



Consulting
Engineers and
Scientists

2018 Annual Groundwater Monitoring and Corrective Action Report – Brayton Point CCR Basins A, B, and C

Brayton Point Power Station
Somerset, Massachusetts

Submitted to:

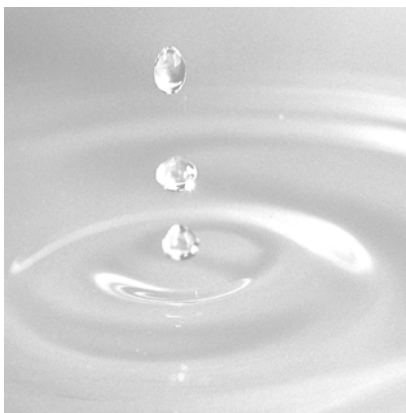
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Project 1800705



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Professional Engineer Certification

“I hereby certify that the 2018 Annual Groundwater Monitoring and Corrective Action Report for Brayton Point CCR Basins A, B, and C at the Brayton Point Power Station facility meets requirements in federal regulation 40 CFR § 257.90 of the Standards of Coal Combustion Residuals (CCR) in Landfills and Impoundments published April 17, 2015. I am a duly licensed Professional Engineer under the laws of the Commonwealth of Massachusetts.”



R. Lee Wooten, P.E.
Vice President



1. Introduction

1.1 Overview

Brayton Point Station (Brayton Point) was an electric generating plant located in Somerset, Massachusetts (Fig. 1). Brayton Point Energy, LLC formerly owned the plant, which burned coal, oil, and natural gas to generate electricity. Brayton Point, LLC now owns the plant. Basins A, B, and C (the Basins) were polishing basins in the wet bottom ash management system and are shown on Fig. 2. Bottom ash from the boilers fell into the wet collection system at the boilers and was conveyed as bottom ash sluice water to the hydro-bins. Decant from the hydro-bins was conveyed into either Basins B or C and then to Basin A for polishing or settling out of additional bottom ash material. In accordance with the United States Environmental Protection Agency (USEPA) coal combustion residual (CCR) rule (40 CFR 257 Subpart D), Brayton Point Basins A, B and C are therefore classified as existing CCR surface impoundments.

Brayton Point ceased electricity generating operations on May 31, 2017. Following shutdown, Brayton Point began the process of closing the Basins. Basin B received its last CCR material on May 31, 2017. Basins A and C were in service until June 1, 2017. Semi-annual monitoring and reporting for the Basins has been performed in accordance with the monitoring requirements §257.90 through §257.94 during the closure process for the Basins.

1.2 Background

In accordance with the USEPA CCR Rule (§257.90(e)), on January 31, 2018, O'Brien and Gere Engineers, Inc. (OBG) on behalf of Brayton Point, LLC completed a 2017 Annual Groundwater Monitoring and Corrective Action Report (2017 Annual Report) to document 2017 groundwater monitoring activities at the Basins. The 2017 Annual Report documented the completion of background groundwater monitoring (eight sampling events), which were completed between November 2015 and July 2017, and the first detection monitoring sampling event, which was completed in November 2017.

In the 2017 Annual Report, OBG on behalf of Brayton Point, LLC concluded that no problems were encountered with the groundwater monitoring program during 2017, and groundwater samples were collected and analyzed in accordance with the Sampling and Analysis Plan, and all data were accepted. The 2017 Annual Report identified a Statistically Significant Increase (SSI) in the concentrations of six CCR Rule Appendix III constituents (boron, calcium, chloride, fluoride, sulfate, and total dissolved solids). OBG on behalf of Brayton Point, LLC identified the SSIs on January 11, 2018.

1.3 Regulatory Framework

This Annual Monitoring and Corrective Action Report has been prepared to provide the information required by 40 CFR §257.90(e) for the Brayton Point CCR Basins A, B, and C (the Basins) located at Brayton Point Power Station in Somerset, Massachusetts.

In accordance with 40 CFR §257.90(e), the owner or operator of an existing CCR unit must prepare an Annual Groundwater Monitoring and Corrective Action Report, for the preceding calendar year, that documents the status of the groundwater monitoring and corrective action program for the CCR unit, summarizes key actions completed, describes any problems encountered, discusses actions to resolve the problems, and projects key activities for the upcoming year. At a minimum, the annual report must contain the following information, to the extent available:

- 1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;
- 2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;
- 3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;
- 4) A narrative discussion of any transition between monitoring programs (*e.g.*, the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and
- 5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

This report provides the required information for the Brayton Point Ash Basins A, B, and C for calendar year 2018.

2. Key Action Completed in 2018

2.1 Summary

GEI on behalf of Brayton Point, LLC completed the following key actions in 2018:

- Completed an Alternative Source Determination (ASD) on April 11, 2018 to address the SSIs identified in the 2017 Annual Report.
- Completed two groundwater sampling events as part of Detection Monitoring on February 26, 2018 and May 1, 2018.
- Determined SSIs over background concentrations on August 7, 2018 of three CCR Rule Appendix III constituents (boron, calcium, and chloride).
- Completed one groundwater sampling event as part of Assessment Monitoring on October 22, 2018.

All laboratory analytical data obtained in 2018, as well as data for the previously collected samples, are summarized in Table 1.

A summary of each of the key actions in 2018 is provided below.

2.1.1 Alternative Source Demonstration – January to April 2018

On January 11, 2018, in accordance with §257.93(h)(2), OBG on behalf of Brayton Point, LLC documented their determination of SSIs over background concentrations for Appendix III constituents. OBG on behalf of Brayton Point, LLC documented these findings in a letter dated January 14, 2018 and in the 2017 Annual Report.

Rather than immediately transitioning to Assessment Monitoring, GEI on behalf of Brayton Point, LLC performed an ASD to evaluate if there was a source other than the CCR unit that caused the SSIs or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variability in groundwater quality. GEI on behalf of Brayton Point, LLC completed the ASD on April 11, 2018, which provided justification that the SSIs identified in the 2017 Annual Report resulted from sources other than the CCR unit. The ASD is provided as Appendix A.

Specifically, the natural variability in upgradient groundwater quality was documented and suggested that the SSIs identified in the 2017 Annual Report were a result of error in statistical evaluation as described in §257.94(e)(2). Although SSIs were identified in downgradient wells for some constituents, further data evaluation identified higher

concentrations and increasing concentration trends of these constituents in an upgradient monitoring well. GEI on behalf of Brayton Point, LLC concluded that a release from the Basins had not occurred and that upgradient groundwater quality had influenced groundwater quality near the Basins. Therefore, no further action (i.e., assessment monitoring) was warranted at the time, and the Basins remained in detection monitoring.

2.1.2 Detection Monitoring – February and May 2018

GEI on behalf of Brayton Point, LLC completed two groundwater sampling events as part of Detection Monitoring on February 26 and May 1, 2018. An additional sampling event was also completed on July 11, 2018 for two wells (MW802 and MW803) to further evaluate results from May 1, 2018. Samples were collected and analyzed in accordance with the Sampling and Analysis Plan (GEI, 2017) prepared for the Basins. The statistical evaluation results for the February 2018 event are included with the ASD provided as Appendix A. The statistical evaluation results for the May 2018 event are included as Appendix B. In accordance with the Statistical Analysis Plan, both evaluations include the analysis of intrawell prediction limits for the Appendix III constituents.

A map showing the groundwater monitoring system, including the CCR unit, two background (upgradient) monitoring wells (MW301 and MW801), and four downgradient monitoring wells (MW802¹ through MW805) for the Basins is presented in Fig. 2.

One groundwater sample was collected from each background and downgradient well during the February and May sampling events. Groundwater samples were analyzed for Appendix III and IV constituents. For the July sampling event, groundwater samples were only analyzed for Appendix III constituents.

Quality assurance and quality control (QA/QC) measures were taken to ensure the reliability of operational data (field and laboratory) generated during the sampling events. These measures included field QA/QC with the collection of duplicate groundwater samples and equipment blanks, and laboratory QA/QC with the analysis of method blank and matrix spike and matrix spike duplicate samples.

Based on the results from the Detection Monitoring on May 1, 2018 and July 11, 2018, on August 7, 2018, GEI on behalf of Brayton Point, LLC identified SSIs in Appendix III constituents at the following locations:

- Calcium – MW802, MW803
- Chloride – MW803
- Fluoride – MW803
- Total Dissolved Solids – MW802, MW803

¹ Note: We call out MW802 as a downgradient well consistent with our past practices. However, based on groundwater gradient patterns during some times of the year (see Fig. 2), MW802 is on the upgradient side of the basins. This will continue to be evaluated during ongoing monitoring.

These SSIs could not be attributed to the alternative source that was demonstrated previously. As a result of the identification of SSIs, an Assessment Monitoring program was established on August 7, 2018 requiring sampling and analysis for all Appendix IV constituents in compliance with 40 CFR §257.95(b). Notification of the establishment of the Assessment Monitoring program was provided on September 5, 2018 as required by 40 CFR §257.94(e)(3).

2.1.3 Assessment Monitoring – October 2018

Following the identification of SSIs, GEI on behalf of Brayton Point, LLC completed one groundwater sampling event as part of the first, semi-annual Assessment Monitoring event on October 22, 2018. The first Assessment Monitoring event was completed within 90 days of the establishment of the Assessment Monitoring program. Groundwater samples were collected and analyzed for Appendix IV constituents in accordance with the Sampling and Analysis Plan (GEI, 2017) prepared for the Basins.

A map showing the groundwater monitoring system, including the CCR unit, two background (upgradient) monitoring wells (MW301 and MW801), and four downgradient monitoring wells (MW802 through MW805) for the Basins is presented in Fig. 2.

One groundwater sample was collected from each background and downgradient well for this sampling event. Groundwater samples were analyzed for Appendix IV constituents.

Quality assurance and quality control (QA/QC) measures were taken to ensure the reliability of operational data (field and laboratory) generated during the sampling events. These measures included field QA/QC with the collection of duplicate groundwater samples and equipment blanks, and laboratory QA/QC with the analysis of method blank and matrix spike and matrix spike duplicate samples.

Based on the results from the Assessment Monitoring on October 22, 2018, concentrations of Appendix IV constituents were detected above laboratory reporting limits. In accordance with the CCR Rule, wells with detectable concentrations of Appendix IV constituents must be re-sampled for Appendix III constituents and detected Appendix IV constituents within 90 days of receipt of laboratory data, which is by February 27, 2019.

2.1.4 Monitoring Well Installation

On November 13 and 14, 2018, GEI on behalf of Brayton Point, LLC installed two additional monitoring wells, MW901 and MW902, near the Basins, as shown on Fig. 2. These wells will be used in the future to evaluate groundwater elevations and groundwater gradients around the Basins. The monitoring well installation logs are provided in Appendix C.

2.2 Problems Encountered and Actions to Resolve Problems

No problems were encountered with the groundwater monitoring program during 2018. Groundwater samples were collected and analyzed in accordance with the Sampling and Analysis Plan, and all data were accepted.

3. Key Activities Planned for 2019

3.1 Summary

The following key activities are planned for 2019:

- Conduct a groundwater sampling event on or before February 27, 2019 for Appendix III constituents and detected Appendix IV constituents, based on the results of the October 2018 Assessment Monitoring.
- Establish Groundwater Protection Standards (GWPS) for detected Appendix IV constituents
- Perform a statistical analysis of the February 2019 groundwater sampling results within 90 days of receipt of the laboratory data to determine if there are Statistically Significant Levels (SSLs) of Appendix IV constituents above the GWPS.

The results and statistical analysis of the February 2019 groundwater sampling will determine monitoring requirements for the remainder of 2019, which will include:

- If no Appendix IV SSLs are identified, continuation of the Assessment Monitoring program with planned sampling events in April and October 2019.
- If Appendix IV SSLs are present, characterization of the nature and extent of groundwater contamination; and either preparation of an ASD for Appendix IV constituents with SSLs above GWPS or initiate assessment of corrective measures.

4. References

GEI Consultants, Inc., 2017, Sampling and Analysis Plan, Brayton Point Ash Basin A, Ash Basin B, Ash Basin C, Brayton Point Power Station, Somerset, Massachusetts, Project 1508760, Revision 0, October 17, 2017.

GEI Consultants, Inc., 2018, Alternative Source Demonstration, Brayton Point Power Station, Somerset, Massachusetts, Project 1800705, Revision 0, April 11, 2018.

Natural Resource Technology, an OBG Company, 2017, Statistical Analysis Plan, Brayton Point Power Station, Brayton Point Energy, LLC, October 17, 2017.

OBG, 2017, 2017 Annual Groundwater Monitoring and Corrective Action Report, Brayton Point Ash Basin A, Ash Basin B, Ash Basin C – CCR Unit ID 131, Brayton Point Power Station, Somerset, Massachusetts, January 31, 2018.

Table

Table 1. Chemical Testing Results - Groundwater
2018 Annual Groundwater Monitoring and Corrective Action Report
Brayton Point CCR Basins A, B, and C
Brayton Point Power Station
Somerset, Massachusetts

Sample Location:			MW301												
Lab Sample ID:			L1530895-01	L1604160-01	L1613936-01	L1625257-01	L1637356-01	L1704663-01	L1713120-04	L1714966-04	L1726405-03	L1742016-02	L1806610-06	L1815689-01	L1843214-03
Date Sampled:			11/24/2015	2/16/2016	5/9/2016	8/11/2016	11/16/2016	2/14/2017	4/25/2017	5/9/2017	7/19/2017	11/15/2017	2/26/2018	5/2/2018	10/23/2018
Analyte	Method	Units													
Appendix III															
Boron	1.6010C	mg/L	0.049	< 0.030	0.044	0.0357	0.042	0.027	NT	0.027	0.031	0.048	< 0.030	< 0.030	NT
Calcium	1.6020A		12.7	8.93	8.44	8.54	13.6	9.80	NT	7.25	6.58	17.3	9.50	5.76	NT
Chloride	1.9056		17	17.2	12.4	18.2	17.1	19.3	NT	12.5	12.2	22.5	14.6	7.62	NT
Fluoride ¹	121.4500F-BC		0.10	0.08	0.08	< 0.20	< 0.20	0.08	NT	0.06	0.07	0.08	< 0.20	< 0.20	< 0.20
Sulfate	1.9056		30	7.58	7.28	13.5	31.8	8.20	NT	7.07	11.8	36.6	5.75	7.82	NT
Total Dissolved Solids (TDS)	121.2540C		90	74	99	88	73	NT	100	90	60	130	120	30	NT
Appendix IV															
Antimony	1.6020A	mg/L	0.0002	0.00125	0.00016	0.0002	< 0.00400	< 0.00400		< 0.00400	< 0.00400		< 0.00400		< 0.00400
Arsenic	1.6020A		0.0003	0.00022	0.00026	0.0002	0.00043	0.00052		0.00022	0.00018		< 0.00050		< 0.00050
Barium	1.6020A		0.0193	0.06368	0.04151	0.0126	0.02871	0.05677		0.05031	0.10263		0.05994		0.02489
Beryllium	1.6020A		< 0.0005	< 0.00050	< 0.00050	< 0.005	< 0.00050	0.00012		0.00011	< 0.00050		< 0.00050		< 0.0050
Cadmium	1.6020A		0.0001	0.00028	0.00019	< 0.0002	0.00008	0.00024		0.00025	< 0.00020		0.00029		< 0.00020
Chromium	1.6020A		0.0005	0.00075	0.00060	< 0.0010	0.00031	0.00060		0.00040	0.00019		< 0.00100		< 0.00100
Cobalt	1.6020A		0.0001	0.00101	0.00072	0.0001	0.00050	0.00050		0.00084	< 0.00050		0.00133		0.00091
Lead	1.6020A		< 0.0010	< 0.00100	< 0.00100	0.0003	0.00048	< 0.00100		< 0.00050	< 0.00100		< 0.00100		< 0.00100
Lithium	3.200.8		< 0.005	0.000533	0.000469	0.001586	< 0.008000	< 0.008000		< 0.00800	< 0.00800		< 0.008000		< 0.008000
Mercury	1.7470A		< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020		< 0.00020	< 0.00020		< 0.00020		< 0.00020
Molybdenum	1.6020A		0.0003	0.00077	0.00022	< 0.0030	< 0.00300	< 0.00200		< 0.00200	< 0.00067		< 0.00200		< 0.00200
Selenium	1.6020A		< 0.005	< 0.00500	< 0.00500	< 0.005	< 0.00500	0.00183		< 0.00500	< 0.00173		< 0.00200		< 0.00200
Thallium	1.6020A		< 0.0005	< 0.00050	< 0.00050	< 0.0005	< 0.00050	< 0.00050		< 0.00050	< 0.00014		< 0.00050		0.00053
Radium 226 and 228 combined	SM 7500-RA B & EPA Ra-05		0.2	1.0	0.4	0.2	0.3	0.4		0.9	1.2		2.4		1.7
Other															
Alkalinity, Bicarbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT		NT	9.80	NT	4.50	NT	NT
Alkalinity, Carbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT		NT	< 2.00	NT	< 2.00	NT	NT
Magnesium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT		NT	11.9	NT	2.88	NT	NT
pH	Field	STD	5.74	4.74	4.93	5.06	4.98	5.03		5.20	6.05	5.68	5.17	4.99	5.68
Potassium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT		NT	4.58	NT	7.19	NT	NT
Sodium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT		NT	5.19	NT	7.60	NT	NT

General Notes:

1. NT = The sample was not tested for this analyte.
2. < = The analyte was not detected at a concentration above the specified laboratory reporting limit.
3. mg/L = milligrams per liter.
4. mg CaCO3/L = milligrams calcium carbonate per liter.
5. STD = standard pH unit.

Footnote:

¹ Fluoride is both an Appendix III and Appendix IV analyte

Table 1. Chemical Testing Results - Groundwater
2018 Annual Groundwater Monitoring and Corrective Action Report
Brayton Point CCR Basins A, B, and C
Brayton Point Power Station
Somerset, Massachusetts

Sample Location:			MW801												
Lab Sample ID:			L1530895-01	L1604160-07	L1613936-02	L1625257-02	L1637356-02	L1704663-03	L1713120-01	L1714966-01	L1724791-04	L1741865-02	L1806610-01	L1815500-03	L1843039-01
Date Sampled:			11/23/2015	2/17/2016	5/9/2016	8/11/2016	11/16/2016	2/14/2017	4/25/2017	5/9/2017	7/20/2017	11/14/2017	2/26/2018	5/1/2018	10/22/2018
Analyte	Method	Units													
Appendix III															
Boron	1.6010C	mg/L	0.276	0.222	0.213	0.208	0.224	0.211	NT	0.223	0.200	0.257	0.228	0.234	NT
Calcium	1.6020A		73.0	63.1	61.7	61.9	60.2	78.2	NT	73.6	61.6	110	127	112	NT
Chloride	1.9056		97	96.6	79.0	82.7	76.5	107	NT	104	85.6	164	166	164	NT
Fluoride ¹	121.4500F-BC		0.06	0.05	0.05	0.04	0.04	0.05	NT	0.04	0.05	0.09	< 0.20	1.1	< 0.20
Sulfate	1.9056		110	95.4	92.6	109	94.1	152	NT	154	106	188	252	217	NT
Total Dissolved Solids (TDS)	121.2540C		530	480	500	480	440	NT	600	590	510	780	960	850	NT
Appendix IV															
Antimony	1.6020A	mg/L	0.0003	0.0002	0.00014	0.0001	< 0.00400	< 0.00400		< 0.00400	< 0.00400		< 0.00400		< 0.00400
Arsenic	1.6020A		0.0009	0.0006	0.00049	0.0006	0.00075	0.00065		0.00045	0.00059		0.00071		0.00077
Barium	1.6020A		0.0547	0.0532	0.04738	0.0537	0.05331	0.07474		0.06967	0.05439		0.1135		0.1211
Beryllium	1.6020A		< 0.0005	< 0.0005	< 0.00050	< 0.0005	< 0.00050	< 0.00050		< 0.00050	< 0.00050		< 0.00050		< 0.00050
Cadmium	1.6020A		0.0001	0.0001	< 0.00006	< 0.0002	< 0.0020	0.00009		0.00009	0.00006		< 0.00020		< 0.00020
Chromium	1.6020A		0.0005	0.0008	0.00055	< 0.0010	0.00033	0.00073		0.00024	< 0.00100		< 0.00100		< 0.00100
Cobalt	1.6020A		0.0019	0.0018	0.00164	0.0018	0.00161	0.00229		0.00201	0.00205		0.00330		0.00328
Lead	1.6020A		0.0002	0.0002	< 0.00100	0.0002	< 0.00100	< 0.00100		< 0.00050	< 0.00100		< 0.00100		< 0.00100
Lithium	3.200.8		< 0.005	< 0.00800	< 0.00800	0.0003070	< 0.00800	< 0.00800		< 0.00800	< 0.00800		< 0.00800		< 0.00800
Mercury	1.7470A		< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020		< 0.00020	< 0.00020		< 0.00020		< 0.00020
Molybdenum	1.6020A		0.0014	0.0014	0.00081	0.0004	< 0.00300	< 0.00200		< 0.00200	< 0.00200		< 0.00200		< 0.00200
Selenium	1.6020A		< 0.00500	0.001	< 0.00500	< 0.005	< 0.00500	< 0.00500		< 0.00500	< 0.00500		< 0.00500		< 0.00500
Thallium	1.6020A		0.0001	0.0001	0.00009	0.0001	< 0.00050	< 0.00050		< 0.00050	< 0.00050		< 0.00050		< 0.00050
Radium 226 and 228 combined	SM 7500-RA B & EPA Ra-05		1.4	0.5	1.1	1.7	0.8	2.1		2.5	2.7		4.4		3.4
Other															
Alkalinity, Bicarbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	345	NT	NT
Alkalinity, Carbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	< 2.00	NT	NT
Magnesium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	30.1	NT	NT
pH	Field	STD	6.47	6.37	6.32	6.26	5.93	6.38		6.29	7.37	6.42	6.22	6.21	6.27
Potassium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	15.5	NT	NT
Sodium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	171	NT	NT

General Notes:

1. NT = The sample was not tested for this analyte.
2. < = The analyte was not detected at a concentration above the specified laboratory reporting limit.
3. mg/L = milligrams per liter.
4. mg CaCO3/L = milligrams calcium carbonate per liter.
5. STD = standard pH unit.

Footnote:

¹ Fluoride is both an Appendix III and Appendix IV analyte

Table 1. Chemical Testing Results - Groundwater
2018 Annual Groundwater Monitoring and Corrective Action Report
Brayton Point CCR Basins A, B, and C
Brayton Point Power Station
Somerset, Massachusetts

Sample Location:			MW802													
Lab Sample ID:			L1530895-02	L1604160-02	L1613936-04	L1625257-04	L1627517-01	L1704663-06	L1712985-03	L1714966-03	L1724791-05	L1741865-02	L1806610-02	L1815500-02	L1826345-01	L1843214-04
Date Sampled:			11/23/2015	2/16/2016	5/9/2016	8/11/2016	11/17/2016	2/15/2017	4/24/2017	5/9/2017	7/20/2017	11/14/2017	2/28/2018	5/1/2018	7/11/2018	10/23/2018
Analyte	Method	Units														
Appendix III																
Boron	1.6010C	mg/L	0.505	0.303	0.270	0.489	0.540	0.313	NT	0.379	0.449	0.523	0.378	0.469	NT	NT
Calcium	1.6020A		43.1	41.4	46.6	70.2	56.5	64.0	NT	61.1	67.3	81.1	124	144	116	NT
Chloride	1.9056		230	123	118	109	134	119	NT	115	108	132	204	227	NT	NT
Fluoride ¹	121.4500F-BC		1.3	0.96	0.86	0.84	0.86	0.74	NT	0.65	0.05	0.93	0.56	0.44	NT	0.34
Sulfate	1.9056		77	52.6	83.9	154	130	109	NT	128	165	174	164	180	NT	NT
Total Dissolved Solids (TDS)	121.2540C		650	440	480	520	520	NT	470	480	540	550	730	860	900	NT
Appendix IV																
Antimony	1.6020A	mg/L	0.0001	0.00023	0.00031	0.0001	< 0.00400	< 0.00400		0.00143	< 0.00400		< 0.00400			< 0.00400
Arsenic	1.6020A		0.000495	0.00018	0.00021	0.0001	0.00043	0.00023		< 0.00050	0.00017		< 0.00050			< 0.00050
Barium	1.6020A		0.0030	0.00096	0.00101	0.0015	0.00168	0.00126		0.00061	0.00077		0.00130			0.00297
Beryllium	1.6020A		< 0.005	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050		< 0.00050	< 0.00050		< 0.00050			< 0.00050
Cadmium	1.6020A		< 0.0002	< 0.00020	< 0.00020	< 0.0002	< 0.00020	< 0.00020		< 0.00020	< 0.00020		< 0.00020			< 0.00020
Chromium	1.6020A		0.0018	0.0011	0.00055	0.0003	0.00076	0.00071		0.00034	0.00019		< 0.00100			< 0.00100
Cobalt	1.6020A		0.004	< 0.00020	< 0.00020	< 0.0002	< 0.00050	< 0.00050		< 0.00050	< 0.00050		< 0.00050			< 0.00050
Lead	1.6020A		0.007	< 0.00100	< 0.00100	0.0002	< 0.00100	< 0.00100		< 0.00100	< 0.00100		< 0.00100			< 0.00100
Lithium	3.200.8		0.0207	0.0207	0.0251	0.04287	0.04704	0.03670		0.0410	0.0512		0.06572			0.1833
Mercury	1.7470A		< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020		< 0.00020	0.00008		< 0.00020			< 0.00020
Molybdenum	1.6020A		0.0028	0.01295	0.01998	0.0432	0.03276	0.02326		0.03102	0.04352		0.03077			0.01140
Selenium	1.6020A		< 0.005	< 0.00500	< 0.00500	< 0.005	< 0.00500	< 0.00500		< 0.00500	< 0.00500		< 0.00500			< 0.00500
Thallium	1.6020A		< 0.0005	< 0.00050	< 0.00050	< 0.0005	< 0.00050	< 0.00050		< 0.00050	< 0.00050		< 0.00050			< 0.00050
Radium 226 and 228 combined	SM 7500-RA B & EPA Ra-05		0.5	0.1	0.2	0.1	0.2	0.1		0.1	1.5		1.5			1.5
Other																
Alkalinity, Bicarbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	153	NT	NT	NT
Alkalinity, Carbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	< 2.00	NT	NT	NT
Magnesium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	16.4	NT	NT	NT
pH	Field	STD	6.66	6.87	7.09	7.14	6.47	7.18		7.30	7.81	7.15	7.46	7.44	7.45	7.34
Potassium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	13.2	NT	NT	NT
Sodium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	95.2	NT	NT	NT

General Notes:

1. NT = The sample was not tested for this analyte.
2. < = The analyte was not detected at a concentration above the specified laboratory reporting limit.
3. mg/L = milligrams per liter.
4. mg CaCO3/L = milligrams calcium carbonate per liter.
5. STD = standard pH unit.

Footnote:

¹ Fluoride is both an Appendix III and Appendix IV analyte

Table 1. Chemical Testing Results - Groundwater
2018 Annual Groundwater Monitoring and Corrective Action Report
Brayton Point CCR Basins A, B, and C
Brayton Point Power Station
Somerset, Massachusetts

Sample Location:			MW803													
Lab Sample ID:			L1530895-07	L1604160-08	L1613936-08	L1625257-05	L1637356-04	L1704663-04	L1712985-02	L1714966-07	L1724791-06	L1741865-04	L1806610-03	L1815500-04	L1826345-02	L1843039-02
Date Sampled:			11/24/2015	2/17/2016	5/10/2016	8/11/2016	11/16/2016	2/14/2017	4/24/2017	5/10/2017	7/20/2017	11/14/2017	2/28/2018	5/1/2018	7/11/2018	10/22/2018
Analyte	Method	Units														
Appendix III																
Boron	1.6010C	mg/L	0.578	0.488	0.442	0.447	0.409	0.404	NT	0.531	0.515	0.479	0.386	0.454	NT	NT
Calcium	1.6020A		40.8	41.6	46.0	46.1	41.0	48.0	NT	48.6	42.7	50.5	51.6	72.7	62.9	NT
Chloride	1.9056		69	76.2	67.8	79.2	67.1	98.2	NT	100	89.8	84.2	82.6	191	186	NT
Fluoride ¹	121.4500F-BC		0.71	0.64	0.63	0.64	0.67	0.60	NT	0.60	0.62	0.63	< 0.20	0.88	0.83	0.37
Sulfate	1.9056		50	39.8	36.6	30.0	33.3	51.8	NT	55.9	61.9	81.4	73.8	72.4	NT	NT
Total Dissolved Solids (TDS)	121.2540C		370	340	320	340	260	NT	400	400	380	380	410	590	640	NT
Appendix IV																
Antimony	1.6020A	mg/L	< 0.0020	0.0011	0.00014	0.0002	0.00141	0.00059		0.00043	< 0.00400		< 0.00400			< 0.00400
Arsenic	1.6020A		0.0101	0.0120	0.01133	0.0102	0.00984	0.00972		0.01173	0.01283		0.01368			0.01045
Barium	1.6020A		0.0037	0.0033	0.00282	0.0029	0.00225	0.00284		0.00301	0.00286		0.00352			0.00671
Beryllium	1.6020A		< 0.005	< 0.0005	< 0.00050	< 0.0005	< 0.00050	< 0.00050		< 0.00050	< 0.00050		< 0.00050			< 0.00050
Cadmium	1.6020A		< 0.0002	< 0.0002	< 0.00020	< 0.0002	< 0.00020	< 0.00020		< 0.00020	< 0.00020		< 0.00020			< 0.00020
Chromium	1.6020A		0.0020	0.0010	0.00031	0.0009	0.00045	0.00051		0.00020	0.00025		< 0.00100			< 0.00100
Cobalt	1.6020A		0.0004	0.0003	0.00032	0.0003	0.00028	0.00030		0.00038	0.00038		< 0.00050			0.00065
Lead	1.6020A		0.0003	< 0.0010	< 0.000100	< 0.0010	< 0.000100	< 0.000100		< 0.000100	< 0.000100		< 0.000100			< 0.000100
Lithium	3.200.8		< 0.005	0.000844	0.000356	0.0007270	< 0.008000	< 0.008000		< 0.00800	< 0.00800		< 0.008000			< 0.008000
Mercury	1.7470A		< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020		< 0.00020	< 0.00020		< 0.00020			< 0.00020
Molybdenum	1.6020A		0.0376	0.0371	0.03389	0.0283	0.03360	0.04301		0.04849	0.04730		0.04259			0.04607
Selenium	1.6020A		< 0.005	< 0.005	< 0.00500	< 0.005	< 0.00500	< 0.00500		< 0.00500	< 0.00500		< 0.00500			< 0.00500
Thallium	1.6020A		< 0.0005	< 0.0005	< 0.00050	< 0.0005	< 0.00050	< 0.00050		< 0.00050	< 0.00050		< 0.00050			< 0.00050
Radium 226 and 228 combined	SM 7500-RA B & EPA Ra-05		0.1	0.3	0.8	0.0	0.0	0.0		0.3	0.6		1.1			1.9
Other																
Alkalinity, Bicarbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	147	NT	NT	NT
Alkalinity, Carbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	< 2.00	NT	NT	NT
Magnesium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	16.5	NT	NT	NT
pH	Field	STD	6.91	6.89	6.89	7.02	6.68	7.25		7.26	7.47	7.31	7.38	7.10	7.19	7.01
Potassium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	13.2	NT	NT	NT
Sodium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	50.6	NT	NT	NT

General Notes:

1. NT = The sample was not tested for this analyte.
2. < = The analyte was not detected at a concentration above the specified laboratory reporting limit.
3. mg/L = milligrams per liter.
4. mg CaCO3/L = milligrams calcium carbonate per liter.
5. STD = standard pH unit.

Footnote:

¹ Fluoride is both an Appendix III and Appendix IV analyte

Table 1. Chemical Testing Results - Groundwater
2018 Annual Groundwater Monitoring and Corrective Action Report
Brayton Point CCR Basins A, B, and C
Brayton Point Power Station
Somerset, Massachusetts

Sample Location:			MW804												
Lab Sample ID:			L1530895-06	L1604160-05	L1613936-07	L1625257-06	L1627517-02	L1704663-07	L1713120-03	L1714966-05	L1724791-01	L1742016-01	L1806610-04	L1815689-02	L1843214-06
Date Sampled:			11/24/2015	2/16/2016	5/10/2016	8/11/2016	11/17/2016	2/15/2017	4/25/2017	5/10/2017	7/19/2017	11/15/2017	2/26/2018	5/2/2018	10/23/2018
Analyte	Method	Units													
Appendix III															
Boron	1.6010C	mg/L	0.181	0.119	0.187	0.238	0.224	0.202	NT	0.232	0.470	0.247	0.185	0.211	NT
Calcium	1.6020A		21.8	16.9	24.4	24.4	30.0	21.6	NT	35.2	87.6	38.6	31.7	26.7	NT
Chloride	1.9056		40	33.8	34.6	42.0	40.2	42.4	NT	41.8	41.5	46.7	56.7	48.1	NT
Fluoride ¹	121.4500F-BC		0.91	0.86	0.80	0.85	0.90	0.77	NT	0.57	0.43	0.75	0.42	0.80	0.44
Sulfate	1.9056		61	26.8	56.8	51.6	66.7	42.0	NT	75.9	288	64.8	48.2	38.8	NT
Total Dissolved Solids (TDS)	121.2540C		180	110	180	180	200	NT	200	200	490	260	280	250	NT
Appendix IV															
Antimony	1.6020A	mg/L	0.0029	0.00225	0.00200	0.0027	0.00249	0.00240	NT	0.00501	< 0.00179	NT	< 0.00400	NT	< 0.00400
Arsenic	1.6020A		0.001	0.00093	0.00113	0.0011	0.00538	0.00906	0.00644	0.00199			0.01365	0.01258	
Barium	1.6020A		0.0269	0.01630	0.02428	0.0291	0.02039	0.02982	0.01810	0.09473			0.04336	0.02330	
Beryllium	1.6020A		< 0.0005	< 0.00050	< 0.00050	< 0.0005	< 0.00050	< 0.00050	< 0.00050	< 0.00050			< 0.00050	< 0.00050	
Cadmium	1.6020A		< 0.0002	< 0.00020	< 0.00020	< 0.0002	< 0.00020	< 0.00020	< 0.00020	< 0.00020			< 0.00020	< 0.00020	
Chromium	1.6020A		0.0015	0.00103	0.00067	0.0005	0.00235	0.00096	0.00057	0.00085			0.00407	0.00384	
Cobalt	1.6020A		< 0.0005	< 0.00020	< 0.00020	< 0.0002	< 0.00050	< 0.00050	< 0.00050	< 0.00050			0.001440	< 0.00050	
Lead	1.6020A		< 0.0010	< 0.00100	< 0.00100	0.0002	< 0.00100	< 0.00100	< 0.00100	< 0.00100			0.00323	< 0.00100	
Lithium	3.200.8		0.0431	0.0333	0.0314	0.05007	0.01909	0.02376	0.0107	0.0758			0.02192	0.008711	
Mercury	1.7470A		< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020			< 0.00020	< 0.00020	
Molybdenum	1.6020A		0.0177	0.01773	0.01302	0.0145	0.02034	0.02500	0.01834	0.01139			0.02390	0.02425	
Selenium	1.6020A		0.00483	0.00631	0.00762	0.004	0.00796	0.0142	0.0111	0.00785			0.0140	0.0122	
Thallium	1.6020A		0.0003	0.00018	0.00020	0.0004	0.00018	0.00031	< 0.00050	0.00047			< 0.00050	< 0.00050	
Radium 226 and 228 combined	SM 7500-RA B & EPA Ra-05		1.2	0.1	0.1	0.2	0.0	0.1	NT	0.5	1.8		1.5	1.4	
Other															
Alkalinity, Bicarbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	104	NT	NT
Alkalinity, Carbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	< 2.00	NT	NT
Magnesium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	15.7	NT	NT
pH	Field	STD	6.75	6.72	6.53	6.56	6.75	7.1	6.97	6.68	7.14	7.35	7.04	7.20	
Potassium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	8.49	NT	NT
Sodium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	37.0	NT	NT

General Notes:

1. NT = The sample was not tested for this analyte.
2. < = The analyte was not detected at a concentration above the specified laboratory reporting limit.
3. mg/L = milligrams per liter.
4. mg CaCO3/L = milligrams calcium carbonate per liter.
5. STD = standard pH unit.

Footnote:

¹ Fluoride is both an Appendix III and Appendix IV analyte

Table 1. Chemical Testing Results - Groundwater
2018 Annual Groundwater Monitoring and Corrective Action Report
Brayton Point CCR Basins A, B, and C
Brayton Point Power Station
Somerset, Massachusetts

Sample Location:			MW805												
Lab Sample ID:			L1530895-09	L1604160-03	L1613936-05	L1625257-07	L1627517-03	L1704663-05	L1712985-01	L1714966-06	L1724791-02	L1741865-05	L1806610-05	L1815500-05	L1843039-03
Date Sampled:			11/24/2015	2/16/2016	5/9/2016	8/11/2016	11/17/2016	2/14/2017	4/24/2017	5/10/2017	7/19/2017	11/14/2017	2/28/2018	5/1/2018	10/22/2018
Analyte	Method	Units													
Appendix III															
Boron	1.6010C	mg/L	0.335	0.185	0.343	0.255	0.358	0.278	NT	0.328	0.340	0.481	0.389	0.367	NT
Calcium	1.6020A		83.3	30.8	57.0	29.4	49.3	53.9	NT	65.5	66.1	138	140	129	NT
Chloride	1.9056		90	51.7	56.9	68.0	64.5	73.0	NT	82.8	99.1	232	215	186	NT
Fluoride ¹	121.4500F-BC		0.72	0.75	0.60	0.77	0.60	0.57	NT	0.44	0.43	0.53	0.43	< 0.20	0.37
Sulfate	1.9056		68	31.5	143	47.6	117	107	NT	113	126	121	154	100	NT
Total Dissolved Solids (TDS)	121.2540C		440	220	400	260	330	NT	410	380	450	740	840	750	NT
Appendix IV															
Antimony	1.6020A	mg/L	< 0.0020	< 0.00300	0.00011	0.0001	< 0.00400	< 0.00400		0.00074	0.00129	NT	< 0.00400	NT	< 0.00400
Arsenic	1.6020A		0.0048	0.00395	0.00262	0.0044	0.00525	0.00307		0.00260	0.00321	0.00431	0.00431	0.00419	0.00419
Barium	1.6020A		0.0445	0.01935	0.03692	0.0232	0.03451	0.02965		0.03636	0.04759	0.1283	0.1283	0.1391	0.1391
Beryllium	1.6020A		< 0.0005	< 0.00050	< 0.00050	< 0.0005	< 0.00050	< 0.00050		< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Cadmium	1.6020A		< 0.0002	< 0.00020	< 0.00020	< 0.0002	< 0.00020	< 0.00020		< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Chromium	1.6020A		< 0.0010	0.00111	0.00105	0.0003	0.00047	0.00031		0.00022	0.00028	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Cobalt	1.6020A		0.0001	0.00021	0.00006	< 0.0002	< 0.00050	< 0.00050		< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Lead	1.6020A		< 0.0010	0.00020	< 0.00100	0.0001	< 0.00100	< 0.00100		< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Lithium	3.200.8		0.0198	0.0132	0.0154	0.01642	0.02128	0.01488		0.0171	0.0209	0.03572	0.03572	0.06393	0.06393
Mercury	1.7470A		< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020		< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Molybdenum	1.6020A		0.0246	0.01794	0.01075	0.0357	0.03259	0.02762		0.0321	0.04830	0.02002	0.04830	0.01832	0.01832
Selenium	1.6020A		< 0.005	< 0.00500	< 0.00500	< 0.005	< 0.00500	< 0.00500		< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Thallium	1.6020A		< 0.0005	< 0.00050	< 0.00050	< 0.0005	< 0.00050	< 0.00050		< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Radium 226 and 228 combined	SM 7500-RA B & EPA Ra-05		0.2	0.3	0.1	0.2	0.3	0.1		0.8	1.1	1.6	1.6	2.2	2.2
Other															
Alkalinity, Bicarbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	301	NT	NT
Alkalinity, Carbonate	121.2320B	mg CaCO3/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	< 2.00	NT	NT
Magnesium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	18.2	NT	NT
pH	Field	STD	7.12	6.98	6.90	6.89	6.44	7.11		7.19	7.54	7.36	7.25	7.15	6.95
Potassium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	15.7	NT	NT
Sodium	1.6020A	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	134	NT	NT

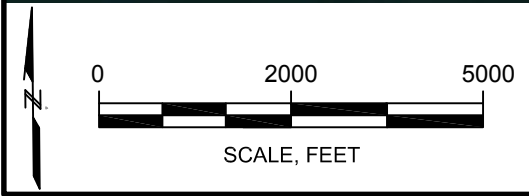
General Notes:

1. NT = The sample was not tested for this analyte.
2. < = The analyte was not detected at a concentration above the specified laboratory reporting limit.
3. mg/L = milligrams per liter.
4. mg CaCO3/L = milligrams calcium carbonate per liter.
5. STD = standard pH unit.

