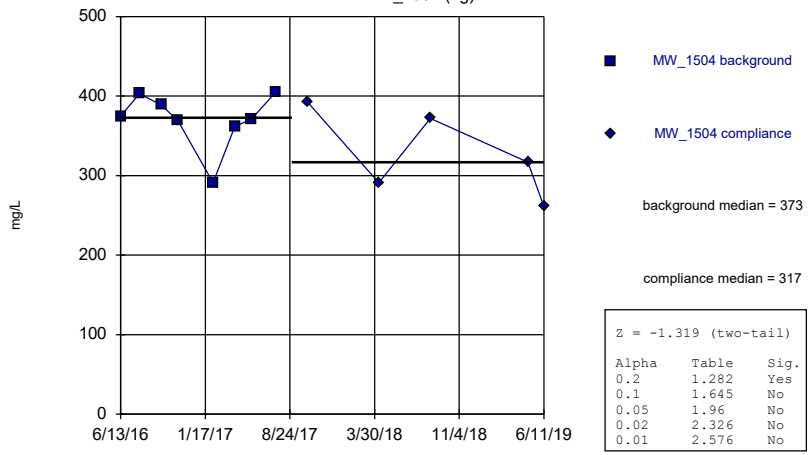
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: Fluoride, total Analysis Run 12/27/2019 9:38 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1504 (bg)



Z = -1.319 (two-tail)

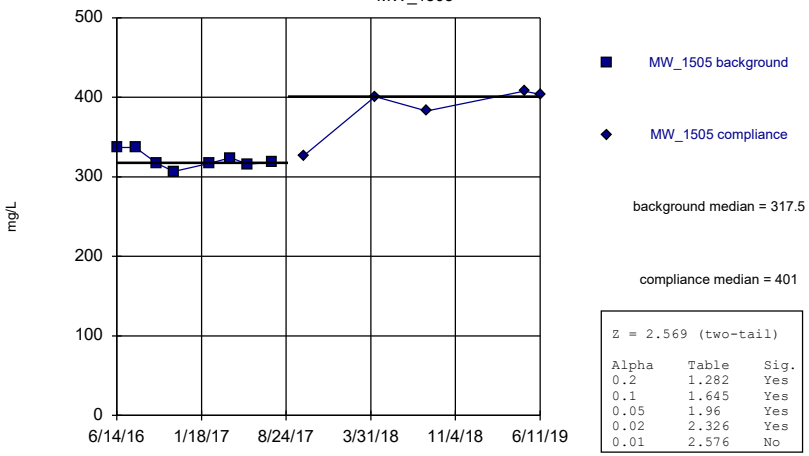
Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1505

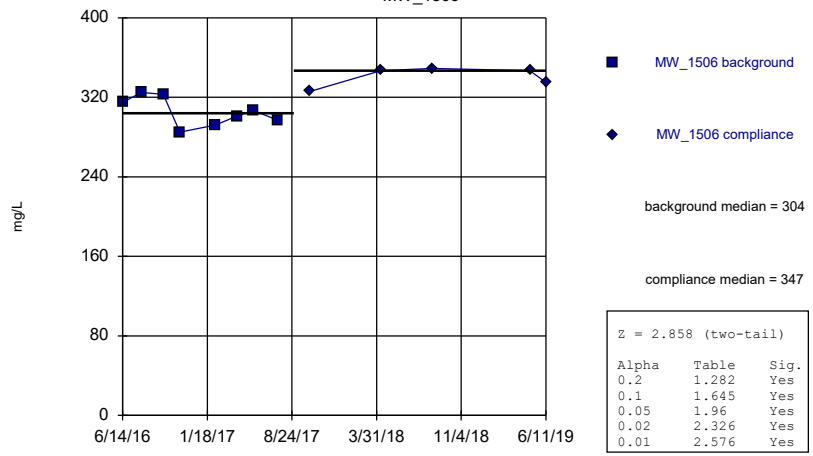


Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1506

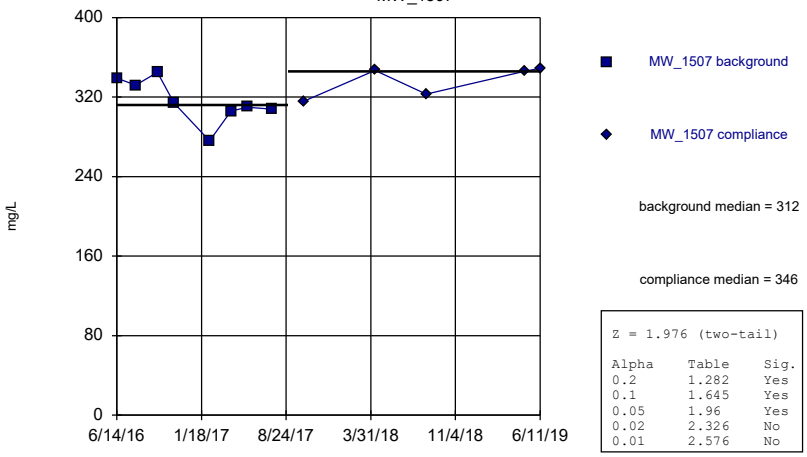


Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1507

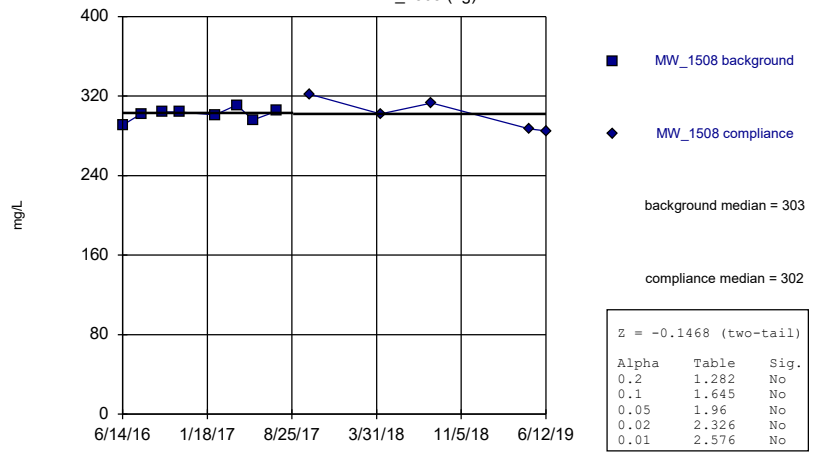


Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

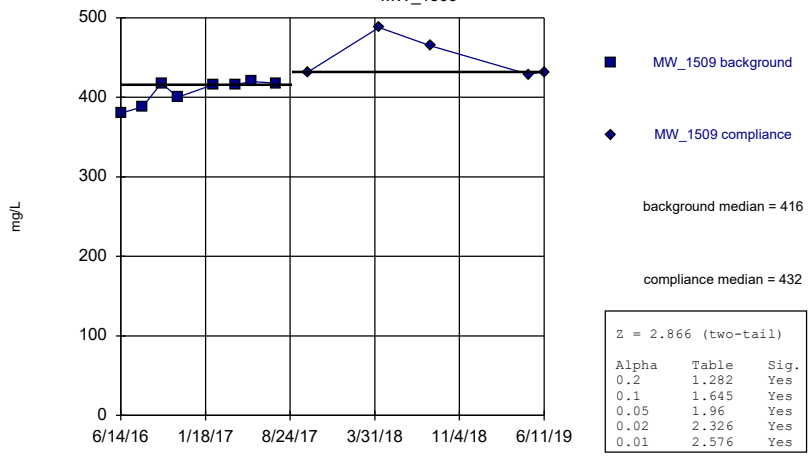
MW_1508 (bg)



Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Mann-Whitney (Wilcoxon Rank Sum)

MW_1509



background median = 416

compliance median = 432

Z = 2.866 (two-tail)

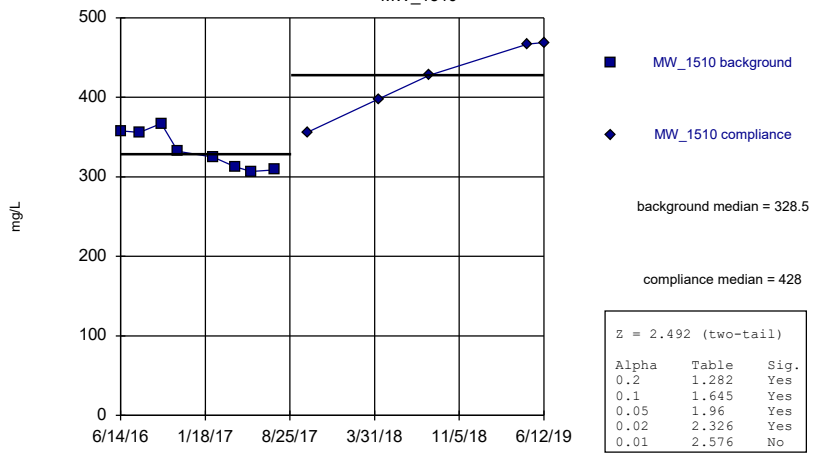
Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	Yes
0.05	1.96	Yes
0.02	2.326	Yes
0.01	2.576	Yes

Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1510



background median = 328.5

compliance median = 428

Z = 2.492 (two-tail)

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

Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

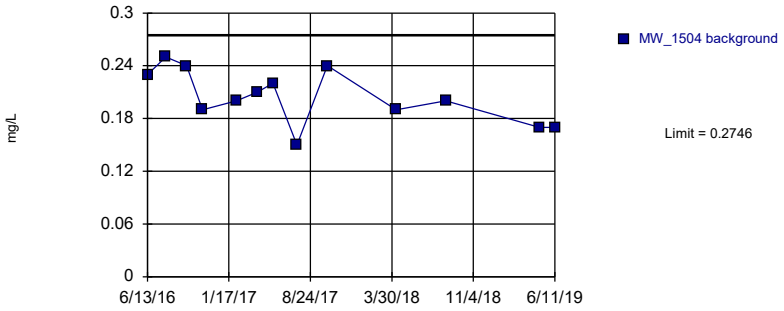
Intrawell Prediction Limit Summary

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/27/2019, 9:49 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Bg N	%NDs	Transform	Alpha	Method
Fluoride, total (mg/L)	MW_1504	0.2746	n/a	n/a	1 future	13	0	No	0.001504	Param Intra 1 of 2
Fluoride, total (mg/L)	MW_1505	0.03	n/a	n/a	1 future	13	84.62	n/a	0.009692	NP Intra (NDs) 1 of 2
Fluoride, total (mg/L)	MW_1506	0.1	n/a	n/a	1 future	13	61.54	n/a	0.009692	NP Intra (NDs) 1 of 2
Fluoride, total (mg/L)	MW_1507	0.09448	n/a	n/a	1 future	13	7.692	x^(1/3)	0.001504	Param Intra 1 of 2
Fluoride, total (mg/L)	MW_1508	0.1	n/a	n/a	1 future	13	0	n/a	0.009692	NP Intra (normality) ...
Fluoride, total (mg/L)	MW_1509	0.1712	n/a	n/a	1 future	13	0	x^3	0.001504	Param Intra 1 of 2
Fluoride, total (mg/L)	MW_1510	0.1	n/a	n/a	1 future	13	23.08	n/a	0.009692	NP Intra (normality) ...
Sulfate, total (mg/L)	MW_1504	461.7	n/a	n/a	1 future	13	0	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW_1505	408	n/a	n/a	1 future	13	0	n/a	0.009692	NP Intra (normality) ...
Sulfate, total (mg/L)	MW_1506	368.7	n/a	n/a	1 future	13	0	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW_1507	373.2	n/a	n/a	1 future	13	0	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW_1508	325.4	n/a	n/a	1 future	13	0	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW_1509	488.8	n/a	n/a	1 future	13	0	No	0.001504	Param Intra 1 of 2
Sulfate, total (mg/L)	MW_1510	496.8	n/a	n/a	1 future	13	0	No	0.001504	Param Intra 1 of 2

Prediction Limit

Intrawell Parametric, MW_1504 (bg)



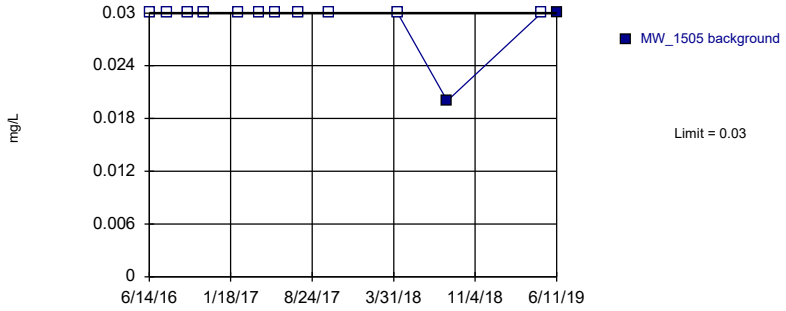
Background Data Summary: Mean=0.2046, Std. Dev.=0.03072, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9628, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Hollow symbols indicate censored values.

Prediction Limit

Intrawell Non-parametric, MW_1505



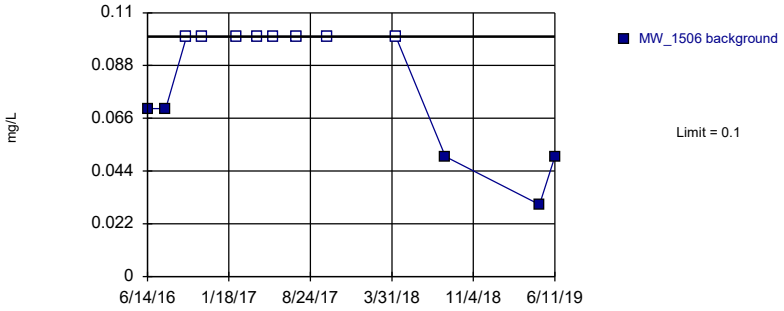
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 13 background values. 84.62% NDs. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Hollow symbols indicate censored values.

Prediction Limit

Intrawell Non-parametric, MW_1506



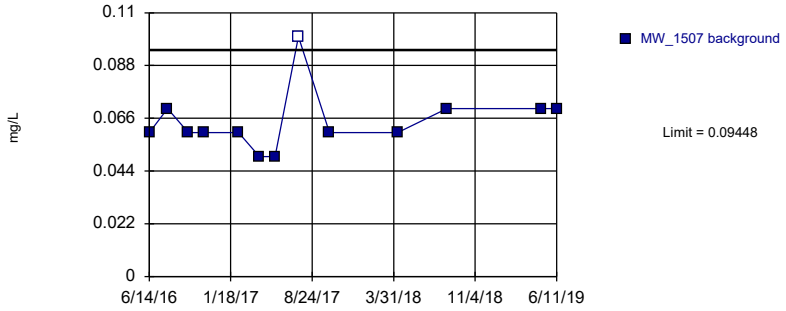
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 13 background values. 61.54% NDs. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Hollow symbols indicate censored values.

Prediction Limit

Intrawell Parametric, MW_1507

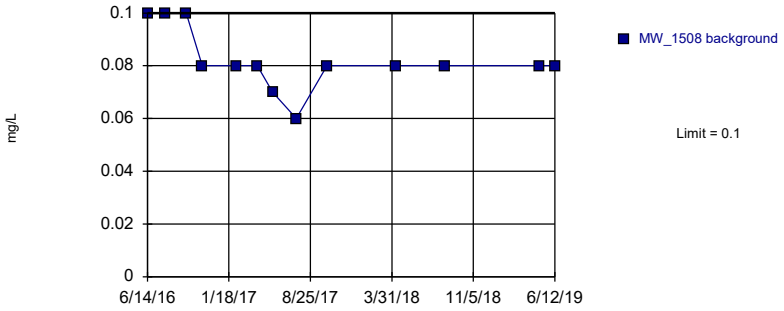


Background Data Summary (based on cube root transformation): Mean=0.3999, Std. Dev.=0.02439, n=13, 7.692% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8228, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Prediction Limit

Intrawell Non-parametric, MW_1508 (bg)

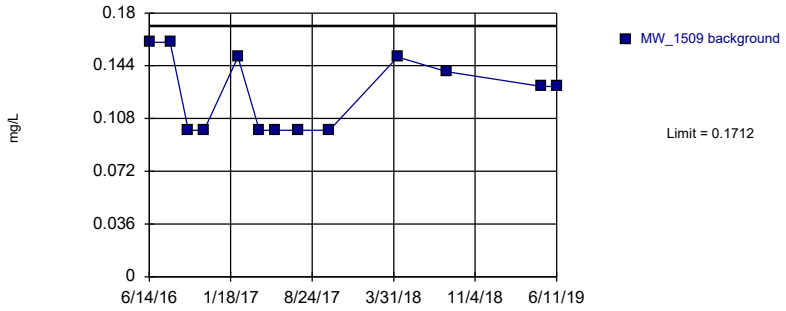


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 13 background values. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Prediction Limit

Intrawell Parametric, MW_1509



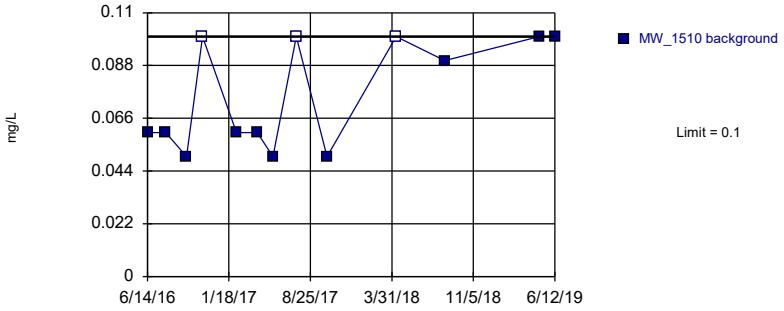
Background Data Summary (based on cube transformation): Mean=0.00216, Std. Dev.=0.001254, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8158, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Hollow symbols indicate censored values.

Prediction Limit

Intrawell Non-parametric, MW_1510

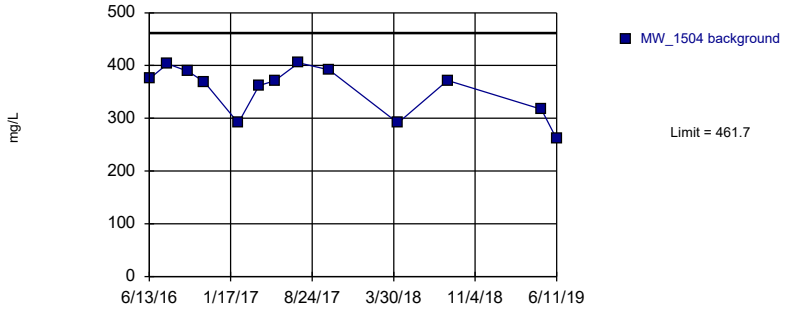


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 13 background values. 23.08% NDs. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes 1 future value.

Constituent: Fluoride, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Prediction Limit

Intrawell Parametric, MW_1504 (bg)

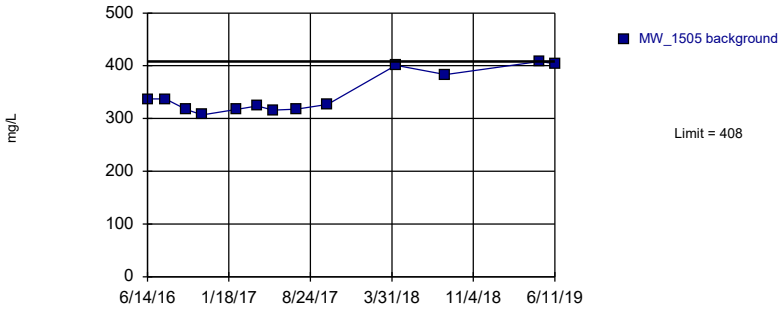


Background Data Summary: Mean=353.7, Std. Dev.=47.41, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8641, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Prediction Limit

Intrawell Non-parametric, MW_1505



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 13 background values. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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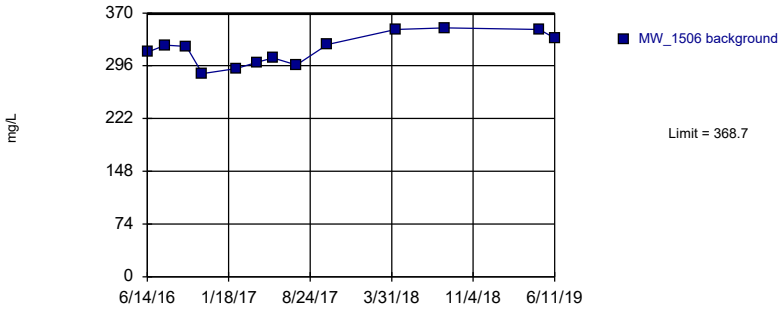
Prediction Limit

Intrawell Parametric, MW_1506



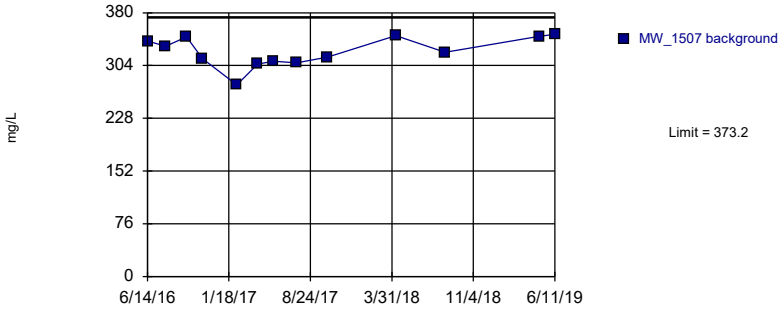
Background Data Summary: Mean=319.2, Std. Dev.=21.75, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9405, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Prediction Limit

Intrawell Parametric, MW_1507



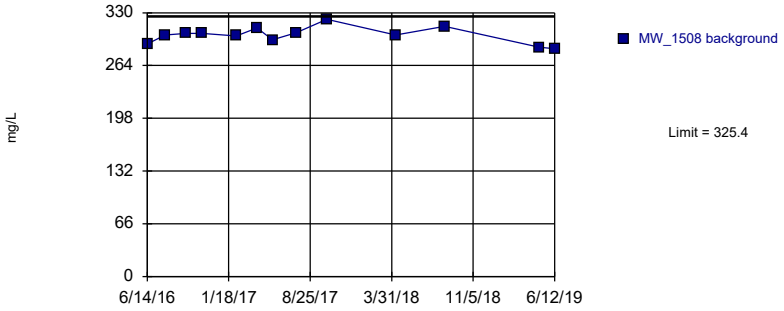
Background Data Summary: Mean=323.9, Std. Dev.=21.63, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9109, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Prediction Limit

Intrawell Parametric, MW_1508 (bg)

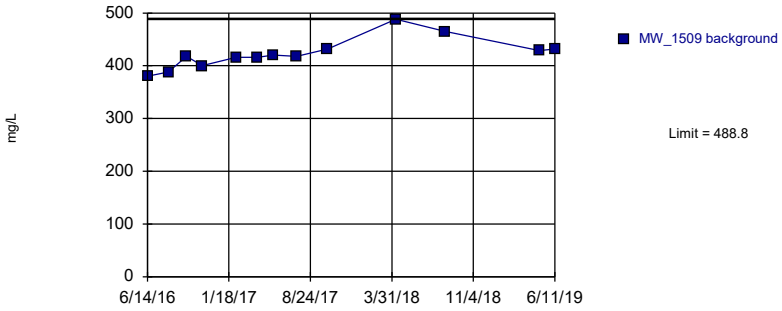


Background Data Summary: Mean=301.8, Std. Dev.=10.37, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9642, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Prediction Limit

Intrawell Parametric, MW_1509



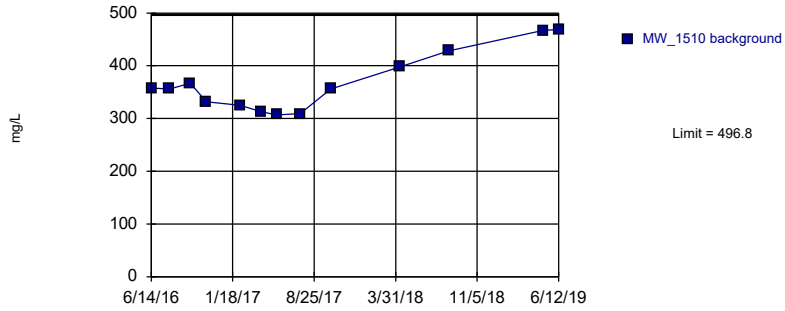
Background Data Summary: Mean=423.2, Std. Dev.=28.79, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9163, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Prediction Limit

Intrawell Parametric, MW_1510



Background Data Summary: Mean=368.1, Std. Dev.=56.47, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8801, 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: Sulfate, total Analysis Run 12/27/2019 9:48 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Interwell Appendix III Trend Test - Significant Results

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 1:51 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Chloride, total (mg/L)	**MW_1508 (bg)**	**-19.98**	**-67**	**-48**	**Yes**	**14**	**0**	**n/a**	**n/a**	**0.01**	**NP**
pH, field (SU)	**MW_1504 (bg)**	**0.1603**	**56**	**48**	**Yes**	**14**	**0**	**n/a**	**n/a**	**0.01**	**NP**

Interwell Appendix III Trend Test - All Results

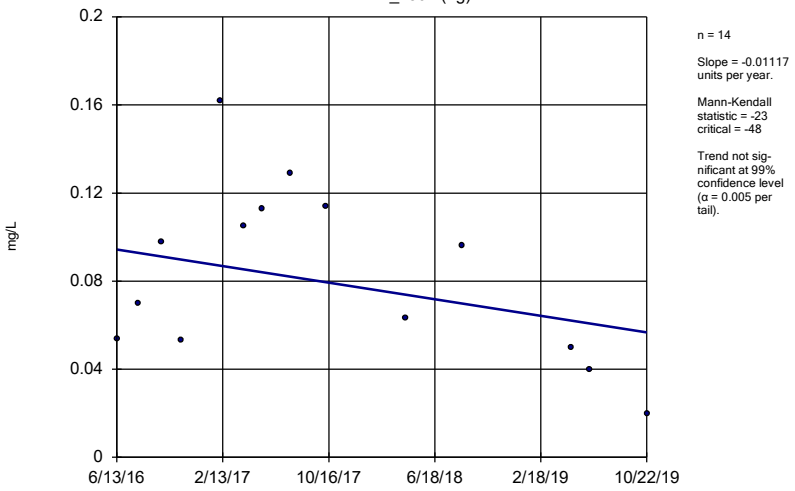
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 1:51 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	MW_1504 (bg)	-0.01117	-23	-48	No	14	0	n/a	n/a	0.01	NP
Boron, total (mg/L)	MW_1508 (bg)	-0.04102	-9	-48	No	14	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW_1504 (bg)	-6.046	-26	-48	No	14	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	MW_1508 (bg)	-1.861	-6	-48	No	14	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	MW_1504 (bg)	-5.395	-46	-48	No	14	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	**MW_1508 (bg)**	**-19.98**	**-67**	**-48**	**Yes**	**14**	**0**	**n/a**	**n/a**	**0.01**	**NP**
pH, field (SU)	**MW_1504 (bg)**	**0.1603**	**56**	**48**	**Yes**	**14**	**0**	**n/a**	**n/a**	**0.01**	**NP**
pH, field (SU)	MW_1508 (bg)	0.08144	37	48	No	14	0	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (m...	MW_1504 (bg)	-42.26	-39	-48	No	14	0	n/a	n/a	0.01	NP
Total Dissolved Solids [TDS] (m...	MW_1508 (bg)	-29.53	-25	-48	No	14	0	n/a	n/a	0.01	NP

Sanitas™ v.9.6.24 . UG

Sen's Slope Estimator

MW_1504 (bg)



n = 14

Slope = -0.01117 units per year.

Mann-Kendall statistic = -23
critical = -48

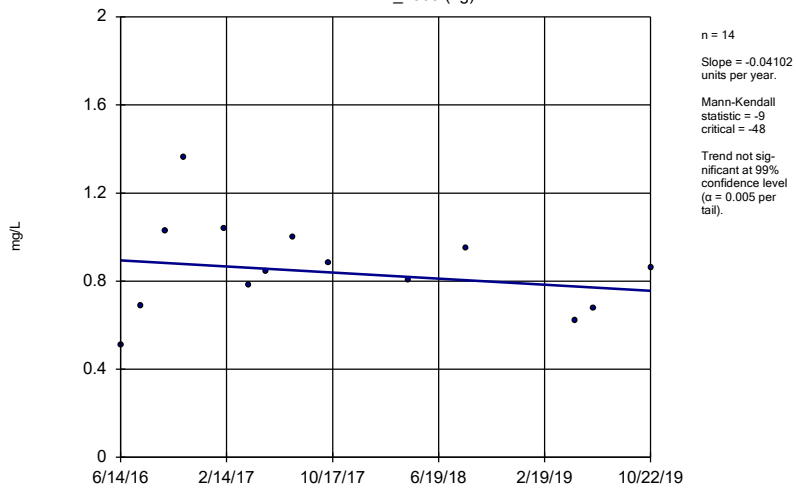
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, total Analysis Run 12/23/2019 1:49 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Sen's Slope Estimator

MW_1508 (bg)



n = 14

Slope = -0.04102 units per year.

Mann-Kendall statistic = -9
critical = -48

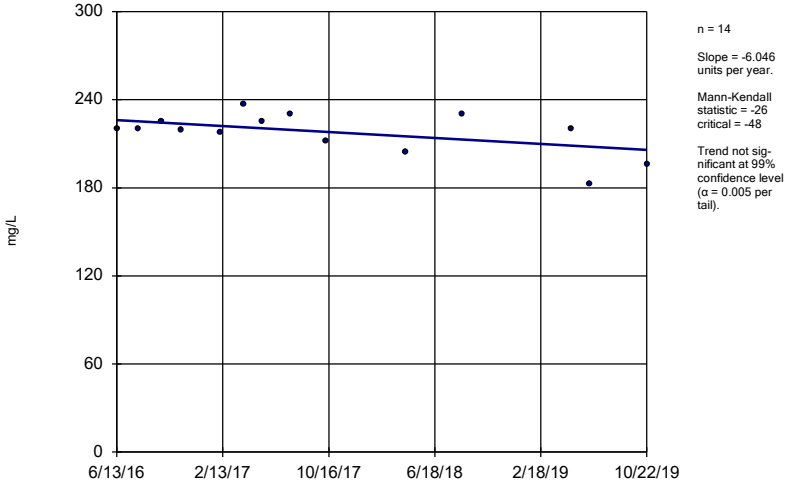
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron, total Analysis Run 12/23/2019 1:49 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Sen's Slope Estimator

MW_1504 (bg)



n = 14

Slope = -6.046 units per year.

Mann-Kendall statistic = -26
critical = -48

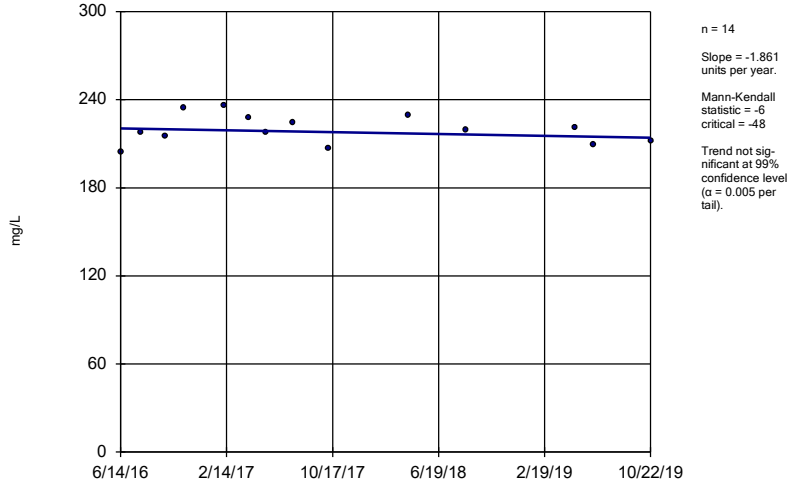
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, total Analysis Run 12/23/2019 1:50 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Sen's Slope Estimator

MW_1508 (bg)



n = 14

Slope = -1.861 units per year.

