Annual Groundwater Monitoring Report

Kentucky Power Company

Mitchell Plant

Bottom Ash Pond

Moundsville, WV

January 2021

Revision 1 - May 2021

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

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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:

- The CCR unit was in Assessment monitoring at the beginning and end of 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

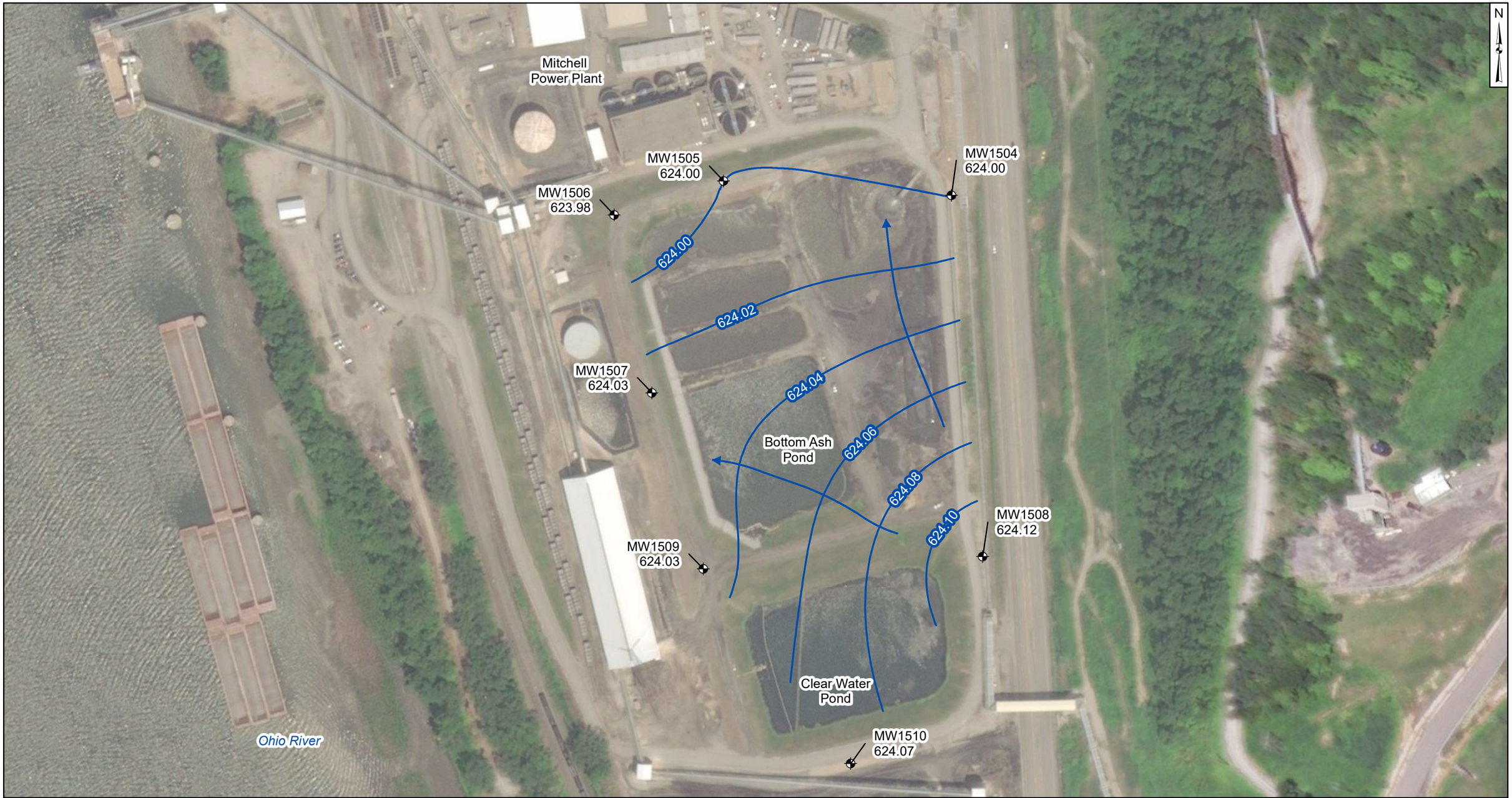
Mitchell Power Generation Plant - Bottom Ash Pond
Marshall County, West Virginia

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

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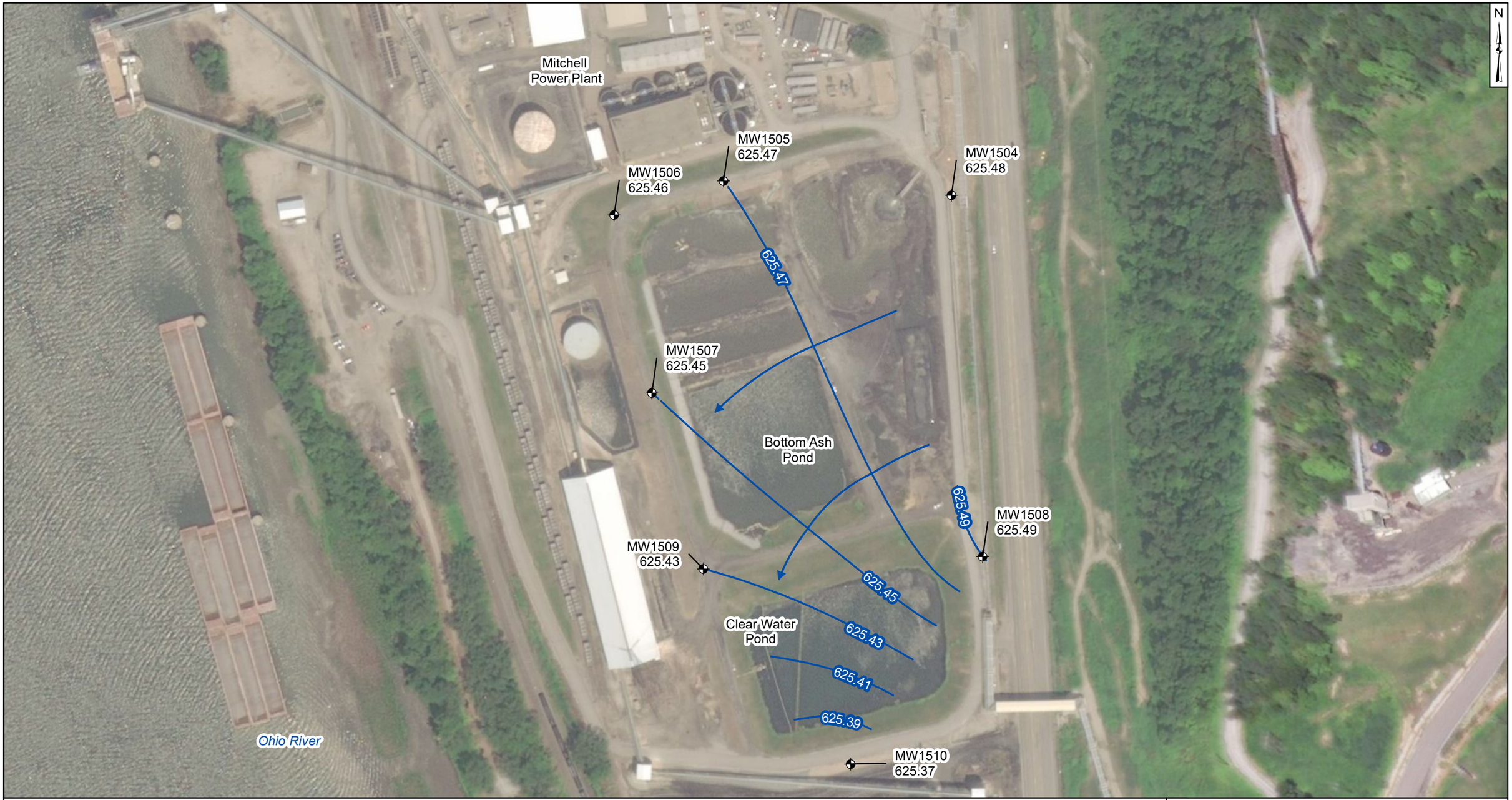

Legend

- 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**

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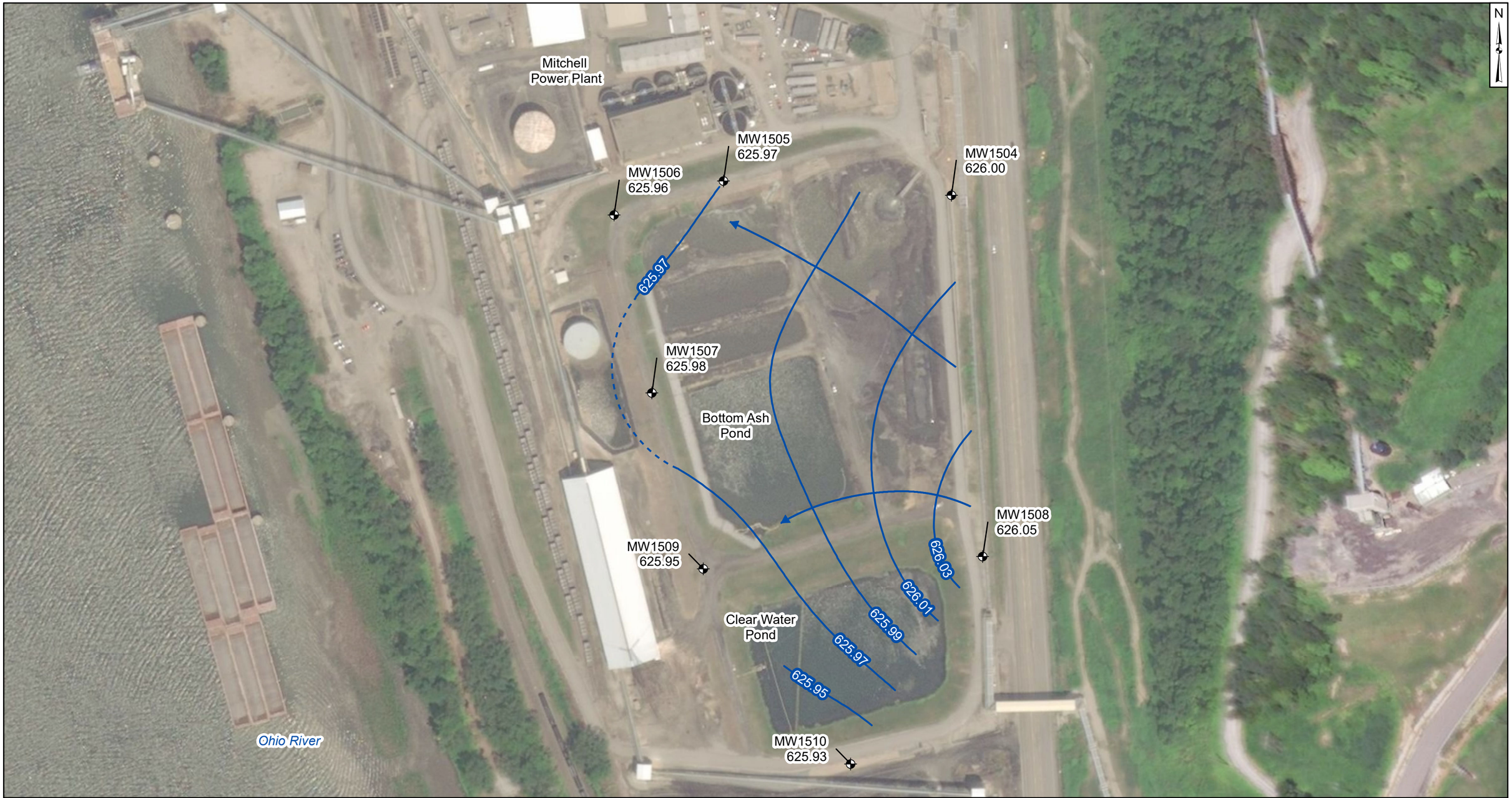

Legend

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

Notes

- Monitoring well coordinates and water level data (collected on 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**

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\BAP\2020\AEP-Mitchell_Pond_GW_May2020.mxd. ARevezzo. 6/10/2020. Project/Phase/Task.

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

P:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Mitchell\BAP\2020\AEP-Mitchell_Pond_GW_October2020.mxd. ARevezzo. 1/14/2021. Project/Phase/Task.

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 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.

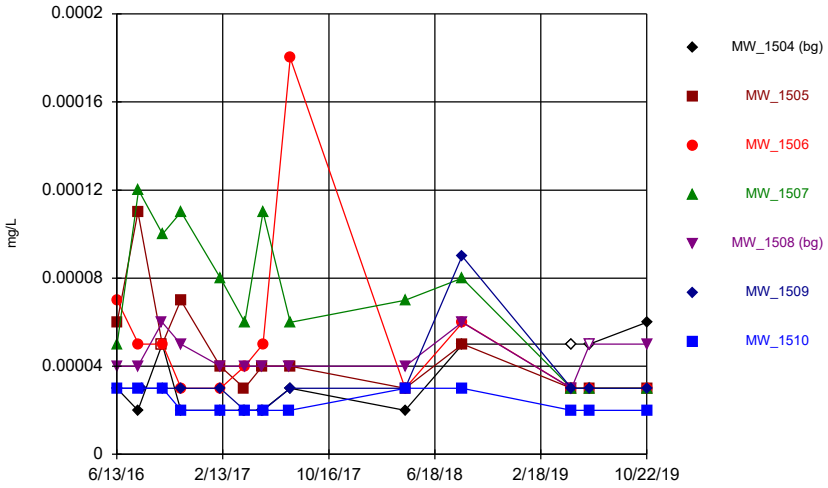
For Groundwater Stats Consulting,

Easton Rayner
Groundwater Analyst

Kristina L. Rayner
Groundwater Statistician

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

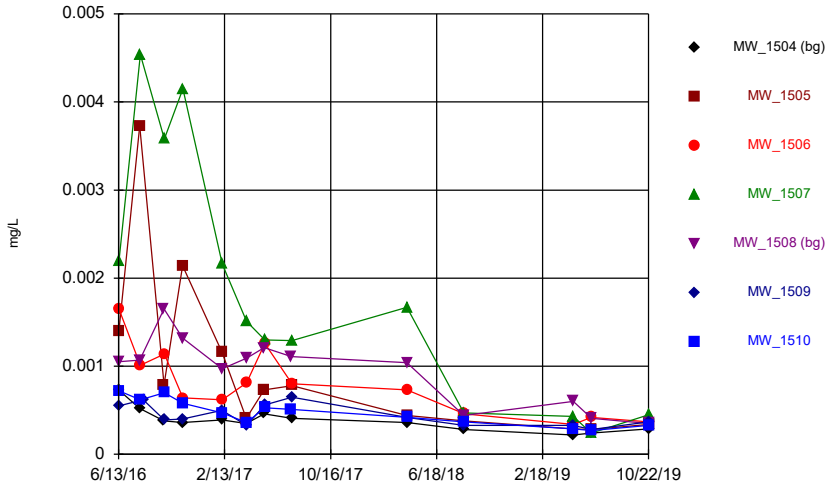
Time Series



Constituent: Antimony, 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



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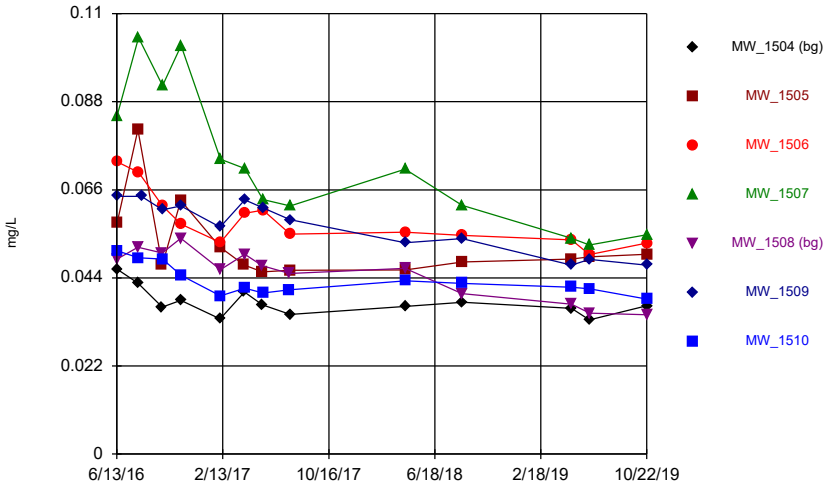
Time Series



Constituent: Barium, total Analysis Run 12/27/2019 9:59 AM View: All Data
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Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

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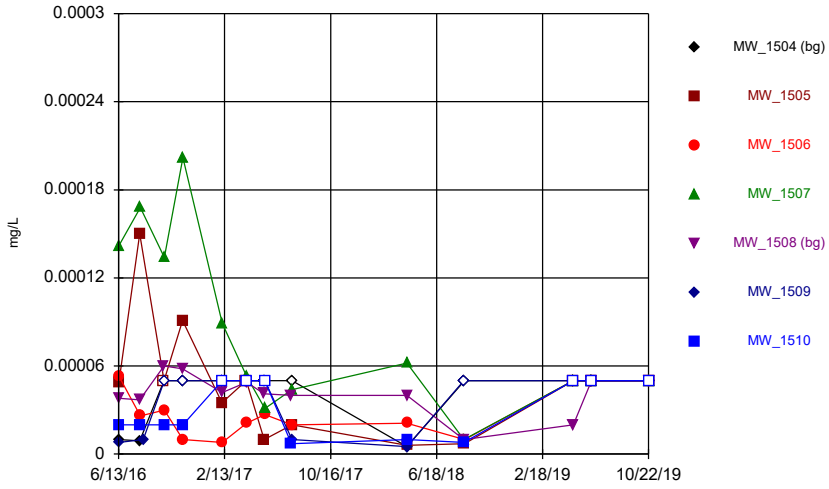

Constituent: Beryllium, total Analysis Run 12/27/2019 9:59 AM View: All Data
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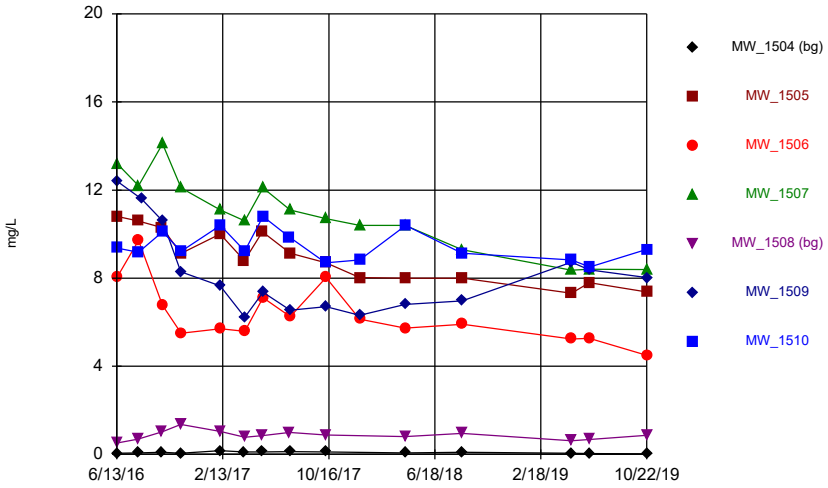
Sanitas™ v.9.6.24 . UG

Time Series



Constituent: Boron, total Analysis Run 12/27/2019 9:59 AM View: All Data
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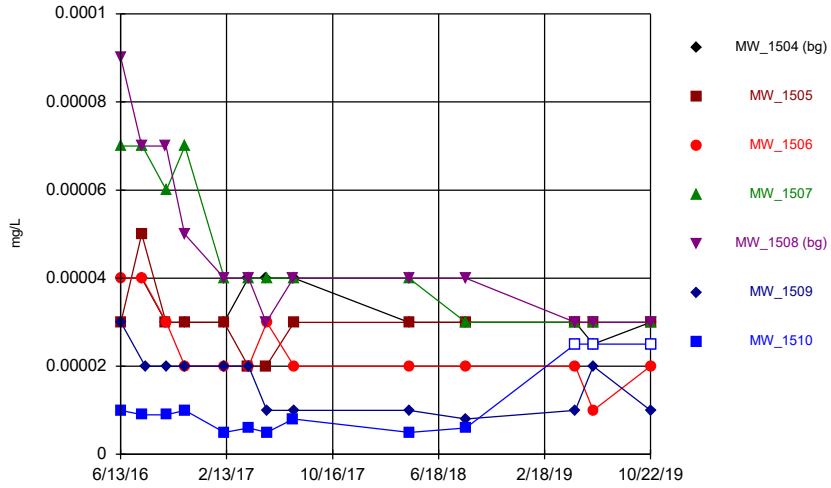
Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Time Series



Constituent: Cadmium, total Analysis Run 12/27/2019 9:59 AM View: All Data
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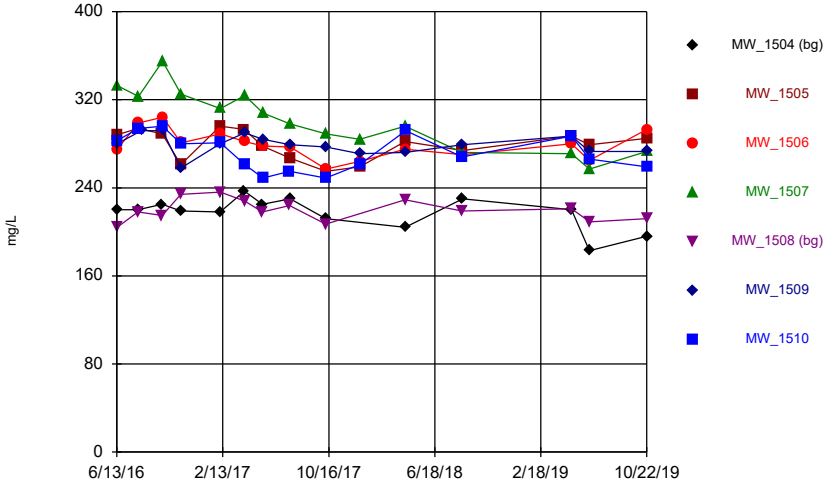
Sanitas™ v.9.6.24 . UG

Time Series



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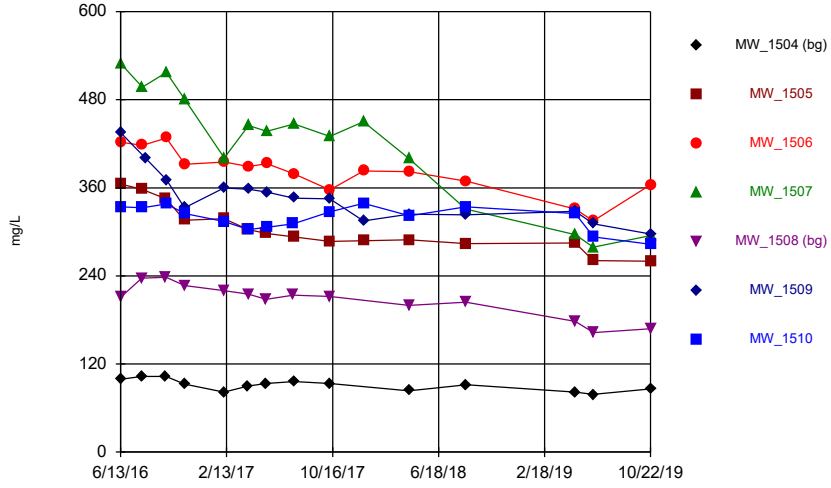
Sanitas™ v.9.6.24 . UG

Time Series



Constituent: Chloride, total Analysis Run 12/27/2019 9:59 AM View: All Data
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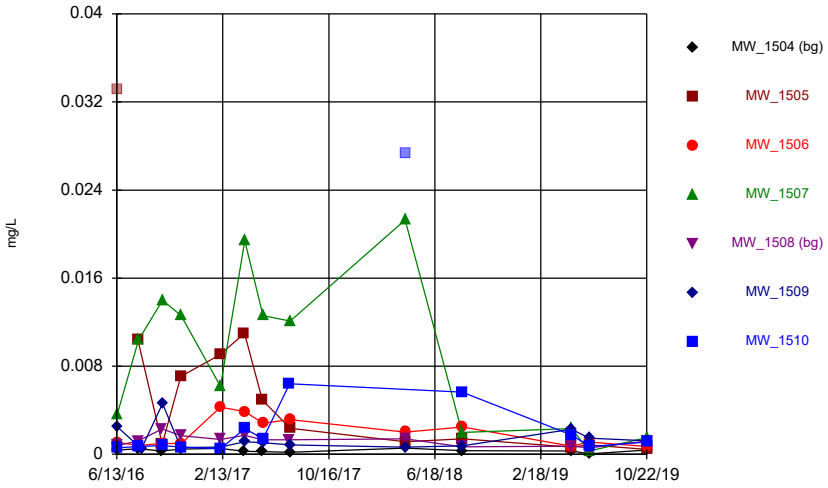
Sanitas™ v.9.6.24 . UG

Time Series



Constituent: Chromium, total Analysis Run 12/27/2019 9:59 AM View: All Data
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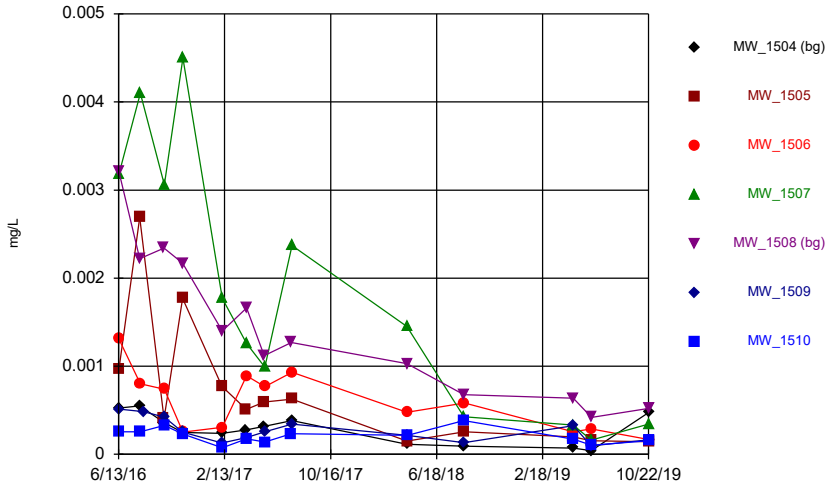
Sanitas™ v.9.6.24 . UG

Time Series



Constituent: Cobalt, total Analysis Run 12/27/2019 9:59 AM View: All Data
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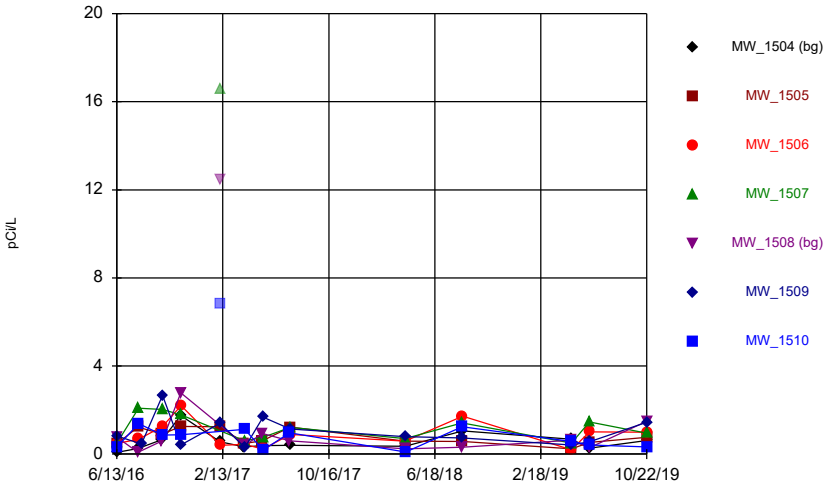
Sanitas™ v.9.6.24 . UG

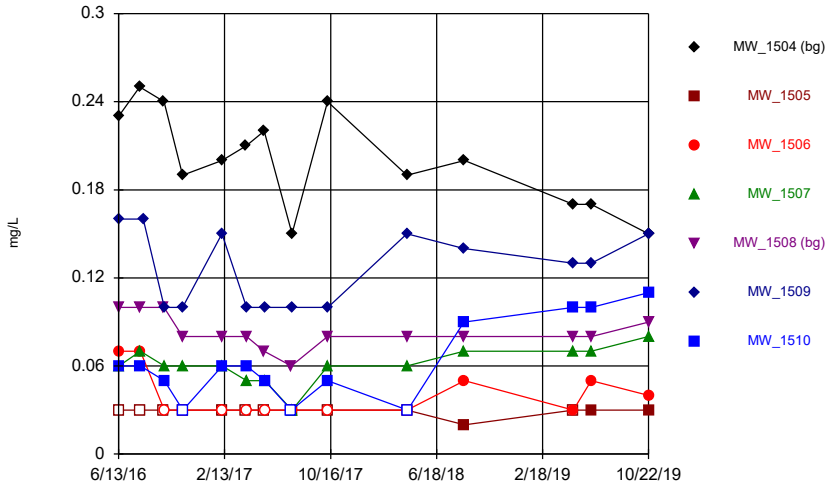
Time Series



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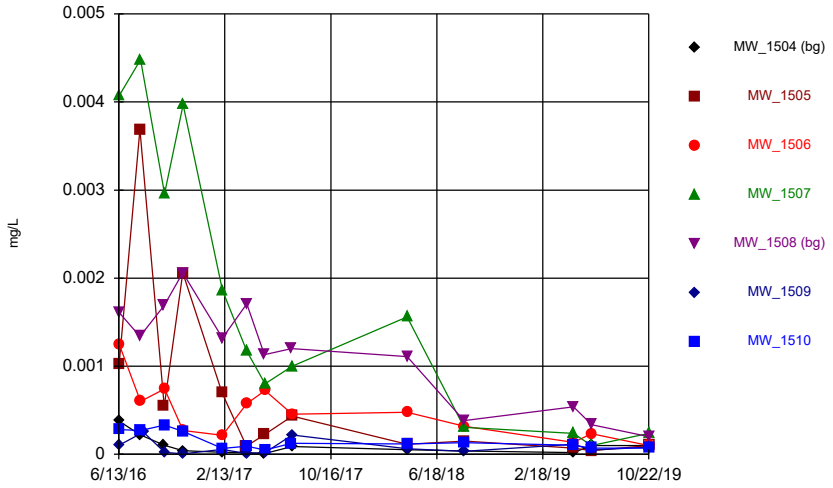
Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

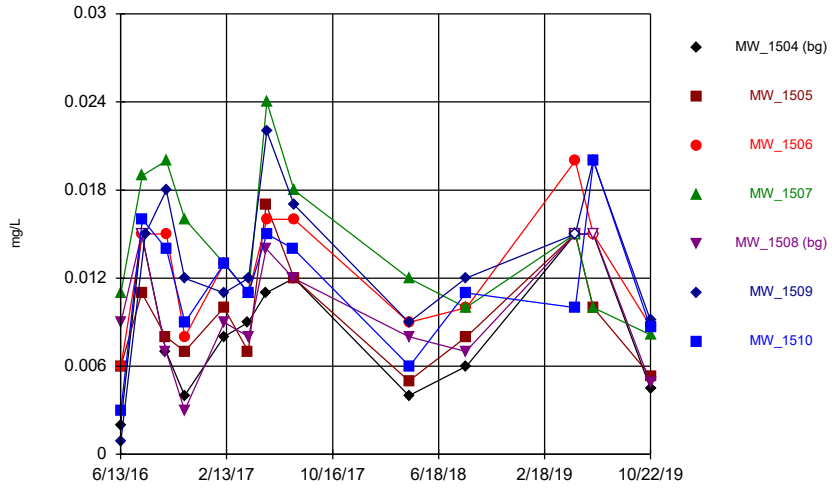
Time Series



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
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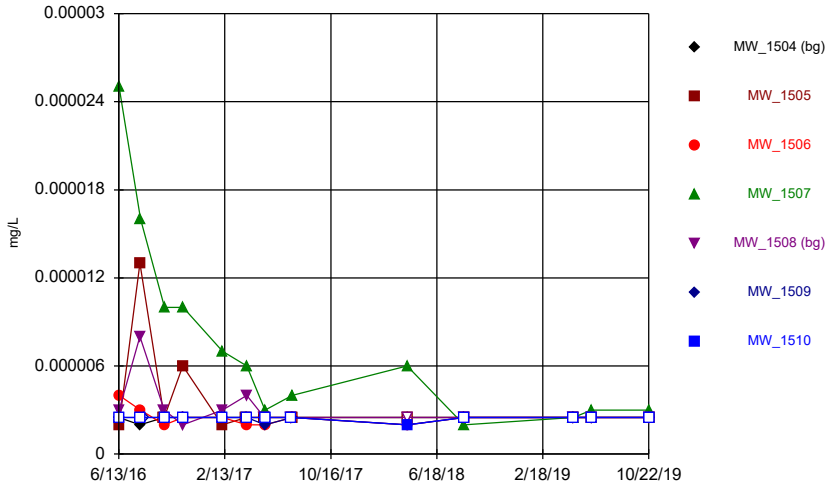
Time Series



Constituent: Mercury, total Analysis Run 12/27/2019 9:59 AM View: All Data
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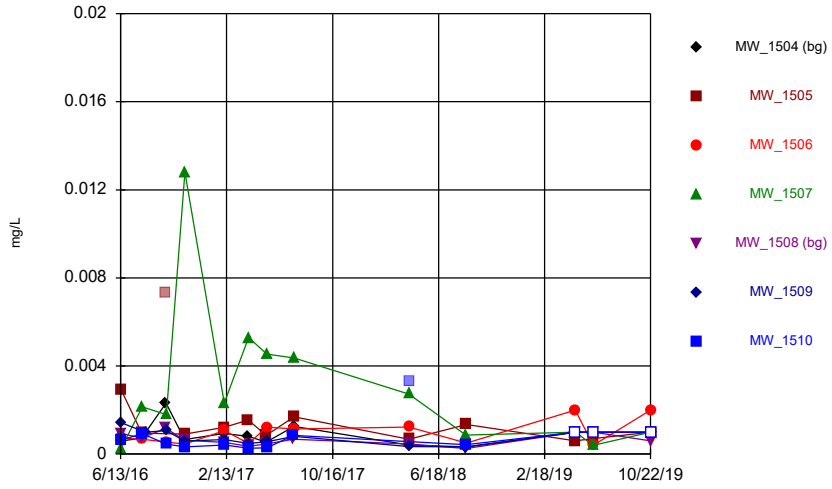
Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Time Series



Constituent: Molybdenum, total Analysis Run 12/27/2019 9:59 AM View: All Data
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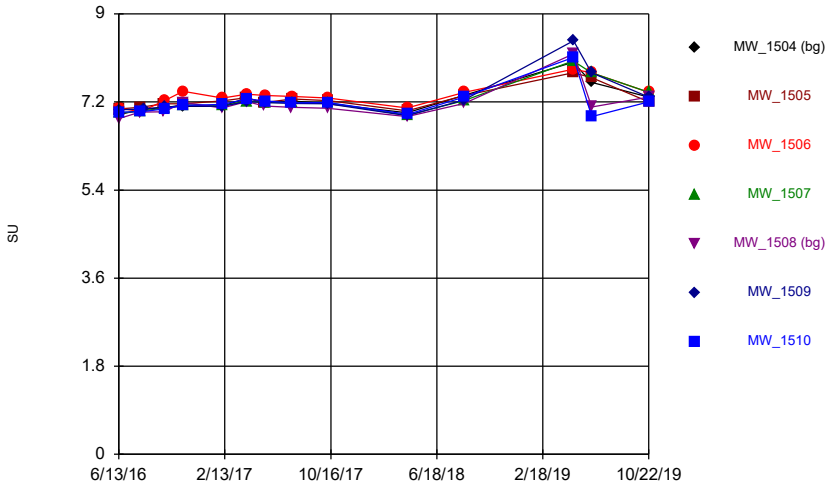
Sanitas™ v.9.6.24 . UG

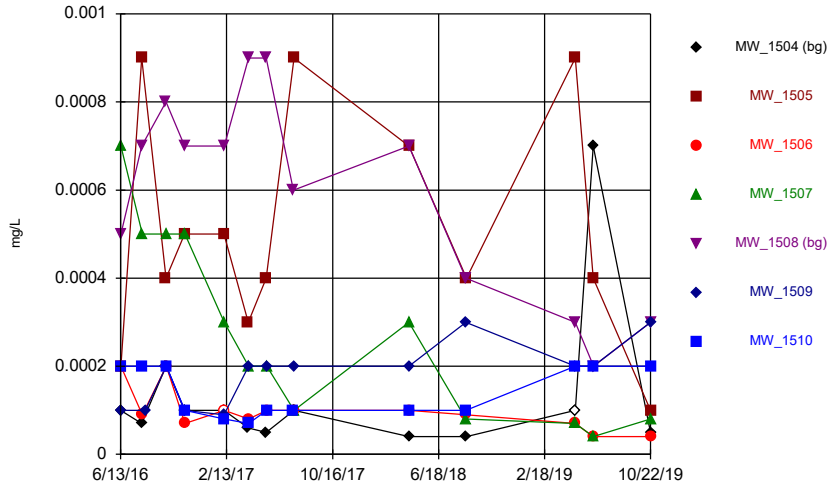
Time Series



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
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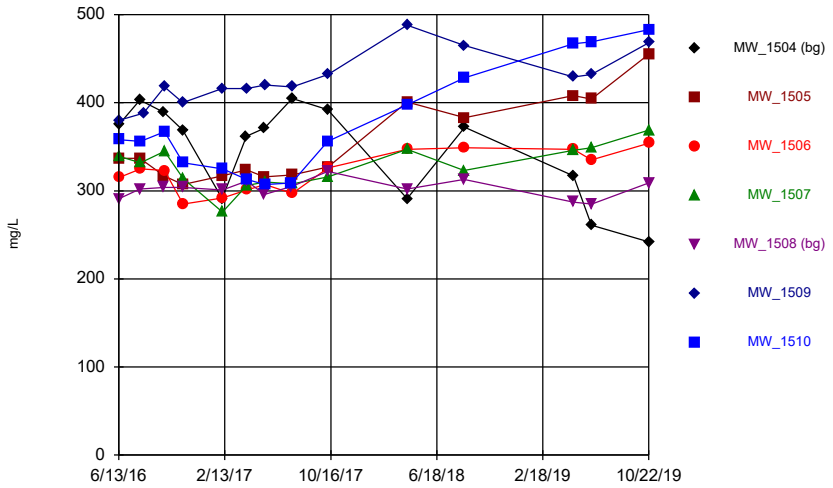
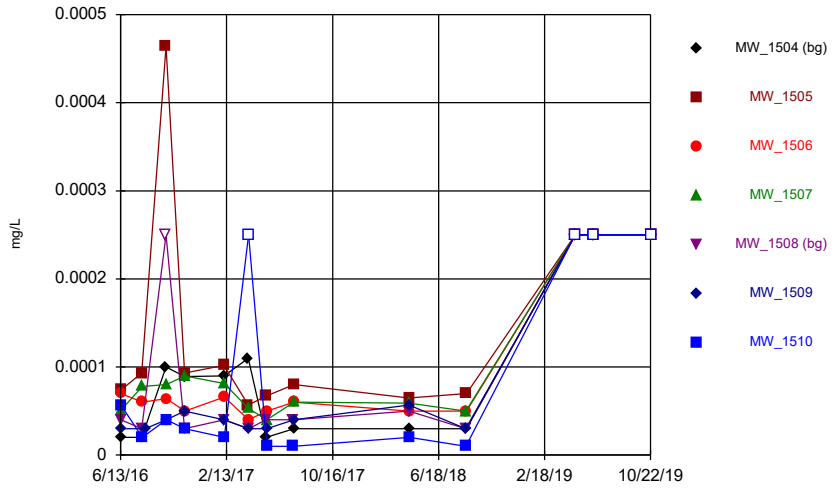
Time Series



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

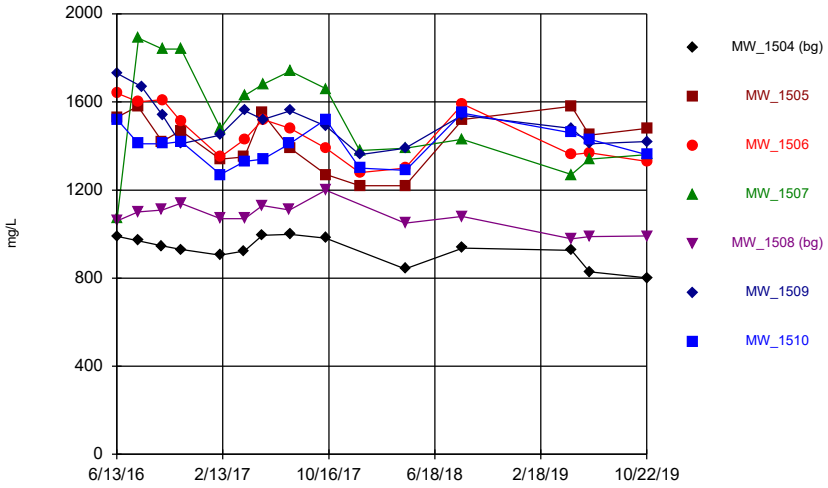
Sanitas™ v.9.6.24 . UG
Hollow symbols indicate censored values.