Footnote:

¹ Fluoride is both an Appendix III and Appendix IV analyte

Figures



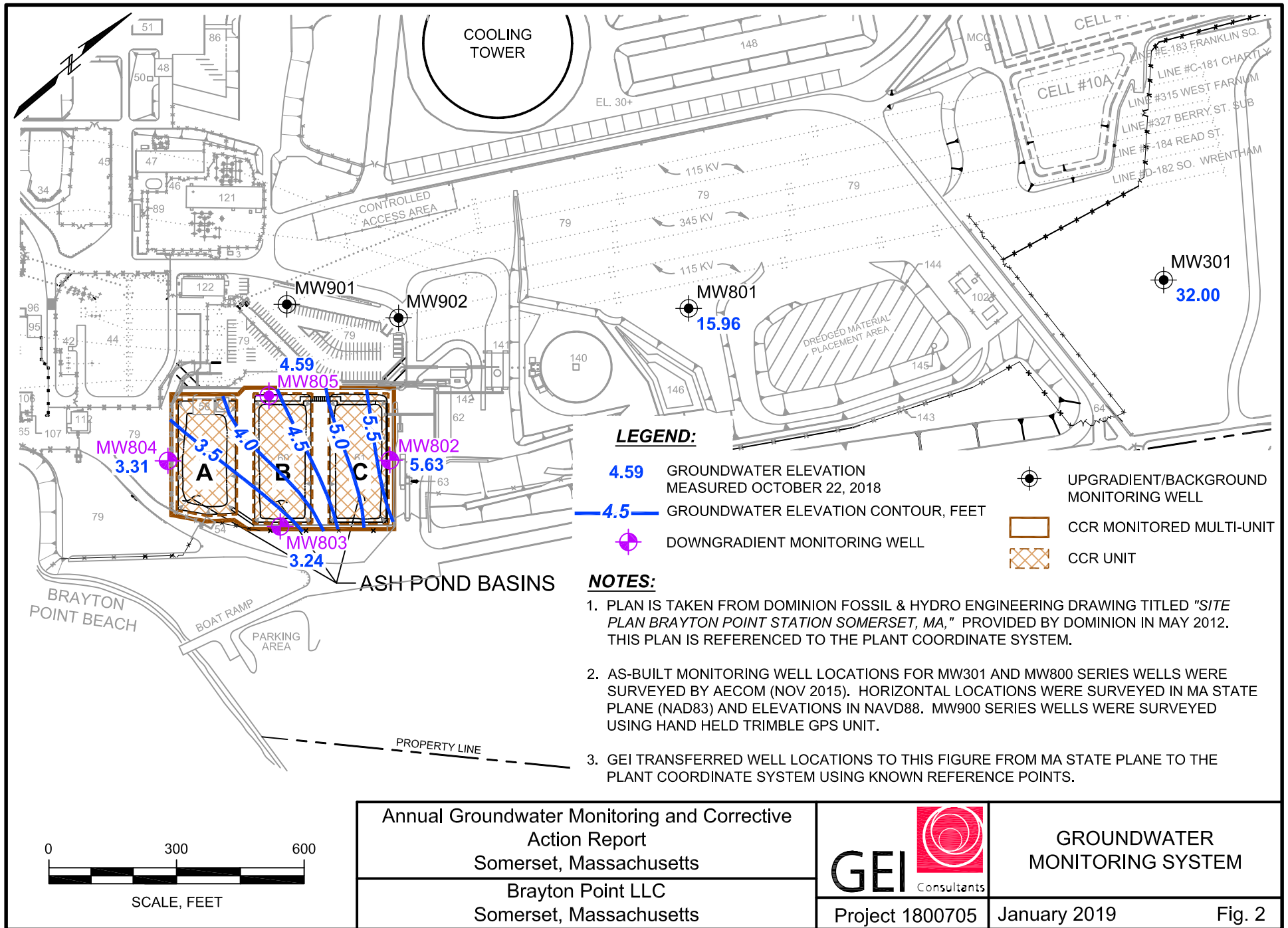
Annual Groundwater Monitoring Report

Brayton Point, LLC
Somerset, Massachusetts

Project 1800705

SITE LOCATION MAP

January 2019



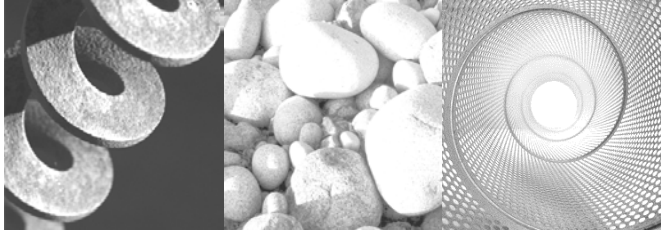
Annual Groundwater Monitoring and Corrective Action Report
 Somerset, Massachusetts
 Brayton Point LLC
 Somerset, Massachusetts



GROUNDWATER MONITORING SYSTEM
 January 2019
 Fig. 2

Appendix A

Alternative Source Demonstration



Consulting
Engineers and
Scientists

Alternative Source Demonstration

Brayton Point Power Station
Somerset, Massachusetts

Submitted to:

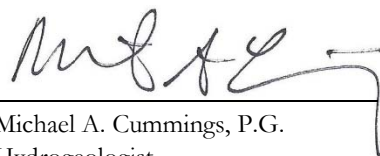
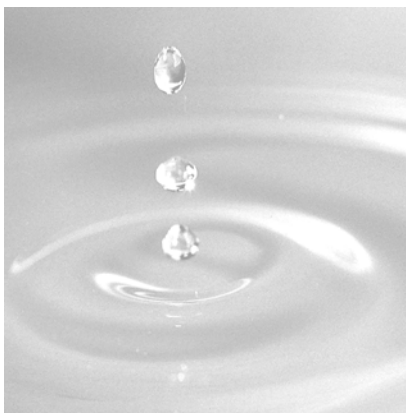
Brayton Point, LLC
1650 Des Peres Road, Suite 230
St. Louis, MO 63131

Submitted by:


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400 Unicorn Park Drive
Woburn, MA 01801
781-721-4000

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Project 1800705



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Professional Engineer Certification

“I hereby certify that the Alternative Source Demonstration prepared for the Brayton Point Station meets requirements in federal regulation 40 CFR § 257.93 of the Standards of Coal Combustion Residuals (CCR) in Landfills and Impoundments published April 17, 2015. I am a duly licensed Professional Engineer under the laws of the Commonwealth of Massachusetts.”



R. Lee Wooten, P.E.
Vice President



1. Introduction

Brayton Point Station (Brayton Point) was an electric generating plant located in Somerset, Massachusetts (Fig. 1). Brayton Point Energy, LLC formerly owned the plant, which burned coal, oil, and natural gas to generate electricity. Brayton Point, LLC now owns the plant. Basins A, B, and C (Basins) were polishing basins in the wet bottom ash management system and are shown on Fig. 2. Bottom ash from the boilers fell into the wet collection system at the boilers and was conveyed as bottom ash sluice water to the hydro-bins. Decant from the hydro-bins was conveyed into either Basins B or C and then to Basin A for polishing or settling out of additional bottom ash material. In accordance with the United States Environmental Protection Agency (USEPA) coal combustion residual (CCR) rule (40 CFR 257 Subpart D), Brayton Point Basins A, B and C are therefore classified as existing CCR surface impoundments.

Brayton Point ceased electricity generating operations on May 31, 2017. Following shutdown, Brayton Point began the process of closing Basins A, B, and C. Basin B received its last CCR material on May 31, 2017. Basins A and C were in service until June 1, 2017. Semi-annual monitoring and reporting for Basins A, B and C is performed in accordance with the monitoring requirements §257.90 through §257.94 during the closure process for the Basins.

In accordance with the USEPA CCR Rule, a 2017 Annual Groundwater Monitoring and Corrective Action Report (2017 Annual Report) was prepared by O'Brien and Gere Engineers, Inc (OBG) in January 2018 to document 2017 groundwater monitoring activities at Basins A, B and C to satisfy the requirements of §257.90(e). The 2017 Annual Report documents the completion of background groundwater monitoring (eight sampling events), which were completed between November 2015 and July 2017; and the first detection monitoring sampling event, which was completed in November 2017.

Following the preparation of the 2017 Annual Report, OBG performed a determination of statistically significant increases (SSIs) over background concentrations for Appendix III constituents for the wells around the Basins. On January 11, 2018 in accordance with 40 CFR Part 257, Subpart D, §257.93(h)(2) OBG documented their findings in a letter dated January 14, 2018, which was placed into the facility's operating record. SSIs documented in the letter included the following Appendix III constituents at unspecified monitoring well locations:

- Boron
- Calcium
- Chloride
- Fluoride
- Sulfate
- Total Dissolved Solids

CCR Rule regulation 40 CFR §257.94(e)(2) states the following,

“the owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels within 90 days from the date of determination.”

The demonstration of an alternate source is frequently referred to as an Alternative Source Demonstration (ASD). The framework for ASD was developed in 1991 USEPA Subtitle D groundwater monitoring regulations for municipal solid waste landfills in 40 CFR Part 258. The objective of this ASD is to provide sufficient evidence, after detailed data evaluation, that the SSIs identified in the 2017 Annual Groundwater Monitoring and Corrective Action Report resulted from sources other than the CCR unit.

1.1 Purpose

This ASD has been prepared by GEI Consultants, Inc., on behalf of Brayton Point, LLC, to address the SSIs identified for the parameters listed above and to demonstrate that the identified statistical increases are an artifact of a statistical evaluation that established upper prediction limits that did not account for the natural variability in background groundwater using a weight-of-evidence based approach.

1.2 Geology, Hydrogeology and Hydrochemistry

The Brayton Point Station is situated on a small peninsular area in Mt. Hope Bay, near the confluence of the Taunton and Lee Rivers. Based on soil borings completed in 2015 during monitoring well installations around the Basins (monitoring wells MW802, MW803, MW804 and MW805), the Site geology in the vicinity of Basins A, B and C consists of an unconsolidated sequence of sand, silty sand, gravel and discontinuous clay interbeds with a combined thickness of approximately 50 feet. Glacial till underlies the silty sand sequence and separates the silty sand from the underlying bedrock.

The dominant sitewide groundwater flow direction is southward toward the Mt. Hope Bay and the Taunton River from upland areas to the north. A groundwater contour map for the Third Quarter 2017 groundwater monitoring event is provided as Fig. 2. Groundwater flow occurs principally in the native silty sand unit, which is defined as the uppermost aquifer at the facility as defined in 40 CFR §257.53.

Background groundwater quality for Basins A, B and C is established using monitoring wells MW801 and MW301 which are located approximately 700 feet and 1,600 feet north (upgradient) of the Basins, respectively. Monitoring well MW801 is installed at a total depth

of 28 feet, with a 10-foot long well screen, monitoring the silty sand and uppermost portion of the till unit. Background monitoring well MW301 is installed to a total depth of approximately 50 feet, with a 40-foot long well screen principally installed in the till unit.

Total Dissolved Solids (TDS) is a general measure of the overall quality of groundwater. Concentrations of TDS in background monitoring well MW801 varied between 440 and 960 mg/L during the 2015-2017 background monitoring period. Comparatively, TDS concentrations in background monitoring well MW301 varied from 60 to 100 mg/L. A statistical analysis that compared geochemistry between the two wells identified significant variance between concentrations of all Appendix III constituents except fluoride, which was not detected in either well during background monitoring. The statistically significant variance is an indication that background groundwater quality at the facility is spatially variable. This variability is discussed in detail in the following section.

2. Alternative Source Demonstration

The following SSIs were identified in unspecified Basin monitoring wells by OBG during the first detection monitoring event which was performed in November 2017:

- Boron
- Calcium
- Chloride
- Fluoride
- Sulfate
- Total Dissolved Solids

Our review of sampling methods and laboratory analytical protocols validated the usability of the data that was statistically evaluated in OBG's 2017 Annual Report and OBG's January 14, 2018 Determination of SSIs over Background Levels. Therefore, this ASD has addressed the methods of statistical data assessment as a possible cause of the SSIs identified at Basins A, B and C as well as the natural variability of dissolved constituents in groundwater.

2.1 Methods

The evaluation of statistical error in determining false SSIs was assessed for Basin A, B and C data through: 1) review of variability in background (upgradient) monitoring wells and 2) revision of the statistical application appropriate for the population. In accordance with the Statistical Analysis Plan (O'Brien and Gere, 2017), GEI resampled monitoring wells in February 2018 to confirm the presence of an SSI.

2.2 Statistical Analysis

The statistical evaluation of groundwater data for Basins A, B and C was performed in accordance with the Statistical Analysis Plan developed for the Site and the 2009 USEPA Unified Guidance Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities. GEI utilizes Sanitas™ software, a third-party statistical program designed specifically for statistical analysis of groundwater data and frequently used for CCR sites across the United States.

OBG's determination of SSIs in downgradient groundwater documented in the January 14, 2018 letter was based on an interwell upper prediction limit (UPL) approach to data evaluation which utilizes pooled upgradient monitoring well data against which downgradient groundwater quality is compared. With an interwell approach, exceedance of a UPL constitutes an SSI for the respective analyte. Use of the interwell UPL method assumes the hypothesis that the background data population is not spatially variable. To evaluate this hypothesis, a one-way Analysis of Variance (ANOVA) was computed for background wells utilizing an alpha value of 0.05 in accordance with the USEPA Unified Guidance and

CCR Rule. Results of the ANOVA test indicates that significant variation, or a significant difference in the median concentrations exists for boron, calcium, chloride, fluoride, sulfate and TDS in background monitoring wells MW301 and MW801. Results of the ANOVA analysis is provided in Appendix A.

Box and Whisker plots were also generated for the Appendix III parameters in background monitoring wells MW301 and MW801 to further evaluate spatial variability in background groundwater. Box and Whisker Plots, presented in Appendix B, visually summarize the upper and lower range of concentrations as well as the median and mean concentration for a given analyte in each monitoring well. The mean concentrations and concentration ranges indicate that significant spatial variability exists for boron, calcium, chloride, sulfate and TDS in background groundwater.

Based on the presence of variability in the background population of the above-described analytes and because the variability in these upgradient wells is not attributable to a release from a CCR unit, an intrawell data comparison (in contrast to an interwell data comparison) was performed in accordance with the Statistical Analysis Plan, which states that if spatial variability is not due to an existing release, intrawell comparisons in downgradient wells may be used to evaluate groundwater quality.

Consistent with the USEPA Unified Guidance, the use of intrawell UPLs evaluates background data from a single monitoring well and evaluates compliance monitoring results against only data from that well. Utilizing this method, the presence of spatial variability in background is eliminated and the presence of trending data is evaluated within a single well. Therefore, intrawell UPLs were constructed utilizing the background and detection monitoring data in each monitoring well and are presented in Appendix C. Utilizing the intrawell UPL approach to the data evaluation, the following SSIs were determined for the Basin A, B and C monitoring network.

- MW802- Calcium, TDS
- MW804- Chloride

These SSIs were further evaluated by comparing the concentrations of each constituent exhibiting an SSI with concentrations in the upgradient monitoring network. Time-concentration trend plots (Appendix D) were prepared which compare upgradient groundwater concentrations of the above-listed parameters with the concentration trend in each downgradient well exhibiting the SSI. The following table summarizes the observed SSI concentrations and the respective upgradient concentrations for each parameter during the February 2018 sampling event.

Appendix III Parameter Exhibiting SSI	Downgradient SSI Concentration (mg/L) and Location	Upgradient Concentration (mg/L) and Location
Calcium	124 (MW802)	127 (MW801)
Chloride	56.7 (MW804)	164 (MW801)
TDS	730 (MW802)	960 (MW801)

As shown in Appendix D and the summary table above, Appendix III parameters which exhibit SSIs in Basin monitoring wells were detected at higher concentrations in background (upgradient) groundwater. The time-series concentration plots also visually highlight the variability in both concentrations and trends of these parameters in background groundwater. The concentration trends for calcium, chloride and TDS were further evaluated for each background monitoring well utilizing the Mann-Kendall/ Sen's Estimate of Slope analysis. Mann-Kendall/ Sen's Slope plots are provided in Appendix E.

The following table summarizes the background (upgradient) concentration trends of Appendix III parameters exhibiting SSIs.

Background Well ID	Concentration Trend*		
	Calcium	Chloride	TDS
MW301	Decreasing	Stable	Increasing
MW801	Increasing	Increasing	Increasing

*based on value of Sen's Slope

Appendix III parameters which exhibit SSIs in Basins A, B and C monitoring wells are present in background groundwater at higher concentrations and also exhibit increasing concentration trends in at least one background monitoring well (MW801). These concentrations and concentration trends indicate that downgradient groundwater quality is likely influenced by elevated concentrations in upgradient groundwater and not attributable to a release from Basins A, B and C.

3. Conclusion

GEI evaluated the potential for statistical error and natural variability in determining an alternative source of SSIs at Basins A, B and C in accordance with 40 CFR 257.94(e)(2). Natural variability in upgradient groundwater quality documented through ANOVA and Box and Whisker plots indicates non-homogenous (variable) background data and suggests that an intrawell comparison, rather than interwell comparison, of downgradient groundwater quality is appropriate for the evaluation of data. SSIs which were subsequently identified utilizing the intrawell comparison method include calcium (MW802), chloride (MW804) and TDS (MW802). However, further data evaluation identified higher concentrations of these constituents in upgradient monitoring well MW801. Furthermore, increasing concentration trends were also identified for each of these constituents in the upgradient well using a Mann-Kendall Sen's Slope analysis.

GEI has concluded that a release from Basins A, B and C has not occurred and that upgradient groundwater quality has influenced groundwater quality in the vicinity of the Basins. Therefore, no further action (i.e., assessment monitoring) is warranted and Basins A, B and C will remain in detection monitoring as the closure process proceeds.

4. References

GEI Consultants, Inc., 2017, Sampling and Analysis Plan, Brayton Point Ash Basin A, Ash Basin B, Ash Basin C, Brayton Point Power Station, Somerset, Massachusetts, Project 1508760, Revision 0, October 17, 2017.

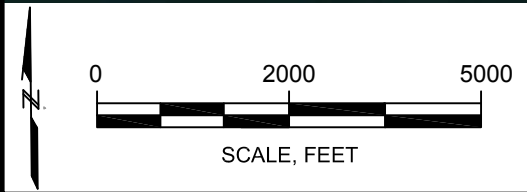
Natural Resource Technology, an OBG Company, 2017, Statistical Analysis Plan, Brayton Point Power Station, Brayton Point Energy, LLC, October 17, 2017.

US Environmental Protection Agency, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities; Unified Guidance. EPA 530/R-09-007.

US Environmental Protection Agency, May 2009. National Primary Drinking Water Regulations. EPA 816-F-09-004.

WQStat Plus by Sanitas Technologies User Manual v.9.4.41, 2014.

Figures



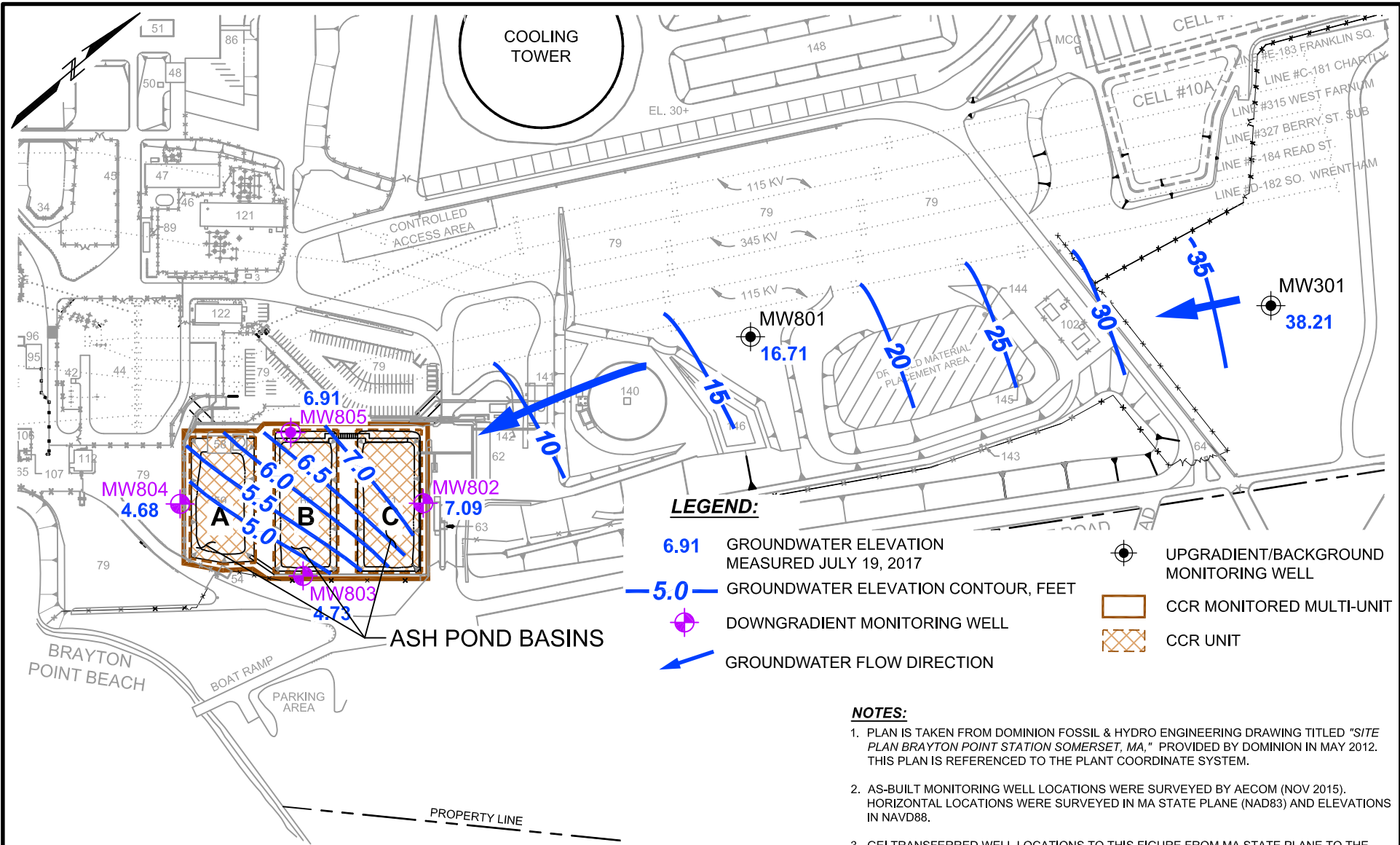
Alternative Source Demonstration

Brayton Point, LLC
Somerset, Massachusetts

Project 1800705

SITE LOCATION MAP

April 2018

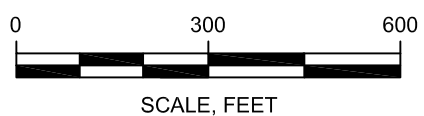



LEGEND:

- 6.91 GROUNDWATER ELEVATION MEASURED JULY 19, 2017
- 5.0- GROUNDWATER ELEVATION CONTOUR, FEET
- ⊕ DOWNGRADIENT MONITORING WELL
- ⊙ UPGRADIENT/BACKGROUND MONITORING WELL
- ▭ CCR MONITORED MULTI-UNIT
- ▨ CCR UNIT
- ➔ GROUNDWATER FLOW DIRECTION

NOTES:

1. PLAN IS TAKEN FROM DOMINION FOSSIL & HYDRO ENGINEERING DRAWING TITLED "SITE PLAN BRAYTON POINT STATION SOMERSET, MA," PROVIDED BY DOMINION IN MAY 2012. THIS PLAN IS REFERENCED TO THE PLANT COORDINATE SYSTEM.
2. AS-BUILT MONITORING WELL LOCATIONS WERE SURVEYED BY AECOM (NOV 2015). HORIZONTAL LOCATIONS WERE SURVEYED IN MA STATE PLANE (NAD83) AND ELEVATIONS IN NAVD88.
3. GEI TRANSFERRED WELL LOCATIONS TO THIS FIGURE FROM MA STATE PLANE TO THE PLANT COORDINATE SYSTEM USING KNOWN REFERENCE POINTS.



Alternative Source Demonstration	 GEI Consultants	SITE LAYOUT AND GROUNDWATER CONTOUR MAP
Brayton Point, LLC Somerset, Massachusetts		Project 1800705 April 2018 Figure 2

Appendix A

Background ANOVA Summary

Parametric ANOVA

Constituent: Boron, total Analysis Run 4/4/2018 2:59 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

For observations made between 11/23/2015 and 2/26/2018 the parametric analysis of variance test indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 14.58

Tabulated F statistic = 2.904 with 3 and 32 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	9.426	3	3.142	10.72
Error Within Groups	9.084	31	0.293	
Total	18.51	34		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.05, calculated = 0.9651, critical = 0.935. Levene's Equality of Variance test passed. Calculated = 0.8191, tabulated = 2.904.

Non-Parametric ANOVA

Constituent: Calcium, total Analysis Run 4/4/2018 2:59 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

For observations made between 11/23/2015 and 2/26/2018, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 19.69

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 1 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 19.69

Adjusted Kruskal-Wallis statistic (H') = 19.69

Non-Parametric ANOVA

Constituent: Chloride Analysis Run 4/4/2018 2:59 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

For observations made between 11/23/2015 and 2/26/2018, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 27.71

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 0 groups of ties in the data, so no adjustment to the Kruskal-Wallis statistic (H) was necessary.

Non-Parametric ANOVA

Constituent: Fluoride Analysis Run 4/4/2018 2:59 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

For observations made between 11/23/2015 and 2/26/2018, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 8.059

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 7 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 8.032

Adjusted Kruskal-Wallis statistic (H') = 8.059

Parametric ANOVA

Constituent: pH [field] Analysis Run 4/4/2018 2:59 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

For observations made between 11/23/2015 and 11/14/2017 the parametric analysis of variance test indicates NO VARIATION at the 5% significance level. Because the calculated F statistic is less than or equal to the tabulated F statistic, the hypothesis of a single homogeneous population is accepted.

Calculated F statistic = 1.809

Tabulated F statistic = 2.904 with 3 and 32 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	9.426	3	3.142	10.72
Error Within Groups	9.084	31	0.293	
Total	18.51	34		

The Shapiro Wilk normality test on the residuals passed on the raw data. Alpha = 0.05, calculated = 0.9863, critical = 0.935. Levene's Equality of Variance test passed. Calculated = 0.3913, tabulated = 2.904.

Parametric ANOVA

Constituent: Sulfate Analysis Run 4/4/2018 2:59 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

For observations made between 11/23/2015 and 2/26/2018 the parametric analysis of variance test (after cube root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 10.72

Tabulated F statistic = 2.912 with 3 and 31 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	9.426	3	3.142	10.72
Error Within Groups	9.084	31	0.293	
Total	18.51	34		

The Shapiro Wilk normality test on the residuals passed after cube root transformation. Alpha = 0.05, calculated = 0.936, critical = 0.934. Levene's Equality of Variance test passed. Calculated = 2.555, tabulated = 2.912.

Non-Parametric ANOVA

Constituent: Total Dissolved Solids Analysis Run 4/4/2018 2:59 PM

Brayton Point Client: GEI Data: Brayton Point CCR Database

For observations made between 11/23/2015 and 11/15/2017, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 21.87

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 9 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 21.8

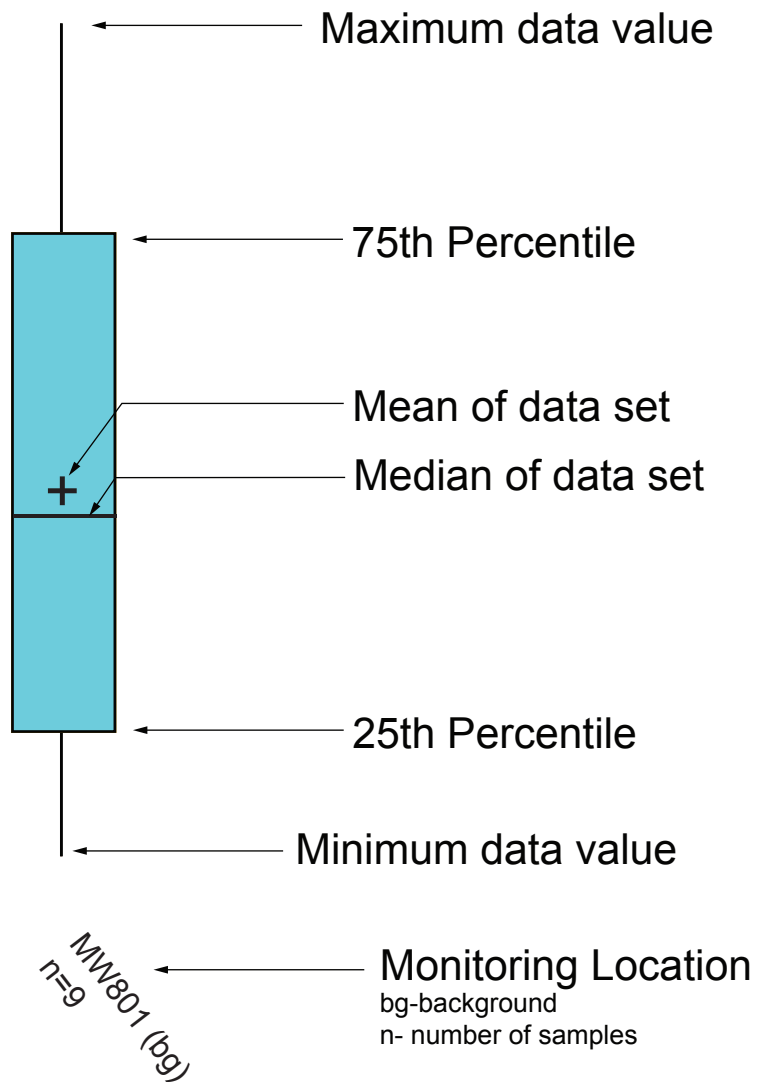
Adjusted Kruskal-Wallis statistic (H') = 21.87

Appendix B

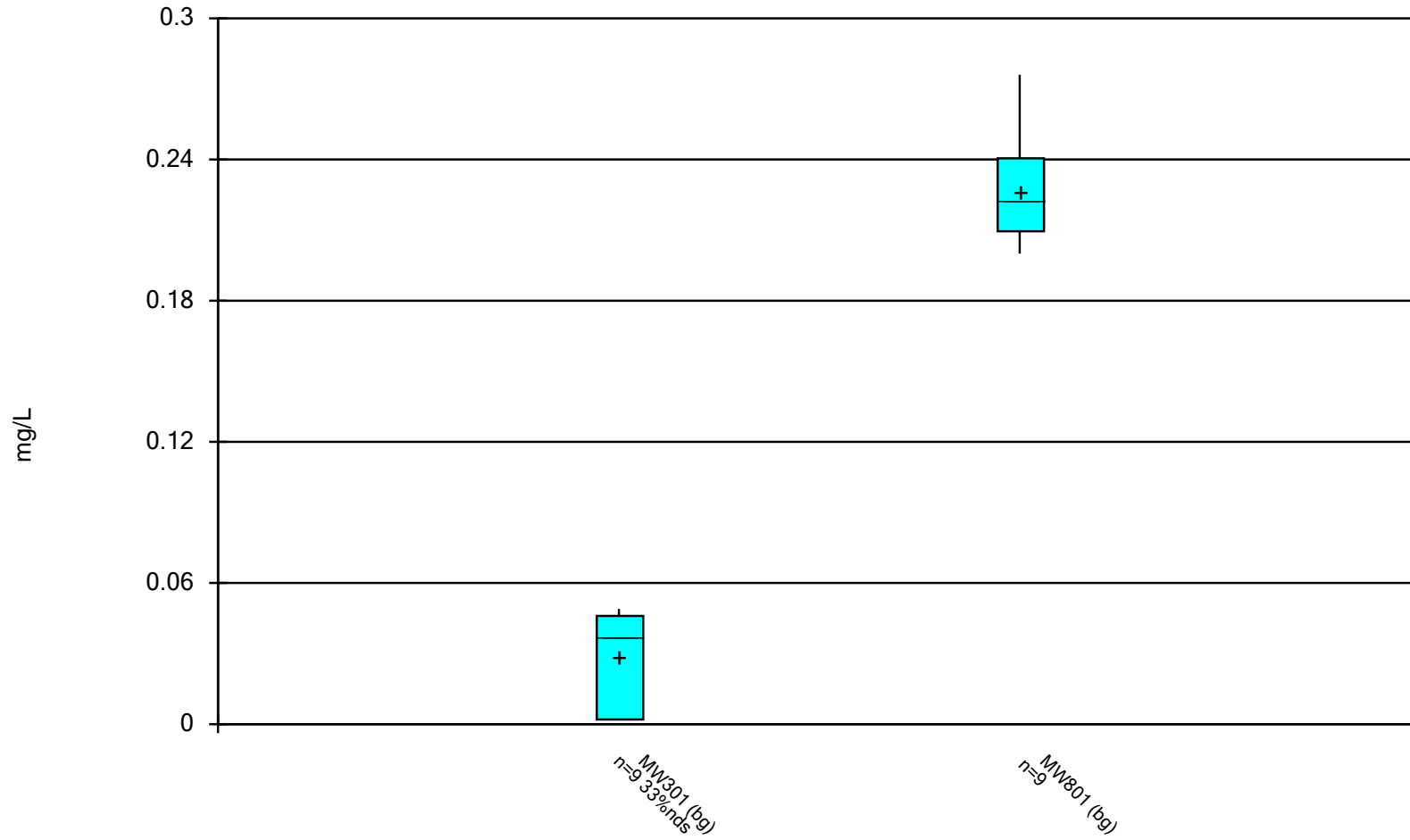
Background Box and Whisker Plots

Background Box and Whisker Plots

LEGEND

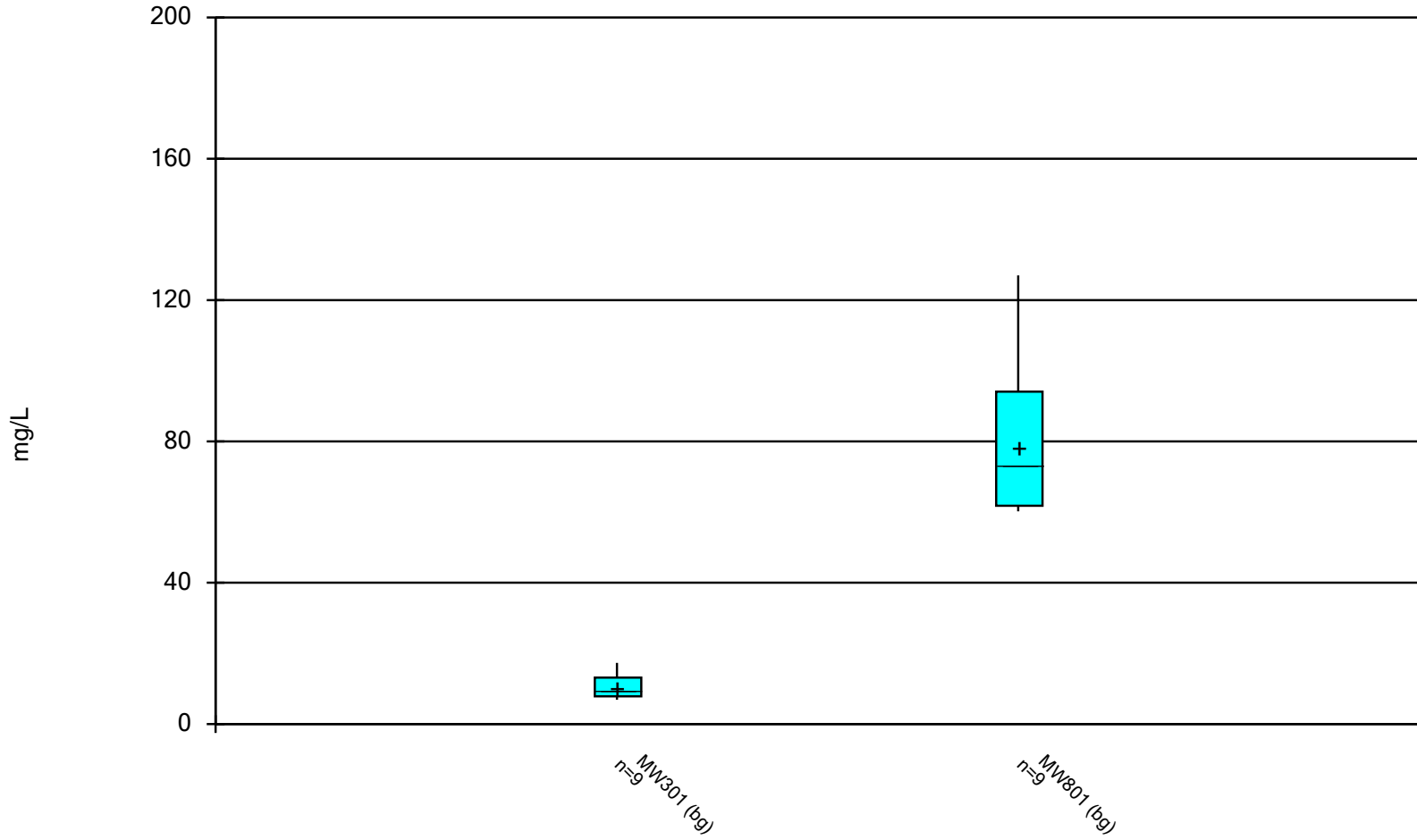


Box & Whiskers Plot



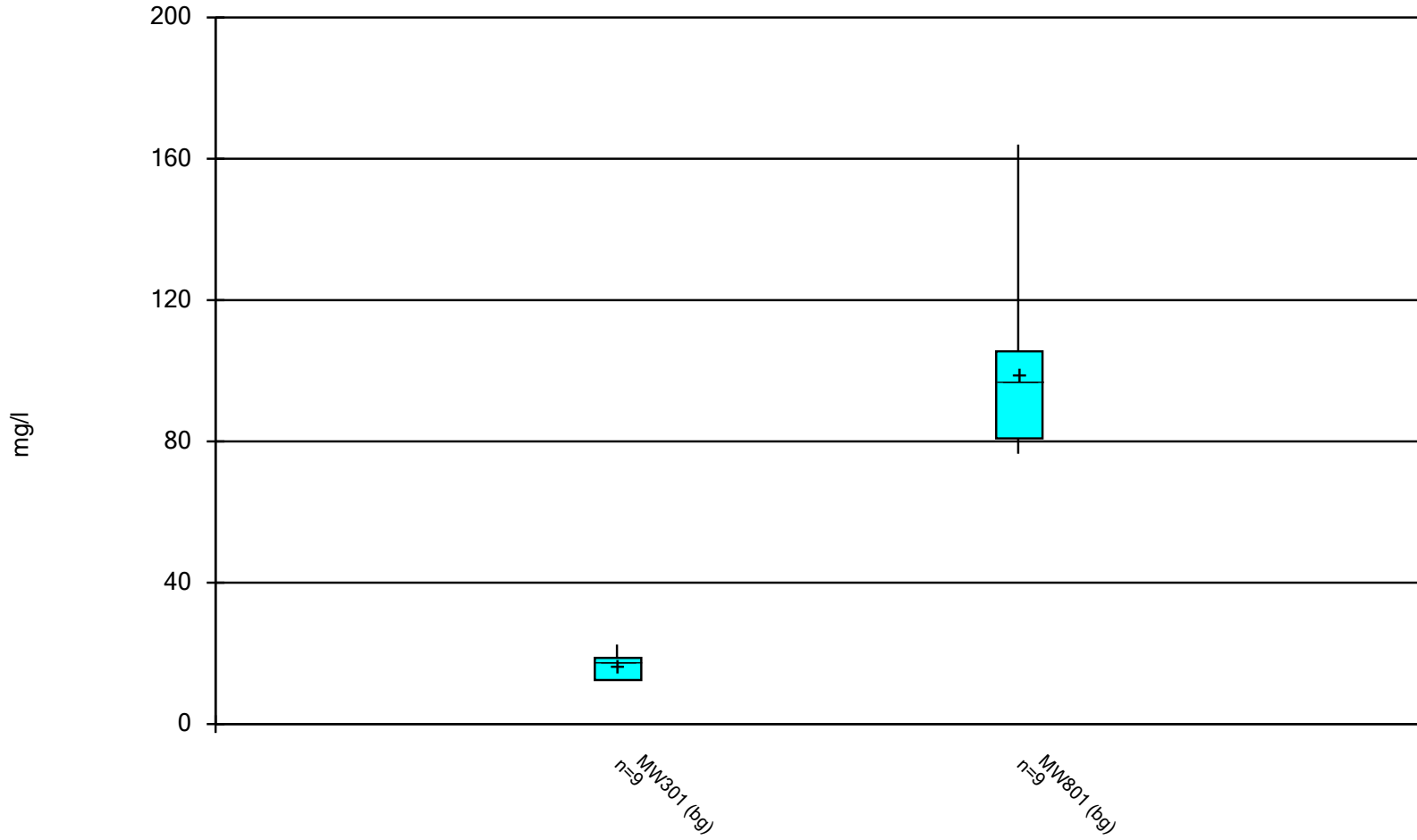
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Brayton Point Client: GEI Data: Brayton Point CCR Database