Mann-Kendall statistic = -6
critical = -48

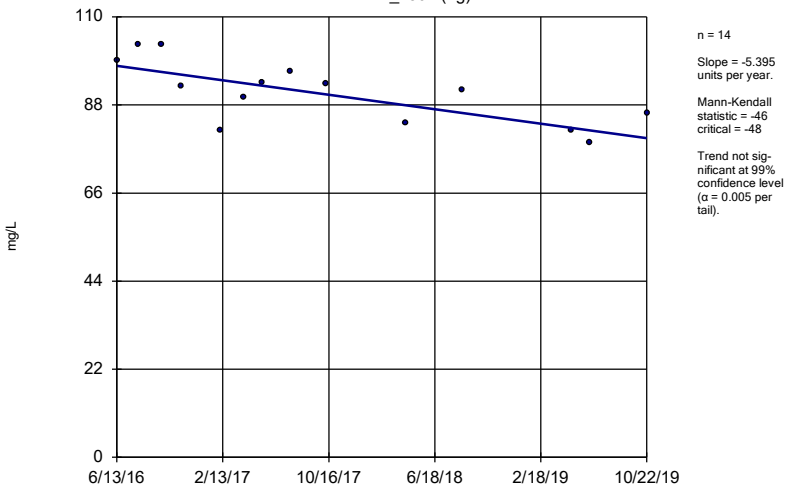
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium, total Analysis Run 12/23/2019 1:50 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Sen's Slope Estimator

MW_1504 (bg)



n = 14

Slope = -5.395 units per year.

Mann-Kendall statistic = -46
critical = -48

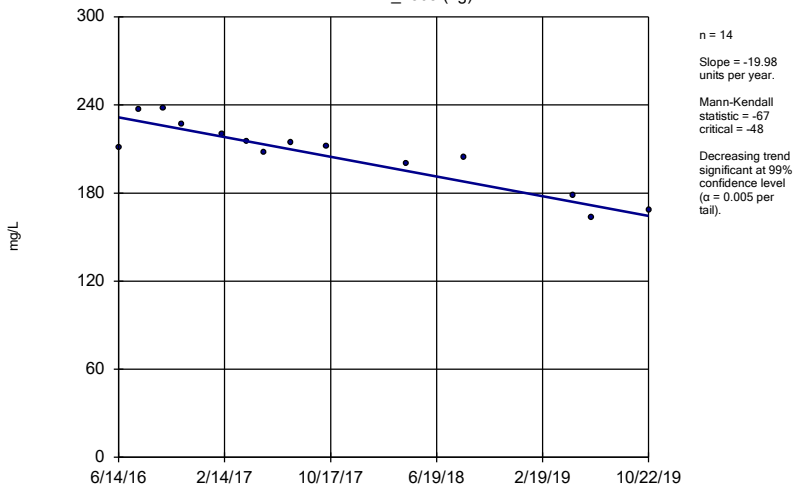
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride, total Analysis Run 12/23/2019 1:50 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Sen's Slope Estimator

MW_1508 (bg)



n = 14

Slope = -19.98 units per year.

Mann-Kendall statistic = -67
critical = -48

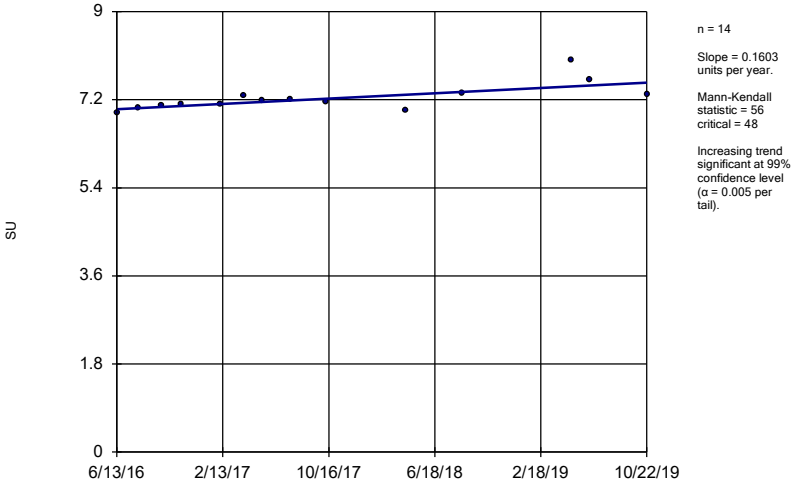
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride, total Analysis Run 12/23/2019 1:50 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Sen's Slope Estimator

MW_1504 (bg)



n = 14

Slope = 0.1603 units per year.

Mann-Kendall statistic = 56
critical = 48

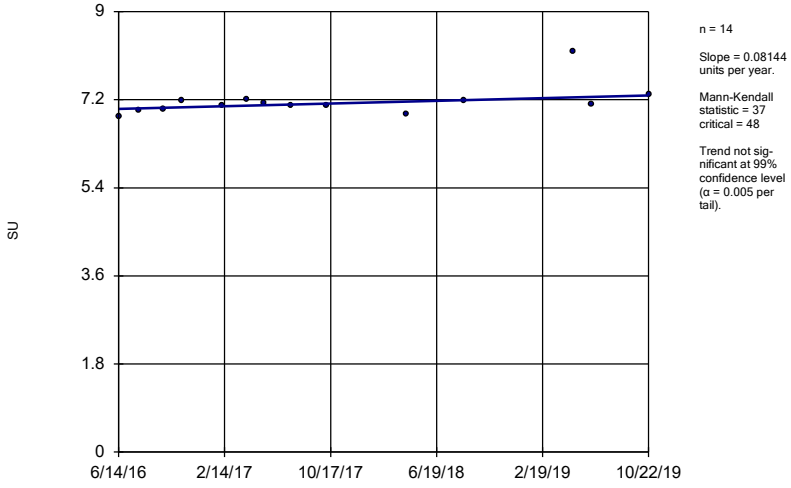
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: pH, field Analysis Run 12/23/2019 1:50 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Sen's Slope Estimator

MW_1508 (bg)



n = 14

Slope = 0.08144 units per year.

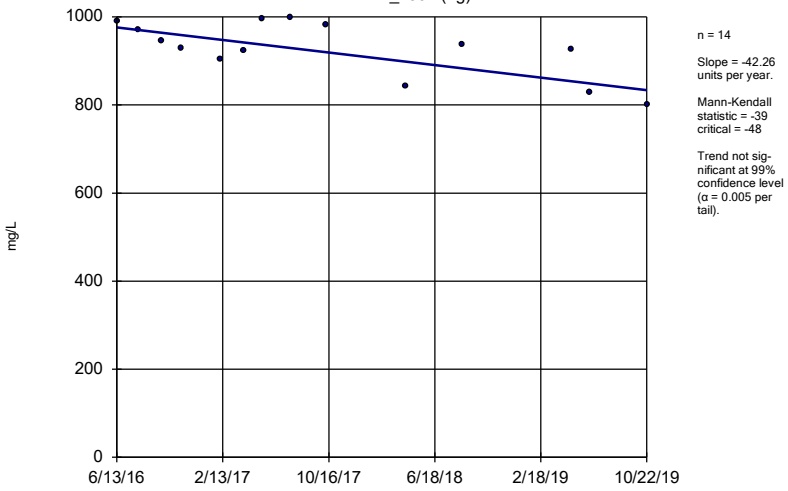
Mann-Kendall statistic = 37
critical = 48

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

Constituent: pH, field Analysis Run 12/23/2019 1:50 PM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sen's Slope Estimator

MW_1504 (bg)



n = 14

Slope = -42.26 units per year.

Mann-Kendall statistic = -39 critical = -48

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

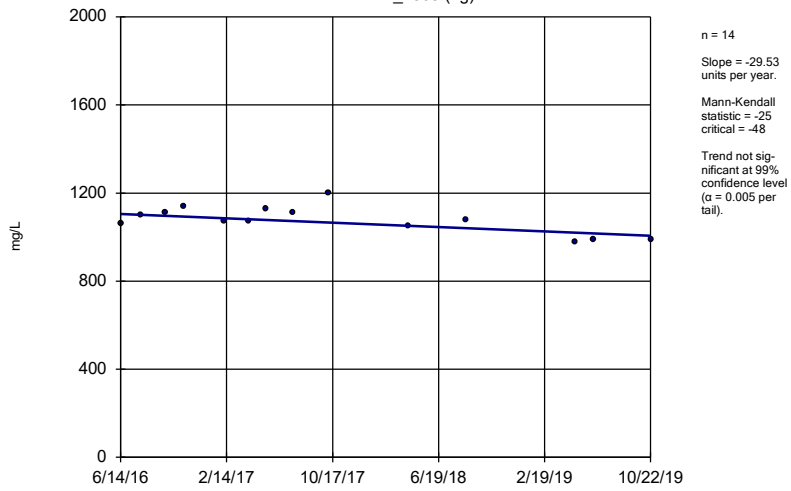
Constituent: Total Dissolved Solids [TDS] Analysis Run 12/23/2019 1:50 PM View: Interwell AIII

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Sen's Slope Estimator

MW_1508 (bg)



n = 14

Slope = -29.53 units per year.

Mann-Kendall statistic = -25 critical = -48

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

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/23/2019 1:50 PM View: Interwell AIII

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Interwell Prediction Limit Summary

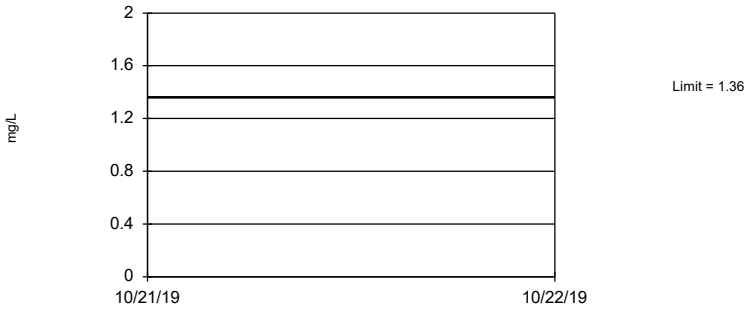
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 1/10/2020, 11:05 AM

Constituent	Well	Upper Lim.	Lower Lim.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron, total (mg/L)	n/a	1.36	n/a	28	n/a	n/a	0	n/a	n/a	0.002247	NP Inter (normality) ...
Calcium, total (mg/L)	n/a	242.1	n/a	28	218.3	12.15	0	None	No	0.001504	Param Inter 1 of 2
Chloride, total (mg/L)	n/a	238	n/a	28	n/a	n/a	0	n/a	n/a	0.002247	NP Inter (normality) ...
pH, field (SU)	n/a	8.18	6.86	28	n/a	n/a	0	n/a	n/a	0.004494	NP Inter (normality) ...
Total Dissolved Solids [TDS] (m...	n/a	1194	n/a	28	1002	98.35	0	None	No	0.001504	Param Inter 1 of 2

Sanitas™ v.9.6.24 . UG

Prediction Limit

Interwell Non-parametric



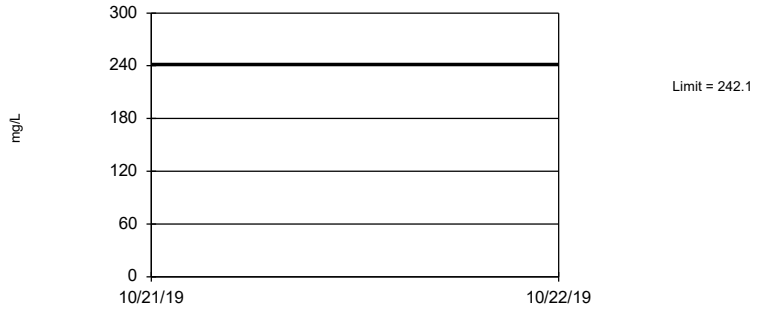
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 28 background values. Annual per-constituent alpha = 0.02225. Individual comparison alpha = 0.002247 (1 of 2). Assumes 5 future values.

Constituent: Boron, total Analysis Run 1/10/2020 11:04 AM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Prediction Limit

Interwell Parametric



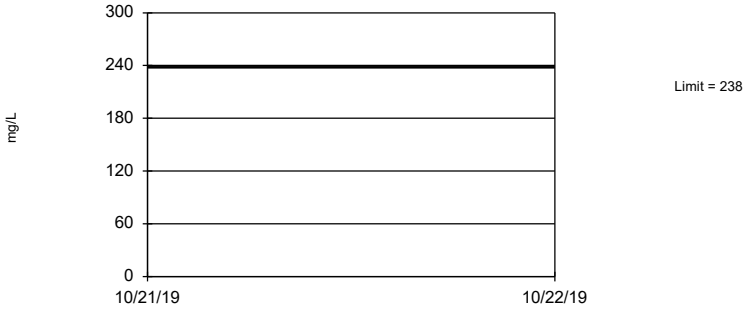
Background Data Summary: Mean=218.3, Std. Dev.=12.15, n=28. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9444, critical = 0.896. Kappa = 1.958 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001504. Assumes 5 future values.

Constituent: Calcium, total Analysis Run 1/10/2020 11:04 AM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Prediction Limit

Interwell Non-parametric



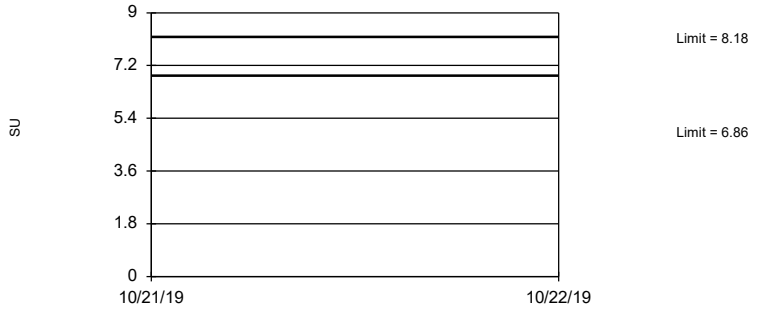
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 28 background values. Annual per-constituent alpha = 0.02225. Individual comparison alpha = 0.002247 (1 of 2). Assumes 5 future values.

Constituent: Chloride, total Analysis Run 1/10/2020 11:04 AM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Prediction Limit

Interwell Non-parametric

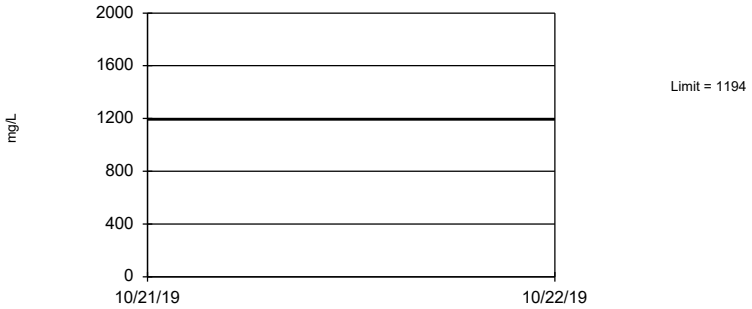


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 28 background values. Annual per-constituent alpha = 0.04449. Individual comparison alpha = 0.004494 (1 of 2). Assumes 5 future values.

Constituent: pH, field Analysis Run 1/10/2020 11:04 AM View: Interwell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=1002, Std. Dev.=98.35, n=28. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9768, critical = 0.896. Kappa = 1.958 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001504. Assumes 5 future values.

Constituent: Total Dissolved Solids [TDS] Analysis Run 1/10/2020 11:04 AM View: Interwell AIII

Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Upper Tolerance Limits

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 1:56 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.00005034	n/a	n/a	n/a	26	15.38	sqrt(x)	0.05	Inter
Arsenic, total (mg/L)	n/a	0.001851	n/a	n/a	n/a	26	0	x^(1/3)	0.05	Inter
Barium, total (mg/L)	n/a	0.05567	n/a	n/a	n/a	26	0	No	0.05	Inter
Beryllium, total (mg/L)	n/a	0.00006	n/a	n/a	n/a	26	46.15	n/a	0.2635	NP Inter(normal...
Cadmium, total (mg/L)	n/a	0.00009	n/a	n/a	n/a	26	3.846	n/a	0.2635	NP Inter(normal...
Chromium, total (mg/L)	n/a	0.002125	n/a	n/a	n/a	26	0	No	0.05	Inter
Cobalt, total (mg/L)	n/a	0.003246	n/a	n/a	n/a	26	0	sqrt(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	n/a	2.155	n/a	n/a	n/a	25	0	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	n/a	0.25	n/a	n/a	n/a	28	0	n/a	0.2378	NP Inter(normal...
Lead, total (mg/L)	n/a	0.003449	n/a	n/a	n/a	26	7.692	x^(1/3)	0.05	Inter
Lithium, total (mg/L)	n/a	0.0136	n/a	n/a	n/a	26	23.08	No	0.05	Inter
Mercury, total (mg/L)	n/a	0.000008	n/a	n/a	n/a	26	73.08	n/a	0.2635	NP Inter(normal...
Molybdenum, total (mg/L)	n/a	0.001678	n/a	n/a	n/a	26	19.23	sqrt(x)	0.05	Inter
Selenium, total (mg/L)	n/a	0.0009	n/a	n/a	n/a	26	15.38	n/a	0.2635	NP Inter(normal...
Thallium, total (mg/L)	n/a	0.00025	n/a	n/a	n/a	26	26.92	n/a	0.2635	NP Inter(normal...

MITCHELL BAP GWPS				
Constituent Name	**MCL**	**CCR-Rule Specified**	**Background Limit**	**GWPS**
Antimony, Total (mg/L)	0.006		0.00005	0.006
Arsenic, Total (mg/L)	0.01		0.0019	0.01
Barium, Total (mg/L)	2		0.056	2
Beryllium, Total (mg/L)	0.004		0.00006	0.004
Cadmium, Total (mg/L)	0.005		0.00009	0.005
Chromium, Total (mg/L)	0.1		0.0021	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.0032	0.006
Combined Radium, Total (pCi/L)	5		2.16	5
Fluoride, Total (mg/L)	4		0.25	4
Lead, Total (mg/L)	0.015		0.0034	0.015
Lithium, Total (mg/L)	n/a	0.04	0.014	0.04
Mercury, Total (mg/L)	0.002		0.000008	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0017	0.1
Selenium, Total (mg/L)	0.05		0.0009	0.05
Thallium, Total (mg/L)	0.002		0.00025	0.002

**MCL = Maximum Contaminant Level*

**GWPS = Groundwater Protection Standard*

Confidence Interval Summary Table - All Results (No Significant)

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 1:59 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	MW_1505	0.0001	0.00003	0.006	No	13	7.692	No	0.01	NP (normality)
Antimony, total (mg/L)	MW_1506	0.00007	0.00003	0.006	No	13	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW_1507	0.00009522	0.00004786	0.006	No	13	0	No	0.01	Param.
Antimony, total (mg/L)	MW_1509	0.00009	0.00002	0.006	No	13	0	No	0.01	NP (normality)
Antimony, total (mg/L)	MW_1510	0.00003	0.00002	0.006	No	13	0	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW_1505	0.001417	0.0003768	0.01	No	13	0	x^(1/3)	0.01	Param.
Arsenic, total (mg/L)	MW_1506	0.001077	0.0004996	0.01	No	13	0	No	0.01	Param.
Arsenic, total (mg/L)	MW_1507	0.002917	0.0007721	0.01	No	13	0	No	0.01	Param.
Arsenic, total (mg/L)	MW_1509	0.0005313	0.0003502	0.01	No	13	0	No	0.01	Param.
Arsenic, total (mg/L)	MW_1510	0.0005865	0.0003628	0.01	No	13	0	No	0.01	Param.
Barium, total (mg/L)	MW_1505	0.0633	0.0459	2	No	13	0	No	0.01	NP (normality)
Barium, total (mg/L)	MW_1506	0.06343	0.05312	2	No	13	0	No	0.01	Param.
Barium, total (mg/L)	MW_1507	0.08602	0.0597	2	No	13	0	No	0.01	Param.
Barium, total (mg/L)	MW_1509	0.06187	0.05222	2	No	13	0	No	0.01	Param.
Barium, total (mg/L)	MW_1510	0.04618	0.04041	2	No	13	0	No	0.01	Param.
Beryllium, total (mg/L)	MW_1505	0.000091	0.000007	0.004	No	13	38.46	No	0.01	NP (Cohens/xfrm)
Beryllium, total (mg/L)	MW_1506	0.0000782	0.00001269	0.004	No	13	23.08	No	0.01	Param.
Beryllium, total (mg/L)	MW_1507	0.0001273	0.00003965	0.004	No	13	23.08	No	0.01	Param.
Beryllium, total (mg/L)	MW_1509	0.00005	0.000008	0.004	No	13	69.23	No	0.01	NP (normality)
Beryllium, total (mg/L)	MW_1510	0.00005	0.000008	0.004	No	13	46.15	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1505	0.00005	0.00002	0.005	No	13	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1506	0.00004	0.00001	0.005	No	13	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1507	0.00007	0.00003	0.005	No	13	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1509	0.00003	0.000008	0.005	No	13	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1510	0.000025	0.000005	0.005	No	13	23.08	No	0.01	NP (normality)
Chromium, total (mg/L)	MW_1505	0.0065	0.0009857	0.1	No	12	0	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	MW_1506	0.002726	0.0009805	0.1	No	13	0	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	MW_1507	0.01429	0.003916	0.1	No	13	0	No	0.01	Param.
Chromium, total (mg/L)	MW_1509	0.001959	0.000684	0.1	No	13	0	x^(1/3)	0.01	Param.
Chromium, total (mg/L)	MW_1510	0.002498	0.0006514	0.1	No	12	0	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW_1505	0.001088	0.000224	0.006	No	13	0	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW_1506	0.0008524	0.0003422	0.006	No	13	0	No	0.01	Param.
Cobalt, total (mg/L)	MW_1507	0.002942	0.0007406	0.006	No	13	0	No	0.01	Param.
Cobalt, total (mg/L)	MW_1509	0.0003735	0.0001688	0.006	No	13	0	No	0.01	Param.
Cobalt, total (mg/L)	MW_1510	0.0002739	0.000145	0.006	No	13	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1505	1.04	0.5131	5	No	13	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1506	1.293	0.4113	5	No	13	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1507	1.626	0.7118	5	No	12	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1509	1.391	0.5042	5	No	13	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1510	1.04	0.3568	5	No	12	0	No	0.01	Param.
Fluoride, total (mg/L)	MW_1505	0.1	0.03	4	No	14	78.57	No	0.01	NP (NDs)
Fluoride, total (mg/L)	MW_1506	0.1	0.04	4	No	14	57.14	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW_1507	0.07393	0.05684	4	No	14	7.143	x^(1/3)	0.01	Param.
Fluoride, total (mg/L)	MW_1509	0.16	0.1	4	No	14	0	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW_1510	0.1	0.05	4	No	14	21.43	No	0.01	NP (normality)
Lead, total (mg/L)	MW_1505	0.001021	0.0001018	0.015	No	13	7.692	x^(1/3)	0.01	Param.
Lead, total (mg/L)	MW_1506	0.0007056	0.0002338	0.015	No	13	0	No	0.01	Param.
Lead, total (mg/L)	MW_1507	0.00271	0.0004773	0.015	No	13	7.692	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW_1509	0.0001217	0.00002425	0.015	No	13	0	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW_1510	0.0002134	0.00007979	0.015	No	13	0	sqrt(x)	0.01	Param.
Lithium, total (mg/L)	MW_1505	0.01207	0.006602	0.04	No	13	7.692	No	0.01	Param.
Lithium, total (mg/L)	MW_1506	0.01553	0.009503	0.04	No	13	7.692	No	0.01	Param.
Lithium, total (mg/L)	MW_1507	0.01792	0.01087	0.04	No	13	7.692	No	0.01	Param.
Lithium, total (mg/L)	MW_1509	0.01739	0.009223	0.04	No	13	7.692	No	0.01	Param.
Lithium, total (mg/L)	MW_1510	0.01491	0.008266	0.04	No	13	0	No	0.01	Param.
Mercury, total (mg/L)	MW_1505	0.000006	0.000002	0.002	No	13	69.23	No	0.01	NP (normality)
Mercury, total (mg/L)	MW_1506	0.000003	0.000002	0.002	No	13	53.85	No	0.01	NP (normality)
Mercury, total (mg/L)	MW_1507	0.00001109	0.000003086	0.002	No	13	7.692	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	MW_1509	0.0000025	0.000002	0.002	No	13	84.62	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW_1510	0.0000025	0.000002	0.002	No	13	92.31	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	MW_1505	0.00162	0.0007387	0.1	No	12	8.333	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW_1506	0.00131	0.0005545	0.1	No	13	0	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW_1507	0.004698	0.0008668	0.1	No	13	7.692	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW_1509	0.001694	0.000527	0.1	No	13	23.08	No	0.01	Param.
Molybdenum, total (mg/L)	MW_1510	0.001	0.00028	0.1	No	12	25	No	0.01	NP (Cohens/xfrm)
Selenium, total (mg/L)	MW_1505	0.0007055	0.0003099	0.05	No	13	0	No	0.01	Param.
Selenium, total (mg/L)	MW_1506	0.0002	0.00005	0.05	No	13	15.38	No	0.01	NP (Cohens/xfrm)
Selenium, total (mg/L)	MW_1507	0.0004336	0.0001156	0.05	No	13	0	No	0.01	Param.

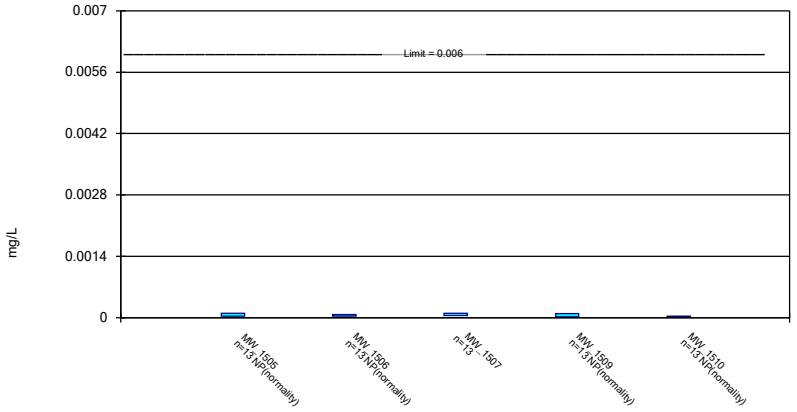
Confidence Interval Summary Table - All Results (No Significant)

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 1:59 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Selenium, total (mg/L)	MW_1509	0.0003	0.0001	0.05	No	13	0	No	0.01	NP (normality)
Selenium, total (mg/L)	MW_1510	0.0002	0.00008	0.05	No	13	0	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1505	0.00025	0.000065	0.002	No	12	25	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1506	0.00025	0.00005	0.002	No	13	23.08	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1507	0.00025	0.00005	0.002	No	13	23.08	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1509	0.00025	0.00003	0.002	No	13	23.08	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1510	0.00025	0.00001	0.002	No	13	30.77	No	0.01	NP (normality)

Parametric and Non-Parametric (NP) Confidence Interval

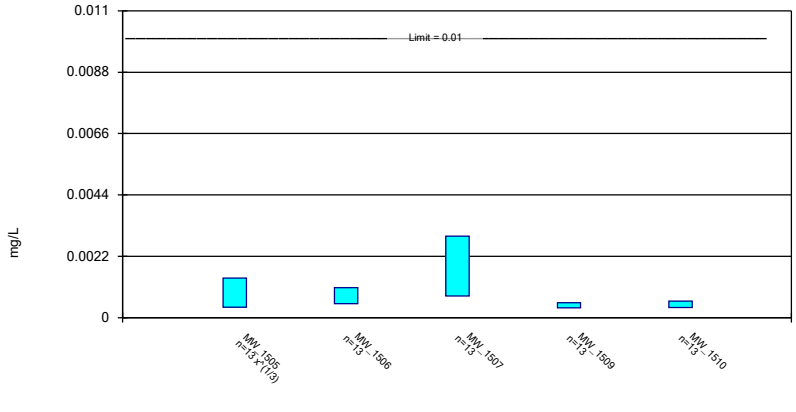
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Antimony, total Analysis Run 12/23/2019 1:57 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Parametric Confidence Interval

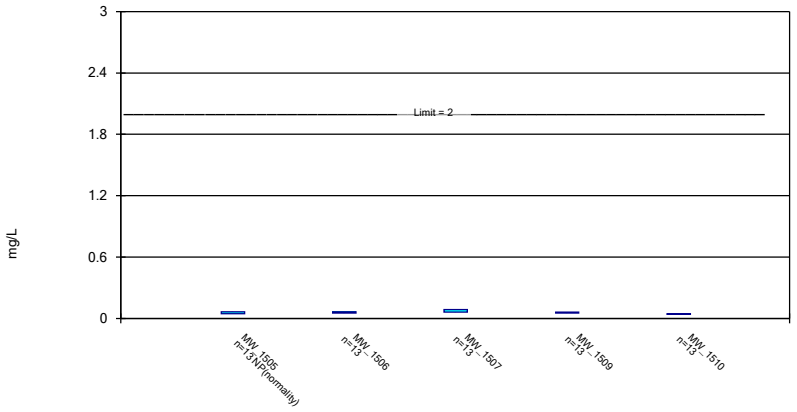
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Parametric and Non-Parametric (NP) Confidence Interval

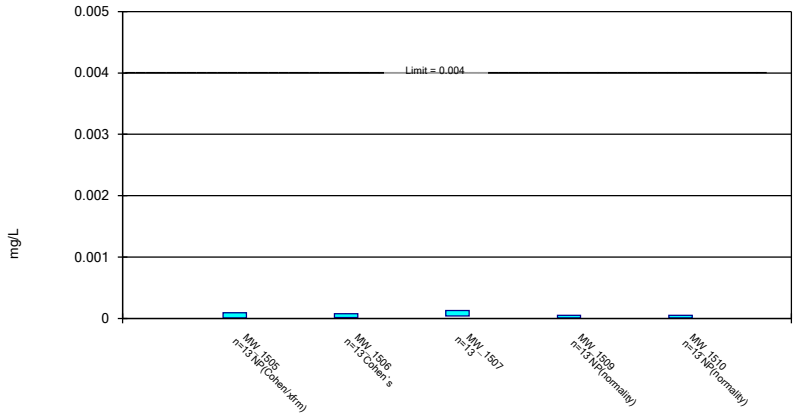
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell 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.