Time Series



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

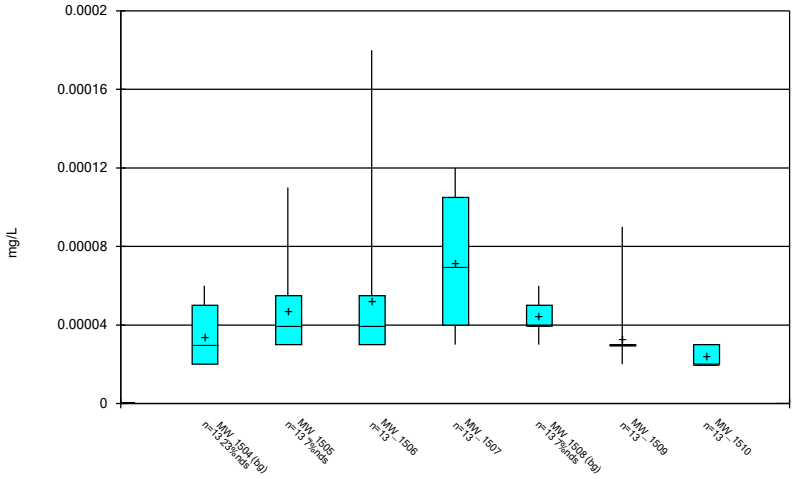
Time Series



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

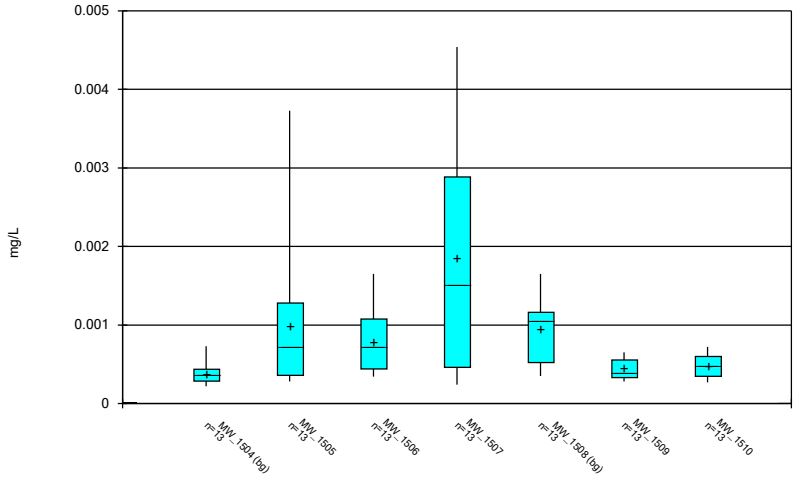
Box & Whiskers Plot



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

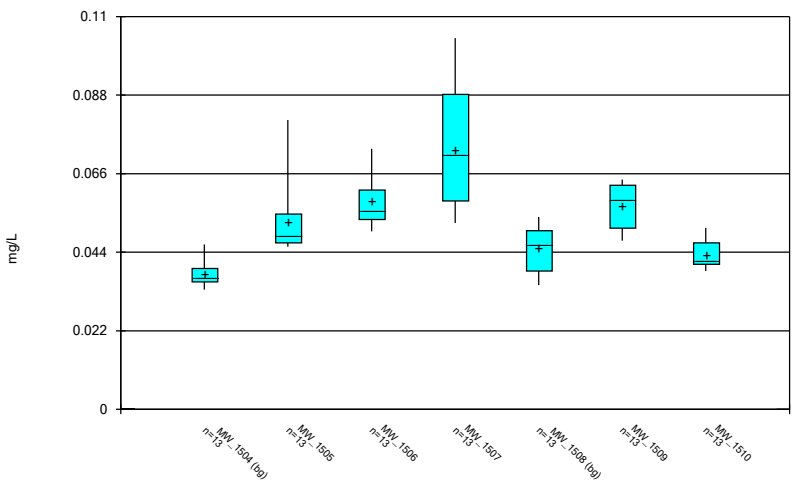
Box & Whiskers Plot



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

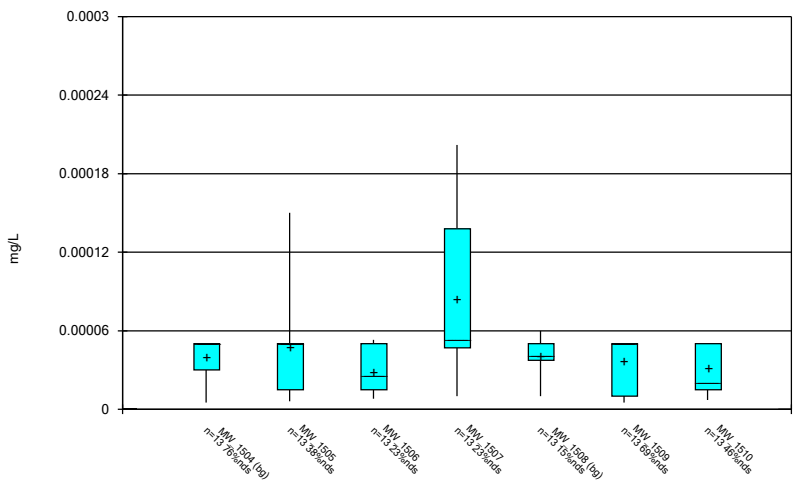
Box & Whiskers Plot



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

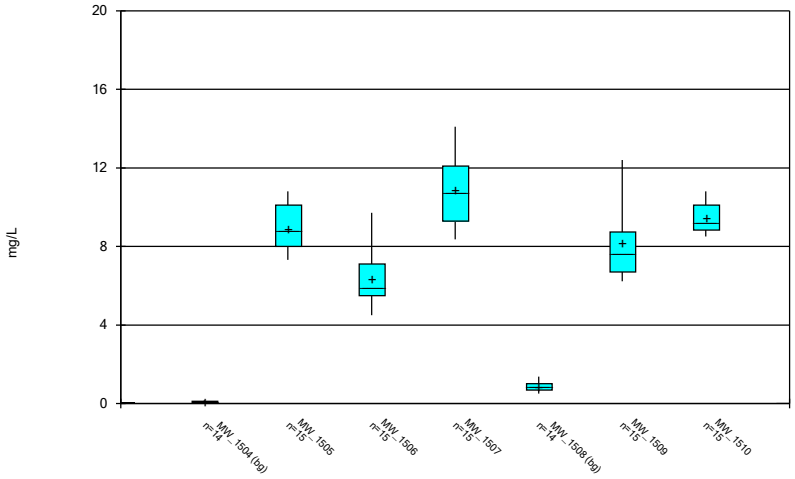
Box & Whiskers Plot



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

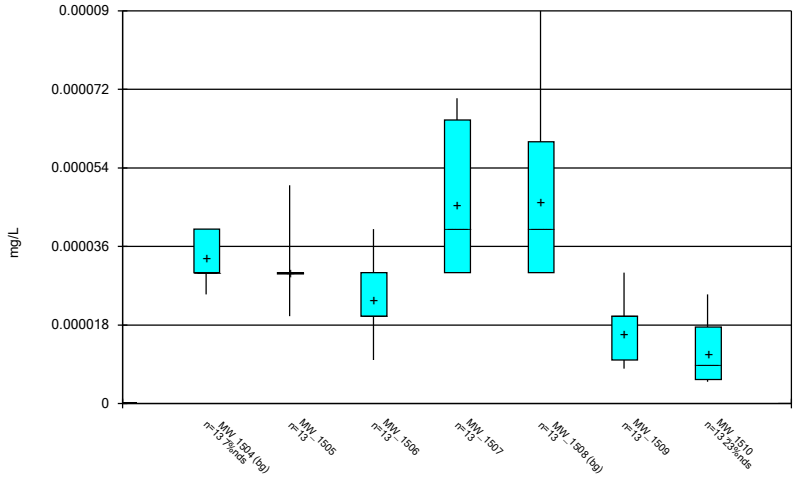
Box & Whiskers Plot



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

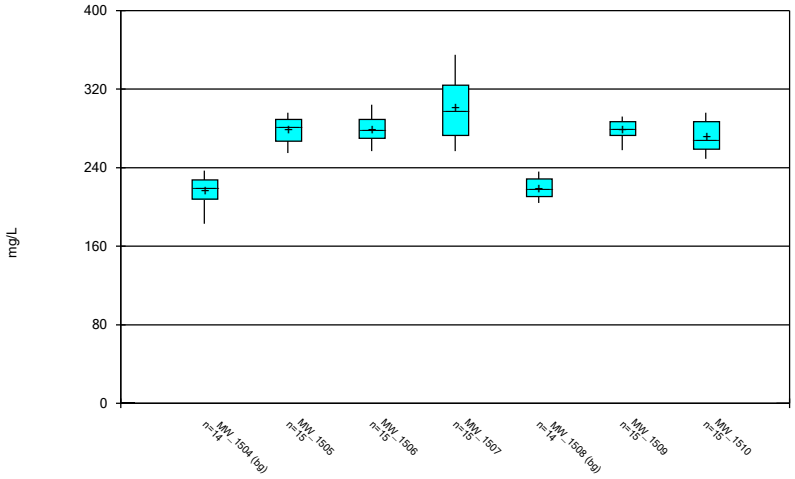
Box & Whiskers Plot



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

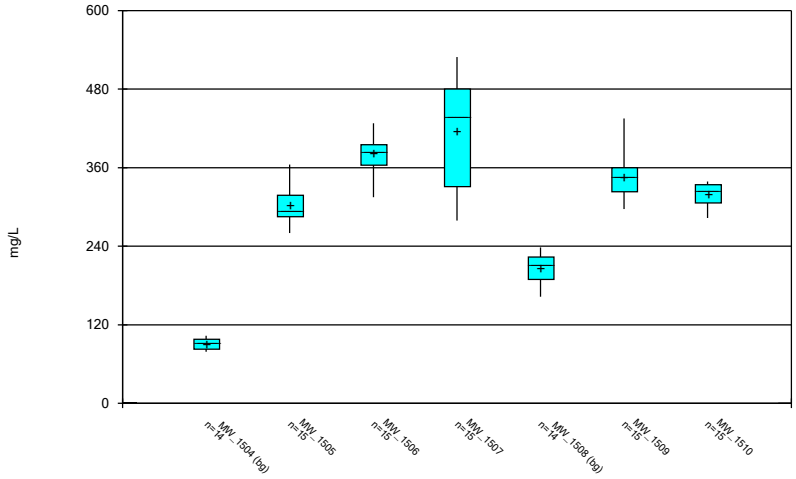
Box & Whiskers Plot



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

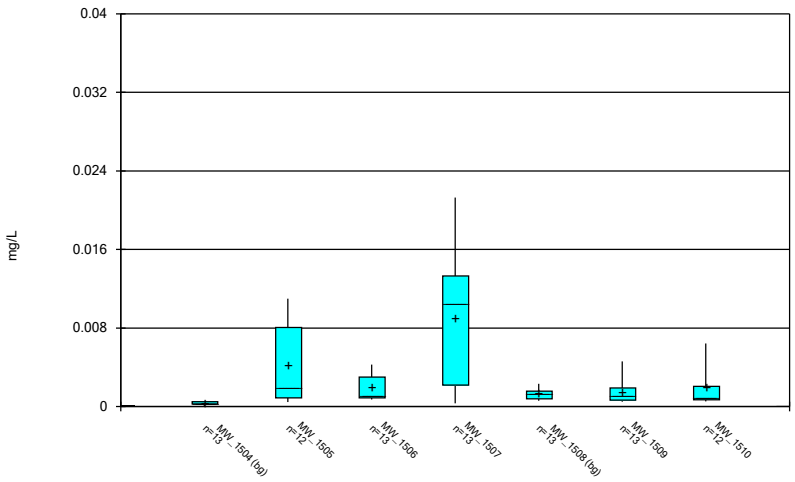
Box & Whiskers Plot



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

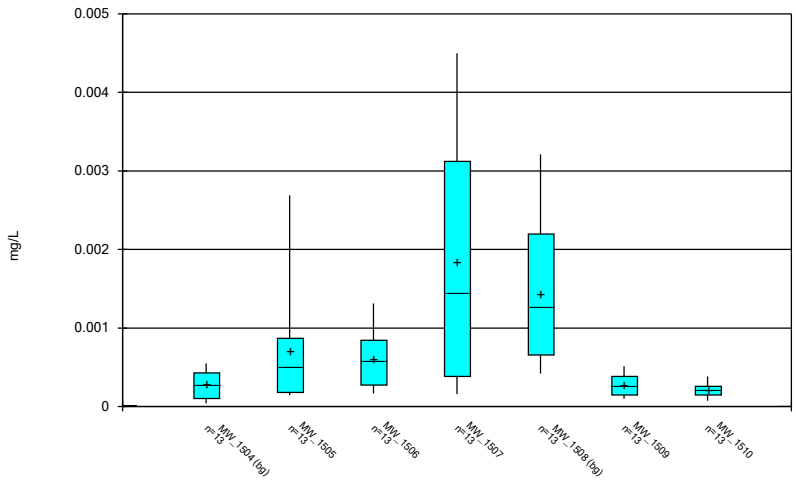
Box & Whiskers Plot



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

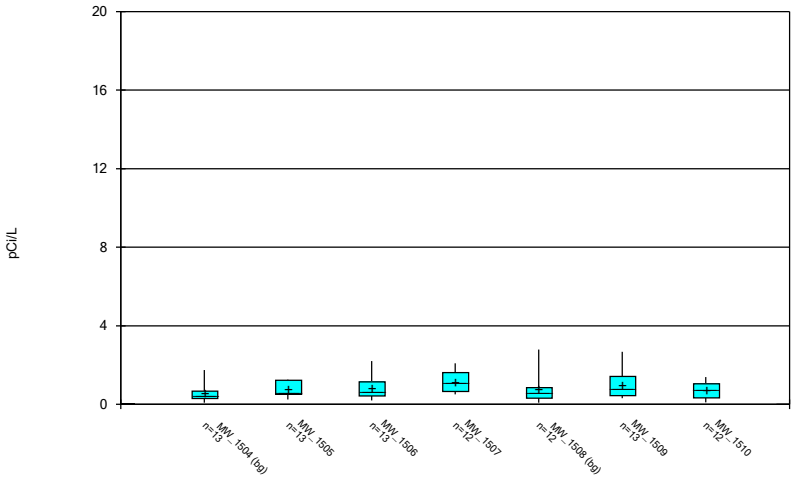
Box & Whiskers Plot



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

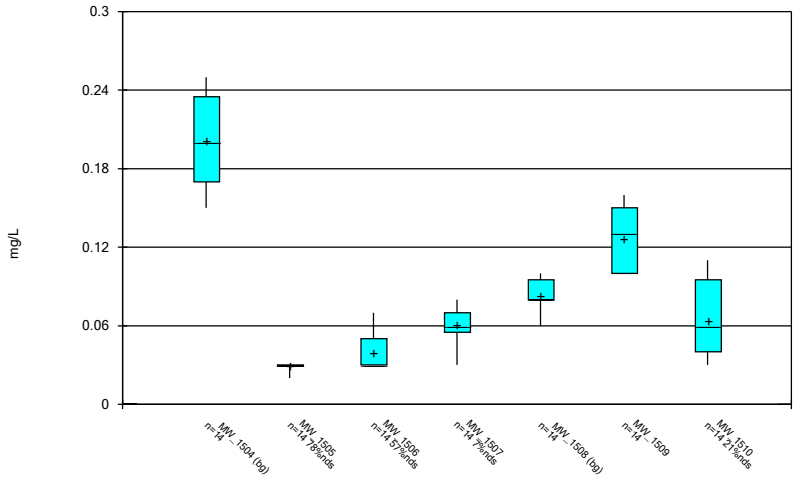
Box & Whiskers Plot



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

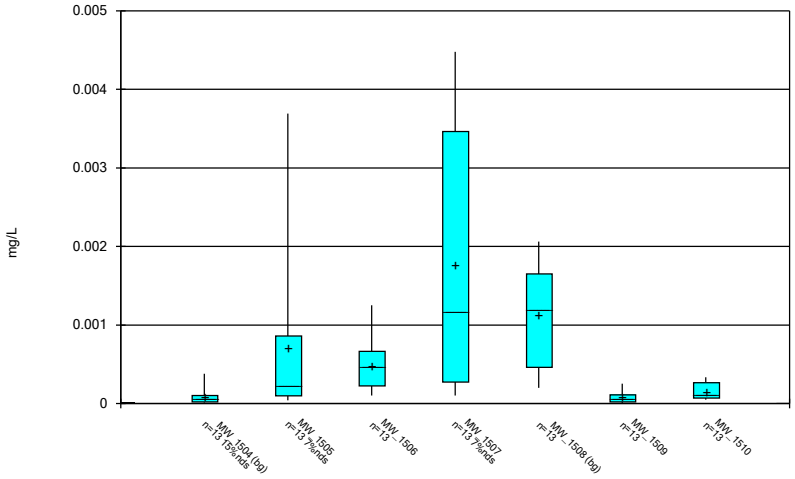
Box & Whiskers Plot



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

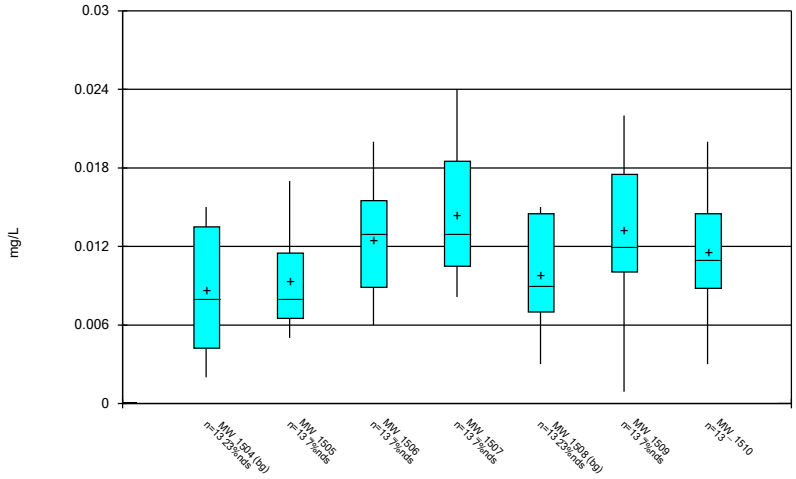
Box & Whiskers Plot



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

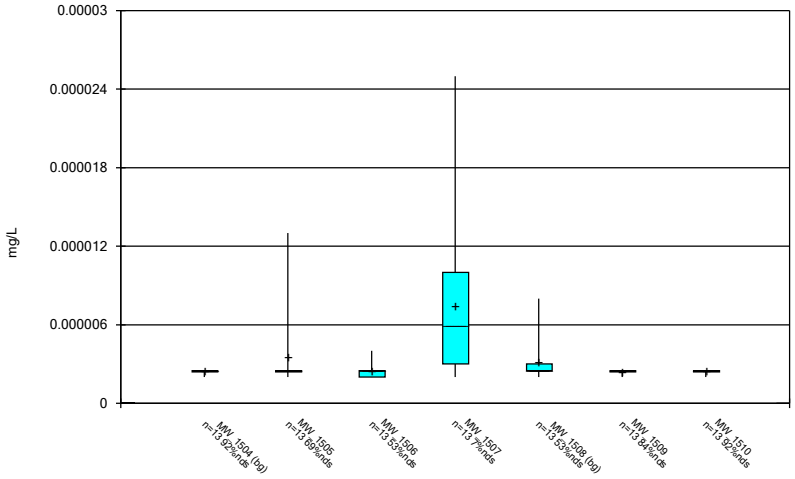
Box & Whiskers Plot



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

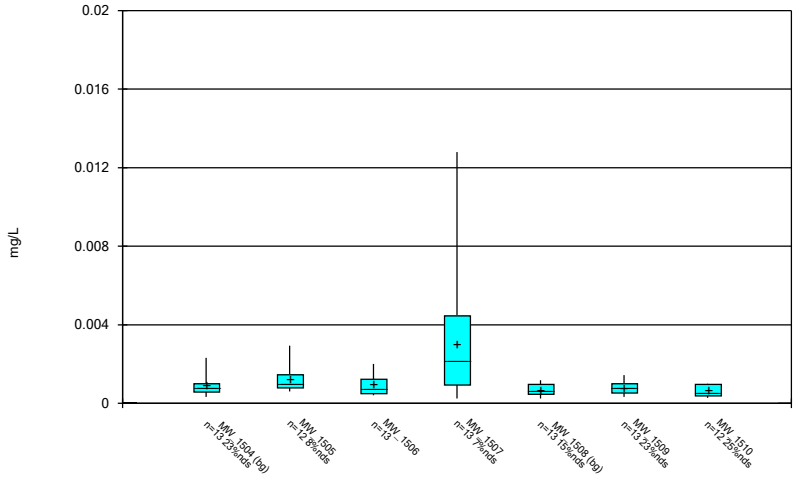
Box & Whiskers Plot



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

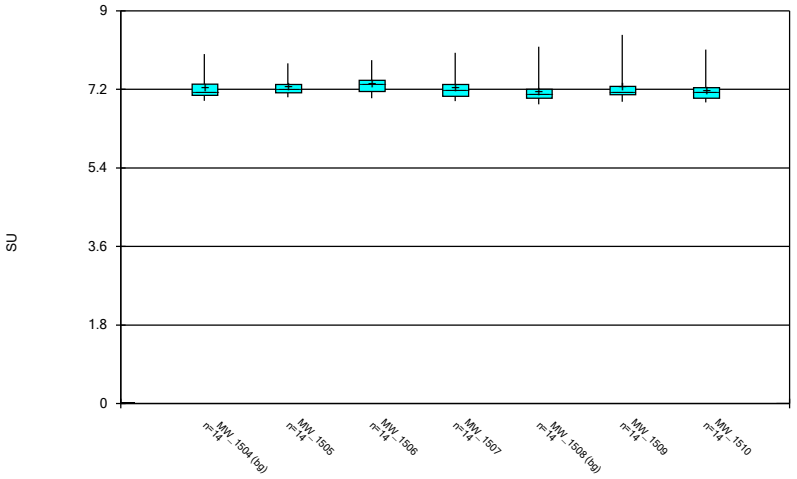
Box & Whiskers Plot



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

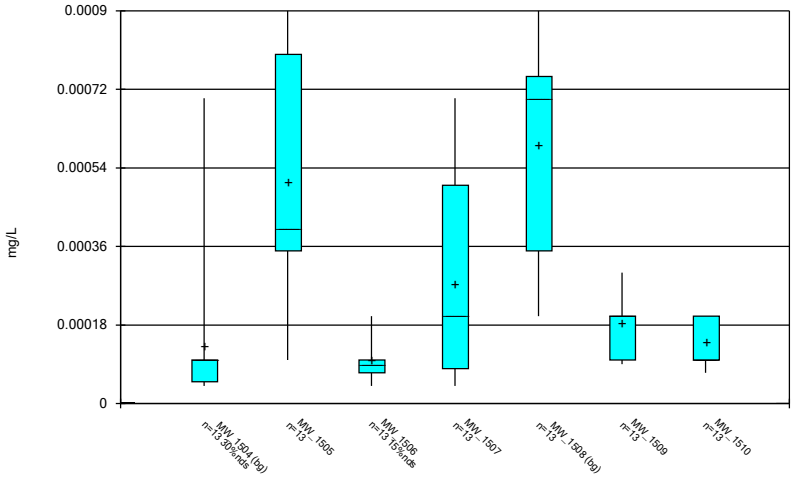
Box & Whiskers Plot



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

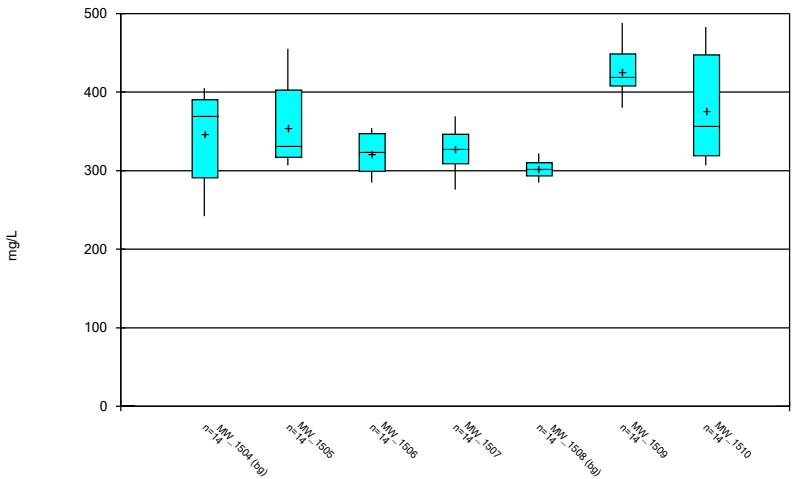
Box & Whiskers Plot



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

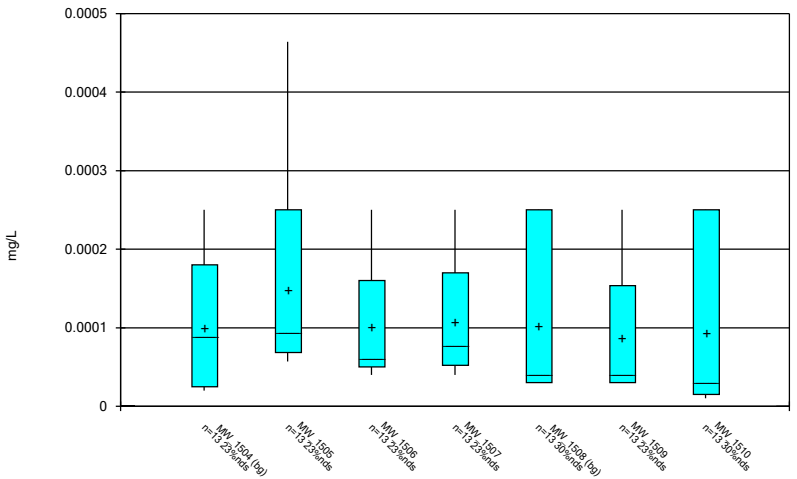
Box & Whiskers Plot



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

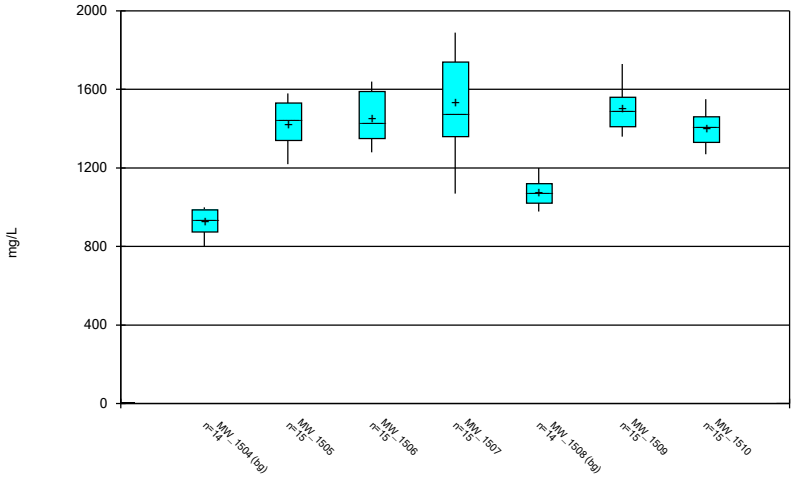
Sanitas™ v.9.6.24 . UG

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

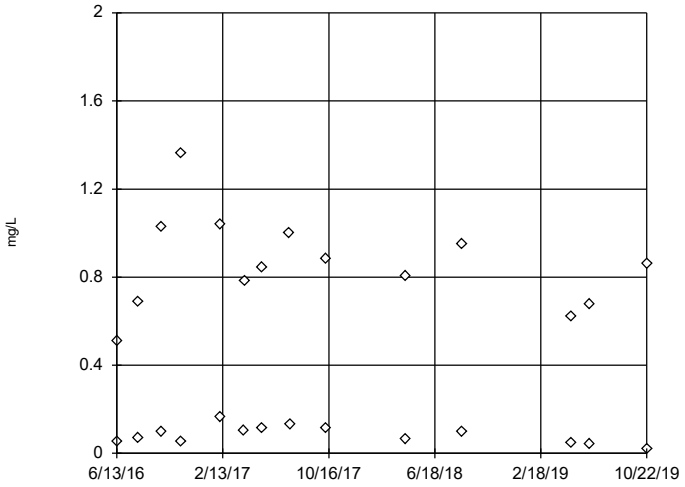
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 12:35 PM

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).

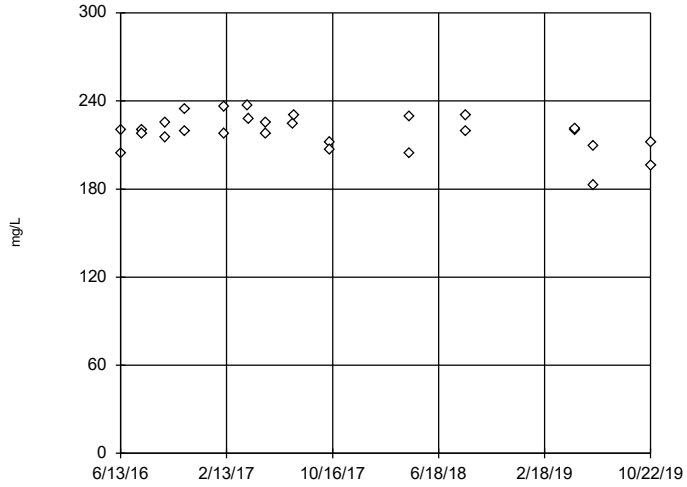
High cutoff = 960.9, low cutoff = 0.00007277, based on IQR multiplier of 3.

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).

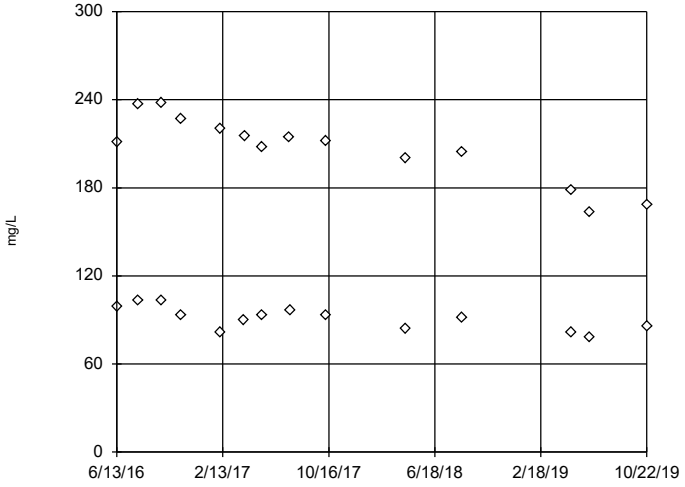
High cutoff = 253.9, low cutoff = -186.6, based on IQR multiplier of 3.

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).

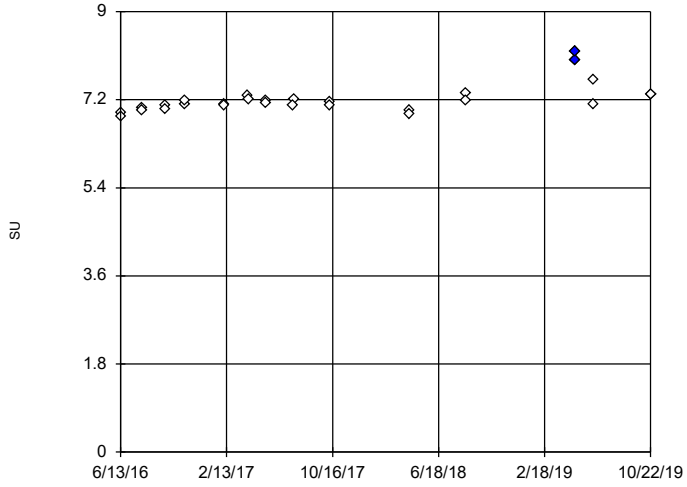
High cutoff = 2541, low cutoff = 7.688, based on IQR multiplier of 3.

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.

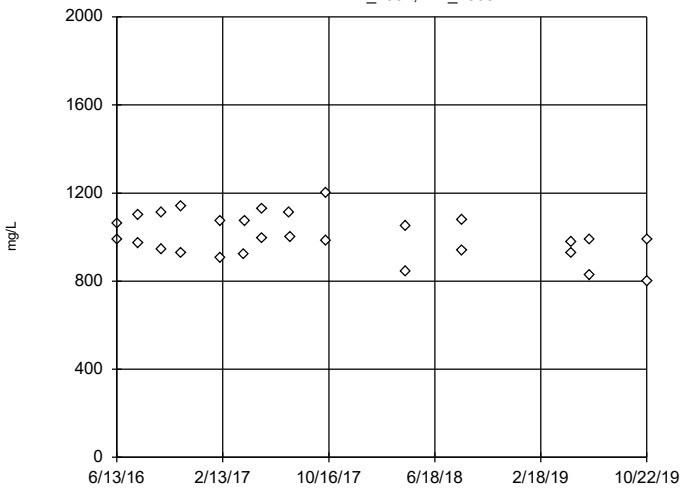
Data were natural log transformed to achieve best W statistic (graph shown in original units).

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

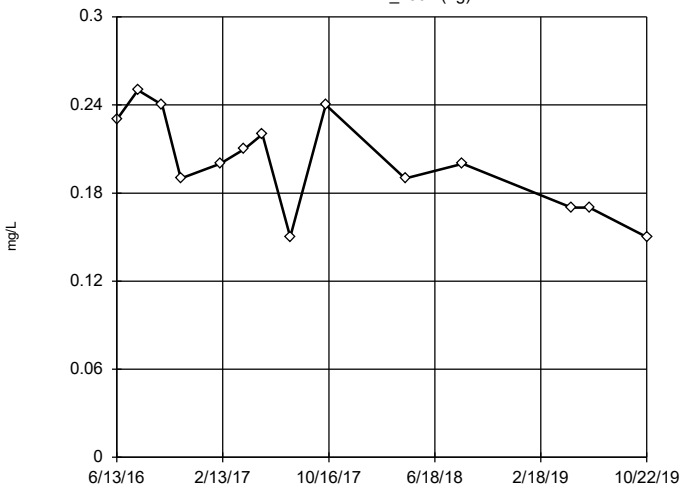
Intrawell Outlier Analysis - All Results (No Significant)

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).

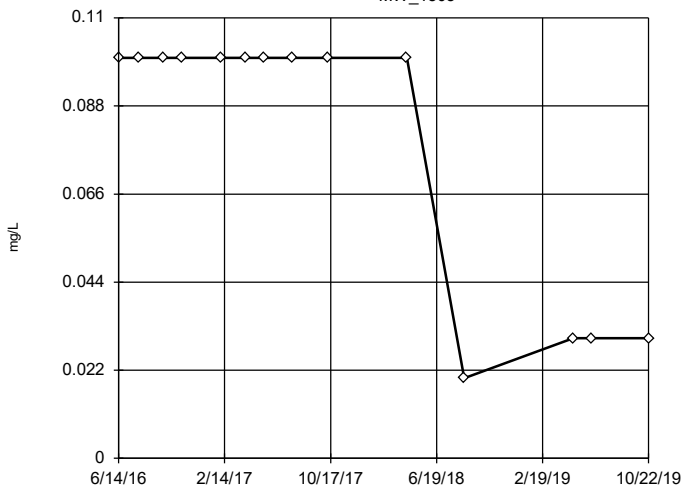
High cutoff = 0.3665, low cutoff = -0.2239, based on IQR multiplier of 3.

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).

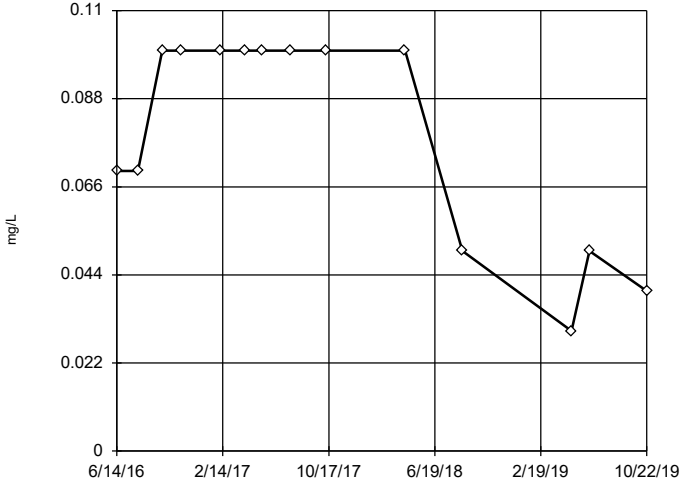
The results were invalidated, because both the lower and upper quartiles represent reporting limits.

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).

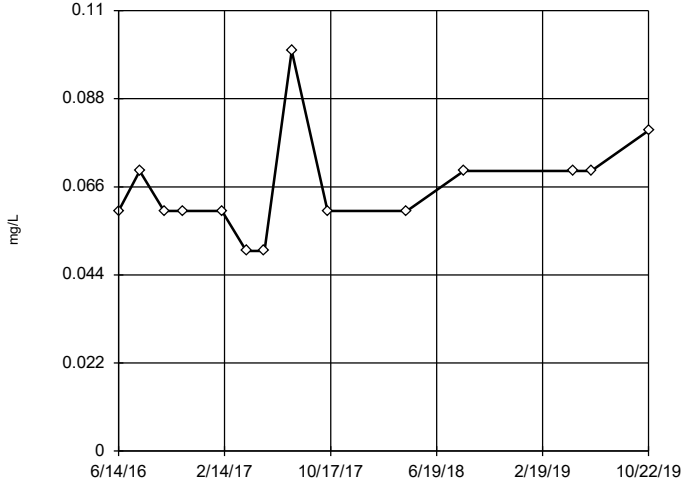
High cutoff = 0.4243, low cutoff = 0.0005341, based on IQR multiplier of 3.