Box & Whiskers Plot



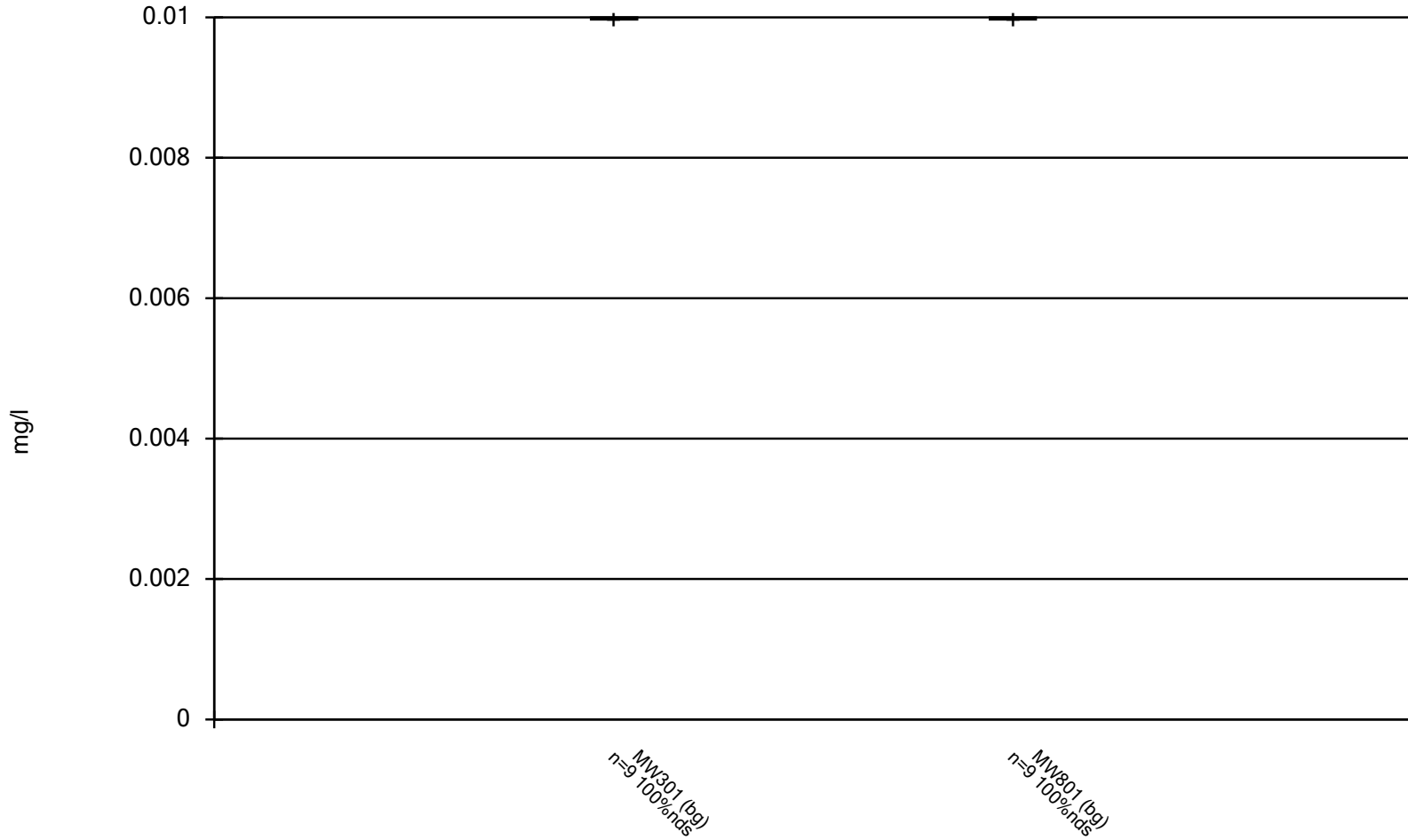
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Brayton Point Client: GEI Data: Brayton Point CCR Database

Box & Whiskers Plot



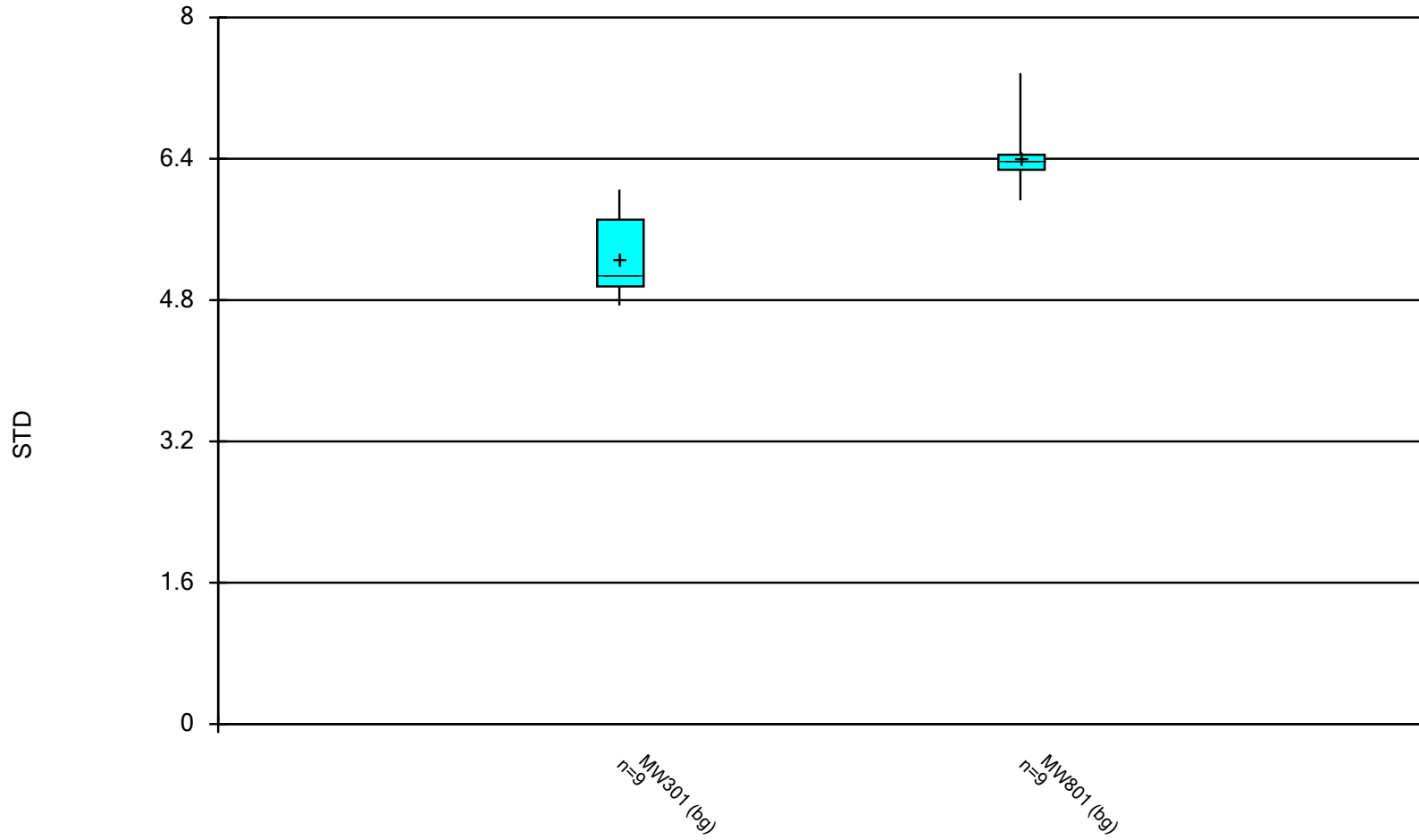
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Brayton Point Client: GEI Data: Brayton Point CCR Database

Box & Whiskers Plot



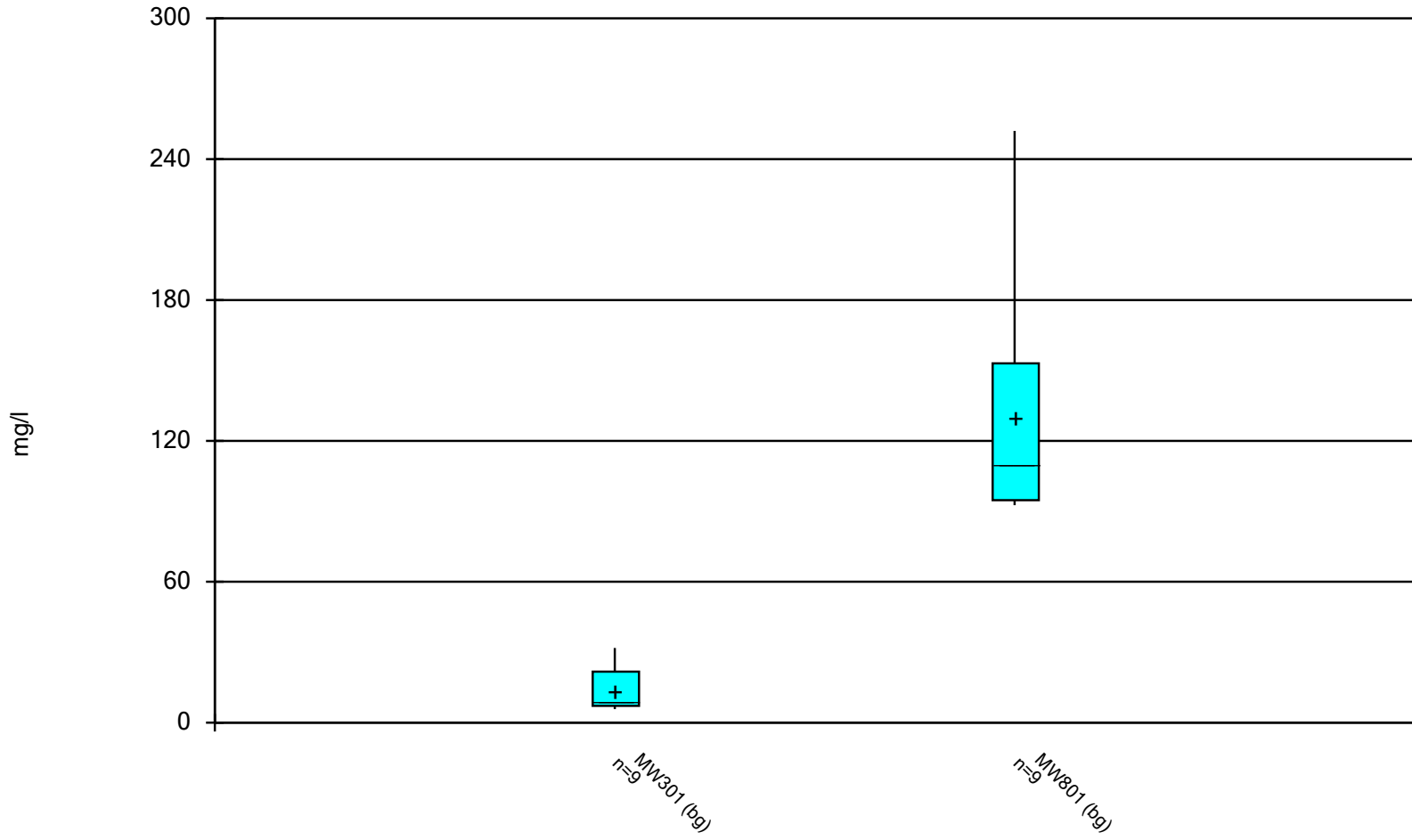
Constituent: Fluoride Analysis Run 4/4/2018 3:01 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Box & Whiskers Plot



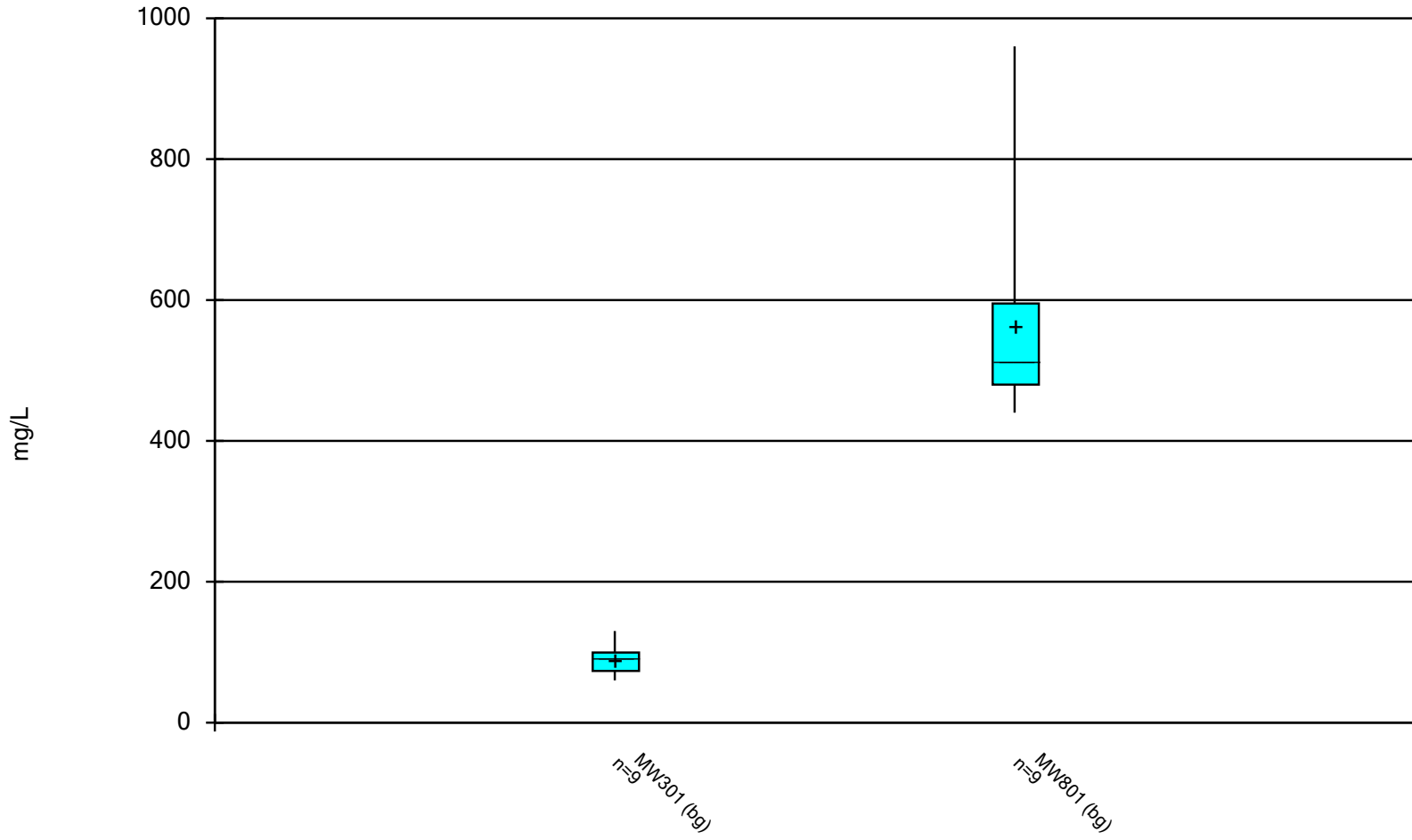
Constituent: pH [field] Analysis Run 4/4/2018 3:01 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Box & Whiskers Plot



Constituent: Sulfate Analysis Run 4/4/2018 3:01 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 4/4/2018 3:01 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Box & Whiskers Plot

Brayton Point Client: GEI Data: Brayton Point CCR Database Printed 4/4/2018, 3:02 PM

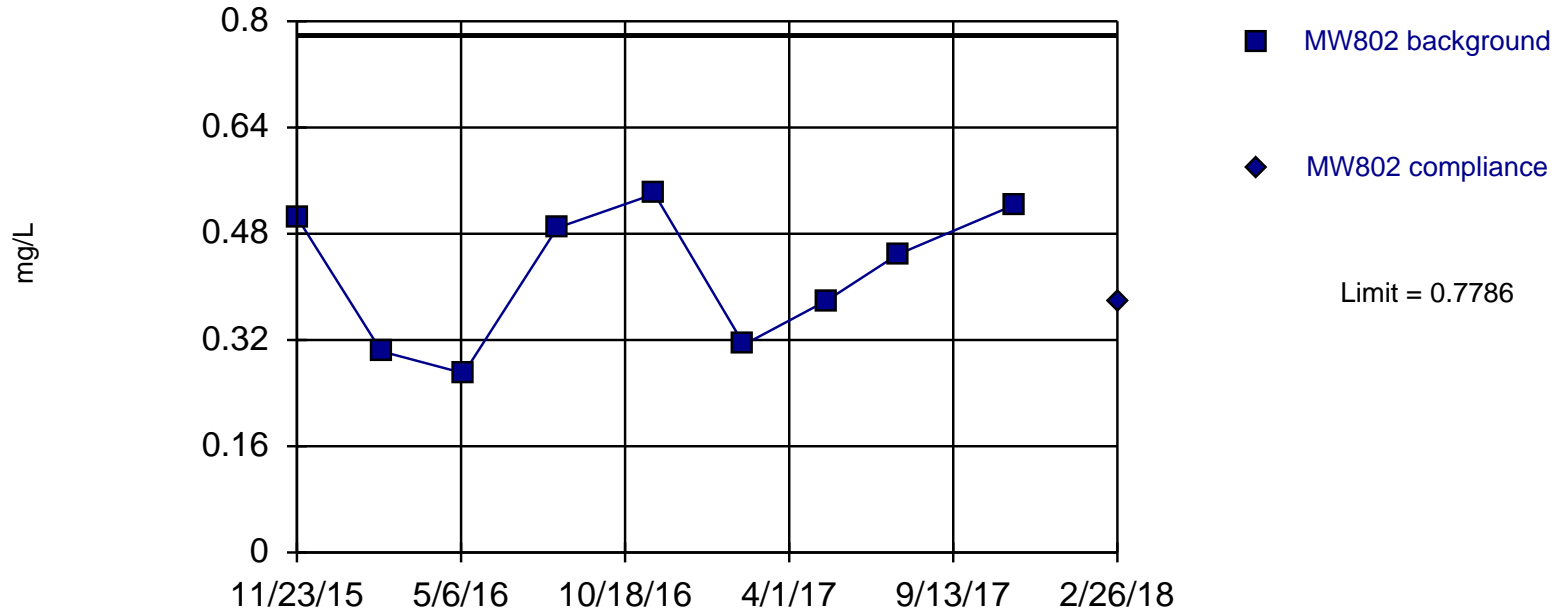
<u>Constituent</u>	<u>Well</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Std. Err.</u>	<u>Median</u>	<u>Min.</u>	<u>Max.</u>	<u>%NDs</u>
Boron, total (mg/L)	MW301 (bg)	9	0.02841	0.02058	0.006859	0.0357	0.002	0.049	33.33
Boron, total (mg/L)	MW801 (bg)	9	0.226	0.02471	0.008236	0.222	0.2	0.276	0
Calcium, total (mg/L)	MW301 (bg)	9	10.38	3.453	1.151	8.93	6.86	17.3	0
Calcium, total (mg/L)	MW801 (bg)	9	78.74	23.79	7.93	73	60.2	127	0
Chloride (mg/l)	MW301 (bg)	9	16.49	3.52	1.173	17.1	12.2	22.5	0
Chloride (mg/l)	MW801 (bg)	9	99.16	26.63	8.878	96.6	76.5	164	0
Fluoride (mg/l)	MW301 (bg)	9	0.01	0	0	0.01	0.01	0.01	100
Fluoride (mg/l)	MW801 (bg)	9	0.01	0	0	0.01	0.01	0.01	100
pH [field] (STD)	MW301 (bg)	9	5.268	0.445	0.1483	5.06	4.74	6.05	0
pH [field] (STD)	MW801 (bg)	9	6.423	0.3876	0.1292	6.37	5.93	7.37	0
Sulfate (mg/l)	MW301 (bg)	9	13.66	10.08	3.36	8.2	5.75	31.8	0
Sulfate (mg/l)	MW801 (bg)	9	129.5	51.53	17.18	109	92.6	252	0
Total Dissolved Solids (mg/L)	MW301 (bg)	9	89.33	20.08	6.694	90	60	130	0
Total Dissolved Solids (mg/L)	MW801 (bg)	9	565.6	156.7	52.23	510	440	960	0

Appendix C

Intrawell Upper Prediction Limits

Within Limit

Prediction Limit Intrawell Parametric

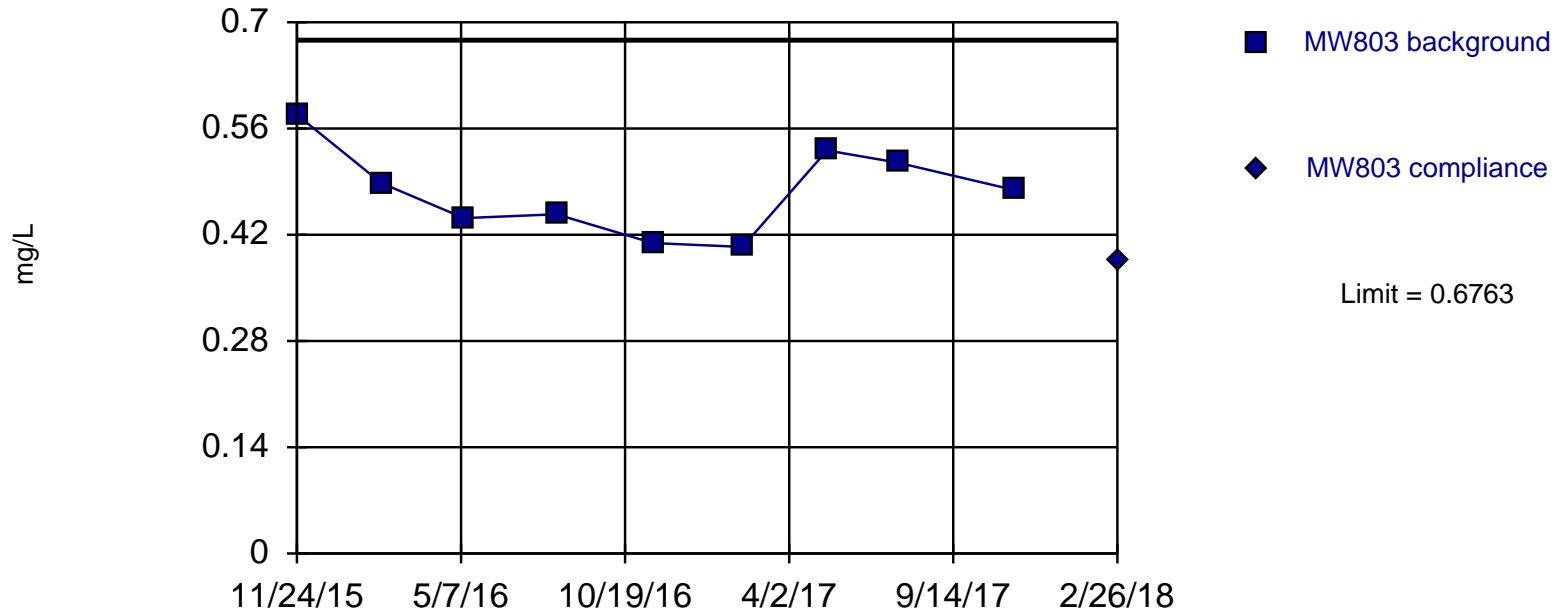


Background Data Summary: Mean=0.419, Std. Dev.=0.1044, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8913, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Boron, total Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

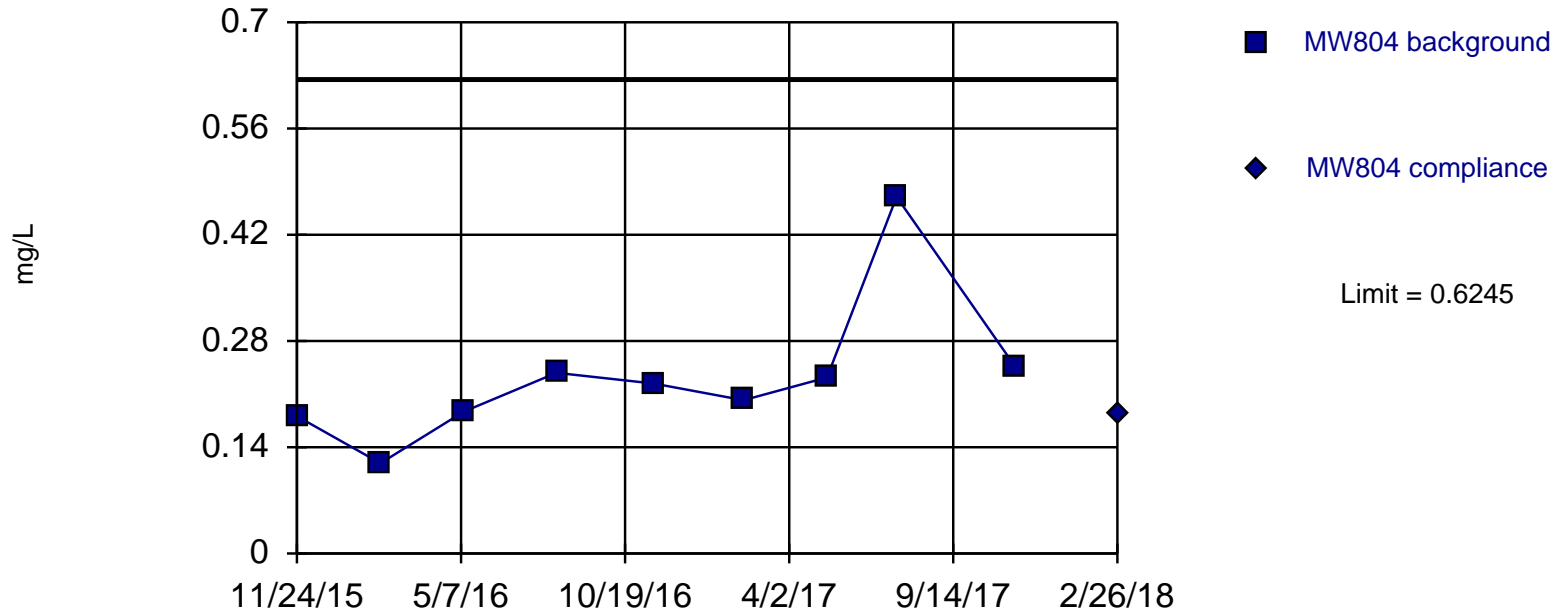


Background Data Summary: Mean=0.477, Std. Dev.=0.05784, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9605, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Boron, total Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

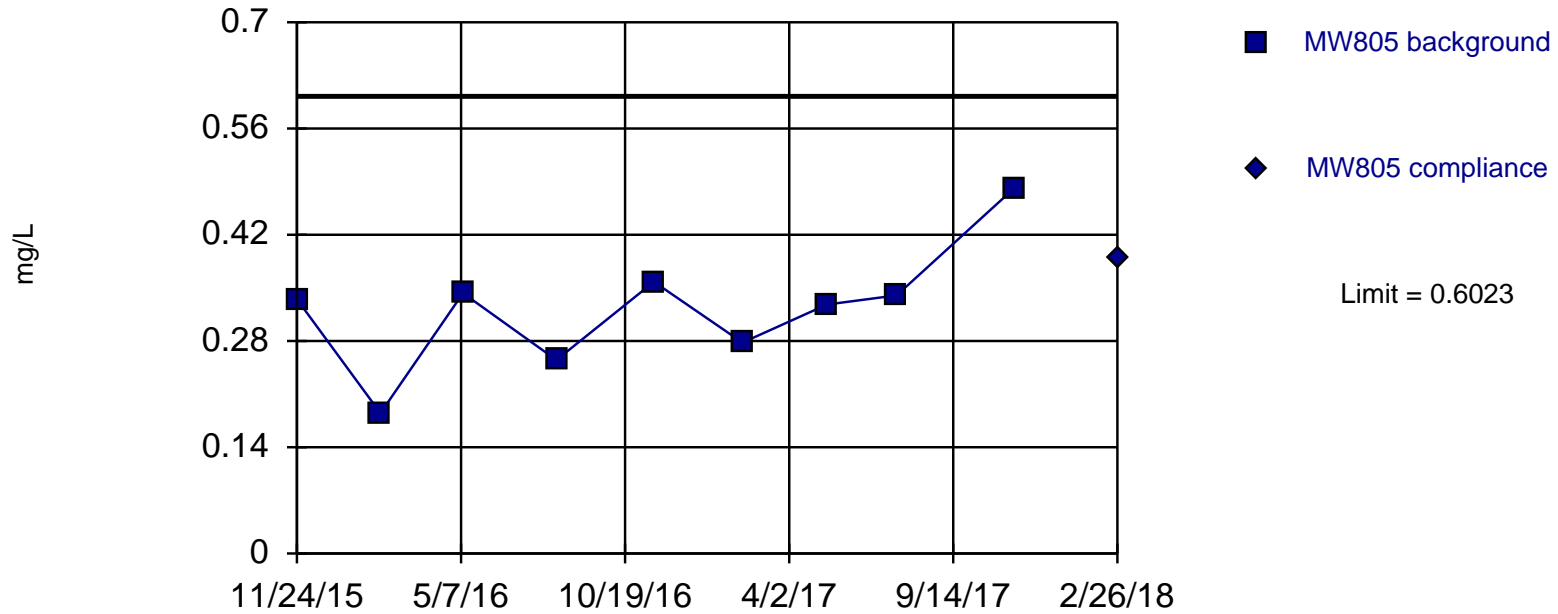


Background Data Summary (based on square root transformation): Mean=0.4753, Std. Dev.=0.09142, n=9.
Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8454, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Boron, total Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

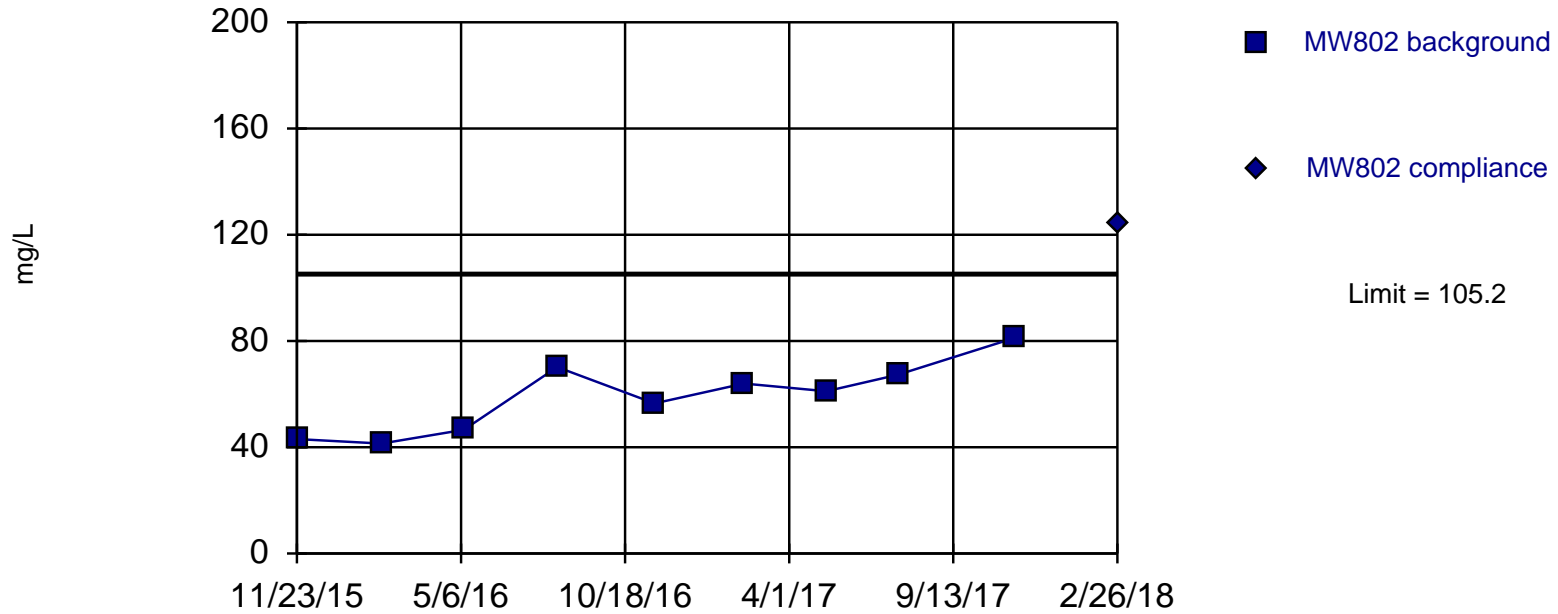


Background Data Summary: Mean=0.3226, Std. Dev.=0.08119, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9318, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Boron, total Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Exceeds Limit

Prediction Limit Intrawell Parametric

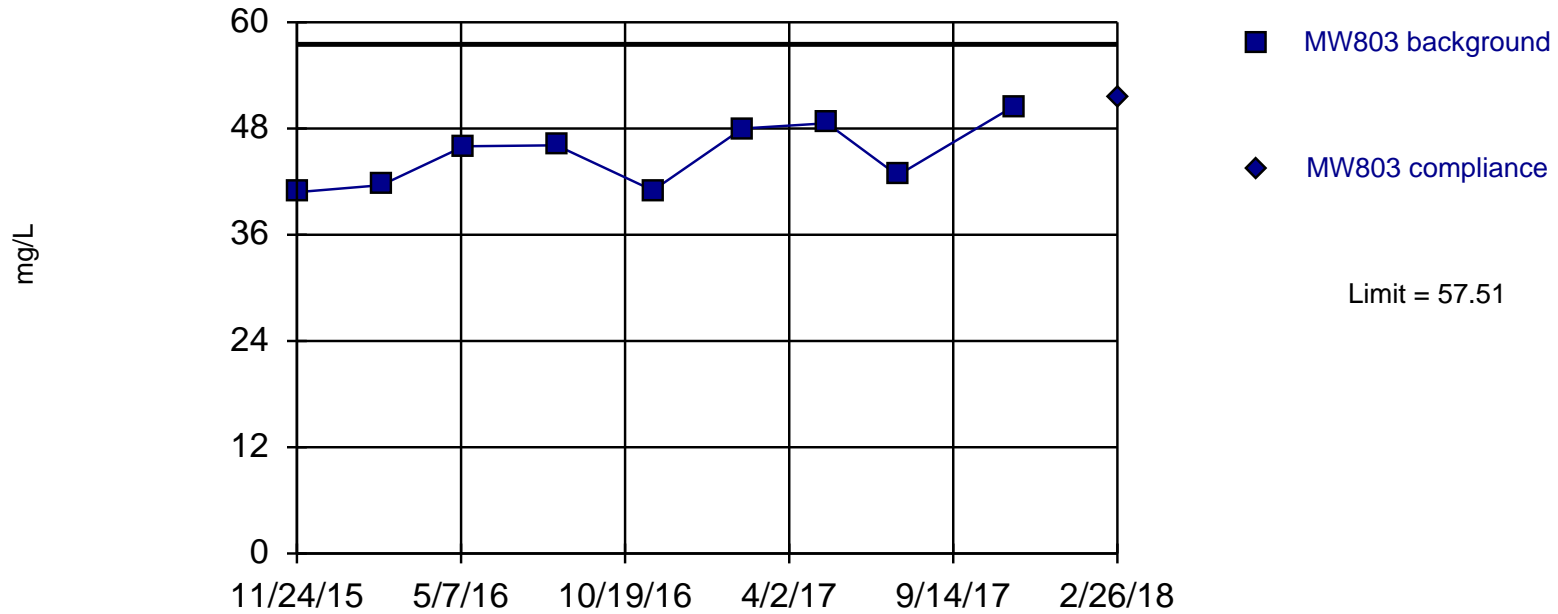


Background Data Summary: Mean=59.03, Std. Dev.=13.39, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9525, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Calcium, total Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

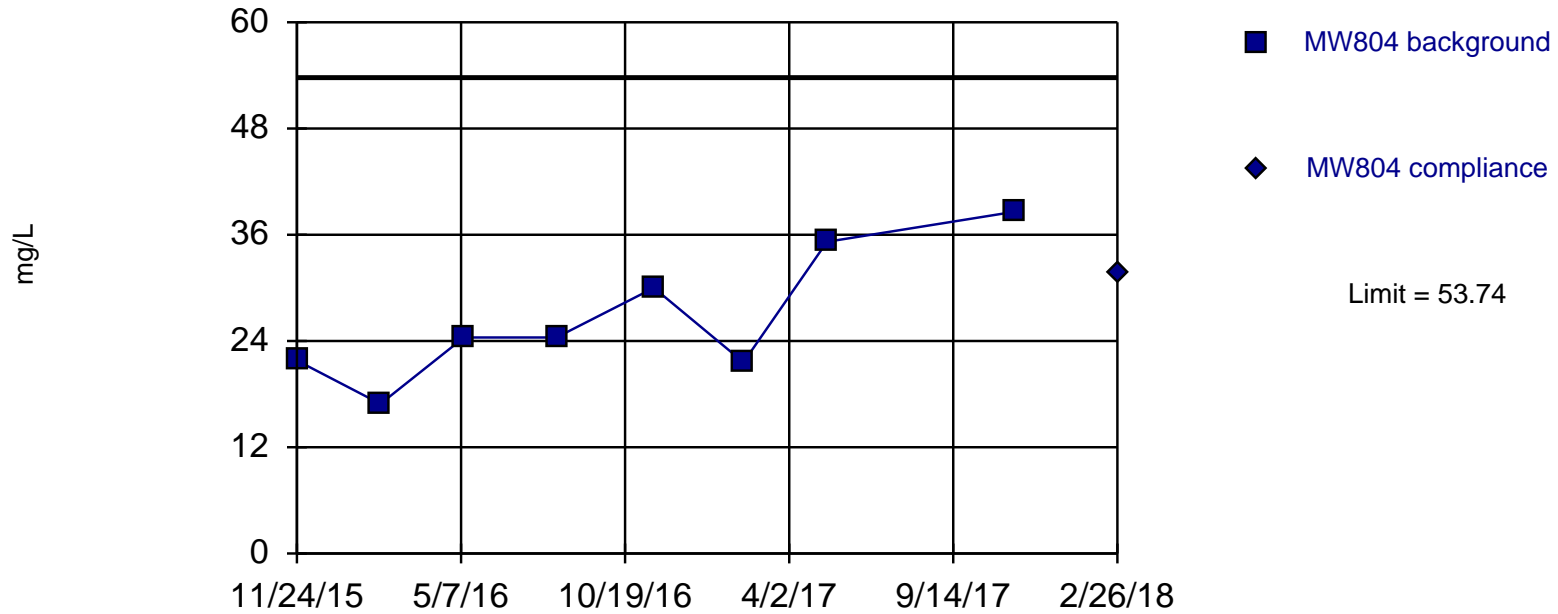


Background Data Summary: Mean=45.03, Std. Dev.=3.621, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9087, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Calcium, total Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