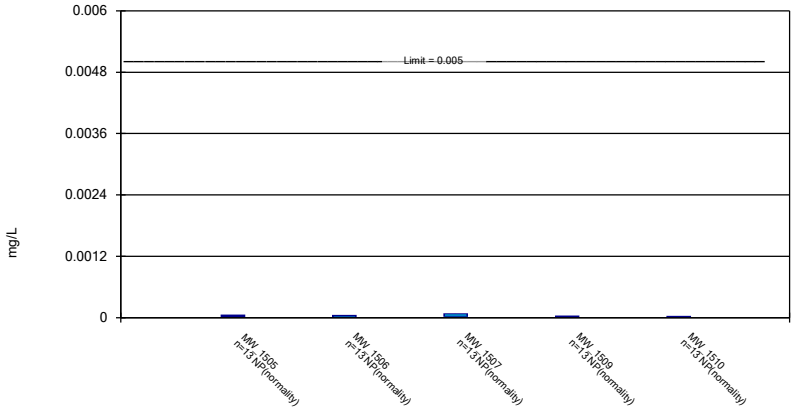


Constituent: Beryllium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Non-Parametric Confidence Interval

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

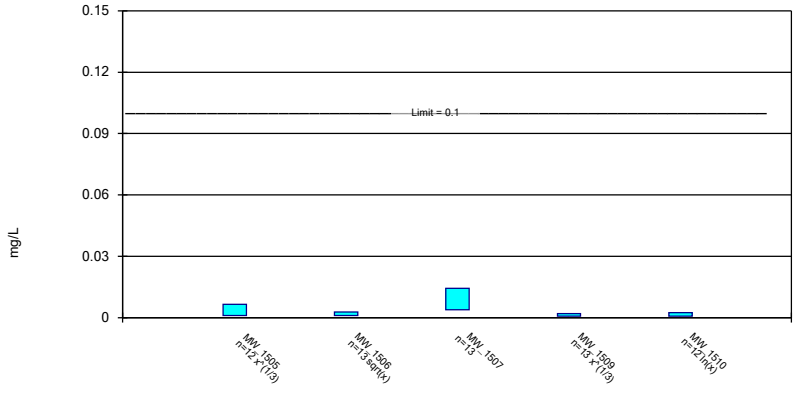


Constituent: Cadmium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Parametric Confidence Interval

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

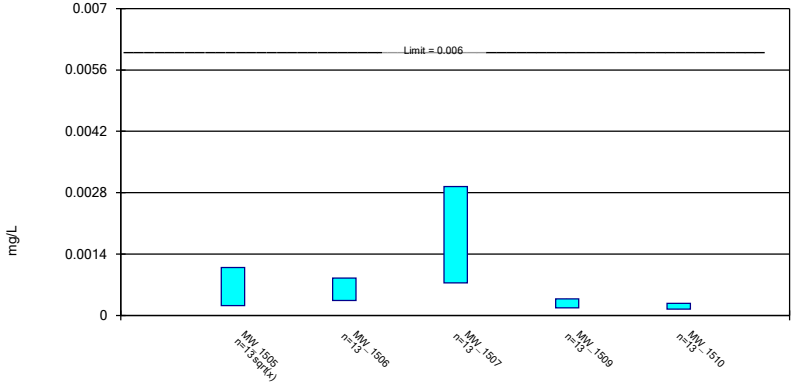


Constituent: Chromium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Parametric Confidence Interval

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

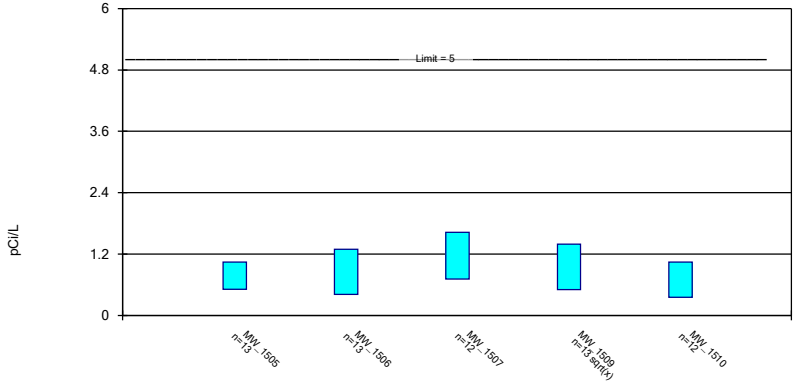


Constituent: Cobalt, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Parametric Confidence Interval

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

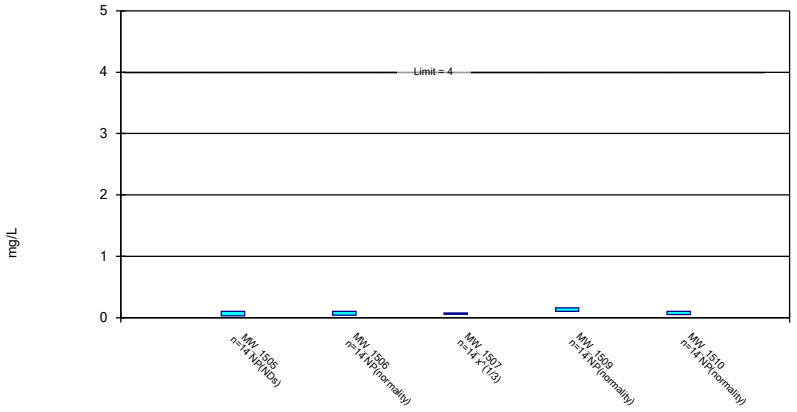


Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Parametric and Non-Parametric (NP) Confidence Interval

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

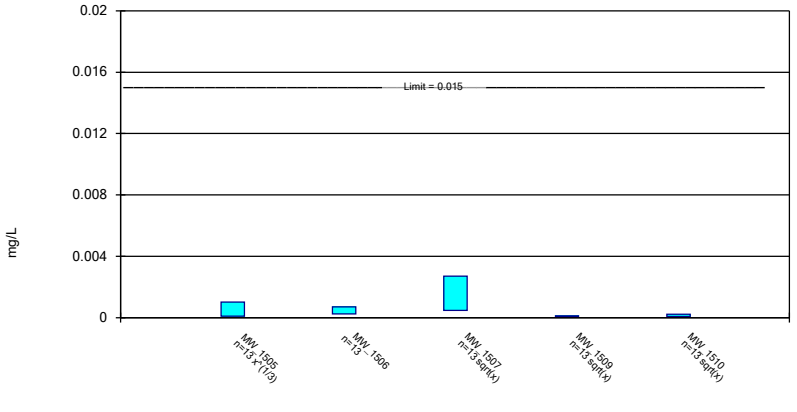


Constituent: Fluoride, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Parametric Confidence Interval

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

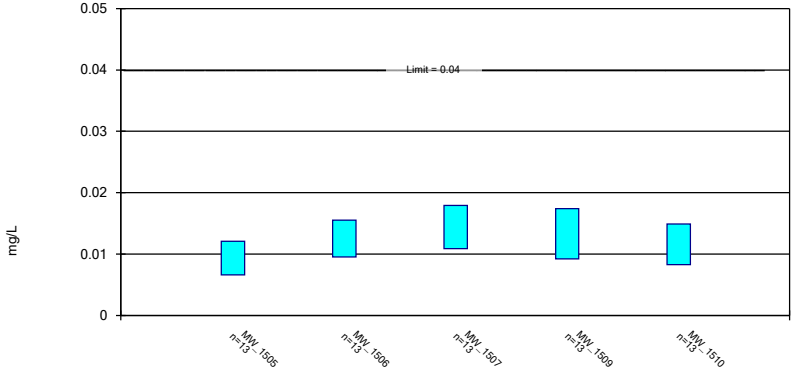


Constituent: Lead, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Parametric Confidence Interval

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

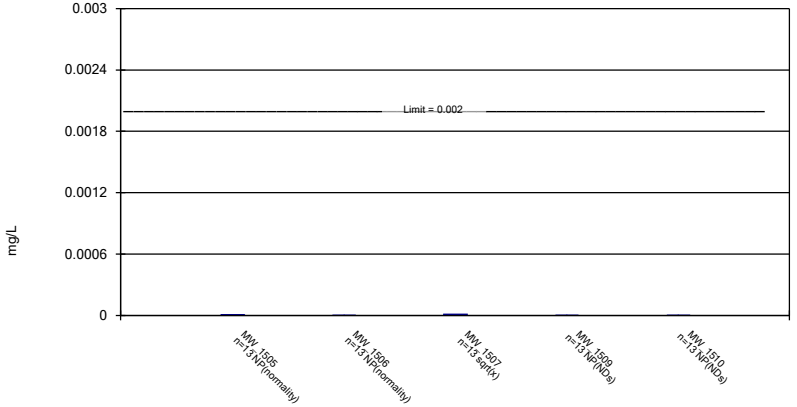


Constituent: Lithium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . 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.

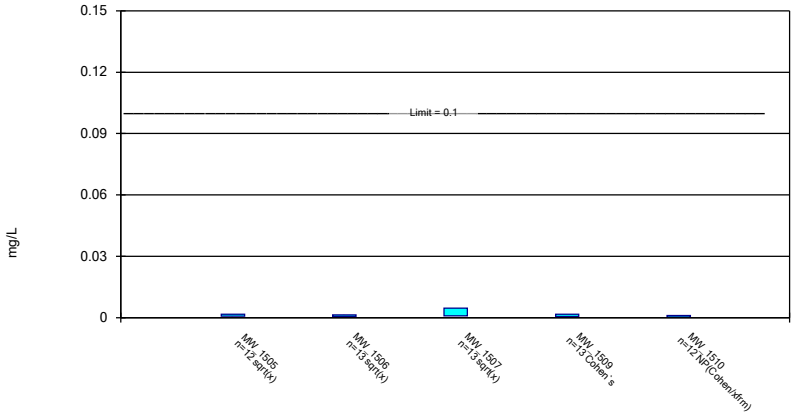


Constituent: Mercury, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . 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.

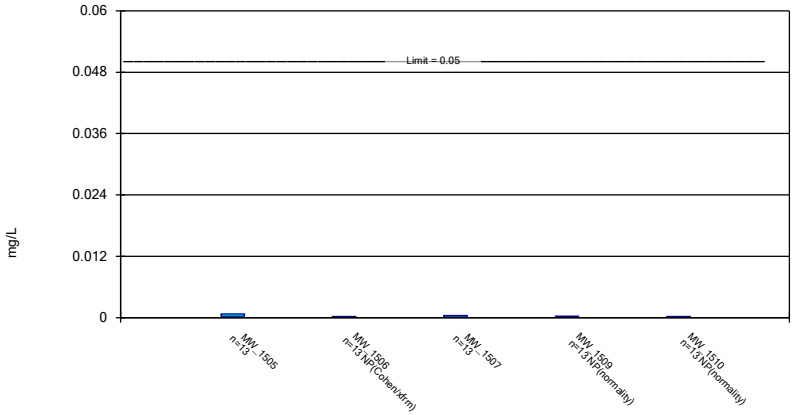


Constituent: Molybdenum, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . 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.

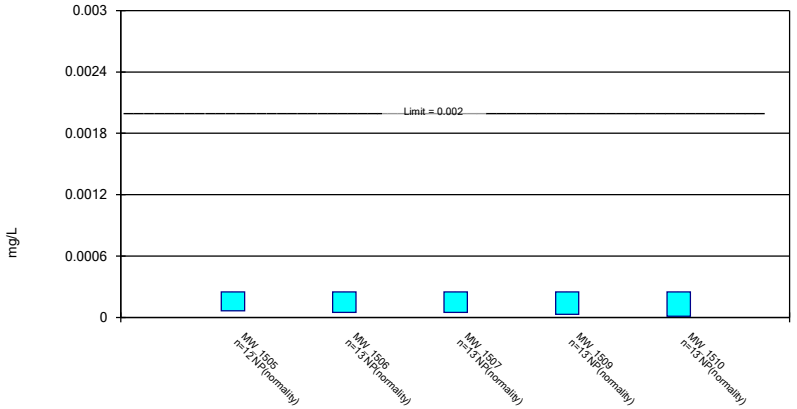


Constituent: Selenium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Non-Parametric Confidence Interval

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



Constituent: Thallium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

STATISTICAL ANALYSIS SUMMARY
BOTTOM ASH POND
Mitchell Plant
Moundsville, West Virginia

Submitted to

AMERICAN ELECTRIC POWER

1 Riverside Plaza
Columbus, Ohio 43215-2372

Submitted by

Geosyntec consultants

engineers | scientists | innovators

941 Chatham Lane
Suite 103
Columbus, Ohio 43221

August 24, 2020

CHA8500

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
BAP	Bottom Ash Pond
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LPL	Lower Prediction Limit
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
QA	Quality Assurance
QC	Quality Control
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
SU	Standard Units
TDS	Total Dissolved Solids
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 Mitchell Power Plant located in Moundsville, West Virginia.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, calcium, chloride, and total dissolved solids (TDS), at the BAP. An alternative source was not identified following the detection monitoring events; thus, the BAP has been in assessment monitoring since 2018. During the most recent assessment monitoring event, completed in October 2019, Appendix III detections of boron, calcium, chloride, fluoride, sulfate, and TDS were observed above background levels and the unit remained in assessment monitoring. The statistical summary of the results of the May 2020 assessment sampling event are documented in this report.

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

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 any were present at concentrations above the GWPSs. No statistically significant levels (SSLs) were identified; however, concentrations of Appendix III parameters remained above background. Thus, the unit will remain in assessment monitoring. 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 May 2020 sample event were analyzed for all Appendix III and Appendix IV parameters, whereas samples from the March 2020 event the were analyzed for Appendix IV parameters only. 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.9.6.25 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; however, no outliers were identified in either set of data (Attachment B).

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. Generally, tolerance limits were calculated parametrically with 95% coverage and 95%

confidence. Non-parametric tolerance limits were calculated for antimony, beryllium, cadmium, fluoride, and thallium due to apparent non-normal distributions. Non-parametric tolerance limits were calculated for mercury because greater than 50% of the data was non-detect results. 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.

No SSLs were identified at the Mitchell BAP.

2.2.3 Evaluation of Potential Appendix III SSIs

The Appendix III results were analyzed to assess whether concentrations of Appendix III parameters at the compliance wells exceeded background concentrations. Data collected during the May 2020 assessment monitoring events from each compliance well were compared to the prediction limits to assess whether the results are above background values. The results from these events and the prediction limits are summarized in Table 3. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 1.36 mg/L at MW-1505 (7.36 mg/L), MW-1506 (4.07 mg/L), MW-1507 (7.72 mg/L), MW-1509 (10.6 mg/L), and MW-1510 (9.14 mg/L).

- Calcium concentrations exceeded the interwell UPL of 240 mg/L at MW-1505 (282 mg/L), MW-1506 (290 mg/L), MW-1507 (262 mg/L), and MW-1509 (262 mg/L).

- Chloride concentrations exceeded the interwell UPL of 238 mg/L at MW-1505 (252 mg/L), MW-1506 (379 mg/L), MW-1507 (310 mg/L), MW-1509 (331 mg/L), and MW-1510 (252 mg/L).

- Sulfate concentrations exceeded the intrawell UPL of 469 mg/L at MW-1505 (471 mg/L), and at MW-1510 (484 mg/L).

- TDS concentrations exceeded the interwell UPL of 1180 mg/L at MW-1505 (1460 mg/L), MW-1506 (1530 mg/L), MW-1507 (1330 mg/L), MW-1509 (1390 mg/L), and MW-1510 (1440 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

this evaluation, concentrations of Appendix III constituents appear to be above background concentrations and the unit will remain in assessment monitoring.

2.3 Conclusions

A 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 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 GWPSs. No SSLs were identified.

The Appendix III results were evaluated to assess whether concentrations of Appendix III parameters exceeded background levels. Boron, calcium, chloride, sulfate, and TDS results exceeded background levels at select downgradient wells.

Based on this evaluation, the Mitchell BAP CCR unit will remain in assessment monitoring.

SECTION 3

REFERENCES

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

Geosyntec Consultants (Geosyntec). 2018. Statistical Analysis Summary – Bottom Ash Pond, Mitchell Plant, Moundsville, West Virginia. January 15, 2018.

TABLES

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

Geosyntec Consultants, Inc.

Parameter	Unit	MW-1504		MW-1505		MW-1506		MW-1507		MW-1508		MW-1509		MW-1510	
		3/17/2020	5/5/2020	3/17/2020	5/5/2020	3/17/2020	5/5/2020	3/18/2020	5/5/2020	3/18/2020	5/6/2020	3/18/2020	5/5/2020	3/18/2020	5/6/2020
Antimony	µg/L	0.1 U	0.1 U	0.1 U	0.03 J	0.1 U	0.02 J	0.1 U	0.03 J	0.1 U	0.1 U	0.1 U	0.03 J	0.1 U	0.1 U
Arsenic	µg/L	0.29	0.26	0.31	0.27	0.44	0.33	0.44	0.42	0.52	0.44	0.42	0.27	0.31	0.29
Barium	µg/L	48.3	43.8	42.8	48.4	53.0	52.2	53.0	53.1	36.2	35.4	45.8	43.7	38.0	36.7
Beryllium	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Boron	mg/L	-	0.04 J	-	7.36	-	4.07	-	7.72	-	0.486	-	10.6	-	9.14
Cadmium	µg/L	0.03 J	0.03 J	0.02 J	0.03 J	0.01 J	0.01 J	0.03 J	0.03 J	0.03 J	0.03 J	0.05 U	0.05 U	0.05 U	0.05 U
Calcium	mg/L	-	230	-	282	-	290	-	262	-	198	-	262	-	228
Chloride	mg/L	-	96.2	-	252	-	379	-	310	-	148	-	331	-	252
Chromium	µg/L	0.238	0.238	0.624	0.291	4.24	0.592	2.69	1.30	0.820	0.654	0.518	0.633	2.10	0.886
Cobalt	µg/L	0.04 J	0.03 J	0.100	0.096	0.393	0.162	0.342	0.345	0.481	0.413	0.144	0.092	0.121	0.109
Combined Radium	pCi/L	0.442	0.758	0.715	0.791	2 U	0.478	0.381	0.836	0.636	0.593	0.551	1.20	0.864	0.737
Fluoride	mg/L	0.15	0.12	0.03 J	0.02 J	0.04 J	0.03 J	0.07	0.05 J	0.08	0.06	0.13	0.10	0.11	0.10
Lead	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.213	0.2 J	0.217	0.208	0.298	0.311	0.2 J	0.05 J	0.08 J	0.07 J
Lithium	mg/L	0.00441	0.00442	0.00501	0.00493	0.00825	0.00782	0.00794	0.00757	0.00484	0.00483	0.00934	0.00897	0.00808	0.00750
Mercury	µg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Molybdenum	µg/L	2 U	2 U	2 U	2 U	1 J	0.7 J	0.8 J	0.7 J	0.8 J	0.7 J	2 U	0.6 J	2 U	2 U
Selenium	µg/L	7.3	3.8	0.06 J	0.06 J	0.09 J	0.2 U	0.06 J	0.08 J	0.1 J	0.1 J	0.07 J	0.1 J	0.2 J	0.2 J
Sulfate	mg/L	-	372	-	471	-	337	-	350	-	273	-	402	-	484
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	0.5 U	0.5 U
Total Dissolved Solids	mg/L	-	1,020	-	1,460	-	1,530	-	1,330	-	947	-	1,390	-	1,440
pH	SU	7.1	7.5	7.2	7.5	7.3	7.5	7.2	7.4	7.2	7.2	7.3	7.4	7.4	7.4

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
Mitchell Plant - Bottom Ash Pond

Geosyntec Consultants, Inc.

Constituent Name	MCL	CCR Rule-Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.00010	0.006
Arsenic, Total (mg/L)	0.01		0.00193	0.01
Barium, Total (mg/L)	2		0.055	2
Beryllium, Total (mg/L)	0.004		0.0001	0.004
Cadmium, Total (mg/L)	0.005		0.00009	0.005
Chromium, Total (mg/L)	0.1		0.0023	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.0030	0.006
Combined Radium, Total (pCi/L)	5		1.97	5
Fluoride, Total (mg/L)	4		0.25	4
Lead, Total (mg/L)	0.015		0.0029	0.015
Lithium, Total (mg/L)	n/a	0.04	0.02116	0.04
Mercury, Total (mg/L)	0.002		0.000008	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0018	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

Notes:
MCL = Maximum Contaminant Level
RSL = Regional Screening Level
GWPS = Groundwater Protection Standard
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
Mitchell Plant - Bottom Ash Pond

Geosyntec Consultants, Inc.

Analyte	Unit	Description	MW-1504	MW-1505	MW-1506	MW-1507	MW-1509	MW-1510
			5/5/2020	5/5/2020	5/5/2020	5/5/2020	5/5/2020	5/6/2020
Boron	mg/L	Interwell Background Value (UPL)	1.36					
		Analytical Result	0.04	**7.36**	**4.07**	**7.72**	**10.6**	**9.14**
Calcium	mg/L	Interwell Background Value (UPL)	240					
		Analytical Result	230	**282**	**290**	**262**	**262**	228
Chloride	mg/L	Interwell Background Value (UPL)	238					
		Analytical Result	96.2	**252**	**379**	**310**	**331**	**252**
Fluoride	mg/L	Intrawell Background Value (UPL)	0.298					
		Analytical Result	0.12	0.02	0.03	0.05	0.10	0.10
pH	SU	Interwell Background Value (UPL)	8.2					
		Interwell Background Value (LPL)	6.9					
		Analytical Result	7.5	7.5	7.5	7.4	7.4	7.4
Sulfate	mg/L	Intrawell Background Value (UPL)	469					
		Analytical Result	372	**471**	337	350	402	**484**
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	1,180					
		Analytical Result	1,020	**1,460**	**1,530**	**1,330**	**1,390**	**1,440**

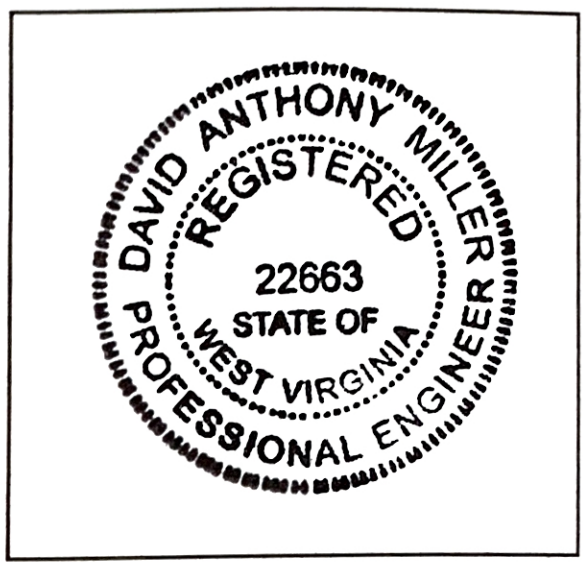
Notes:
UPL: Upper prediction limit
LPL: Lower prediction limit
Bold values exceed the background value.
Background values are shaded gray.

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 Mitchell 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

08.24.2020

Date

ATTACHMENT B

Statistical Analysis Output

GROUNDWATER STATS CONSULTING

June 16, 2020

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

RE: Mitchell Bottom Ash Pond (BAP)
Assessment Statistics - May 2020 Sample Event

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the groundwater Assessment Monitoring statistics for the May 2020 sample event for American Electric Power Company's Mitchell 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 at each of the wells below began at Mitchell Bottom Ash Pond for the CCR program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following: upgradient wells MW-1504 and MW-1508; and downgradient wells MW-1505, MW-1506, MW-1507, MW-1509, and MW-1510.

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 CCR program consists of the following Assessment Monitoring constituents:

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

Time series graphs and box plots for these parameters are provided for all wells and constituents; and are used to evaluate concentrations over the entire record as well as view variation within and across wells (Figures A and B).

All data were screened during previous analyses for outliers using Tukey's outlier test and visual screening. When values are identified as outliers, they are flagged in the database with "o" and are deselected prior to construction of statistical limits. A list of all flagged outliers follows this letter (Figure C). Additionally, 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.

Evaluation of Appendix IV Parameters

Interwell tolerance limits were used to calculate the site-specific background limits from pooled upgradient well data with for the Appendix IV constituents discussed above (Figure D). Parametric tolerance limits are calculated, with a target of 95% confidence and 95% coverage, when data follow a normal or transformed-normal distribution such as for arsenic, barium, chromium, cobalt, combined radium 226 + 228, lead, lithium, molybdenum, and selenium. When data contained greater than 50% nondetects or did not follow a normal or transformed-normal distribution, non-parametric tolerance limits were used. 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 the CCR-Rule specified levels in the Groundwater Protection Standards (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 either 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 noted for any of the Appendix IV parameters. 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 Mitchell Bottom Ash Pond. If you have any questions or comments, please feel free to contact me.

For Groundwater Stats Consulting,

Easton Rayner
Groundwater Analyst

Kristina L. Rayner
Groundwater Statistician

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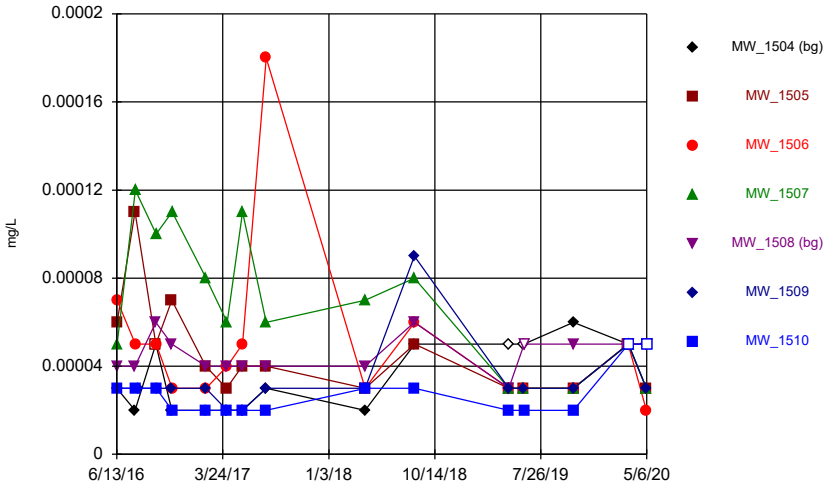
Hollow symbols indicate censored values.

Time Series



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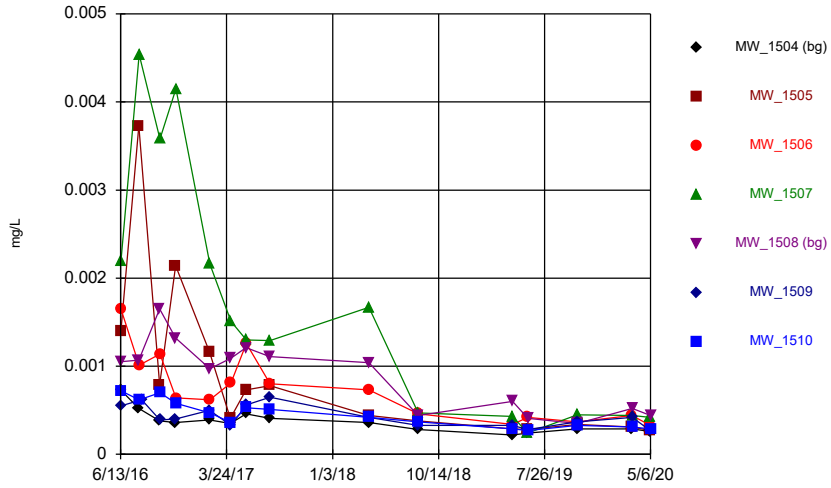
Sanitas™ v.9.6.25 . UG

Time Series



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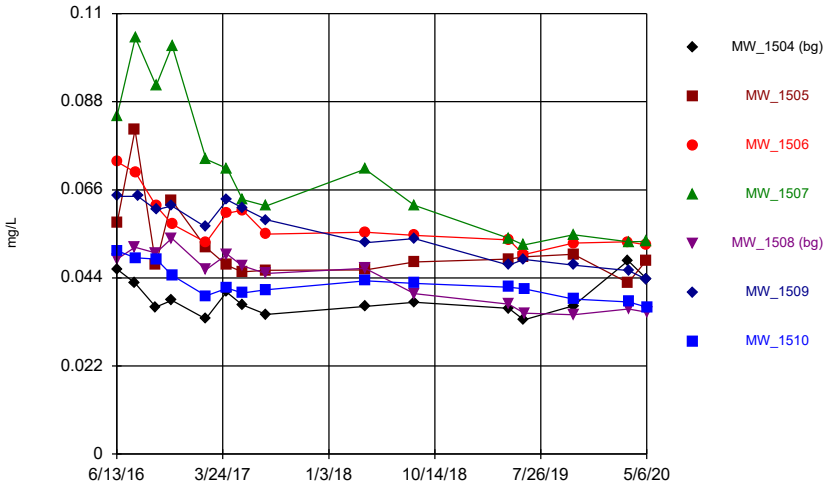
Time Series



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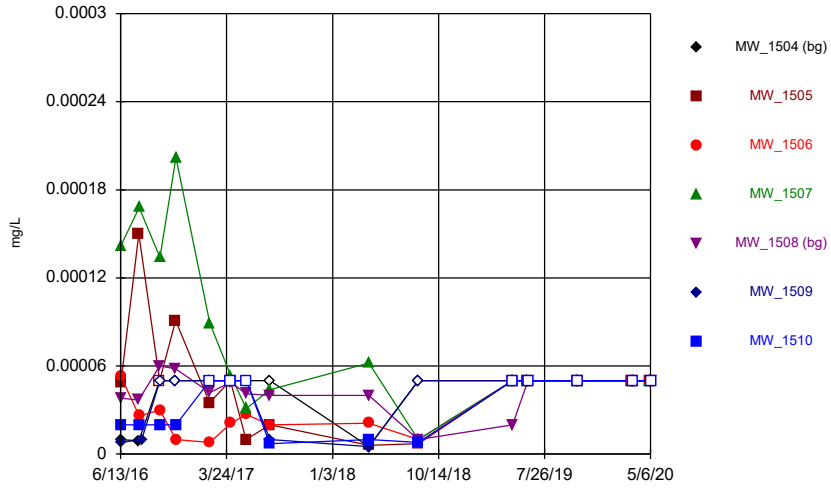
Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

Time Series



Constituent: Beryllium, total Analysis Run 6/11/2020 8:54 AM View: AIV
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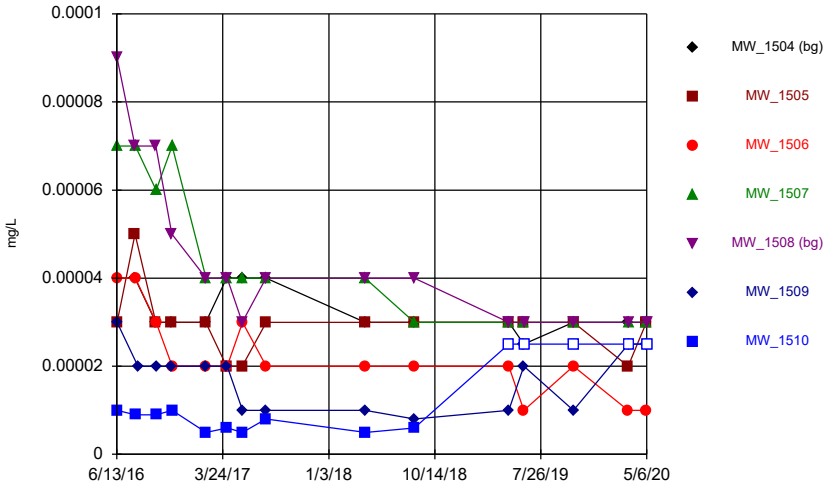
Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