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.

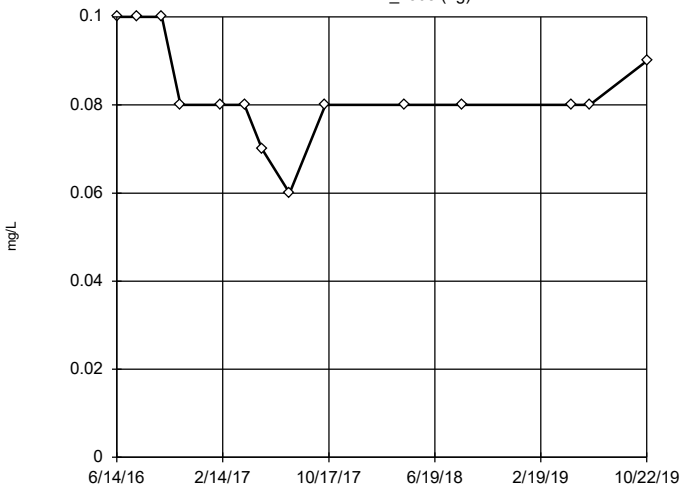
Data were natural log transformed to achieve best W statistic (graph shown in original units).

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).

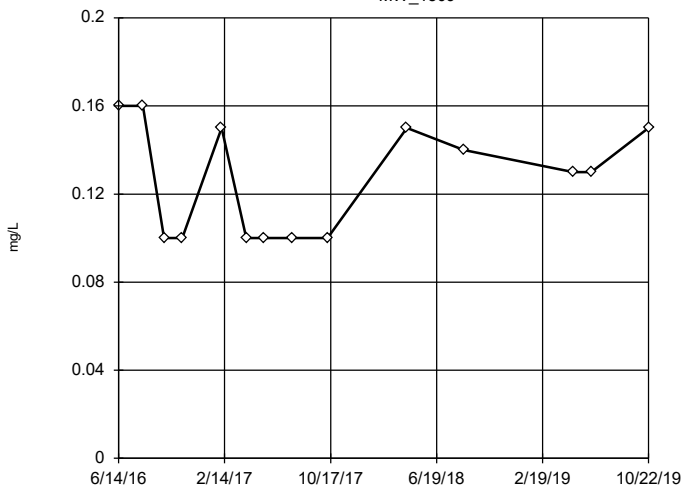
High cutoff = 0.1474, low cutoff = 0.04286, based on IQR multiplier of 3.

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).

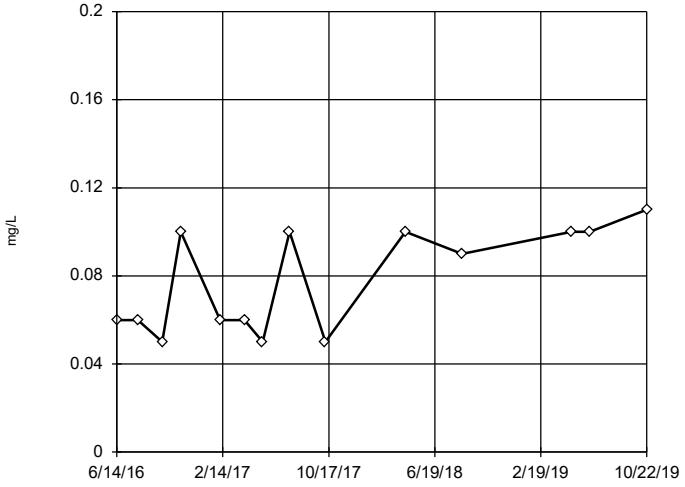
High cutoff = 0.2038, low cutoff = -0.1829, based on IQR multiplier of 3.

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).

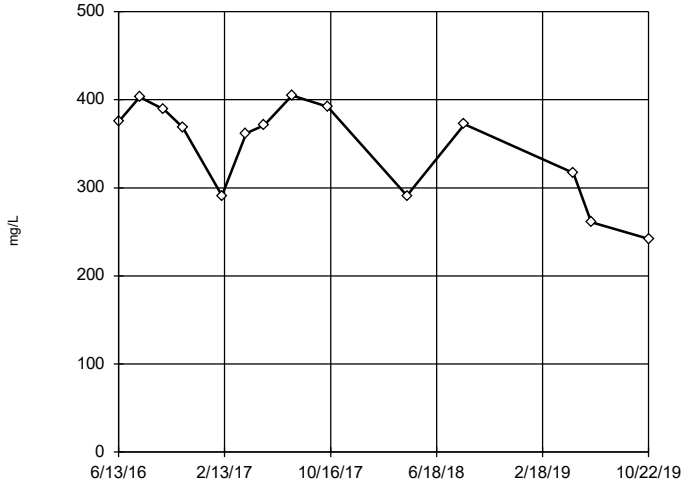
High cutoff = 0.6086, low cutoff = 0.009, based on IQR multiplier of 3.

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.

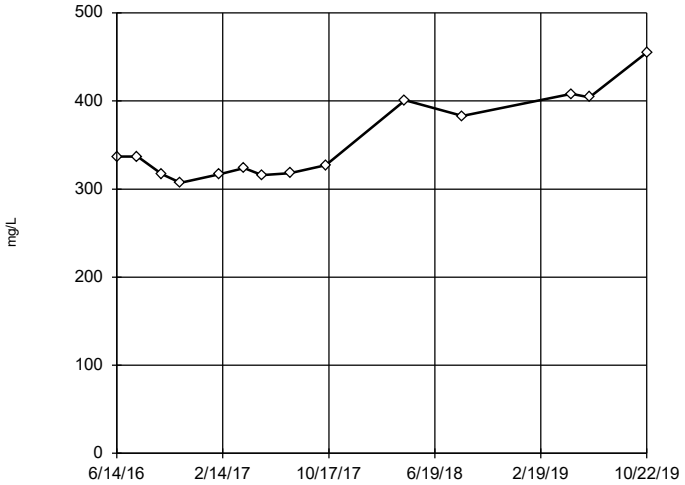
Data were x^6 transformed to achieve best W statistic (graph shown in original units).

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).

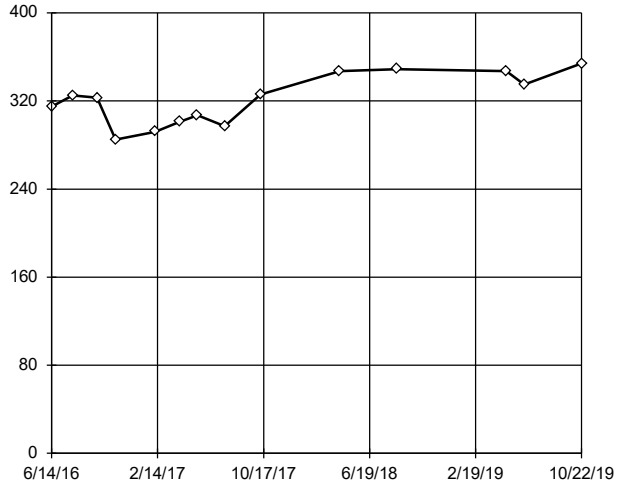
High cutoff = 823.9, low cutoff = 154.9, based on IQR multiplier of 3.

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).

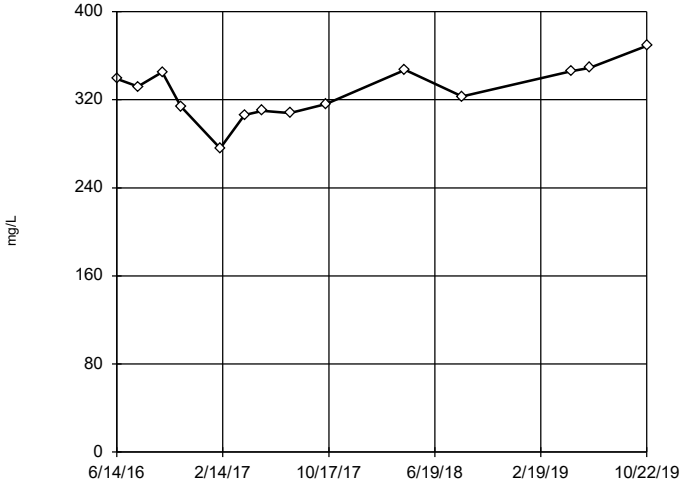
High cutoff = 512.4, low cutoff = 176.4, based on IQR multiplier of 3.

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).

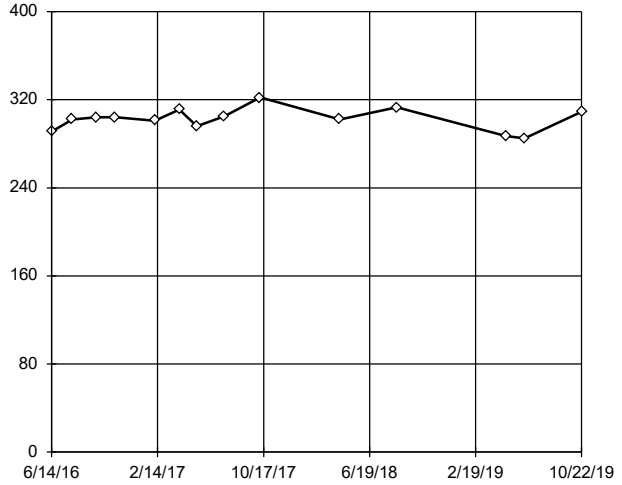
High cutoff = 427.1, low cutoff = -189.3, based on IQR multiplier of 3.

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.

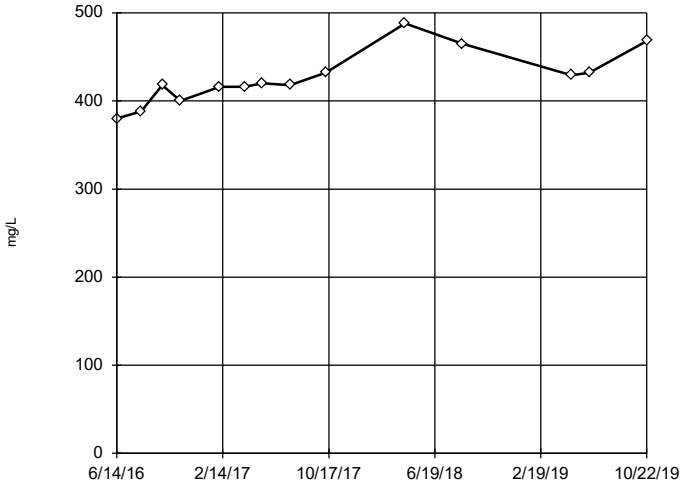
Data were square transformed to achieve best W statistic (graph shown in original units).

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).

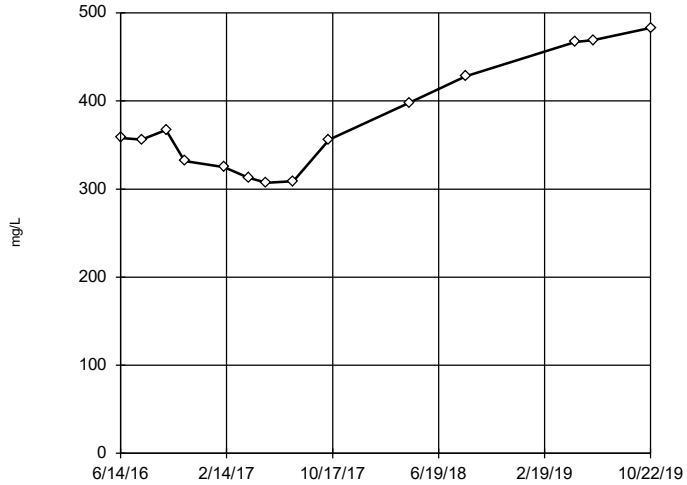
High cutoff = 594.5, low cutoff = 307.5, based on IQR multiplier of 3.

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

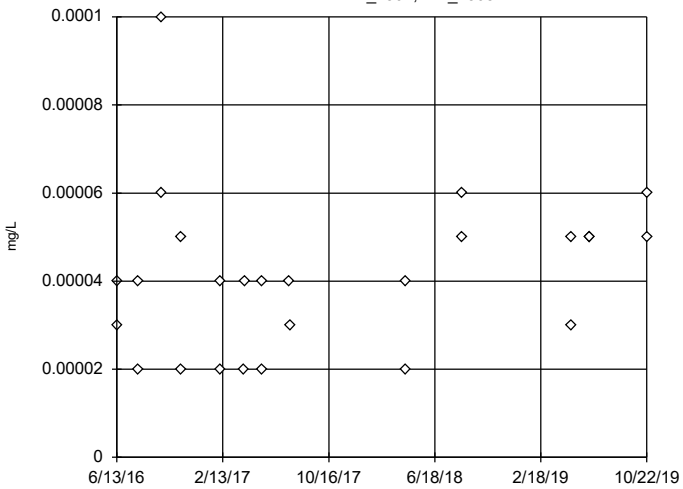
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 12:44 PM

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.

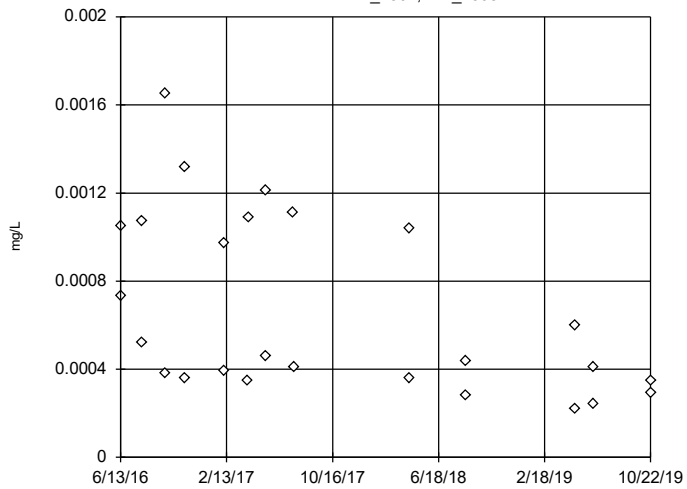
Constituent: Antimony, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

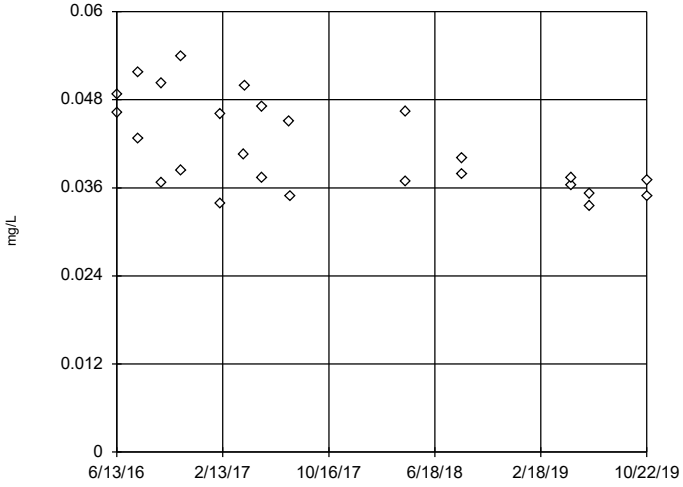
Constituent: Arsenic, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

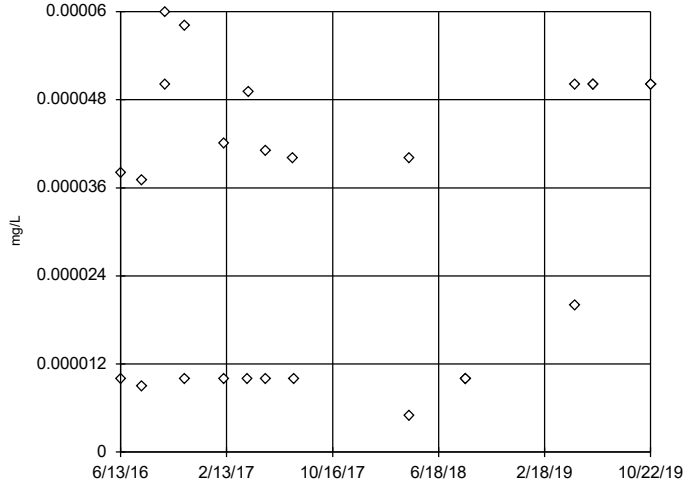
Constituent: Barium, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

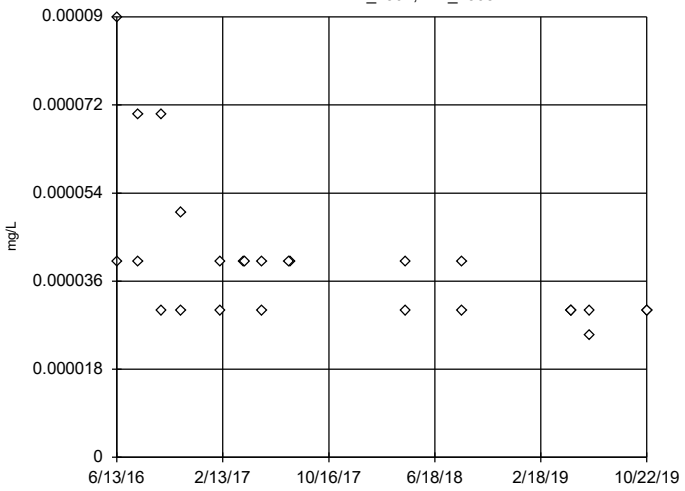
Constituent: Beryllium, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

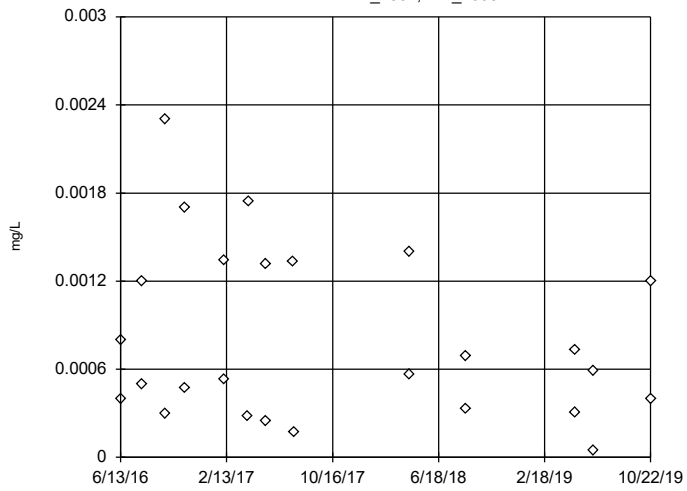
Constituent: Cadmium, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

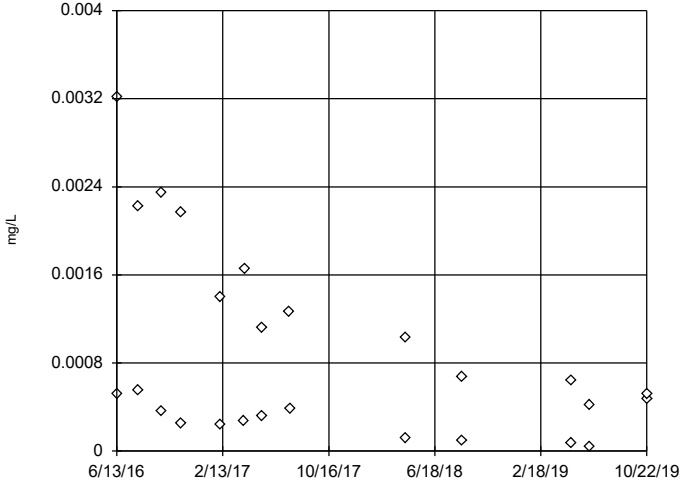
Constituent: Chromium, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

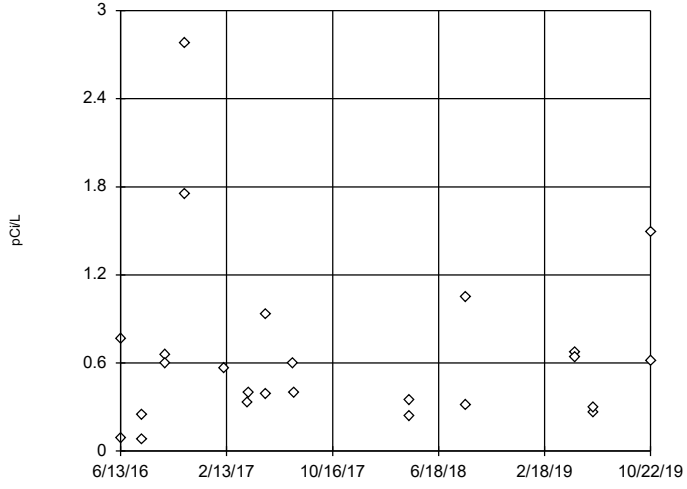
Constituent: Cobalt, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

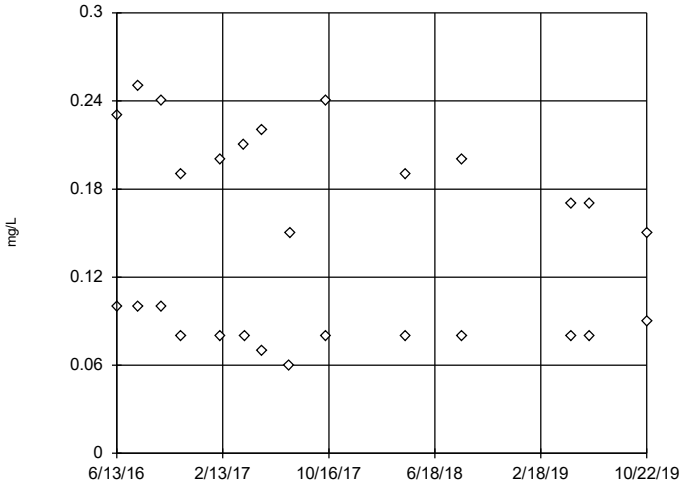
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:39 PM View: AIV

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.

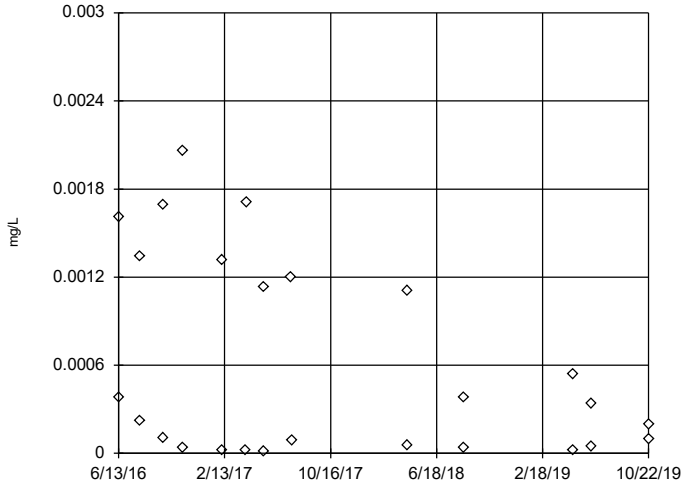
Constituent: Fluoride, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

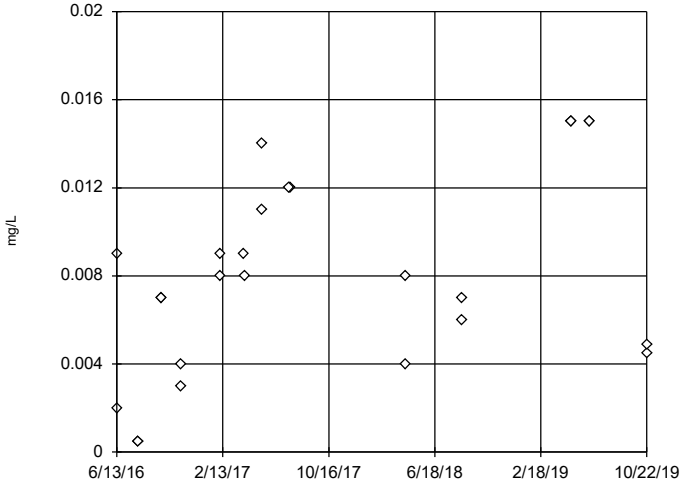
Constituent: Lead, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

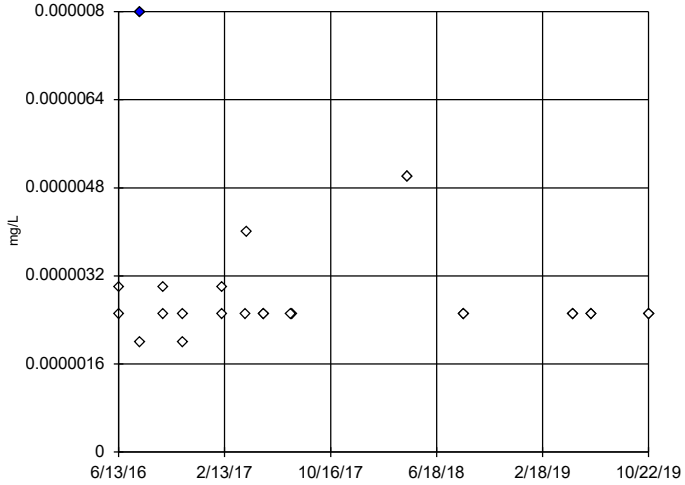
Constituent: Lithium, total Analysis Run 12/23/2019 12:39 PM View: AIV

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).

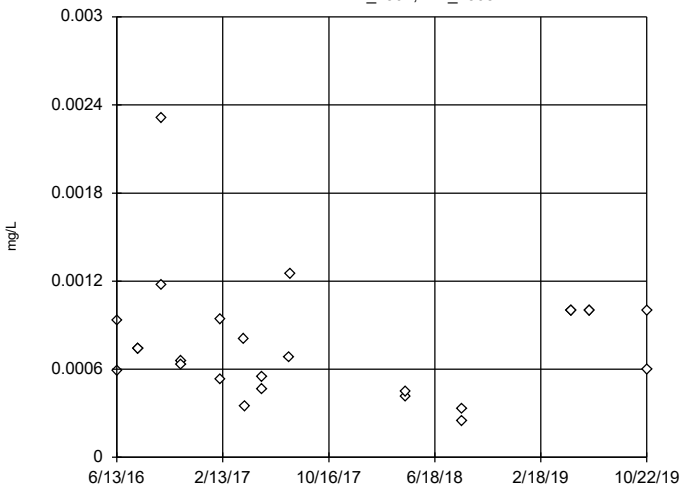
High cutoff = 0.000005184, low cutoff = 0.000001447, based on IQR multiplier of 3.

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.

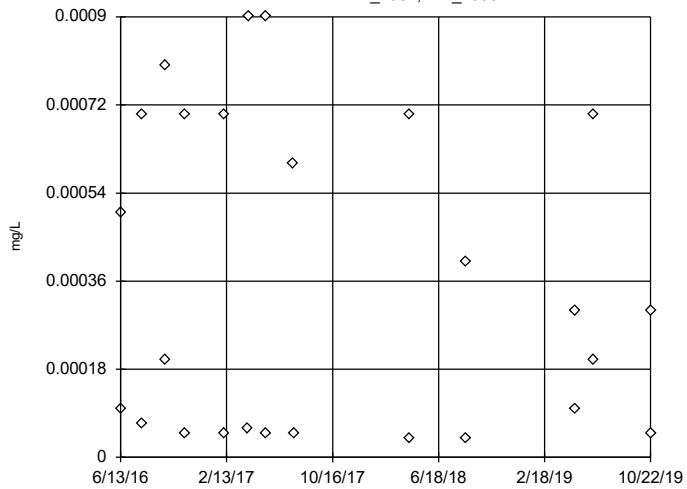
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

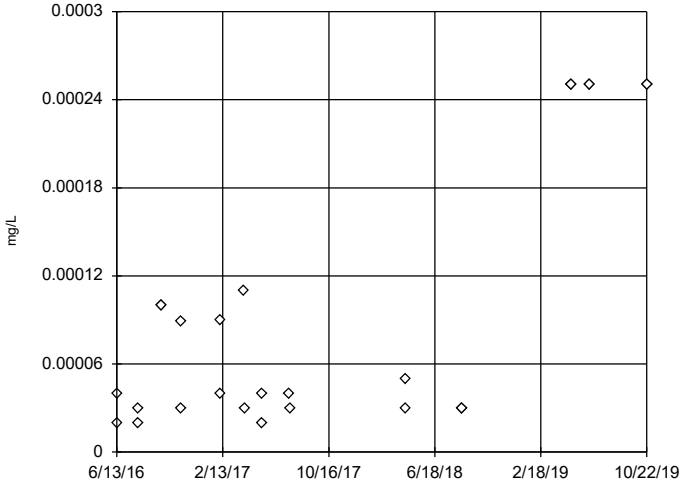
Constituent: Selenium, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

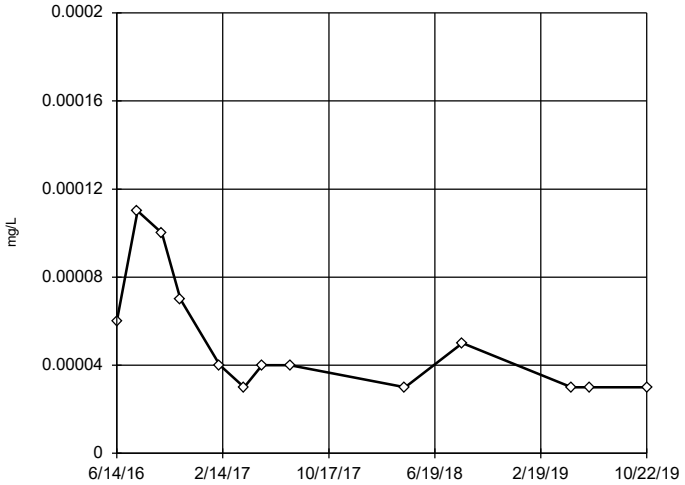
Constituent: Thallium, total Analysis Run 12/23/2019 12:39 PM View: AIV

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.

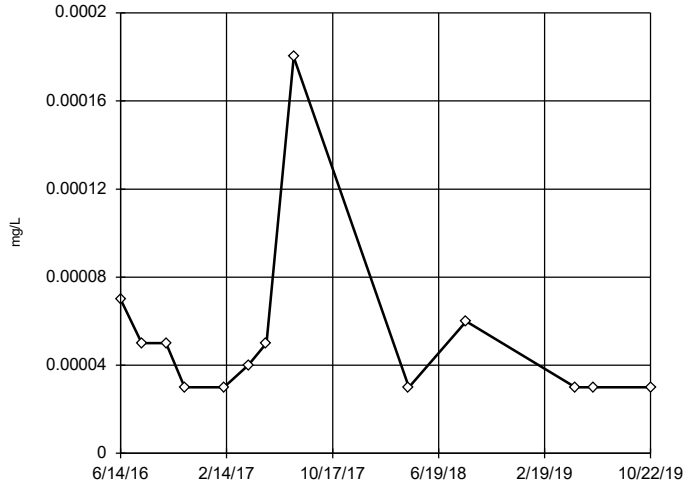
Constituent: Antimony, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

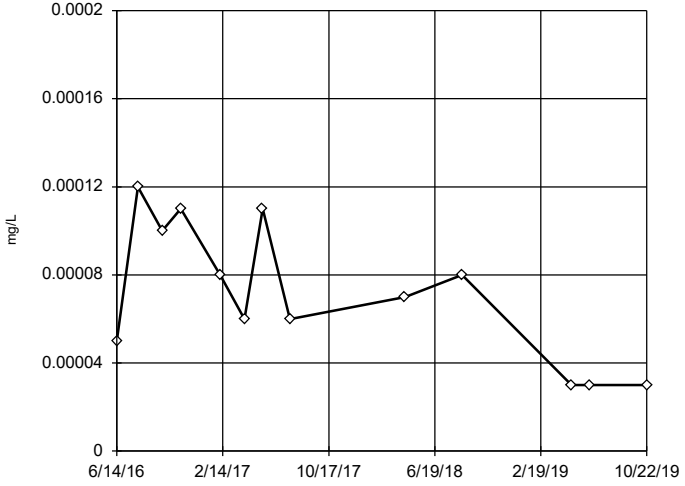
Constituent: Antimony, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

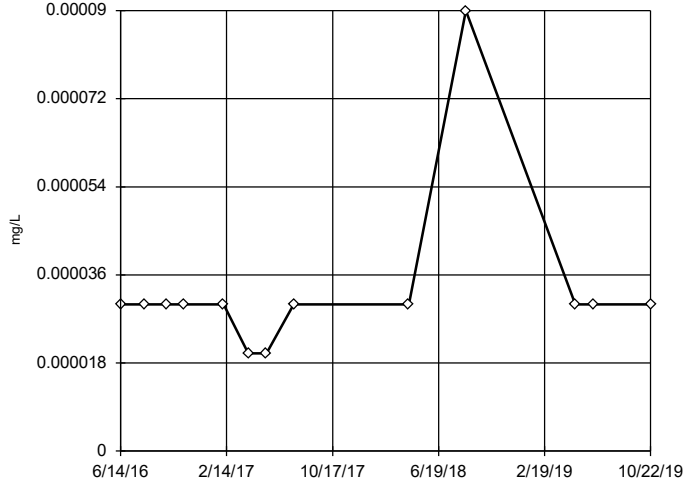
Constituent: Antimony, total Analysis Run 12/23/2019 12:40 PM View: AIV

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).

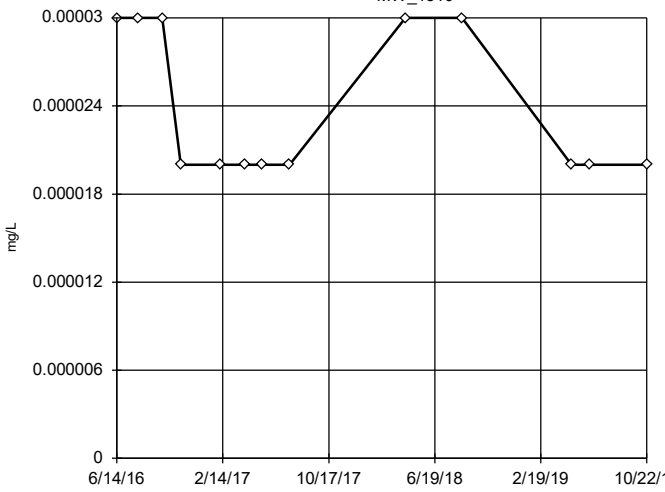
The results were invalidated, because the lower and upper quartiles are equal.

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.