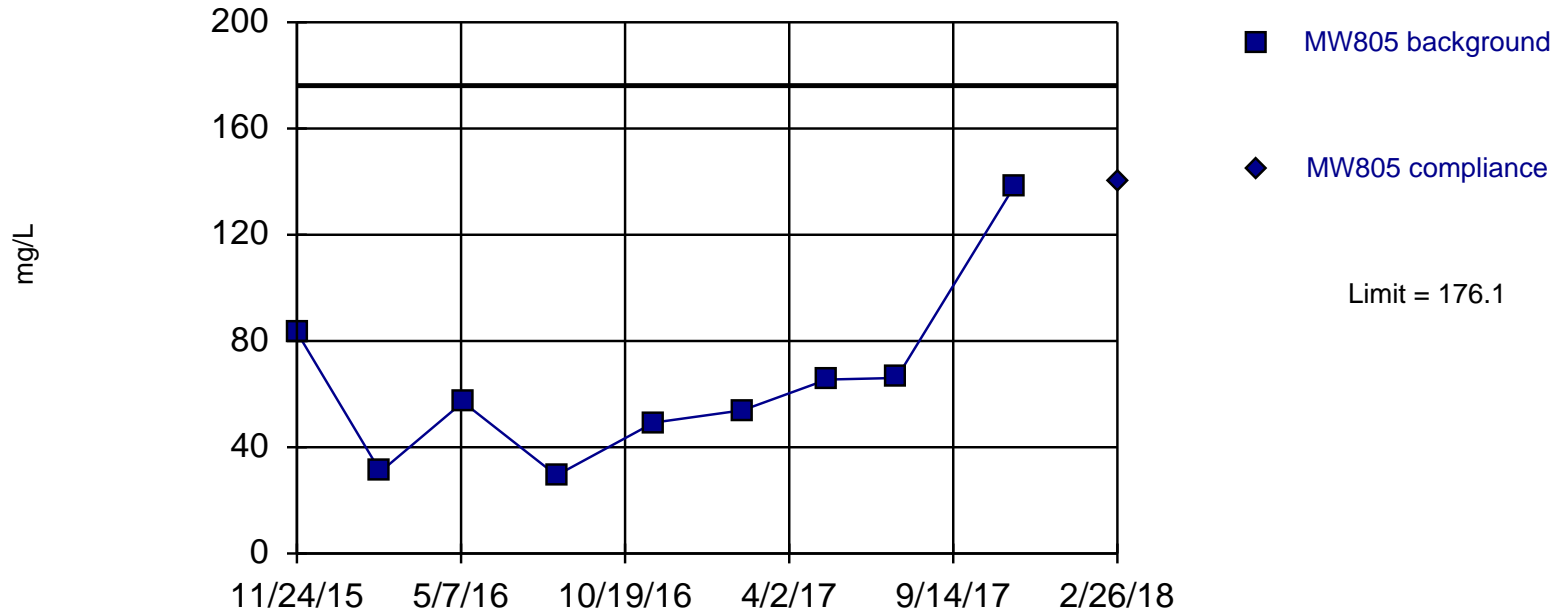


Background Data Summary: Mean=26.61, Std. Dev.=7.381, n=8. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9333, critical = 0.818. Kappa = 3.675 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Calcium, total Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

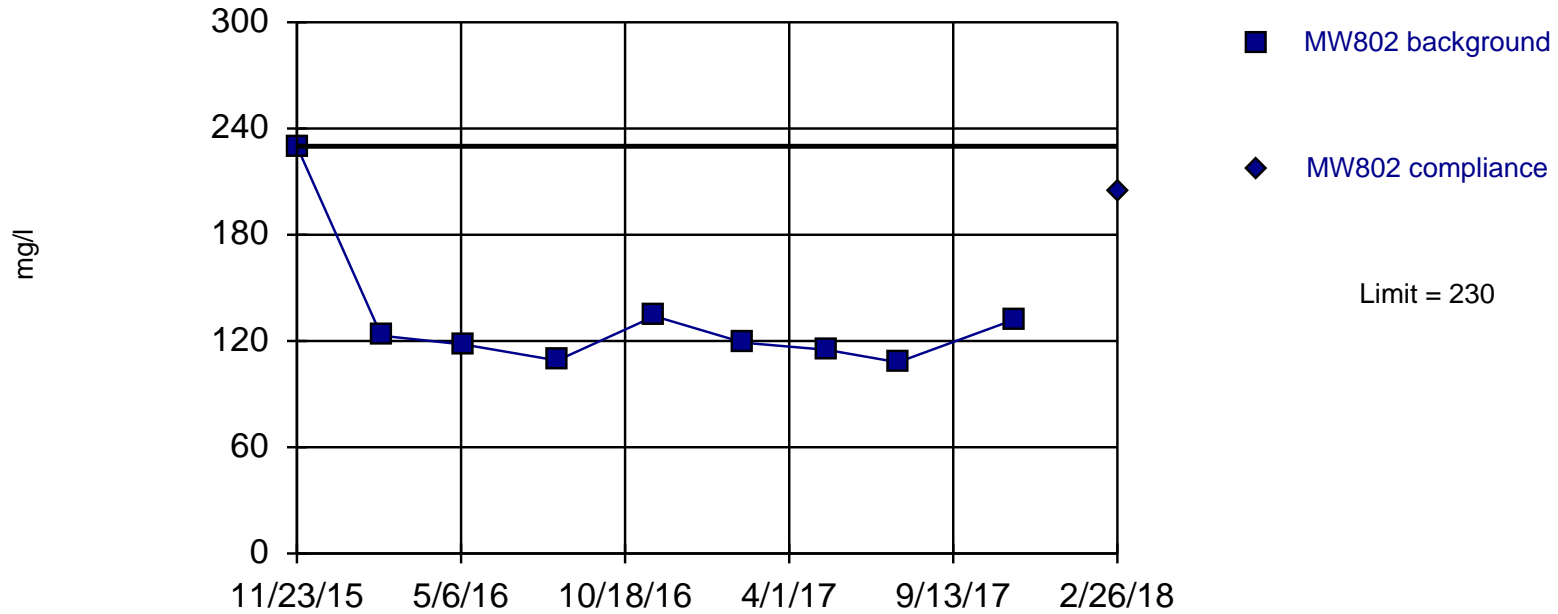


Background Data Summary: Mean=63.7, Std. Dev.=32.64, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8558, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Calcium, total Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Non-parametric

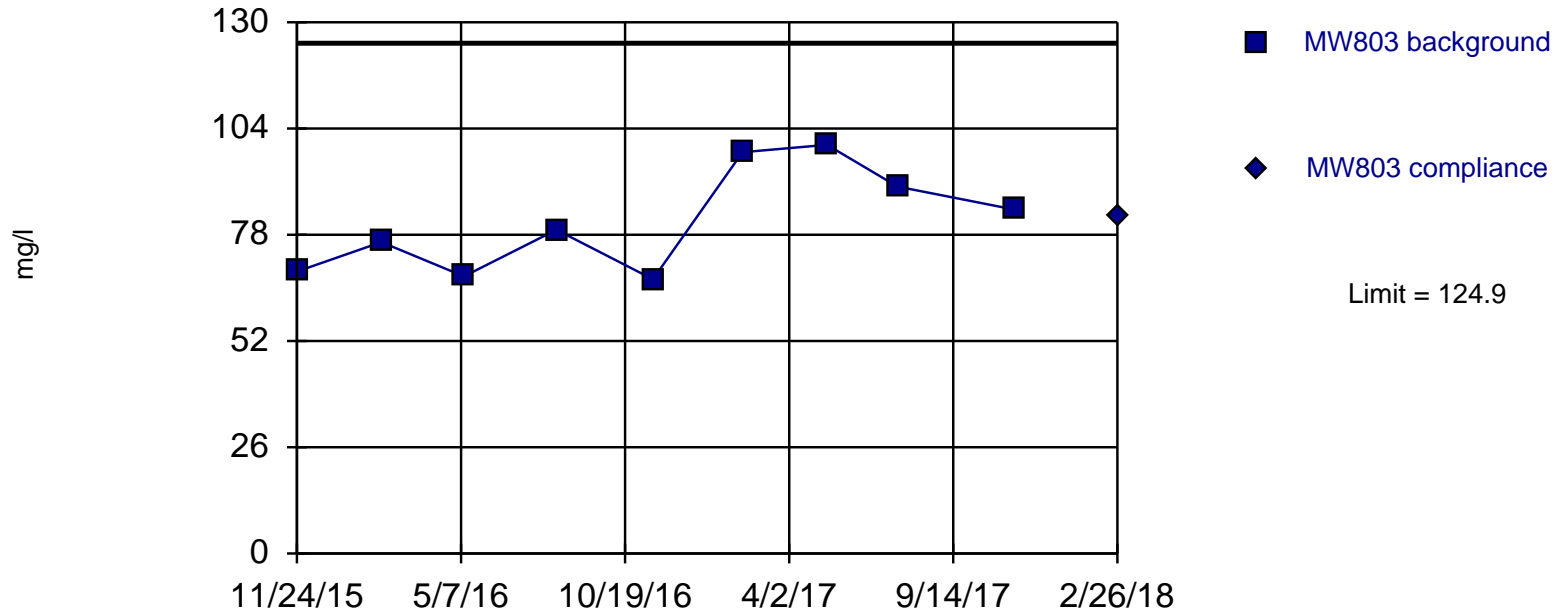


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 9 background values. Well-constituent pair annual alpha = 0.03586. Individual comparison alpha = 0.01809 (1 of 2).

Constituent: Chloride Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

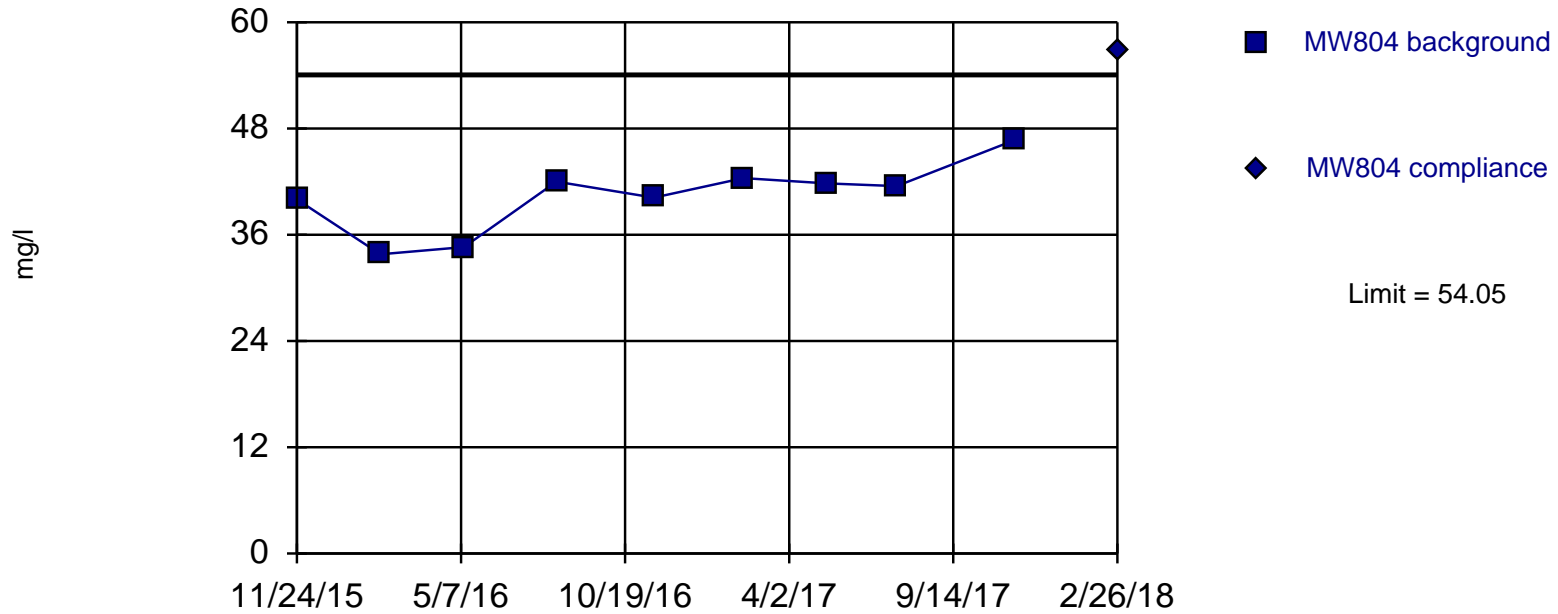


Background Data Summary: Mean=81.28, Std. Dev.=12.66, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9074, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Chloride Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Exceeds Limit

Prediction Limit Intrawell Parametric

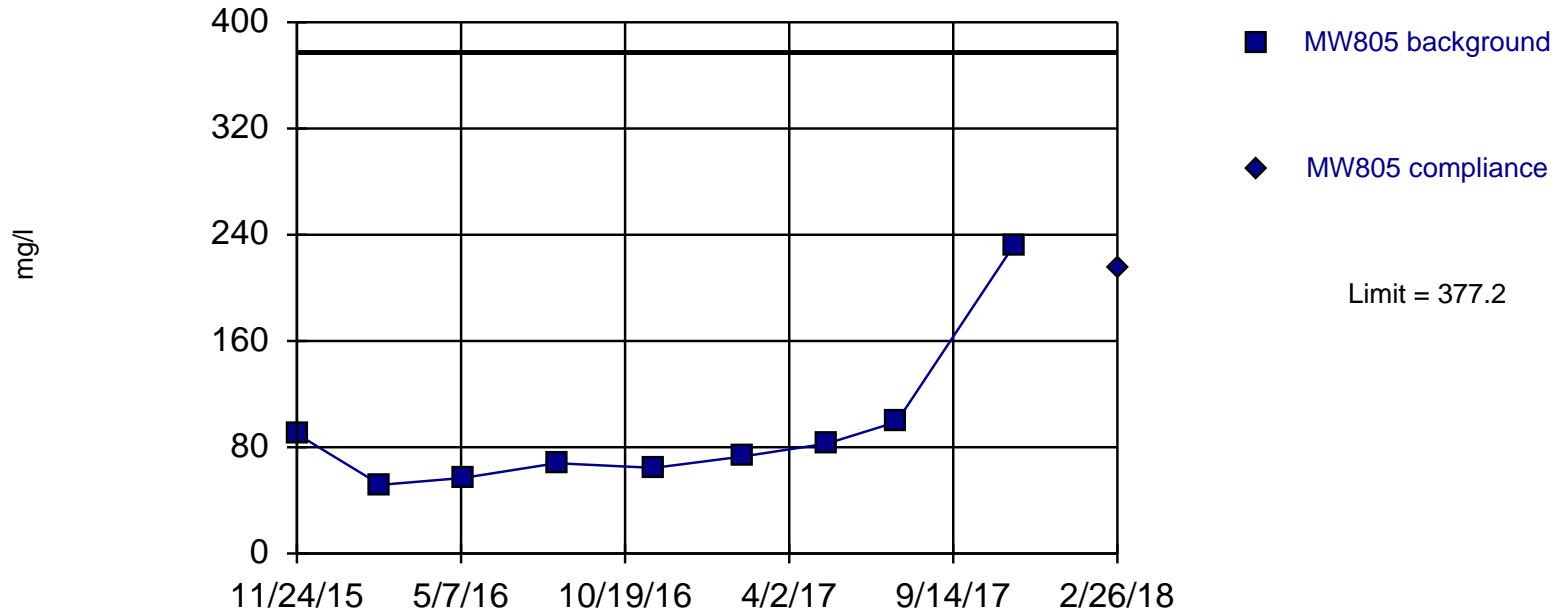


Background Data Summary: Mean=40.33, Std. Dev.=3.981, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8984, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Chloride Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

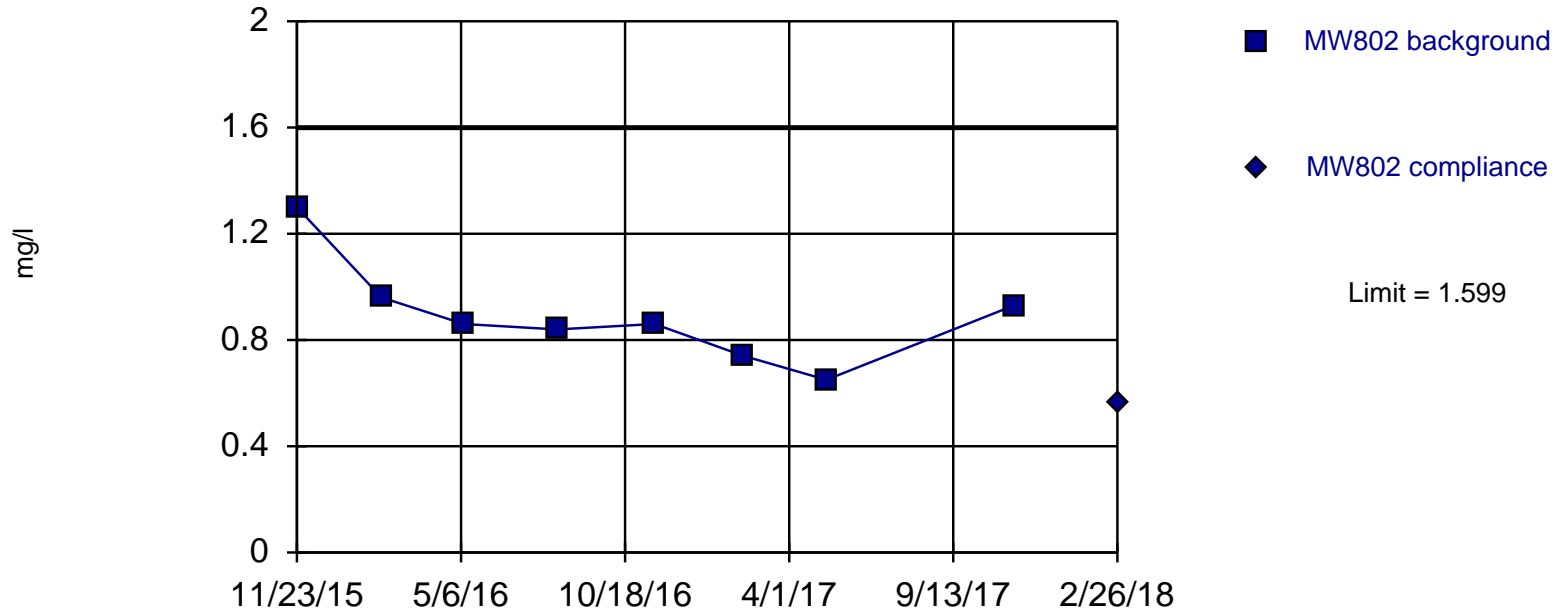


Background Data Summary (based on natural log transformation): Mean=4.402, Std. Dev.=0.4442, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8355, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Chloride Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

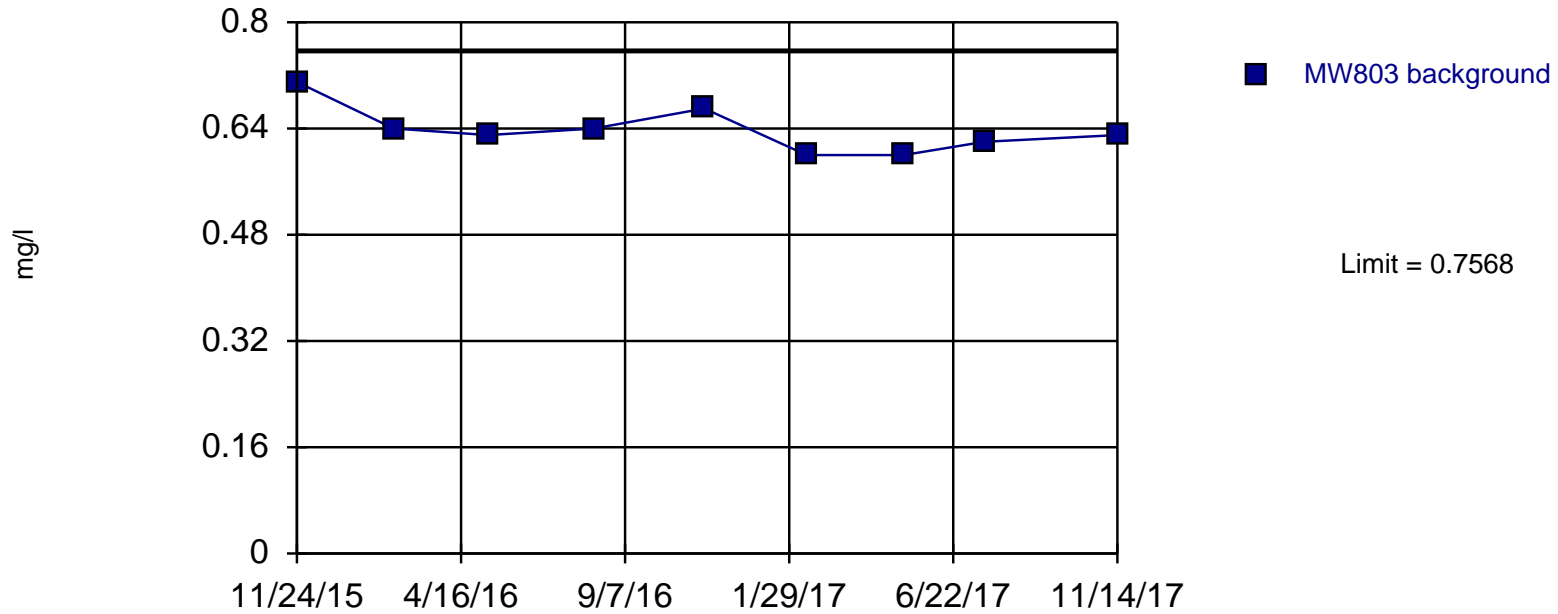
Prediction Limit Intrawell Parametric



Background Data Summary: Mean=0.8925, Std. Dev.=0.1923, n=8. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8848, critical = 0.818. Kappa = 3.675 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Fluoride Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Prediction Limit Intrawell Parametric, MW803

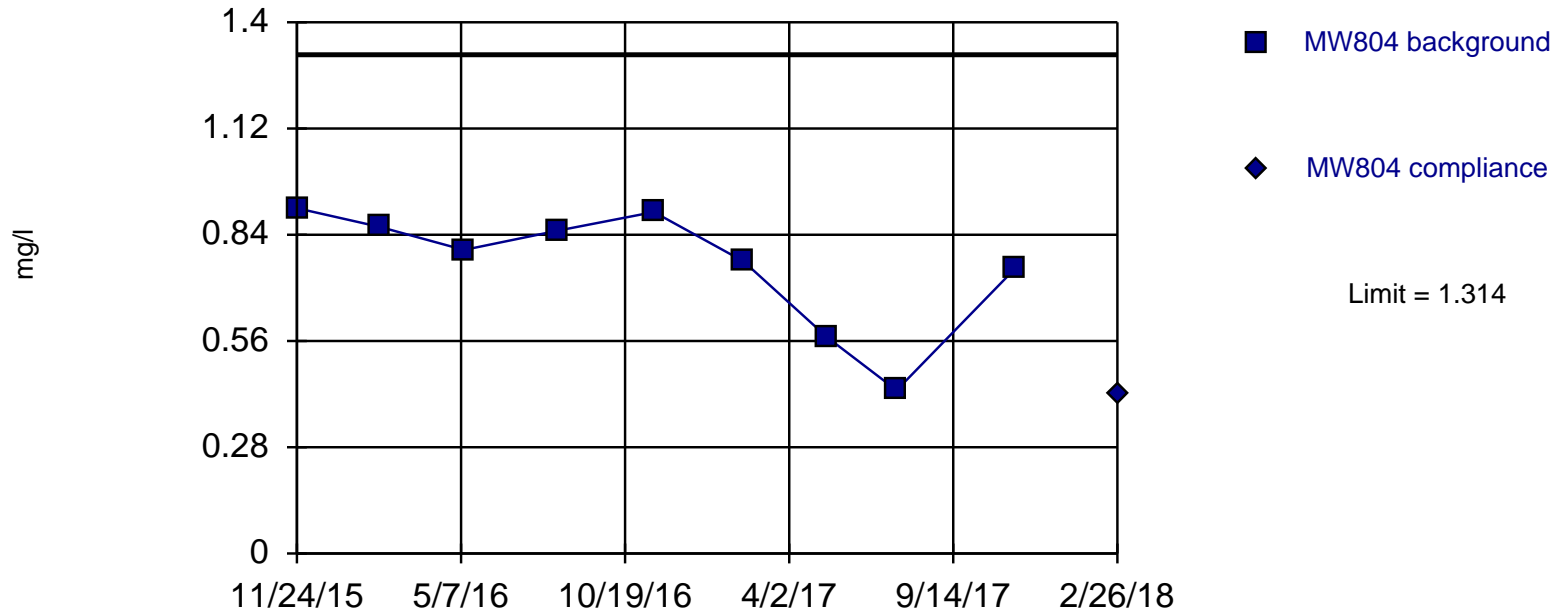


Background Data Summary: Mean=0.6378, Std. Dev.=0.03456, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.893, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192. Assumes 1 future value.

Constituent: Fluoride Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

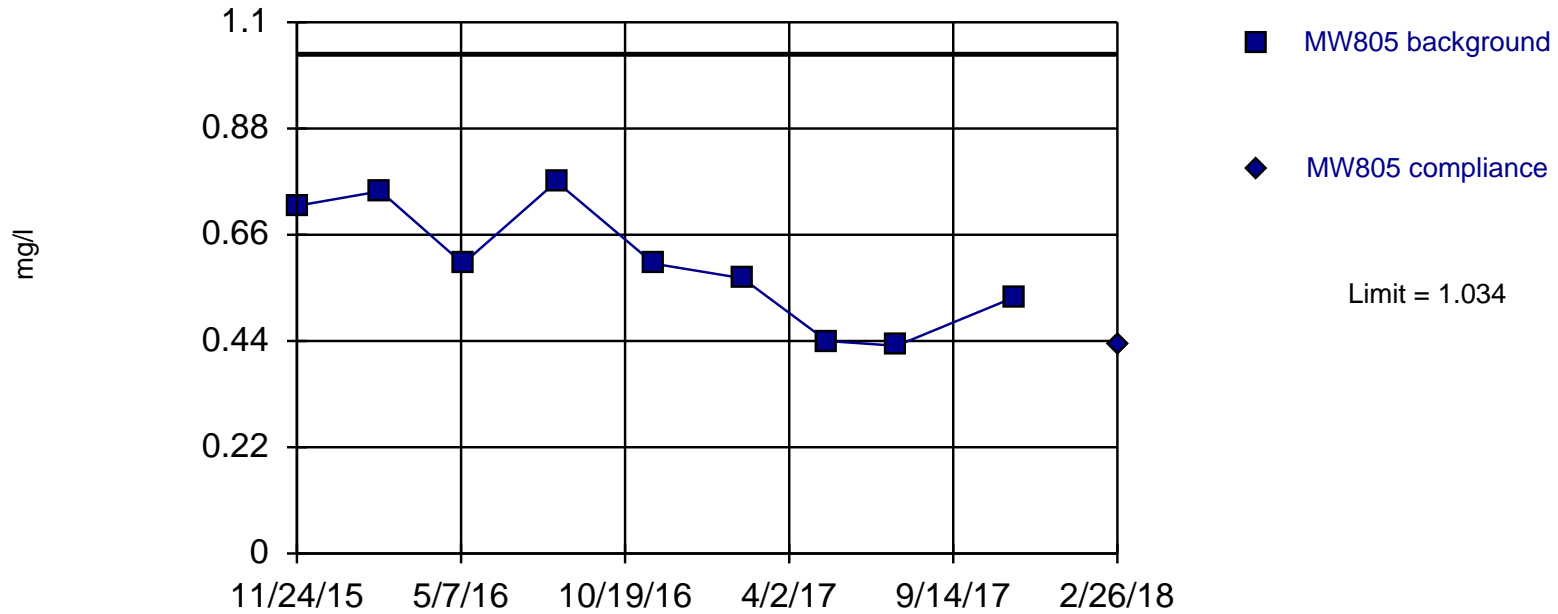


Background Data Summary: Mean=0.76, Std. Dev.=0.1609, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8481, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Fluoride Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

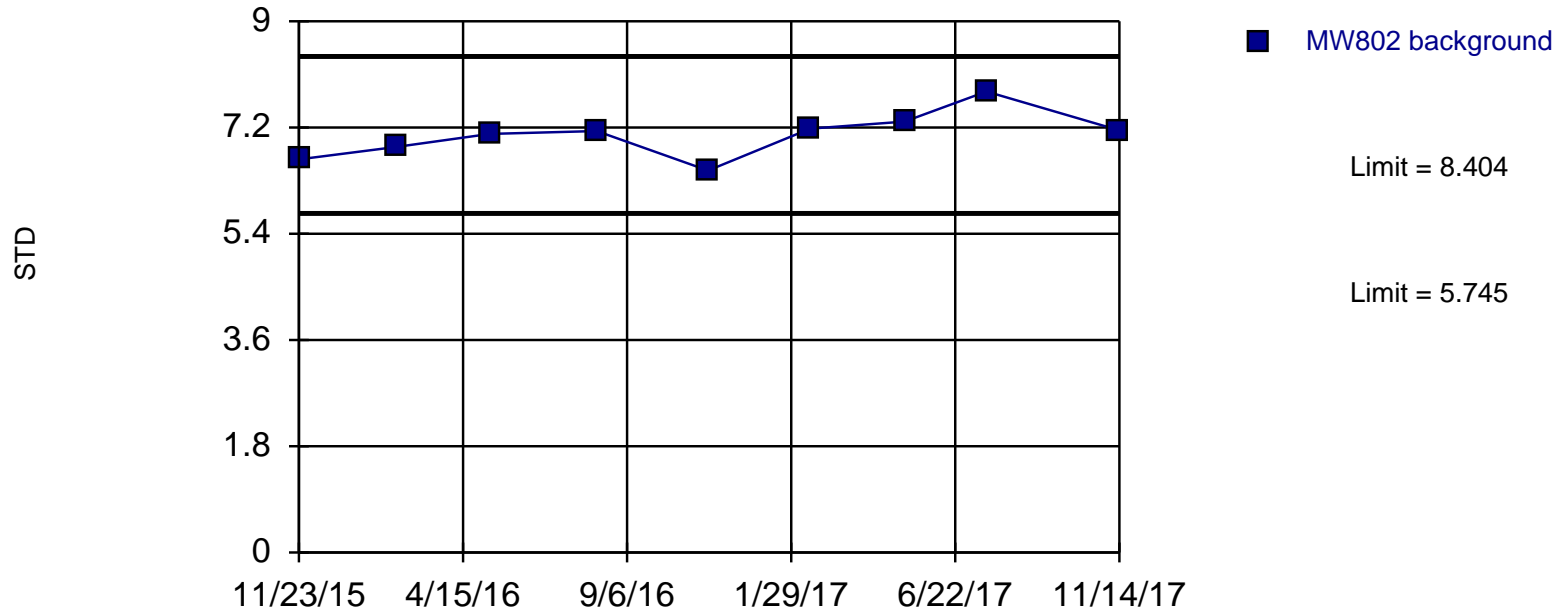
Prediction Limit Intrawell Parametric



Background Data Summary: Mean=0.6011, Std. Dev.=0.1255, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.923, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Fluoride Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

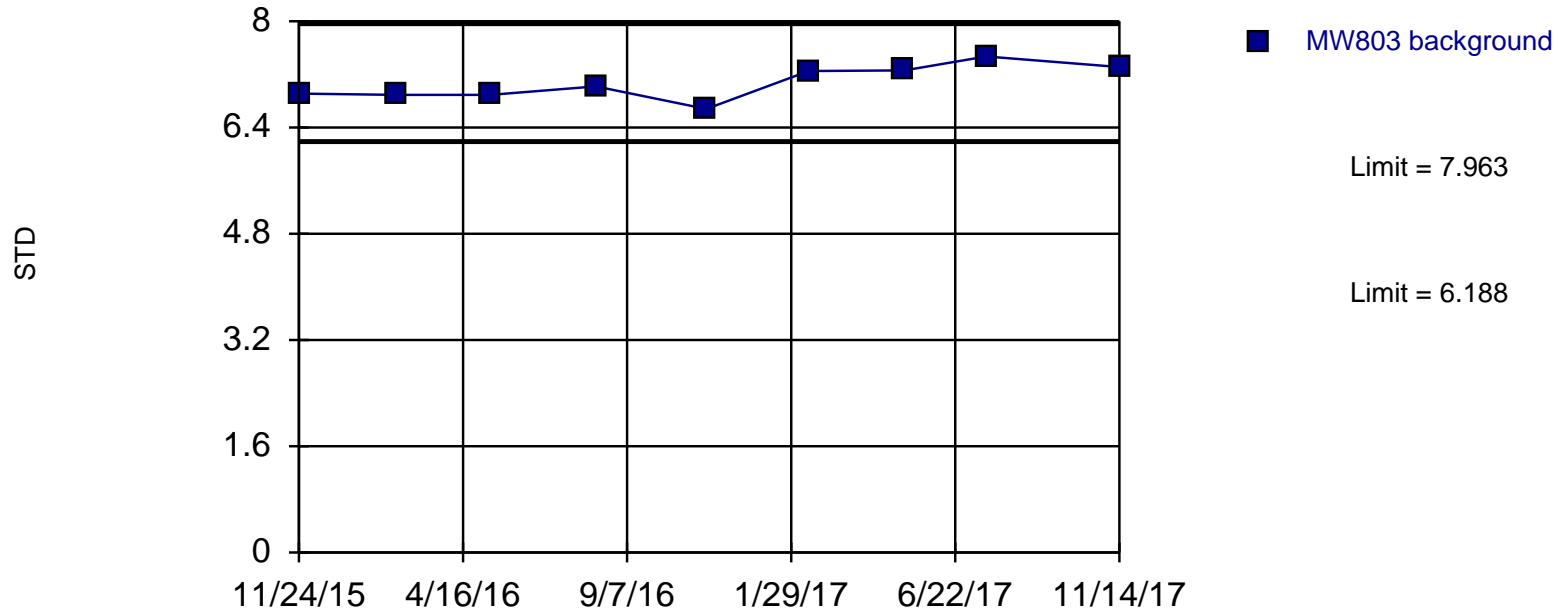
Prediction Limit Intrawell Parametric, MW802



Background Data Summary: Mean=7.074, Std. Dev.=0.386, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9488, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192. Assumes 1 future value.

Constituent: pH [field] Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

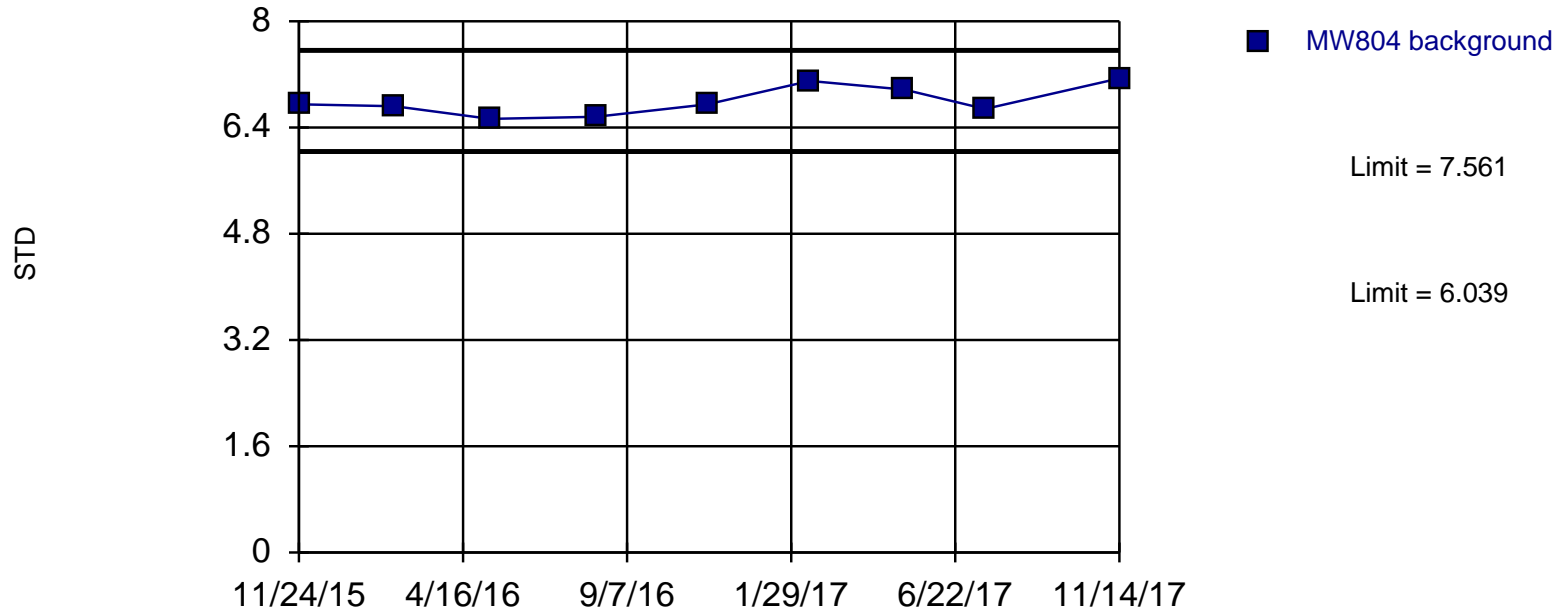
Prediction Limit Intrawell Parametric, MW803



Background Data Summary: Mean=7.076, Std. Dev.=0.2576, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9409, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192. Assumes 1 future value.

Constituent: pH [field] Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

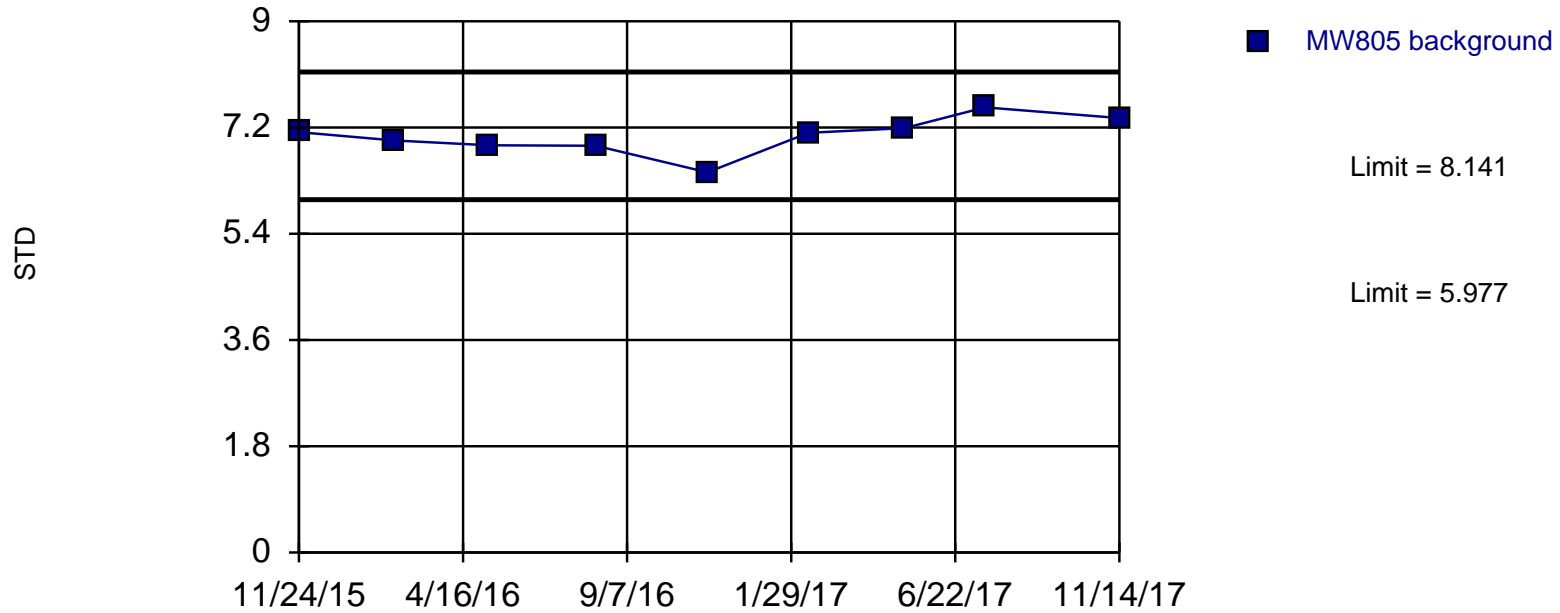
Prediction Limit Intrawell Parametric, MW804



Background Data Summary: Mean=6.8, Std. Dev.=0.221, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9043, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192. Assumes 1 future value.