Time Series



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Sanitas™ v.9.6.25 . UG

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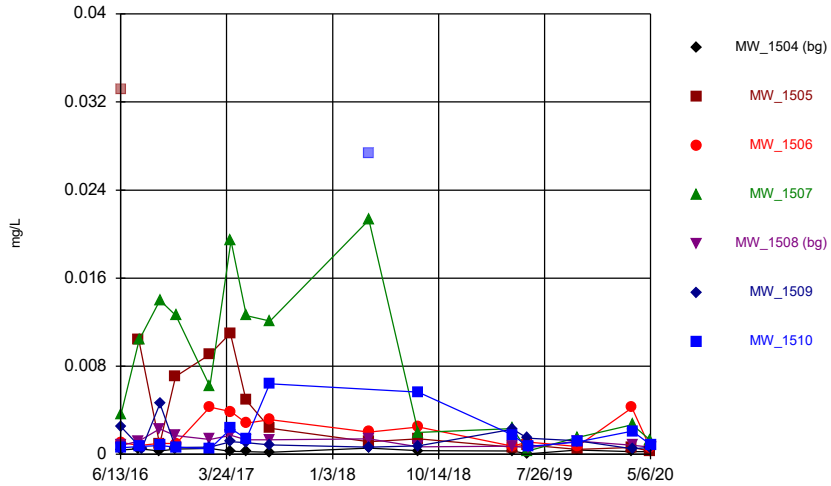

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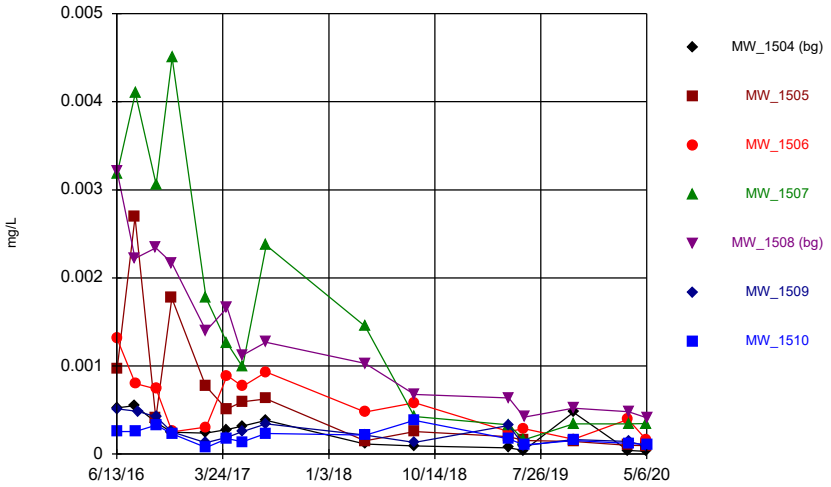

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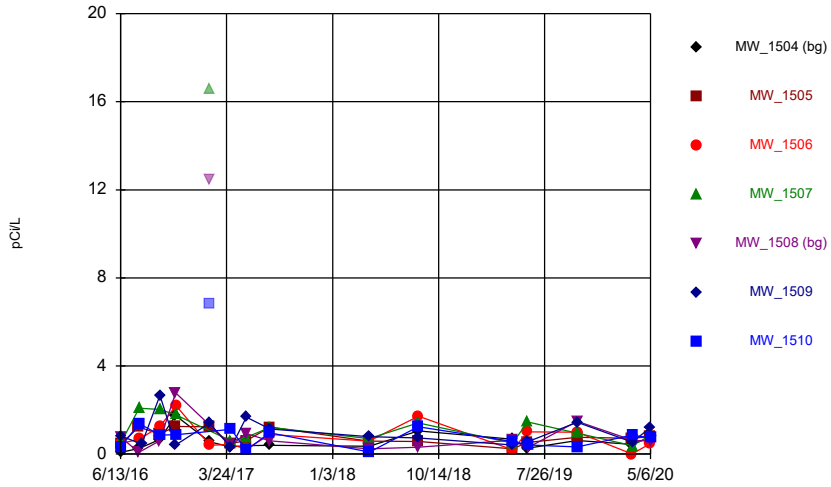
Sanitas™ v.9.6.25 . UG

Time Series



Constituent: Combined Radium 226 + 228 Analysis Run 6/11/2020 8:55 AM View: AIV
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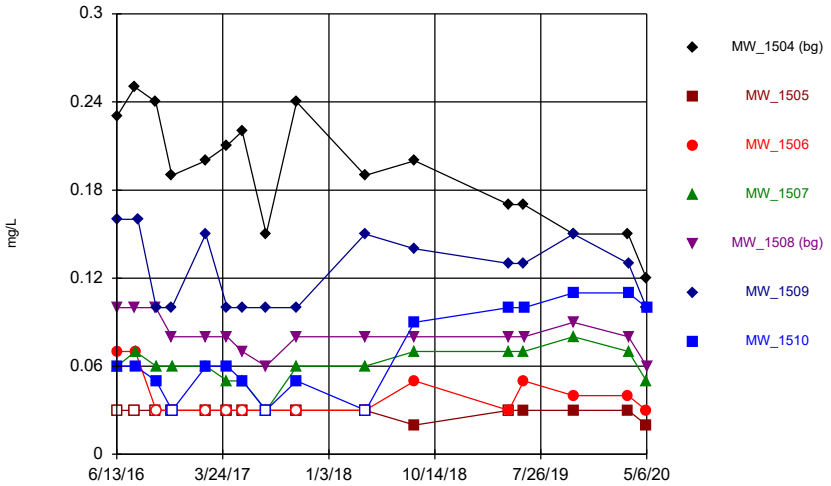
Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

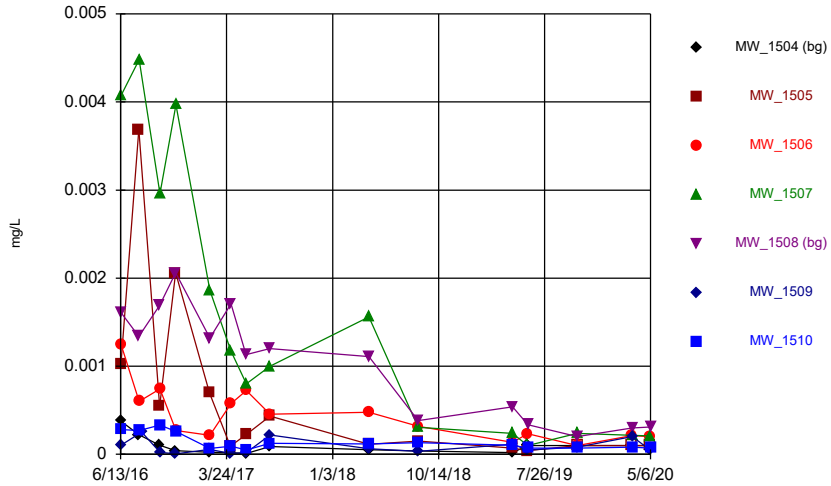
Time Series



Constituent: Fluoride, total Analysis Run 6/11/2020 8:55 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

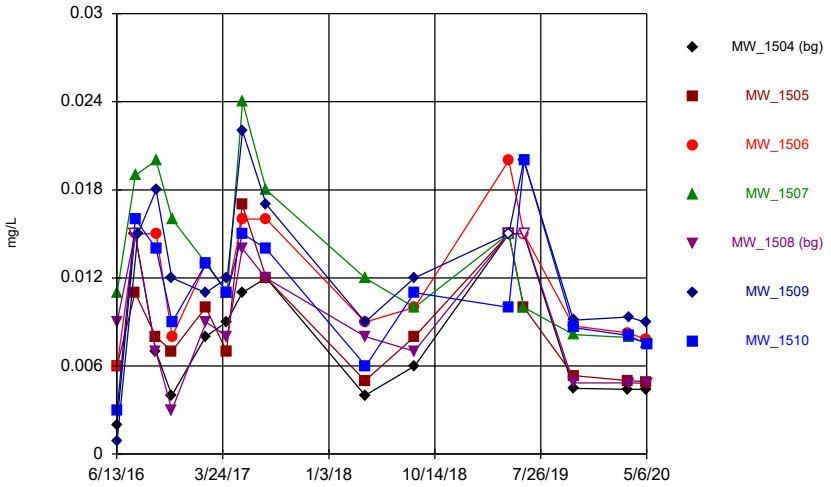
Time Series



Constituent: Lead, total Analysis Run 6/11/2020 8:55 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

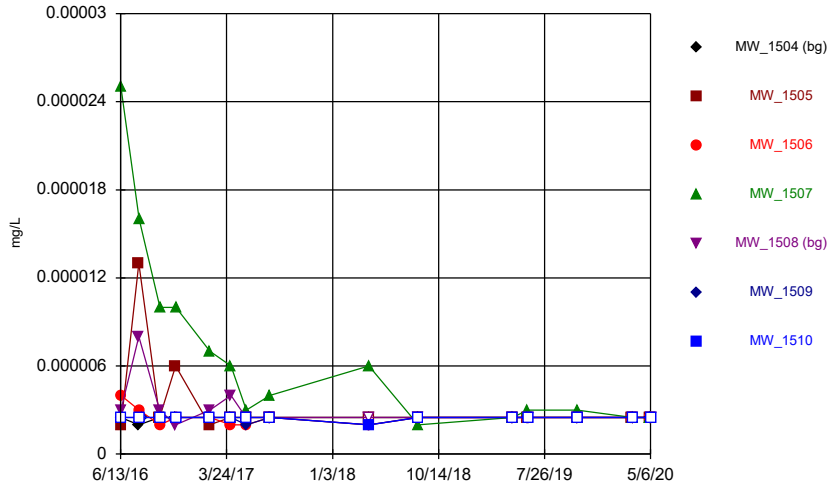
Time Series



Constituent: Lithium, total Analysis Run 6/11/2020 8:55 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

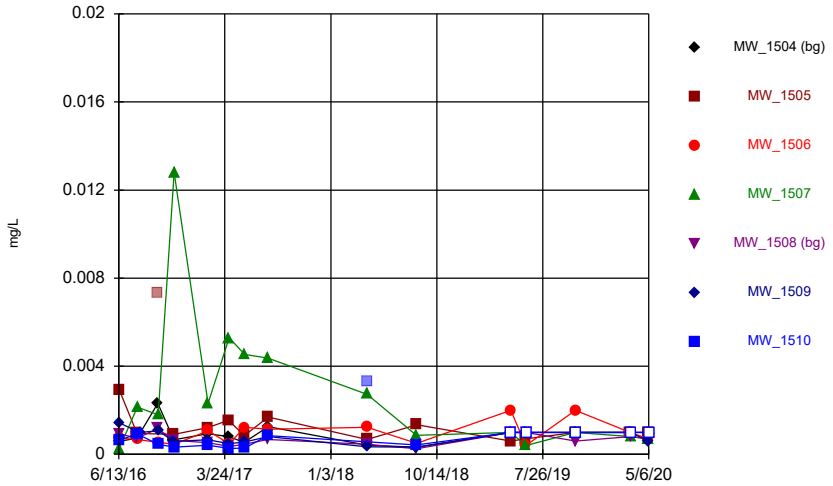
Time Series



Constituent: Mercury, total Analysis Run 6/11/2020 8:55 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

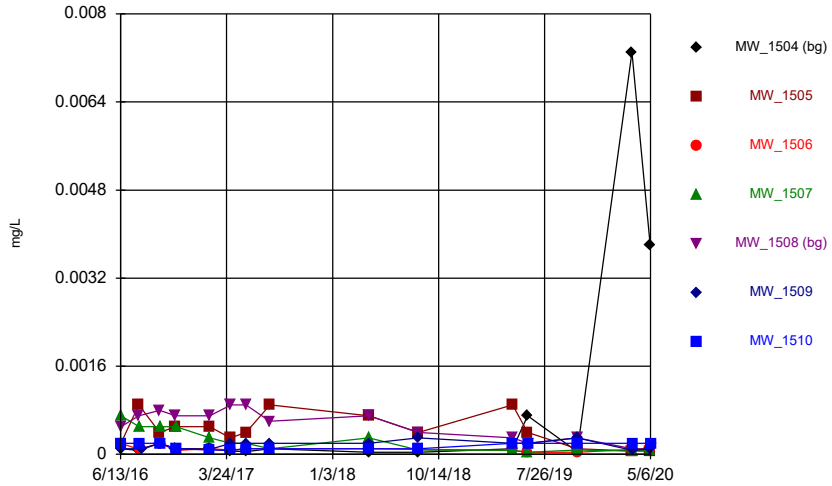
Time Series



Constituent: Molybdenum, total Analysis Run 6/11/2020 8:55 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

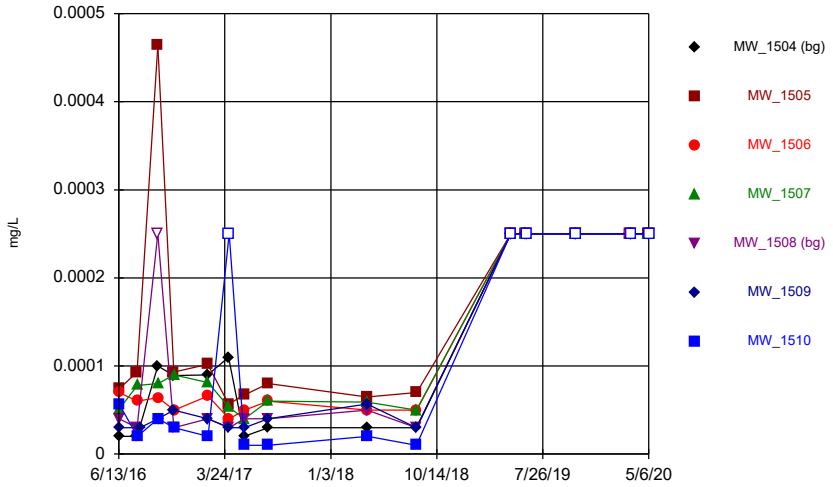
Time Series



Constituent: Selenium, total Analysis Run 6/11/2020 8:55 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

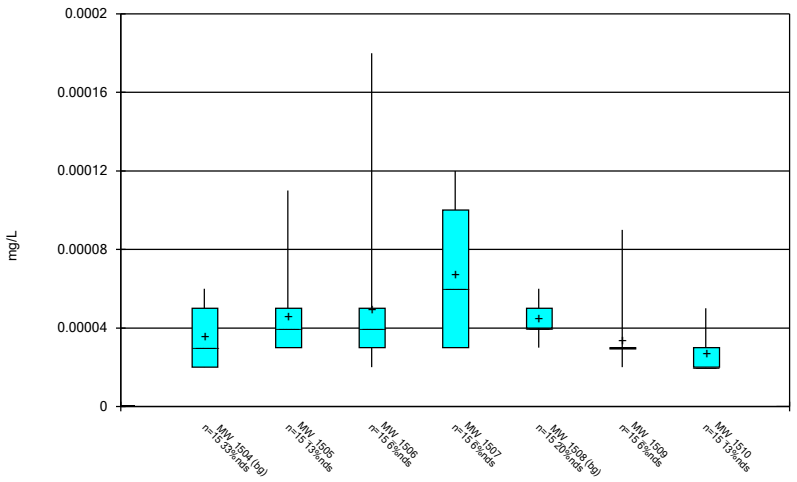
Time Series



Constituent: Thallium, total Analysis Run 6/11/2020 8:55 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

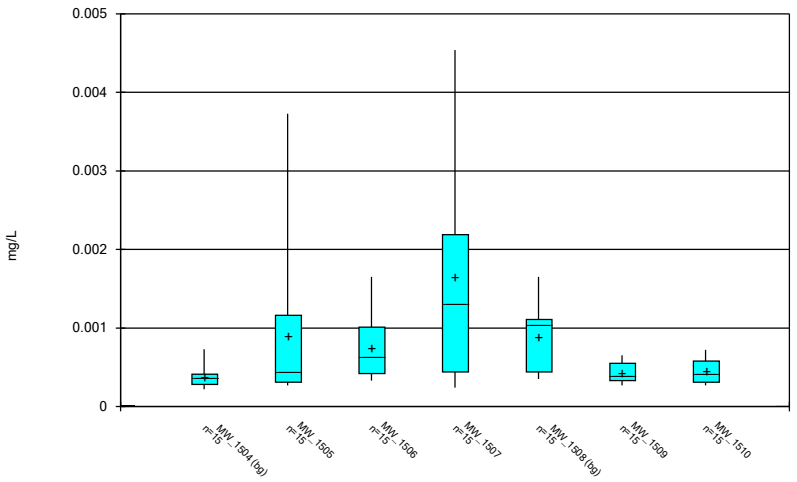
Box & Whiskers Plot



Constituent: Antimony, total Analysis Run 6/11/2020 8:55 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

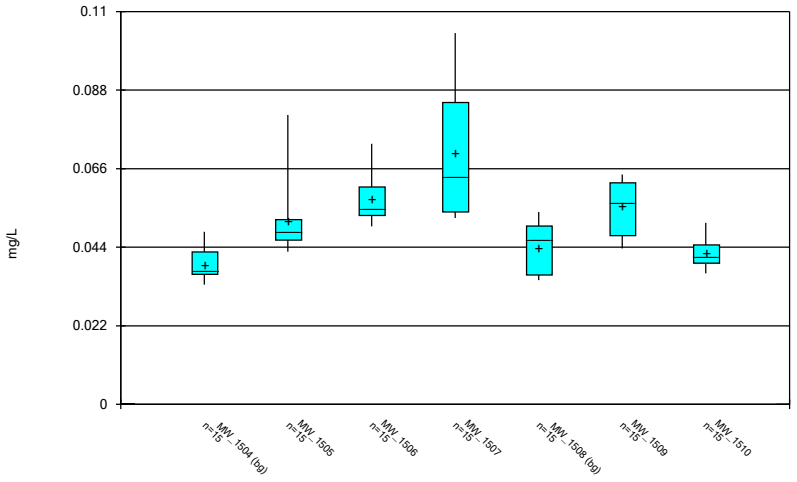
Box & Whiskers Plot



Constituent: Arsenic, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

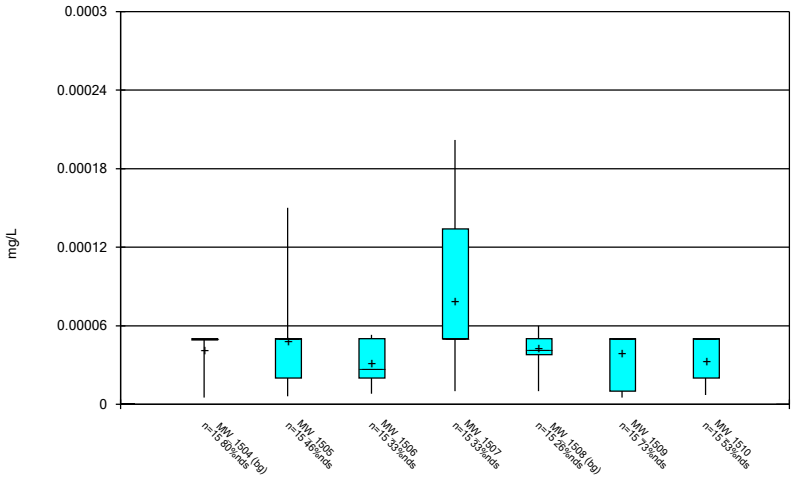
Box & Whiskers Plot



Constituent: Barium, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

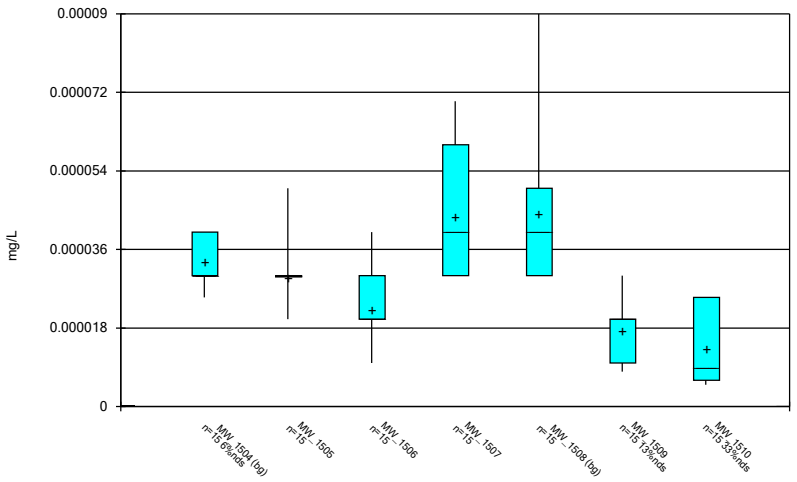
Box & Whiskers Plot



Constituent: Beryllium, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

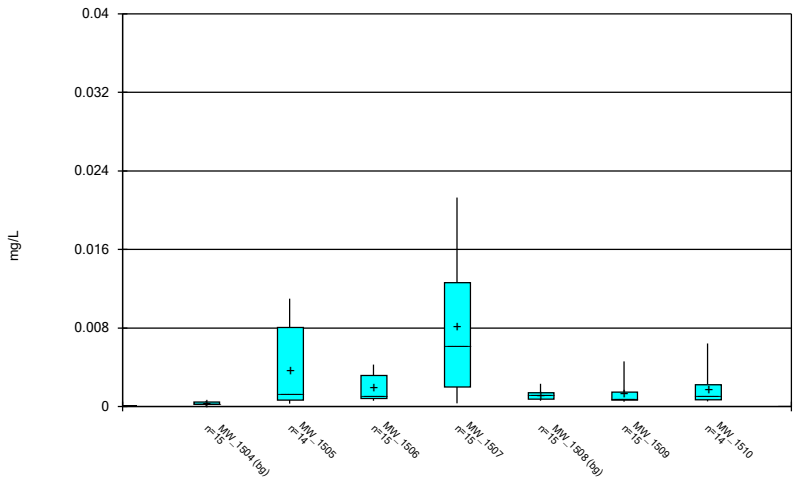
Box & Whiskers Plot



Constituent: Cadmium, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

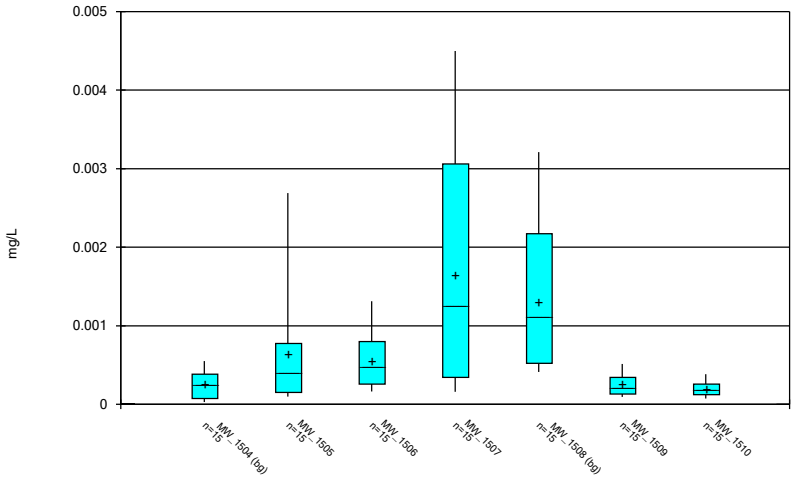
Box & Whiskers Plot



Constituent: Chromium, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

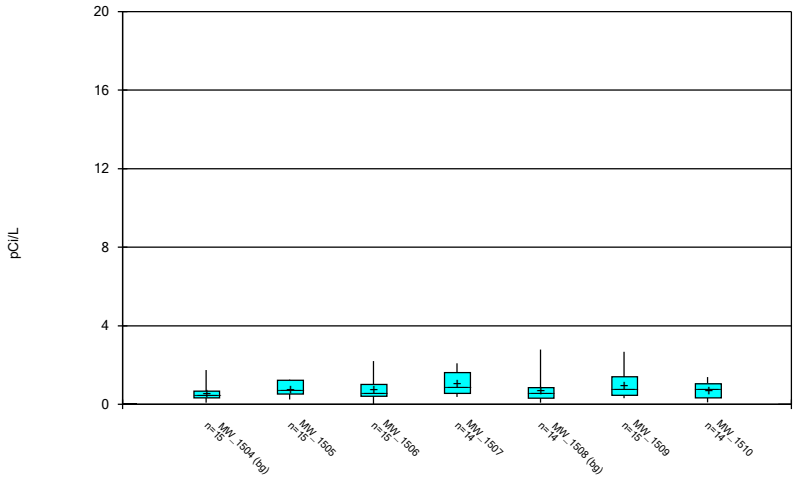
Box & Whiskers Plot



Constituent: Cobalt, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

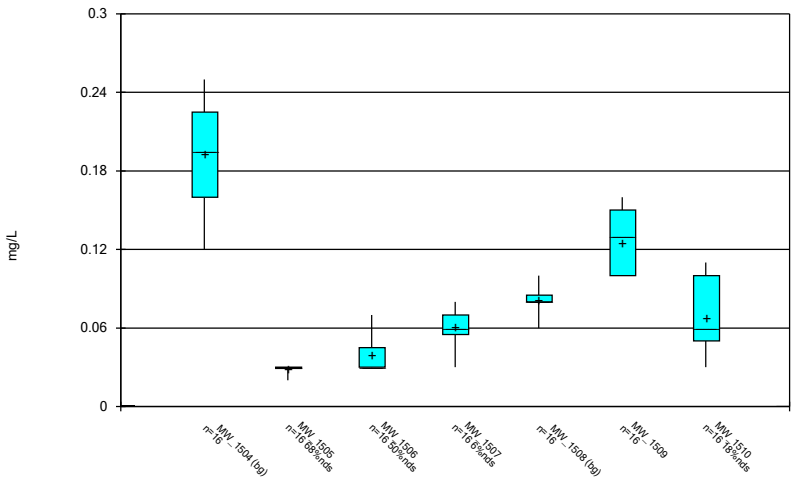
Box & Whiskers Plot



Constituent: Combined Radium 226 + 228 Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

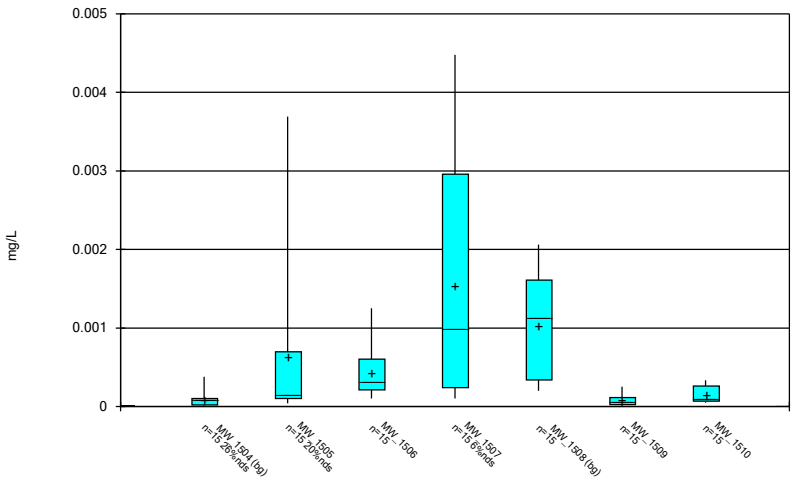
Box & Whiskers Plot



Constituent: Fluoride, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

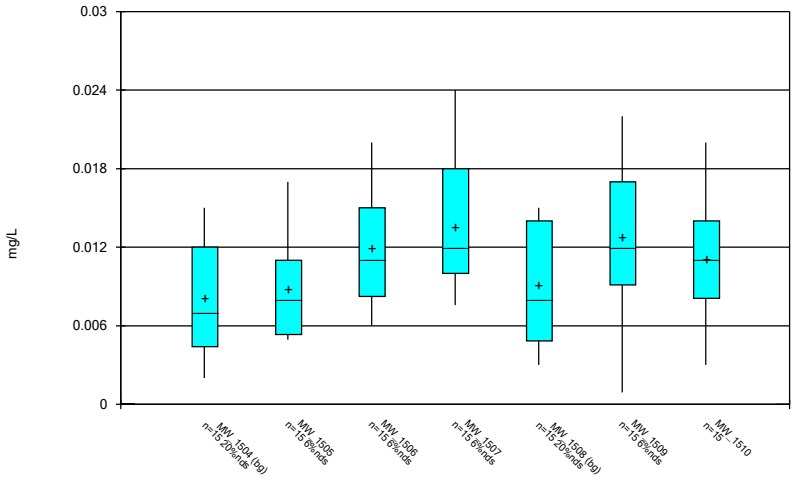
Box & Whiskers Plot



Constituent: Lead, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

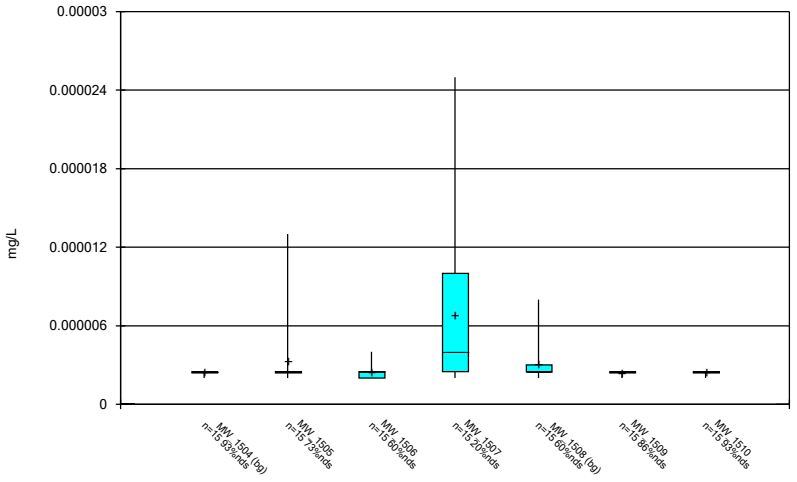
Box & Whiskers Plot



Constituent: Lithium, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

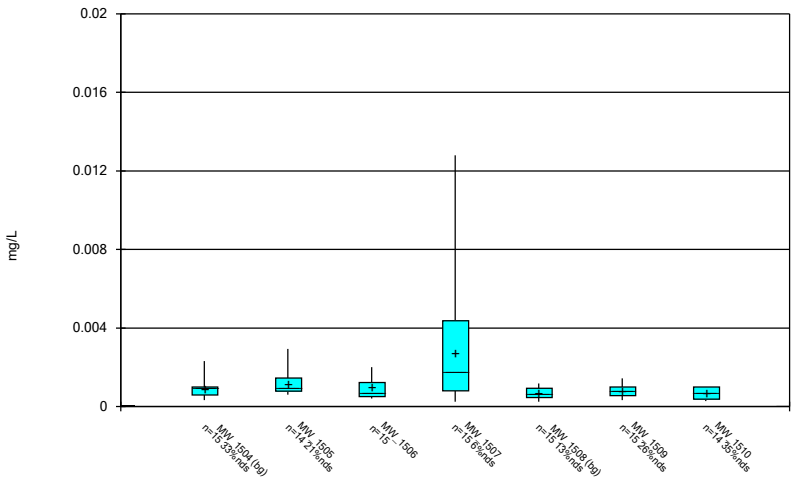
Box & Whiskers Plot



Constituent: Mercury, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

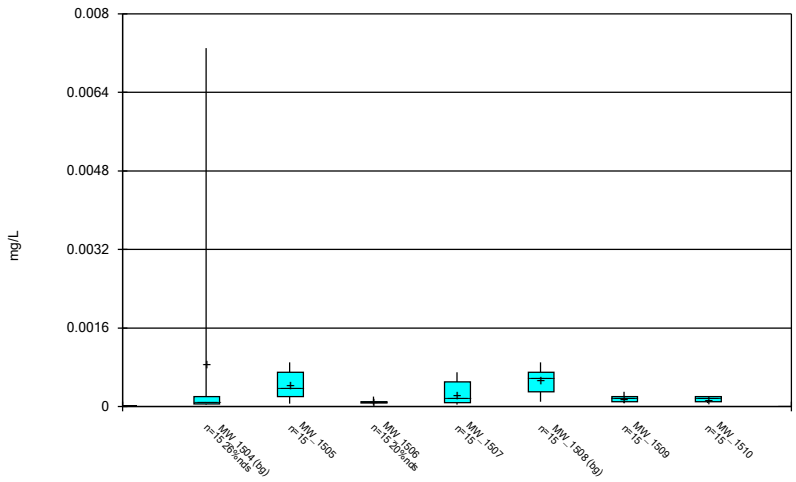
Box & Whiskers Plot



Constituent: Molybdenum, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

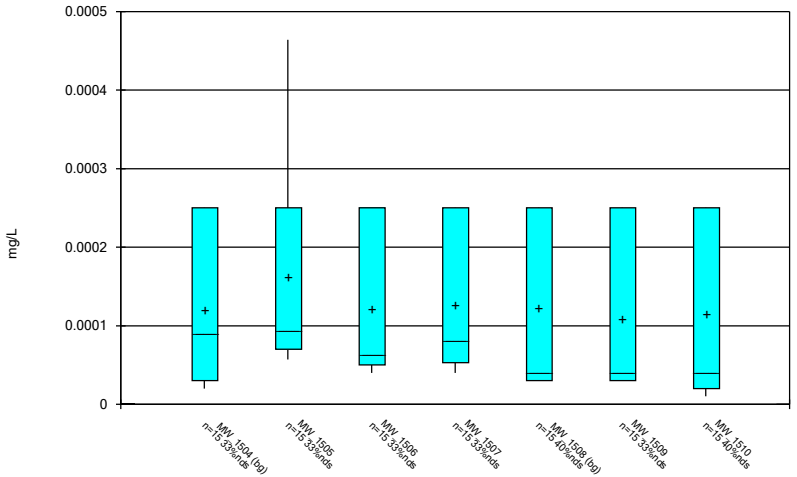
Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 6/11/2020 8:56 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Outliers