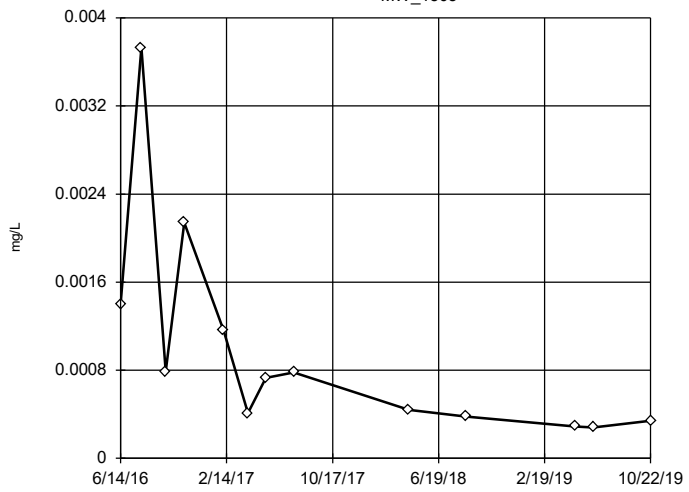
Constituent: Antimony, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

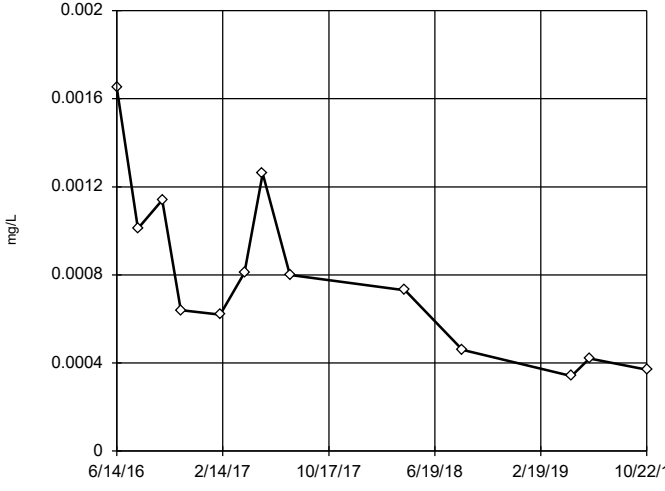
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

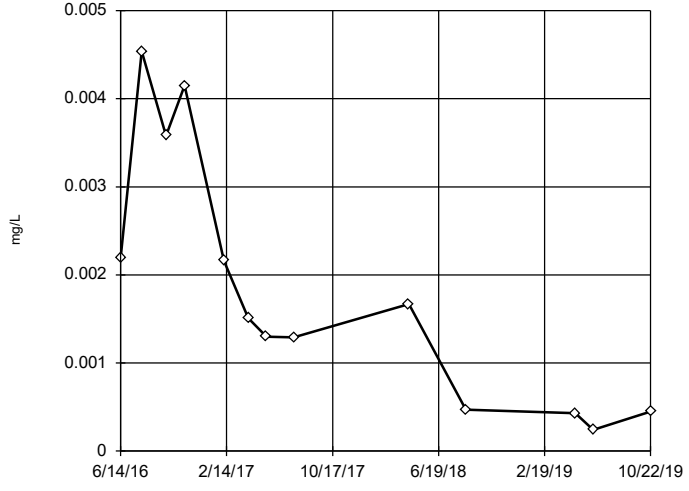
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

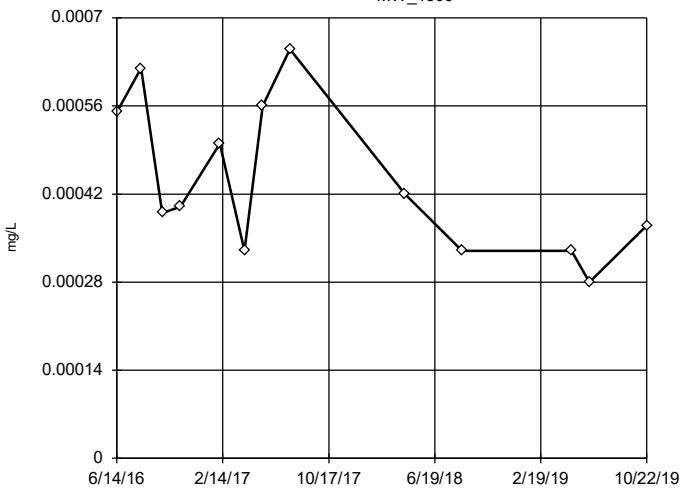
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

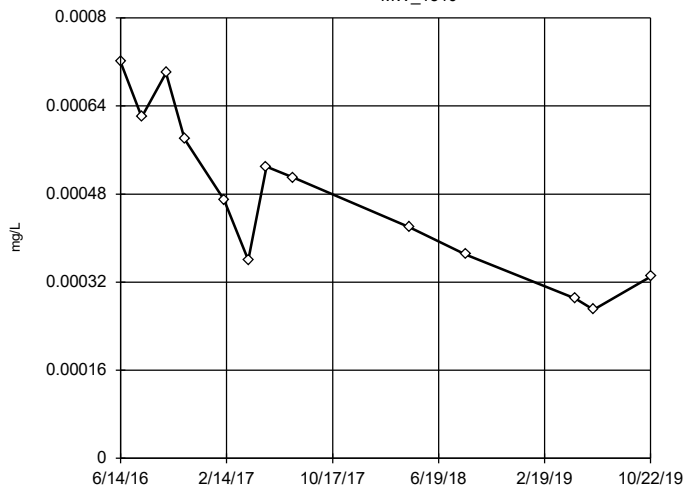
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

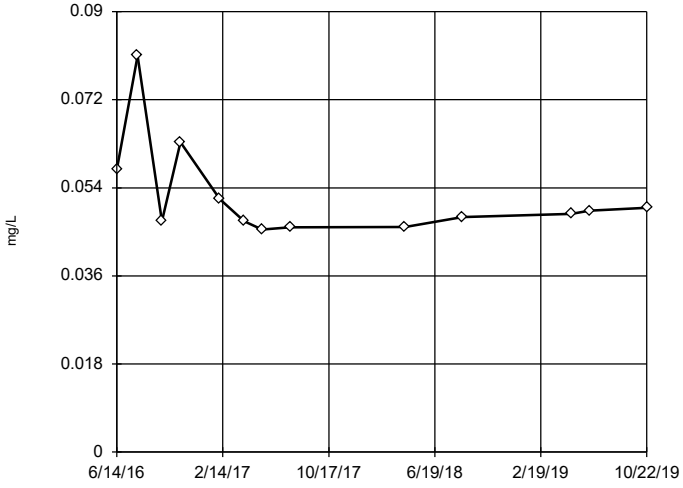
Constituent: Arsenic, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

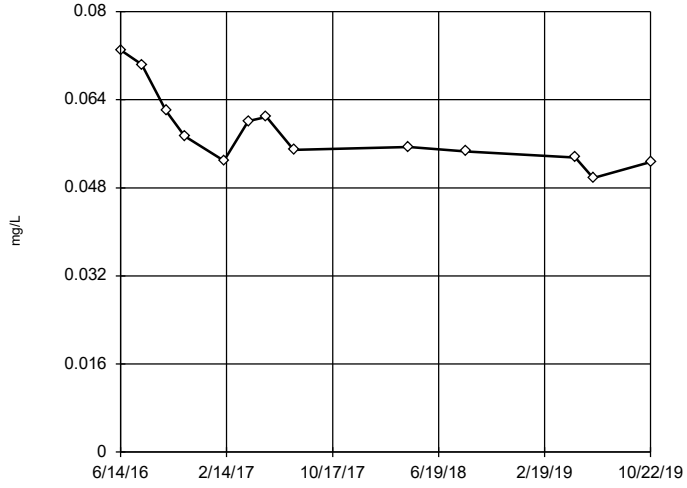
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

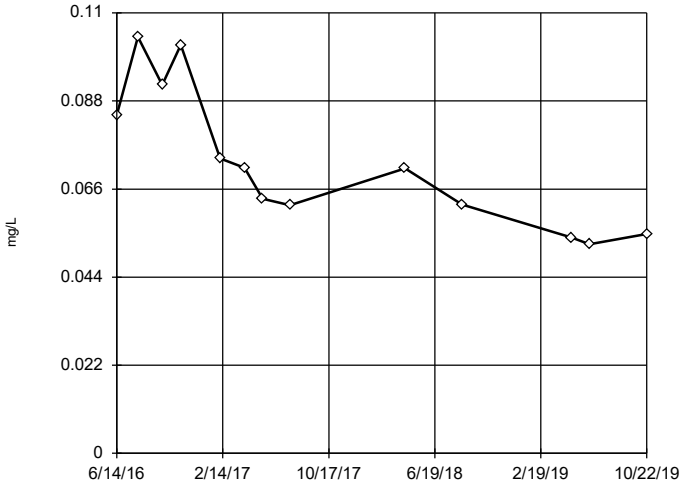
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

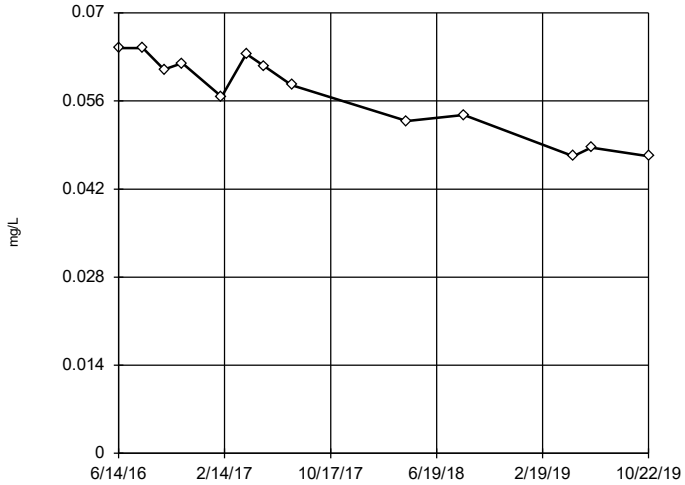
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

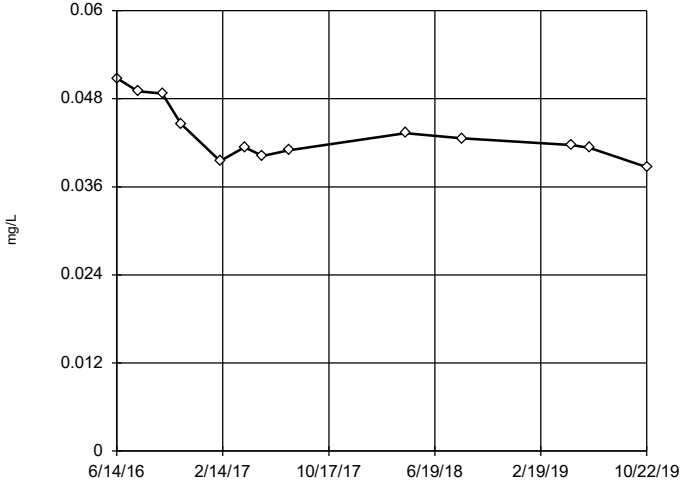
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

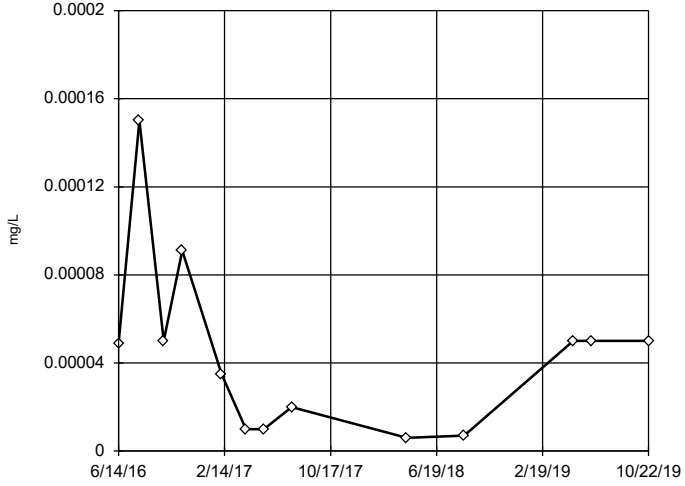
Constituent: Barium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

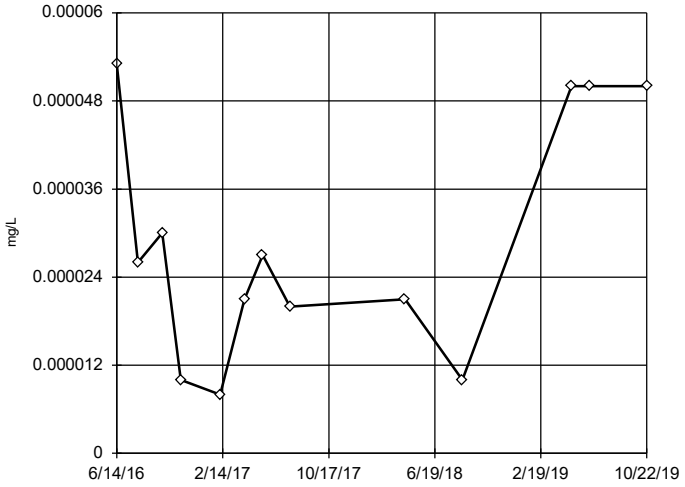
Constituent: Beryllium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

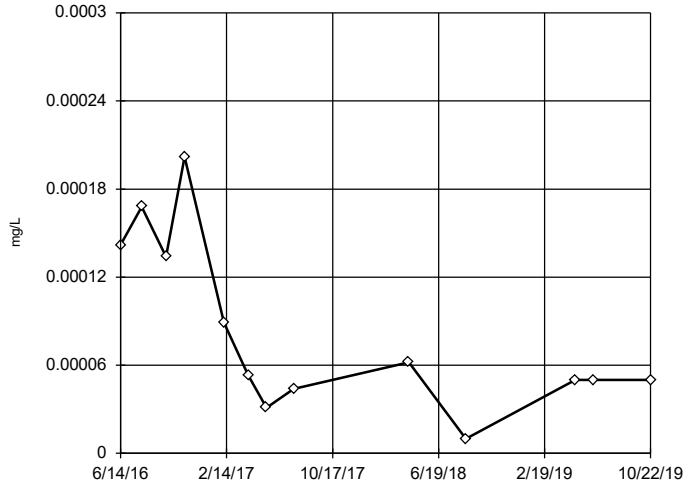
Constituent: Beryllium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

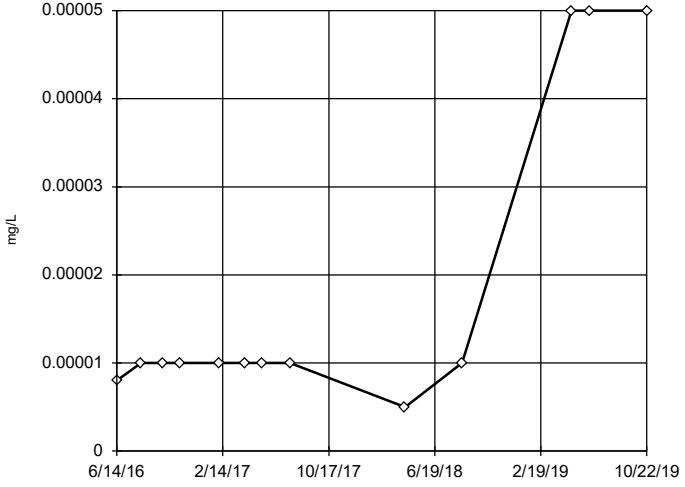
Constituent: Beryllium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

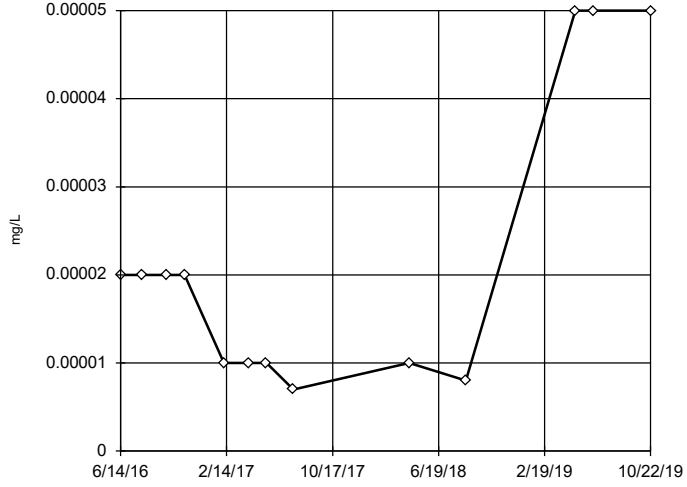
Constituent: Beryllium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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).

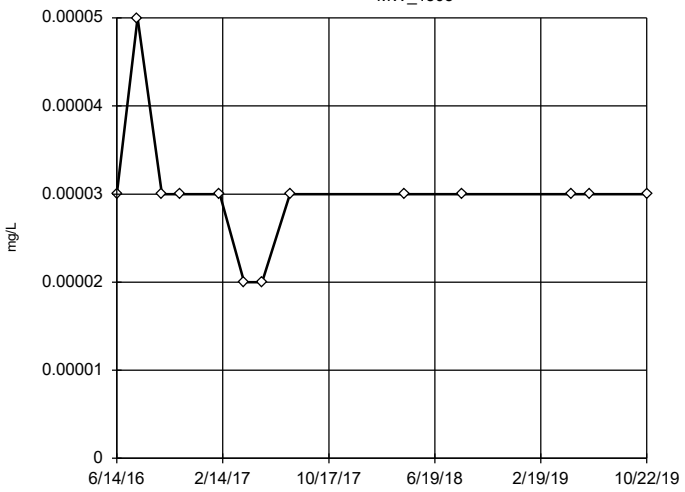
High cutoff = 0.001, low cutoff = 3.2e-7, based on IQR multiplier of 3.

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.

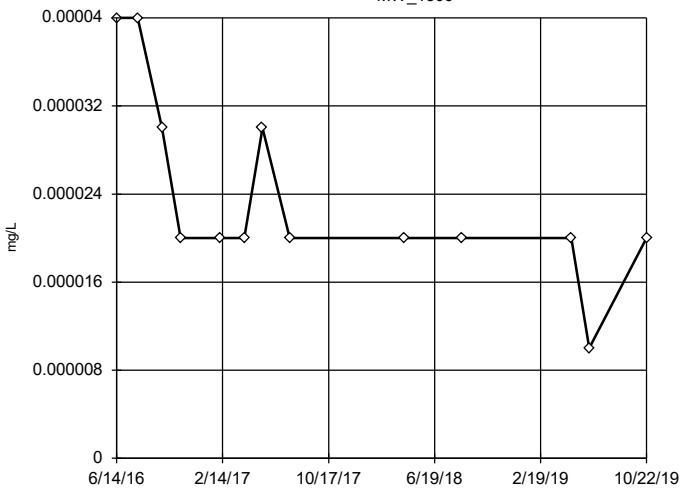
Constituent: Cadmium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

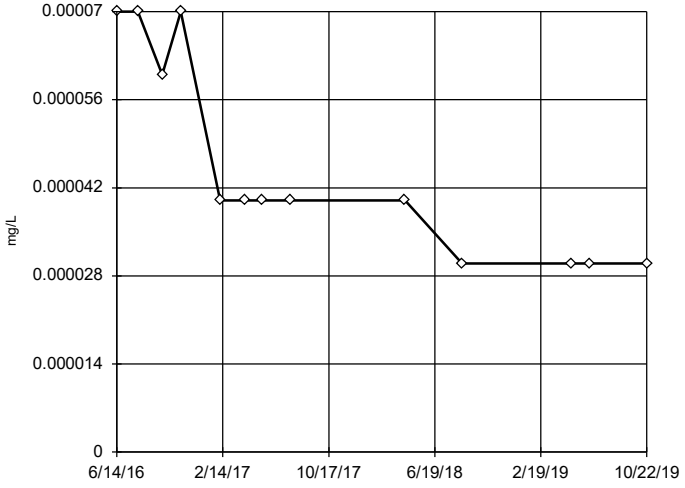
Constituent: Cadmium, total Analysis Run 12/23/2019 12:40 PM View: AIV

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.

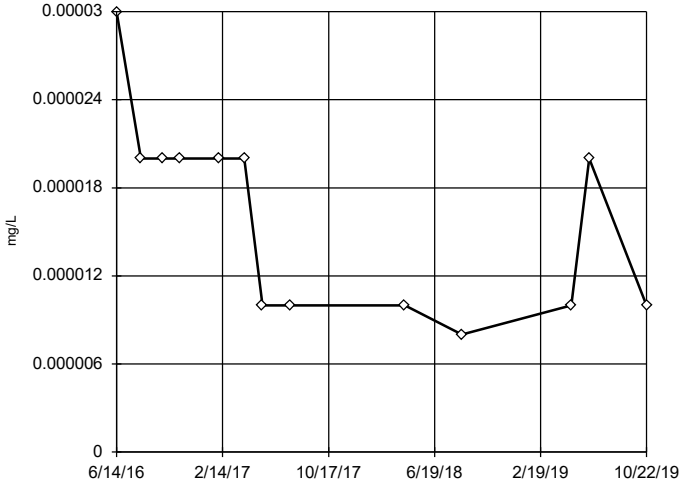
Constituent: Cadmium, total Analysis Run 12/23/2019 12:41 PM View: AIV

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).

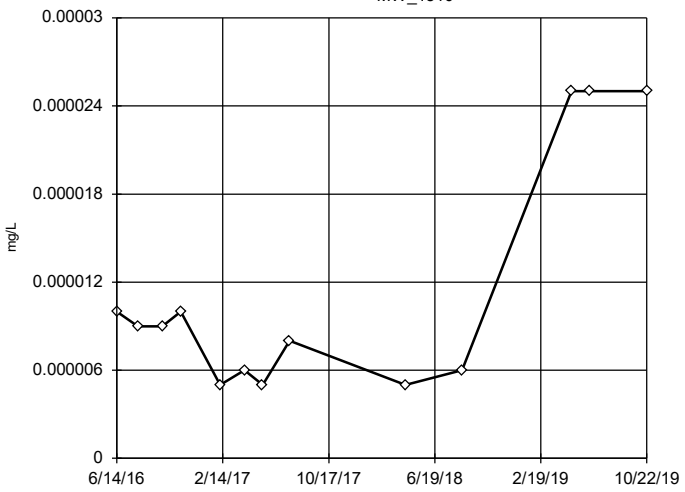
High cutoff = 0.00008486, low cutoff = 1.1e-7, based on IQR multiplier of 3.

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).

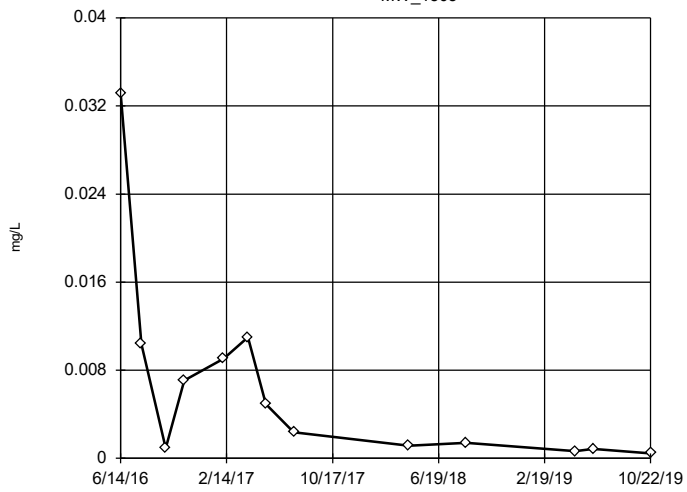
High cutoff = 0.0003804, low cutoff = 2.3e-7, based on IQR multiplier of 3.

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).

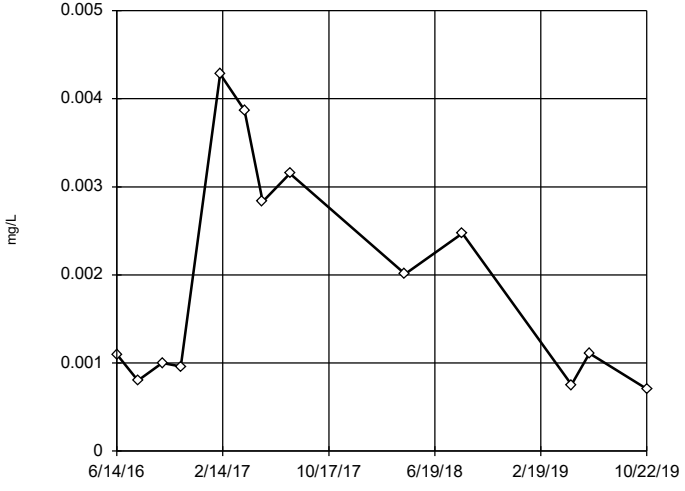
High cutoff = 13.29, low cutoff = 6.4e-7, based on IQR multiplier of 3.

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).

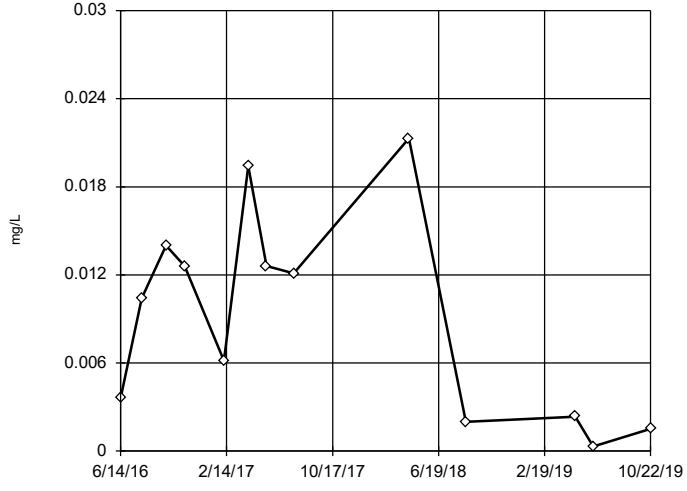
High cutoff = 0.1183, low cutoff = 0.00002211, based on IQR multiplier of 3.

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).

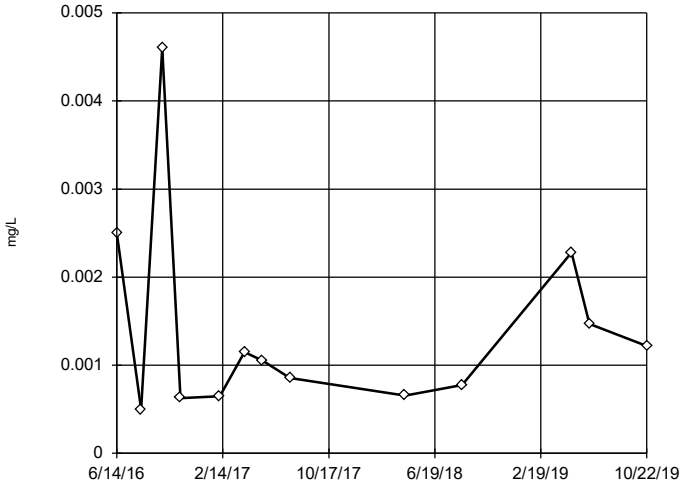
High cutoff = 0.1033, low cutoff = -0.02543, based on IQR multiplier of 3.

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.

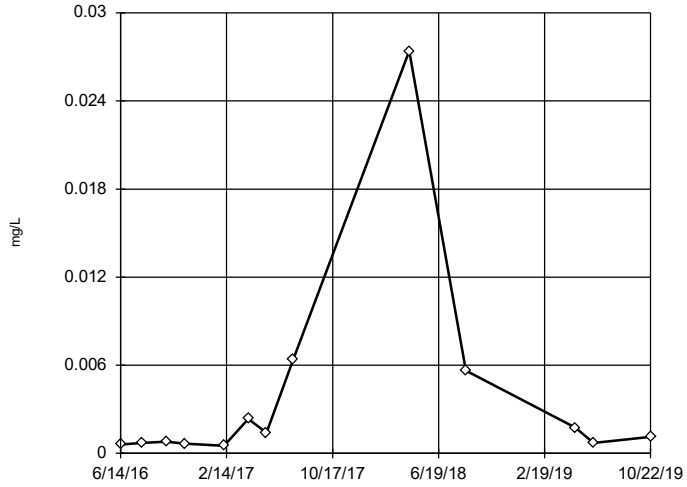
Constituent: Chromium, total Analysis Run 12/23/2019 12:41 PM View: AIV

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.

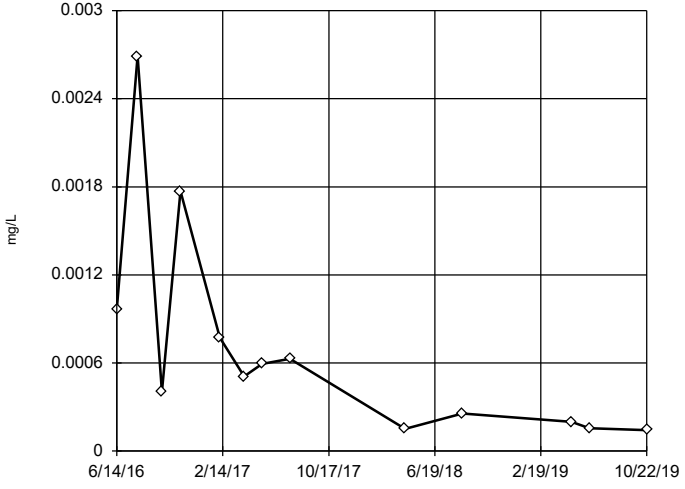
Constituent: Chromium, total Analysis Run 12/23/2019 12:41 PM View: AIV

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.

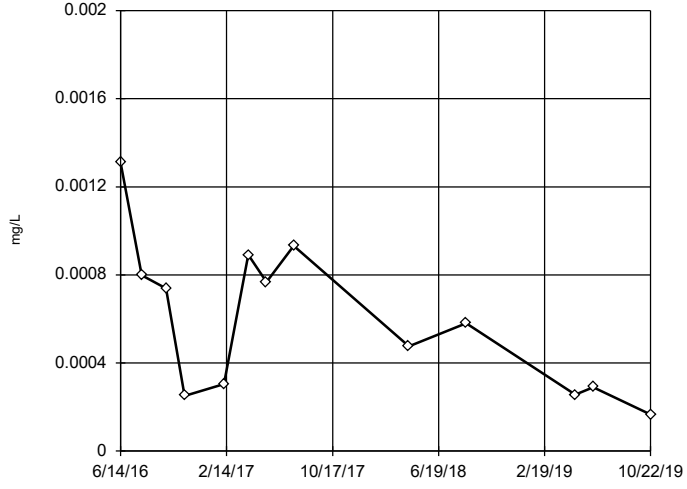
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

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.

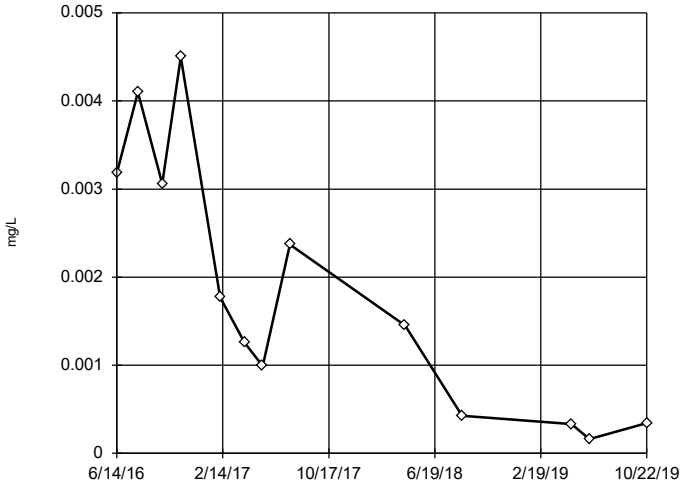
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

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.

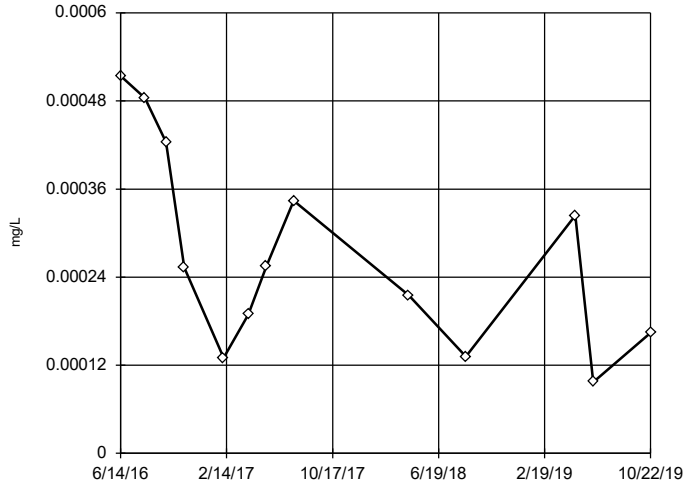
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

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.

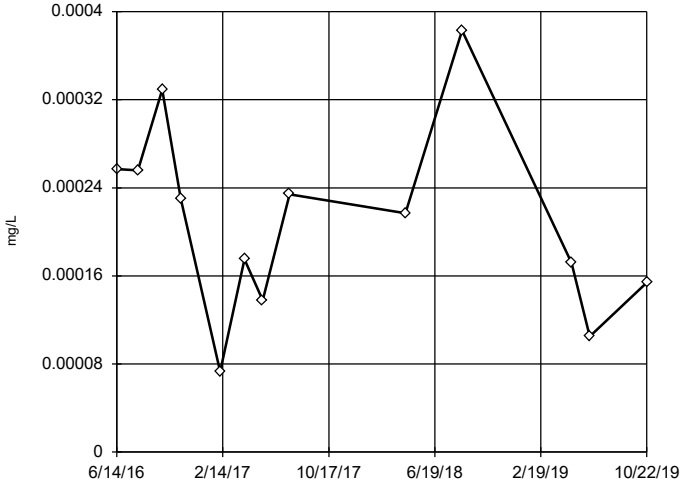
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

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.

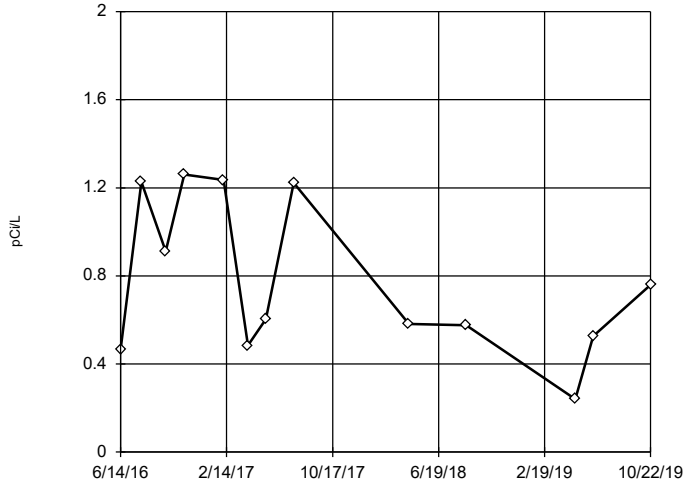
Constituent: Cobalt, total Analysis Run 12/23/2019 12:41 PM View: AIV

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.

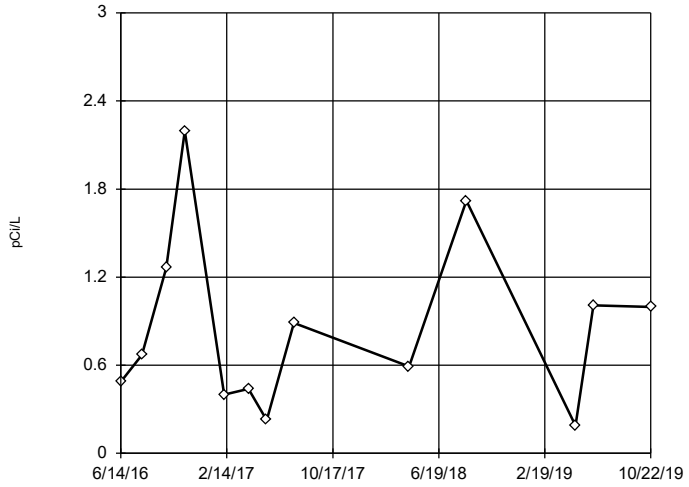
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

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.

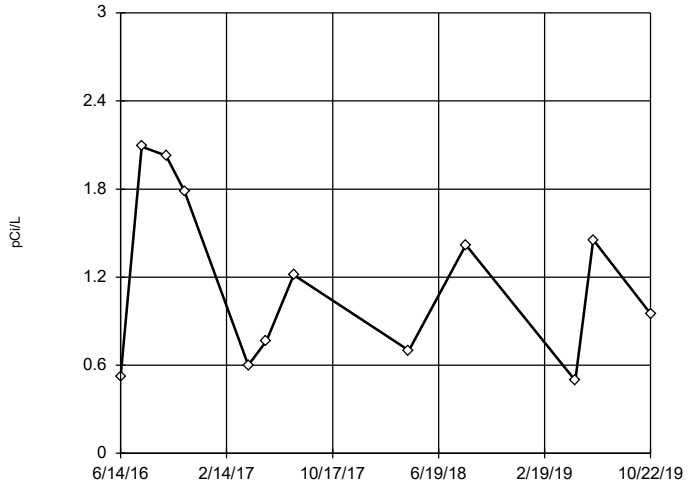
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

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.

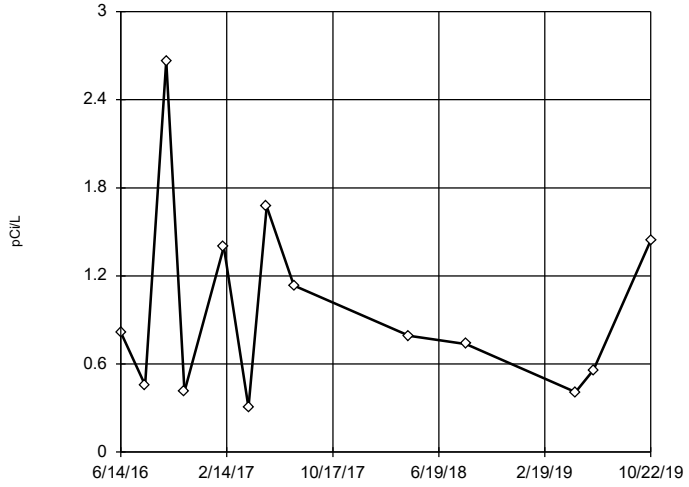
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

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.

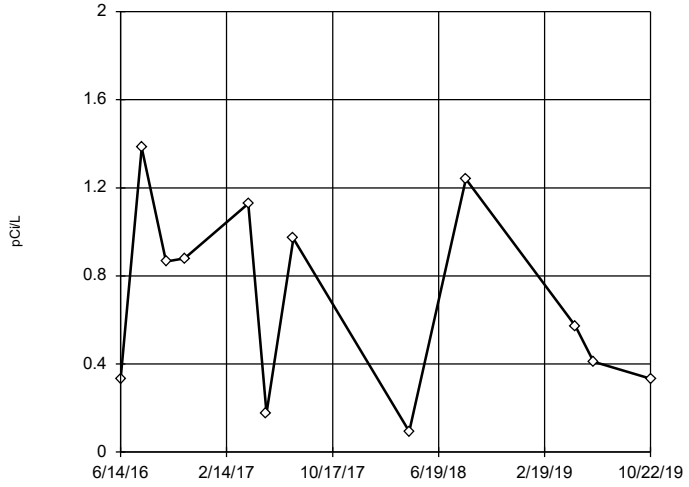
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

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.

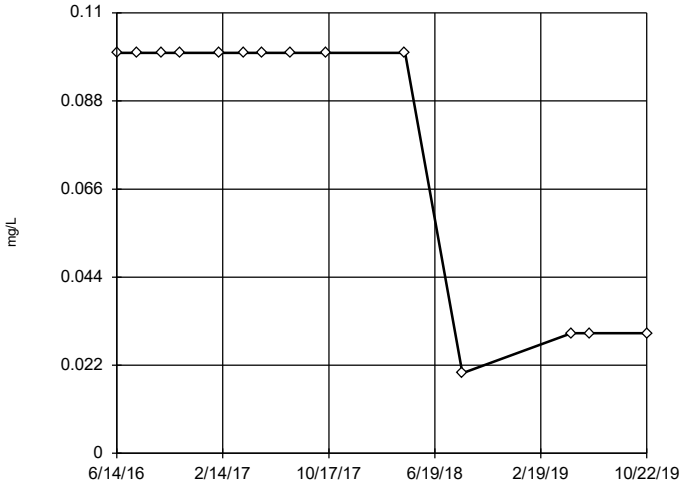
Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 12:41 PM View: AIV

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.

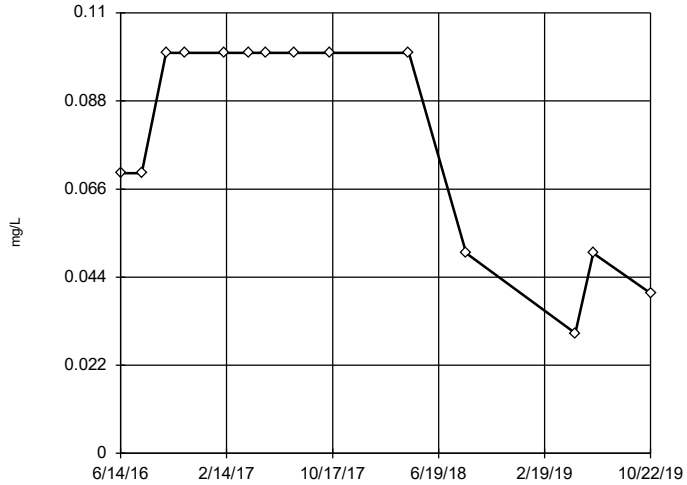
Constituent: Fluoride, total Analysis Run 12/23/2019 12:41 PM View: AIV

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.

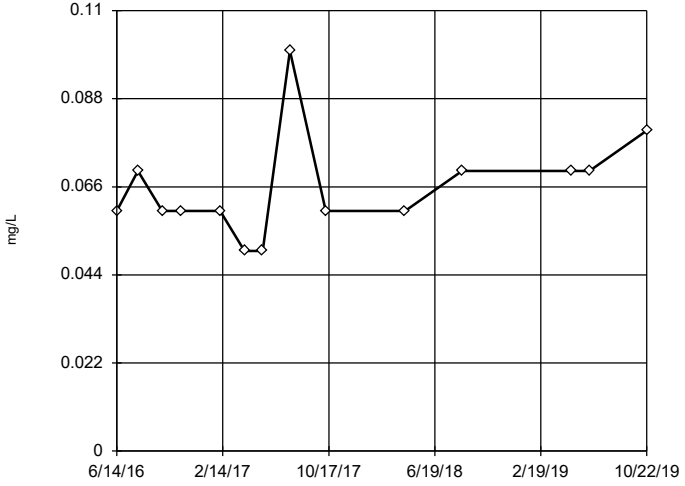
Constituent: Fluoride, total Analysis Run 12/23/2019 12:41 PM View: AIV

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.

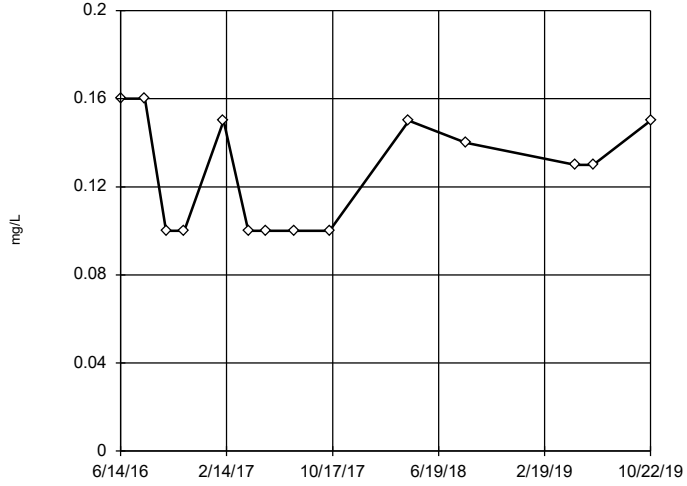
Constituent: Fluoride, total Analysis Run 12/23/2019 12:41 PM View: AIV

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).