Constituent: pH [field] Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Prediction Limit Intrawell Parametric, MW805

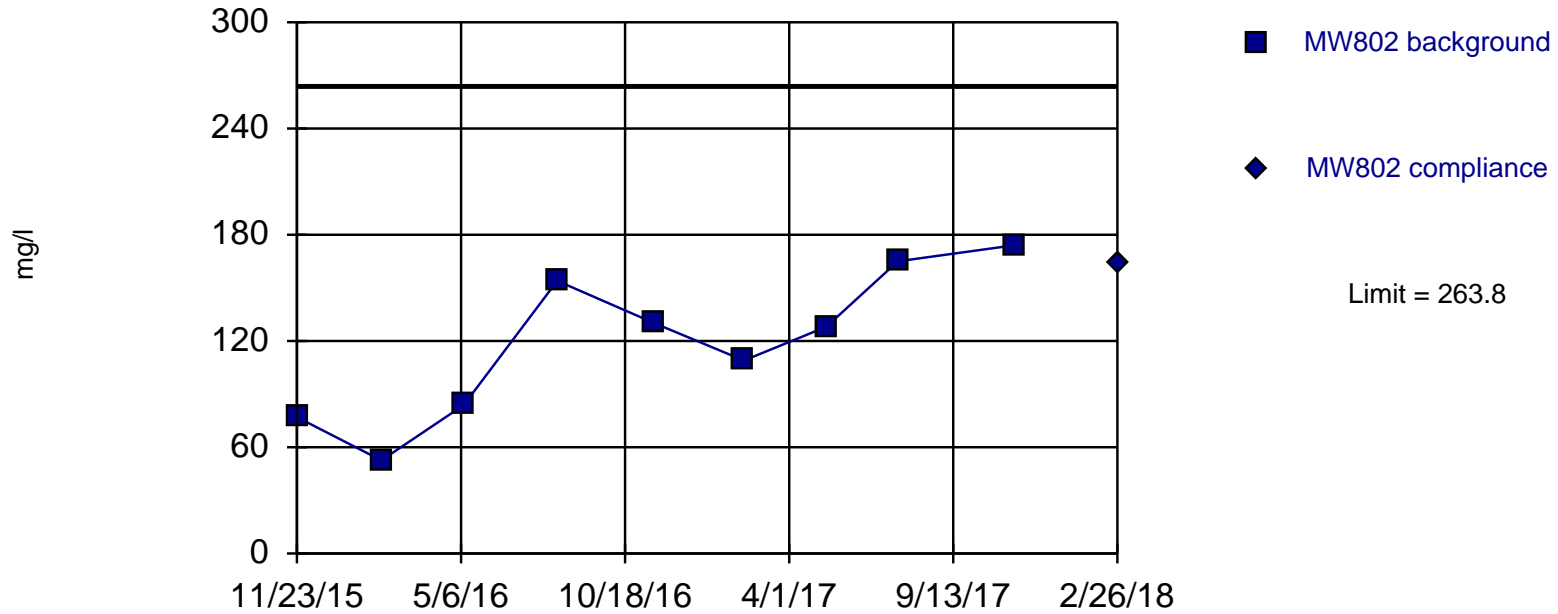


Background Data Summary: Mean=7.059, Std. Dev.=0.314, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9613, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192. Assumes 1 future value.

Constituent: pH [field] Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

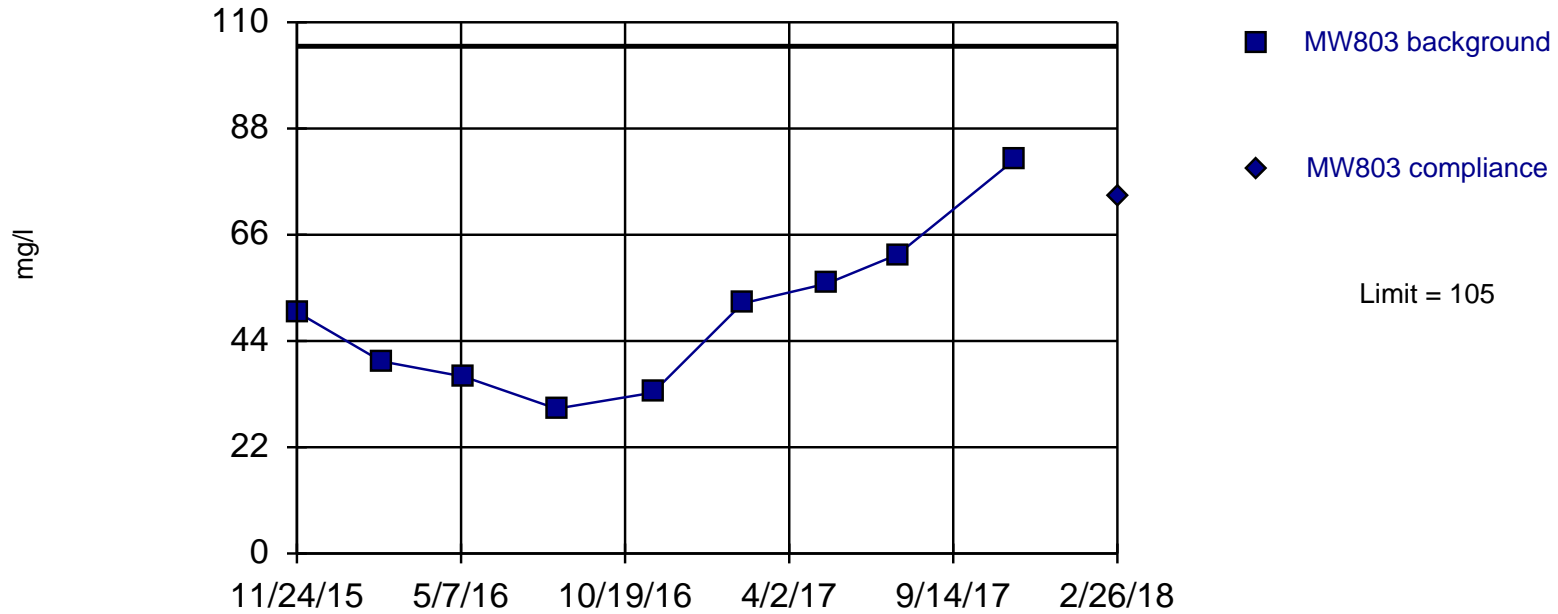


Background Data Summary: Mean=119.3, Std. Dev.=41.94, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.954, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Sulfate Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

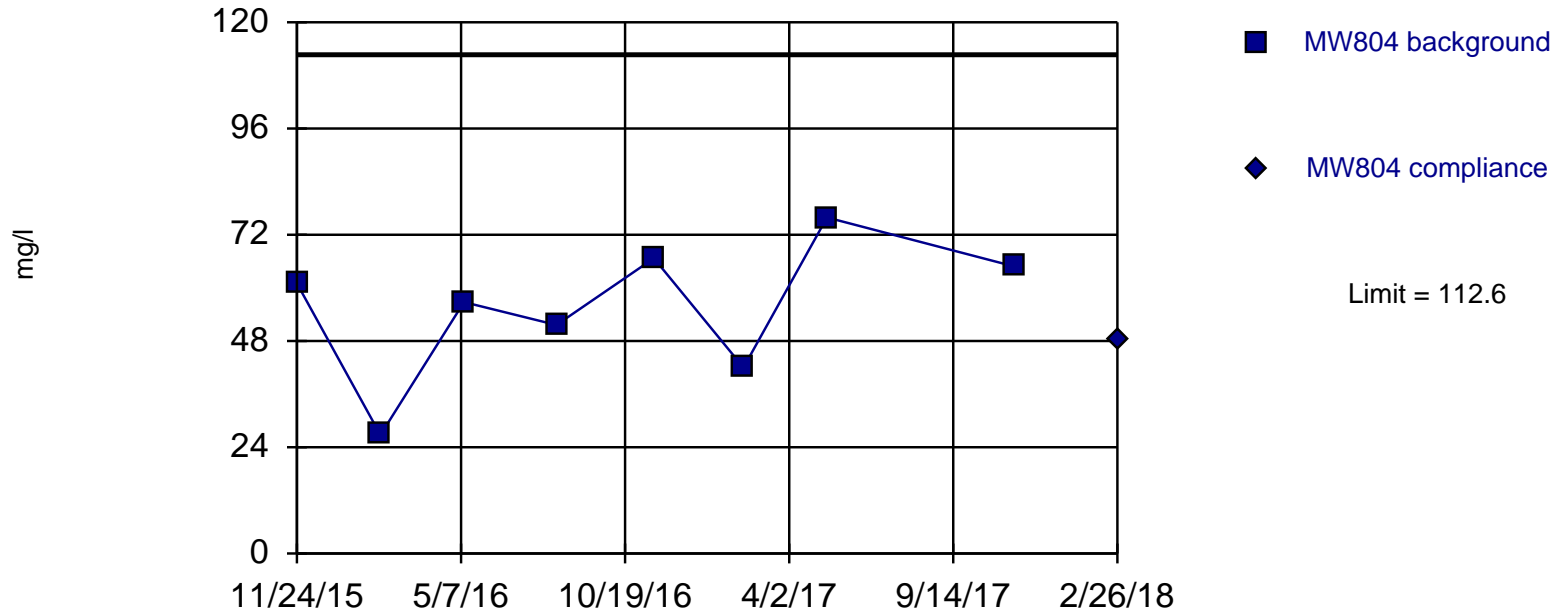


Background Data Summary: Mean=48.97, Std. Dev.=16.27, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9344, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Sulfate Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

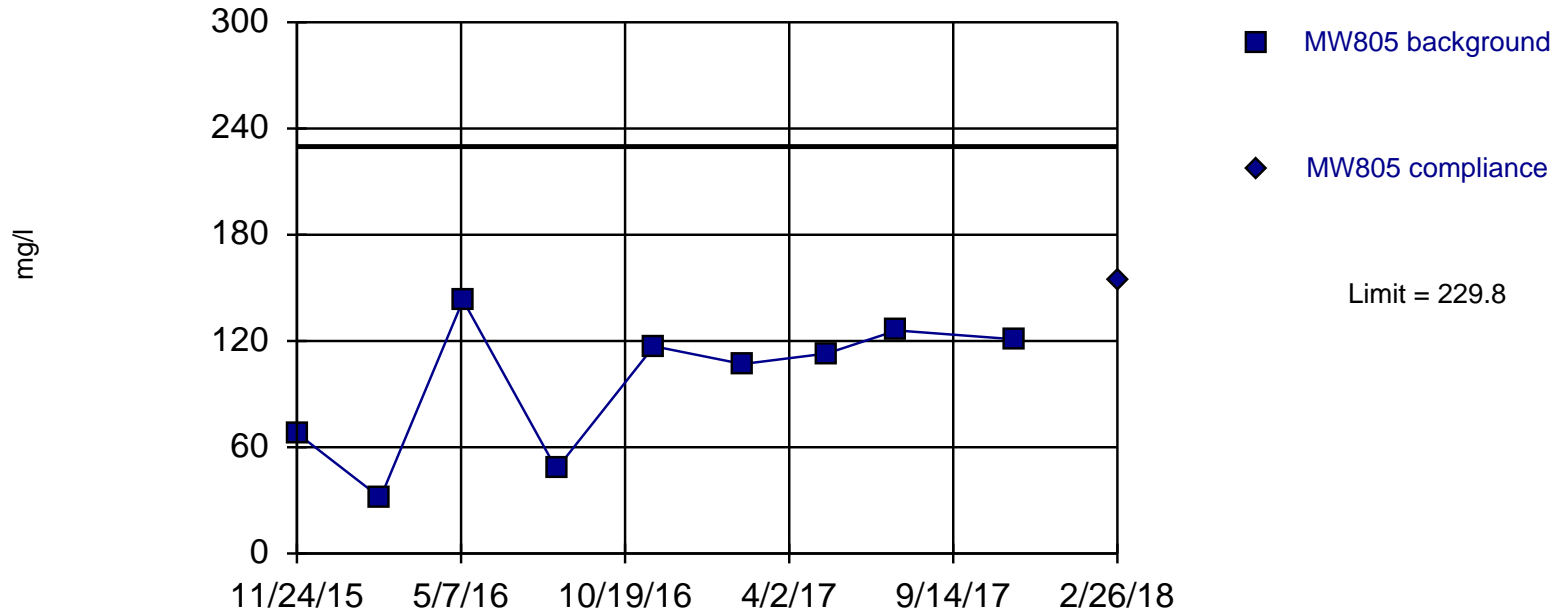


Background Data Summary: Mean=55.7, Std. Dev.=15.5, n=8. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9551, critical = 0.818. Kappa = 3.675 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Sulfate Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

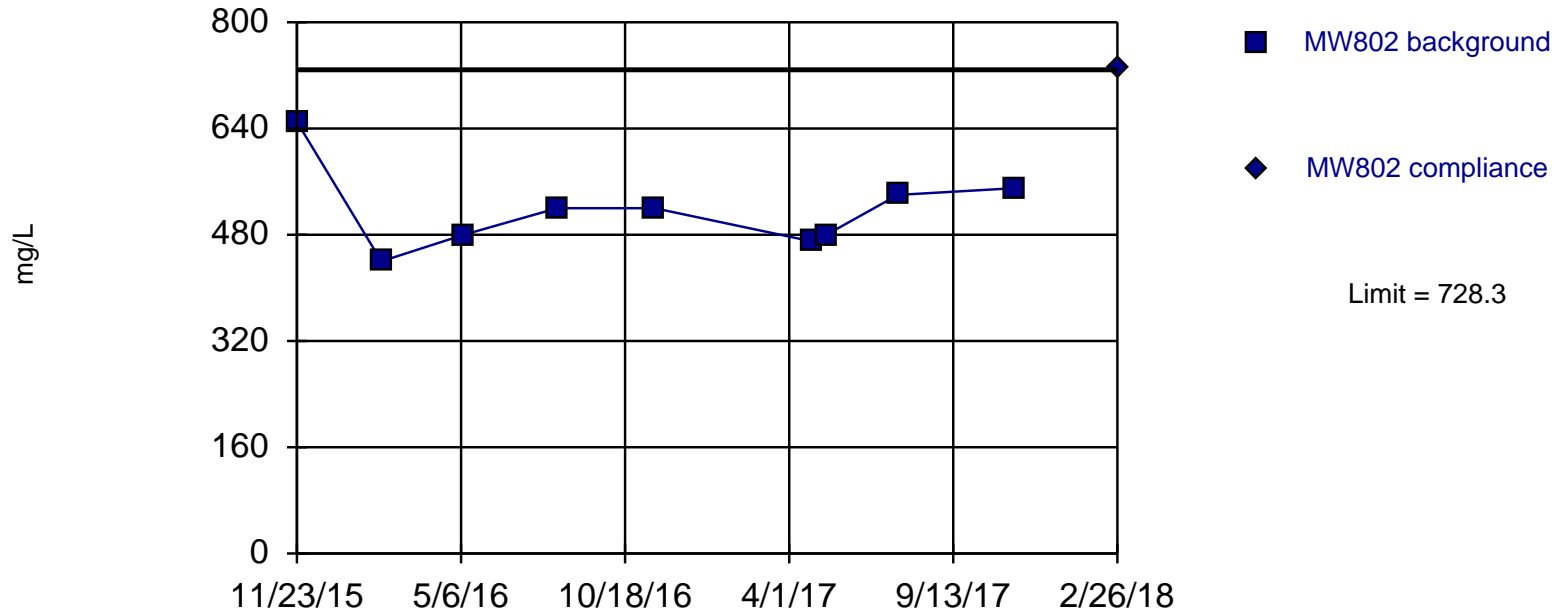


Background Data Summary: Mean=97.12, Std. Dev.=38.5, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8859, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Sulfate Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Exceeds Limit

Prediction Limit Intrawell Parametric



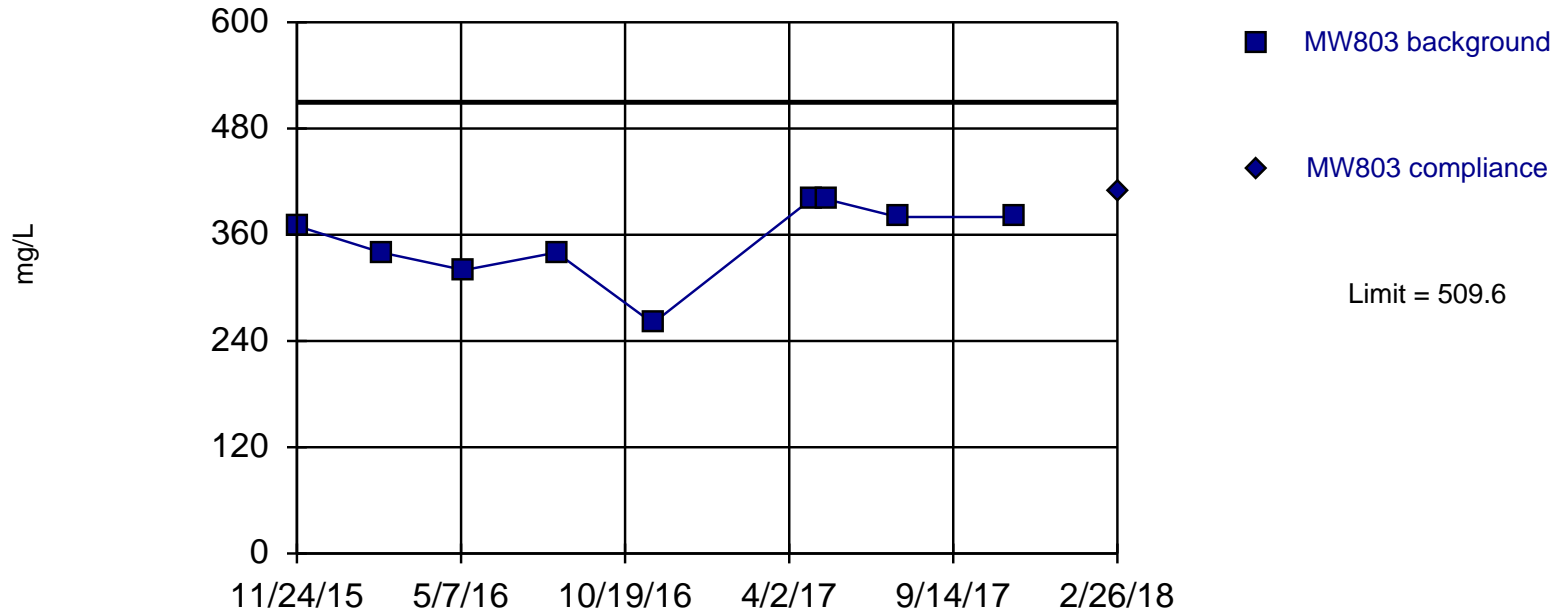
Background Data Summary: Mean=516.7, Std. Dev.=61.44, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9042, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Total Dissolved Solids Analysis Run 4/4/2018 3:54 PM

Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric



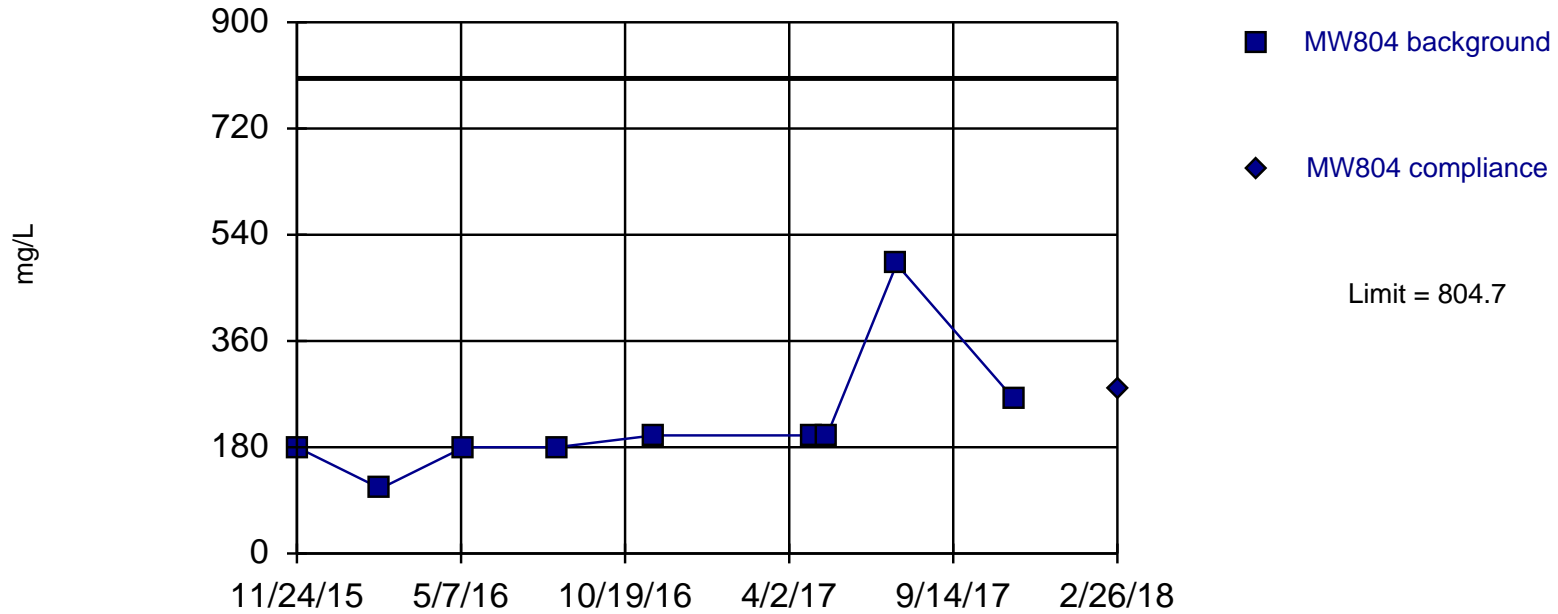
Background Data Summary: Mean=354.4, Std. Dev.=45.03, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8888, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Total Dissolved Solids Analysis Run 4/4/2018 3:54 PM

Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

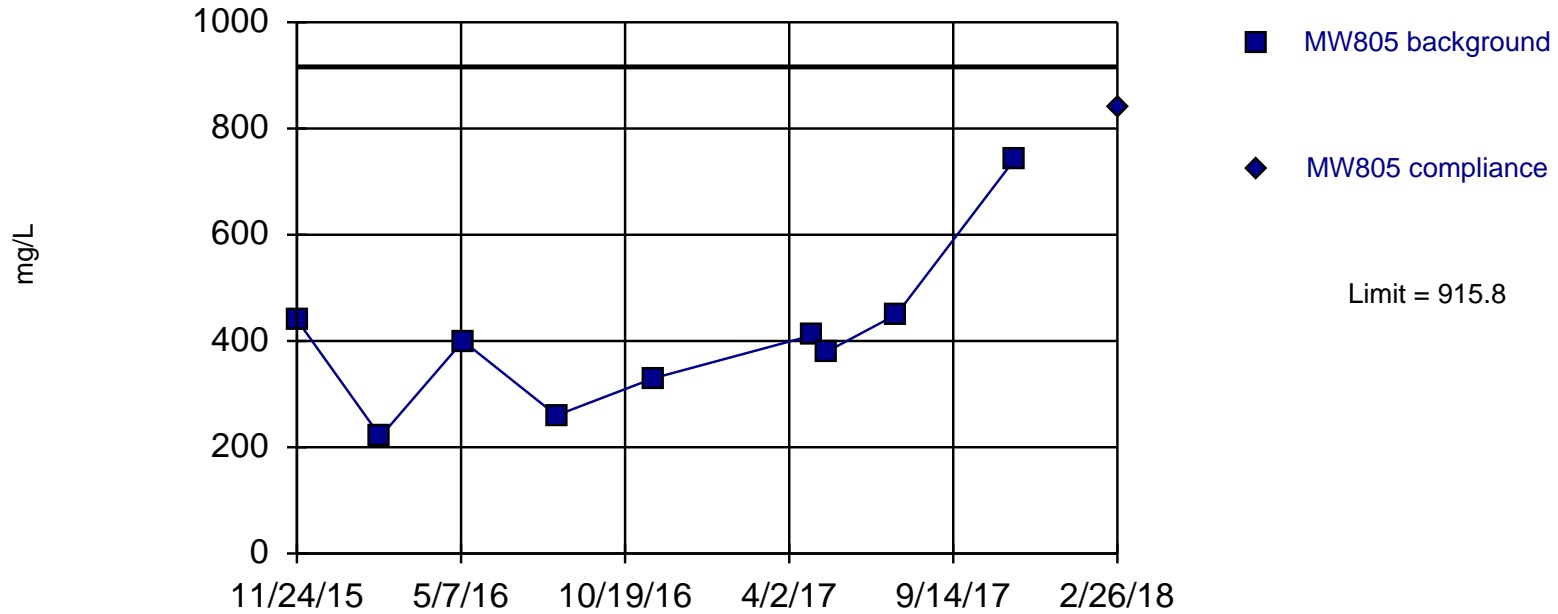


Background Data Summary (based on natural log transformation): Mean=5.325, Std. Dev.=0.3962, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8443, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Total Dissolved Solids Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric



Background Data Summary: Mean=403.3, Std. Dev.=148.7, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8699, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Total Dissolved Solids Analysis Run 4/4/2018 3:54 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Prediction Limit

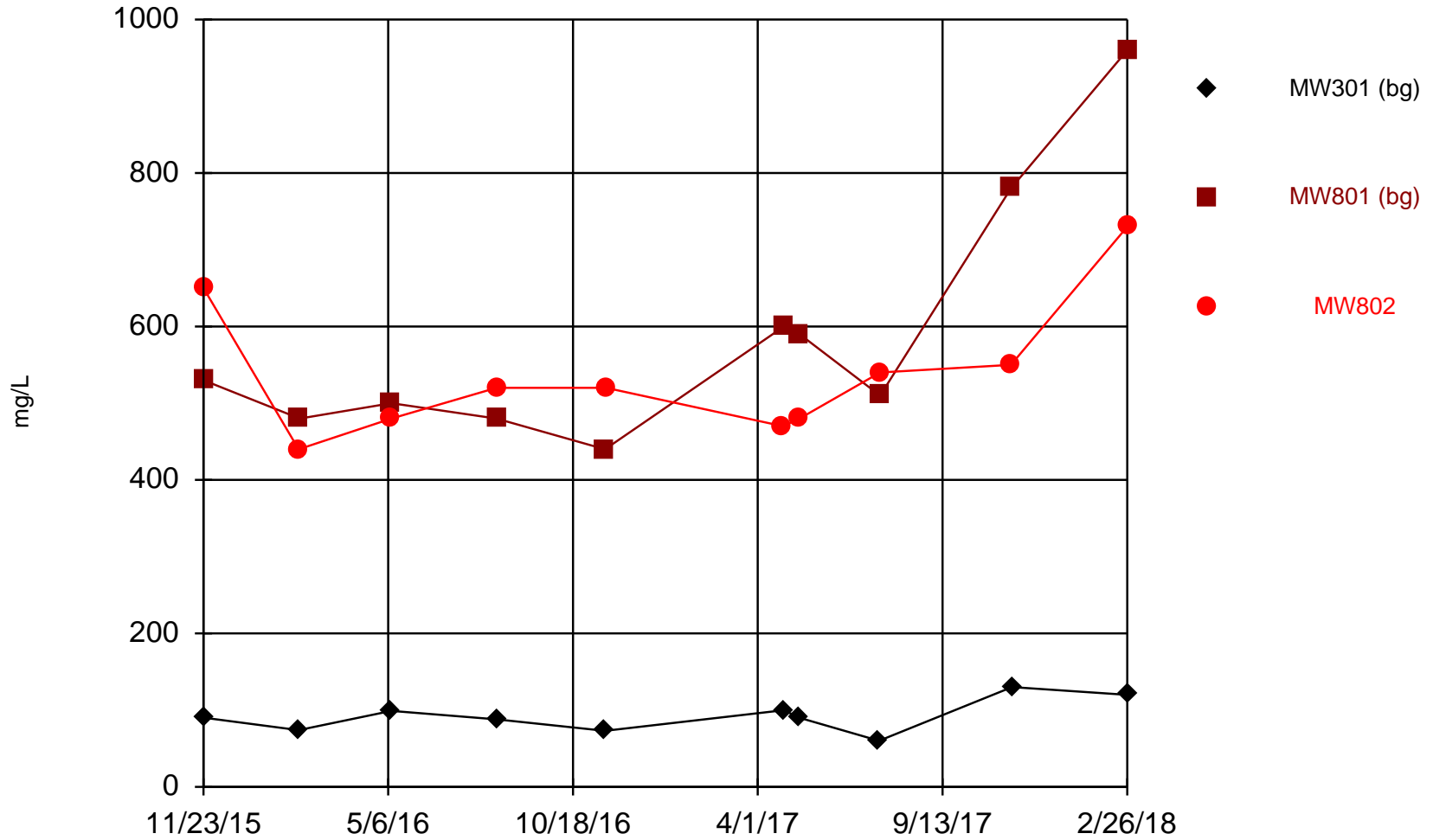
Brayton Point Client: GEI Data: Brayton Point CCR Database Printed 4/4/2018, 3:55 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N%NDs</u>	<u>Trans...</u>	<u>Alpha</u>	<u>Method</u>
Calcium, total (mg/L)	MW802	105.2	n/a	2/26/2018	124	Yes	9 0	No	0.0003192	Param Intra 1 of 2
Chloride (mg/l)	MW804	54.05	n/a	2/26/2018	56.7	Yes	9 0	No	0.0003192	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW802	728.3	n/a	2/26/2018	730	Yes	9 0	No	0.0003192	Param Intra 1 of 2

Appendix D

Time-Series Concentration Plots

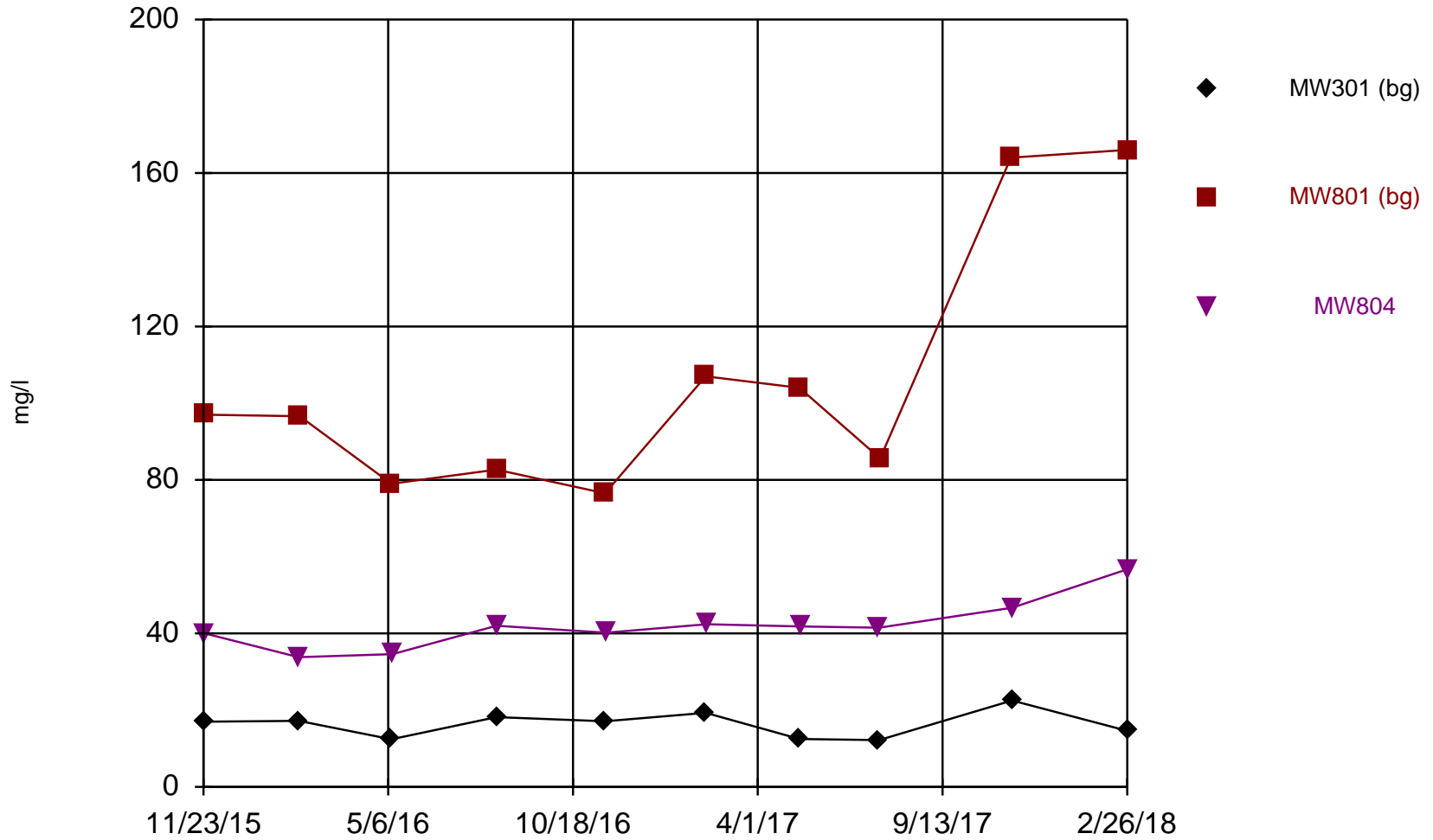
Time Series



Constituent: Total Dissolved Solids Analysis Run 4/5/2018 12:03 PM

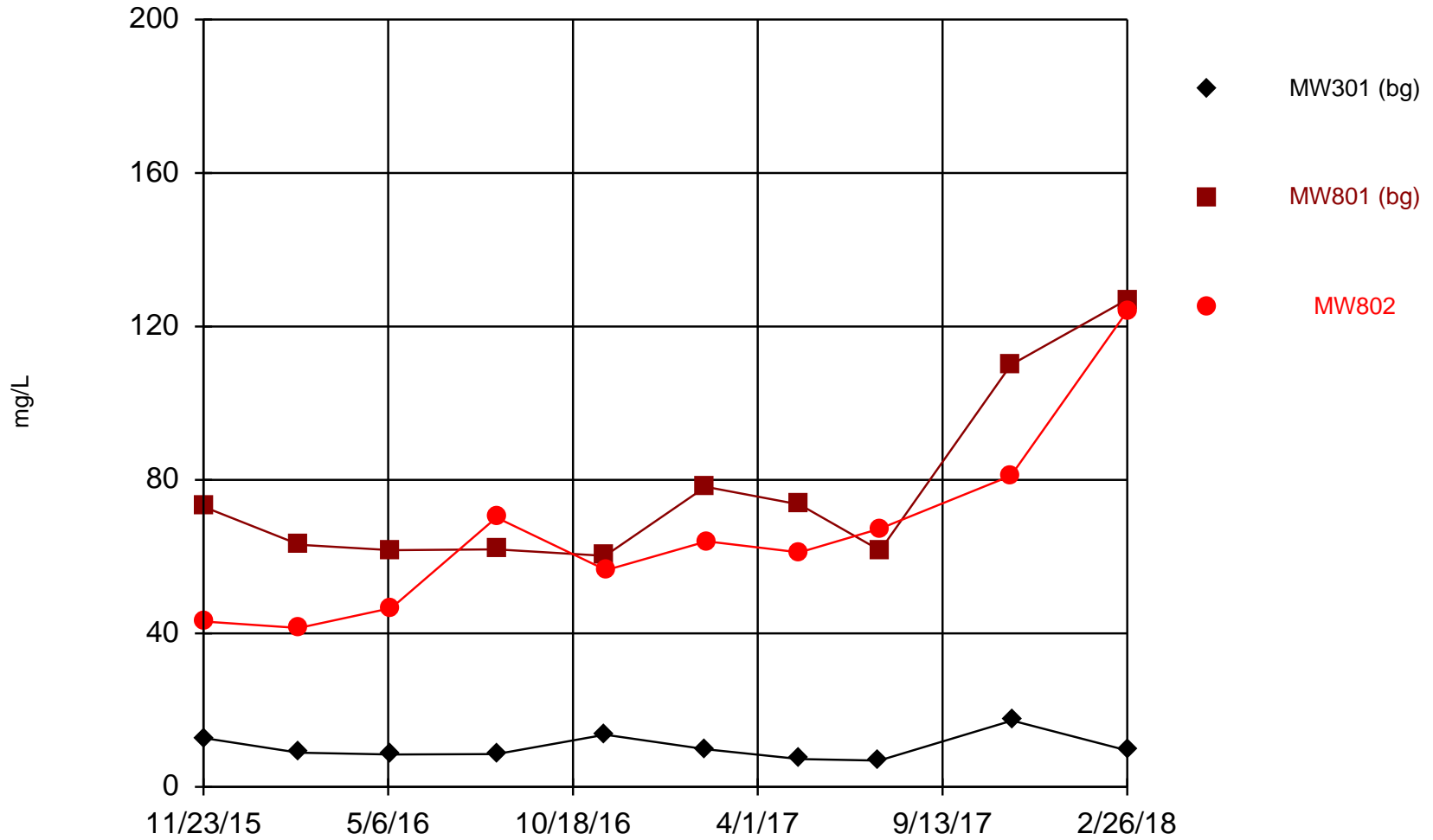
Plant McIntosh Client: GEI Data: Brayton Point CCR Database

Time Series



Constituent: Chloride Analysis Run 4/5/2018 12:03 PM
Plant McIntosh Client: GEI Data: Brayton Point CCR Database

Time Series



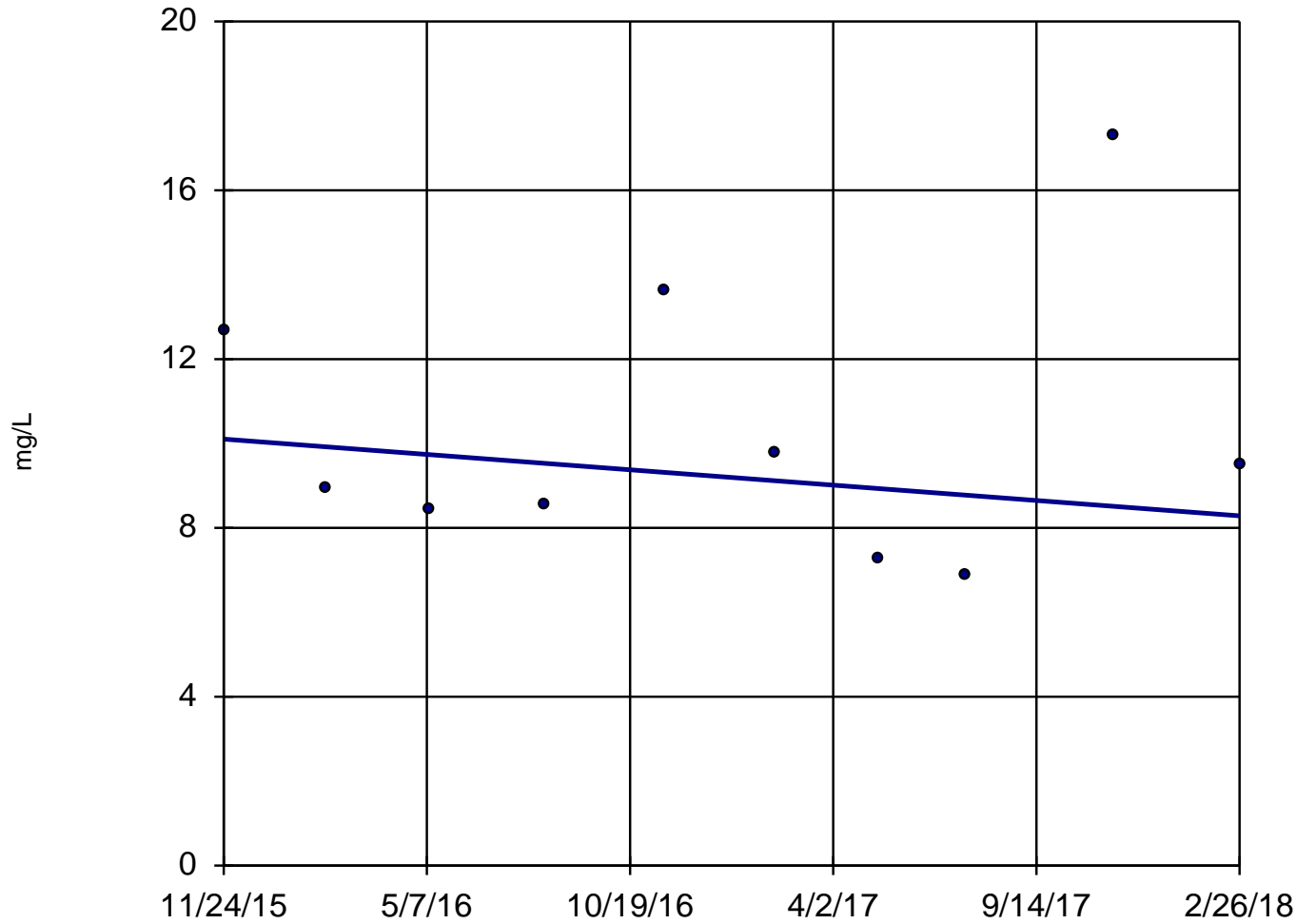
Constituent: Calcium, total Analysis Run 4/5/2018 12:03 PM
Plant McIntosh Client: GEI Data: Brayton Point CCR Database

Appendix E

Mann-Kendall / Sen's Estimate of Slope Plots

Sen's Slope Estimator

MW301 (bg)



n = 10

Slope = -0.8042
units per year.