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 6/11/2020, 9:03 AM

	MW_1505 Chromium, total (mg/L)	MW_1510 Chromium, total (mg/L)	MW_1507 Combined Radium 226 + 228 (pCi/L)	MW_1508 Combined Radium 226 + 228 (pCi/L)	MW_1510 Combined Radium 226 + 228 (pCi/L)	MW_1505 Molybdenum, total (mg/L)	MW_1510 Molybdenum, total (mg/L)
6/14/2016	0.0332 (o)						
9/26/2016						0.00735 (o)	
2/8/2017			16.587 (o)	12.465 (o)	6.828 (o)		
4/12/2018		0.0274 (o)					0.0033 (o)

Tolerance Limit Summary Table

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 6/16/2020, 1:55 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.0001	n/a	n/a	n/a	30	26.67	n/a	0.2146	NP Inter(normal...
Arsenic, total (mg/L)	n/a	0.001931	n/a	n/a	n/a	30	0	ln(x)	0.05	Inter
Barium, total (mg/L)	n/a	0.055	n/a	n/a	n/a	30	0	No	0.05	Inter
Beryllium, total (mg/L)	n/a	0.0001	n/a	n/a	n/a	30	53.33	n/a	0.2146	NP Inter(normal...
Cadmium, total (mg/L)	n/a	0.00009	n/a	n/a	n/a	30	3.333	n/a	0.2146	NP Inter(normal...
Chromium, total (mg/L)	n/a	0.002286	n/a	n/a	n/a	30	0	sqrt(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.002988	n/a	n/a	n/a	30	0	sqrt(x)	0.05	Inter
Combined Radium 226 + 228 (pCi/L)	n/a	1.973	n/a	n/a	n/a	29	0	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	n/a	0.25	n/a	n/a	n/a	32	0	n/a	0.1937	NP Inter(normal...
Lead, total (mg/L)	n/a	0.002896	n/a	n/a	n/a	30	13.33	x^(1/3)	0.05	Inter
Lithium, total (mg/L)	n/a	0.02116	n/a	n/a	n/a	30	20	ln(x)	0.05	Inter
Mercury, total (mg/L)	n/a	0.000008	n/a	n/a	n/a	30	76.67	n/a	0.2146	NP Inter(NDs)
Molybdenum, total (mg/L)	n/a	0.001756	n/a	n/a	n/a	30	23.33	ln(x)	0.05	Inter
Selenium, total (mg/L)	n/a	0.005006	n/a	n/a	n/a	30	13.33	ln(x)	0.05	Inter
Thallium, total (mg/L)	n/a	0.0005	n/a	n/a	n/a	30	36.67	n/a	0.2146	NP Inter(normal...

MITCHELL 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		0.001931	0.01
Barium, Total (mg/L)	2		0.055	2
Beryllium, Total (mg/L)	0.004		0.0001	0.004
Cadmium, Total (mg/L)	0.005		0.00009	0.005
Chromium, Total (mg/L)	0.1		0.002286	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.002988	0.006
Combined Radium, Total (pCi/L)	5		1.973	5
Fluoride, Total (mg/L)	4		0.25	4
Lead, Total (mg/L)	0.015		0.002896	0.015
Lithium, Total (mg/L)	n/a	0.04	0.02116	0.04
Mercury, Total (mg/L)	0.002		0.000008	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.001756	0.1
Selenium, Total (mg/L)	0.05		0.005006	0.05
Thallium, Total (mg/L)	0.002		0.0005	0.002

**MCL = Maximum Contaminant Level*

**GWPS = Groundwater Protection Standard*

Confidence Interval - All Results (No Significant)

Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 6/16/2020, 2:13 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	MW_1505	0.00006	0.00003	0.006	No	15	13.33	No	0.01	NP (normality)
Antimony, total (mg/L)	MW_1506	0.00006	0.00003	0.006	No	15	6.667	No	0.01	NP (normality)
Antimony, total (mg/L)	MW_1507	0.00008883	0.00004583	0.006	No	15	6.667	No	0.01	Param.
Antimony, total (mg/L)	MW_1509	0.00005	0.00002	0.006	No	15	6.667	No	0.01	NP (normality)
Antimony, total (mg/L)	MW_1510	0.00005	0.00002	0.006	No	15	13.33	No	0.01	NP (normality)
Arsenic, total (mg/L)	MW_1505	0.001088	0.0003622	0.01	No	15	0	ln(x)	0.01	Param.
Arsenic, total (mg/L)	MW_1506	0.0009971	0.0004722	0.01	No	15	0	No	0.01	Param.
Arsenic, total (mg/L)	MW_1507	0.002382	0.0006497	0.01	No	15	0	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	MW_1509	0.00051	0.000346	0.01	No	15	0	No	0.01	Param.
Arsenic, total (mg/L)	MW_1510	0.0005545	0.0003482	0.01	No	15	0	No	0.01	Param.
Barium, total (mg/L)	MW_1505	0.0577	0.0459	2	No	15	0	No	0.01	NP (normality)
Barium, total (mg/L)	MW_1506	0.062	0.0527	2	No	15	0	No	0.01	NP (normality)
Barium, total (mg/L)	MW_1507	0.08132	0.05811	2	No	15	0	sqrt(x)	0.01	Param.
Barium, total (mg/L)	MW_1509	0.06043	0.05038	2	No	15	0	No	0.01	Param.
Barium, total (mg/L)	MW_1510	0.04532	0.03968	2	No	15	0	No	0.01	Param.
Beryllium, total (mg/L)	MW_1505	0.00015	0.00001	0.004	No	15	46.67	No	0.01	NP (normality)
Beryllium, total (mg/L)	MW_1506	0.0001	0.00001	0.004	No	15	33.33	No	0.01	NP (normality)
Beryllium, total (mg/L)	MW_1507	0.0001307	0.00006062	0.004	No	15	33.33	No	0.01	Param.
Beryllium, total (mg/L)	MW_1509	0.0001	0.00001	0.004	No	15	73.33	No	0.01	NP (normality)
Beryllium, total (mg/L)	MW_1510	0.0001	0.00001	0.004	No	15	53.33	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1505	0.00005	0.00002	0.005	No	15	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1506	0.00003	0.00001	0.005	No	15	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1507	0.00007	0.00003	0.005	No	15	0	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1509	0.000025	0.00001	0.005	No	15	13.33	No	0.01	NP (normality)
Cadmium, total (mg/L)	MW_1510	0.000025	0.000005	0.005	No	15	33.33	No	0.01	NP (normality)
Chromium, total (mg/L)	MW_1505	0.004527	0.0007618	0.1	No	14	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW_1506	0.00256	0.00097	0.1	No	15	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW_1507	0.01285	0.003459	0.1	No	15	0	No	0.01	Param.
Chromium, total (mg/L)	MW_1509	0.001602	0.000668	0.1	No	15	0	ln(x)	0.01	Param.
Chromium, total (mg/L)	MW_1510	0.00228	0.0007276	0.1	No	14	0	ln(x)	0.01	Param.
Cobalt, total (mg/L)	MW_1505	0.0008655	0.0001921	0.003	No	15	0	x^(1/3)	0.01	Param.
Cobalt, total (mg/L)	MW_1506	0.0007849	0.0003244	0.003	No	15	0	No	0.01	Param.
Cobalt, total (mg/L)	MW_1507	0.002391	0.0005695	0.003	No	15	0	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	MW_1509	0.0003447	0.0001567	0.003	No	15	0	No	0.01	Param.
Cobalt, total (mg/L)	MW_1510	0.0002558	0.000138	0.003	No	15	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1505	0.9958	0.5509	5	No	15	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1506	1.175	0.3661	5	No	15	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1507	1.5	0.6779	5	No	14	0	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1509	1.309	0.5448	5	No	15	0	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW_1510	0.9987	0.4276	5	No	14	0	No	0.01	Param.
Fluoride, total (mg/L)	MW_1505	0.06	0.03	4	No	16	68.75	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW_1506	0.07	0.04	4	No	16	50	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW_1507	0.07	0.06	4	No	16	6.25	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW_1509	0.15	0.1	4	No	16	0	No	0.01	NP (normality)
Fluoride, total (mg/L)	MW_1510	0.1	0.05	4	No	16	18.75	No	0.01	NP (normality)
Lead, total (mg/L)	MW_1505	0.00102	0.000091	0.015	No	15	20	No	0.01	NP (Cohens/xfrm)
Lead, total (mg/L)	MW_1506	0.0005977	0.0002256	0.015	No	15	0	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW_1507	0.002285	0.0004213	0.015	No	15	6.667	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW_1509	0.0001239	0.00003055	0.015	No	15	0	sqrt(x)	0.01	Param.
Lead, total (mg/L)	MW_1510	0.0001785	0.00007751	0.015	No	15	0	ln(x)	0.01	Param.
Lithium, total (mg/L)	MW_1505	0.01128	0.006223	0.021	No	15	6.667	No	0.01	Param.
Lithium, total (mg/L)	MW_1506	0.01468	0.009161	0.021	No	15	6.667	No	0.01	Param.
Lithium, total (mg/L)	MW_1507	0.01688	0.01014	0.021	No	15	6.667	No	0.01	Param.
Lithium, total (mg/L)	MW_1509	0.01634	0.009168	0.021	No	15	6.667	No	0.01	Param.
Lithium, total (mg/L)	MW_1510	0.01402	0.008135	0.021	No	15	0	No	0.01	Param.
Mercury, total (mg/L)	MW_1505	0.000006	0.000002	0.002	No	15	73.33	No	0.01	NP (normality)
Mercury, total (mg/L)	MW_1506	0.000005	0.000002	0.002	No	15	60	No	0.01	NP (normality)
Mercury, total (mg/L)	MW_1507	0.00001	0.000003	0.002	No	15	20	No	0.01	NP (Cohens/xfrm)
Mercury, total (mg/L)	MW_1509	0.000005	0.000002	0.002	No	15	86.67	No	0.01	NP (NDs)
Mercury, total (mg/L)	MW_1510	0.000005	0.000002	0.002	No	15	93.33	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	MW_1505	0.002074	0.0009128	0.0018	No	14	21.43	No	0.01	Param.
Molybdenum, total (mg/L)	MW_1506	0.001235	0.0005945	0.0018	No	15	0	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW_1507	0.004103	0.0008945	0.0018	No	15	6.667	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	MW_1509	0.002	0.00048	0.0018	No	15	26.67	No	0.01	NP (Cohens/xfrm)
Molybdenum, total (mg/L)	MW_1510	0.002	0.00033	0.0018	No	14	35.71	No	0.01	NP (normality)
Selenium, total (mg/L)	MW_1505	0.0006461	0.0002499	0.05	No	15	0	No	0.01	Param.
Selenium, total (mg/L)	MW_1506	0.0001	0.00007	0.05	No	15	20	No	0.01	NP (normality)
Selenium, total (mg/L)	MW_1507	0.0003551	0.0000984	0.05	No	15	0	sqrt(x)	0.01	Param.

Confidence Interval - All Results (No Significant)

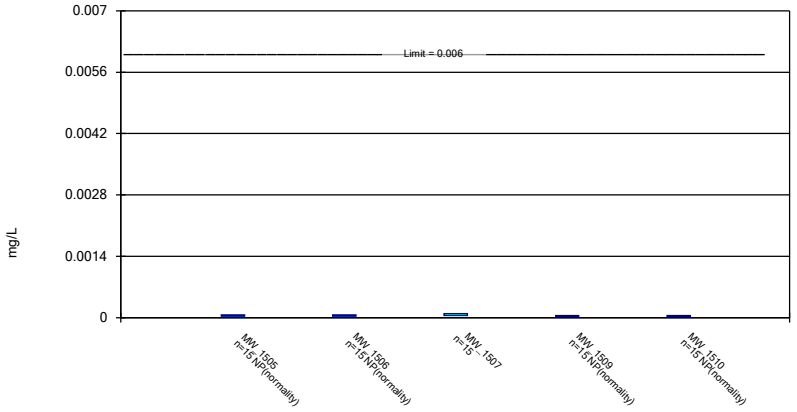
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 6/16/2020, 2:13 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	Transform	Alpha	Method
Selenium, total (mg/L)	MW_1509	0.0003	0.00009	0.05	No	15	0	No	0.01	NP (normality)
Selenium, total (mg/L)	MW_1510	0.0002	0.00008	0.05	No	15	0	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1505	0.0005	0.000067	0.002	No	15	33.33	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1506	0.0005	0.00005	0.002	No	15	33.33	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1507	0.0005	0.000051	0.002	No	15	33.33	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1509	0.0005	0.00003	0.002	No	15	33.33	No	0.01	NP (normality)
Thallium, total (mg/L)	MW_1510	0.0005	0.00001	0.002	No	15	40	No	0.01	NP (normality)

Sanitas™ v.9.6.25 . 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.

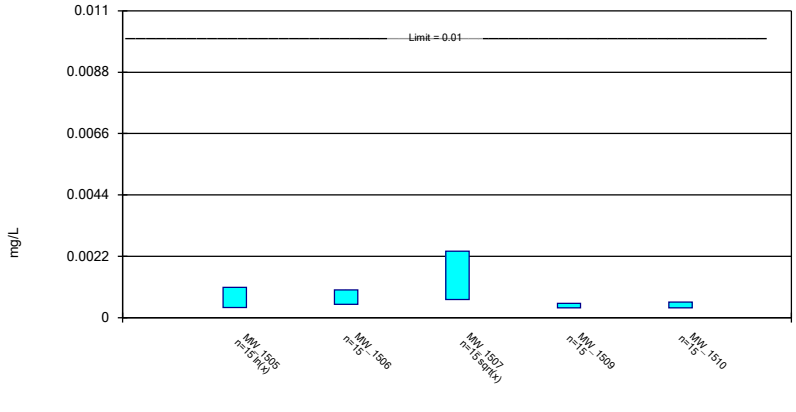


Constituent: Antimony, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

Parametric Confidence Interval

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

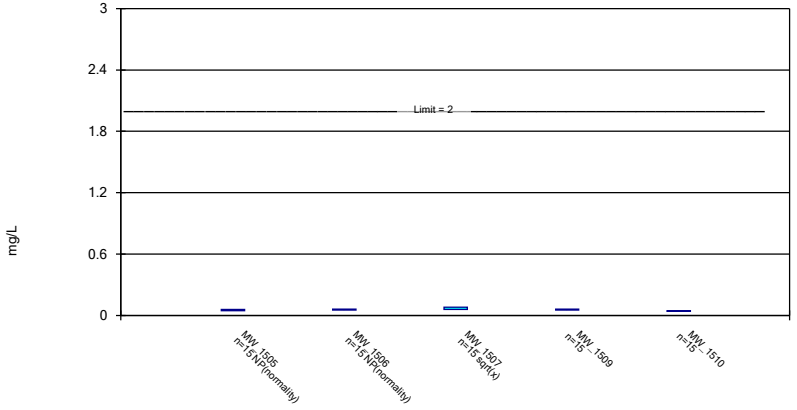


Constituent: Arsenic, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . 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.

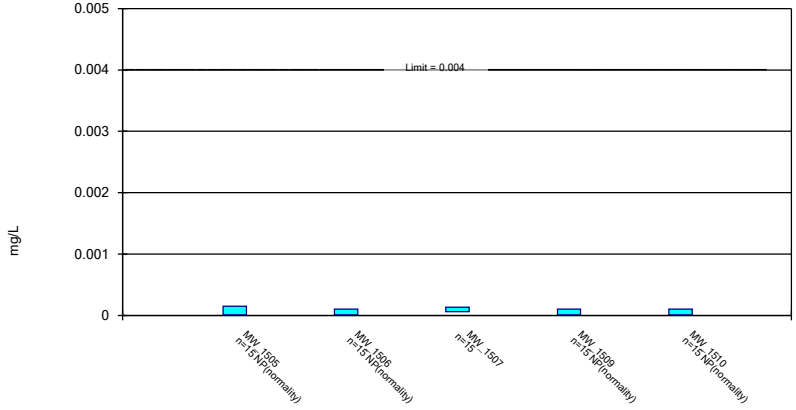


Constituent: Barium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

Parametric and Non-Parametric (NP) Confidence Interval

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

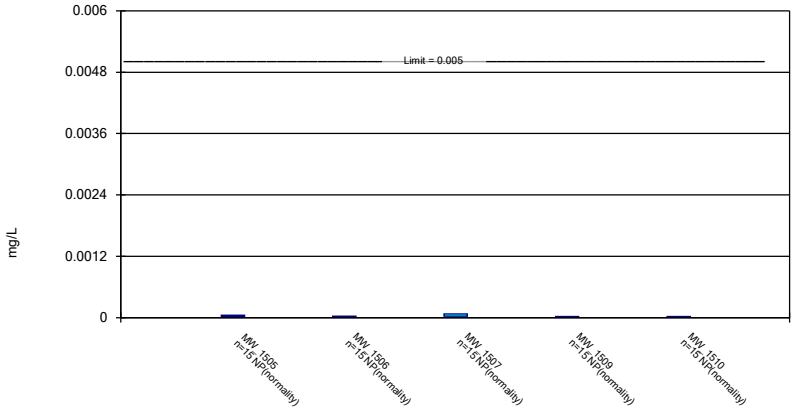


Constituent: Beryllium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

Non-Parametric Confidence Interval

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

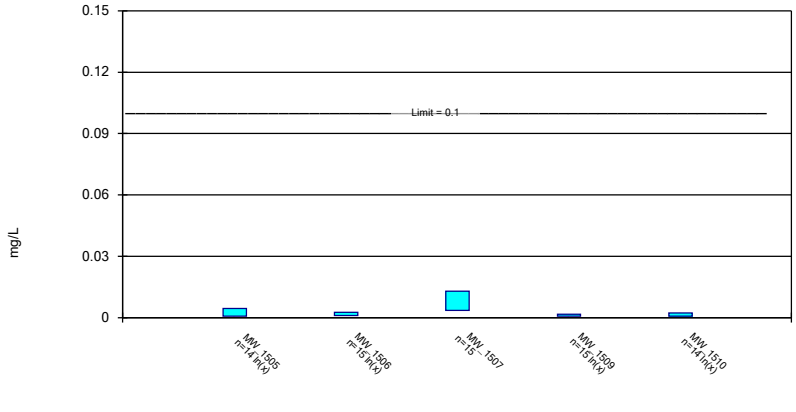


Constituent: Cadmium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

Parametric Confidence Interval

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

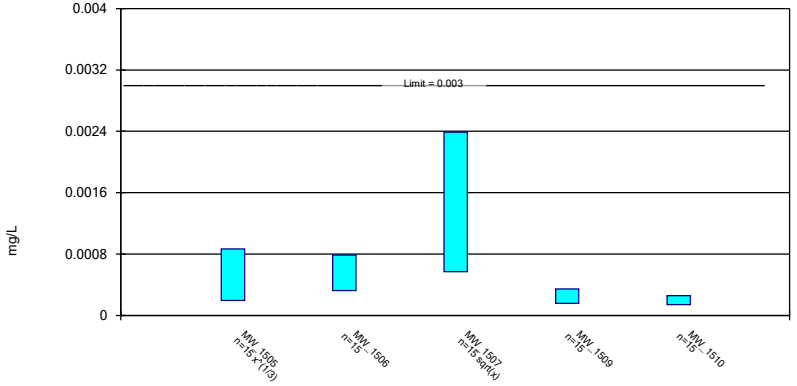


Constituent: Chromium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

Parametric Confidence Interval

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

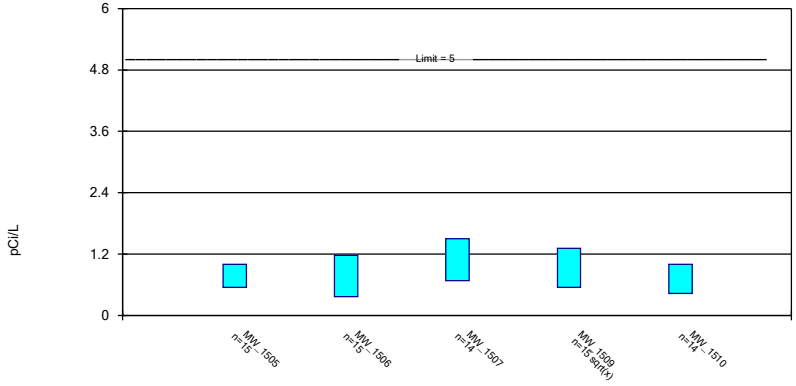


Constituent: Cobalt, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

Parametric Confidence Interval

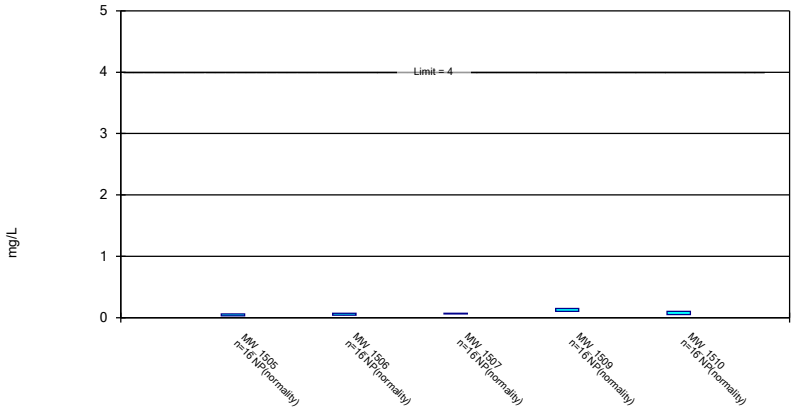
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Non-Parametric Confidence Interval

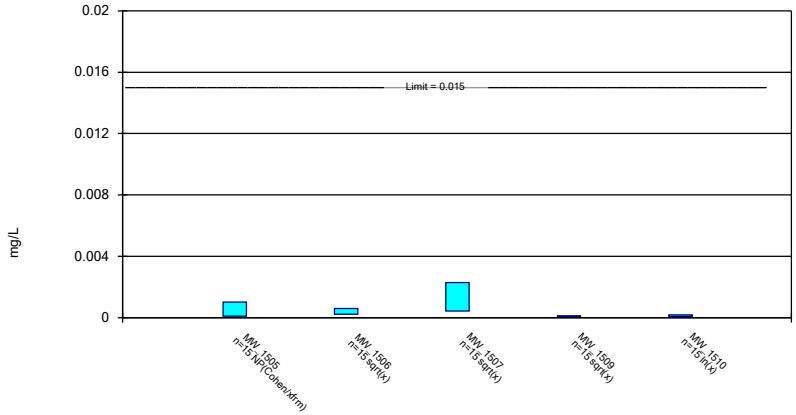
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Fluoride, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Parametric and Non-Parametric (NP) Confidence Interval

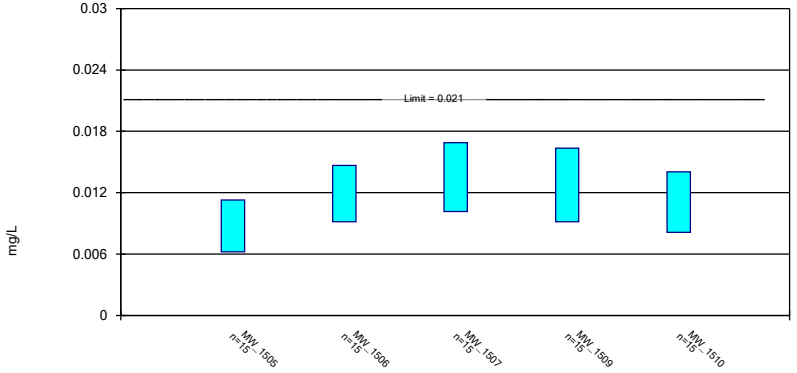
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Parametric Confidence Interval

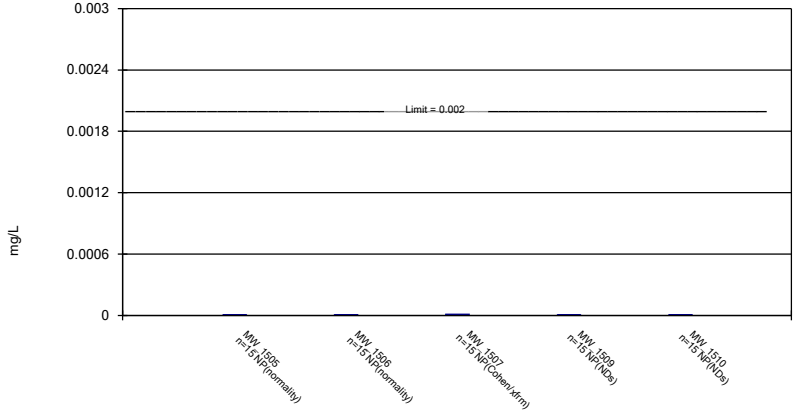
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Non-Parametric Confidence Interval

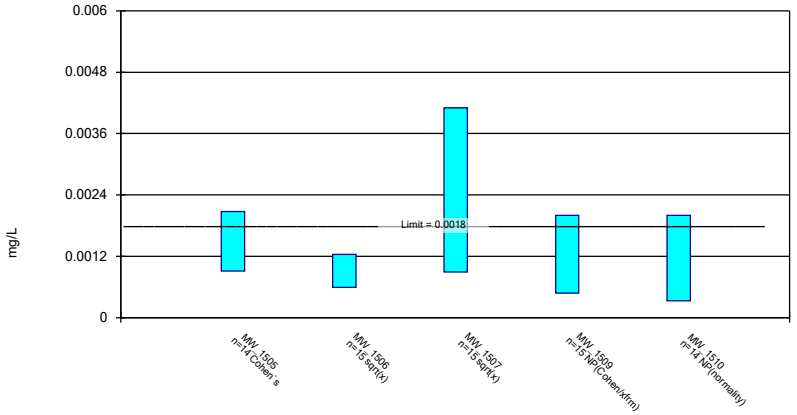
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Parametric and Non-Parametric (NP) Confidence Interval

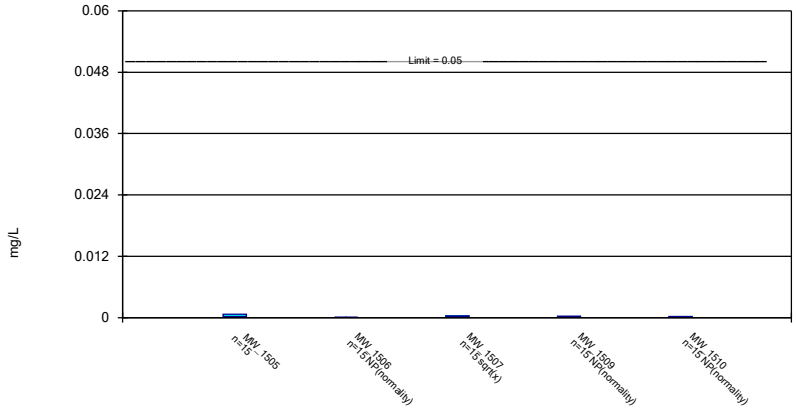
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum, total Analysis Run 6/16/2020 2:11 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Parametric and Non-Parametric (NP) Confidence Interval

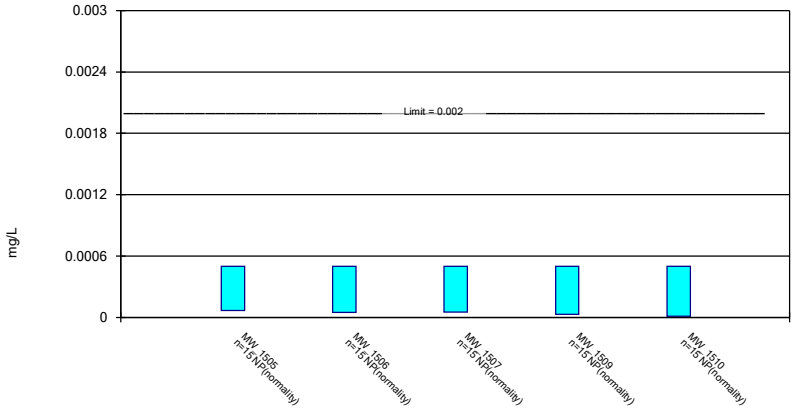
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 6/16/2020 2:11 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Non-Parametric Confidence Interval

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



Constituent: Thallium, total Analysis Run 6/16/2020 2:11 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

APPENDIX 3 – Alternative Source Demonstrations

Alternative source demonstrations relative to Appendix IV SSLs above the groundwater protection standard were not necessary because no SSLs above the groundwater protection standards were identified in 2020. Alternative source demonstrations are not applicable at this time.

APPENDIX 4 - Notices for Monitoring Program Transitions

No transition between monitoring requirements occurred in 2020; the CCR unit remained in assessment monitoring over the entire year. Notices for monitoring program transitions are not applicable at this time.

APPENDIX 5 - Well Installation/Decommissioning Logs

No monitoring wells installed or decommissioned in 2020. Well installation/decommissioning logs are not applicable at this time.