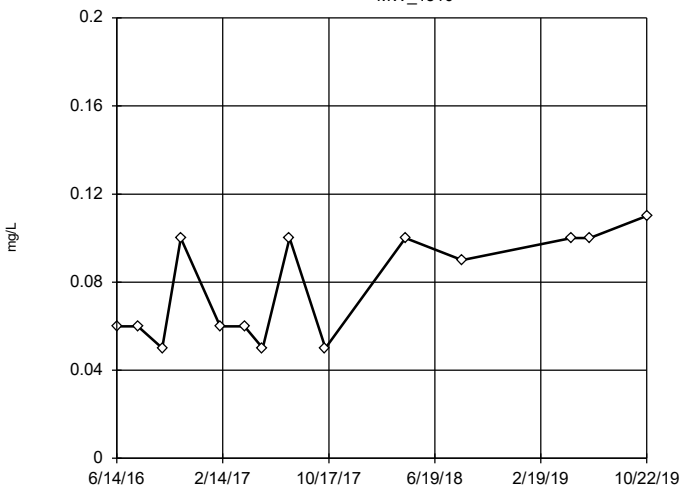
High cutoff = 0.2038, low cutoff = -0.1829, based on IQR multiplier of 3.

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).

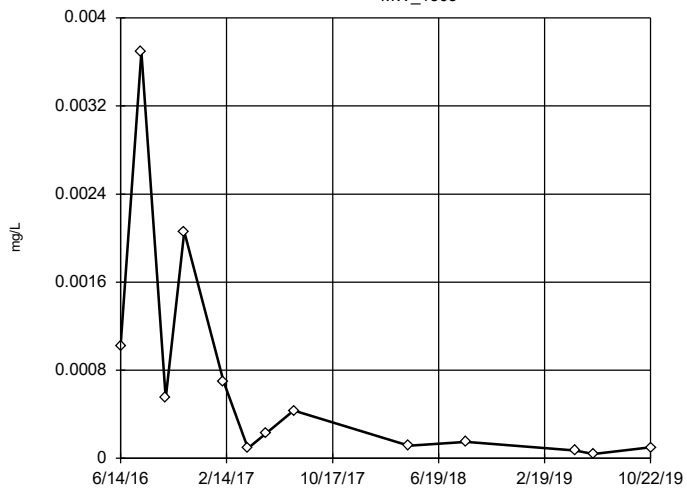
High cutoff = 0.6086, low cutoff = 0.009, based on IQR multiplier of 3.

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).

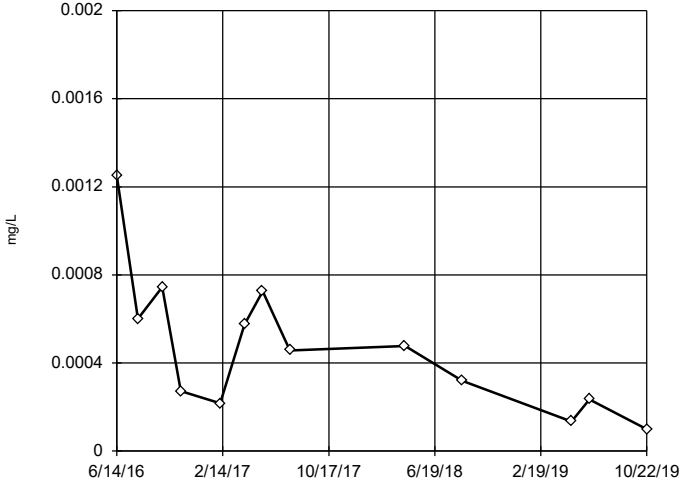
High cutoff = 0.5822, low cutoff = 1.4e-7, based on IQR multiplier of 3.

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).

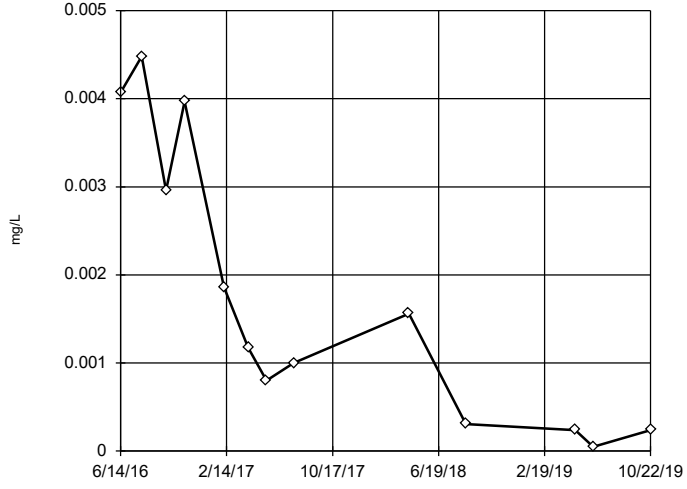
High cutoff = 0.004571, low cutoff = -0.000005803, based on IQR multiplier of 3.

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.

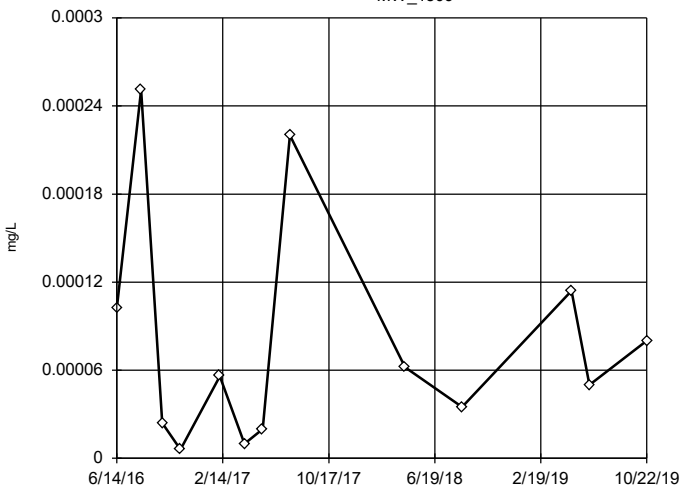
Data were cube root transformed to achieve best W statistic (graph shown in original units).

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).

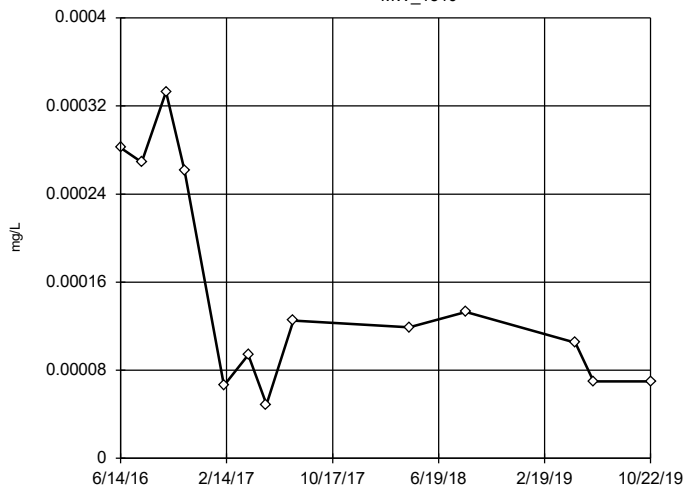
High cutoff = 0.01286, low cutoff = 1.8e-7, based on IQR multiplier of 3.

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).

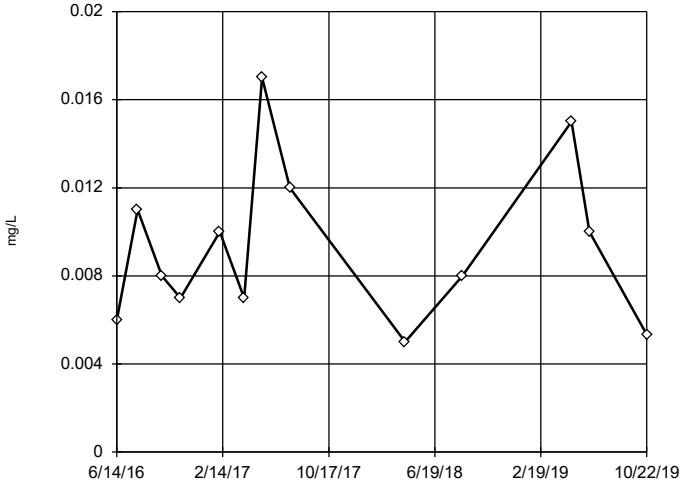
High cutoff = 0.01437, low cutoff = 0.000001291, based on IQR multiplier of 3.

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).

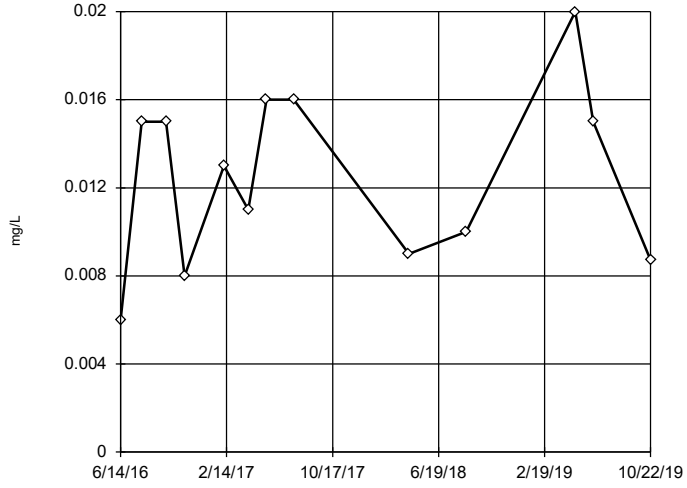
High cutoff = 0.06401, low cutoff = 0.001163, based on IQR multiplier of 3.

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.

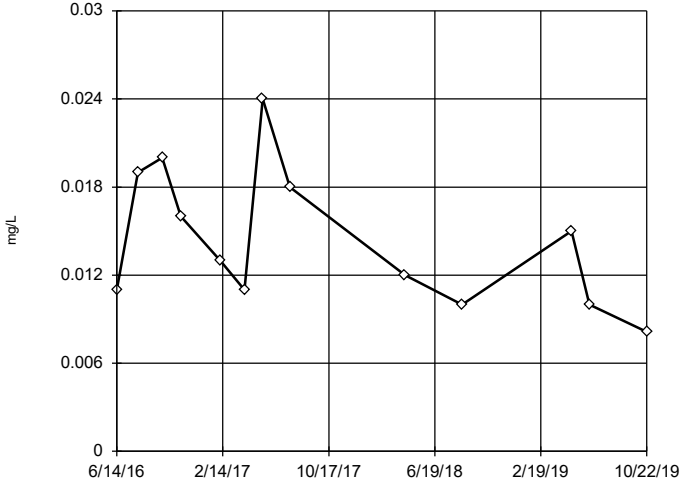
Data were square root transformed to achieve best W statistic (graph shown in original units).

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).

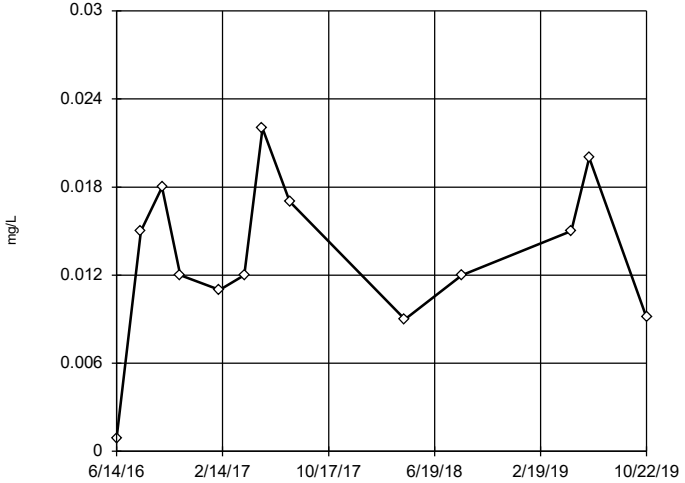
High cutoff = 0.1014, low cutoff = 0.001913, based on IQR multiplier of 3.

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.

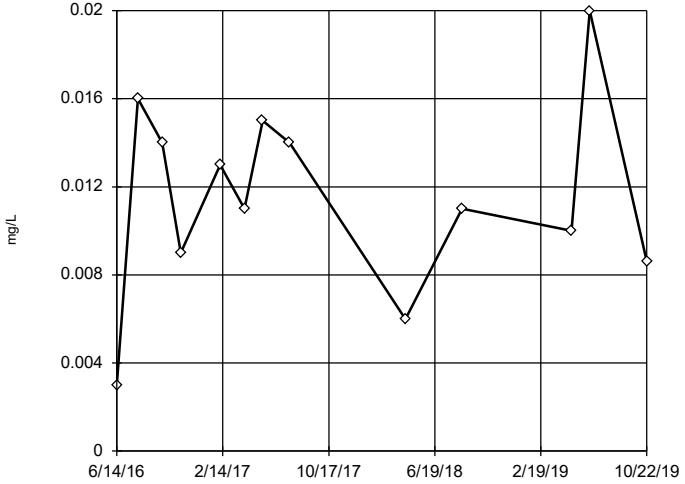
High cutoff = 0.03984, low cutoff = -0.01228, based on IQR multiplier of 3.

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.

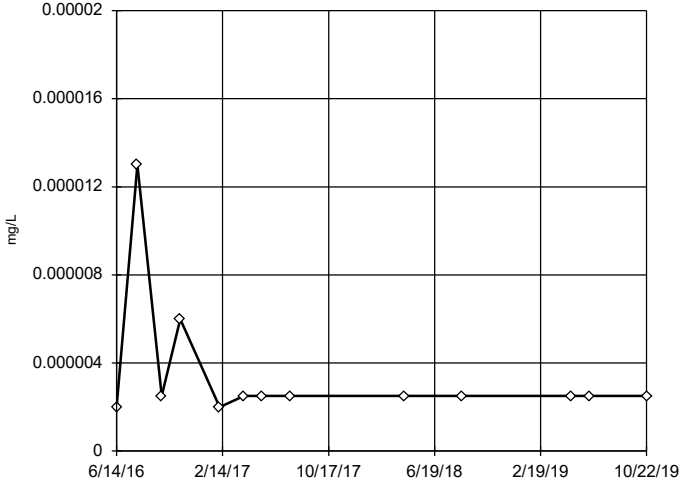
High cutoff = 0.03157, low cutoff = -0.00826, based on IQR multiplier of 3.

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.

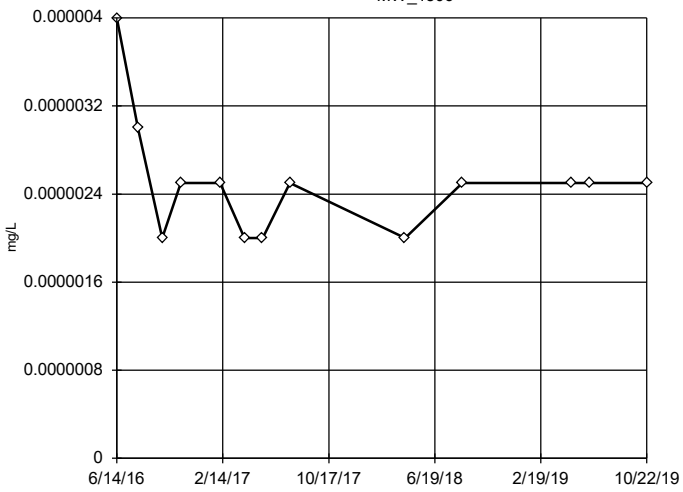
Data were natural log transformed to achieve best W statistic (graph shown in original units).

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.

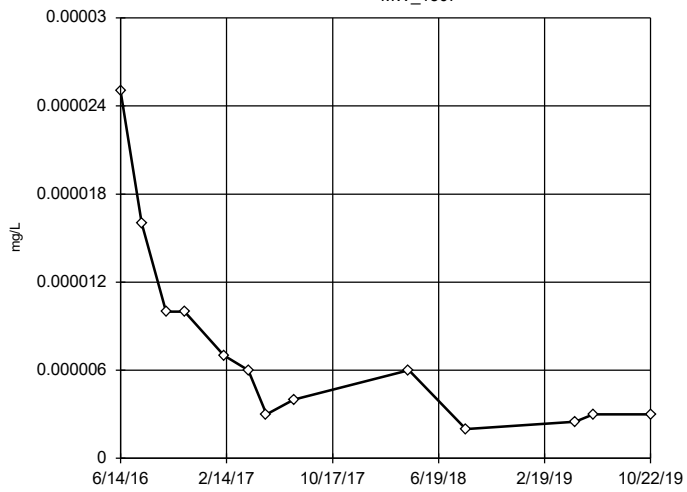
Constituent: Mercury, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

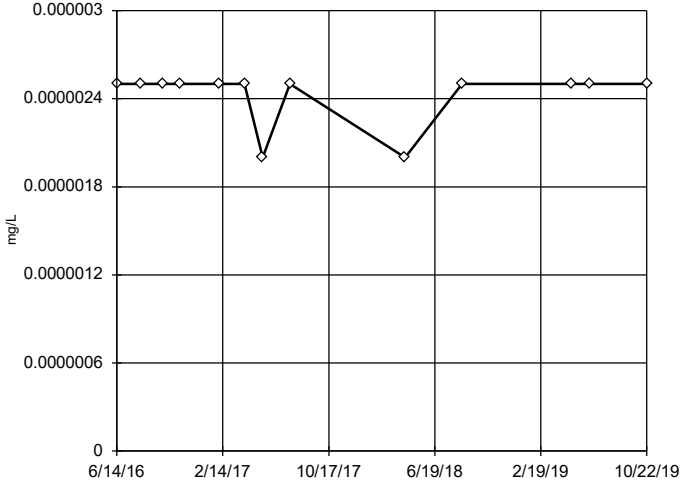
Constituent: Mercury, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

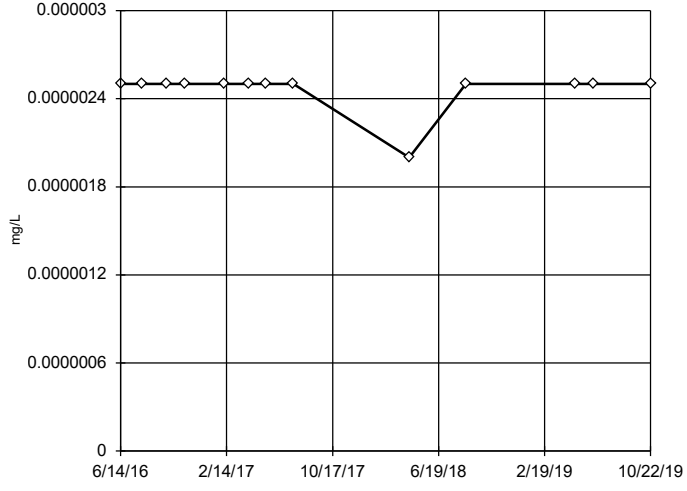
Constituent: Mercury, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

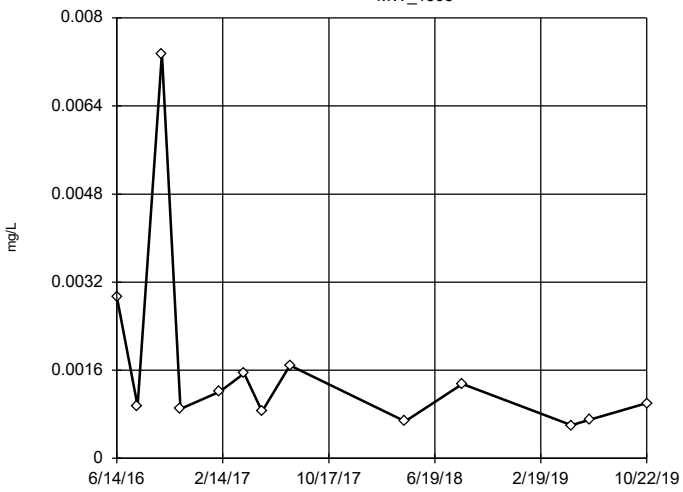
Constituent: Mercury, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

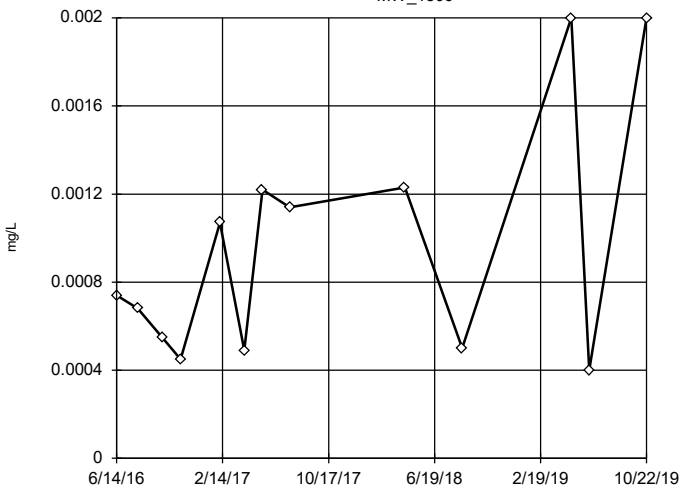
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

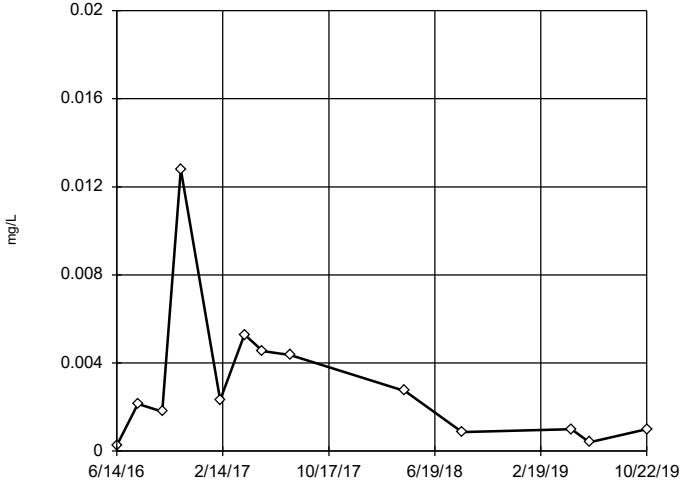
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

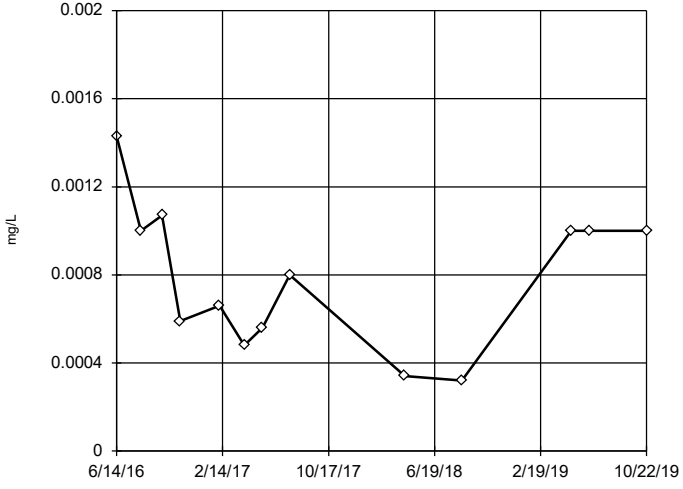
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

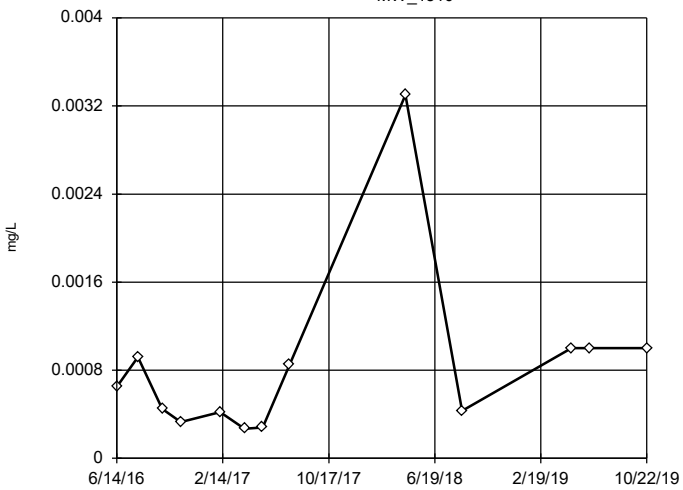
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

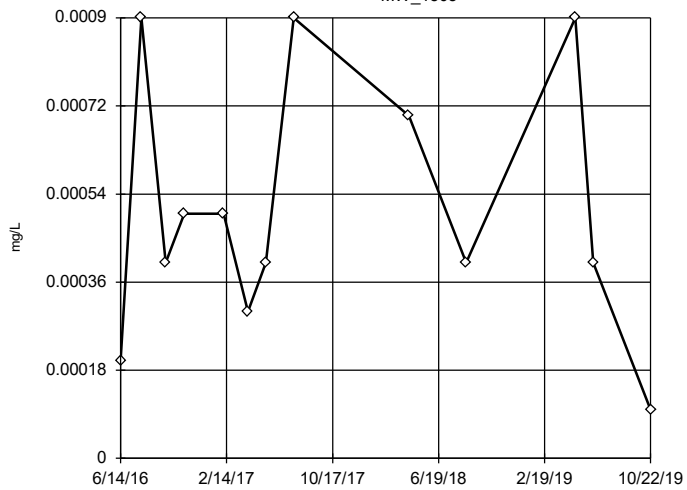
Constituent: Molybdenum, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

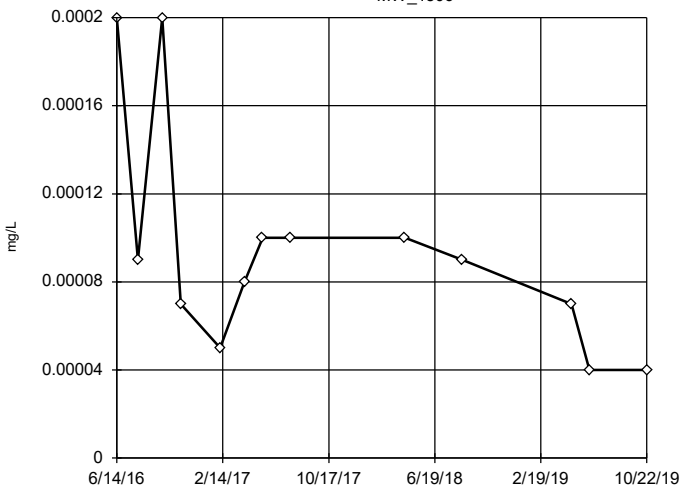
Constituent: Selenium, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

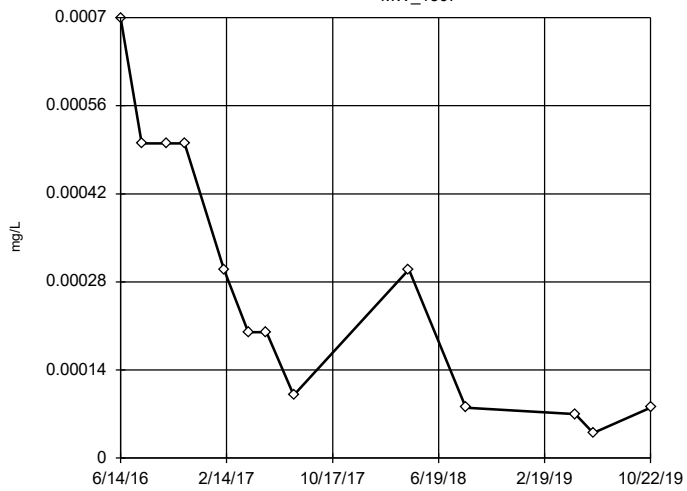
Constituent: Selenium, total Analysis Run 12/23/2019 12:42 PM View: AIV

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).

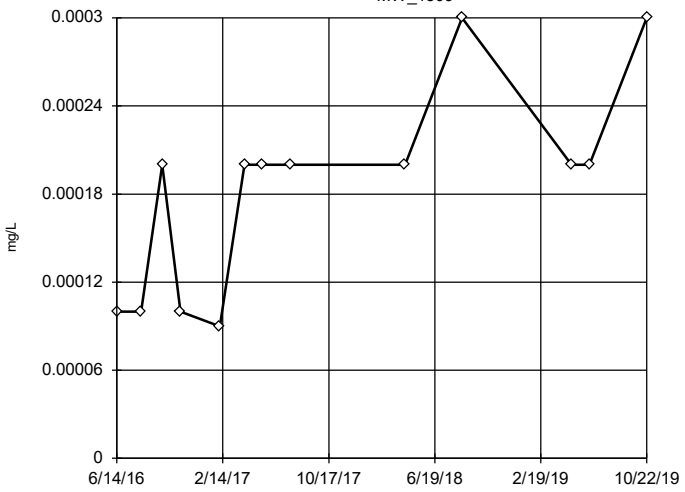
High cutoff = 0.006667, low cutoff = -0.0002843, based on IQR multiplier of 3.

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.

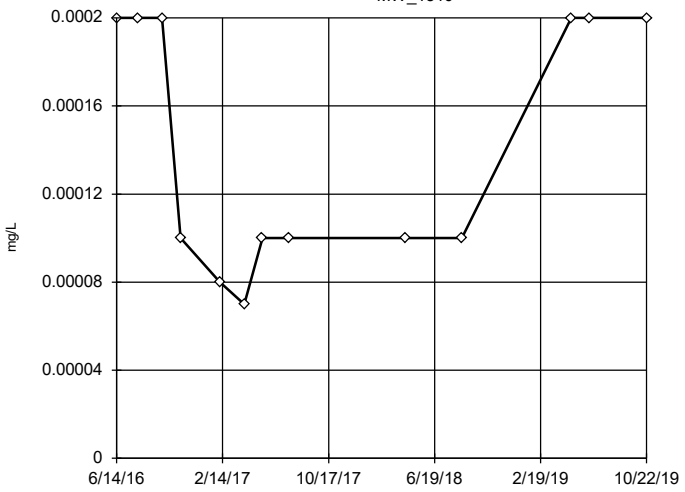
Constituent: Selenium, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

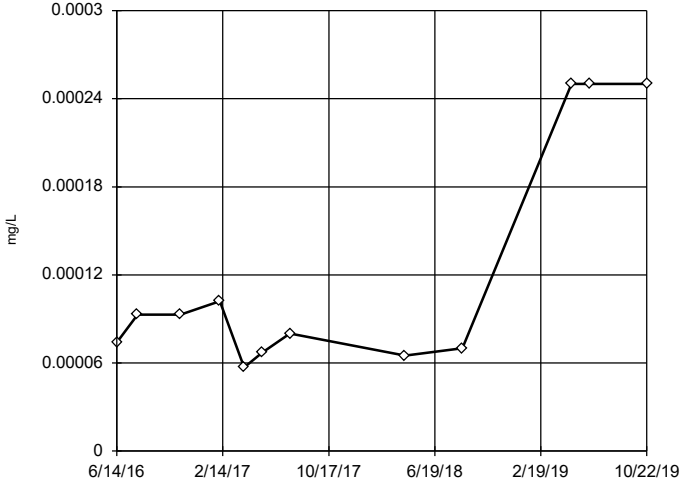
Constituent: Selenium, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

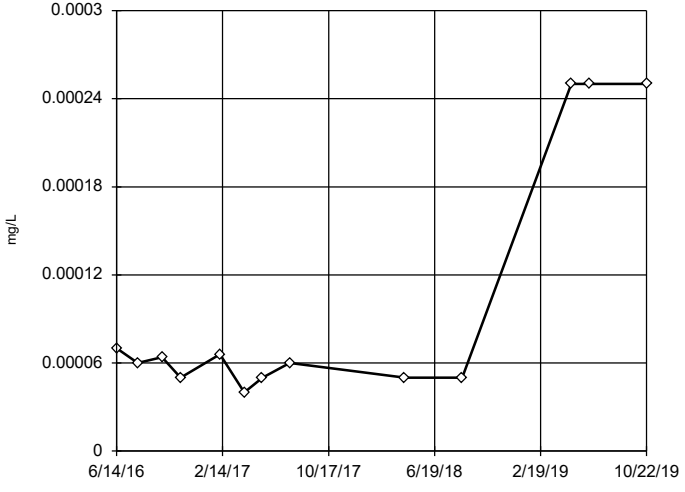
Constituent: Thallium, total Analysis Run 12/23/2019 12:42 PM View: AIV

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).

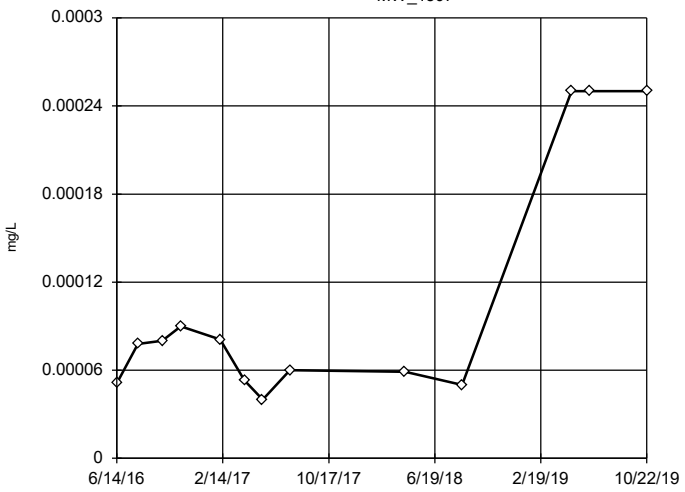
High cutoff = 0.00245, low cutoff = 0.0000027, based on IQR multiplier of 3.

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.

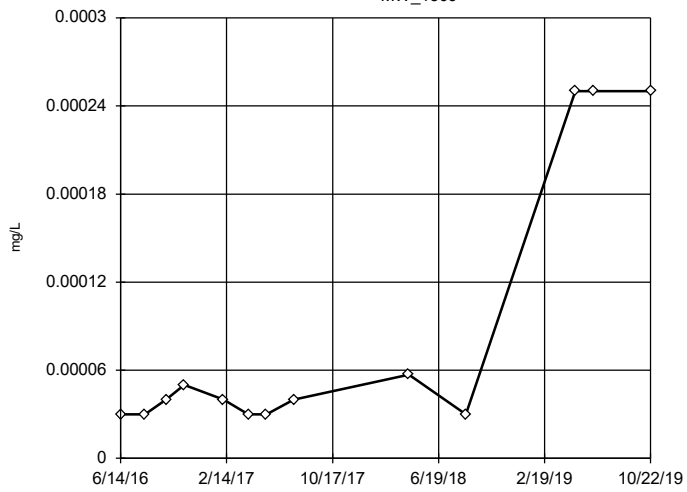
Constituent: Thallium, total Analysis Run 12/23/2019 12:42 PM View: AIV

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.