Mann-Kendall
statistic = -3
critical = -23

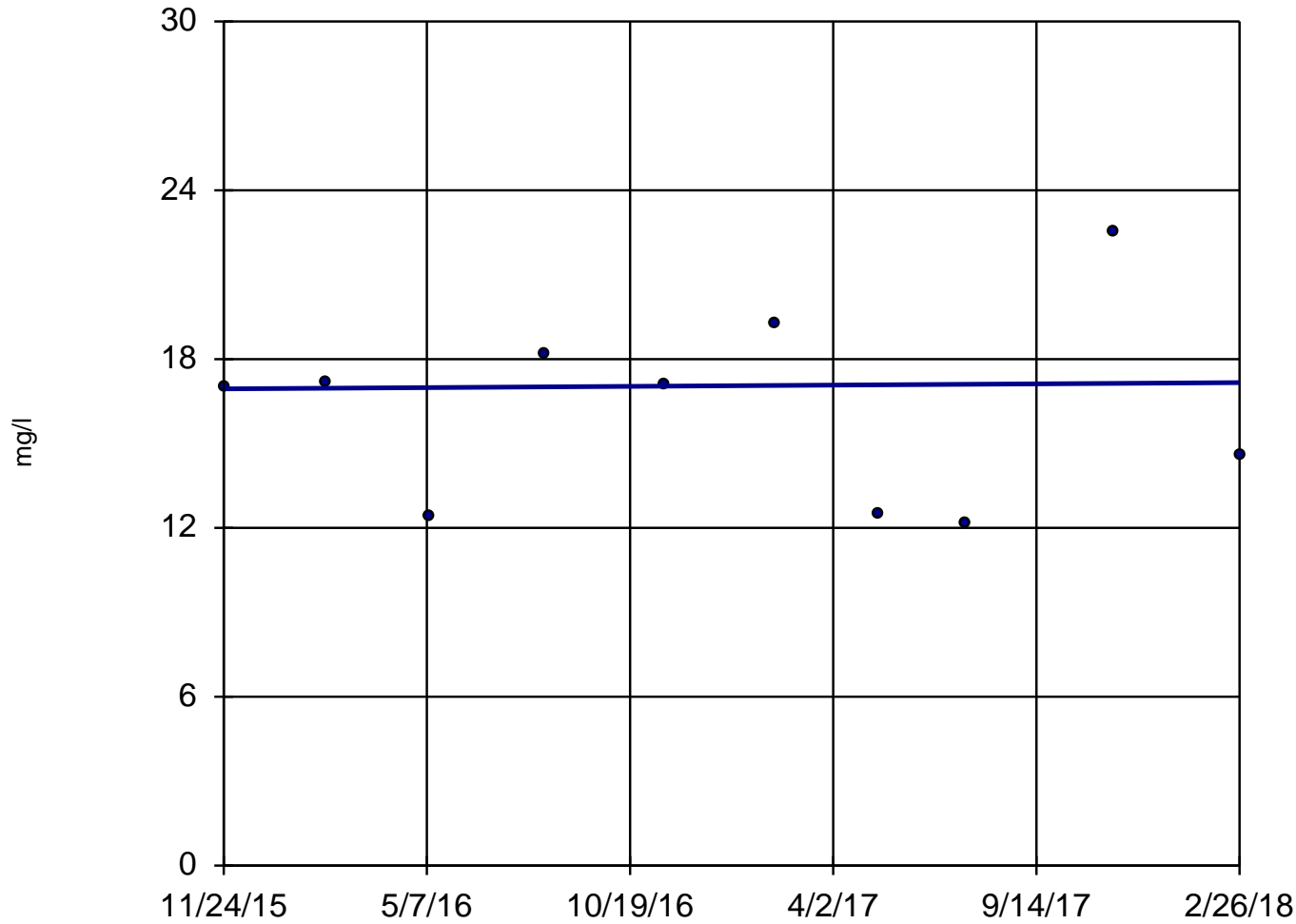
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Constituent: Calcium, total Analysis Run 4/4/2018 4:13 PM

Brayton Point Client: GEI Data: Brayton Point CCR Database

Sen's Slope Estimator

MW301 (bg)



n = 10

Slope = 0.1
units per year.

Mann-Kendall
statistic = 1
critical = 23

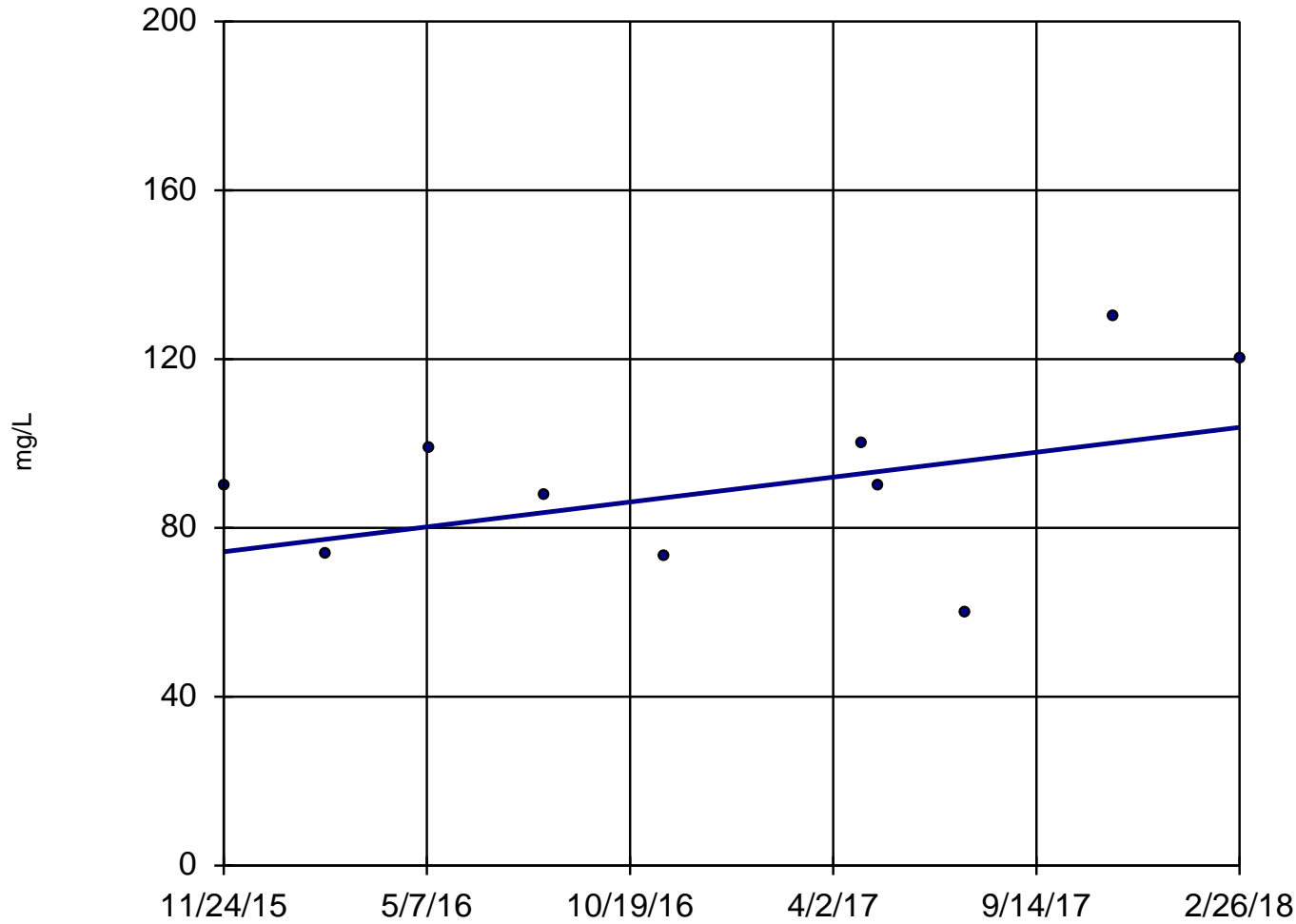
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Constituent: Chloride Analysis Run 4/4/2018 4:13 PM

Brayton Point Client: GEI Data: Brayton Point CCR Database

Sen's Slope Estimator

MW301 (bg)



n = 10

Slope = 13.04
units per year.

Mann-Kendall
statistic = 10
critical = 23

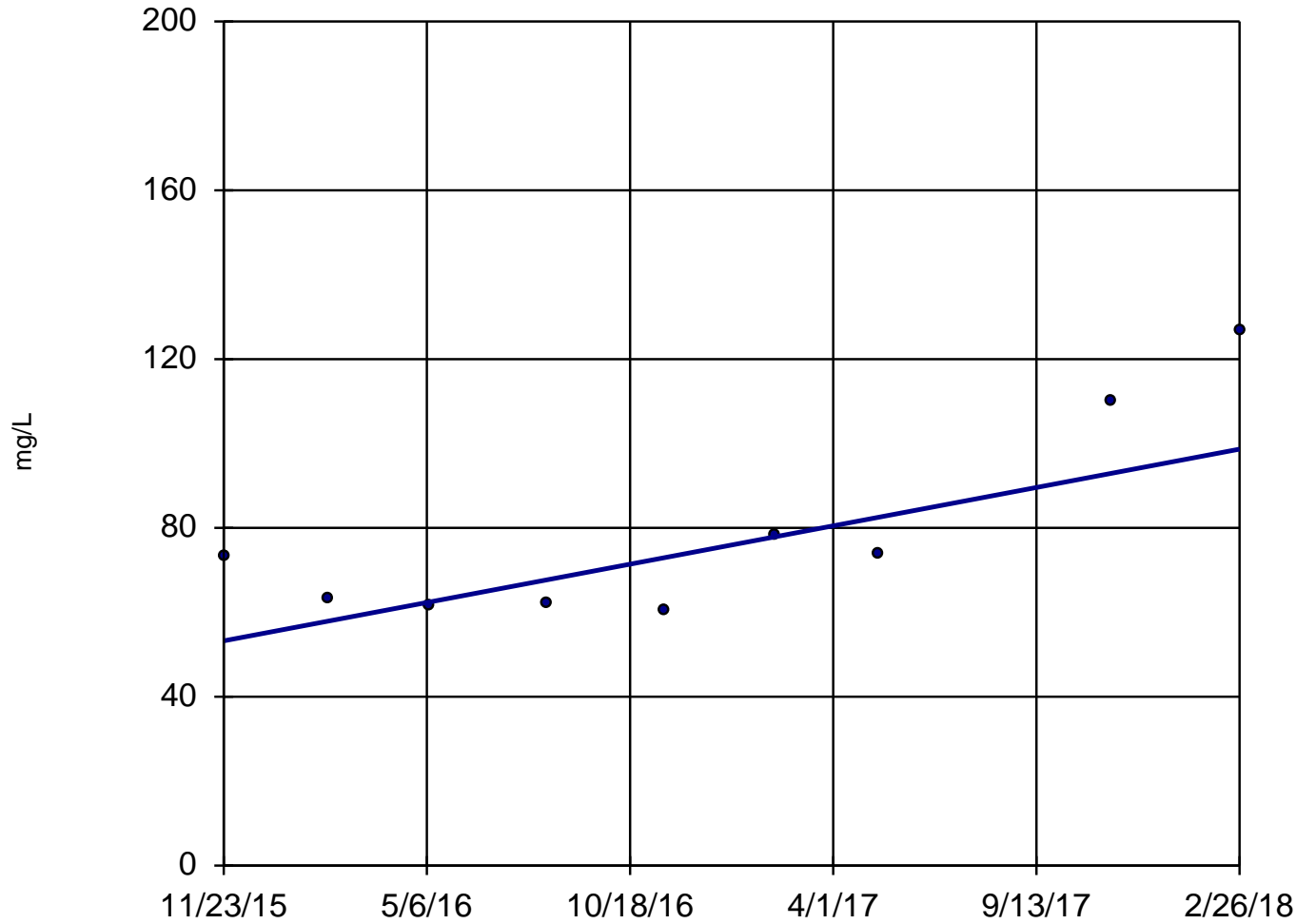
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Constituent: Total Dissolved Solids Analysis Run 4/4/2018 4:13 PM

Brayton Point Client: GEI Data: Brayton Point CCR Database

Sen's Slope Estimator

MW801 (bg)

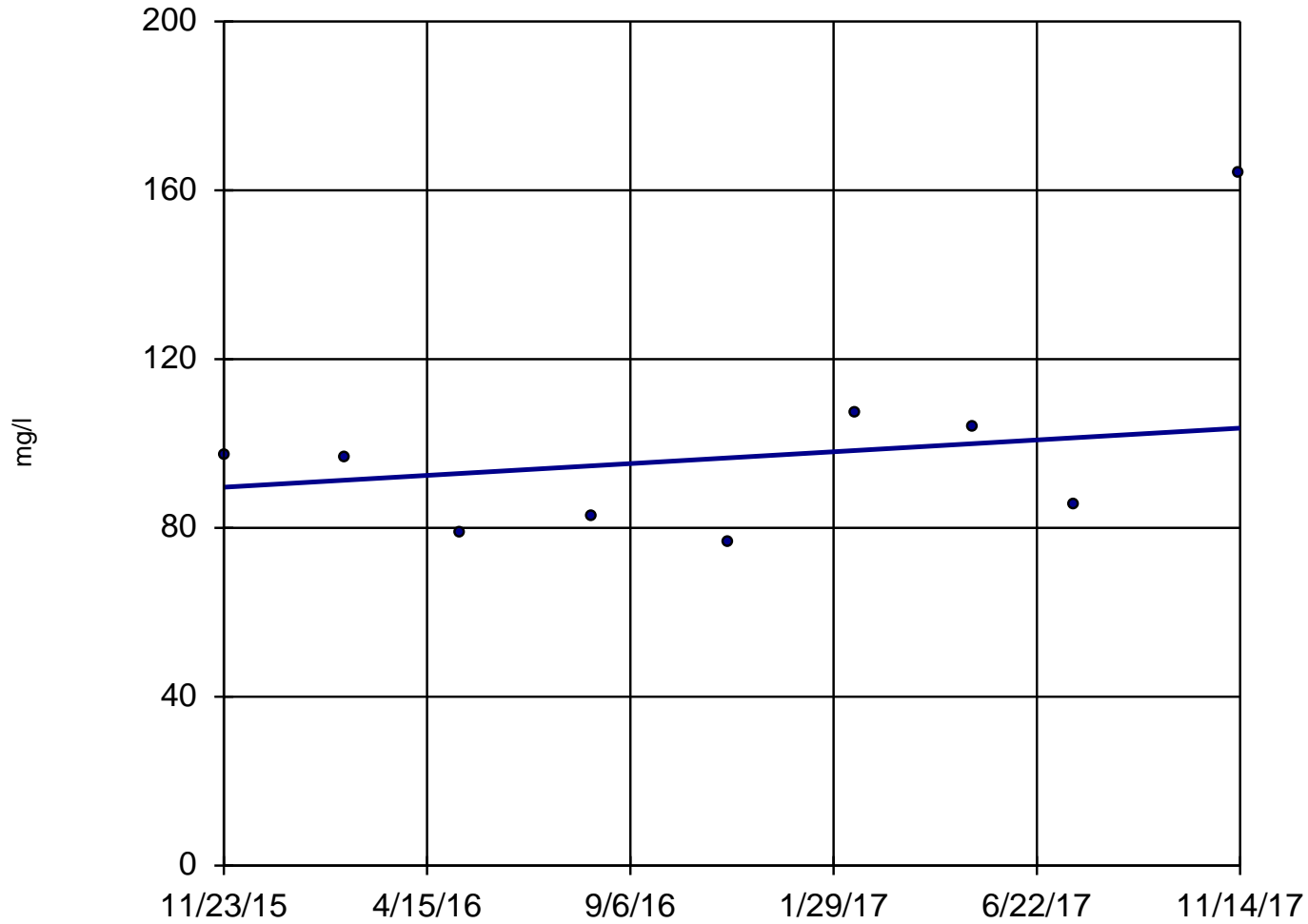


n = 9
Slope = 20.07 units per year.
Mann-Kendall statistic = 16
critical = 20
Trend not significant at 95% confidence level ($\alpha = 0.025$ per tail).

Constituent: Calcium, total Analysis Run 4/4/2018 3:06 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Sen's Slope Estimator

MW801 (bg)

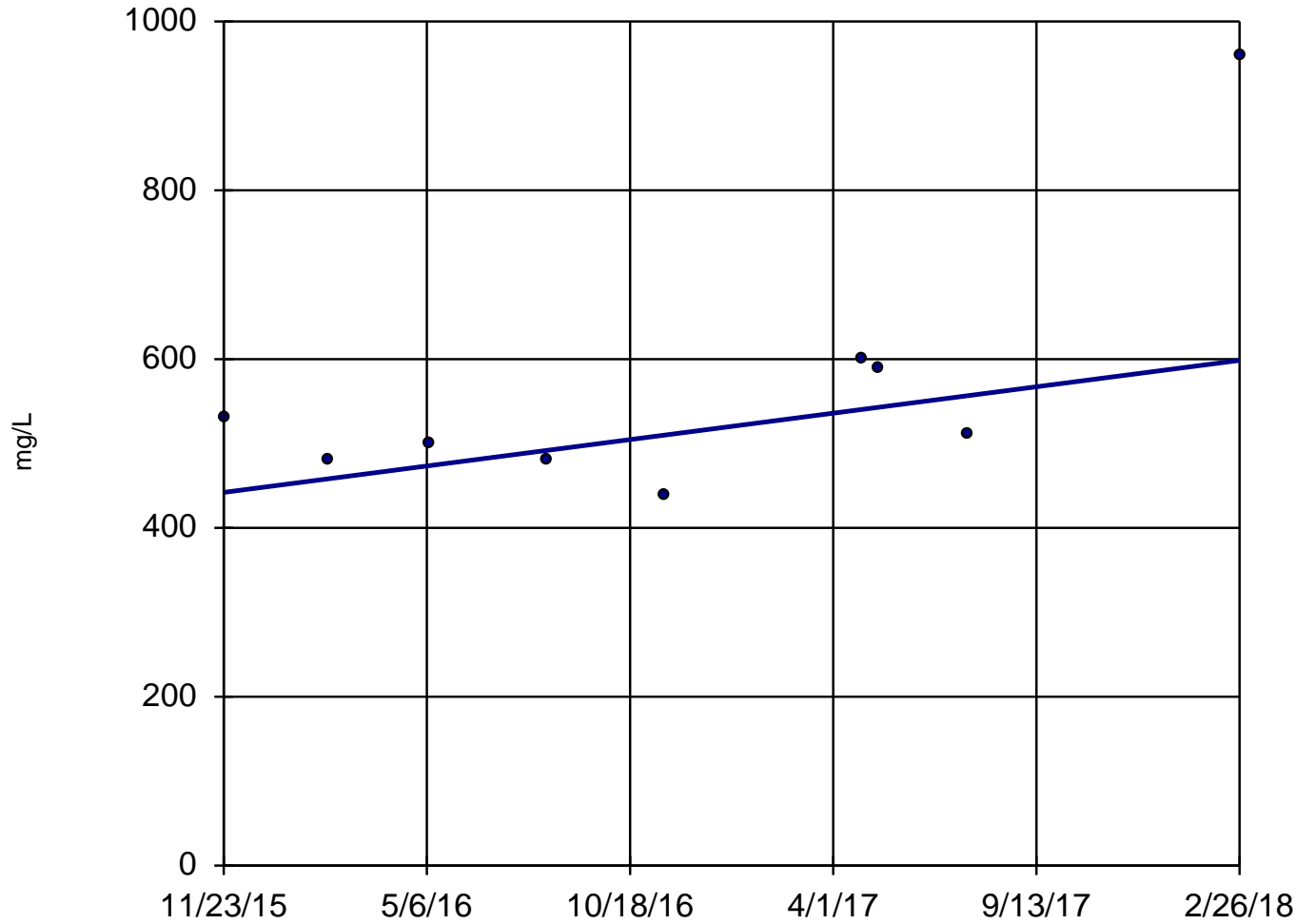


n = 9
Slope = 7.086
units per year.
Mann-Kendall
statistic = 8
critical = 20
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Constituent: Chloride Analysis Run 4/4/2018 3:06 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Sen's Slope Estimator

MW801 (bg)



n = 9
Slope = 69.13
units per year.
Mann-Kendall
statistic = 11
critical = 20
Trend not sig-
nificant at 95%
confidence level
($\alpha = 0.025$ per
tail).

Constituent: Total Dissolved Solids Analysis Run 4/4/2018 3:06 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Appendix B

Second Semi-Annual 2018 Sampling Event Statistical Analysis

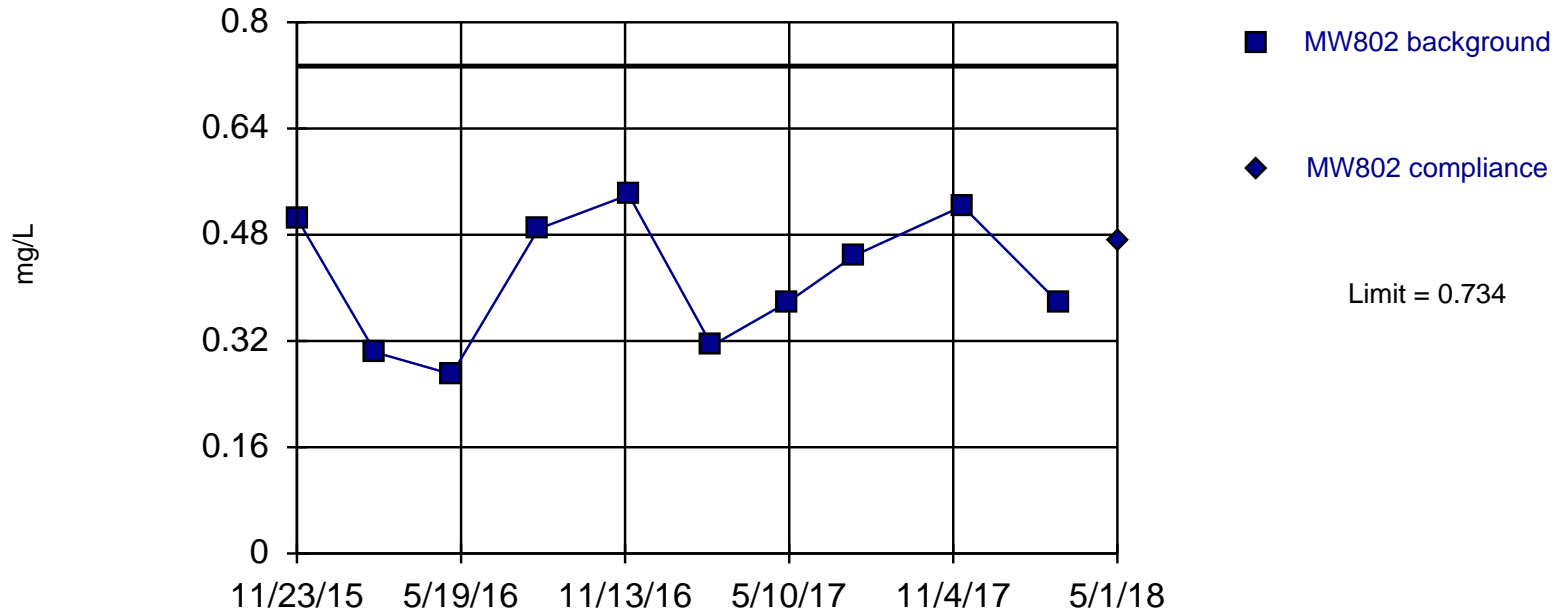
Prediction Limit

Brayton Point Client: GEI Data: Brayton Point CCR Database Printed 5/11/2018, 2:12 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg</u>	<u>N%NDs</u>	<u>Trans...</u>	<u>Alpha</u>	<u>Method</u>
Calcium, total (mg/L)	MW802	143.1	n/a	5/1/2018	144	Yes	10	0	No	0.0003192	Param Intra 1 of 2
Calcium, total (mg/L)	MW803	58.54	n/a	5/1/2018	72.7	Yes	10	0	No	0.0003192	Param Intra 1 of 2
Chloride (mg/l)	MW803	119.8	n/a	5/1/2018	191	Yes	10	0	No	0.0003192	Param Intra 1 of 2
Fluoride (mg/l)	MW803	0.7568	n/a	5/1/2018	0.88	Yes	9	0	No	0.0003192	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW802	823.9	n/a	5/1/2018	860	Yes	10	0	No	0.0003192	Param Intra 1 of 2
Total Dissolved Solids (mg/L)	MW803	507.7	n/a	5/1/2018	590	Yes	10	0	No	0.0003192	Param Intra 1 of 2

Within Limit

Prediction Limit Intrawell Parametric

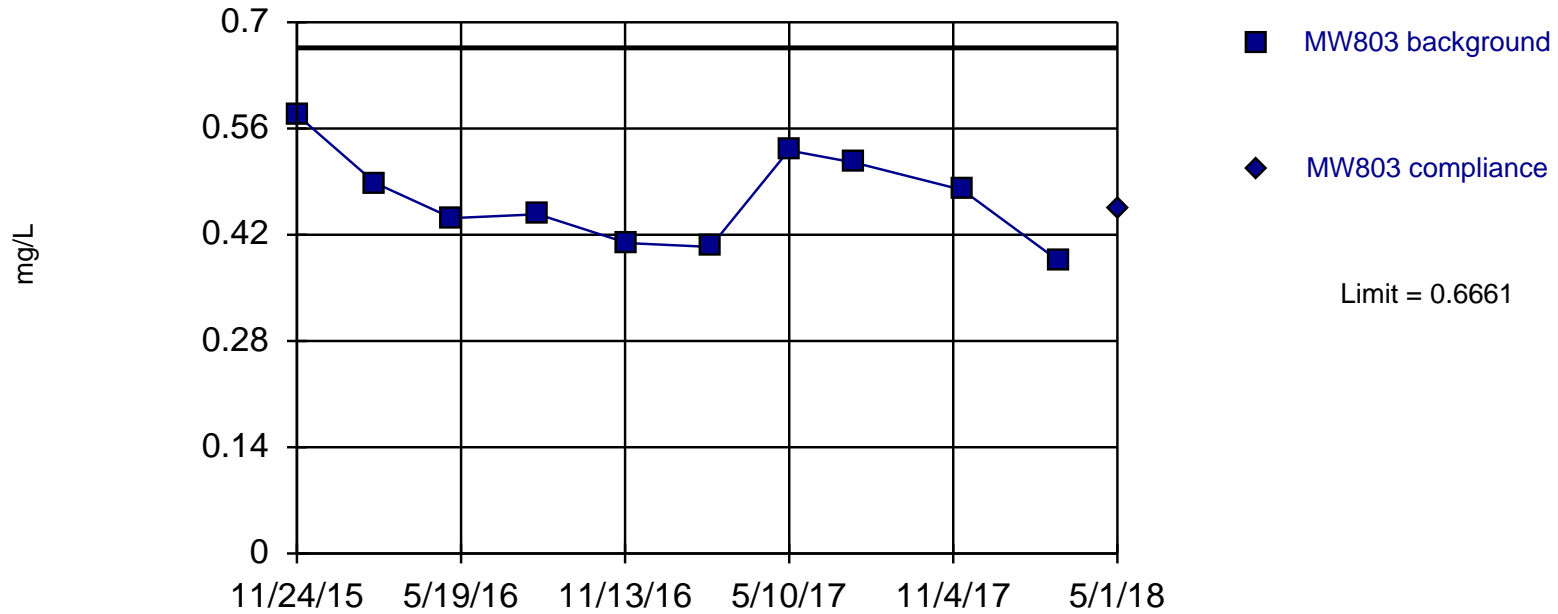


Background Data Summary: Mean=0.4149, Std. Dev.=0.09925, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9151, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Boron, total Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

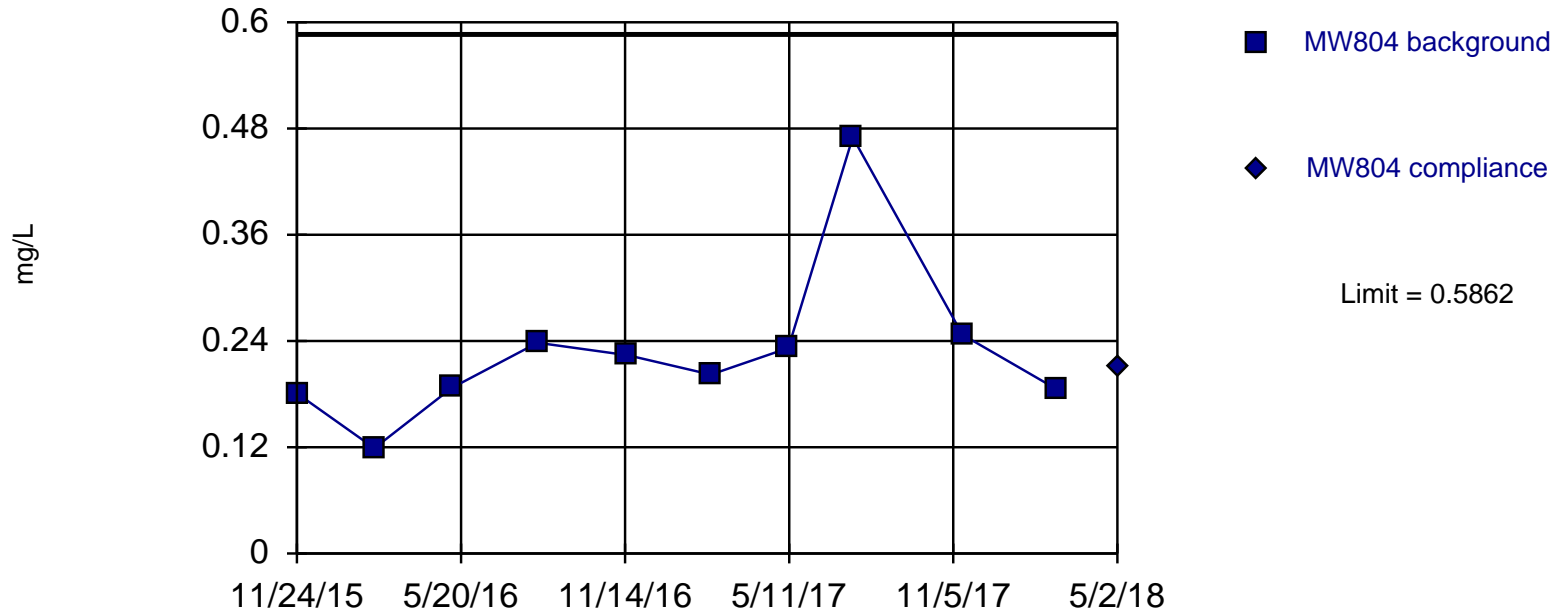


Background Data Summary: Mean=0.4679, Std. Dev.=0.06166, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9637, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Boron, total Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

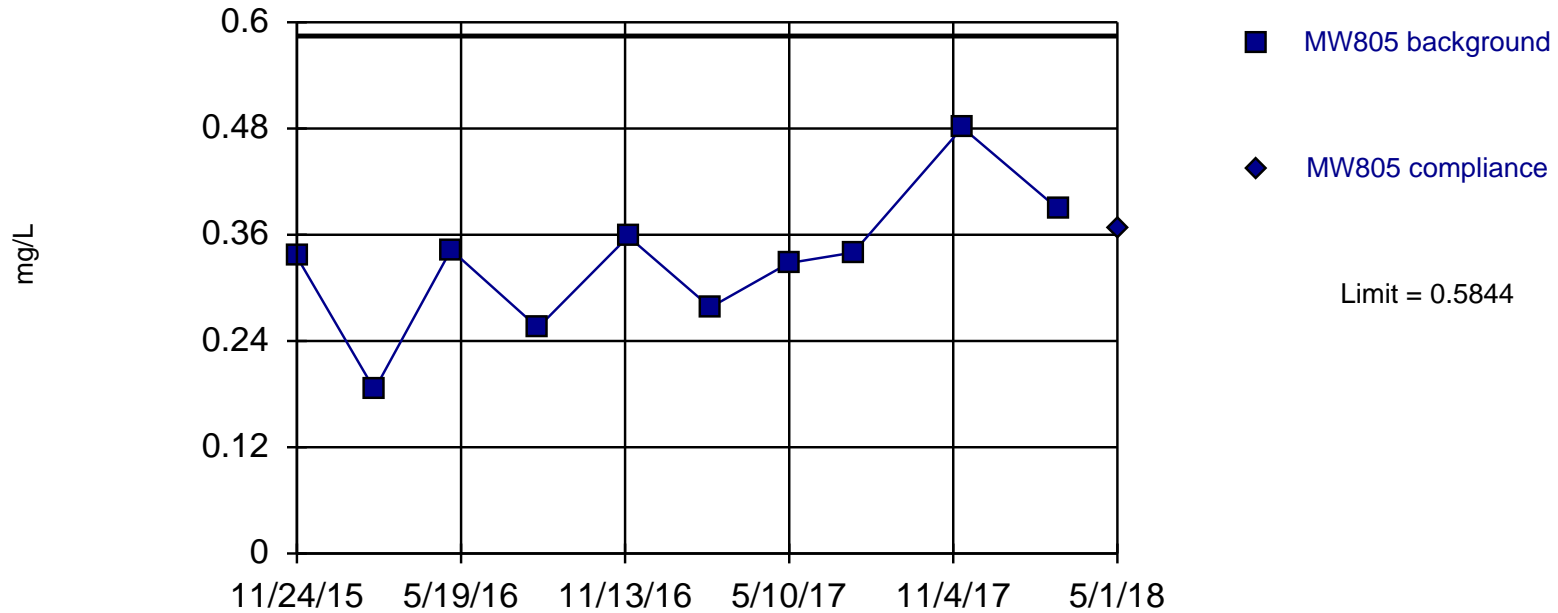


Background Data Summary (based on cube root transformation): Mean=0.6032, Std. Dev.=0.07269, n=10.
Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8493, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2,
event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Boron, total Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

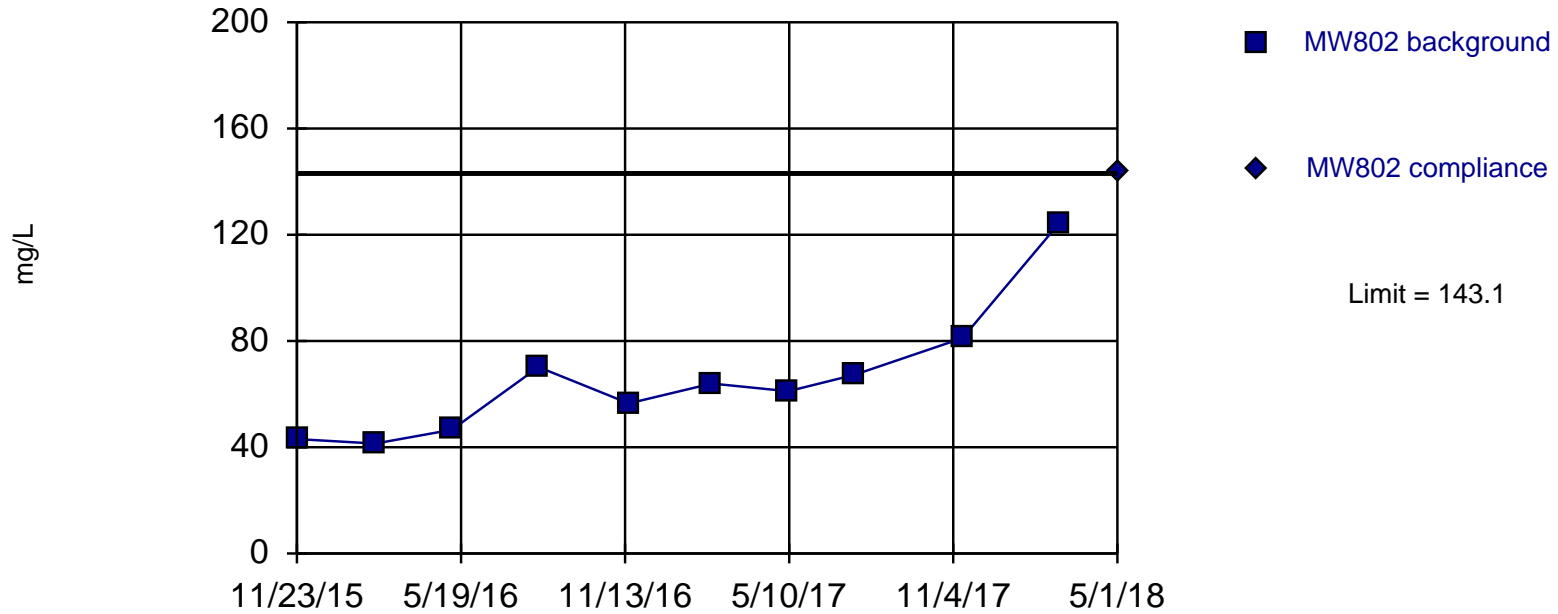


Background Data Summary: Mean=0.3292, Std. Dev.=0.07938, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9584, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Boron, total Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Exceeds Limit

Prediction Limit Intrawell Parametric

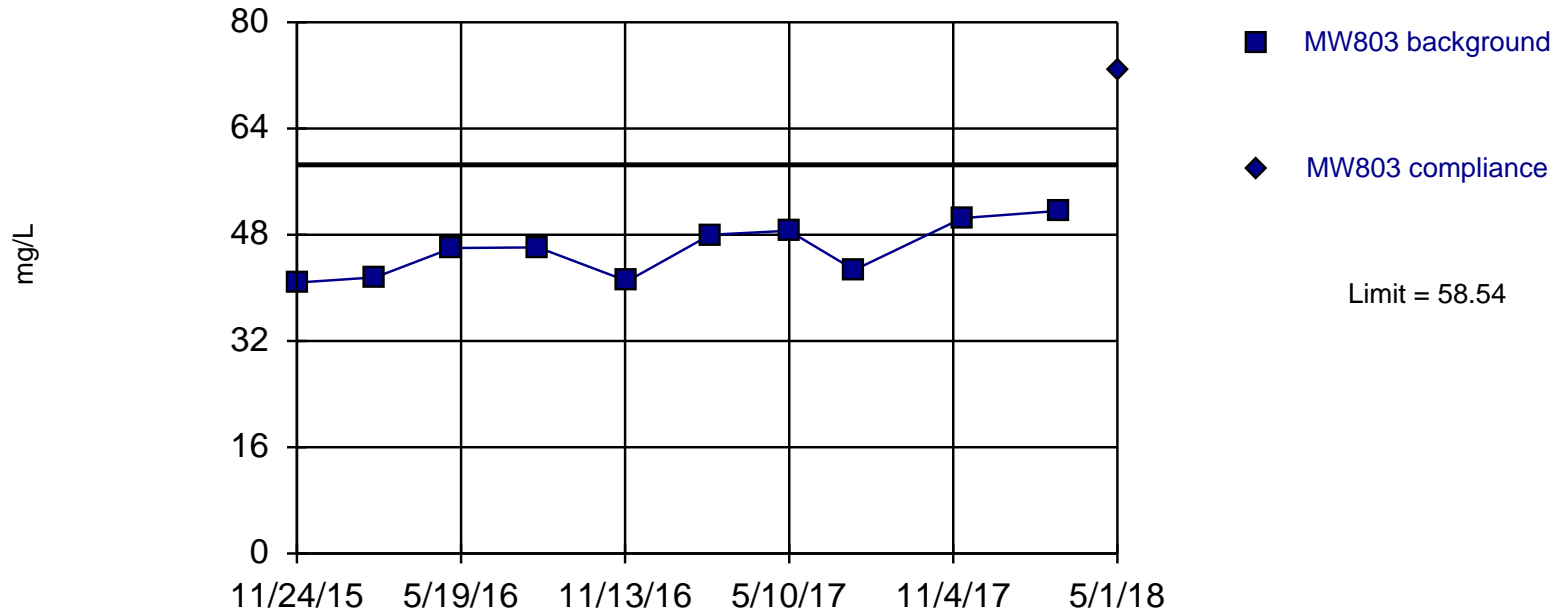


Background Data Summary: Mean=65.53, Std. Dev.=24.11, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8425, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Calcium, total Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Exceeds Limit