EPA ADDITIONAL INFORMATION REQUEST

Attachment C

2020 Field Data Sheets Documenting Dry Monitoring Well Status at Mitchell Plant's Landfill

Field Static Water Level Form
Mitchell Landfill
Mitchell Power Generation Plant
American Electric Power

Soil Boring ID	Monitoring Well ID	Monitoring Well Tag Number	Date Well Installed	Coordinates[1]		Top of Riser Elevation	Casing Diameter (inches)	Depth to Top of Screen	Screen Length	Measured Total Depth[4] (feet)	1-31-20	
				Northing	Easting	(ft amsl)		(ft amsl)	(ft amsl)		Water Level TOC	Elevation
SB-01	MW1101H	0491-0003-2011	10/7/2011	484883.9	1609657.8	1220.71	2	290	50	342.9	—	—
	MW1101R	0491-0006-2011	10/28/2011	484877.8	1609656.4	1221.23	2	187	25	214.5	196.35	
	MW1101F	0402-0006-2011	12/20/2011	484864.5	1609651.4	1220.86	2	162	7	171.1	165.45	
	MW1101B	0402-0005-2011	12/19/2011	484870.8	1609653.8	1220.73	2	89	18	109.2	—	—
SB-07	MW1102R	0402-0002-2011	12/14/2011	485101.7	1611103.3	1228.36	2	196	8	205.8	184.90	
	MW1102F	0491-0004-2011	10/25/2011	485106.1	1611110.1	1228.67	2	147	30	180	156.30	
	MW1102B	0402-0003-2011	12/15/2011	485097.4	1611096.9	1228.84	2	72	17	90.9	—	—
SB-18	MW1103H	0491-0002-2011	9/27/2011	487005.3	1610094	1239.82	2	307	40	349.4	—	—
	MW1103R	0402-0004-2011	12/16/2011	486998.5	1610097.2	1240.01	2	191	7	200.3	196.50	
	MW1103F	0491-0005-2011	10/26/2011	487011.2	1610102.2	1239.19	2	149	30	181.6	157.20	
SB-23	MW1104R	0402-0008-2011	12/22/2011	486345.1	1609471.2	1230.66	2	187	25	213.8	190.65	
	MW1104F	0402-0007-2011	12/21/2011	486352.3	1609469.3	1230.3	2	152	20	174.1	169.90	
SB-09	PZ1101H[3]	0402-0001-2011	9/19/2011	485990.9	1610339.5	1143.59	1	212	35	247.5	—	—
B-1501	MW1501R		8/5/2015	484663.0	1609913.5	1161.78	4	135.4	14.6	153.5	152.42	
	MW1501F		8/6/2015	484662.0	1609917.5	1161.83	4	91.4	14.6	109.7	102.80	
B-1502	MW1502R		8/6/2015	484648.8	1610218.1	1047.41	4	23.4	9.6	36.0	31.10	
B-1503	MW1503R		8/15/2015	484596.7	1610487.6	1111.96	4	89.4	9.6	101.9	92.50	
	MW1503F		8/15/2015	484591.4	1610488.5	1111.93	4	48.4	14.6	66.3	64.64	

(1) Survey coordinates are US State Plane 1983 West Virginia North.

(2) amsl = average mean sea level. Vertical Datum is NAVD 1988, GEOID 03

(3) Piezometer Abandoned in June 2013 due to encroaching landfill construction. One inch diameter piezometer.

(4) Measured from the top of riser.

Bedrock Unit Legend:

H = Hundred Sandstone

R = Rush Run Sandstone

F = Fish Creek Sandstone

B = Burton Sandstone/Shallow Bedrock

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell L.F.
AEP Project Number: 4238025602
Date: 1-31-20
Weather Observations: overcast - Flurries 30's

WELL ID: MW 1102F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)
Water Height in Well: 23.7 (feet)
Total Depth: 180.0 (feet)
Water Volume in Well: 4.03 (gallons)
Depth to Water: 156.3 (feet)
Purge Volume: 2 gal.(calculated)
2 gal. (removed)
Depth to Top of Screen: 147.0 (feet)
Mimimum Purge Volume (drawdown)(gal/ft.) + (well screen length)(gal./ft.) = _____
Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
11.8	8.2	770	3.59	0.5	156.5	1327
11.8	8.2	770	1.21	1.0	159.9	1331
11.8	8.2	770	0.00	1.5	158.4	1335

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
11.7	8.3	770	0.00	2.0	159.8	1337

Instrument Calibration

Turbidity Meter Type Hannah HI 93703
1.0 NTU std = _____ 5.42 NTU std = _____
10.0 NTD std = _____ 51.8 NTU std = _____
499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus
4.01 std = _____
7.0 std = _____ 1413 umhos/cm = _____
10.1 std = _____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: _____
Sample time/date: 1337 / 1-31-20

Comments: _____

Deviations from FSAP: _____

Sampler: Ron Volk Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell L.F. AEP Project Number: 4238025602

Date: 1-31-20 Weather Observations: overcast/Flurries 30's

WELL ID: MW-1502R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches) Water Height in Well: 4.9 (feet)

Total Depth: 36.0 (feet) Water Volume in Well: 3.2 (gallons)

Depth to Water: 31.1 (feet) Purge Volume: 2 gal.(calculated)

2 gal. (removed)

Depth to Top of Screen: 23.4 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
13.5	7.3	660	2.18	0.5	31.35	1224
13.5	7.4	660	2.40	1.0	31.60	1228
13.5	7.4	660	2.10	1.5	31.80	1232

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
13.5	7.4	660	2.20	2.0	32.10	1235

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI-Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A Analysis Required: _____

Color: N/A

Turbidity: N/A Sample time/date: 1235 / 1-31-20

Comments: _____

Deviations from FSAP: _____

Sampler: Ron Vah Signature: Ron Vah

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

Field Static Water Level Form
Mitchell Landfill
Mitchell Power Generation Plant
American Electric Power

Soil Boring ID	Monitoring Well ID	Monitoring Well Tag Number	Date Well Installed	Coordinates[1]		Top of Riser Elevation	Casing Diameter (inches)	Depth to Top of Screen	Screen Length	Measured Total Depth[4] (feet)		
				Northing	Easting	(ft amsl)		(ft amsl)	(ft amsl)		Water Level TOC	Elevation
SB-01	MW1101H	0491-0003-2011	10/7/2011	484883.9	1609657.8	1220.71	2	290	50	342.9	DRY	N/A
	MW1101R	0491-0006-2011	10/28/2011	484877.8	1609656.4	1221.23	2	187	25	214.5	195.60	1025.63
	MW1101F	0402-0006-2011	12/20/2011	484864.5	1609651.4	1220.86	2	162	7	171.1	165.10	1055.76
	MW1101B	0402-0005-2011	12/19/2011	484870.8	1609653.8	1220.73	2	89	18	109.2	—	—
SB-07	MW1102R	0402-0002-2011	12/14/2011	485101.7	1611103.3	1228.36	2	196	8	205.8	182.95	1045.41
	MW1102F	0491-0004-2011	10/25/2011	485106.1	1611110.1	1228.67	2	147	30	180	155.85	1072.82
	MW1102B	0402-0003-2011	12/15/2011	485097.4	1611096.9	1228.84	2	72	17	90.9	—	—
SB-18	MW1103H	0491-0002-2011	9/27/2011	487005.3	1610094	1239.82	2	307	40	349.4	DRY	N/A
	MW1103R	0402-0004-2011	12/16/2011	486998.5	1610097.2	1240.01	2	191	7	200.3	195.66	1044.35
	MW1103F	0491-0005-2011	10/26/2011	487011.2	1610102.2	1239.19	2	149	30	181.6	156.70	1082.49
SB-23	MW1104R	0402-0008-2011	12/22/2011	486345.1	1609471.2	1230.66	2	187	25	213.8	186.40	1044.26
	MW1104F	0402-0007-2011	12/21/2011	486352.3	1609469.3	1230.3	2	152	20	174.1	168.84	1061.46
SB-09	PZ1101H[3]	0402-0001-2011	9/19/2011	485990.9	1610339.5	1143.59	1	212	35	247.5	—	—
B-1501	MW1501R		8/5/2015	484663.0	1609913.5	1161.78	4	135.4	14.6	153.5	152.41	1009.37
	MW1501F		8/6/2015	484662.0	1609917.5	1161.83	4	91.4	14.6	109.7	102.30	1059.53
B-1502	MW1502R		8/6/2015	484648.8	1610218.1	1047.41	4	23.4	9.6	36.0	31.01	1016.40
B-1503	MW1503R		8/15/2015	484596.7	1610487.6	1111.96	4	89.4	9.6	101.9	92.22	1019.74
	MW1503F		8/15/2015	484591.4	1610488.5	1111.93	4	48.4	14.6	66.3	63.15	1048.78

(1) Survey coordinates are US State Plane 1983 West Virginia North.

(2) amsl = average mean sea level. Vertical Datum is NAVD 1988, GEOID 03.

(3) Piezometer Abandoned in June 2013 due to encroaching landfill construction. One inch diameter piezometer.

(4) Measured from the top of riser.

Bedrock Unit Legend:

H = Hundred Sandstone

R = Rush Run Sandstone

F = Fish Creek Sandstone

B = Burton Sandstone/Shallow Bedrock

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802560 2

Date: 5-6-2020

Weather Observations: Overcast 40's

WELL ID: MW 1101 M

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 342.90 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: DRY (feet)

Purge Volume: Ø gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 290.0 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	N/A	1500

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
						1500

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 5-6-2020

Comments: Insufficient Water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah **Signature:** _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill
AEP Project Number: 423802562
Date: 5-6-2020
Weather Observations:

WELL ID: MW-1101R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)
Water Height in Well: 19.9 (feet)
Total Depth: 214.5 (feet)
Water Volume in Well: 3.4 (gallons)
Depth to Water: 195.60 (feet)
Purge Volume: 1.5 gal.(calculated)
_____ gal. (removed)
Depth to Top of Screen: 187.0 (feet)
Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____
Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
11.5	8.71	1070	6.93	0.4	196.10	1433
11.5	8.71	1070	5.64	0.8	196.70	1437
11.5	8.81	1070	5.05	1.1	197.20	1441

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
11.5	9.04	1080	7.21	1.5	198.12	1444

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703
1.0 NTU std = _____ 5.42 NTU std = _____
10.0 NTD std = _____ 51.8 NTU std = _____
499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus
4.01 std = _____
7.0 std = _____ 1413 umhos/cm = _____
10.1 std = _____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: _____
Sample time/date: 1444 / 5-6-2020

Comments: _____

Deviations from FSAP: _____

Sampler: Ron Vak
Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill
AEP Project Number: 423802562
Date: 5-6-2020
Weather Observations: overcast 40's

WELL ID: MW 1101 F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)
Water Height in Well: N/A (feet)
Total Depth: 171.10 (feet)
Water Volume in Well: N/A (gallons)
Depth to Water: 165.10 (feet)
Purge Volume: _____ gal.(calculated)
Ø gal. (removed)
Depth to Top of Screen: 162.0 (feet)
Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____
Measured using: GeoTech ET SWL Meter
Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump
Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1510

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	Ø	N/A	1510

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703
1.0 NTU std = _____ 5.42 NTU std = _____
10.0 NTD std = _____ 51.8 NTU std = _____
499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus
4.01 std = _____
7.0 std = _____ 1413 umhos/cm = _____
10.1 std = _____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: _____
Sample time/date: No Sample / 5-6-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Volk
Signature: Ron Volk

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
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FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802560 2

Date: 5-6-2020

Weather Observations: overcast 40's

WELL ID: MW - 1102 R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 205.08 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 182.95 (feet)

Purge Volume: _____ gal.(calculated)

Ø gal. (removed)

Depth to Top of Screen: 196.6 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1620

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	Ø	N/A	1620

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 5-6-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah **Signature:** _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 5-6-2020

Weather Observations: overcast 40's

WELL ID: MW-1102F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: 24.15 (feet)

Total Depth: 180.0 (feet)

Water Volume in Well: 4.1 (gallons)

Depth to Water: 155.85 (feet)

Purge Volume: 4 gal.(calculated)

____ gal. (removed)

Depth to Top of Screen: 147.0 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = ____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
12.0	8.72	780	1.26	1	156.26'	1554
12.0	8.75	770	1.52	2	156.84'	1556
12.0	8.75	770	0.05	3	157.44'	1600

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
12.0	8.75	780	4.93	4	158.5'	1602

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = ____ 5.42 NTU std = ____

10.0 NTD std = ____ 51.8 NTU std = ____

499 NTU std = ____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = ____

7.0 std = ____ 1413 umhos/cm = ____

10.1 std = ____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: ____

Sample time/date: 1602 / 5-6-2020

Comments: ____

Deviations from FSAP: ____

Sampler: Ron Vick

Signature: Ron Vick

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 5-6-2020

Weather Observations: Overcast 40's

WELL ID: MW-1103H

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 349.4 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: DRY (feet)

Purge Volume: Ø gal.(calculated)

gal. (removed)

Depth to Top of Screen: 307.0 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1716

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	Ø	N/A	1716

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 5-6-2020

Comments: Insufficient water to sample

Deviations from FSAP: _____

Sampler: Ron Vath **Signature:** Ron Vath

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 5-6-2020

Weather Observations: overcast 40's

WELL ID: MW-1103R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 260.30 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 195.66 (feet)

Purge Volume: Ø gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 191.6 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1720

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	Ø	N/A	—

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 5-6-2020

Comments: Insufficient water to sample

Deviations from FSAP: _____

Sampler: Ron Vah

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802560 2

Date: 5-6-2020

Weather Observations: overcast 40's

WELL ID: MW-1103F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: 24.9 (feet)

Total Depth: 181.60 (feet)

Water Volume in Well: 4.2 (gallons)

Depth to Water: 156.70 (feet)

Purge Volume: 3.5 gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 149.0 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
11.9	8.72	1940	138	0.7	158.10	1638
11.8	8.84	1950	56	1.4	159.90	1642
11.8	8.85	1950	19.02	2.1	160.80	1648
11.7	8.85	1950	35.25	2.8	161.40	1652

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
11.6	8.80	1960	16.73	3.5	162.90	1654

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: 1654 / 5-6-2020

Comments: _____

Deviations from FSAP: _____

Sampler: Ron Voth

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 5-6-2020

Weather Observations: overcast 40°s

WELL ID: MW 1104R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 213.80 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 186.40 (feet)

Purge Volume: Ø gal.(calculated)

gal. (removed)

Depth to Top of Screen: 187.0 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1300

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	N/A	—

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 5-6-2020

Comments: Insufficient to purge

Deviations from FSAP: _____

Sampler: Ron Vath

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill
AEP Project Number: 423802560 2
Date: 5-6-2020
Weather Observations: _____

WELL ID: MW 1104 F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)
Water Height in Well: N/A (feet)
Total Depth: 174.10 (feet)
Water Volume in Well: N/A (gallons)
Depth to Water: 168.84 (feet)
Purge Volume: Ø gal.(calculated)
Ø gal. (removed)
Depth to Top of Screen: 152.0 (feet)
Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____
Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1310

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703
1.0 NTU std = _____ 5.42 NTU std = _____
10.0 NTD std = _____ 51.8 NTU std = _____
499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus
4.01 std = _____
7.0 std = _____ 1413 umhos/cm = _____
10.1 std = _____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: _____
Sample time/date: No Sample / 5-6-2020

Comments: Insufficient to Sample

Deviations from FSAP: _____

Sampler: Ron Vah
Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO®
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FIELD INFORMATION FORM

Site: Mitchell Land Fill
AEP Project Number: 423802562
Date: 5-6-2020
Weather Observations: overcast 40°s

WELL ID: MW 1501 R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)
Water Height in Well: N/A (feet)
Total Depth: 153.5 (feet)
Water Volume in Well: N/A (gallons)
Depth to Water: 152.41 (feet)
Purge Volume: Ø gal.(calculated)
gal. (removed)
Depth to Top of Screen: 135.40 (feet)
Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____
Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1520

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703
1.0 NTU std = _____ 5.42 NTU std = _____
10.0 NTD std = _____ 51.8 NTU std = _____
499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus
4.01 std = _____
7.0 std = _____ 1413 umhos/cm = _____
10.1 std = _____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: _____
Sample time/date: No Sample / 5-6-2020

Comments: Insufficient water to sample.

Deviations from FSAP: _____

Sampler: Ron Vah
Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
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FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802560 2

Date: 5-6-2020

Weather Observations: overcast 40's

WELL ID: MW-1501 F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)

Water Height in Well: N/A (feet)

Total Depth: 109.79 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 102.30 (feet)

Purge Volume: Ø gal.(calculated)

gal. (removed)

Depth to Top of Screen: 91.4 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1530

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 5-6-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah **Signature:** _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
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FIELD INFORMATION FORM

Site: Mitchell Land Fill
AEP Project Number: 423802562
Date: 5-6-2020
Weather Observations: light Rain 40's

WELL ID: MW-1502R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)
Water Height in Well: 5.0 (feet)
Total Depth: 36.0 (feet)
Water Volume in Well: 3.3 (gallons)
Depth to Water: 31.01 (feet)
Purge Volume: 2.5 gal.(calculated)
_____ gal. (removed)
Depth to Top of Screen: 23.40 (feet)
Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____
Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
12.4	7.94	644	40.7	.6	31.71	1333
12.4	7.88	642	8.26	1.2	32.12	1337
12.4	7.84	639	9.33	2.0	32.32	1341

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
12.3	7.79	639	23.76	2.5	32.70	1344

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703
1.0 NTU std = _____ 5.42 NTU std = _____
10.0 NTD std = _____ 51.8 NTU std = _____
499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus
4.01 std = _____
7.0 std = _____ 1413 umhos/cm = _____
10.1 std = _____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: _____
Sample time/date: 1344 / 5-6-2020

Comments: _____

Deviations from FSAP: _____

Sampler: Ron Vah
Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
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FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 5-6-2020

Weather Observations: overcast 40's

WELL ID: MW-1503R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)

Water Height in Well: N/A (feet)

Total Depth: 101.90 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 92.22 (feet)

Purge Volume: Ø gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 89.40 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1535

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTU std = 7 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 5-6-2020

Comments: Insufficient to purge

Deviations from FSAP: _____

Sampler: Ron Vah

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

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FIELD INFORMATION FORM

Site: Mitchell Land Fill
AEP Project Number: 423802562
Date: 5-6-2020
Weather Observations: overcast 40's

WELL ID: MW-1503F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)
Water Height in Well: N/A (feet)
Total Depth: 66.30 (feet)
Water Volume in Well: N/A (gallons)
Depth to Water: 63.15 (feet)
Purge Volume: Ø gal.(calculated)
_____ gal. (removed)
Depth to Top of Screen: 48.4 (feet)
Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____
Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	Ø	N/A	1540

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703
1.0 NTU std = _____ 5.42 NTU std = _____
10.0 NTD std = _____ 51.8 NTU std = _____
499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus
4.01 std = _____
7.0 std = _____ 1413 umhos/cm = _____
10.1 std = _____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: _____
Sample time/date: _____

Comments: Insufficient to purge

Deviations from FSAP: _____

Sampler: Ron Vath
Signature: Ron Vath

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

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FIELD INFORMATION FORM

Site: Mitchell Land Fill
AEP Project Number: 423802562
Date: 5-6-2020
Weather Observations: Overcast 40°s

WELL ID: Leachate

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: — (inches)
Water Height in Well: — (feet)
Total Depth: — (feet)
Water Volume in Well: — (gallons)
Depth to Water: — (feet)
Purge Volume: N/A gal.(calculated)
gal. (removed)
Depth to Top of Screen: — (feet)
Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) =
Measured using: GeoTech ET SWL Meter
Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dip Sample
Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dip Sample

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
15.1	9.04	7590	5.27	N/A	100 gpm	1745

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703
1.0 NTU std = ____ 5.42 NTU std = ____
10.0 NTD std = ____ 51.8 NTU std = ____
499 NTU std = ____

pH/Conductivity — Meter Type YSI - Pro Plus
4.01 std = ____
7.0 std = ____ 1413 umhos/cm = ____
10.1 std = ____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: ____
Sample time/date: 1745 / 5-6-2020

Comments: ____

Deviations from FSAP: ____

Sampler: Ron Vah
Signature: [signature]

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

Field Static Water Level Form
Mitchell Landfill
Mitchell Power Generation Plant
American Electric Power

Soil Boring ID	Monitoring Well ID	Monitoring Well Tag Number	Date Well Installed	Coordinates[1]		Top of Riser Elevation	Casing Diameter (inches)	Depth to Top of Screen	Screen Length	Measured Total Depth[4] (feet)	7-15-20	
				Northing	Easting	(ft amsl)		(ft amsl)	(ft amsl)		Water Level TOC	Elevation
SB-01	MW1101H	0491-0003-2011	10/7/2011	484983.9	1609657.8	1220.71	2	290	50	342.9	DRY	
	MW1101R	0491-0006-2011	10/28/2011	484877.8	1609656.4	1221.23	2	187	25	214.5	195.60	1025.63
	MW1101F	0402-0006-2011	12/20/2011	484864.5	1609651.4	1220.66	2	152	7	171.1	164.80	1056.06
	MW1101B	0402-0005-2011	12/19/2011	484870.8	1609653.8	1220.73	2	89	18	109.2	—	—
SB-07	MW1102R	0402-0002-2011	12/14/2011	485101.7	1611103.3	1228.36	2	196	8	205.8	181.57	1046.79
	MW1102F	0491-0004-2011	10/25/2011	485106.1	1611110.1	1228.67	2	147	30	180	156.10	1072.57
	MW1102B	0402-0003-2011	12/15/2011	485097.4	1611096.9	1228.84	2	72	17	90.9	—	—
SB-18	MW1103H	0491-0002-2011	9/27/2011	487005.3	1610094	1239.82	2	307	40	349.4	DRY	
	MW1103R	0402-0004-2011	12/16/2011	486998.5	1610097.2	1240.01	2	191	7	200.3	195.90	1044.11
	MW1103F	0491-0005-2011	10/26/2011	487011.2	1610102.2	1239.19	2	149	30	181.6	156.80	1082.39
SB-23	MW1104R	0402-0008-2011	12/22/2011	486345.1	1609471.2	1230.66	2	187	25	213.8	181.52	1049.14
	MW1104F	0402-0007-2011	12/21/2011	486352.3	1609469.3	1230.3	2	152	20	174.1	168.54	1061.76
SB-09	PZ1101H[3]	0402-0001-2011	9/19/2011	485990.9	1610339.5	1143.59	1	212	35	247.5		
B-1501	MW1501R		8/5/2015	484663.0	1609913.5	1161.78	4	135.4	14.6	153.5	152.40	1009.38
	MW1501F		8/6/2015	484662.0	1609917.5	1161.83	4	91.4	14.6	109.7	102.00	1059.83
B-1502	MW1502R		8/5/2015	484648.8	1610218.1	1047.41	4	23.4	9.6	36.0	DRY	
B-1503	MW1503R		8/15/2015	484596.7	1610487.6	1111.96	4	89.4	9.6	101.9	92.44	1019.52
	MW1503F		8/15/2015	484591.4	1610488.5	1111.93	4	48.4	14.6	66.3	63.95	1047.98

(1) Survey coordinates are US State Plane 1983 West Virginia North.

(2) amsl = average mean sea level. Vertical Datum is NAVD 1988, GEOID 03.

(3) Piezometer Abandoned in June 2013 due to encroaching landfill construction. One inch diameter piezometer.

(4) Measured from the top of riser.

Bedrock Unit Legend:

H = Hundred Sandstone

R = Rush Run Sandstone

F = Fish Creek Sandstone

B = Burton Sandstone/Shallow Bedrock

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FIELD INFORMATION FORM

Site: Mitchell Land Fill
Date: 7-15-20
AEP Project Number: 423802562
Weather Observations:

WELL ID: MW 1102 F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)
Water Height in Well: 23.9 (feet)
Total Depth: 180.0 (feet)
Water Volume in Well: 4.1 (gallons)
Depth to Water: 156.10 (feet)
Purge Volume: 7 gal.(calculated)
_____ gal. (removed)
Depth to Top of Screen: 147.0 (feet)
Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____
Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
12.9	9.0	880	0.8	1	156.33	1314
12.8	8.8	870	1.2	2	156.51	1318
12.8	8.6	850	1.4	3	156.73	1322
12.7	8.5	820	1.8	4	156.99	1326
12.7	8.4	810	2.1	5	157.21	1330
12.7	8.4	800	1.8	6	157.76	1334

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
12.7	8.4	800	1.4	7	158.12	1336

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703
1.0 NTU std = _____ 5.42 NTU std = _____
10.0 NTD std = _____ 51.8 NTU std = _____
499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus
4.01 std = _____
7.0 std = _____ 1413 umhos/cm = _____
10.1 std = _____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: _____
Sample time/date: 1336 / 7-15-2020

Comments:

Deviations from FSAP:

Sampler: Ron Vah
Signature: Ron Vah

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

Field Static Water Level Form
Mitchell Landfill
Mitchell Power Generation Plant
American Electric Power

Soil Boring ID	Monitoring Well ID	Monitoring Well Tag Number	Date Well Installed	Coordinates[1]		Top of Riser Elevation	Casing Diameter (inches)	Depth to Top of Screen	Screen Length	Measured Total Depth[4] (feet)	9-1-2020	
				Northing	Easting	(ft amsl)		(ft amsl)	(ft amsl)		Water Level TOC	Elevation
SB-01	MW1101H	0491-0003-2011	10/7/2011	484983.9	1609657.8	1220.74	2	290	50	342.9	DRY	N/A
	MW1101R	0491-0006-2011	10/28/2011	484877.8	1609656.4	1221.23	2	187	25	214.5	195.6	1025.63
	MW1101F	0402-0006-2011	12/20/2011	484864.5	1609651.4	1220.86	2	162	7	171.1	164.6	1056.26
	MW1101B	0402-0005-2011	12/19/2011	484870.8	1609653.8	1220.73	2	89	18	109.2	—	—
SB-07	MW1102R	0402-0002-2011	12/14/2011	485101.7	1611103.3	1228.36	2	196	8	225.8	180.71	1047.65
	MW1102T	0491-0004-2011	10/25/2011	485106.1	1611110.1	1228.67	2	147	30	180	156.2	1072.47
	MW1102B	0402-0003-2011	12/15/2011	485097.4	1611096.9	1228.84	2	72	17	90.9	—	—
SB-18	MW1103H	0491-0002-2011	9/27/2011	487005.3	1610094	1239.82	2	307	40	349.4	DRY	N/A
	MW1103R	0402-0004-2011	12/16/2011	486998.5	1610097.2	1240.01	2	191	7	200.3	178.7	1061.31
	MW1103F	0491-0005-2011	10/26/2011	487011.2	1610102.2	1239.19	2	149	30	181.6	156.65	1082.54
SB-23	MW1104R	0402-0008-2011	12/22/2011	486345.1	1609471.2	1230.66	2	187	25	213.8	178.7	1051.96
	MW1104F	0402-0007-2011	12/21/2011	486352.3	1609469.3	1230.3	2	152	20	174.1	168.38	1061.92
SB-09	PZ1101H[3]	0402-0001-2011	9/19/2011	485990.9	1610339.5	1143.59	1	212	35	247.5	—	—
B-1501	MW1501R		8/5/2015	484863.0	1609913.5	1161.78	4	135.4	14.6	153.5	152.4	1009.38
	MW1501F		8/6/2015	484862.0	1609917.5	1161.83	4	91.4	14.6	109.7	101.8	1060.03
B-1502	MW1502R		8/6/2015	484648.8	1610248.1	1047.41	4	23.4	9.6	36.0	32.5	1014.91
B-1503	MW1503R		8/15/2015	484596.7	1610487.6	1111.96	4	89.4	9.6	101.9	92.6	1019.36
	MW1503F		8/15/2015	484591.4	1610488.5	1111.93	4	48.4	14.6	66.3	64.5	1047.43

(1) Survey coordinates are US State Plane 1983 West Virginia North.

(2) amsl = average mean sea level. Vertical Datum is NAVD 1988, GEOID 03.

(3) Piezometer Abandoned in June 2013 due to encroaching landfill construction. One inch diameter piezometer.

(4) Measured from the top of riser.

Bedrock Unit Legend:

H = Hundred Sandstone

R = Rush Run Sandstone

F = Fish Creek Sandstone

B = Burton Sandstone/Shallow Bedrock

AEP OHIO
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FIELD INFORMATION FORM

Site: Mitchell Land Fill
Date: 9-1-2020

AEP Project Number: 423802560 2
Weather Observations: overcast 80's

WELL ID: MW1502R

Casing Diameter: 4 (inches)
Total Depth: 36.0 (feet)
Depth to Water: 32.5 (feet)
Depth to Top of Screen: 23.40 (feet)

Water Height in Well: 3.5 (feet)
Water Volume in Well: 2.31 (gallons)
Purge Volume: 2.5 gal.(calculated)
_____ gal. (removed)

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
15.5	7.0	871	3.4	0.625	33.1	1330
15.4	7.1	870	5.7	1.25	33.5	1334
15.4	7.2	870	7.2	1.8	34.2	1338

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
15.3	7.2	870	7.5	2.5	34.9	1342

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703
1.0 NTU std = _____ 5.42 NTU std = _____
10.0 NTD std = _____ 51.8 NTU std = _____
499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus
4.01 std = _____
7.0 std = _____ 1413 umhos/cm = _____
10.1 std = _____

Physical Properties
Odor: N/A
Color: N/A
Turbidity: N/A

Analysis Required: No
Sample time/date: No Sample

Comments: PH stabilized @ 7.2

Deviations from FSAP: _____

Sampler: Ron Vah
Signature: Ron Vah

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

Field Static Water Level Form
Mitchell Landfill
Mitchell Power Generation Plant
American Electric Power

Soil Boring ID	Monitoring Well ID	Monitoring Well Tag Number	Date Well Installed	Coordinates[1]		Top of Riser Elevation (ft amsl)	Casing Diameter (inches)	Depth to Top of Screen (ft amsl)	Screen Length (ft amsl)	Measured Total Depth[4] (feet)	10-20-20	
				Northing	Easting						Water Level TOC	Elevation
SB-01	MW1101H	0491-0003-2011	10/7/2011	484983.9	1609557.8	1220.71	2	250	50	342.9	292.90	927.81
	MW1101R	0491-0006-2011	10/28/2011	484877.8	1609656.4	1221.23	2	137	25	214.5	195.79	1025.44
	MW1101F	0402-0006-2011	12/20/2011	484864.5	1609051.4	1220.86	2	162	7	171.1	164.31	1056.65
	MW1101B	0402-0005-2011	12/19/2011	484870.8	1609653.8	1220.73	2	89	18	109.2	—	—
SB-07	MW1102R	0402-0002-2011	12/14/2011	485101.7	1611103.3	1228.36	2	196	8	205.8	179.96	1048.40
	MW1102F	0491-0004-2011	10/25/2011	485106.1	1611110.1	1228.67	2	147	30	180	156.51	1072.16
	MW1102B	0402-0003-2011	12/15/2011	485097.4	1611096.9	1228.84	2	72	17	90.9	—	—
SB-18	MW1103H	0491-0002-2011	9/27/2011	487005.3	1610094	1239.82	2	307	40	349.4	295.20	944.62
	MW1103R	0402-0004-2011	12/16/2011	486998.5	1610097.2	1240.01	2	191	7	200.3	195.26	1044.75
	MW1103F	0491-0005-2011	10/26/2011	487011.2	1610102.2	1239.19	2	149	30	181.6	156.79	1082.40
SB-23	MW1104R	0402-0008-2011	12/22/2011	486345.1	1609471.2	1230.66	2	137	25	213.8	178.77	1051.89
	MW1104F	0402-0007-2011	12/21/2011	486352.3	1609469.3	1230.3	2	152	20	174.1	168.23	1062.07
SB-09	PZ1101H[3]	0402-0001-2011	9/19/2011	485990.9	1610339.5	1143.59	1	212	35	247.5	—	—
B-1501	MW1501R		8/5/2015	484863.0	1609913.5	1161.78	4	135.4	14.6	153.5	152.48	1009.30
	MW1501F		8/6/2015	484862.0	1609917.5	1161.83	4	91.4	14.6	109.7	101.65	1060.18
B-1502	MW1502R		8/6/2015	484648.8	1610248.1	1047.41	4	23.4	9.6	36.0	33.53	1013.88
B-1503	MW1503R		8/15/2015	484596.7	1610487.6	1111.96	4	89.4	9.6	101.9	94.60	1017.36
	MW1503F		8/15/2015	484591.4	1610488.5	1111.93	4	48.4	14.6	66.3	64.17	1047.76

(1) Survey coordinates are US State Plane 1983 West Virginia North.