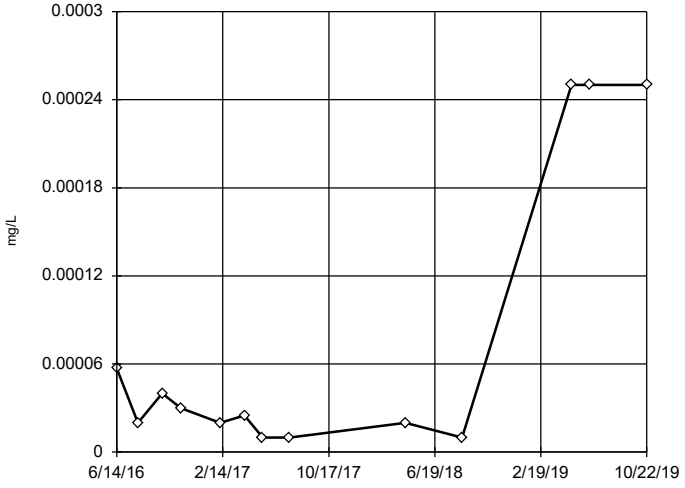
Constituent: Thallium, total Analysis Run 12/23/2019 12:42 PM View: AIV

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

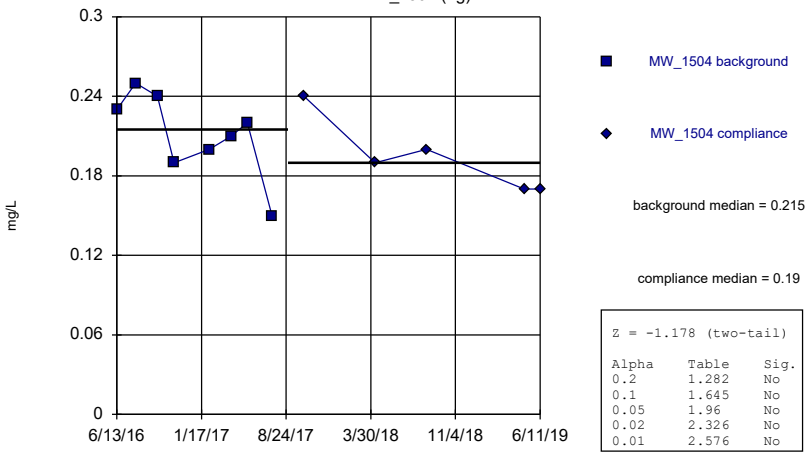
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/27/2019, 9:40 AM

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)

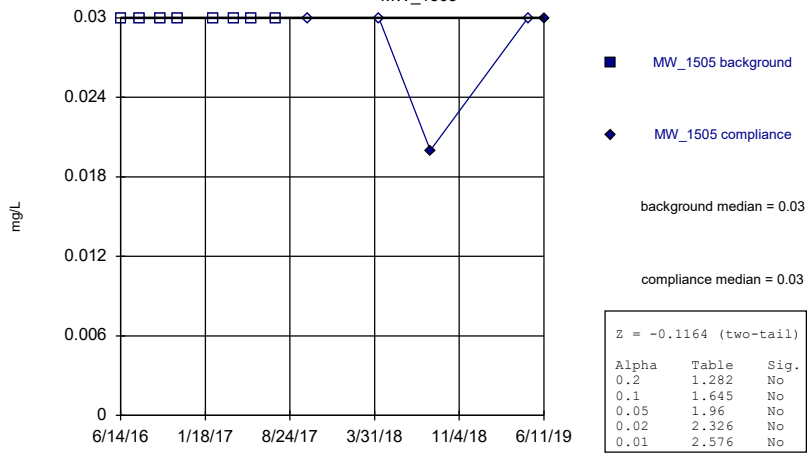
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

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)

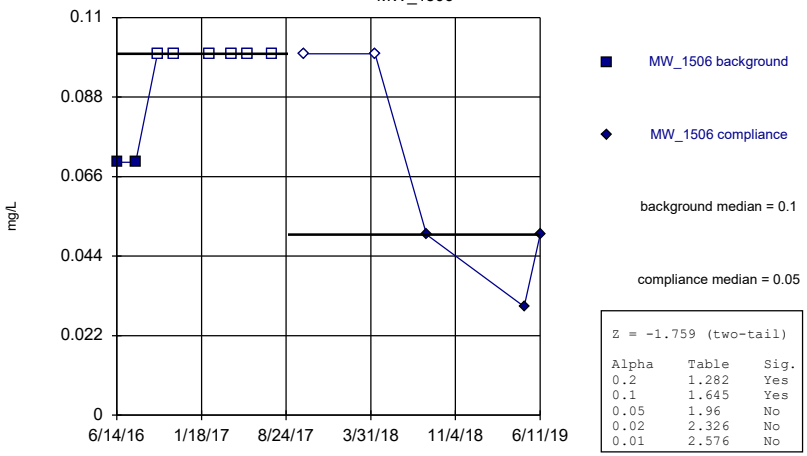
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

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)

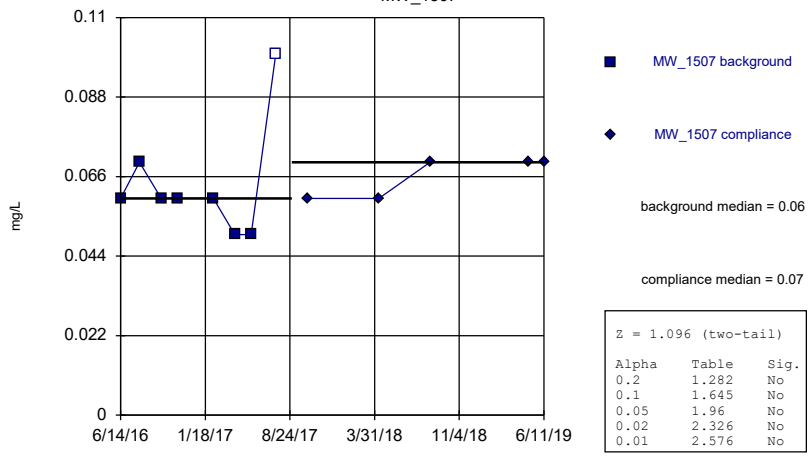
Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	Yes
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

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)

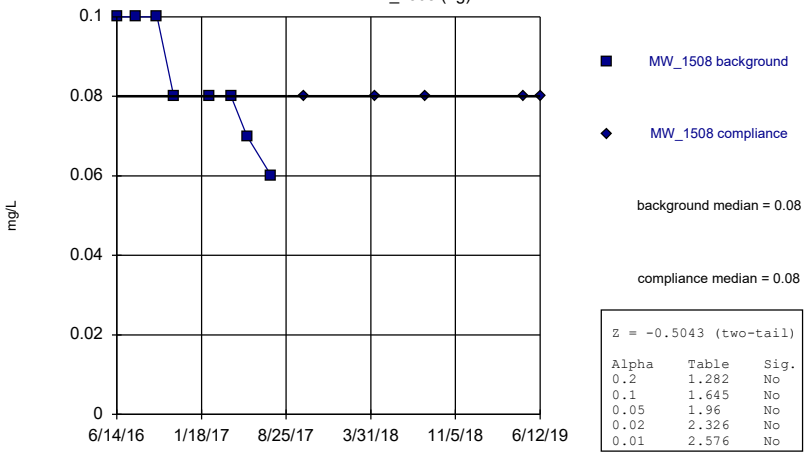
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

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)

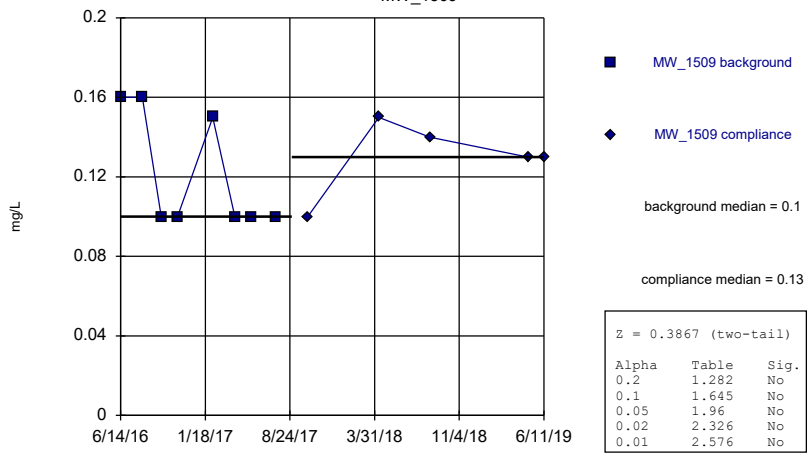
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

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)

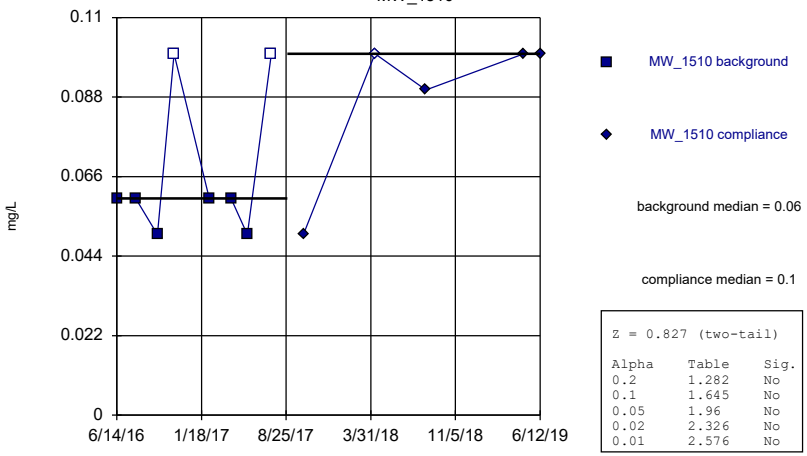
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

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)

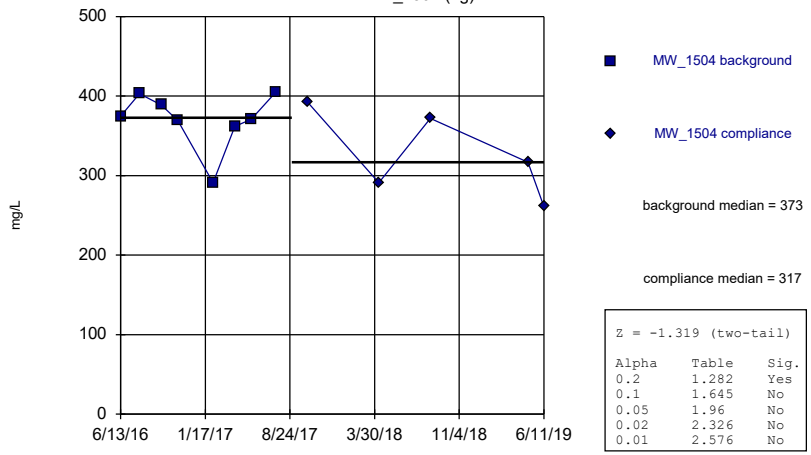
Alpha	Table	Sig.
0.2	1.282	No
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

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)

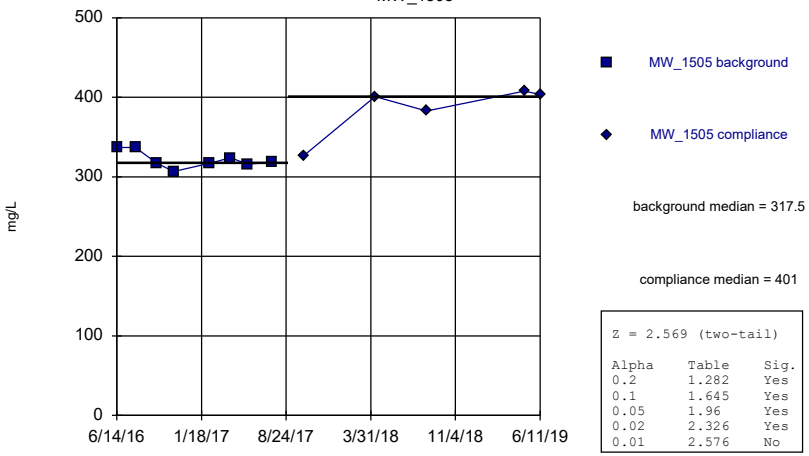
Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	No
0.05	1.96	No
0.02	2.326	No
0.01	2.576	No

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

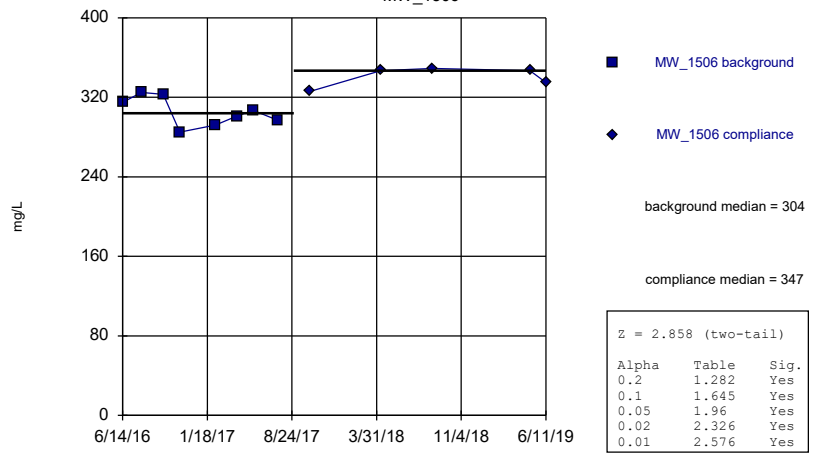


Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1506

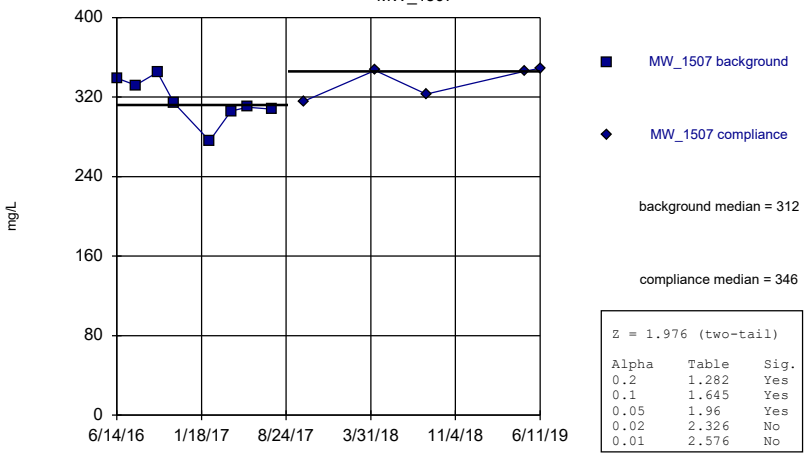


Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

MW_1507

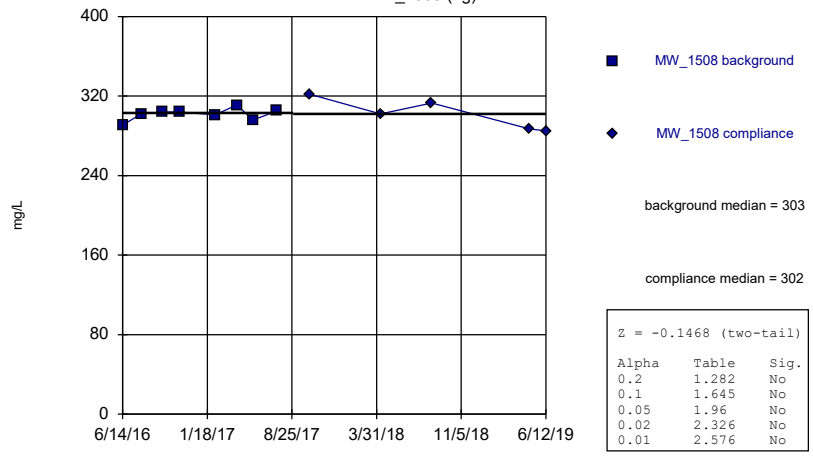


Constituent: Sulfate, total Analysis Run 12/27/2019 9:39 AM View: Intrawell AIII
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Mann-Whitney (Wilcoxon Rank Sum)

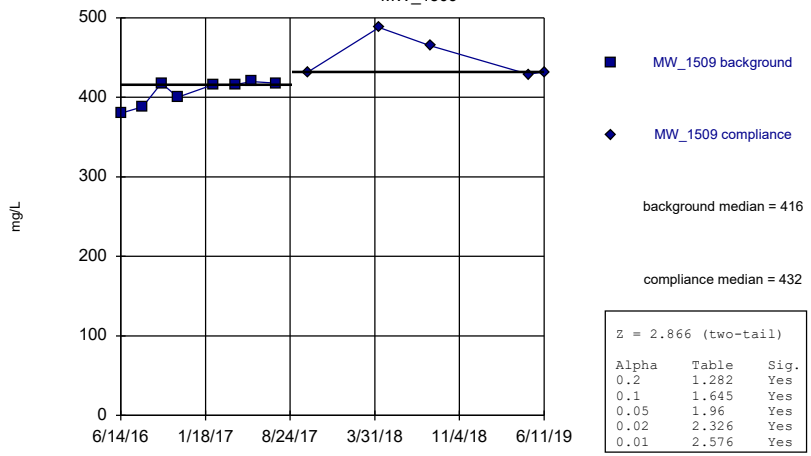
MW_1508 (bg)



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)

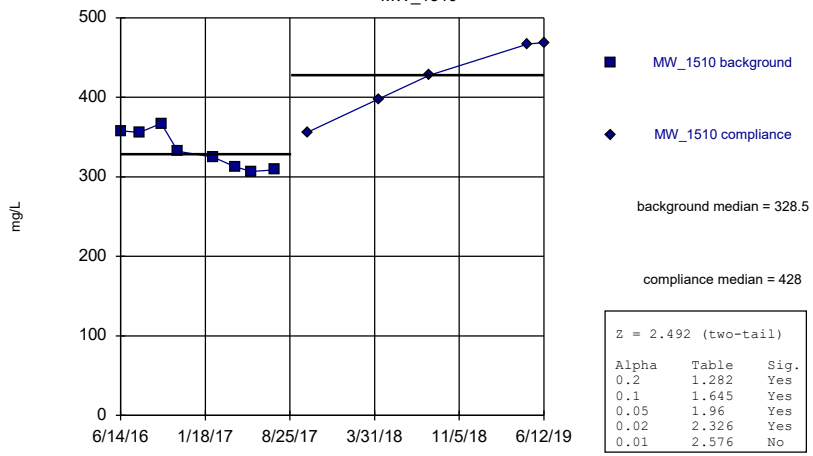
Alpha	Table	Sig.
0.2	1.282	Yes
0.1	1.645	Yes
0.05	1.96	Yes
0.02	2.326	Yes
0.01	2.576	Yes

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

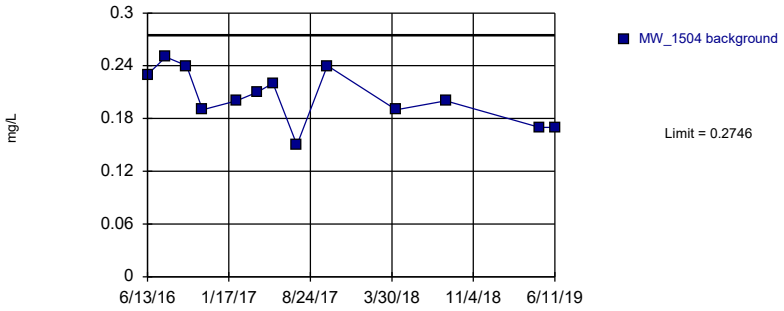
Intrawell Prediction Limit Summary

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)



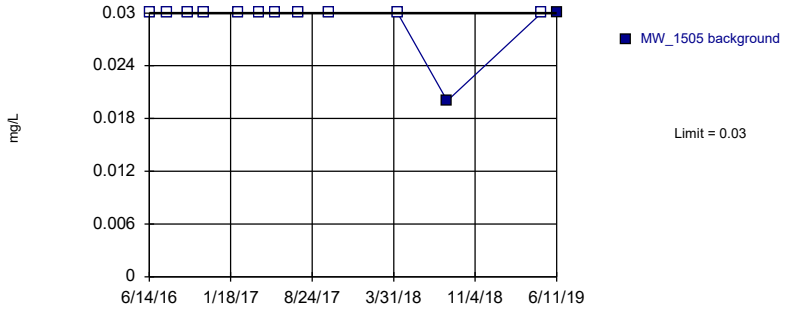
Background Data Summary: Mean=0.2046, Std. Dev.=0.03072, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9628, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

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



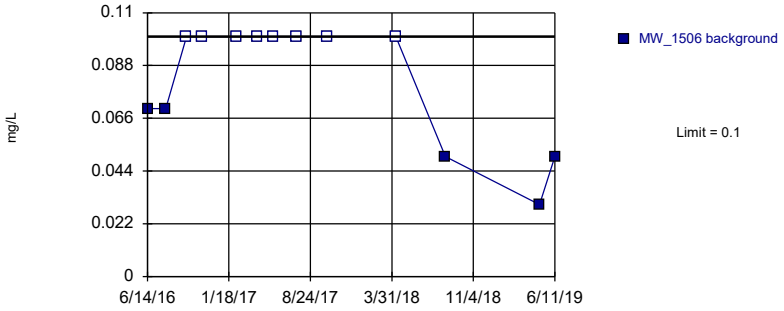
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 13 background values. 84.62% NDs. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes 1 future value.

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



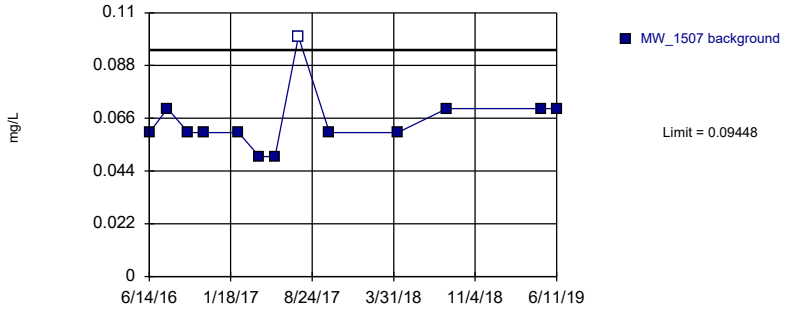
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 13 background values. 61.54% NDs. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes 1 future value.

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

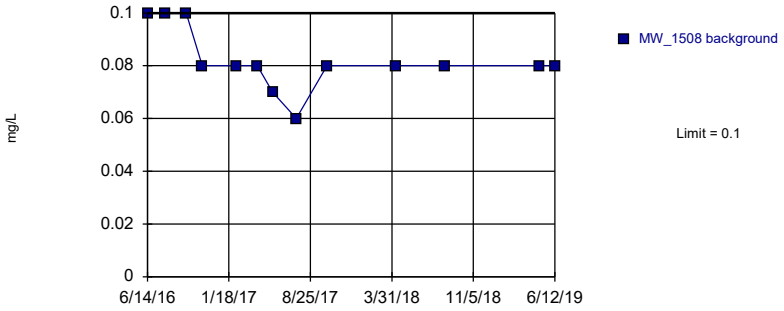


Background Data Summary (based on cube root transformation): Mean=0.3999, Std. Dev.=0.02439, n=13, 7.692% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8228, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

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)

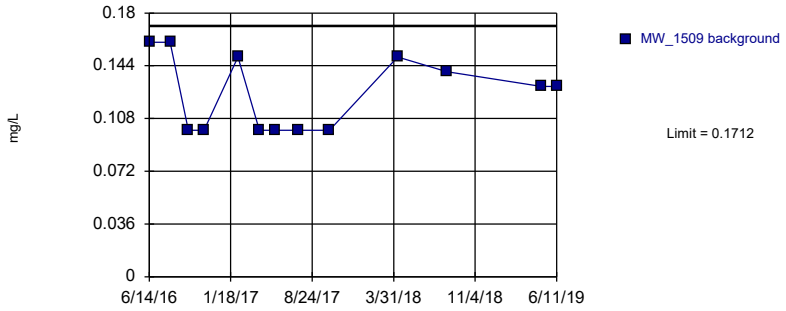


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 13 background values. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (1 of 2). Assumes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



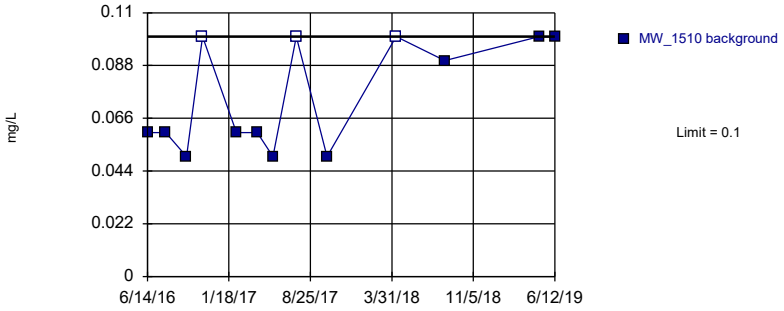
Background Data Summary (based on cube transformation): Mean=0.00216, Std. Dev.=0.001254, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8158, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

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

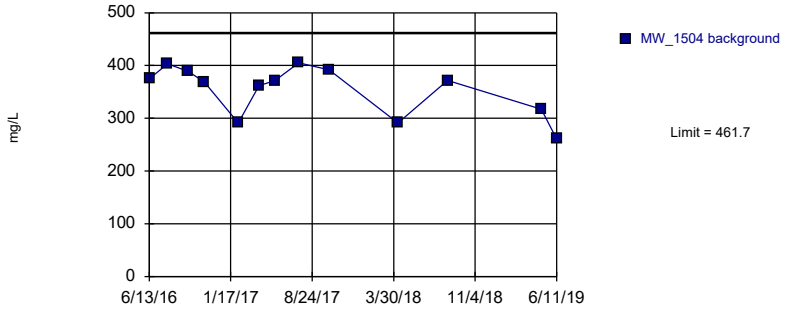


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 13 background values. 23.08% NDs. Well-constituent pair annual alpha = 0.01929. Individual comparison alpha = 0.009692 (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)

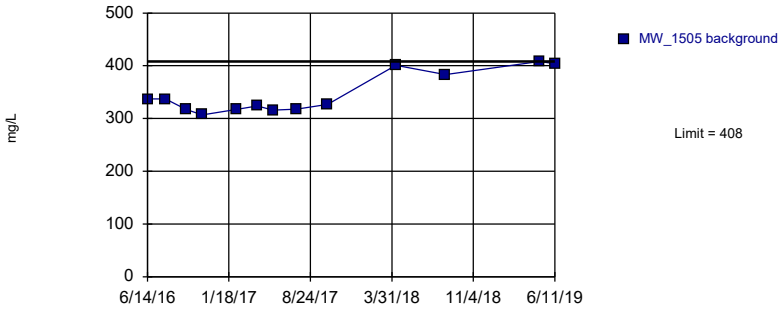


Background Data Summary: Mean=353.7, Std. Dev.=47.41, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8641, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

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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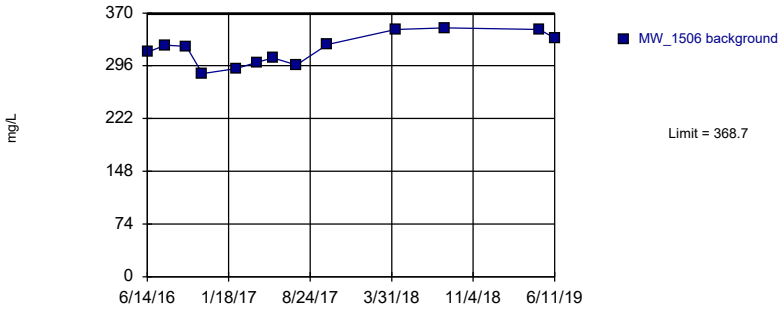
Prediction Limit

Intrawell Parametric, MW_1506



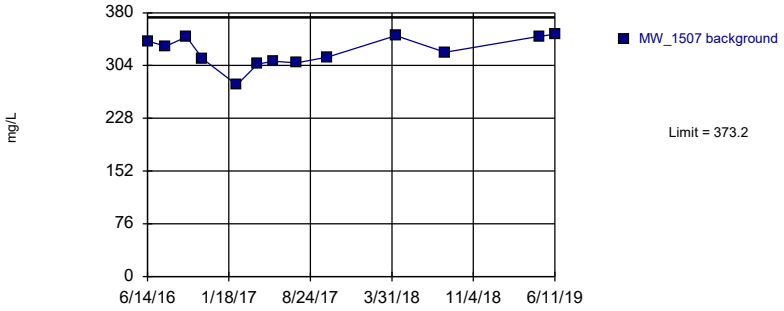
Background Data Summary: Mean=319.2, Std. Dev.=21.75, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9405, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

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



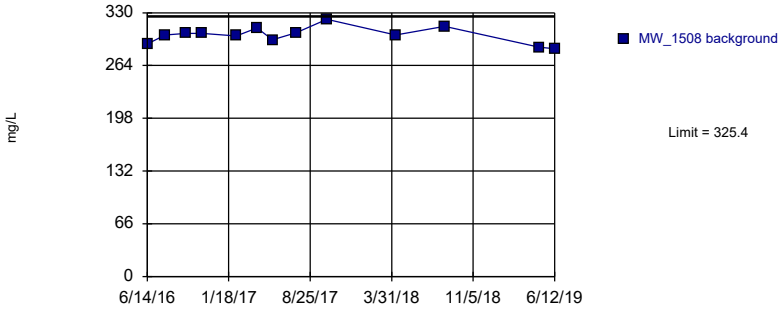
Background Data Summary: Mean=323.9, Std. Dev.=21.63, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9109, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

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)

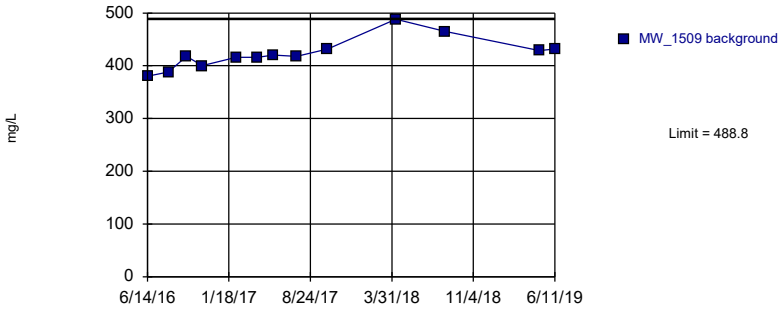


Background Data Summary: Mean=301.8, Std. Dev.=10.37, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9642, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

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



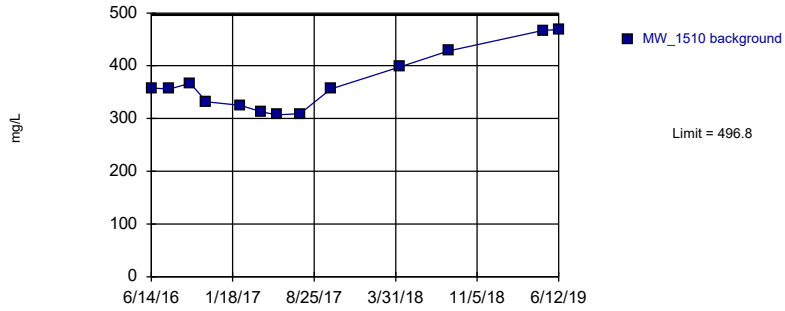
Background Data Summary: Mean=423.2, Std. Dev.=28.79, n=13. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9163, critical = 0.814. Kappa = 2.279 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.001504. Assumes 1 future value.

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

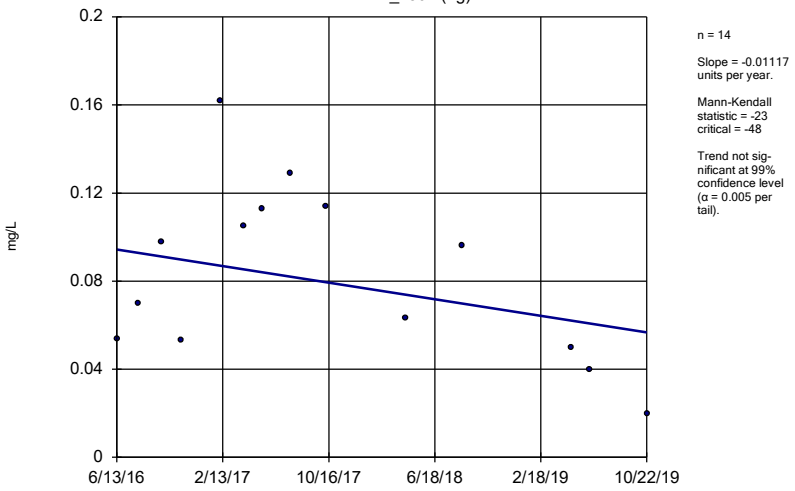
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 12/23/2019, 1:51 PM

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

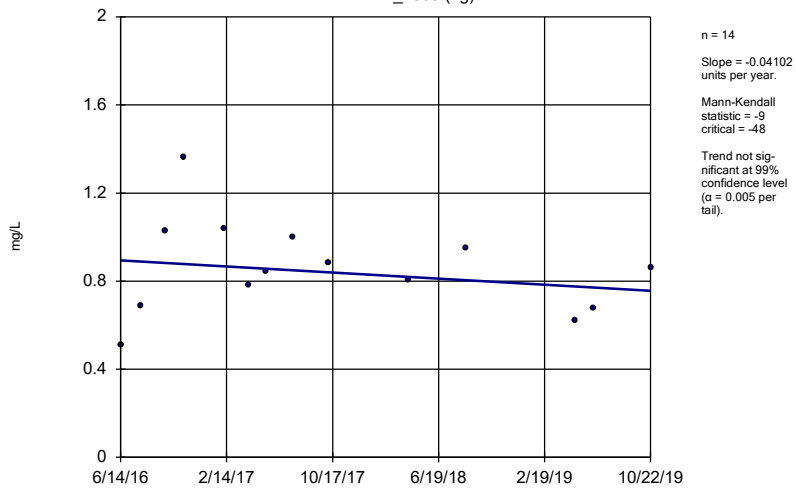
Trend not significant at 99% confidence level (α = 0.005 per tail).

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

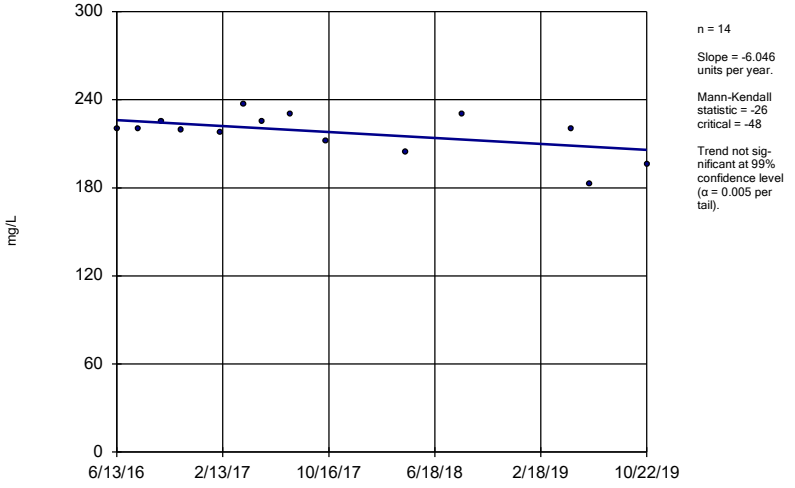
Trend not significant at 99% confidence level (α = 0.005 per tail).

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

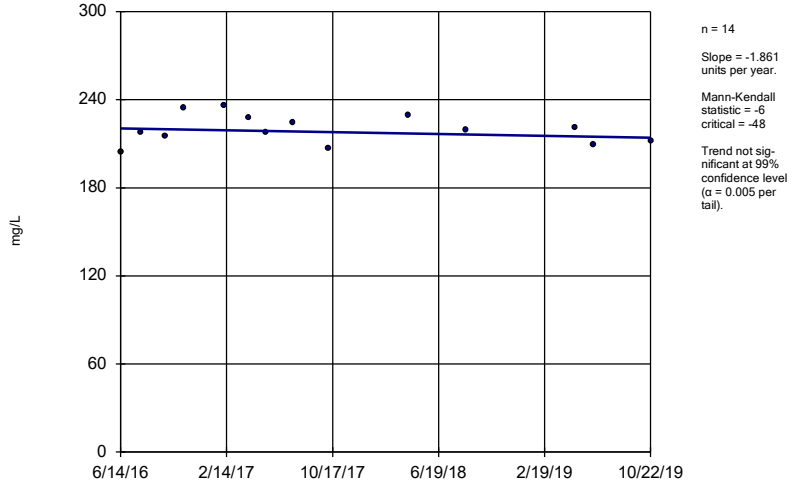
Trend not significant at 99% confidence level (α = 0.005 per tail).

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

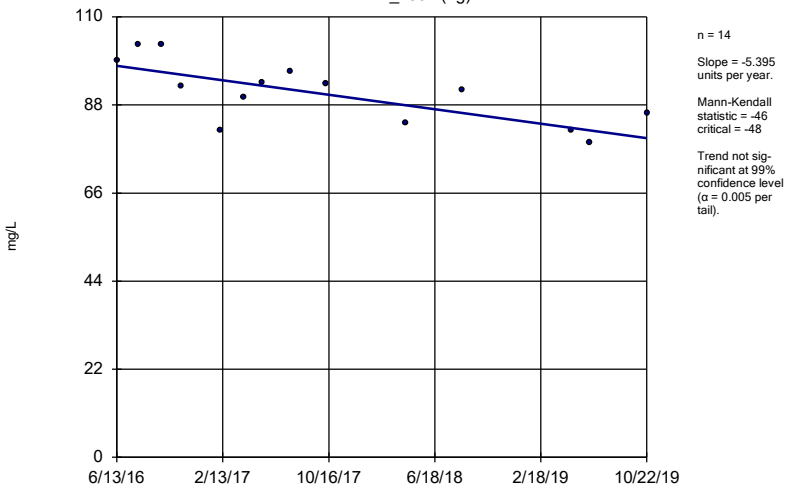
Trend not significant at 99% confidence level (α = 0.005 per tail).

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

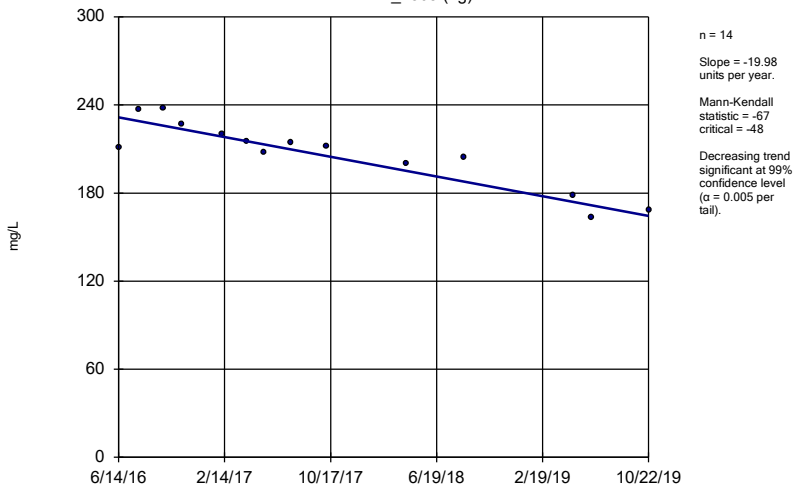
Trend not significant at 99% confidence level (α = 0.005 per tail).

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

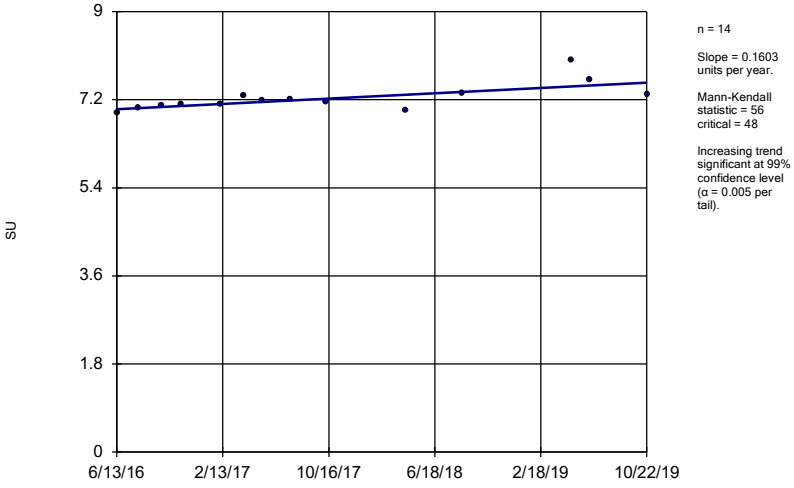
Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

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

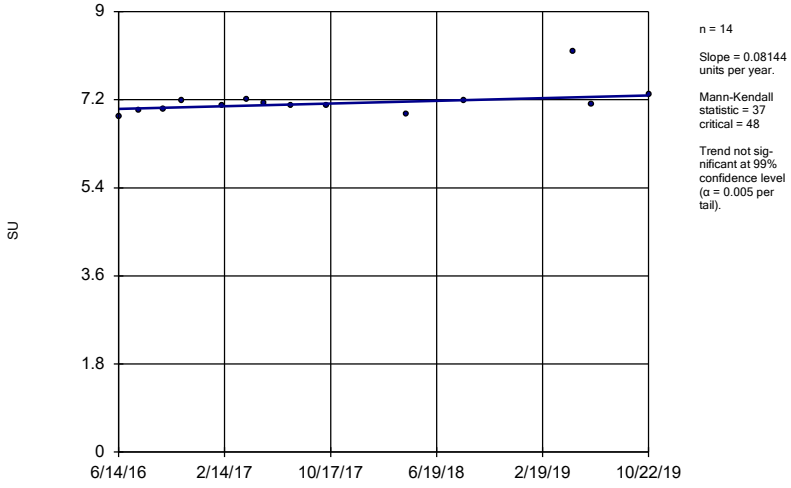
Increasing trend significant at 99% confidence level (α = 0.005 per tail).

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.

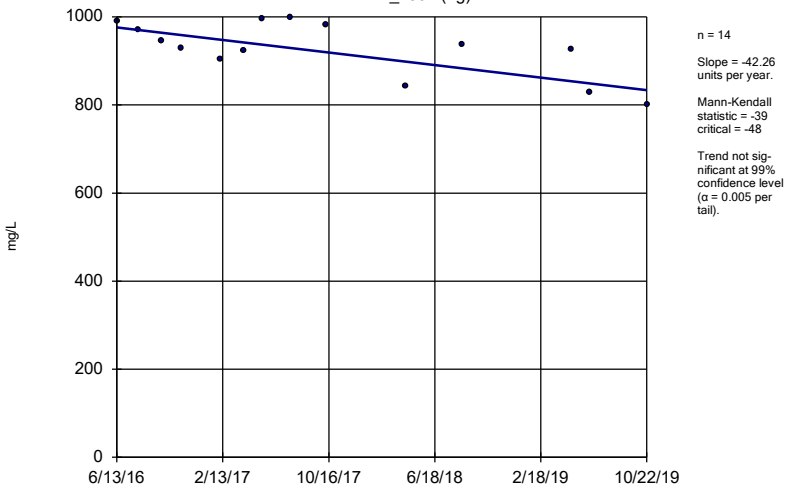
Mann-Kendall statistic = 37
critical = 48

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).