Prediction Limit Intrawell Parametric

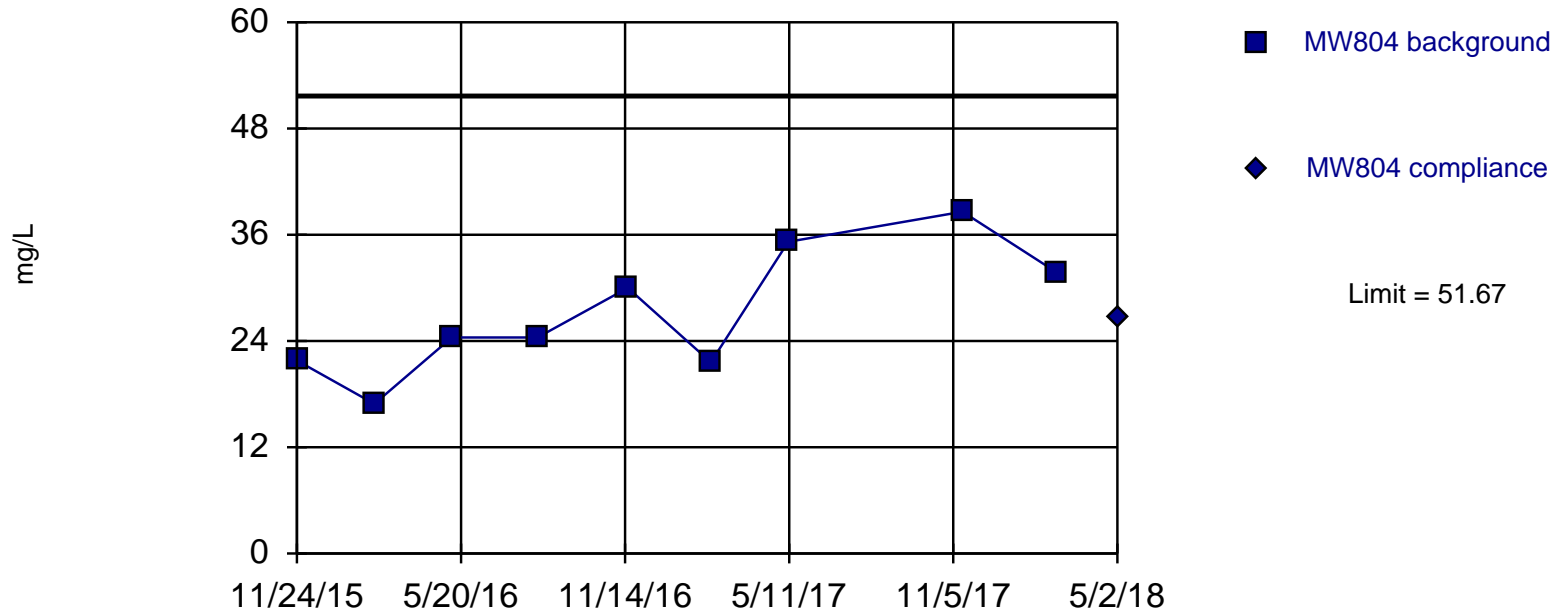


Background Data Summary: Mean=45.69, Std. Dev.=3.996, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9164, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Calcium, total Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

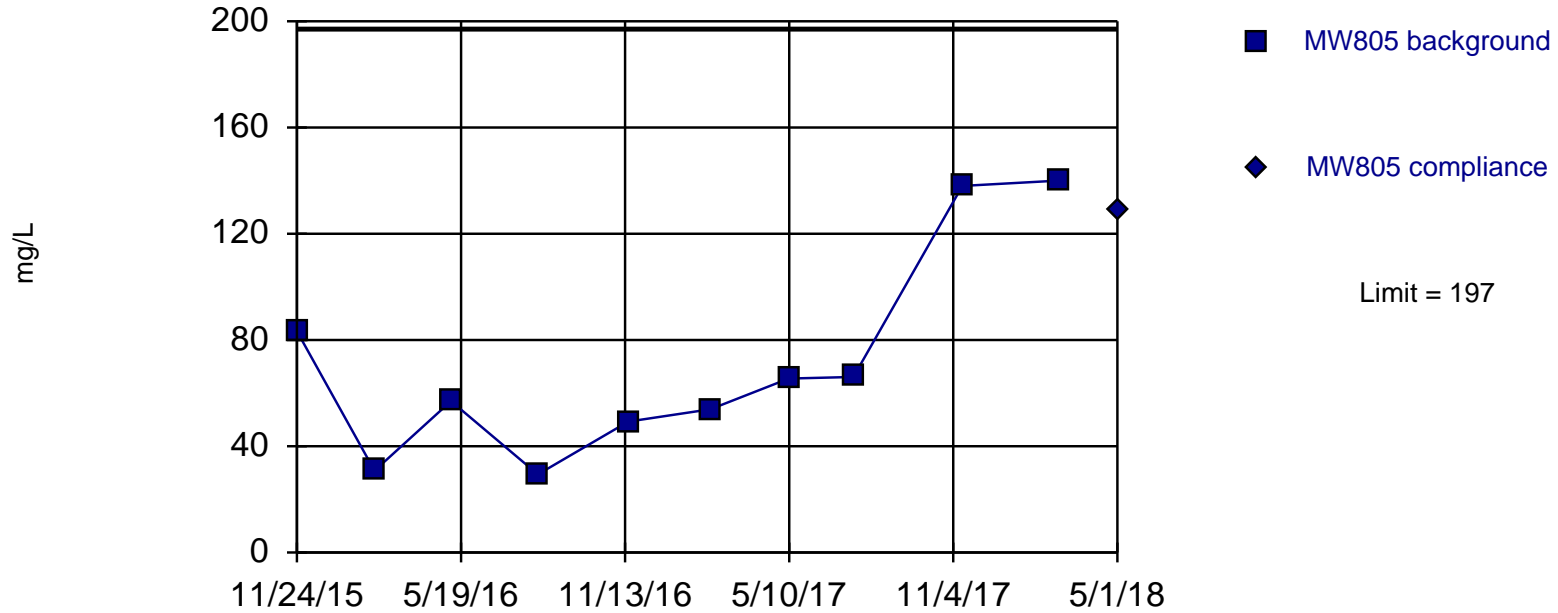


Background Data Summary: Mean=27.18, Std. Dev.=7.109, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9574, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Calcium, total Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

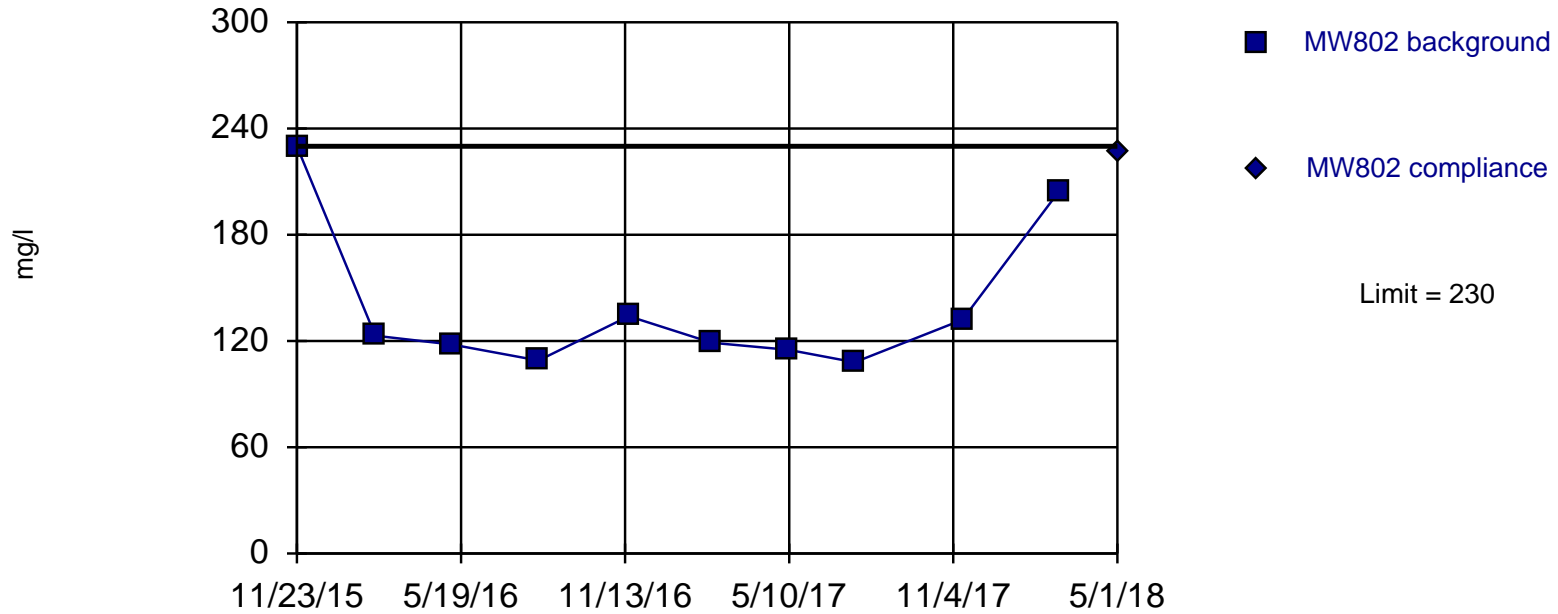


Background Data Summary: Mean=71.33, Std. Dev.=39.1, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8455, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Calcium, total Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Non-parametric

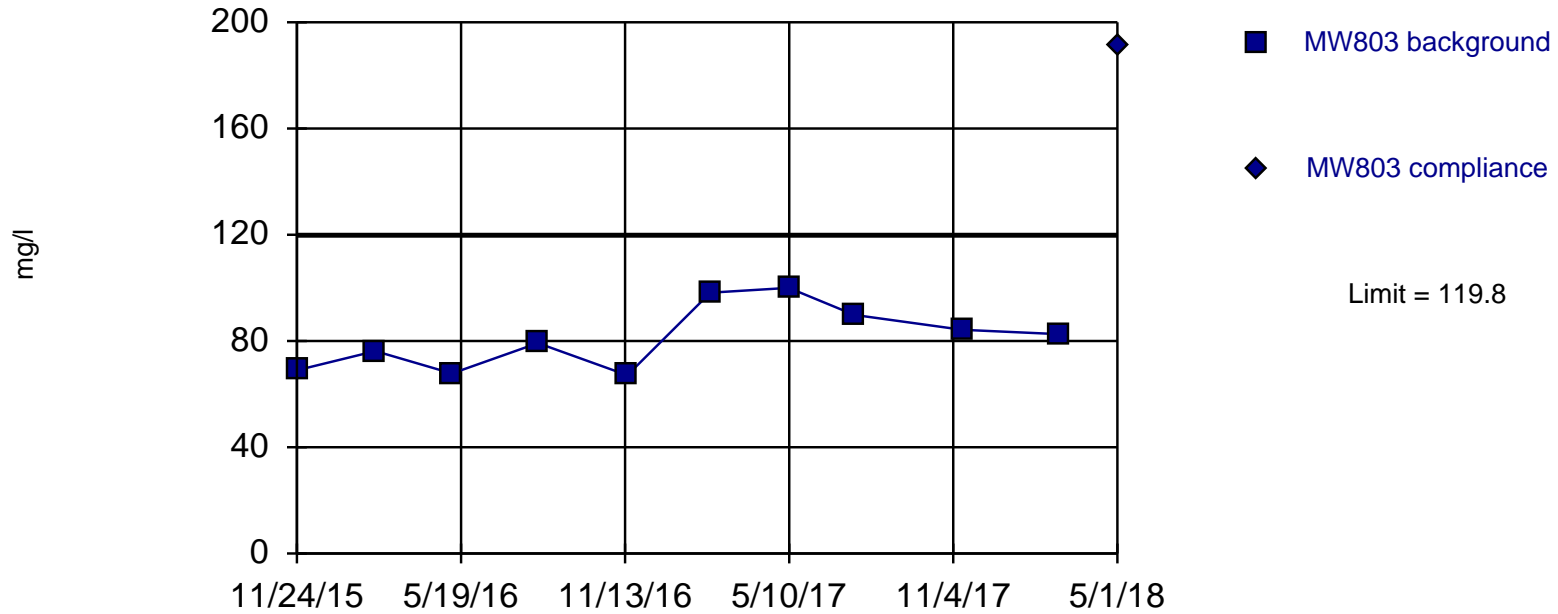


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 10 background values. Well-constituent pair annual alpha = 0.0293. Individual comparison alpha = 0.01476 (1 of 2).

Constituent: Chloride Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Exceeds Limit

Prediction Limit Intrawell Parametric

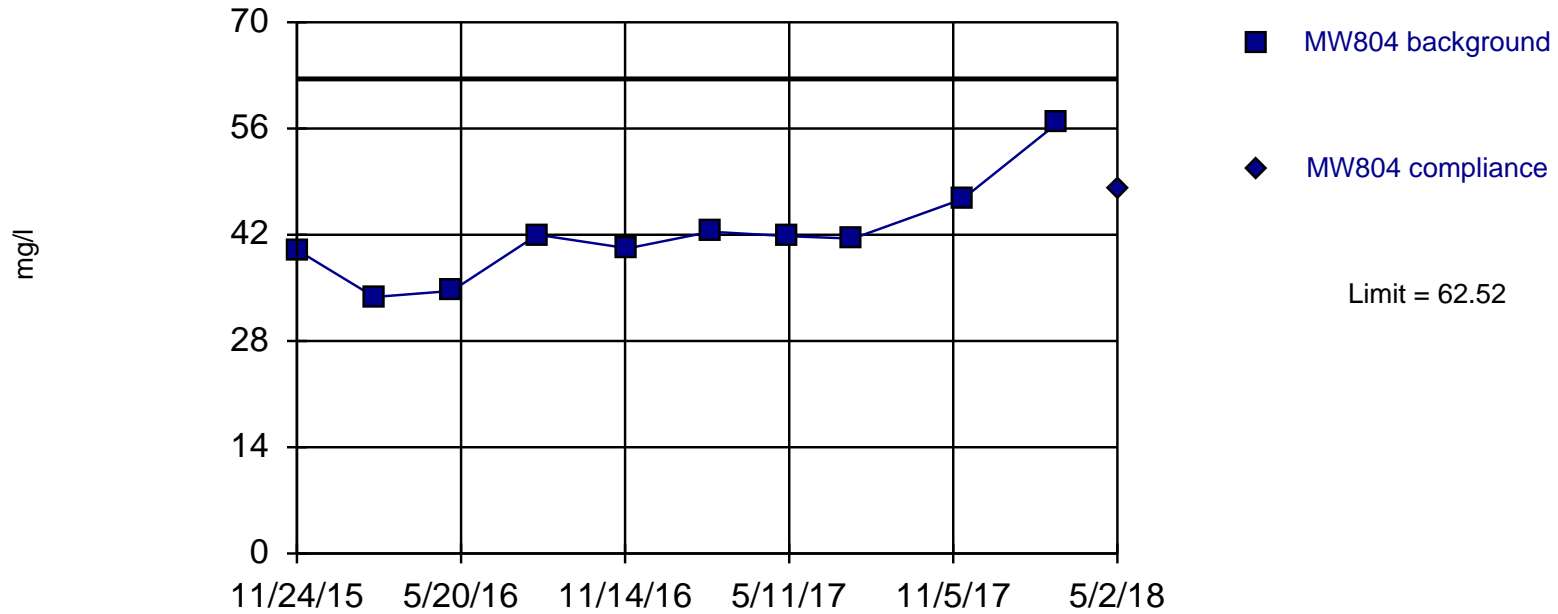


Background Data Summary: Mean=81.41, Std. Dev.=11.94, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9251, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Chloride Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

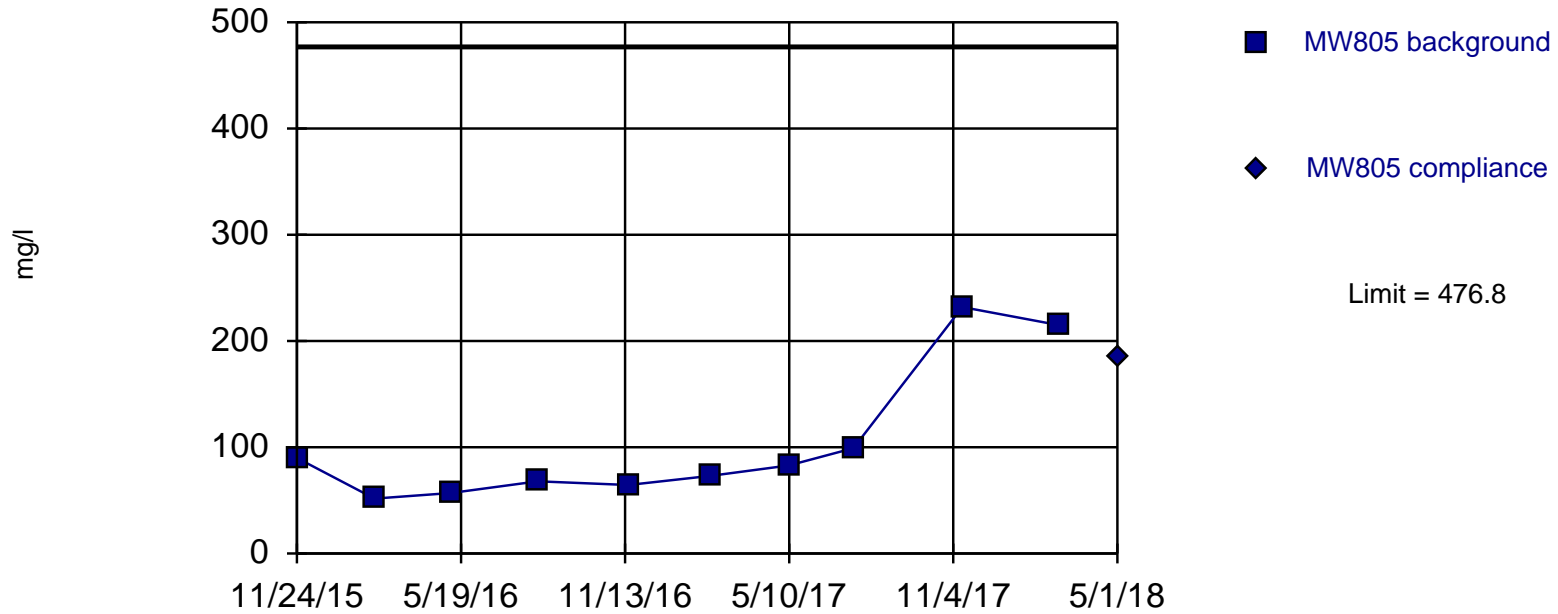


Background Data Summary: Mean=41.97, Std. Dev.=6.393, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8681, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Chloride Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

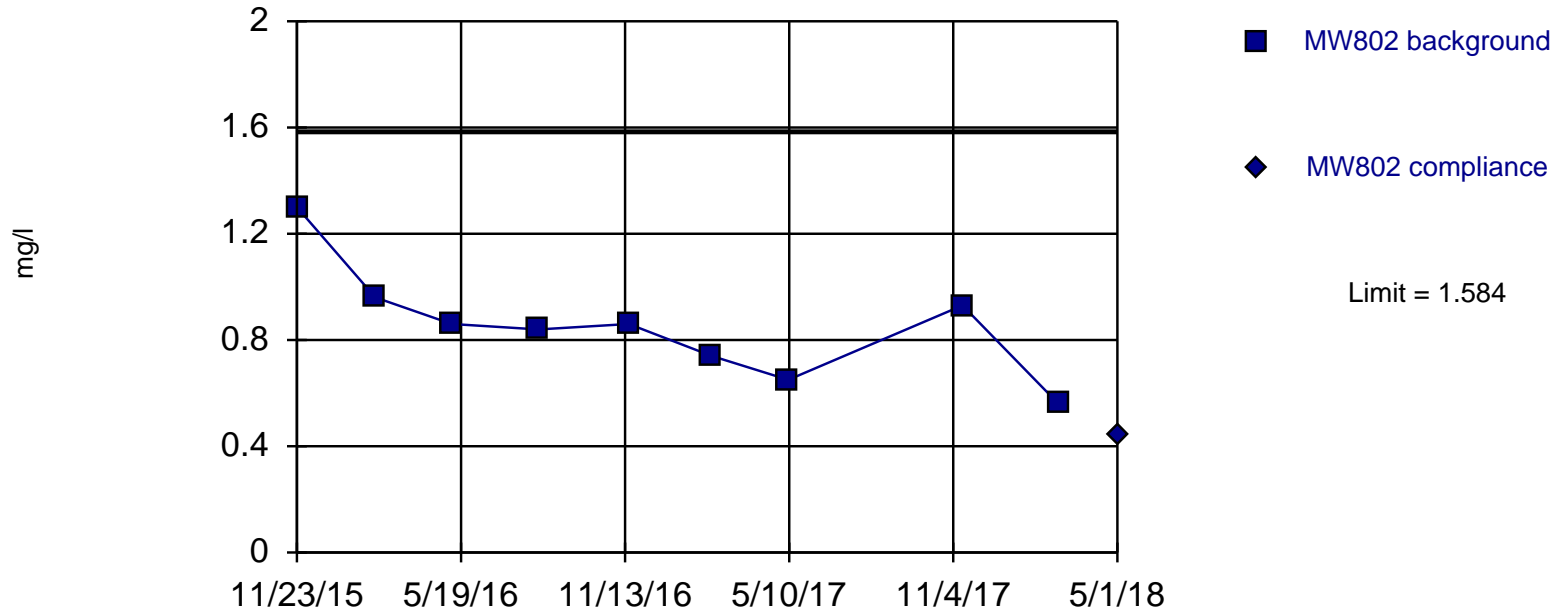


Background Data Summary (based on natural log transformation): Mean=4.499, Std. Dev.=0.5188, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8447, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Chloride Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

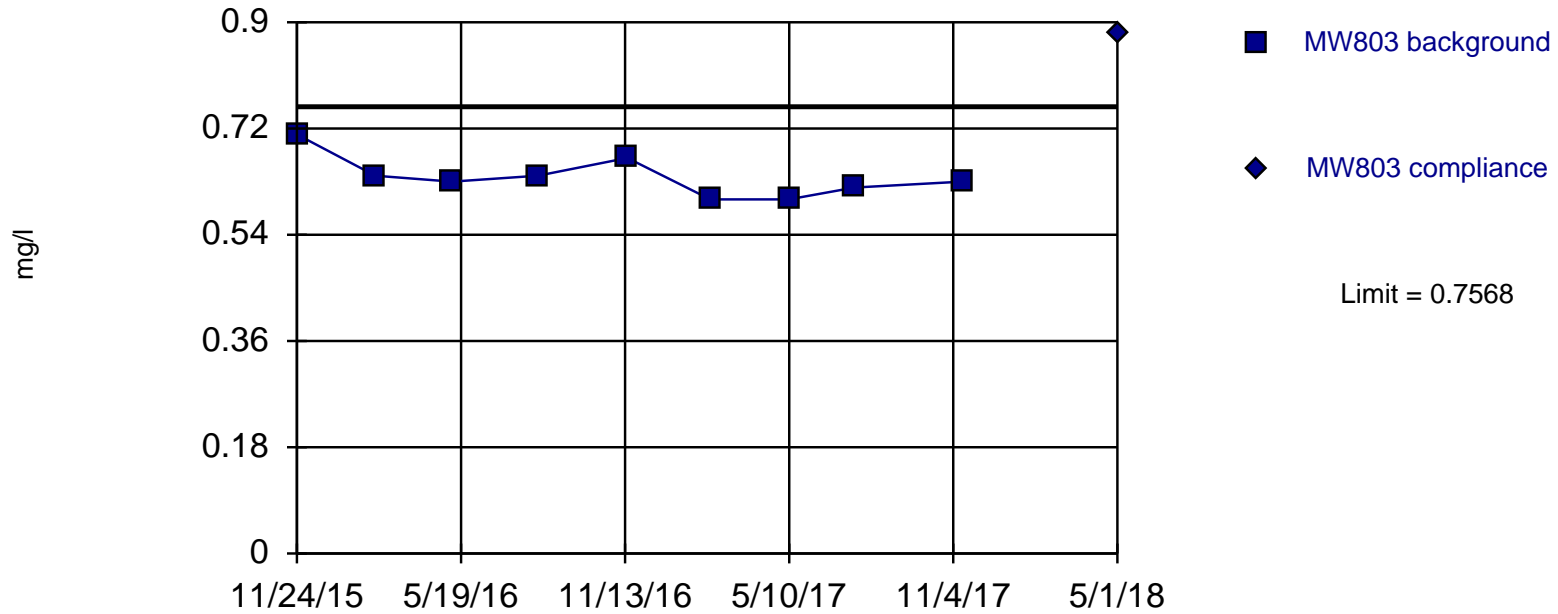


Background Data Summary: Mean=0.8556, Std. Dev.=0.2113, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9278, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Fluoride Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Exceeds Limit

Prediction Limit Intrawell Parametric

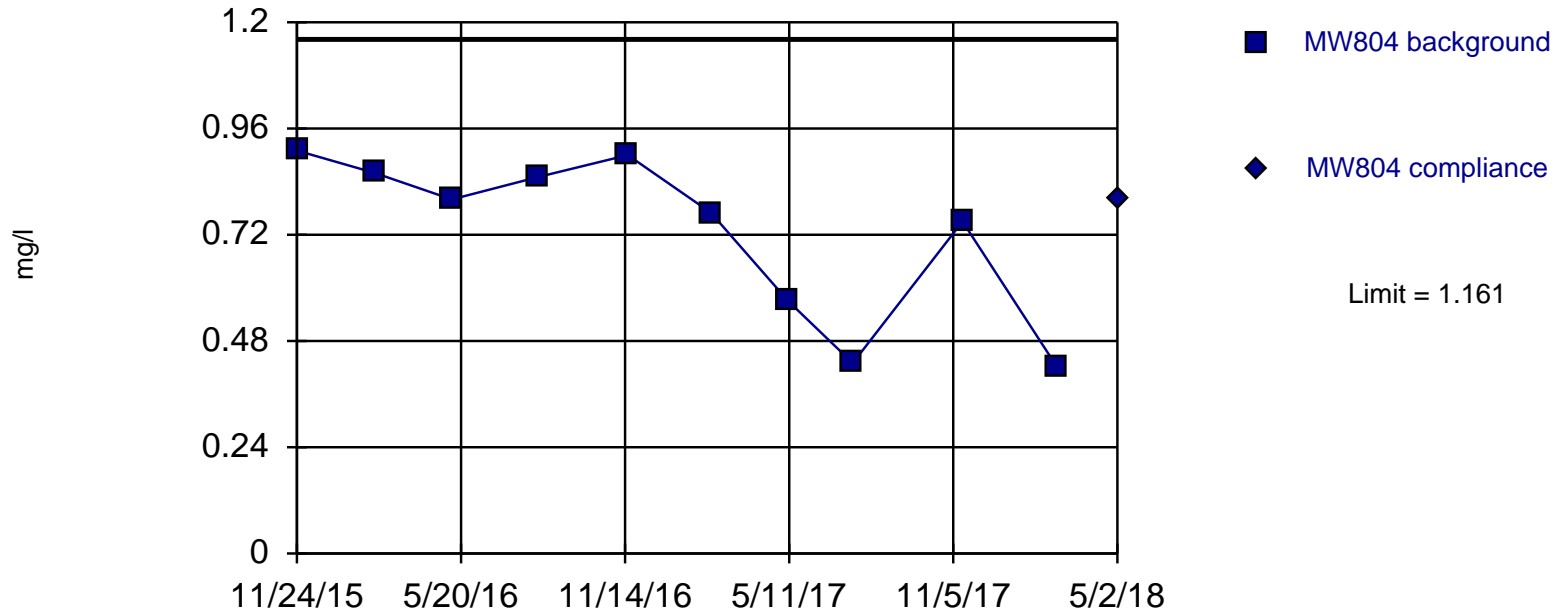


Background Data Summary: Mean=0.6378, Std. Dev.=0.03456, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.893, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Fluoride Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

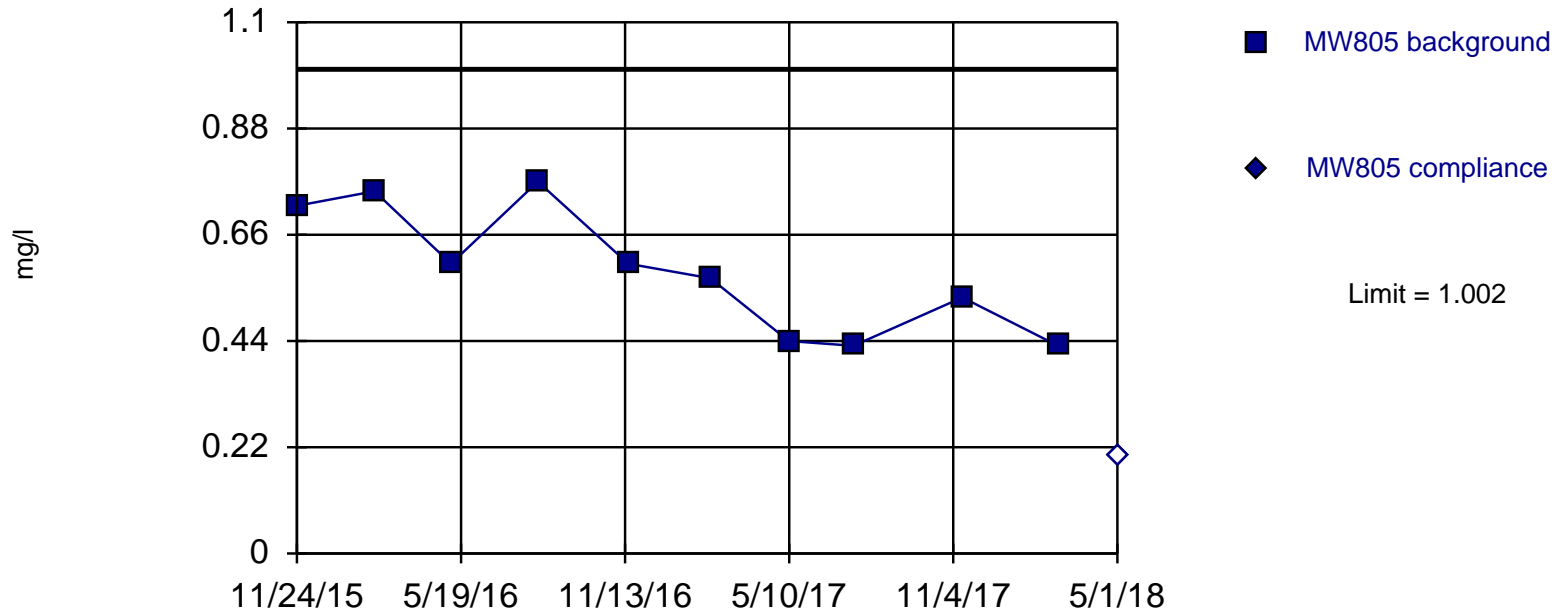


Background Data Summary (based on square transformation): Mean=0.5582, Std. Dev.=0.2458, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8758, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Fluoride Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

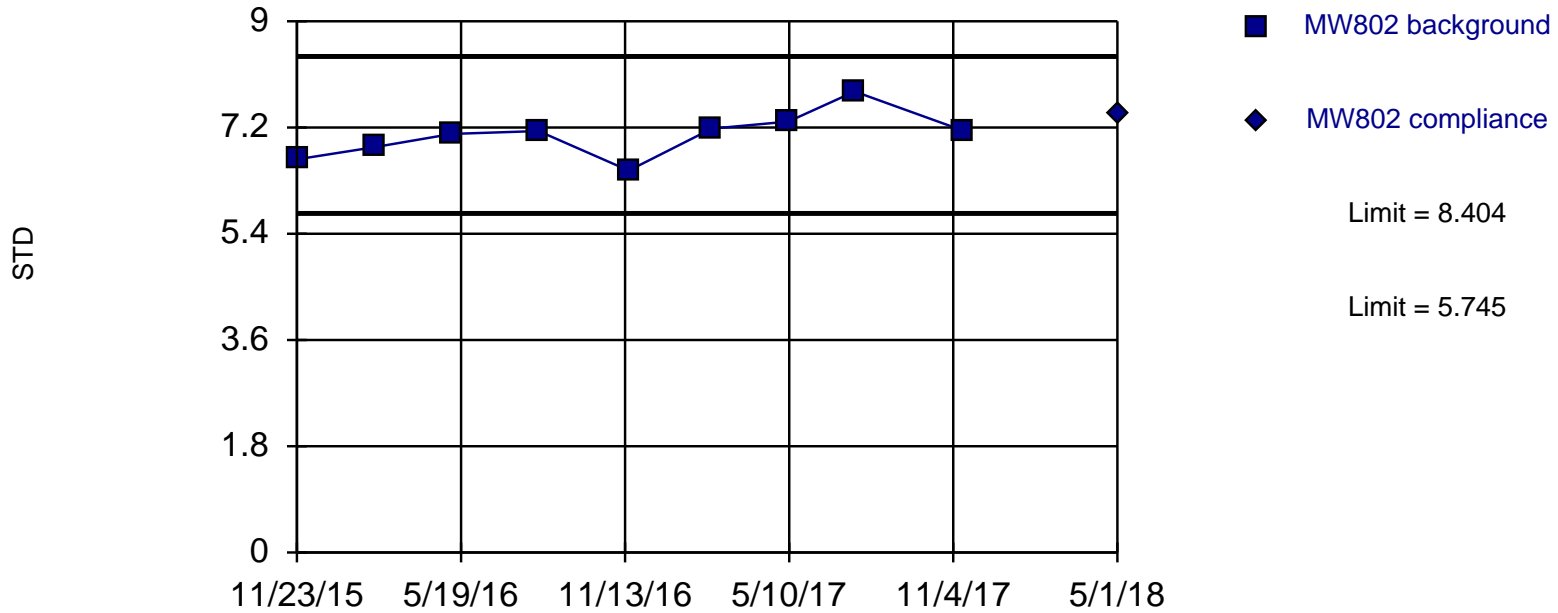


Background Data Summary: Mean=0.584, Std. Dev.=0.1301, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8988, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Fluoride Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limits

Prediction Limit Intrawell Parametric

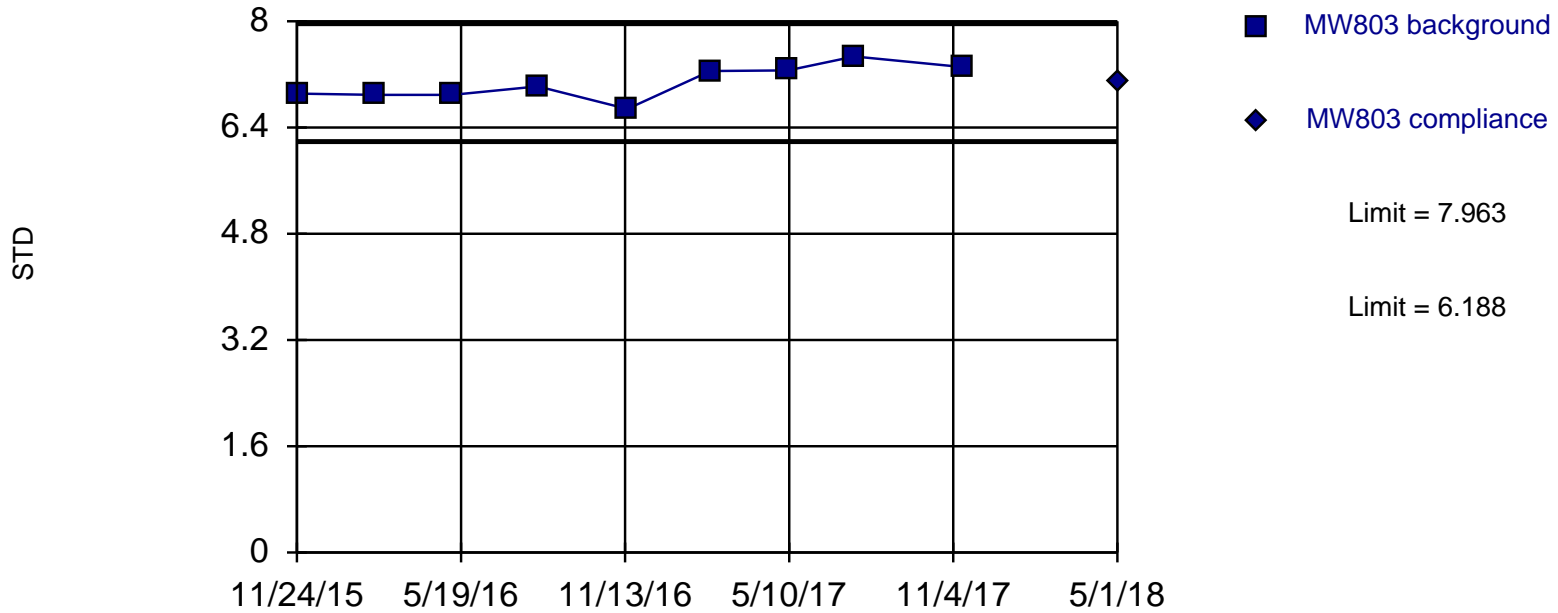


Background Data Summary: Mean=7.074, Std. Dev.=0.386, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9488, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: pH [field] Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limits

Prediction Limit Intrawell Parametric

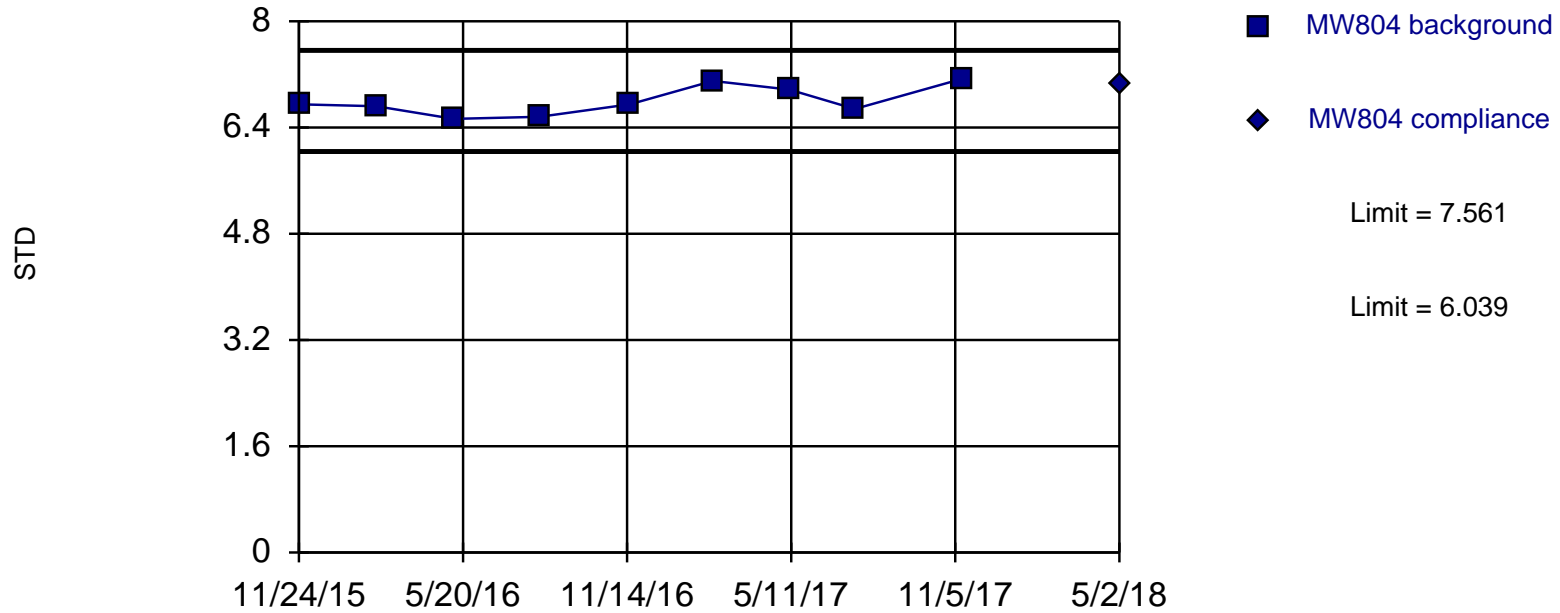


Background Data Summary: Mean=7.076, Std. Dev.=0.2576, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9409, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: pH [field] Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limits