(2) amsl = average mean sea level. Vertical Datum is NAVD 1988, GEOID 03.

(3) Piezometer Abandoned in June 2013 due to encroaching landfill construction. One inch diameter piezometer.

(4) Measured from the top of riser.

Bedrock Unit Legend:

H = Hundred Sandstone

R = Rush Run Sandstone

F = Fish Creek Sandstone

B = Burton Sandstone/Shallow Bedrock

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802560 2

Date: 10-21-20

Weather Observations: Sunny 70's

WELL ID: MW-1101H

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 342.9 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 292.90 (feet)

Purge Volume: ϕ gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 290.0 (feet)

Minimum Purge Volume (drawdown)(gal/ft.) + (well screen length)(gal/ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1440

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst **Signature:** _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill AEP Project Number: 423802560 2

Date: 10-21-2020 Weather Observations: Sunny 70's

WELL ID: MW 1101R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches) Water Height in Well: 18.7 (feet)

Total Depth: 214.5 (feet) Water Volume in Well: 3.2 (gallons)

Depth to Water: 195.8 (feet) Purge Volume: 2 gal.(calculated) _____ gal. (removed)

Depth to Top of Screen: 187.0 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
12.8	9.19	1120	5.5	0.5	196.7	1404
12.8	9.21	1120	7.8	1.0	197.9	1408
12.8	9.12	1120	9.6	1.5	199.2	1412

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
12.7	9.06	1110	12.94	2.0	202.6	1427

Instrument Calibration

Turbidity Meter Type Hanna HI 93703 1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus 4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A Analysis Required: _____

Color: N/A

Turbidity: N/A Sample time/date: 1415 @ 10-21-2020

Comments: _____

Deviations from FSAP: _____

Sampler: RonVah / Chris Parkhurst Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802560 2

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW 1101 F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 171.10 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 164.31 (feet)

Purge Volume: Ø gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 162.0 (feet)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
						1435

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: Insufficient water to sample

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO

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FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW 1102 R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 205.08 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 179.96 (feet)

Purge Volume: Ø gal.(calculated)

Depth to Top of Screen: 196.6 (feet)

_____ gal. (removed)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1530

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst **Signature:** _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW 1102 F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: 23.49 (feet)

Total Depth: 180.0 (feet)

Water Volume in Well: 4.0 (gallons)

Depth to Water: 156.5 (feet)

Purge Volume: 2 gal (calculated)

____ gal. (removed)

Depth to Top of Screen: 147.0 (feet)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = ____

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
12.9	8.98	800	1.80	0.5	157.0'	1506
12.8	9.01	800	1.33	1.0	157.8'	1510
12.8	9.01	800	1.27	1.5	158.7'	1514

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
12.9	8.99	800	2.08	2.0	160.20'	1525

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = ____ 5.42 NTU std = ____

10.0 NTD std = ____ 51.8 NTU std = ____

499 NTU std = ____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = ____

7.0 std = ____ 1413 umhos/cm = ____

10.1 std = ____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: ____

Sample time/date: 1516 / 10-21-2020

Comments: ____

Deviations from FSAP: ____

Sampler: Ron Vah / Chris Parkhurst

Signature: ____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO®

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FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW 1103H

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 349.4 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 307.7' (feet)

Purge Volume: Ø gal.(calculated)

Depth to Top of Screen: 307.0 (feet)

_____ gal. (removed)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1650

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst **Signature:** _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802602

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW 1103R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 200.30 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 195.26 (feet)

Purge Volume: Ø gal (calculated)

_____ gal. (removed)

Depth to Top of Screen: 191.0 (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET SWL Meter

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1655

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTU std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW 1103 F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: 24.9 (feet)

Total Depth: 181.6 (feet)

Water Volume in Well: 4.2 (gallons)

Depth to Water: 156.7 (feet)

Purge Volume: 2.5 gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 149.0 (feet)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
13.0	8.93	2000	8.7	0.6	157.8	1612
13.0	8.94	2000	9.8	1.2	158.7	1616
13.0	8.93	2000	9.6	1.8	159.4	1620

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
13.5	8.81	1990	16.63	2.5	163.0	1635

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: 1622 / 10-21-2020

Comments: _____

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW 1104R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 213.80 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 178.77 (feet)

Purge Volume: Ø gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 187.0 (feet)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1545

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTU std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO

A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802560 2

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW-1104F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 2 (inches)

Water Height in Well: N/A (feet)

Total Depth: 174.10 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 168.23 (feet)

Purge Volume: 0 gal.(calculated)

Depth to Top of Screw: 152.0 (feet)

_____ gal. (removed)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1455

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: Insufficient water to sample

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst **Signature:** _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW1501R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)

Water Height in Well: N/A (feet)

Total Depth: 153.5 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 152.48 (feet)

Purge Volume: Ø gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 135.40 (feet)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1450

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTU std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO®

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FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW 1501F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)

Water Height in Well: N/A (feet)

Total Depth: 109.70 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 101.65 (feet)

Purge Volume: Ø gal.(calculated)

Depth to Top of Screen: 91.4 (feet)

_____ gal. (removed)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1445

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NIU std = _____

10.0 NTD std = _____ 51.8 NIU std = _____

499 NIU std = _____

pH/Conductivity Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: _____

Deviations from FSAP: _____

Sampler: Ron Vah / Christ Parkhurst

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO

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FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW1502R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)

Water Height in Well: 2.85 (feet)

Total Depth: 36.0 (feet)

Water Volume in Well: 1.9 (gallons)

Depth to Water: 33.15 (feet)

Purge Volume: 3 gal.(calculated)

_____ gal. (removed)

Depth to Top of Screen: 23.40 (feet)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
14.3	8.41	870	4.92	.33	33.51	1248
14.7	8.11	870	13.21	.66	33.69	1252
14.9	8.02	860	26.71	.99	33.76	1256
15.0	7.96	860	33.78	1.32	33.84	1300
15.0	7.92	860	20.87	1.65	33.92	1304
15.0	7.91	860	14.9	1.98	34.10	1308
15.0	7.91	860	12.2	2.31	34.11	1312
15.1	7.91	870	9.8	2.64	34.11	1316

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
15.5	7.70	870	9.77	3.0	34.11	1342

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTU std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: 1318 / 10-21-2020

Comments: _____

Deviations from FSAP: _____

Sampler: RonVah / Chris Parkhurst

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO

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FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW-1503 R

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)

Water Height in Well: 7.3 (feet)

Total Depth: 101.9 (feet)

Water Volume in Well: .66 (gallons)

Depth to Water: 94.60 (feet)

Purge Volume: Ø gal.(calculated)

Depth to Top of Screen: 88.4 (feet)

Ø gal. (removed)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1215

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity — Meter Type: Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTD std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type: YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-23-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vak / Chris Parkhurst

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill

AEP Project Number: 423802562

Date: 10-21-2020

Weather Observations: Sunny 70's

WELL ID: MW 1503 F

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: 4 (inches)

Water Height in Well: N/A (feet)

Total Depth: 66.30 (feet)

Water Volume in Well: N/A (gallons)

Depth to Water: 64.17 (feet)

Purge Volume: Ø gal.(calculated)

gal. (removed)

Depth to Top of Screen: 48.4 (feet)

Measured using: GeoTech ET SWL Meter

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Purged using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Sampled using: Dedicated Bailer/Polypro Rope | Grundfos pump/poly tubing | Other Dedicated Bladder Pump

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	1220

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
—	—	—	—	—	—	—

Instrument Calibration

Turbidity — Meter Type Hanna HI 93703

1.0 NTU std = _____ 5.42 NTU std = _____

10.0 NTU std = _____ 51.8 NTU std = _____

499 NTU std = _____

pH/Conductivity — Meter Type YSI - Pro Plus

4.01 std = _____

7.0 std = _____ 1413 umhos/cm = _____

10.1 std = _____

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: No Sample / 10-21-2020

Comments: Insufficient water to Sample

Deviations from FSAP: _____

Sampler: Ron Vah / Chris Parkhurst

Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

AEP OHIO
A unit of American Electric Power

FIELD INFORMATION FORM

Site: Mitchell Land Fill AEP Project Number: 4238025602

Date: 10-21-2020 Weather Observations: Sunny 70°s

WELL ID: Leachate

Water Volume Factors	
Diameter	Gallons/Foot
1 inches	0.04
1.5 inches	0.092
2 inches	0.17
3 inches	0.38
4 inches	0.66

Casing Diameter: N/A (inches) Water Height in Well: N/A (feet)

Total Depth: N/A (feet) Water Volume in Well: N/A (gallons)

Depth to Water: N/A (feet) Purge Volume: N/A gal.(calculated) _____ gal. (removed)

Depth to Top of Screen: N/A (feet)

Minimum Purge Volume (drawdown)(gal./ft.) + (well screen length)(gal./ft.) = _____

Measured using: GeoTech ET

Purged using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other N/A

Sampled using: Dedicated Bailer/Polypro Rope Grundfos pump/poly tubing Other Dipper Pole

Field Measurements

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Purging (feet)	Time
—	—	—	—	—	—	—

Field Measurements at Time of Sampling

Temperature (degrees C)	pH (s.u.)	Conductivity (umhos/cm)	Turbidity (NTU)	Volume (gallons)	Water Level During Sampling (feet)	Time
19.8	9.08	1930	—	N/A	100 spm	1135

Instrument Calibration

Turbidity	Meter Type _____	1.0 NTU std = _____	5.42 NTU std = _____
		10.0 NTD std = _____	51.8 NTU std = _____
			499 NTU std = _____
pH/Conductivity	Meter Type YSI-Pro	4.01 std = _____	
		7.0 std = _____	1413 umhos/cm = _____
		10.1 std = _____	

Physical Properties

Odor: N/A

Color: N/A

Turbidity: N/A

Analysis Required: _____

Sample time/date: 1135 / 10-21-2020

Comments: _____

Deviations from FSAP: _____

Sampler: RonVah / Chris Parkhurst Signature: _____

Parameter	Method #
Temperature	SM 2550-B 2000/2010
pH	SM4500-H B2011
Conductivity	SM2510B-2011

EPA ADDITIONAL INFORMATION REQUEST

Attachment D

2017 Annual Groundwater Report for

Mitchell Plant's Landfill

Annual Groundwater Monitoring Report

Kentucky Power Company

Mitchell Plant

Landfill

Moundsville, WV

January 2018

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

KENTUCKY POWER℠

An AEP Company

BOUNDLESS ENERGY℠

Table of Contents

I. Overview

This *Annual Groundwater Monitoring Report* (Report) has been prepared to report the status of activities for the preceding year for the Landfill at Kentucky Power Company's, a wholly-owned subsidiary of American Electric Power Company (AEP), Mitchell Power Plant. The USEPA's CCR rules require that the Annual Groundwater Monitoring Report be posted to the operating record for the preceding year no later than January 31, 2018.

In general, the following activities were completed:

- Monitoring wells were installed and developed to establish a certified groundwater monitoring system around each CCR unit, in accordance with the requirements of 40 CFR 257.91 pursuant AEP's *Groundwater Monitoring Network Evaluation (2016)*;
- Groundwater samples were collected and analyzed for Appendix III and Appendix IV 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;
- Background groundwater values for each Appendix III and Appendix IV constituent were collected;
- Detection Monitoring sampling was initiated;
- A statistical process in accordance with 40 CFR 257.93 to evaluate groundwater data was prepared, certified, and posted to AEP's CCR website in April 2017 [AEP's *Statistical Analysis Plan (*AEP 2017)]. The statistical process was guided by USEPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* ("Unified Guidance", USEPA, 2009). Data evaluation is underway.

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 I**);

- 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 (Attached as **Appendix II**, where applicable); and
- Other information required to be included in the annual report such as alternate source demonstration or assessment of corrective measures, if applicable.

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

II. Groundwater Monitoring Well Locations and Identification Numbers

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

Legend

- Compliance Sampling Location
- Upgradient Sampling Location
- CCR Landfill (Approximate Limits of Waste)

Notes

- Monitoring well coordinates provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.

500 250 0 500 Feet

Site Layout
Landfill - Fish Creek Aquifer

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2018/01/26

Figure **1a**

C:\Users\mmuenich\Documents\local_projects\AEP_GIS\Mitchell\MXDs\Landfill-FC\AEP-Mitchell_LF-Fish-Creek_Site_Layout.mxd. MMuenich. 1/26/2018. Project/Phase/Task.

Legend

- Compliance Sampling Location
- Upgradient Sampling Location
- CCR Landfill (Approximate Limits of Waste)

Notes

- Monitoring well coordinates provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.

500 250 0 500 Feet

Site Layout
Landfill - Rush Run Aquifer

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2018/01/26

Figure **1b**

C:\Users\mmuenich\Documents\local_projects\AEP_GIS\Mitchell\MXDs\AEP-Mitchell_LF-Rush-Run_Site_Layout.mxd. MMuenich. 1/26/2018. Project/Phase/Task.

III. Monitoring Wells Installed or Decommissioned

There were no monitoring wells installed or decommissioned in 2017. The network design, as summarized in the *Groundwater Monitoring Network Design Report* (2016) and as posted at the CCR web site for Mitchell 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 I contains tables showing the groundwater quality data collected during the establishment of background quality. Static water elevation data from each monitoring event also are shown in Appendix I, along with the groundwater velocity calculations, groundwater flow direction and potentiometric maps developed after each sampling event.

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

As of this first annual groundwater report date there has been no transition between detection monitoring and assessment monitoring. Detection monitoring will continue in 2018. 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).

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.

VI. Other Information Required

At the appropriate time the geochemical analyses, coupled with the statistical analyses of the groundwater quality data, will determine whether an alternate source or alternate sources are affecting groundwater chemistry. In those cases where an alternative source(s) demonstration is made, those analyses and supporting information will be presented as well.

VII. Description of Any Problems Encountered in 2017 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. There were, however, dry wells encountered during sampling, but this did not affect the monitoring network at the landfill and the minimum requirement of 1 upgradient and 3 downgradient wells was still met.

VIII. A Projection of Key Activities for the Upcoming Year

Key activities for 2018 include:

- Detection monitoring on a twice per year schedule
- Evaluation of the first 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 second annual groundwater report

APPENDIX I

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.

Groundwater Data Tables

Table 1: Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1101F									MW-1102F								
		6/15/2016	8/3/2016	9/28/2016	11/15/2016	2/14/2017	4/12/2017	5/24/2017	7/26/2017	10/10/2017	6/15/2016	8/3/2016	10/3/2016	11/15/2016	2/14/2017	4/12/2017	5/24/2017	7/26/2017	10/10/2017
		Background								Detection	Background								Detection
Antimony	µg/L	0.210	0.140	0.180	-	-	-	-	-	-	0.710	0.690	0.640	0.630	0.620	0.560	0.600	0.540	NS
Arsenic	µg/L	1.64	1.46	1.79	-	-	-	-	-	-	9.37	8.16	8.45	8.49	8.66	7.68	8.76	7.58	NS
Barium	µg/L	159	155	142	-	-	-	-	-	-	214	212	194	212	197	191	229	205	NS
Beryllium	µg/L	0.0230	0.0330	0.0290	-	-	-	-	-	-	<0.005 U	<0.005 U	0.00500 J	0.00500 J	0.00600 J	0.00500 J	0.0100 J	<0.004 U	NS
Boron	mg/L	0.0420	0.380	0.0540	-	-	-	-	-	-	0.109	0.280	0.160	0.117	0.109	0.109	0.118	0.202	0.278
Cadmium	µg/L	0.0800	0.0800	0.120	-	-	-	-	-	-	0.0400	0.0200 J	0.0100 J	0.00800 J	0.00600 J	0.0100 J	0.0200	0.0100 J	NS
Calcium	mg/L	88.3	91.0	88.6	-	-	-	-	-	-	4.34	5.48	5.45	4.87	5.04	4.67	5.31	5.41	4.79
Chloride	mg/L	3.87	3.30	3.73	-	-	-	-	-	-	12.4	11.9	11.8	11.7	11.3	11.3	13.7	11.4	12.4
Chromium	µg/L	0.600	0.600	0.800	-	-	-	-	-	-	0.400	0.400	0.500	0.435	0.411	0.399	0.807	0.323	NS
Cobalt	µg/L	0.294	0.244	0.231	-	-	-	-	-	-	0.0960	0.0900	0.286	0.0740	0.0490	0.0790	0.203	0.0720	NS
Combined Radium	pCi/L	0.304	1.49	1.56	-	-	-	-	-	-	0.352	0.881	0.972	1.86	1.02	0.183	0.325	0.942	NS
Fluoride	mg/L	0.220	0.210	0.260	-	-	-	-	-	-	0.560	0.580	0.600	0.560	0.530	0.530	0.560	0.570	0.570
Lead	µg/L	0.525	0.673	0.511	-	-	-	-	-	-	0.335	0.183	0.298	0.141	0.131	0.135	0.335	0.121	NS
Lithium	mg/L	0.0120	0.0170	0.0160	-	-	-	-	-	-	0.00300	0.00600	0.00200	0.00300	0.00400	0.00500	<0.0002 U	0.00700	NS
Mercury	µg/L	<0.002 U	<0.002 U	<0.002 U	-	-	-	-	-	-	<0.002 U	<0.002 U	<0.002 U	<0.002 U	<0.002 U	<0.002 U	<0.002 U	<0.002 U	NS
Molybdenum	µg/L	3.87	4.04	3.39	-	-	-	-	-	-	28.1	25.8	23.9	22.9	21.4	19.3	20.0	34.7	NS
Selenium	µg/L	0.200	0.200	0.300	-	-	-	-	-	-	0.300	0.300	0.300	0.300	0.300	0.300	0.400	0.300	NS
Total Dissolved Solids	mg/L	395	425	466	-	-	-	-	-	-	523	535	519	551	521	530	521	519	526
Sulfate	mg/L	64.3	62.1	58.1	-	-	-	-	-	-	37.2	35.9	29.5	27.4	29.9	30.6	31.8	31.5	32.3
Thallium	µg/L	0.0200 J	<0.01 U	0.0200 J	-	-	-	-	-	-	<0.01 U	0.0100 J	<0.01 U	<0.01 U	0.0200 J	0.0100 J	0.0100 J	0.0300 J	NS
pH	SU	7.37	7.41	8.66	-	-	-	-	-	-	8.02	8.19	8.10	8.14	8.20	8.29	8.28	8.26	8.37

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL).
J: Estimated value. Parameter was detected in concentrations below the reporting limit.
NS: Not Sampled
-: Insufficient water to sample
For statistical analysis, parameters which were not detected were replaced with the reporting limit.

Table 1: Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1103F									MW-1104F								
		6/15/2016	8/2/2016	10/3/2016	11/16/2016	2/15/2017	4/11/2017	5/23/2017	7/26/2017	10/11/2017	6/15/2016	8/3/2016	9/28/2016	11/15/2016	2/14/2017	4/12/2017	5/24/2017	7/26/2017	10/10/2017
		Background								Detection	Background								Detection
Antimony	µg/L	0.160	0.140	0.0400 J	0.100	0.0300 J	0.0700	0.0300 J	0.0200 J	NS	-	-	-	-	-	-	-	-	-
Arsenic	µg/L	8.03	7.01	5.80	7.71	7.67	8.46	7.85	6.81	NS	-	-	-	-	-	-	-	-	-
Barium	µg/L	639	704	558	723	631	618	688	562	NS	-	-	-	-	-	-	-	-	-
Beryllium	µg/L	0.0290	0.0260	0.0100 J	0.0100 J	0.00900 J	0.00600 J	0.00600 J	<0.004 U	NS	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.355	0.402	0.321	0.323	0.303	0.304	0.346	0.343	0.328	-	-	-	-	-	-	-	-	-
Cadmium	µg/L	0.0200	0.0100 J	0.0300	0.00900 J	0.00800 J	0.00600 J	0.00700 J	0.00700 J	NS	-	-	-	-	-	-	-	-	-
Calcium	mg/L	3.01	2.99	3.12	2.97	2.82	2.57	2.88	2.76	3.09	-	-	-	-	-	-	-	-	-
Chloride	mg/L	243	247	242	240	240	234	237	240	247	-	-	-	-	-	-	-	-	-
Chromium	µg/L	1.00	0.900	0.400	0.471	0.336	0.262	0.260	0.112	NS	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	0.351	0.299	0.180	0.159	0.147	0.102	0.149	0.136	NS	-	-	-	-	-	-	-	-	-
Combined Radium	pCi/L	1.10	0.899	1.03	1.57	1.42	2.18	1.21	1.80	NS	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	3.11	3.20	3.34	2.96	3.07	3.05	3.23	3.24	3.17	-	-	-	-	-	-	-	-	-
Lead	µg/L	0.674	0.479	0.313	0.218	0.213	0.0880	0.194	0.103	NS	-	-	-	-	-	-	-	-	-
Lithium	mg/L	0.0120	0.0160	0.0160	0.0150	0.0160	0.0150	0.00600	0.0150	NS	-	-	-	-	-	-	-	-	-
Mercury	µg/L	<0.002 U	<0.002 U	<0.004 U	<0.002 U	<0.002 U	<0.002 U	<0.002 U	<0.002 U	NS	-	-	-	-	-	-	-	-	-
Molybdenum	µg/L	10.1	2.61	2.66	2.57	2.81	3.19	2.80	5.46	NS	-	-	-	-	-	-	-	-	-
Selenium	µg/L	0.200	0.200	0.100 J	0.100	0.0900 J	0.100	0.0600 J	0.0700 J	NS	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	1390	1420	1380	1370	1400	1400	1370	1370	1390	-	-	-	-	-	-	-	-	-
Sulfate	mg/L	0.500	0.300	<0.04 U	0.200	0.200	0.400	0.400	0.300	0.500	-	-	-	-	-	-	-	-	-
Thallium	µg/L	0.0100 J	<0.01 U	0.0100 J	<0.01 U	0.0300 J	<0.01 U	<0.01 U	0.0200 J	NS	-	-	-	-	-	-	-	-	-
pH	SU	8.29	8.30	8.37	8.39	8.48	8.58	8.54	8.54	8.60	-	-	-	-	-	-	-	-	-

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL).
J: Estimated value. Parameter was detected in concentrations below the reporting limit.
NS: Not Sampled
-: Insufficient water to sample
For statistical analysis, parameters which were not detected were replaced with the reporting limit.

Table 1: Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1501F									MW-1503F								
		6/15/2016	8/3/2016	9/28/2016	11/15/2016	2/14/2017	4/12/2017	5/24/2017	7/26/2017	10/10/2017	6/15/2016	8/3/2016	9/28/2016	11/15/2016	2/14/2017	4/12/2017	5/24/2017	7/26/2017	10/10/2017
		Background								Detection	Background								Detection
Antimony	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Combined Radium	pCi/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	SU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL).
J: Estimated value. Parameter was detected in concentrations below the reporting limit.
NS: Not Sampled
-: Insufficient water to sample
For statistical analysis, parameters which were not detected were replaced with the reporting limit.

Table 1: Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1101R									MW-1102R								
		6/15/2016	8/3/2016	9/28/2016	11/16/2016	2/14/2017	4/12/2017	5/24/2017	7/25/2017	10/11/2017	6/15/2016	8/3/2016	10/3/2016	11/16/2016	2/15/2017	4/11/2017	5/23/2017	7/26/2017	10/11/2017
		Background								Detection	Background								Detection
Antimony	µg/L	0.820	1.10	0.920	0.670	0.690	0.840	0.660	0.620	NS	2.01	1.71	1.73	-	-	-	-	-	-
Arsenic	µg/L	8.11	10.8	11.1	14.2	15.3	12.4	15.7	14.5	NS	2.64	3.57	3.37	-	-	-	-	-	-
Barium	µg/L	185	149	149	125	102	117	102	91.3	NS	292	356	441	-	-	-	-	-	-
Beryllium	µg/L	0.0310	0.0230	0.0100 J	0.0100 J	0.0100 J	0.0200 J	0.0100 J	0.0100 J	NS	0.0200 J	0.128	0.307	-	-	-	-	-	-
Boron	mg/L	0.287	0.518	0.382	1.80	0.501	0.360	0.380	0.415	0.394	0.339	0.467	0.332	-	-	-	-	-	-
Cadmium	µg/L	0.0300	0.0300	0.0200	0.0200 J	0.0200 J	0.0200 J	0.0100 J	0.0100 J	NS	0.350	0.140	0.170	-	-	-	-	-	-
Calcium	mg/L	6.91	5.00	6.12	19.4	2.23	4.02	1.91	1.76	1.87	3.49	4.05	5.33	-	-	-	-	-	-
Chloride	mg/L	8.41	10.3	13.3	15.2	15.4	14.4	15.1	15.8	16.9	219	217	213	-	-	-	-	-	-
Chromium	µg/L	1.10	1.00	0.700	0.595	0.512	0.824	0.526	0.377	NS	0.500	3.00	3.90	-	-	-	-	-	-
Cobalt	µg/L	0.650	0.363	0.301	0.143	0.160	0.333	0.299	0.126	NS	0.799	1.75	3.01	-	-	-	-	-	-
Combined Radium	pCi/L	0.493	0.478	0.565	1.81	1.66	0.190	0.759	0.977	NS	0.710	1.22	2.83	-	-	-	-	-	-
Fluoride	mg/L	1.20	1.56	1.83	2.29	2.40	2.17	2.41	2.61	2.59	2.97	2.98	2.96	-	-	-	-	-	-
Lead	µg/L	1.22	0.674	0.550	0.292	0.327	0.634	0.298	0.235	NS	0.558	2.82	7.24	-	-	-	-	-	-
Lithium	mg/L	0.00200	0.0120	0.00900	0.0260	0.0120	0.0100	<0.0002 U	0.00900	NS	0.0150	0.0210	0.0280	-	-	-	-	-	-
Mercury	µg/L	0.00300 J	<0.002 U	<0.002 U	<0.002 U	<0.002 U	0.00200 J	<0.002 U	<0.002 U	NS	<0.002 U	0.00700 J	0.00700	-	-	-	-	-	-
Molybdenum	µg/L	31.8	32.9	26.2	20.6	34.0	16.7	14.8	18.3	NS	68.7	66.0	51.4	-	-	-	-	-	-
Selenium	µg/L	0.500	0.500	0.500	0.400	0.400	0.500	0.300	0.300	NS	0.900	1.20	1.90	-	-	-	-	-	-
Total Dissolved Solids	mg/L	741	750	43.0	801	806	798	793	788	784	1470	1450	1530	-	-	-	-	-	-
Sulfate	mg/L	76.4	76.4	43.5	32.2	32.0	39.2	28.6	28.7	29.1	47.8	44.9	35.1	-	-	-	-	-	-
Thallium	µg/L	0.0500 J	0.0200 J	0.0100 J	<0.01 U	0.0200 J	<0.01 U	<0.01 U	0.0200 J	NS	0.0100 J	0.0300 J	0.0300 J	-	-	-	-	-	-
pH	SU	8.17	8.40	8.50	8.56	8.57	8.74	8.68	8.65	8.72	8.21	8.29	8.30	-	-	-	-	-	-

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL).
J: Estimated value. Parameter was detected in concentrations below the reporting limit.
NS: Not Sampled
-: Insufficient water to sample
For statistical analysis, parameters which were not detected were replaced with the reporting limit.

Table 1: Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1103R									MW-1104R								
		6/20/2016	8/9/2016	9/27/2016	11/9/2016	2/15/2017	4/12/2017	5/23/2017	7/25/2017	10/11/2017	6/21/2016	8/9/2016	9/27/2016	11/9/2016	2/15/2017	4/12/2017	5/23/2017	7/25/2017	10/11/2017
		Background								Detection	Background								Detection
Antimony	µg/L	-	-	-	-	-	-	-	-	-	0.660	-	-	-	-	-	-	-	-
Arsenic	µg/L	-	-	-	-	-	-	-	-	-	4.35	-	-	-	-	-	-	-	-
Barium	µg/L	-	-	-	-	-	-	-	-	-	182	-	-	-	-	-	-	-	-
Beryllium	µg/L	-	-	-	-	-	-	-	-	-	0.570	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	-	-	-	-	0.431	-	-	-	-	-	-	-	-
Cadmium	µg/L	-	-	-	-	-	-	-	-	-	0.180	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	-	-	-	-	39.4	-	-	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-	-	485	-	-	-	-	-	-	-	-
Chromium	µg/L	-	-	-	-	-	-	-	-	-	3.40	-	-	-	-	-	-	-	-
Cobalt	µg/L	-	-	-	-	-	-	-	-	-	4.36	-	-	-	-	-	-	-	-
Combined Radium	pCi/L	-	-	-	-	-	-	-	-	-	0.153	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	1.18	-	-	-	-	-	-	-	-
Lead	µg/L	-	-	-	-	-	-	-	-	-	9.41	-	-	-	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	-	-	-	-	0.0140	-	-	-	-	-	-	-	-
Mercury	µg/L	-	-	-	-	-	-	-	-	-	<0.09 U	-	-	-	-	-	-	-	-
Molybdenum	µg/L	-	-	-	-	-	-	-	-	-	42.3	-	-	-	-	-	-	-	-
Selenium	µg/L	-	-	-	-	-	-	-	-	-	2.30	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	-	-	-	-	-	2390	-	-	-	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	162	-	-	-	-	-	-	-	-
Thallium	µg/L	-	-	-	-	-	-	-	-	-	0.133	-	-	-	-	-	-	-	-
pH	SU	-	-	-	-	-	-	-	-	-	7.87	-	-	-	-	-	-	-	-

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL).
J: Estimated value. Parameter was detected in concentrations below the reporting limit.
NS: Not Sampled
-: Insufficient water to sample
For statistical analysis, parameters which were not detected were replaced with the reporting limit.