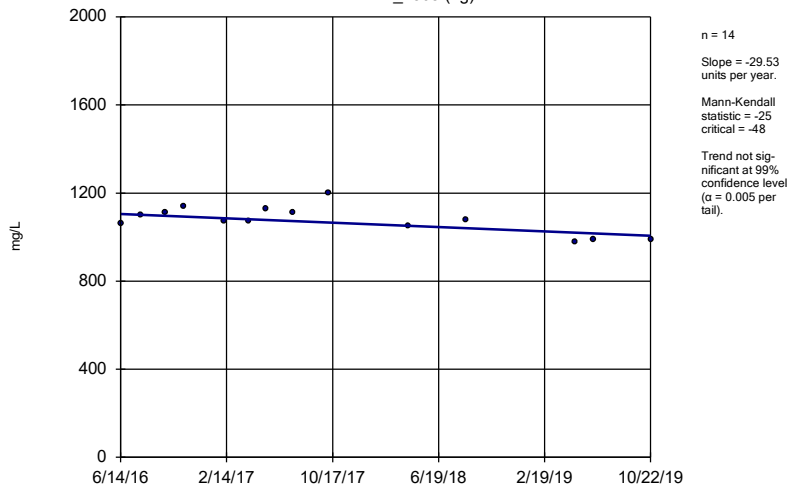
Constituent: Total Dissolved Solids [TDS] Analysis Run 12/23/2019 1:50 PM View: Interwell AIII

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

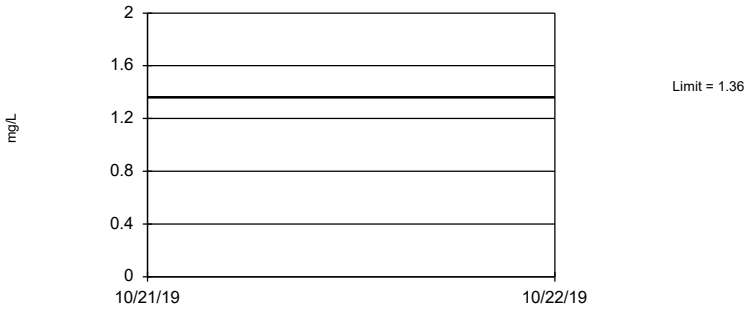
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 1/10/2020, 11:05 AM

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



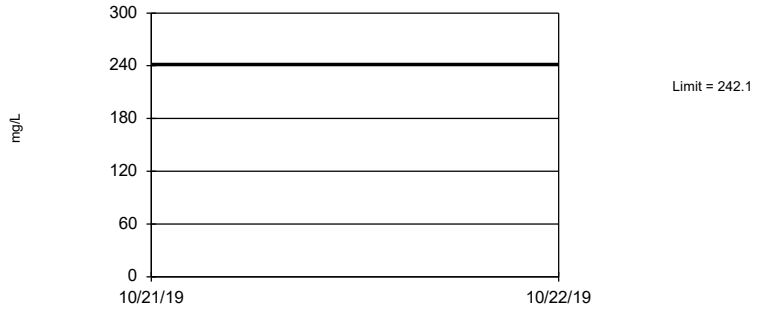
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 28 background values. Annual per-constituent alpha = 0.02225. Individual comparison alpha = 0.002247 (1 of 2). Assumes 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



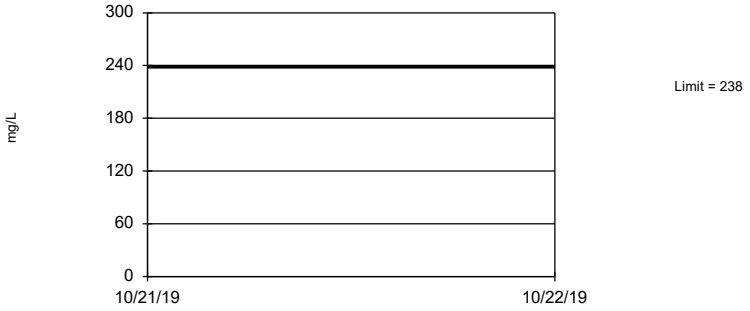
Background Data Summary: Mean=218.3, Std. Dev.=12.15, n=28. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9444, critical = 0.896. Kappa = 1.958 (c=7, w=5, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001504. Assumes 5 future values.

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



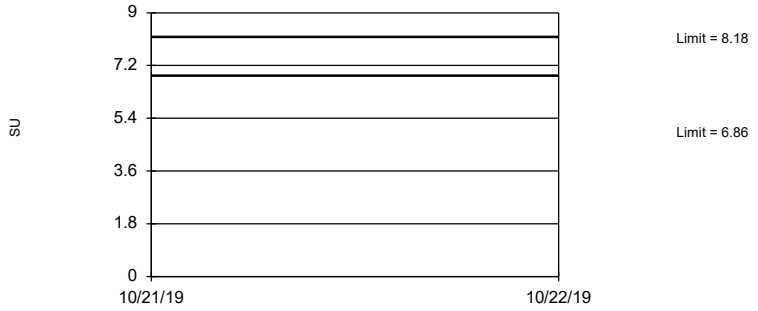
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 28 background values. Annual per-constituent alpha = 0.02225. Individual comparison alpha = 0.002247 (1 of 2). Assumes 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

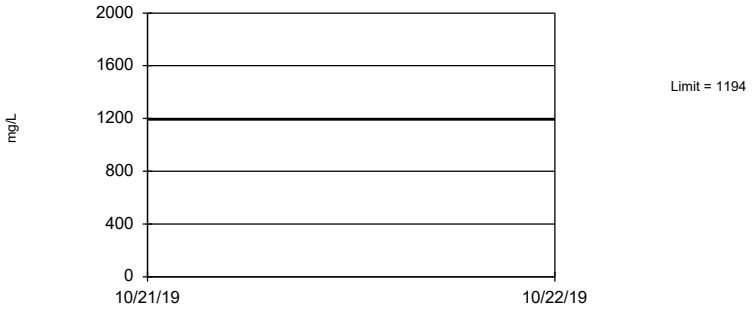


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 28 background values. Annual per-constituent alpha = 0.04449. Individual comparison alpha = 0.004494 (1 of 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.

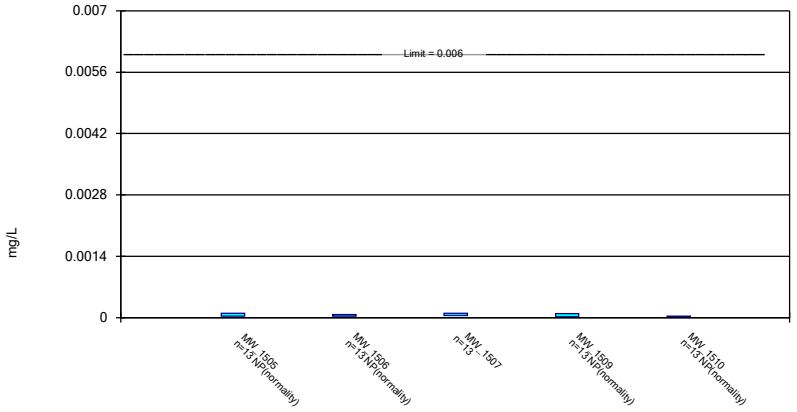
Confidence Interval Summary Table - All Results (No Significant)

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

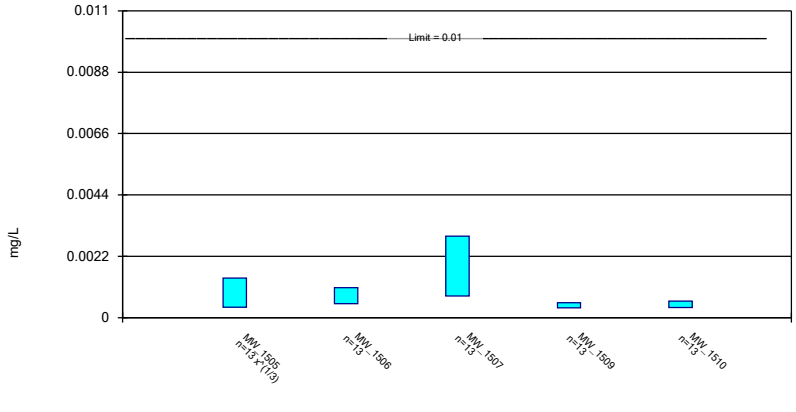
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Antimony, total Analysis Run 12/23/2019 1:57 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Parametric Confidence Interval

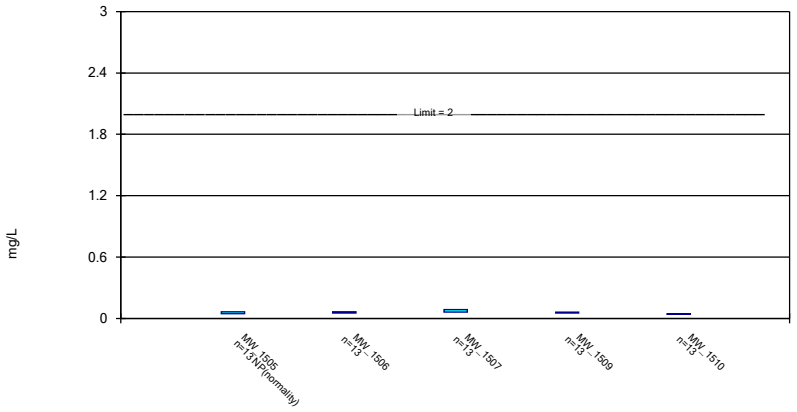
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



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

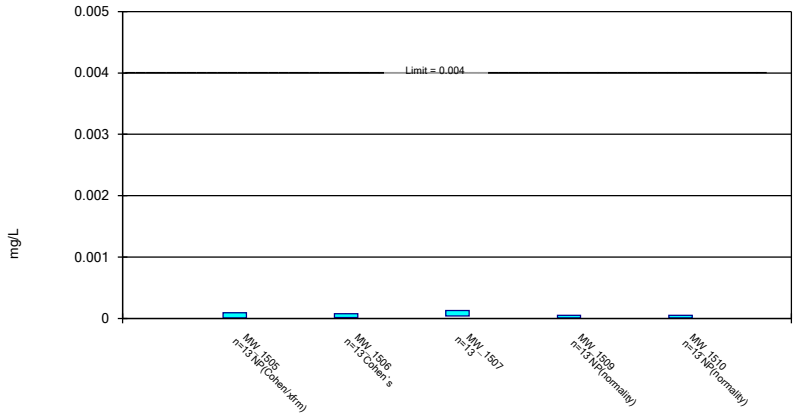
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



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.

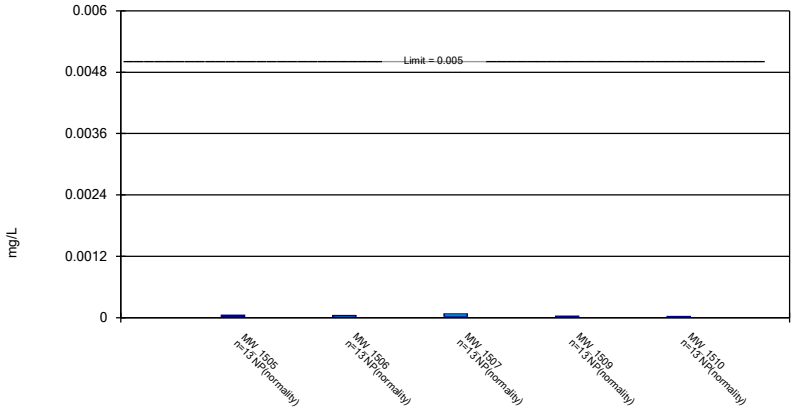


Constituent: Beryllium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.24 . UG

Non-Parametric Confidence Interval

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

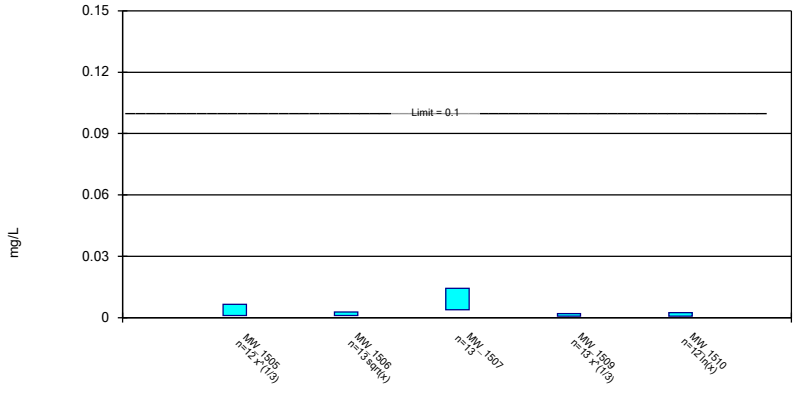


Constituent: Cadmium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

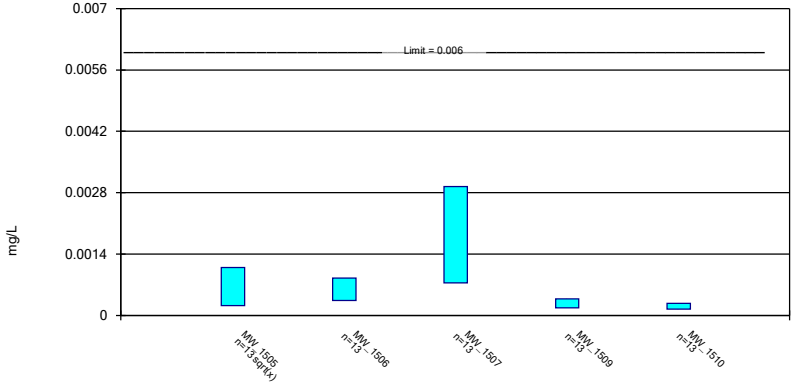


Constituent: Chromium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

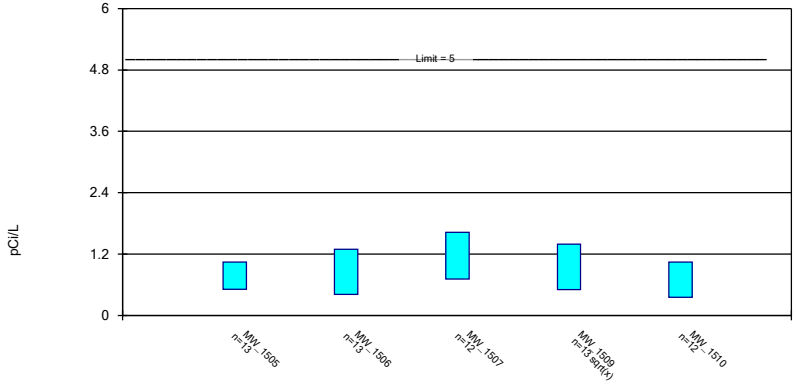


Constituent: Cobalt, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

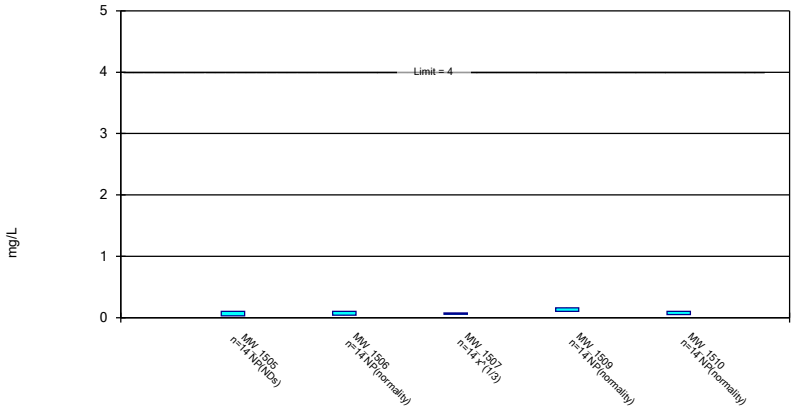


Constituent: Combined Radium 226 + 228 Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

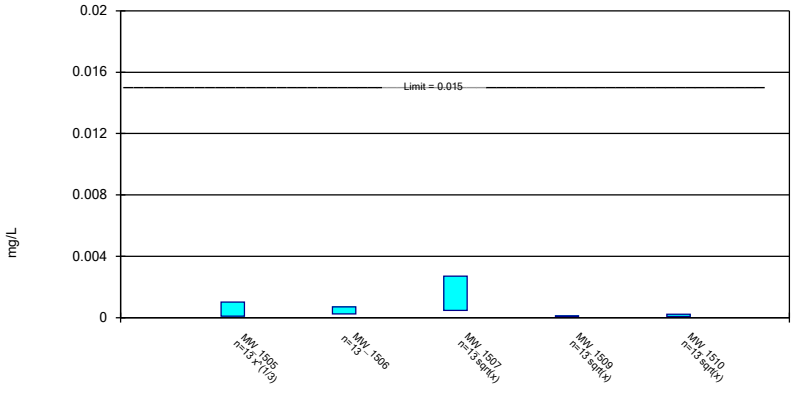


Constituent: Fluoride, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

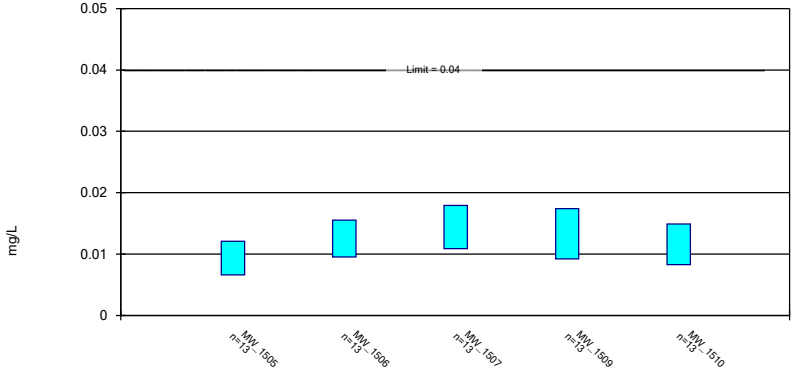


Constituent: Lead, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

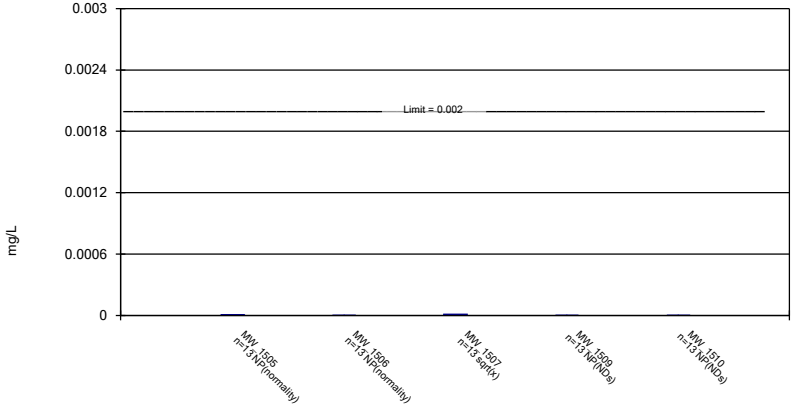


Constituent: Lithium, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

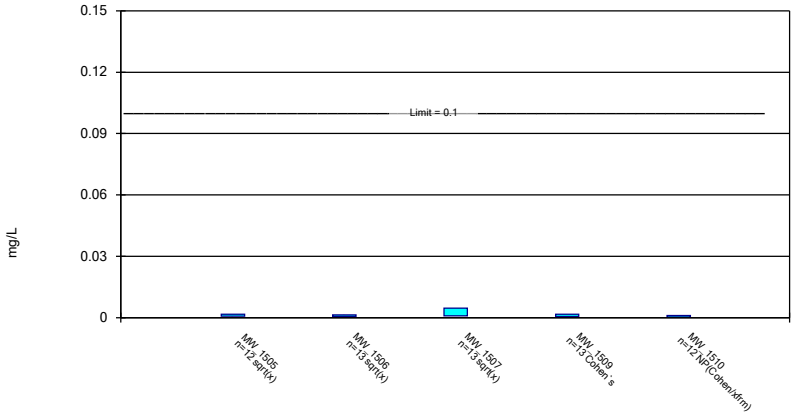


Constituent: Mercury, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

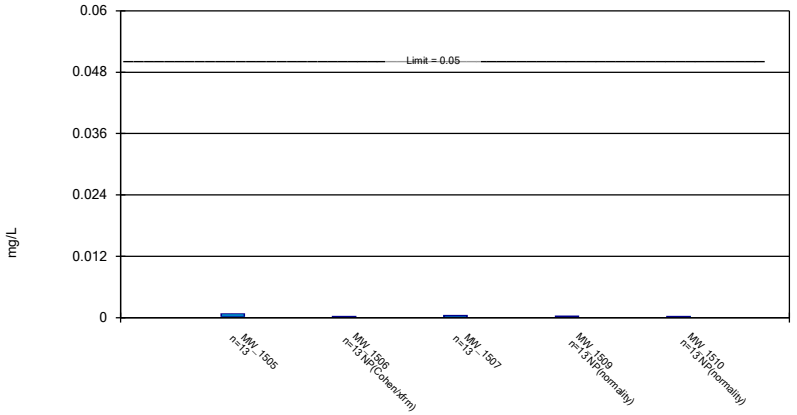


Constituent: Molybdenum, total Analysis Run 12/23/2019 1:58 PM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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

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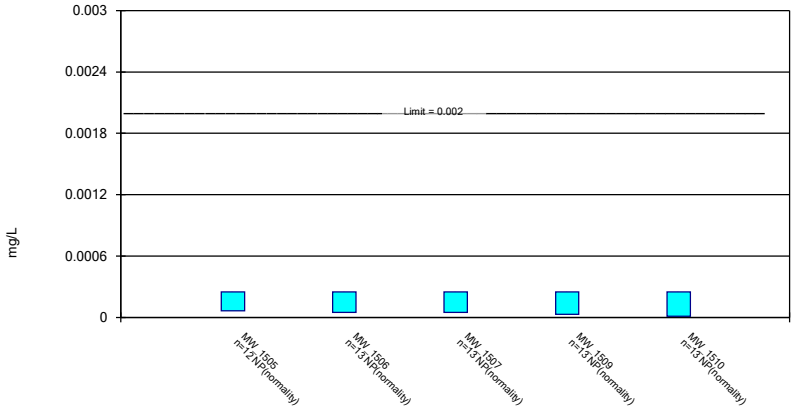
Non-Parametric Confidence Interval

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

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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**

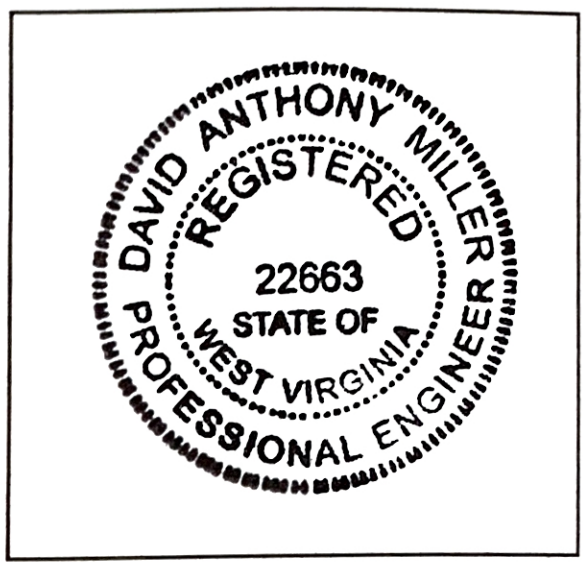
Notes:
UPL: Upper prediction limit
LPL: Lower prediction limit
Bold values exceed the background value.
Background values are shaded gray.

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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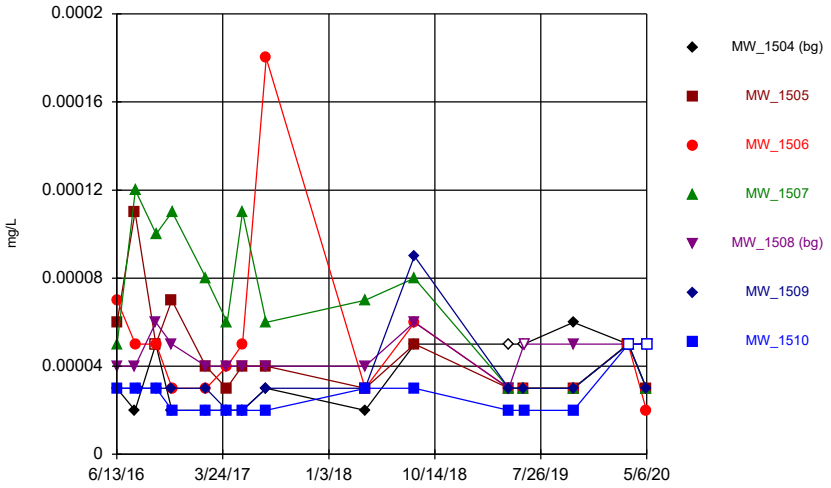
Hollow symbols indicate censored values.

Time Series



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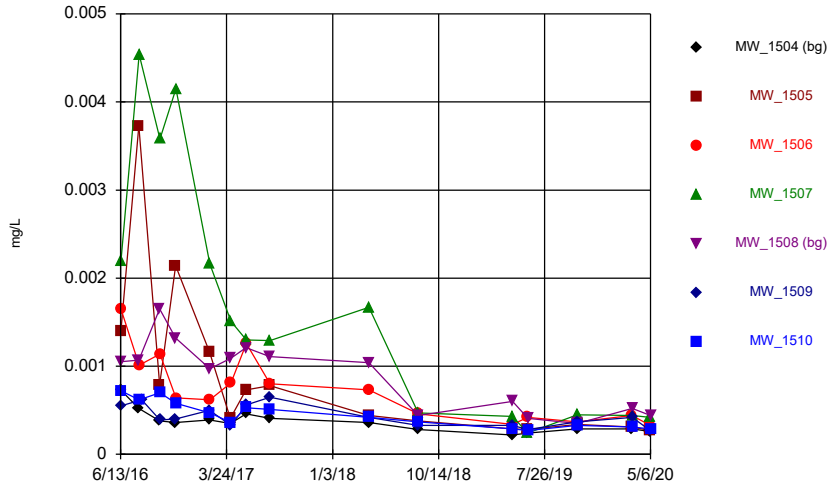
Time Series



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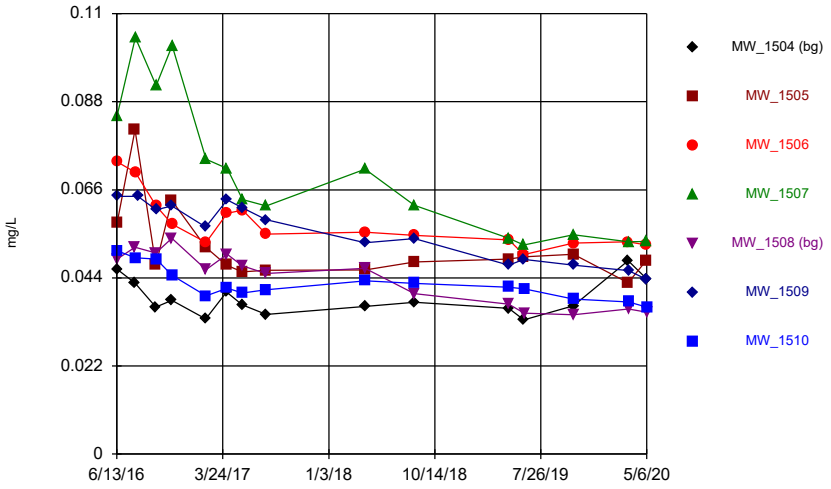
Time Series



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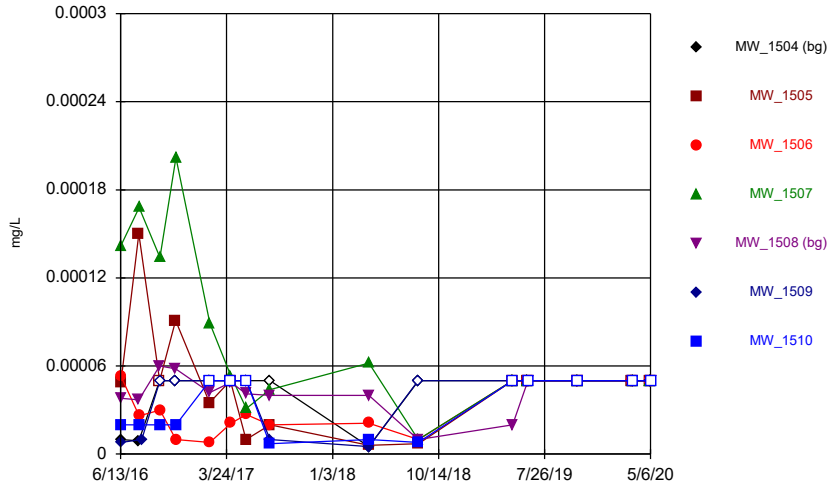
Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

Time Series



Constituent: Beryllium, total Analysis Run 6/11/2020 8:54 AM View: AIV
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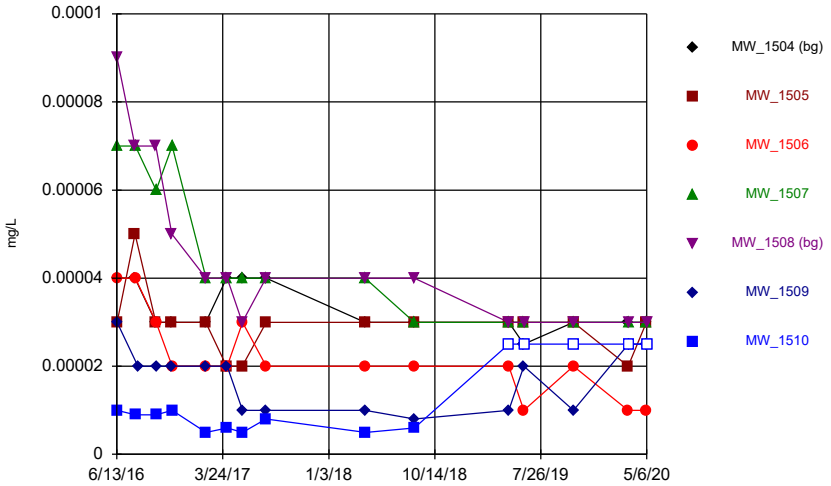
Sanitas™ v.9.6.25 . UG
Hollow symbols indicate censored values.

Time Series



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Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

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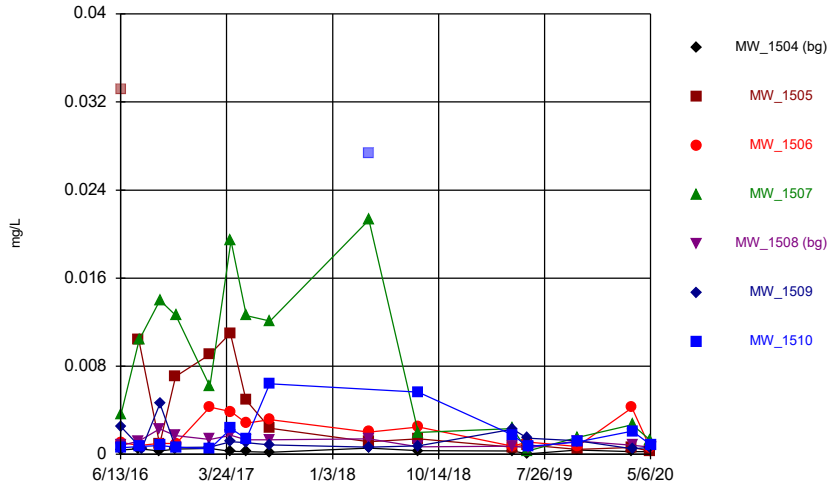

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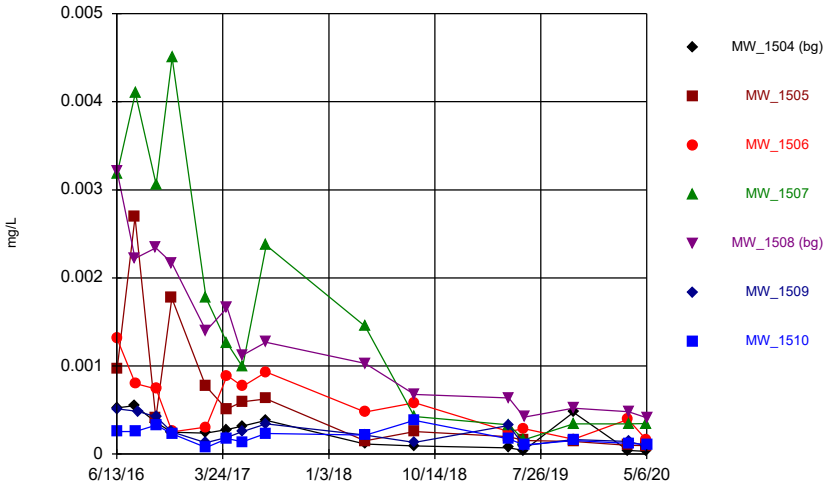
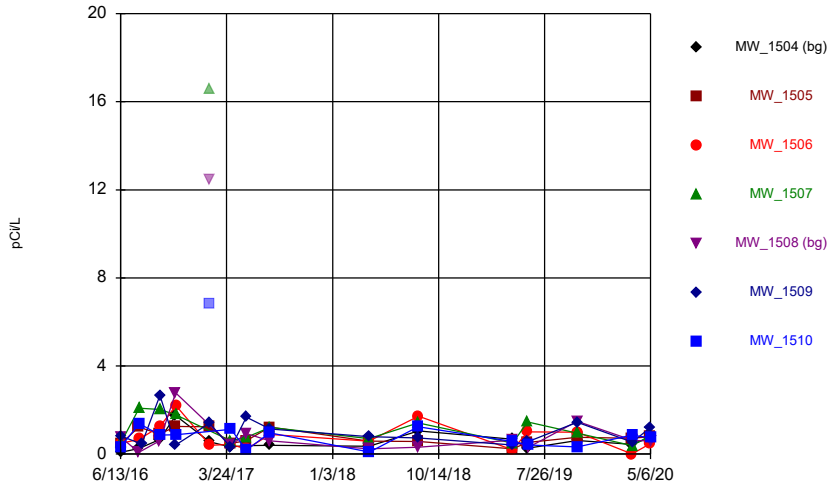
Time Series



Constituent: Cobalt, total Analysis Run 6/11/2020 8:55 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

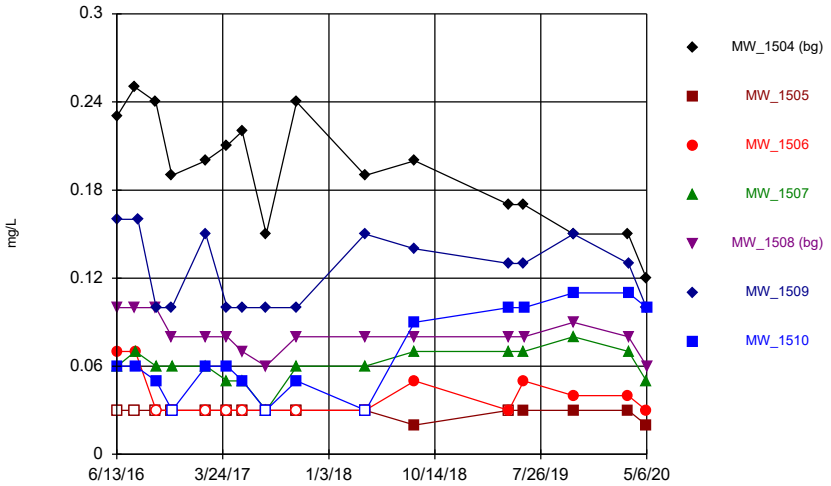
Time Series



Constituent: Combined Radium 226 + 228 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.

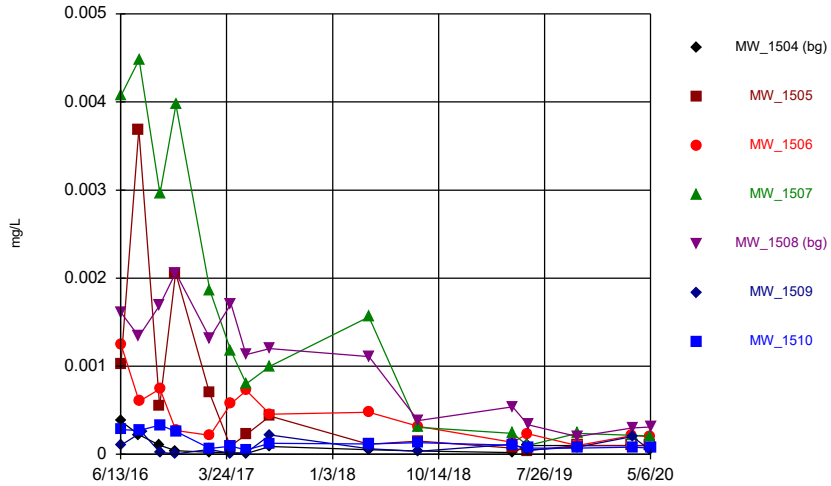
Time Series



Constituent: 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.

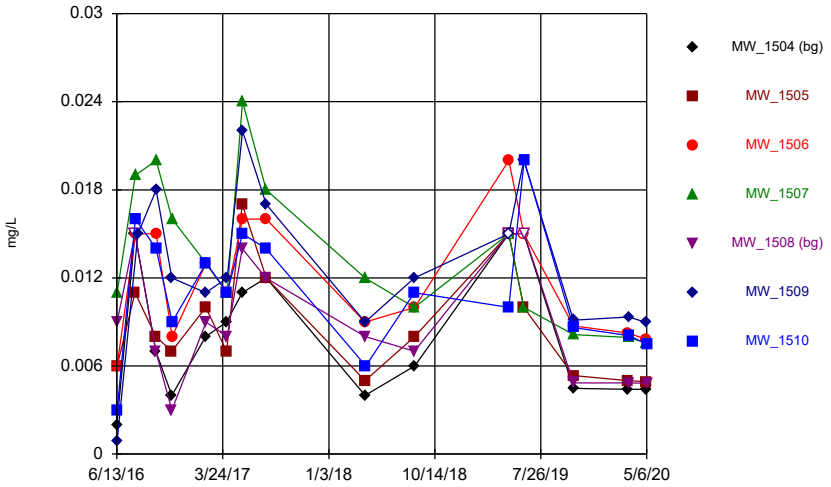
Time Series



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.

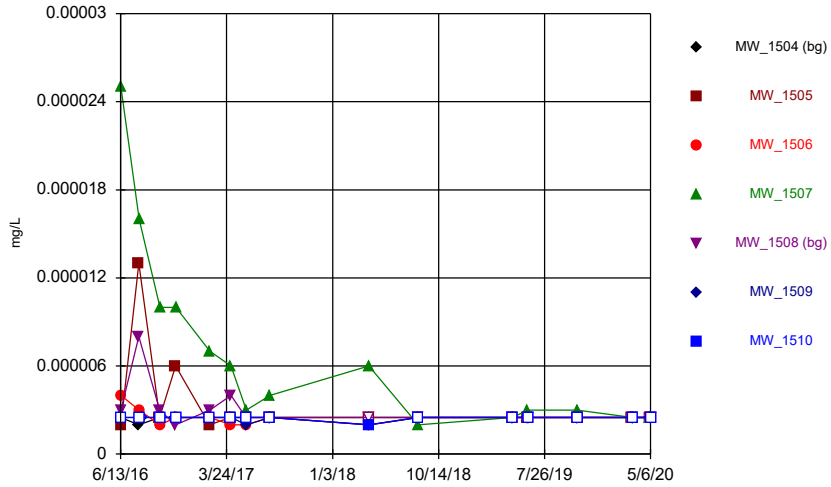
Time Series



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.

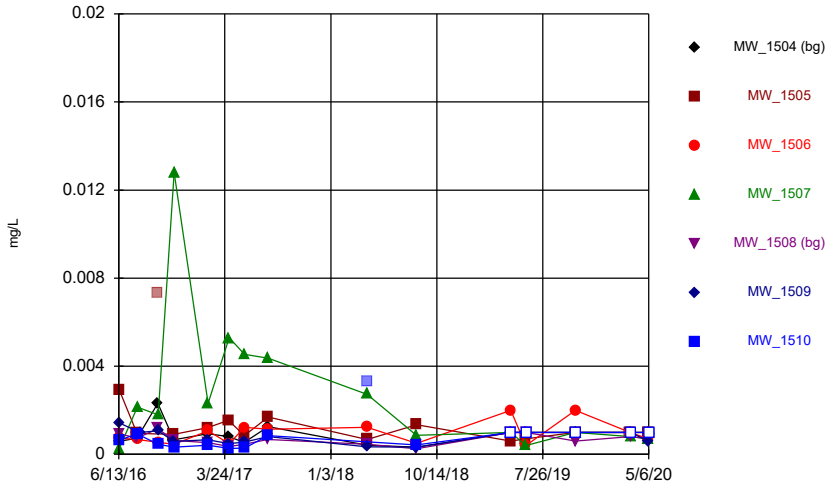
Time Series



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.