Table 1: Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1501R									MW-1502R								
		6/20/2016	8/9/2016	9/27/2016	11/9/2016	2/15/2017	4/12/2017	5/23/2017	7/25/2017	10/11/2017	6/20/2016	8/9/2016	9/27/2016	11/9/2016	2/15/2017	4/12/2017	5/23/2017	7/25/2017	10/11/2017
		Background								Detection	Background								Detection
Antimony	µg/L	-	-	-	-	-	-	-	-	-	0.220	0.200	0.160	0.200	0.130	0.130	0.150	0.210	NS
Arsenic	µg/L	-	-	-	-	-	-	-	-	-	0.280	0.260	0.270	0.840	0.240	0.690	0.530	0.300	NS
Barium	µg/L	-	-	-	-	-	-	-	-	-	30.6	34.1	38.2	44.2	27.7	29.2	32.2	19.0	NS
Beryllium	µg/L	-	-	-	-	-	-	-	-	-	<0.005 U	<0.005 U	<0.005 U	0.0620	0.00600 J	0.0530	0.0330	0.00800 J	NS
Boron	mg/L	-	-	-	-	-	-	-	-	-	0.268	0.160	0.376	0.214	0.0690	0.0750	0.100	0.158	0.132
Cadmium	µg/L	-	-	-	-	-	-	-	-	-	0.00500 J	0.00600 J	0.00400 J	0.00900 J	<0.004 U	0.00800 J	<0.005 U	<0.005 U	NS
Calcium	mg/L	-	-	-	-	-	-	-	-	-	71.5	95.4	103	87.3	90.0	72.2	73.9	61.7	91.0
Chloride	mg/L	-	-	-	-	-	-	-	-	-	33.4	34.0	39.7	25.4	167	79.5	52.4	18.8	24.5
Chromium	µg/L	-	-	-	-	-	-	-	-	-	0.300	0.300	0.400	1.44	1.90	1.20	0.918	0.196	NS
Cobalt	µg/L	-	-	-	-	-	-	-	-	-	0.0820	0.0680	0.0760	0.507	0.0690	0.426	0.238	0.0820	NS
Combined Radium	pCi/L	-	-	-	-	-	-	-	-	-	0.143	1.03	0.429	2.50	2.61	0.613	0.647	0.632	NS
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	0.180	0.170	0.100 J	0.100 J	0.160	0.160	0.170	0.200	0.100 J
Lead	µg/L	-	-	-	-	-	-	-	-	-	0.0640	0.0890	0.0640	0.764	0.0610	0.630	0.364	0.0880	NS
Lithium	mg/L	-	-	-	-	-	-	-	-	-	0.00200	0.0100	0.0120	0.00600	0.00900	0.0150	0.00200	0.00900	NS
Mercury	µg/L	-	-	-	-	-	-	-	-	-	<0.09 U	<0.002 U	<0.002 U	<0.002 U	<0.002 U	0.00200 J	<0.002 U	<0.002 U	NS
Molybdenum	µg/L	-	-	-	-	-	-	-	-	-	3.48	8.71	8.40	3.19	1.84	1.91	2.46	2.47	NS
Selenium	µg/L	-	-	-	-	-	-	-	-	-	8.20	7.40	8.80	5.30	4.30	4.80	4.70	3.20	NS
Total Dissolved Solids	mg/L	-	-	-	-	-	-	-	-	-	474	547	560	551	564	507	466	358	535
Sulfate	mg/L	-	-	-	-	-	-	-	-	-	155	187	183	186	90.1	102	118	88.6	159
Thallium	µg/L	-	-	-	-	-	-	-	-	-	0.0100 J	<0.01 U	<0.01 U	0.0300 J	0.0300 J	0.0200 J	0.0100 J	0.0300 J	NS
pH	SU	-	-	-	-	-	-	-	-	-	7.28	7.28	7.38	7.43	7.50	7.59	7.55	7.32	7.33

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL).
J: Estimated value. Parameter was detected in concentrations below the reporting limit.
NS: Not Sampled
-: Insufficient water to sample
For statistical analysis, parameters which were not detected were replaced with the reporting limit.

Table 1: Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1503R								
		6/20/2016	8/9/2016	9/27/2016	11/9/2016	2/15/2017	4/12/2017	5/23/2017	7/25/2017	10/11/2017
		Background								Detection
Antimony	µg/L	-	-	-	-	-	-	-	-	-
Arsenic	µg/L	-	-	-	-	-	-	-	-	-
Barium	µg/L	-	-	-	-	-	-	-	-	-
Beryllium	µg/L	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	-	-	-	-
Cadmium	µg/L	-	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	-	-	-	-
Chloride	mg/L	-	-	-	-	-	-	-	-	-
Chromium	µg/L	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	-	-	-	-	-	-	-	-	-
Combined Radium	pCi/L	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-
Lead	µg/L	-	-	-	-	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	-	-	-	-
Mercury	µg/L	-	-	-	-	-	-	-	-	-
Molybdenum	µg/L	-	-	-	-	-	-	-	-	-
Selenium	µg/L	-	-	-	-	-	-	-	-	-
Total Dissolved Solids	mg/L	-	-	-	-	-	-	-	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	-	-
Thallium	µg/L	-	-	-	-	-	-	-	-	-
pH	SU	-	-	-	-	-	-	-	-	-

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
pCi/L: picocuries per liter
SU: standard unit
U: Non-detect value. Parameters which were not detected are shown as less than the method detection limit (MDL).
J: Estimated value. Parameter was detected in concentrations below the reporting limit.
NS: Not Sampled
-: Insufficient water to sample
For statistical analysis, parameters which were not detected were replaced with the reporting limit.

Table 2: Historical Groundwater Data Summary
Mitchell Plant - Landfill

Geosyntec Consultants, Inc.

Parameter	Unit	MW-1101F														
		2/23/2012	4/24/2012	6/1/2012	8/23/2012	10/23/2012	12/21/2012	2/20/2013	6/18/2013	9/25/2013	12/19/2013	6/26/2014	10/2/2014	6/15/2015	9/17/2015	5/25/2016
Chloride	mg/L	54	18	16	13	57	25	4.7	5.1	5.6	6.4	5	5	4.5	4.5	4.01
Fluoride	mg/L	0.7	0.25	0.19	0.28	1.1	0.71	0.23	0.083	0.23	0.32	-	-	-	-	0.23
pH	SU	8.26	8.03	8.04	7.92	8.49	7.48	7.89	7.35	7.64	-	7.64	7.99	7.49	8.34	7.68
Sulfate	mg/L	160	99	96	82	180	110	67	65	71	69	66.9	68.4	66.5	66.7	65.1
Total Dissolved Solids	mg/L	780	560	500	480	830	1100	350	360	320	410	391	419	405	421	398

Notes:
mg/L: milligrams per liter
SU: standard unit
U: Component was not present in concentrations above method detection limit and is reported as the reporting limit
*: Component was not present in concentrations above method detection limit and is reported as the method detection limit
J: Component was detected in concentrations below the reporting limit
-: Not sampled

Table 2: Historical Groundwater Data Summary
Mitchell Plant - Landfill

Geosyntec Consultants, Inc.

Parameter	Unit	MW-1102F																
		2/29/2012	4/24/2012	6/27/2012	8/24/2012	10/26/2012	2/21/2013	6/18/2013	9/25/2013	12/19/2013	6/26/2014	9/26/2014	12/9/2014	6/17/2015	8/7/2015	9/18/2015	11/2/2015	5/25/2016
Chloride	mg/L	6.6	7.1	6.9	6.5	7	7.7	8	8.5	7.6	9	9.6	10.1	11	10.9	11	10.3	12
Fluoride	mg/L	0.48	0.43	0.43	0.4	0.61	0.55	0.35	0.48	0.47	-	-	-	-	-	-	-	-
pH	SU	7.76	7.9	7.71	7.72	8.57	7.72	7.59	7.76	-	7.85	8.23	8.15	8.22	8.15	7.61	7.8	8.36
Sulfate	mg/L	40	48	42	38	37	44	42	44	38	37.6	39.4	38.8	38.2	37.5	37.7	32.7	37
Total Dissolved Solids	mg/L	420	410	410	440	440	380	420	400	470	518	537	506	519	530	519	518	540

Notes:
mg/L: milligrams per liter
SU: standard unit
U: Component was not present in concentrations above method detection limit and is reported as the reporting limit
*: Component was not present in concentrations above method detection limit and is reported as the method detection limit
J: Component was detected in concentrations below the reporting limit
-: Not sampled

Table 2: Historical Groundwater Data Summary
Mitchell Plant - Landfill

Geosyntec Consultants, Inc.

Parameter	Unit	MW-1103F													
		2/20/2012	4/25/2012	6/27/2012	8/22/2012	10/24/2012	12/22/2012	2/19/2013	6/19/2013	9/25/2013	12/19/2013	6/26/2014	9/25/2014	9/18/2015	6/1/2016
Chloride	mg/L	230	240	220	240	220	230	250	240	240	250	221	-	243	247
Fluoride	mg/L	2.5	2.7	2.7	3.3	3.1	3.1	2.9	2.9	3	2.8	-	-	-	-
pH	SU	8.39	8.8	8.32	8.17	8.93	7.82	8.25	8.11	8.15	-	8.35	8.42	8.3	8.31
Sulfate	mg/L	11	8.6	7.4	8.3	4.7	6.9	9.1	8.3	8.7	8.5	4.2	2.3	2.6	2.1
Total Dissolved Solids	mg/L	1500	690	1300	1300	1500	1900	1300	1100	1000	1200	1510	1540	1440	1380

Notes:
mg/L: milligrams per liter
SU: standard unit
U: Component was not present in concentrations above method detection limit and is reported as the reporting limit
*: Component was not present in concentrations above method detection limit and is reported as the method detection limit
J: Component was detected in concentrations below the reporting limit
-: Not sampled

Table 2: Historical Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1101R															
		2/24/2012	4/25/2012	6/27/2012	8/23/2012	10/25/2012	12/22/2012	2/21/2013	6/20/2013	9/25/2013	12/20/2013	6/26/2014	10/2/2014	6/16/2015	9/18/2015	11/4/2015	6/1/2016
Chloride	mg/L	17	18	17	17	16	16	17	17	17	16	16.2	-	17.6	17.3	17.1	10.9
Fluoride	mg/L	2.5	3	2.8	2.7	3	2.9	2.8	2.8	2.6	2.6	-	-	-	-	-	-
pH	SU	9.15	7.78	8.61	8.6	8.89	7.94	8.72	-	8.36	-	8.28	8.46	8.42	8.47	7.78	8.09
Sulfate	mg/L	27	30	32	32	26	29	30	32	31	26	28.2	30.5	34	37.3	36	67.3
Total Dissolved Solids	mg/L	720	880	880	970	830	1600	3500	710	770	760	902	878	910	876	846	672

Notes:
mg/L: milligrams per liter
SU: standard unit
U: Component was not present in concentrations above method detection limit and is reported as the reporting limit
*: Component was not present in concentrations above method detection limit and is reported as the method detection limit
J: Component was detected in concentrations below the reporting limit
-: Not sampled

Table 2: Historical Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1102R															
		2/23/2012	4/23/2012	6/23/2012	8/22/2012	10/25/2012	12/19/2012	2/21/2013	6/20/2013	9/25/2013	12/20/2013	6/26/2014	9/26/2014	6/12/2015	9/18/2015	11/2/2015	5/25/2016
Chloride	mg/L	63	-	190	220	190	210	210	230	190	190	192	-	211	208	165	214
Fluoride	mg/L	1.4	-	1.7	2.5	2.6	3	3.4	3	2.3	3	-	-	-	-	-	-
pH	SU	8.88	8.46	8.17	7.41	7.98	8.6	7.85	-	8.45	-	7.97	8.36	7.9	8.14	8.45	8.3
Sulfate	mg/L	72	-	55	43	28	28	25	27	27	28	18.2	19.1	38.7	36.8	22.7	39
Total Dissolved Solids	mg/L	-	-	1500	1300	1300	1300	1300	1300	1000	1100	1430	1490	1420	1440	1420	1450

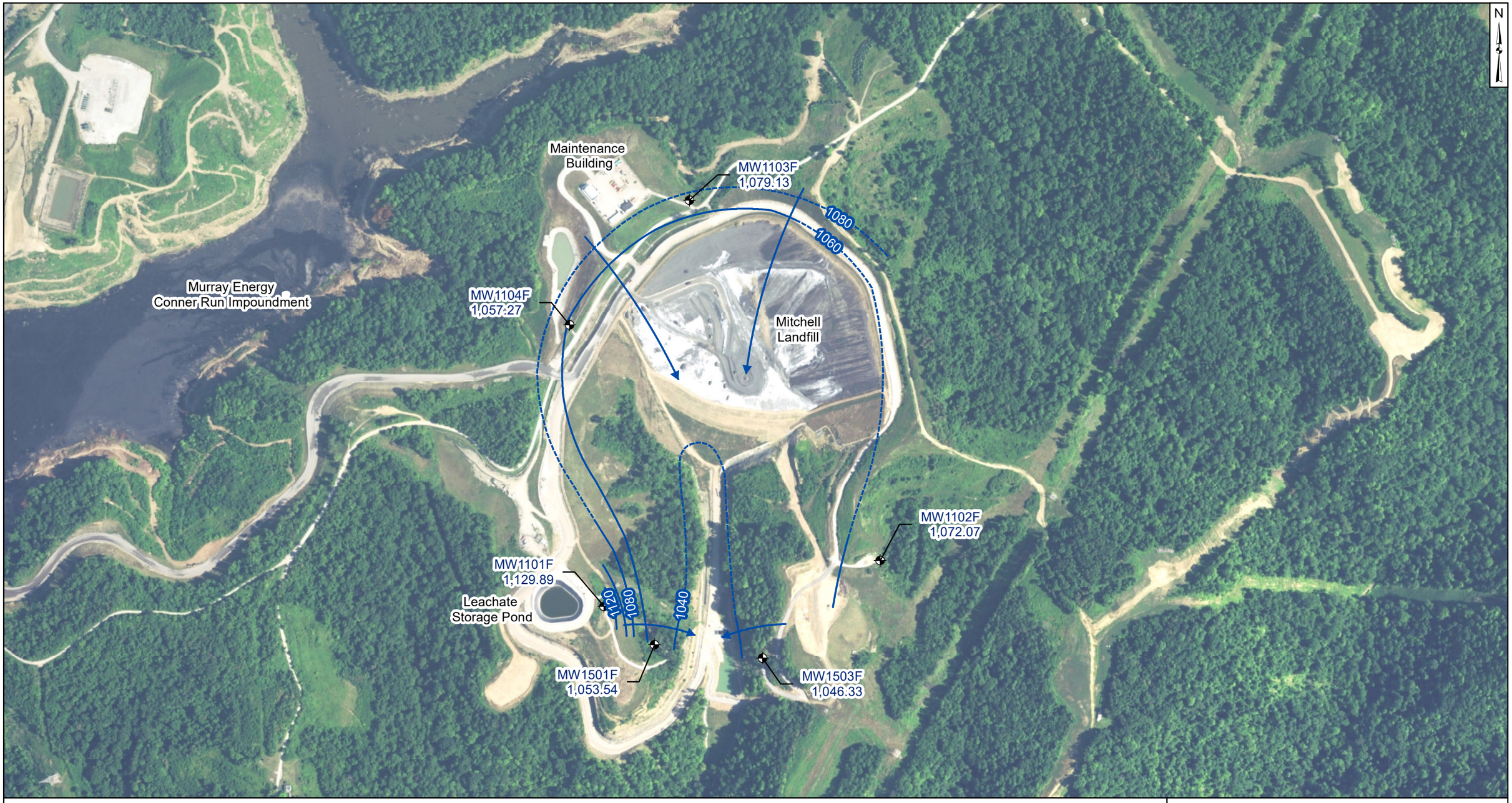
Notes:
mg/L: milligrams per liter
SU: standard unit
U: Component was not present in concentrations above method detection limit and is reported as the reporting limit
*: Component was not present in concentrations above method detection limit and is reported as the method detection limit
J: Component was detected in concentrations below the reporting limit
-: Not sampled

Table 2: Historical Groundwater Data Summary
Mitchell Plant - Landfill

Parameter	Unit	MW-1104R							
		2/23/2012	4/24/2012	6/19/2012	8/20/2012	10/22/2012	12/20/2012	2/19/2013	6/1/2016
Chloride	mg/L	-	-	-	-	-	-	-	467
Fluoride	mg/L	-	-	-	-	-	-	-	-
pH	SU	9.54	8.9	8.86	8.68	7.57	7.69	7.62	7.96
Sulfate	mg/L	-	-	-	-	-	-	-	136
Total Dissolved Solids	mg/L	-	-	-	-	-	-	-	2530

Notes:
mg/L: milligrams per liter
SU: standard unit
U: Component was not present in concentrations above method detection limit and is reported as the reporting limit
*: Component was not present in concentrations above method detection limit and is reported as the method detection limit
J: Component was detected in concentrations below the reporting limit
-: Not sampled

Groundwater Flow Direction Maps



Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on June 13, 2016) provided by AEP.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.

500 250 0 500
Feet

Potentiometric Surface Map - Fish Creek
June 2016

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/06

Figure **1**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\AEP-Mitchell_Landfill-FC_GW_June2016.mxd. ARevezzo. 11/6/2017. Project/Phase/Task.

Maintenance Building

MW1103F
1,081.01

Murray Energy
Conner Run Impoundment

MW1104F
1,057.15

Mitchell
Landfill

1060

1080

1060

MW1102F
1,071.93

1060

MW1101F
1,106.32

Leachate
Storage Pond

1100

1040

1040

MW1503F
1,045.75

MW1501F
1,053.55

N

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on August 1, 2016) provided by AEP.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Fish Creek
August 2016

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/06

Figure
2

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\AEP-Mitchell_Landfill-FC_GW_Aug2016.mxd. ARevezzo. 11/6/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on September 26, 2016) provided by AEP.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Fish Creek
September 2016

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/06

Figure **3**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\AEP-Mitchell_Landfill-FC_GW_Sept2016.mxd. ARevezzo. 11/6/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on November 8, 2016) provided by AEP.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Fish Creek
November 2016

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/06

Figure **4**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\AEP-Mitchell_Landfill-FC_GW_Nov2016.mxd. ARevezzo. 11/6/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contours (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on February 7, 2017) provided by AEP.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Fish Creek
February 2017

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/06

Figure **5**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\AEP-Mitchell_Landfill-FC_GW_Feb2017.mxd. ARevezzo. 11/6/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on April 4, 2017) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (AMEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Contours - Fish Creek Aquifer
April 2017

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/12/29

Figure **6**

C:\Users\mmuenich\Documents\local_projects\AEP_GIS\Mitchell\MXDs\Landfill-FC\AEP-Mitchell_Landfill-FC_GW_Apr2017.mxd. MMuenich. 12/29/2017. Project/Phase/Task.

Maintenance Building

MW1103F
1,080.79

1060

Murray Energy
Conner Run Impoundment

MW1104F
1,057.70

Mitchell
Landfill

1080

1040

1060

MW1102F
1,072.12

MW1101F
1,053.06

Leachate
Storage Pond

MW1503F
1,046.73

MW1501F
1,053.73

N

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on May 16, 2017) provided by AEP.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Contours - Fish Creek Aquifer
May 2017

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/06

Figure
7

C:\Users\mmuenich\Documents\local_projects\AEP_GIS\Mitchell\MXDs\Landfill-FC\AEP-Mitchell_Landfill-FC_GW_May2017.mxd. MMuenich. 11/6/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on July 18, 2017) provided by AEP.
- Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

* MW1101F not gauged during July 2017 event; contours inferred from previous monitoring events.

500 250 0 500 Feet

Potentiometric Contours - Fish Creek Aquifer
July 2017

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/06

Figure **8**

C:\Users\mmuenich\Documents\local_projects\AEP_GIS\Mitchell\MXDs\Landfill-FC\AEP-Mitchell_Landfill-FC_GW_July2017.mxd. MMuenich. 11/6/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contours (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on October 9, 2017) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (AMEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Fish Creek
October 2017

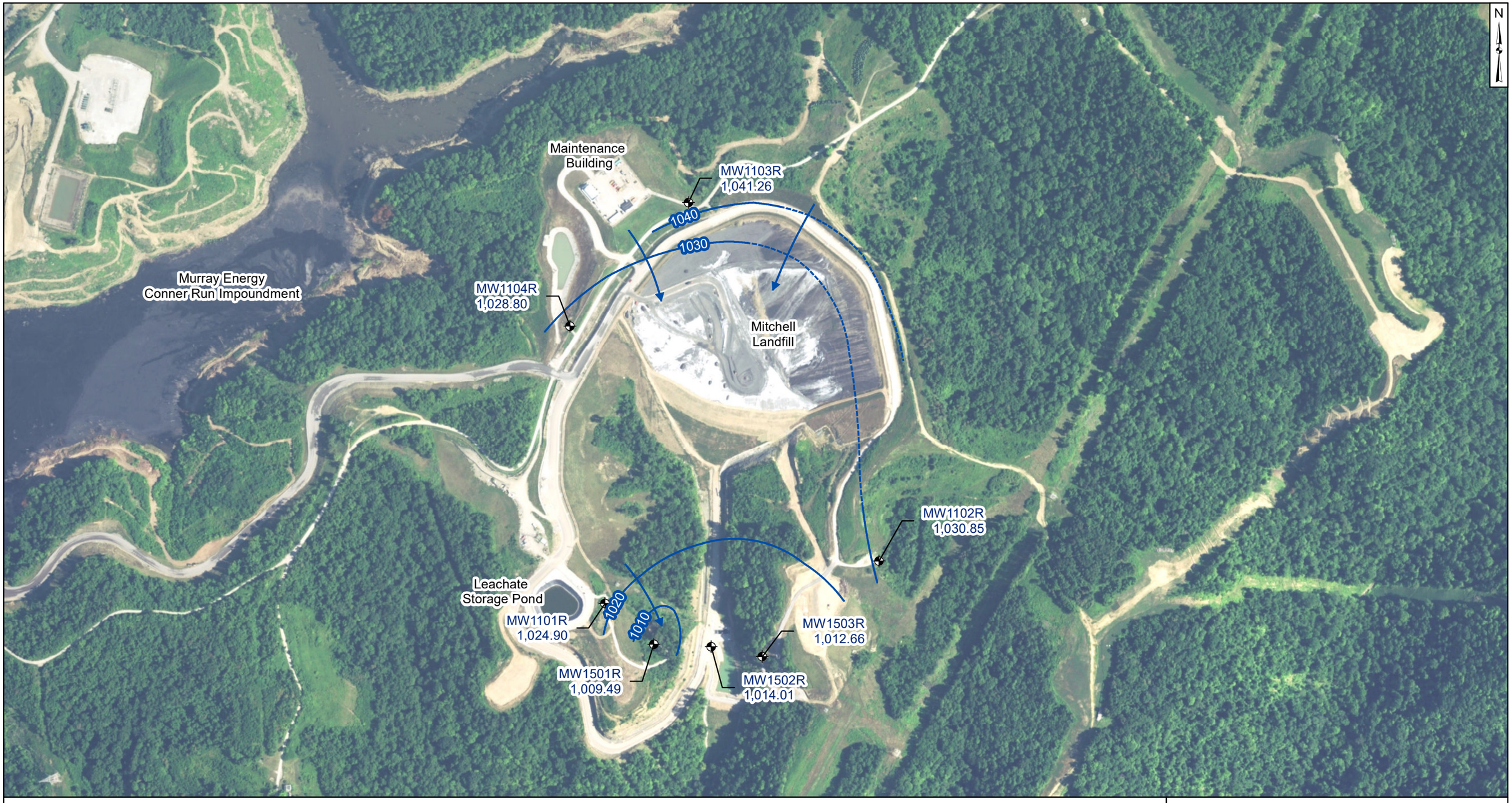
Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2018/01/29

Figure **9**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-FC\AEP-Mitchell_Landfill-FC_GW_Oct2017.mxd. ARevezzo. 1/29/2018. Project/Phase/Task.



Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on June 13, 2016) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.

500 250 0 500
Feet

Potentiometric Surface Map - Rush Run
June 2016

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/07

Figure **1**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\AEP-Mitchell_Landfill-RR_GW_June2016.mxd. ARevezzo. 11/7/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on August 1, 2016) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500 Feet

Potentiometric Surface Map - Rush Run
August 2016

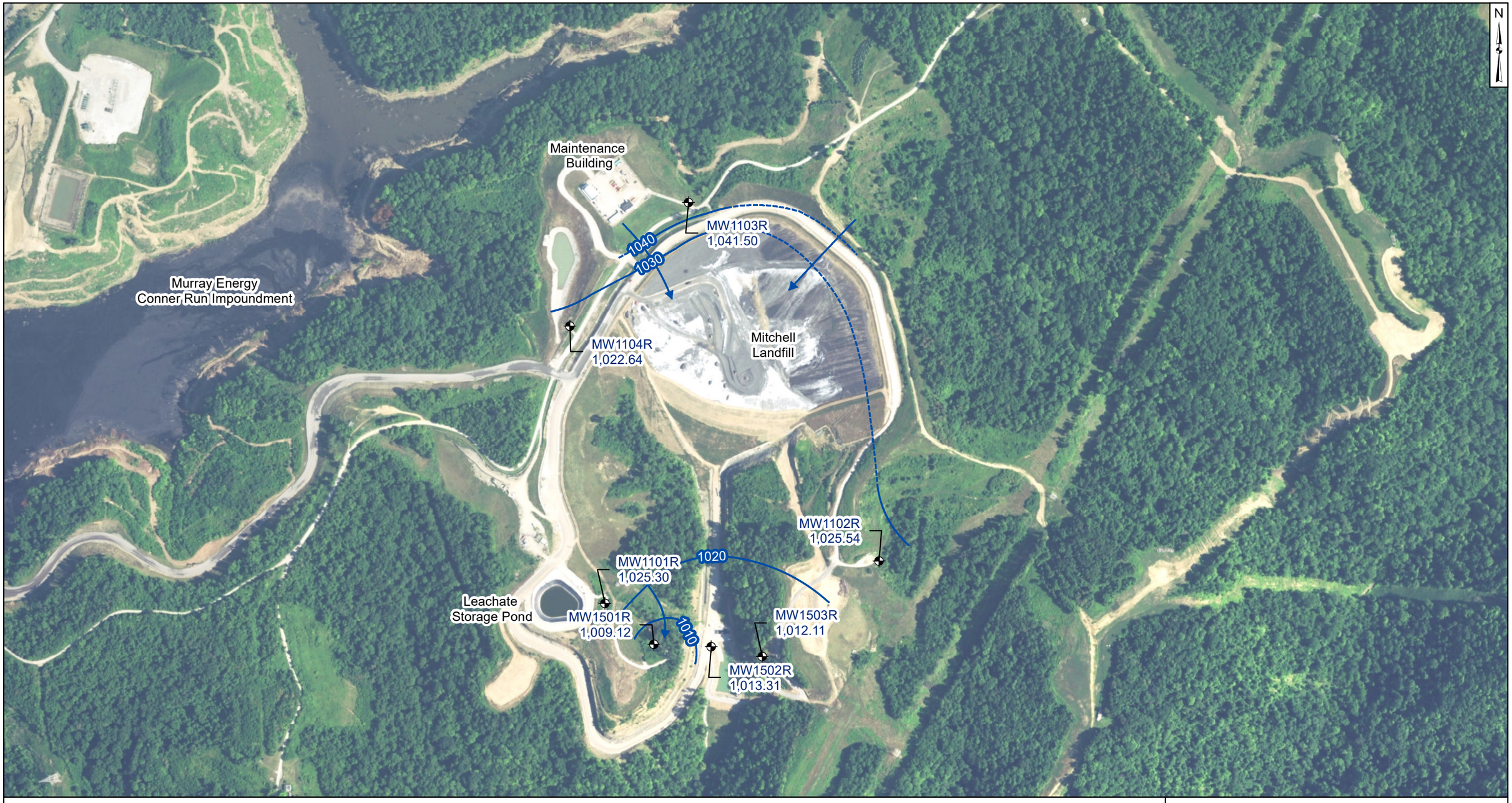
Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/06

Figure **2**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\AEP-Mitchell_Landfill-RR_GW_Aug2016.mxd. ARevezzo. 11/6/2017. Project/Phase/Task.



Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on September 26, 2016) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500 Feet

Potentiometric Surface Map - Rush Run
September 2016

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/07

Figure **3**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\AEP-Mitchell_Landfill-RR_GW_Sept2016.mxd. ARevezzo. 11/7/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on November 8, 2016) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Rush Run
November 2016

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Columbus, Ohio | 2017/11/07

Figure **4**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\AEP-Mitchell_Landfill-RR_GW_Nov2016.mxd. ARevezzo. 11/7/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on February 7, 2017) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500 Feet

Potentiometric Surface Map - Rush Run
February 2017

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Clumbus, Ohio | 2017/11/07

Figure **5**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\AEP-Mitchell_Landfill-RR_GW_Feb2017.mxd. ARevezzo. 11/7/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on April 4, 2017) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Rush Run
April 2017

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Clumbus, Ohio | 2017/11/07

Figure
6

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\AEP-Mitchell_Landfill-RR_GW_April2017.mxd. ARevezzo. 11/7/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on May 16, 2017) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500 Feet

Potentiometric Surface Map - Rush Run
May 2017

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Clumbus, Ohio | 2017/11/07

Figure **7**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\AEP-Mitchell_Landfill-RR_GW_May2017.mxd. ARevezzo. 11/7/2017. Project/Phase/Task.

Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on July 18, 2017) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500
Feet

Potentiometric Surface Map - Rush Run
July 2017

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Clumbus, Ohio | 2017/11/07

Figure
8

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Legend

- Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater Elevation Contour
- Groundwater Elevation Contour (Inferred)

Notes

- Monitoring well coordinates and water level data (collected on October 9, 2017) provided by AEP.
-Site features based on information available in the Groundwater Monitoring Network Evaluation (CEC, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level (NAVD 88).

500 250 0 500 Feet

Potentiometric Surface Map - Rush Run
October 2017

Mitchell Power Generation Plant
Marshall County, West Virginia

Geosyntec consultants

Clumbus, Ohio | 2018/01/29

Figure **9**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\Landfill-RR\AEP-Mitchell_Landfill-RR_GW_Oct2017.mxd. ARevezzo. 1/29/2018. Project/Phase/Task.

Groundwater Flow Velocity Calculations

Table 1: Residence Time Calculation Summary - Landfill
Mitchell Landfill

Geosyntec Consultants, Inc.

			2016-06		2016-08		2016-09		2016-11	
CCR Management Unit	Monitoring Well Pair	Well Diameter (inches)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Landfill	MW1101F/R [1]	2.0	8.2	7	6.3	10	3.9	15	2.2	28
	MW1102F/R [1]	2.0	1.6	37	1.7	35	1.8	33	1.9	32
	MW1103F/R [2]	2.0	1.8	34	1.9	33	1.8	33	1.8	33
	MW1104F/R [2]	2.0	1.6	38	2.0	31	1.9	31	1.9	31
	MW1501F/R [3]	4.0	2.0	62	2.0	62	2.0	62	2.0	61
	MW1502R [3]	4.0	NC	NC	NC	NC	NC	NC	NC	NC
	MW1503F/R [3]	4.0	1.6	76	1.6	76	1.6	76	1.6	76

			2017-02		2017-04		2017-05		2017-07		2017-10	
CCR Management Unit	Monitoring Well Pair	Well Diameter (inches)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Vertical Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
Landfill	MW1101F/R [1]	2.0	2.2	28	2.2	28	2.2	28	NC	NC	NC	NC
	MW1102F/R [1]	2.0	1.9	33	1.9	33	1.9	33	NC	NC	NC	NC
	MW1103F/R [2]	2.0	1.8	33	1.8	33	1.8	34	1.8	33	1.8	33
	MW1104F/R [2]	2.0	1.9	32	1.9	32	1.9	32	1.9	32	1.9	32
	MW1501F/R [3]	4.0	2.0	62	2.0	61	2.0	61	2.0	61	2.0	61
	MW1502R [3]	4.0	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
	MW1503F/R [3]	4.0	1.6	74	1.7	73	1.7	73	1.7	73	1.7	73

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

APPENDIX II

Not applicable at this time.