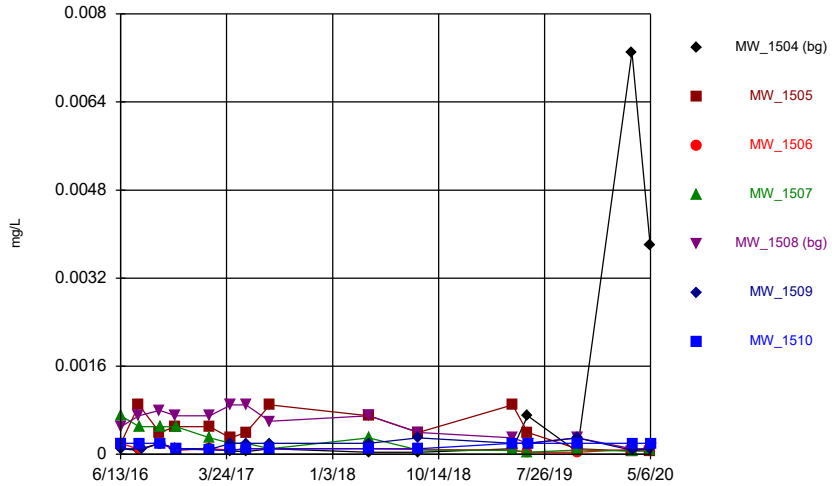
Time Series



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.

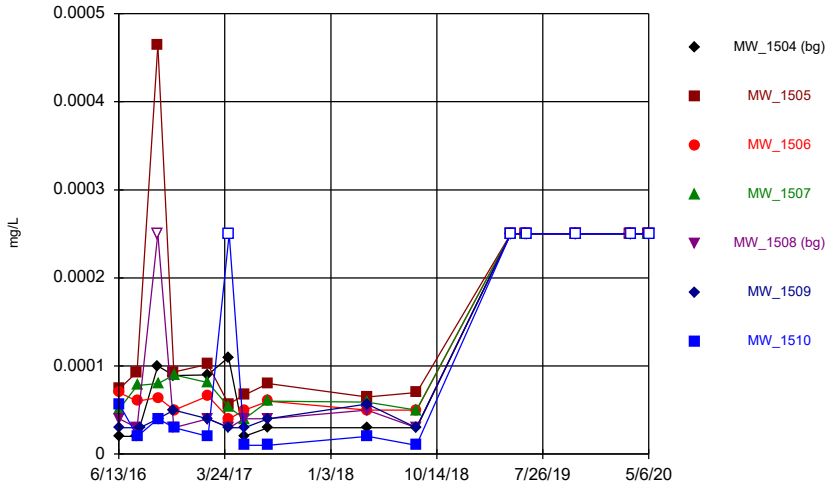
Time Series



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.

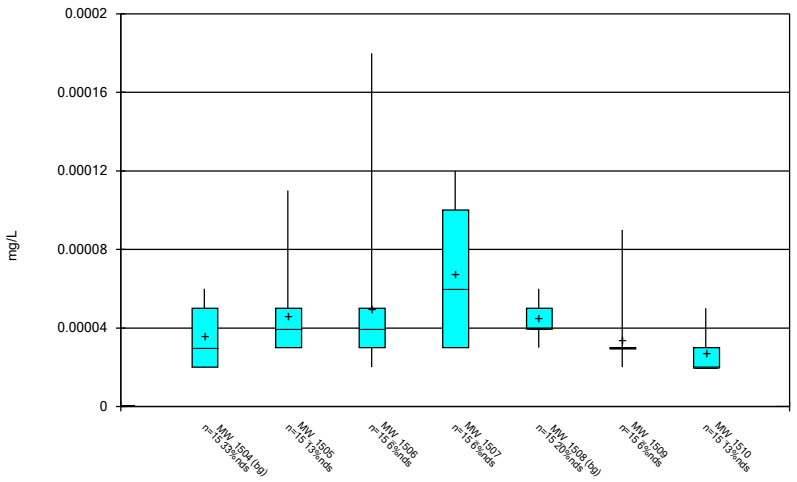
Time Series



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

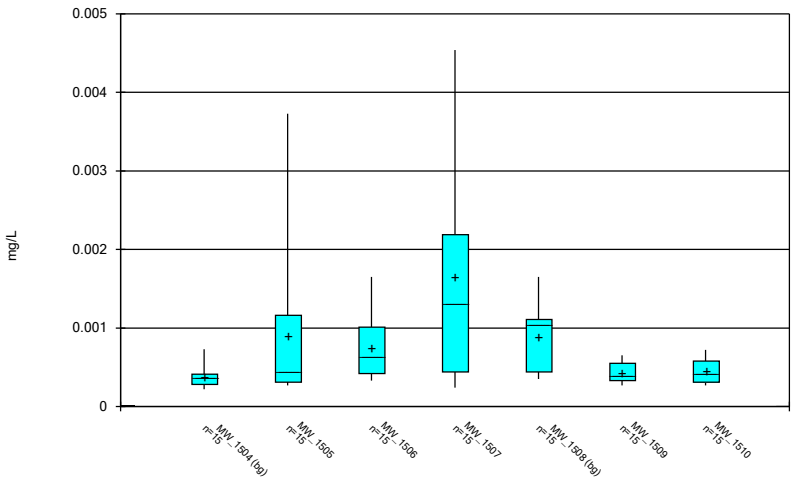
Box & Whiskers Plot



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

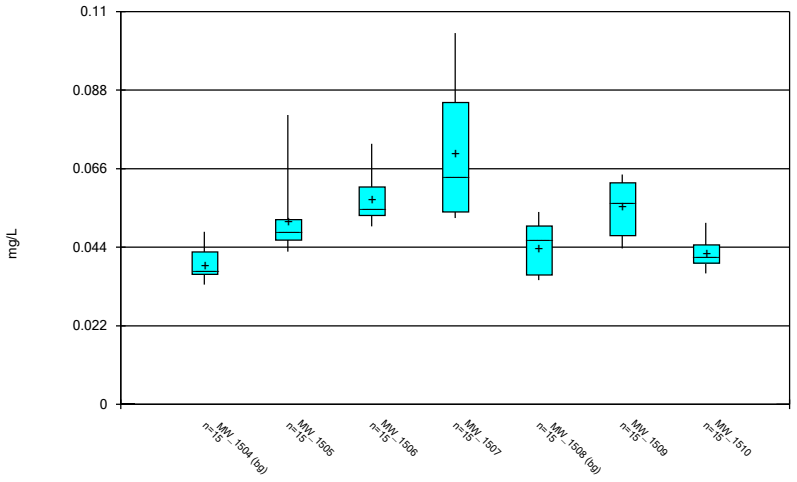
Box & Whiskers Plot



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

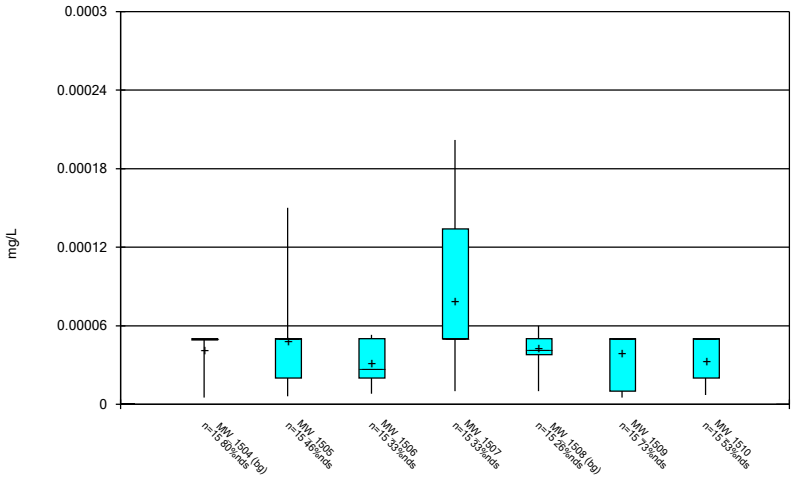
Box & Whiskers Plot



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

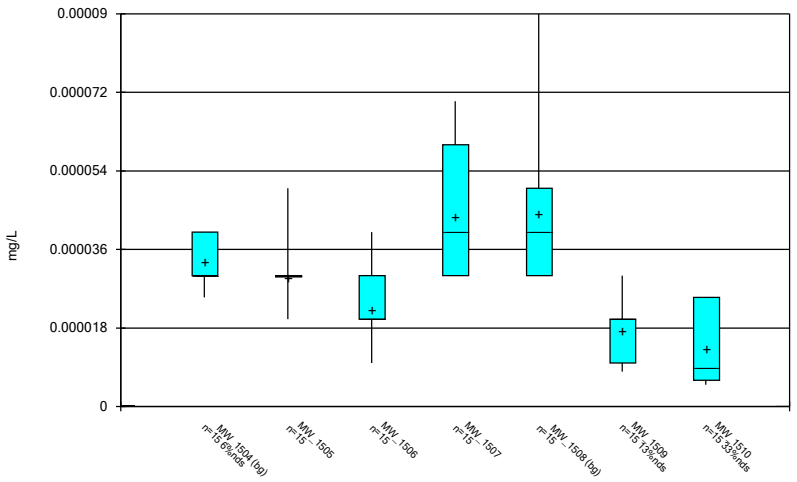
Box & Whiskers Plot



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

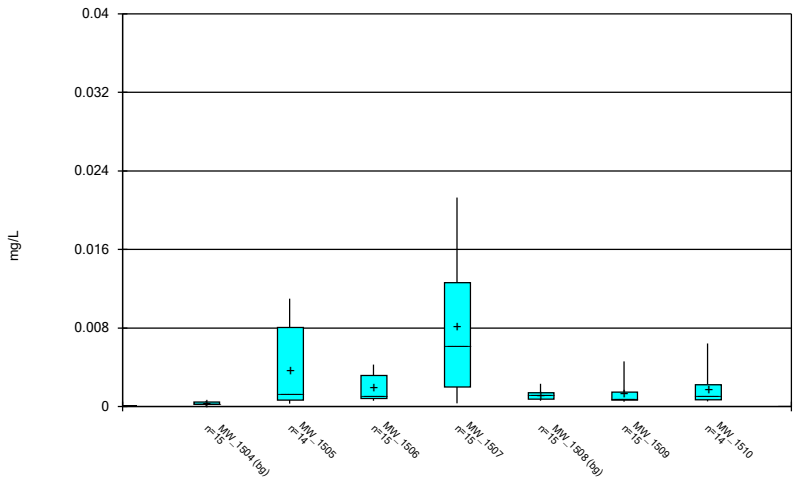
Box & Whiskers Plot



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

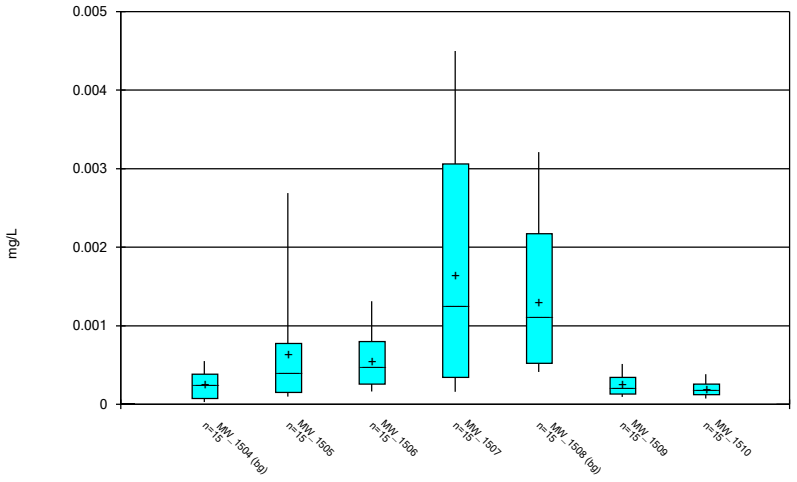
Box & Whiskers Plot



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

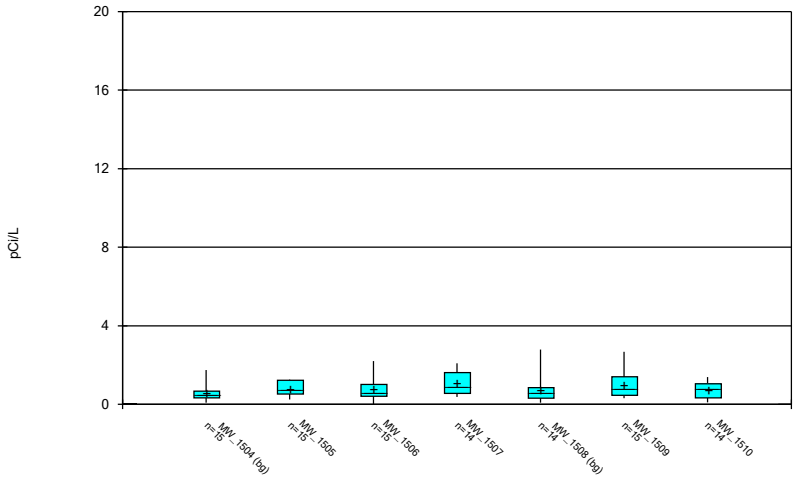
Box & Whiskers Plot



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

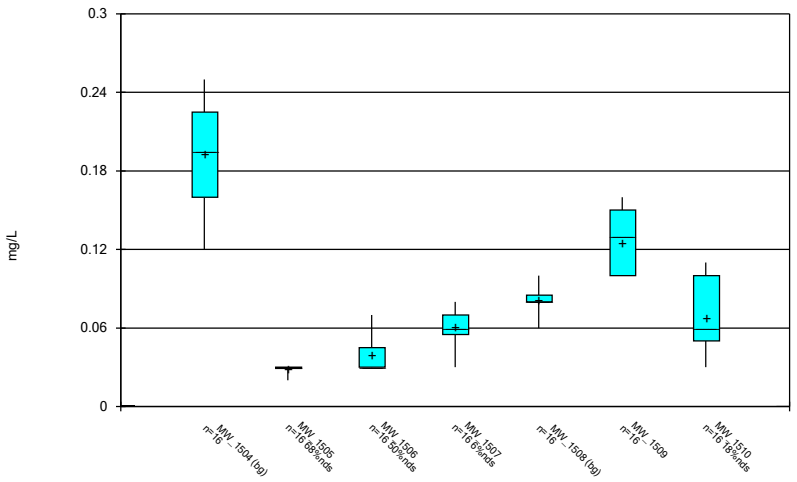
Box & Whiskers Plot



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

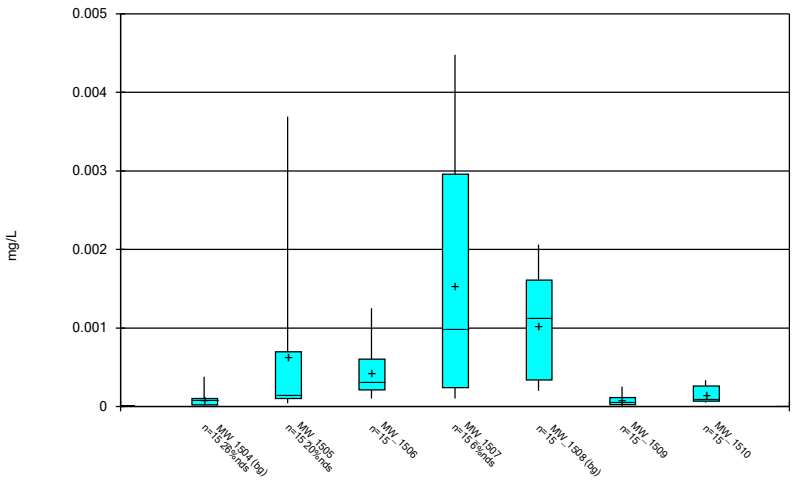
Box & Whiskers Plot



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

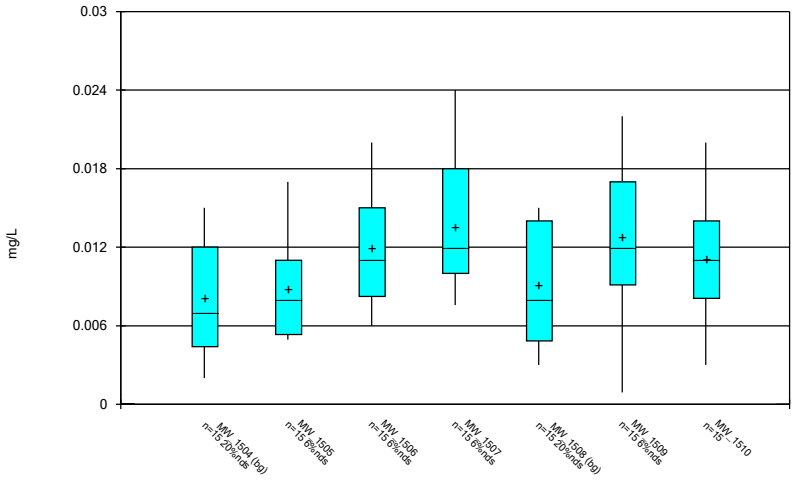
Box & Whiskers Plot



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

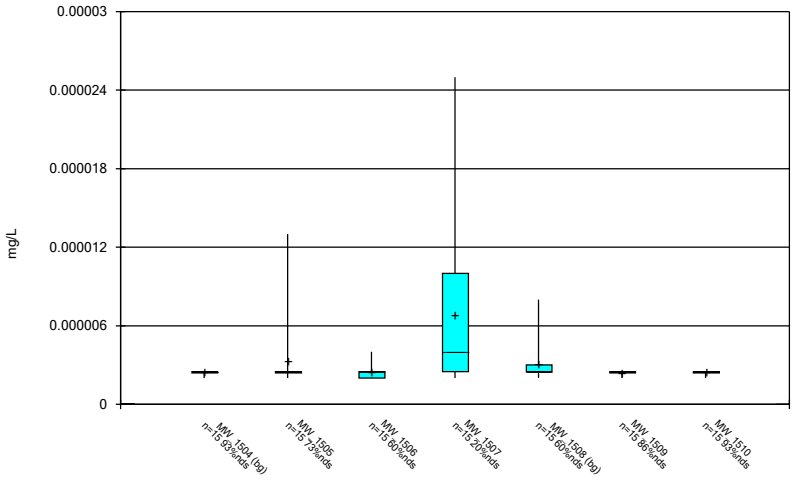
Box & Whiskers Plot



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

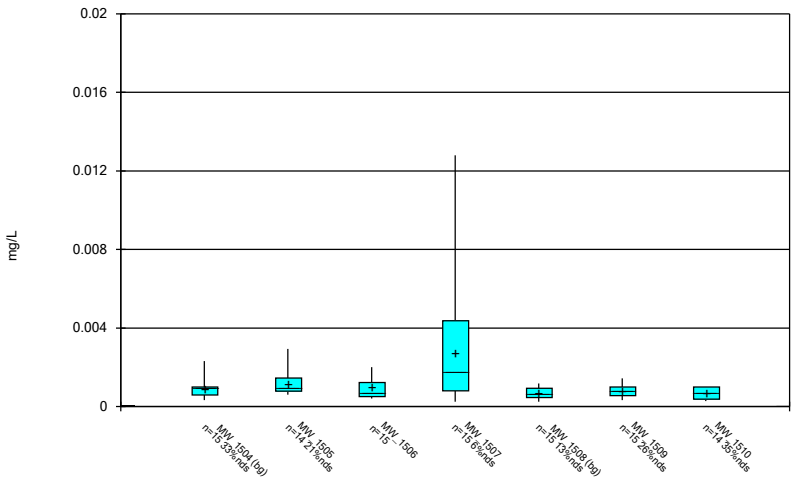
Box & Whiskers Plot



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

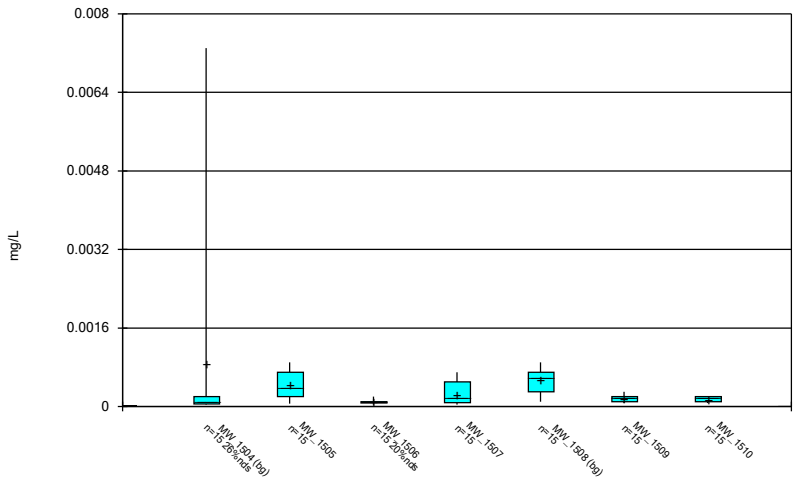
Box & Whiskers Plot



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

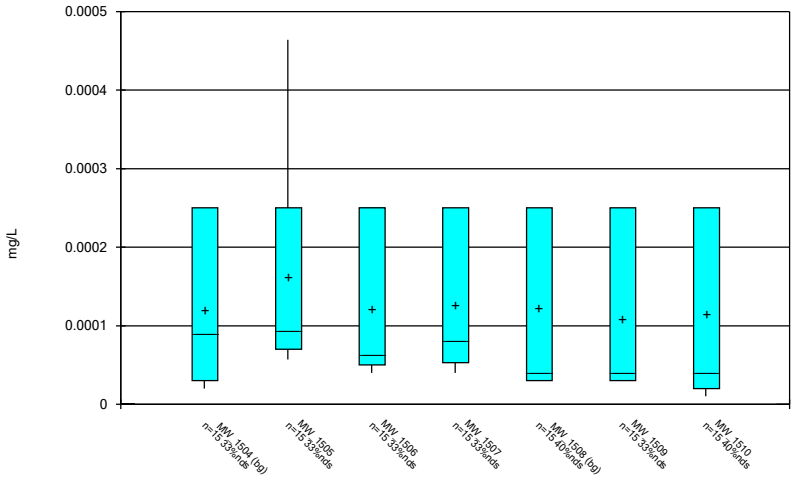
Box & Whiskers Plot



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)

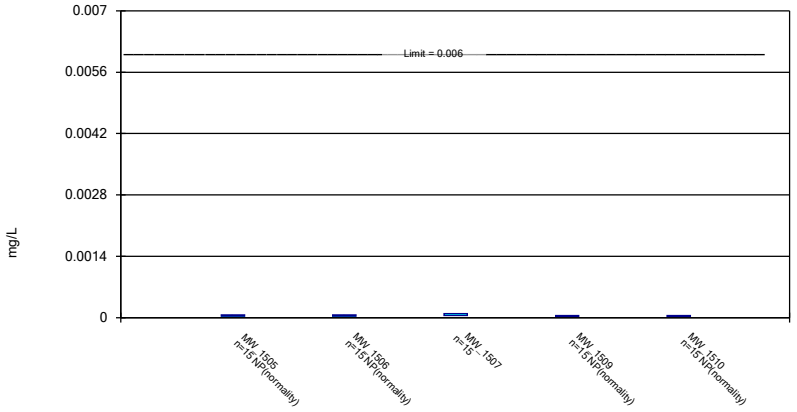
Mitchell BAP Client: Geosyntec Data: Mitchell BAP Printed 6/16/2020, 2:13 AM

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.

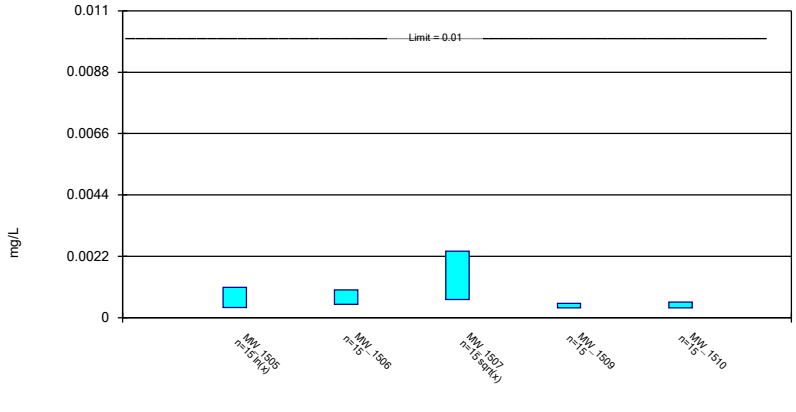


Constituent: Antimony, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

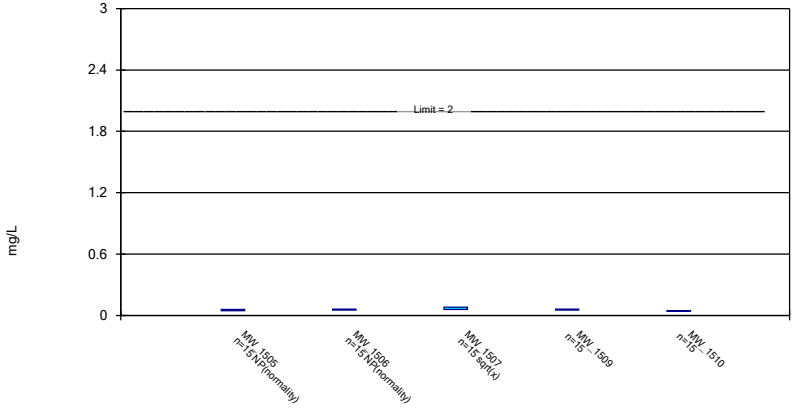


Constituent: Arsenic, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

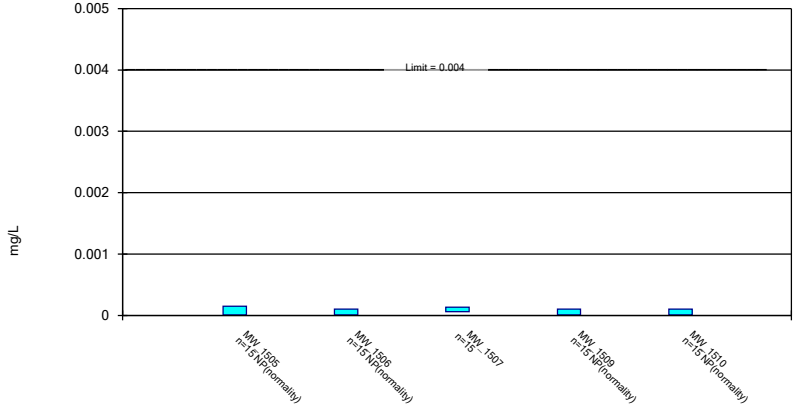


Constituent: Barium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

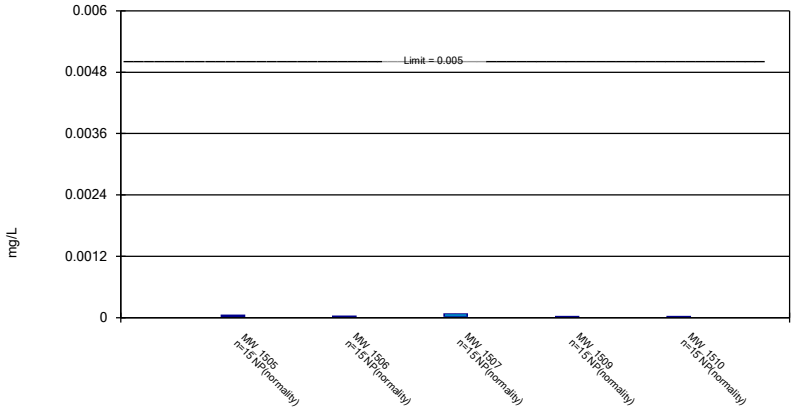


Constituent: Beryllium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

Non-Parametric Confidence Interval

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

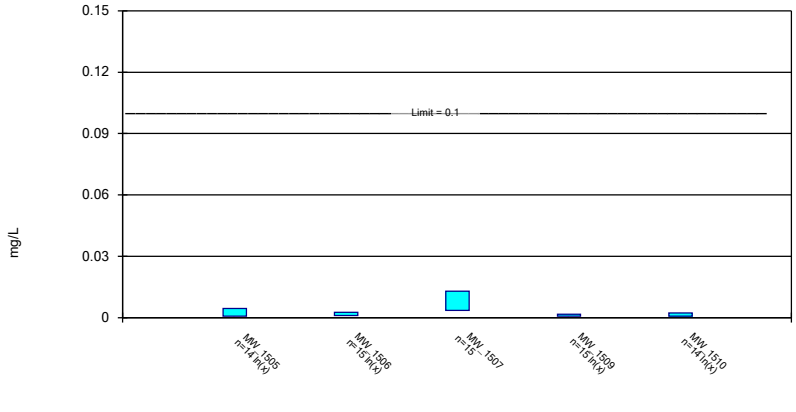


Constituent: Cadmium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

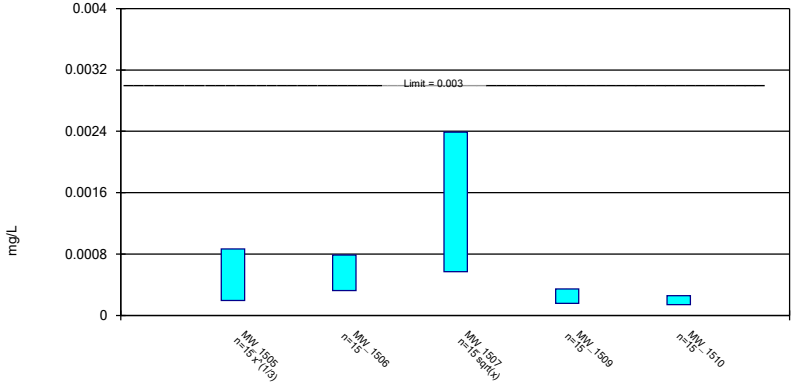


Constituent: Chromium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

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.

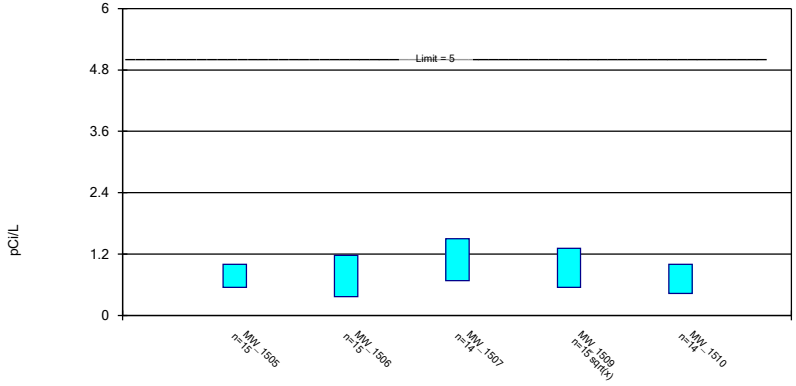


Constituent: Cobalt, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Sanitas™ v.9.6.25 . UG

Parametric Confidence Interval

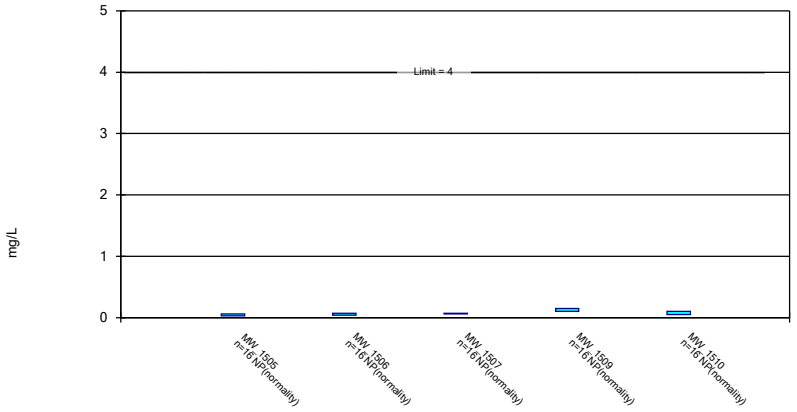
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



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

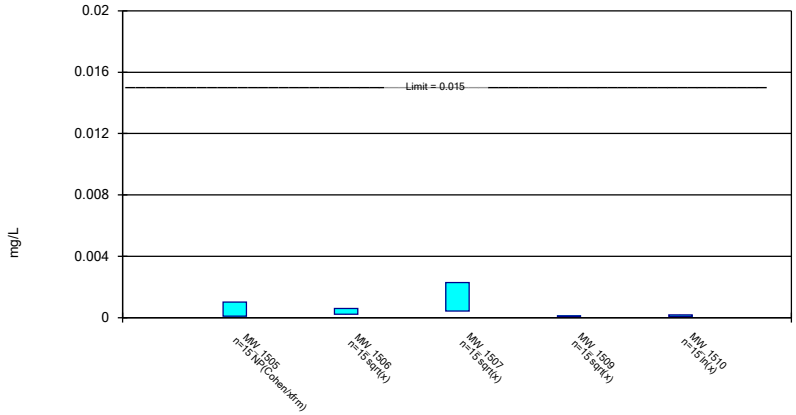
Compliance Limit is not exceeded. Per-well alpha = 0.01.



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

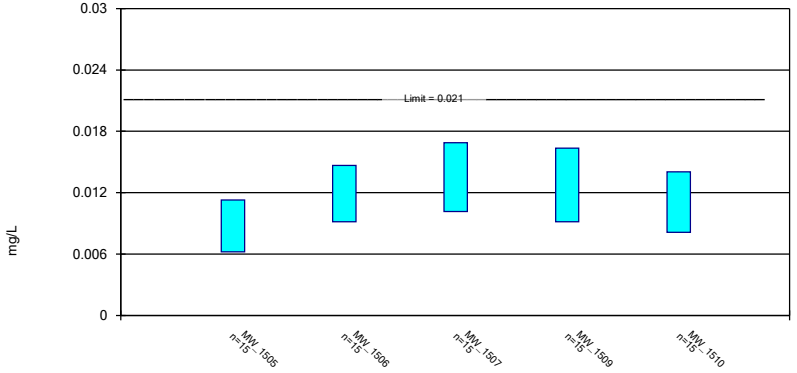
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lead, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Parametric Confidence Interval

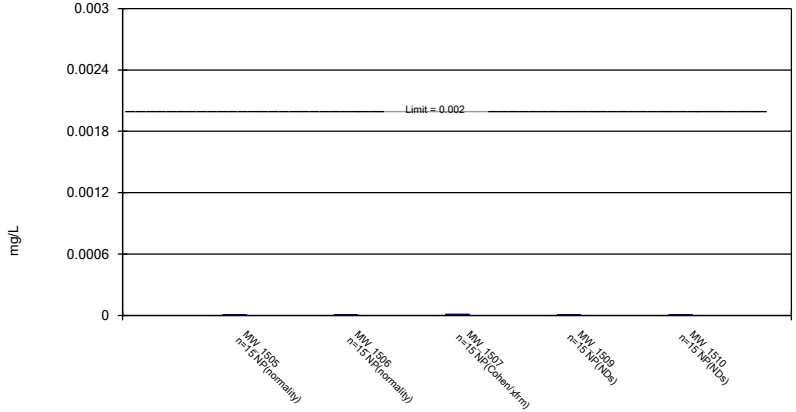
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 6/16/2020 2:10 AM View: AIV
Mitchell BAP Client: Geosyntec Data: Mitchell BAP

Non-Parametric Confidence Interval

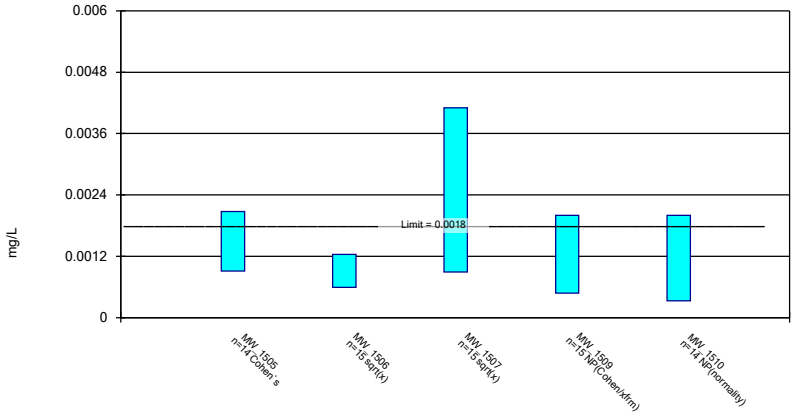
Compliance Limit is not exceeded. Per-well alpha = 0.01.



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

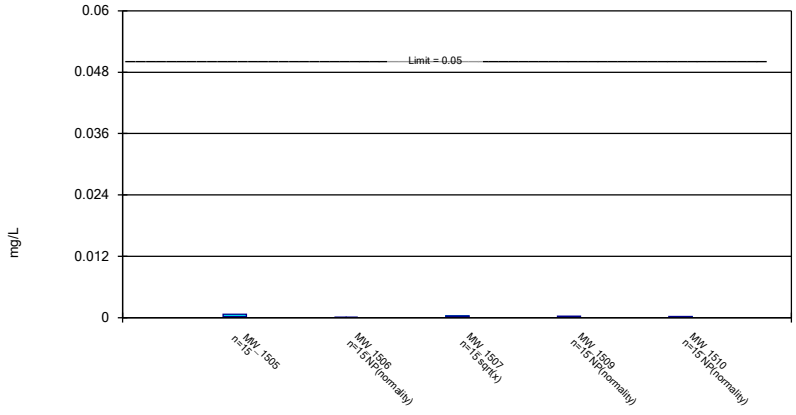
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



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

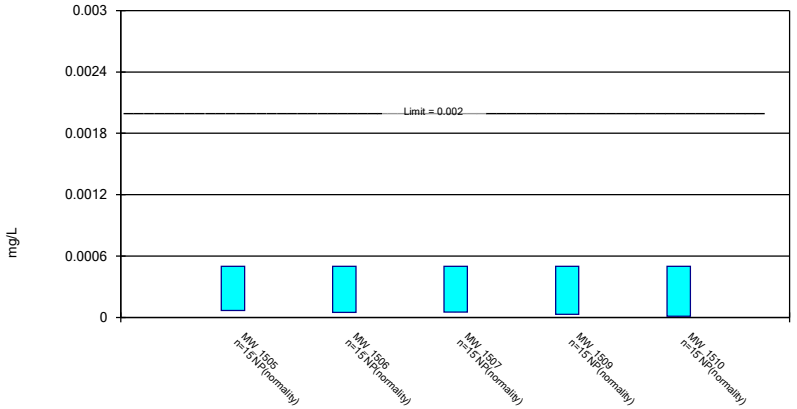
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



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.

APPENDIX 6 - Record of Changes

Record of Changes		
Revision Number	Date	Revision Description
0	01/31/2021	Initial Report
1	05/05/2021	Made changes to Section I – Overview. Added a statement on what monitoring mode (detection or assessment) the CCR unit was in at the beginning and end of the reporting year; and added a statement identifying all constituents and monitoring wells with any statistically significant increases (SSIs) over background in the case of a CCR unit in detection monitoring or statistically significant levels (SSLs) over groundwater protection standards (GWPSs) in the case of a CCR unit in assessment monitoring.