Prediction Limit Intrawell Parametric

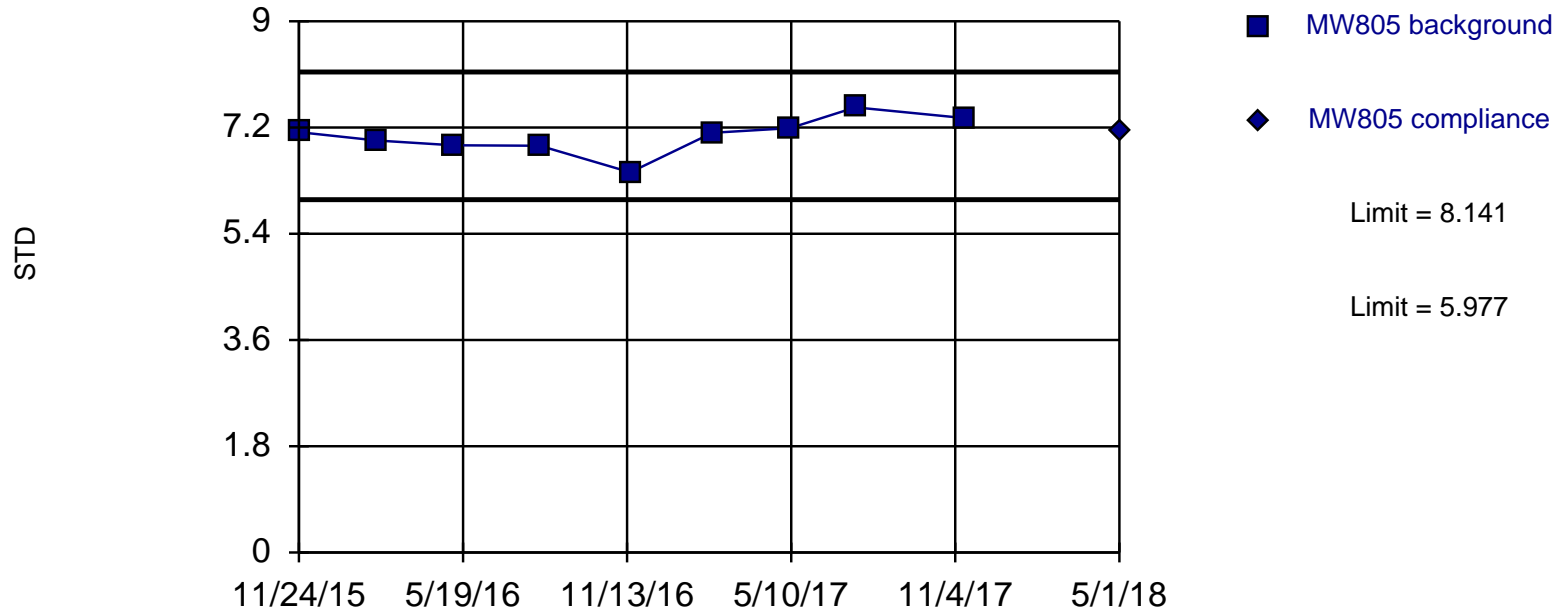


Background Data Summary: Mean=6.8, Std. Dev.=0.221, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9043, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: pH [field] Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limits

Prediction Limit Intrawell Parametric

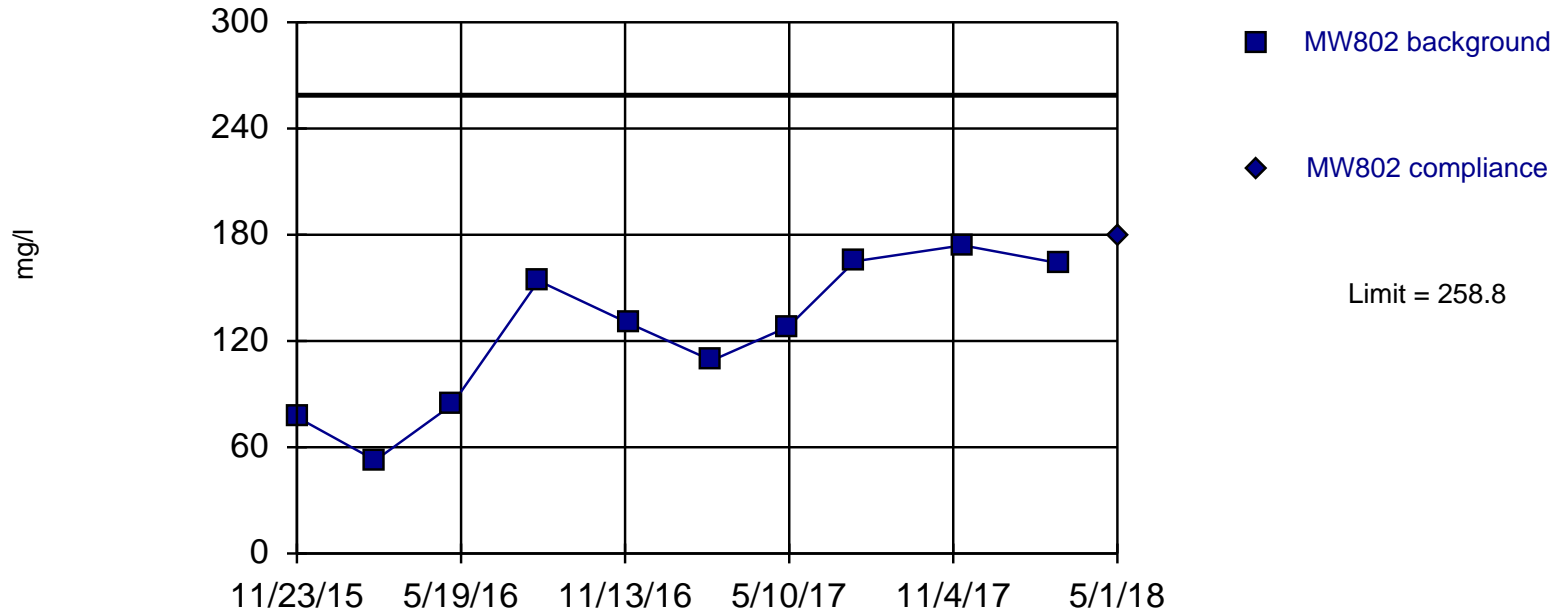


Background Data Summary: Mean=7.059, Std. Dev.=0.314, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9613, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: pH [field] Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

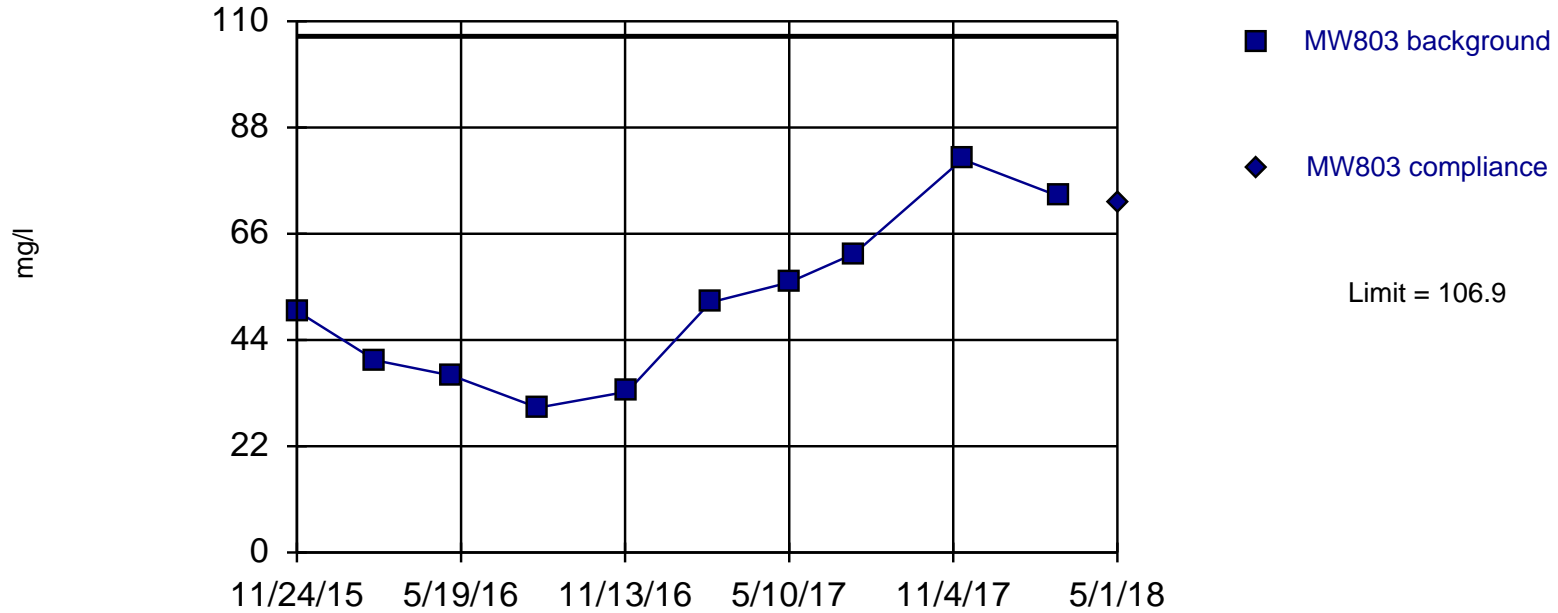


Background Data Summary: Mean=123.8, Std. Dev.=42, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9281, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Sulfate Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

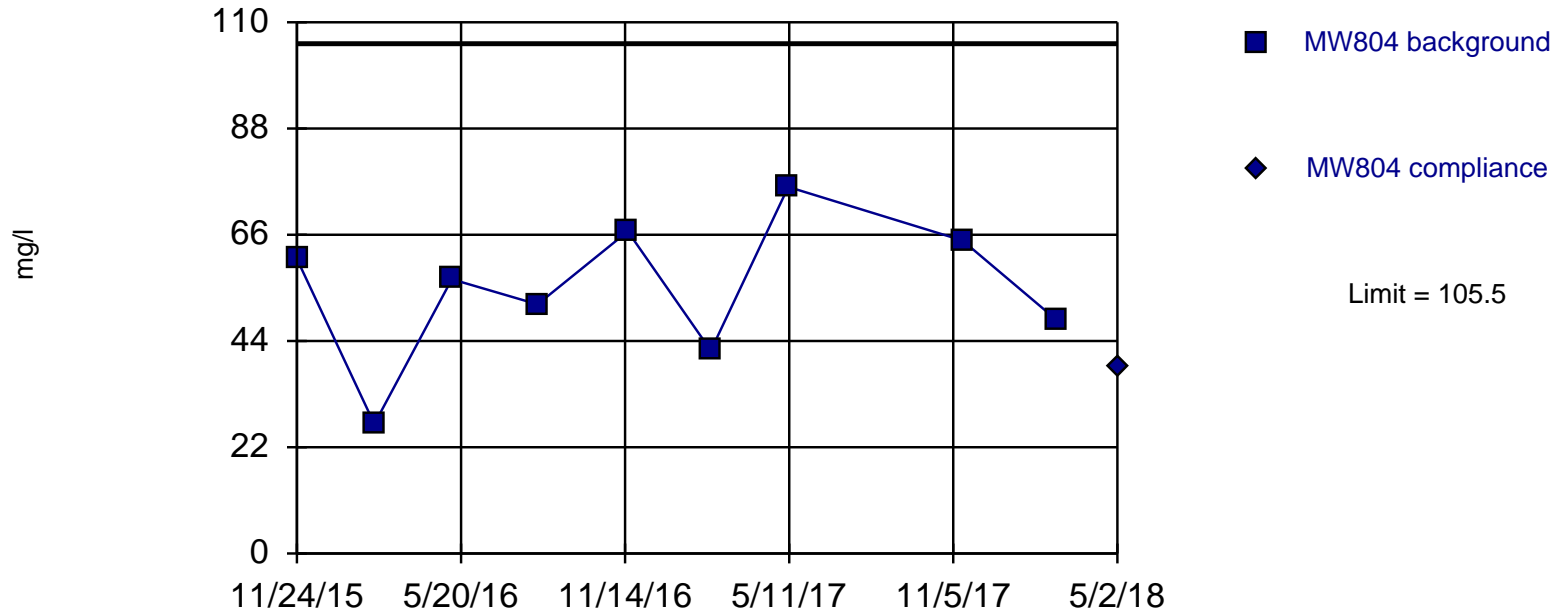


Background Data Summary: Mean=51.45, Std. Dev.=17.24, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9458, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Sulfate Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

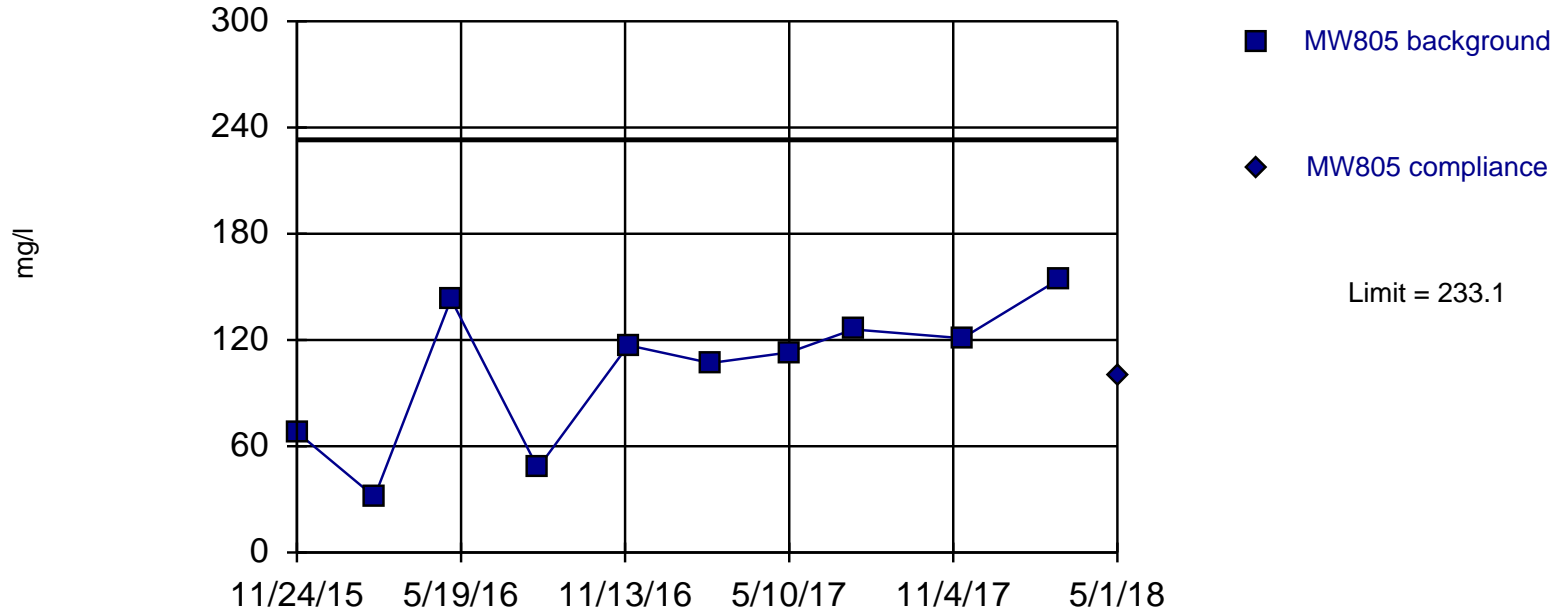


Background Data Summary: Mean=54.87, Std. Dev.=14.71, n=9. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9756, critical = 0.829. Kappa = 3.445 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Sulfate Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

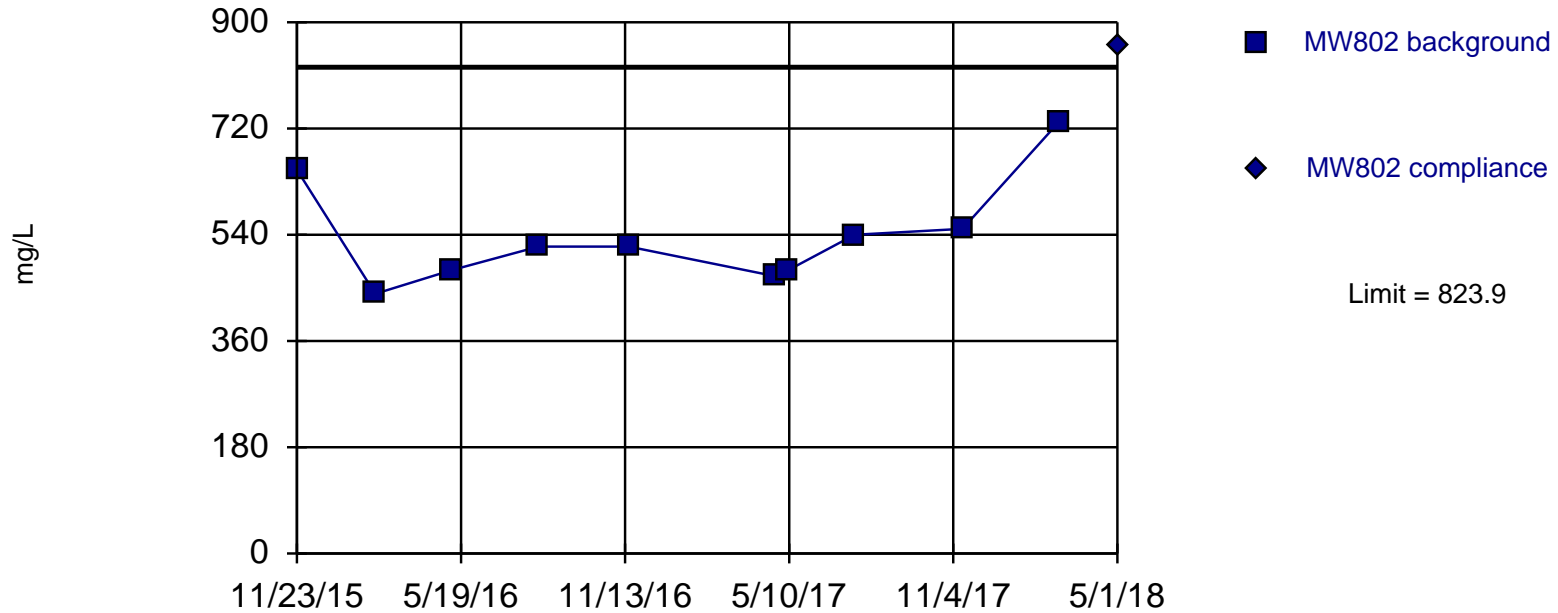


Background Data Summary: Mean=102.8, Std. Dev.=40.51, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9108, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Sulfate Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Exceeds Limit

Prediction Limit Intrawell Parametric

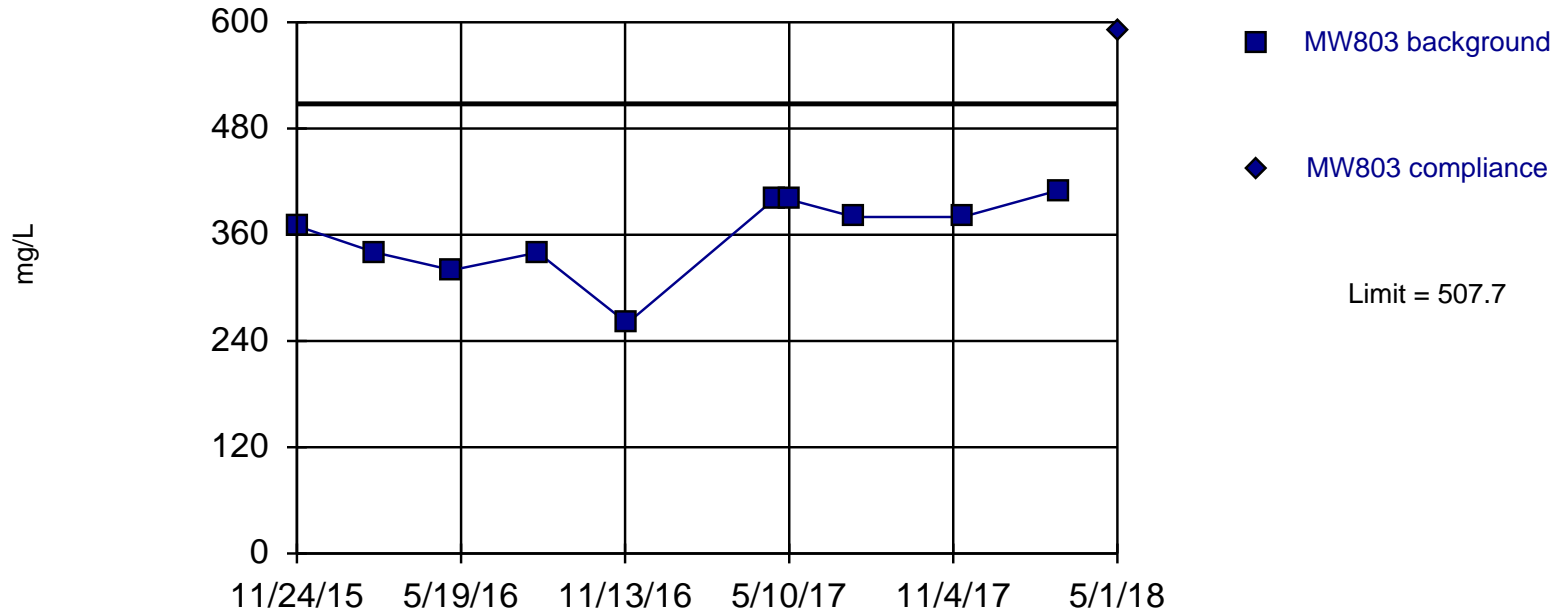


Background Data Summary: Mean=538, Std. Dev.=88.92, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8643, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Total Dissolved Solids Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Exceeds Limit

Prediction Limit Intrawell Parametric



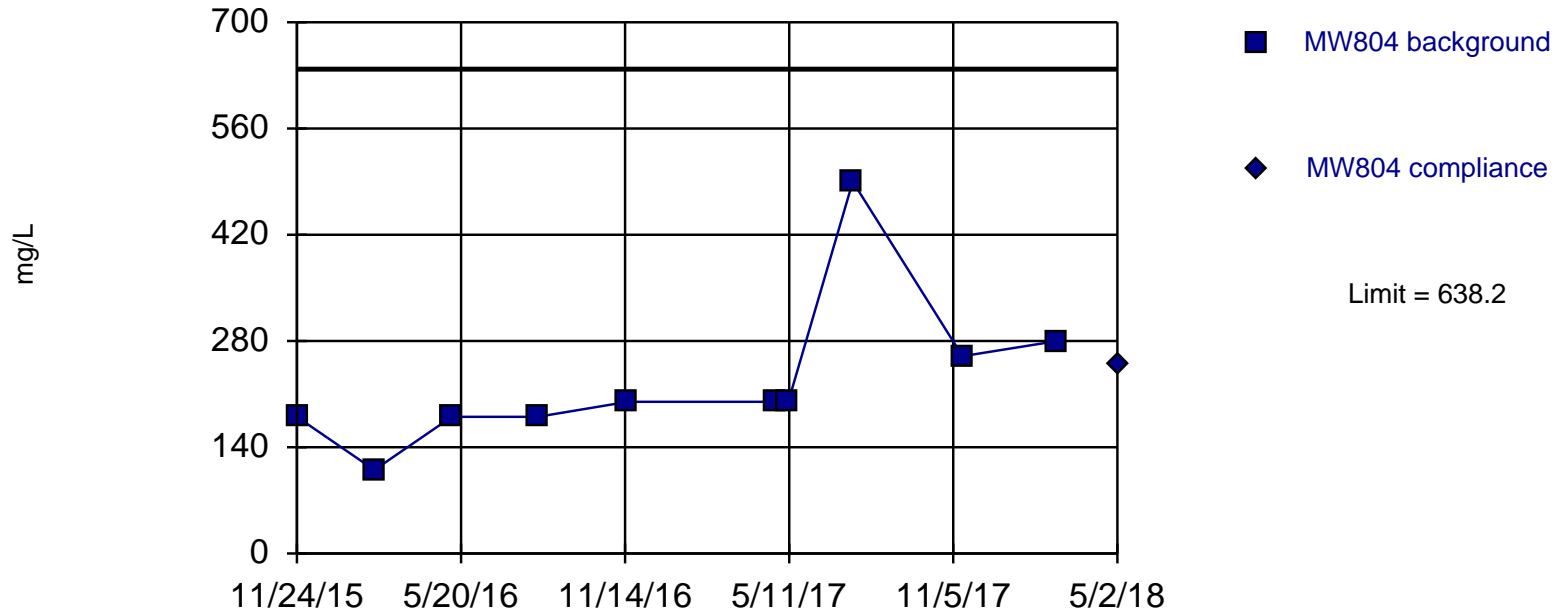
Background Data Summary: Mean=360, Std. Dev.=45.95, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8971, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Total Dissolved Solids Analysis Run 5/11/2018 2:11 PM

Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric

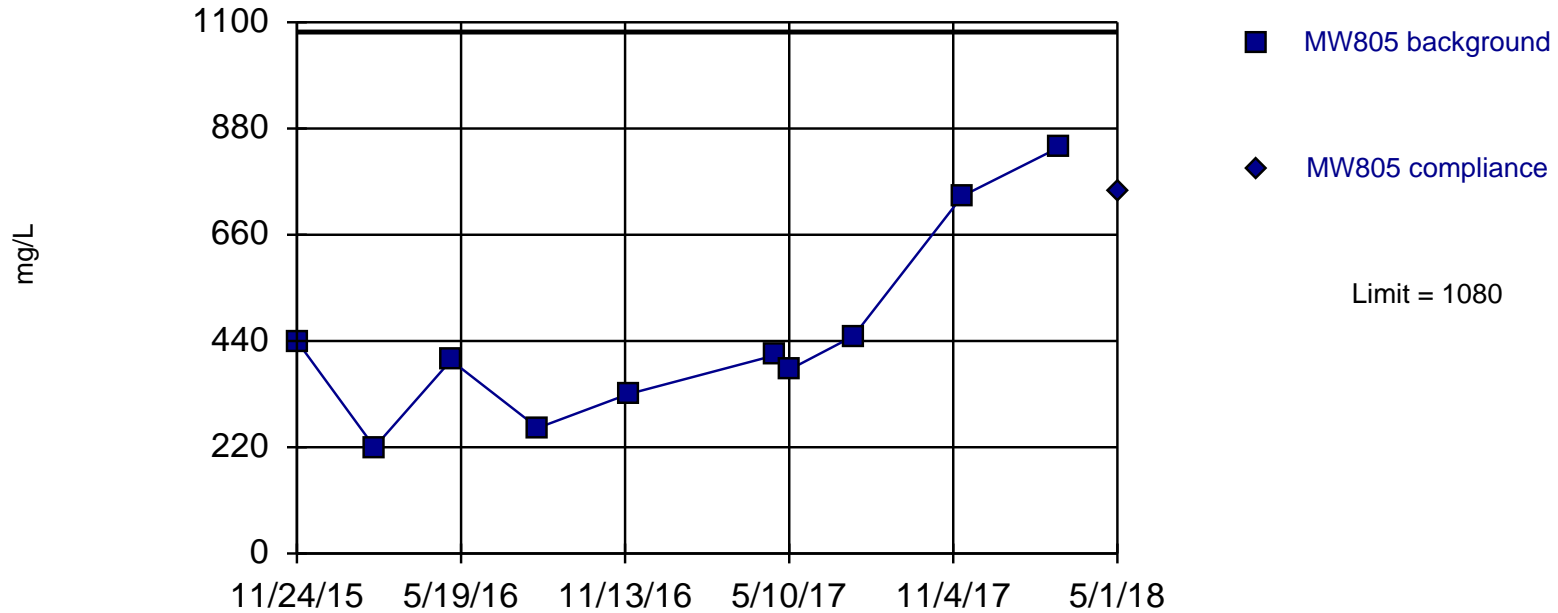


Background Data Summary (based on cube root transformation): Mean=6.008, Std. Dev.=0.8092, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8604, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Total Dissolved Solids Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Within Limit

Prediction Limit Intrawell Parametric



Background Data Summary: Mean=447, Std. Dev.=196.8, n=10. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.859, critical = 0.842. Kappa = 3.215 (c=15, w=11, 1 of 2, event alpha = 0.05132). Report alpha = 0.0003192.

Constituent: Total Dissolved Solids Analysis Run 5/11/2018 2:11 PM
Brayton Point Client: GEI Data: Brayton Point CCR Database

Appendix C

Well Installation Logs

Groundwater Well Installation Log

MW-901

Project Brayton Point Redevelopment
City / Town Somerset, MA
Client Brayton Point, LLC
Contractor Northern Drill Service, Inc.
Driller J. Bierholm **GEI Rep.** D. Litton

GEI Proj. No. 1803990
Location _____
N: 2720904.95
E: 740947.81
Install Date 11/13/2018

Survey

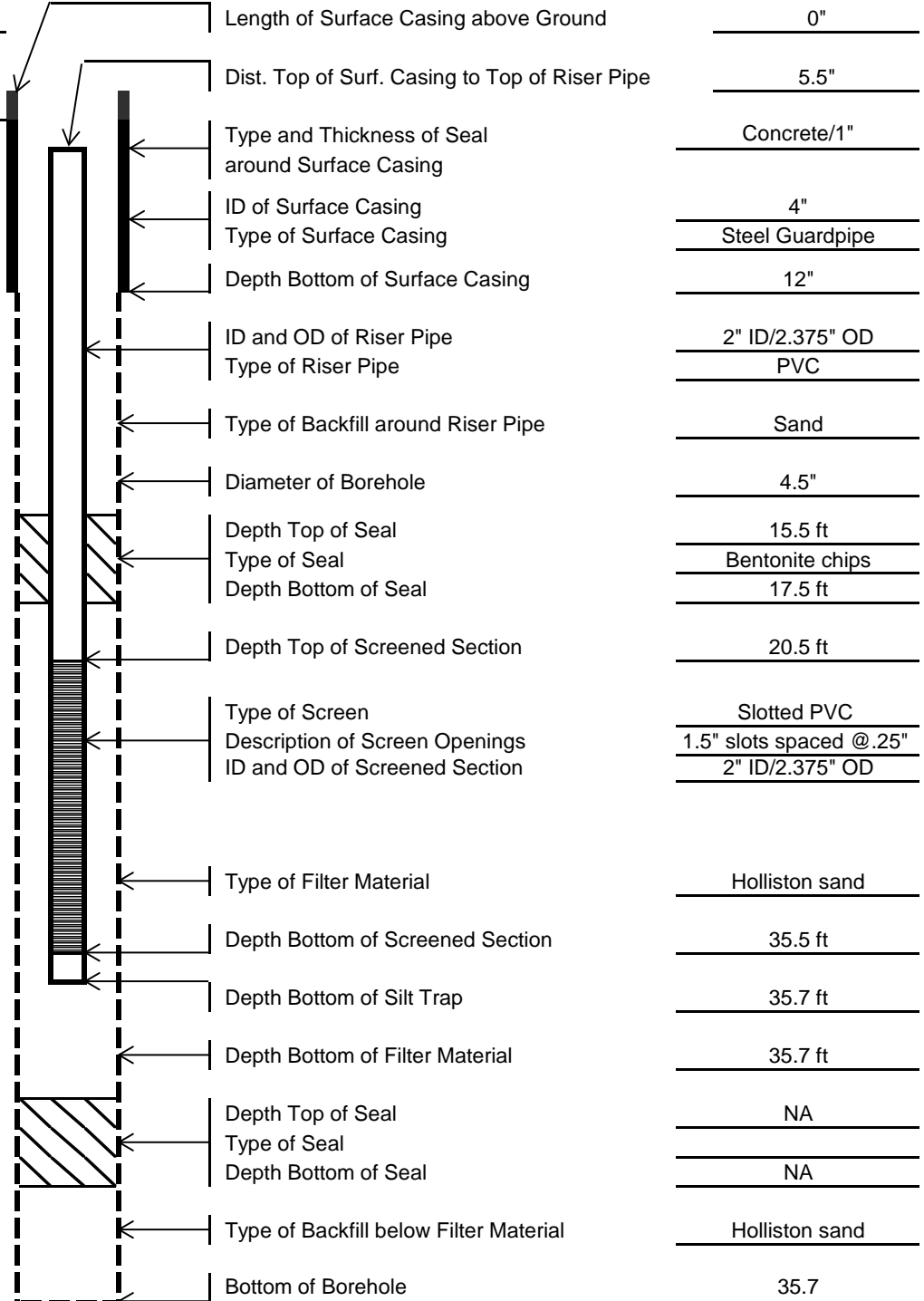
Datum: NAD 1983 (2011)

Ground Elevation:

-74.44

Date	11/14/2018	11/14/2018	11/14/2018
Time	7:25 AM	11:03 AM	11:03 AM
Distance to ▼ below top of riser pipe	12.9 ft (below asphalt)	12.55 ft (top of riser)	

General Soil Conditions (Not to Scale)



Length of Surface Casing above Ground	<u>0"</u>
Dist. Top of Surf. Casing to Top of Riser Pipe	<u>5.5"</u>
Type and Thickness of Seal around Surface Casing	<u>Concrete/1"</u>
ID of Surface Casing	<u>4"</u>
Type of Surface Casing	<u>Steel Guardpipe</u>
Depth Bottom of Surface Casing	<u>12"</u>
ID and OD of Riser Pipe	<u>2" ID/2.375" OD</u>
Type of Riser Pipe	<u>PVC</u>
Type of Backfill around Riser Pipe	<u>Sand</u>
Diameter of Borehole	<u>4.5"</u>
Depth Top of Seal	<u>15.5 ft</u>
Type of Seal	<u>Bentonite chips</u>
Depth Bottom of Seal	<u>17.5 ft</u>
Depth Top of Screened Section	<u>20.5 ft</u>
Type of Screen	<u>Slotted PVC</u>
Description of Screen Openings	<u>1.5" slots spaced @.25"</u>
ID and OD of Screened Section	<u>2" ID/2.375" OD</u>
Type of Filter Material	<u>Holliston sand</u>
Depth Bottom of Screened Section	<u>35.5 ft</u>
Depth Bottom of Silt Trap	<u>35.7 ft</u>
Depth Bottom of Filter Material	<u>35.7 ft</u>
Depth Top of Seal	<u>NA</u>
Type of Seal	<u>NA</u>
Depth Bottom of Seal	<u>NA</u>
Type of Backfill below Filter Material	<u>Holliston sand</u>
Bottom of Borehole	<u>35.7</u>

Notes:



Groundwater Well Installation Log

MW-902

Project Brayton Point Redevelopment
City / Town Somerset, MA
Client Brayton Point, LLC
Contractor Northern Drill Service, Inc.
Driller J. Bierholm **GEI Rep.** D. Litton

GEI Proj. No. 1803990
Location _____
N: 2721059.52
E: 741044.55
Install Date 11/14/2018

Survey

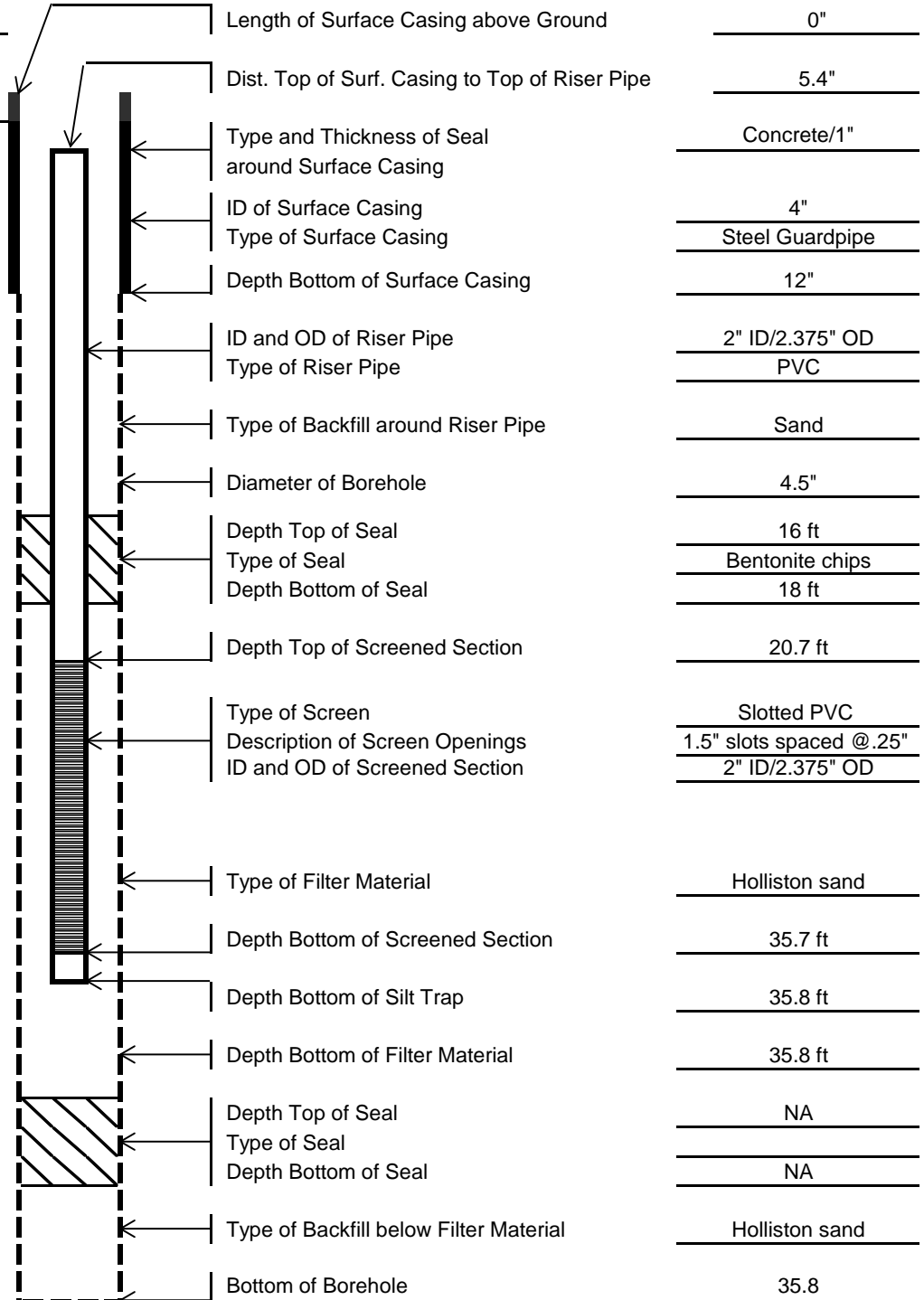
Datum: NAD 1983 (2011)

Ground

Elevation: -74.44

	11/14/2018	
Date	11:15 AM	
Time		13.25 ft
Distance to ▼ below top of riser pipe		

General Soil Conditions (Not to Scale)



Length of Surface Casing above Ground	<u>0"</u>
Dist. Top of Surf. Casing to Top of Riser Pipe	<u>5.4"</u>
Type and Thickness of Seal around Surface Casing	<u>Concrete/1"</u>
ID of Surface Casing	<u>4"</u>
Type of Surface Casing	<u>Steel Guardpipe</u>
Depth Bottom of Surface Casing	<u>12"</u>
ID and OD of Riser Pipe	<u>2" ID/2.375" OD</u>
Type of Riser Pipe	<u>PVC</u>
Type of Backfill around Riser Pipe	<u>Sand</u>
Diameter of Borehole	<u>4.5"</u>
Depth Top of Seal	<u>16 ft</u>
Type of Seal	<u>Bentonite chips</u>
Depth Bottom of Seal	<u>18 ft</u>
Depth Top of Screened Section	<u>20.7 ft</u>
Type of Screen	<u>Slotted PVC</u>
Description of Screen Openings	<u>1.5" slots spaced @.25"</u>
ID and OD of Screened Section	<u>2" ID/2.375" OD</u>
Type of Filter Material	<u>Holliston sand</u>
Depth Bottom of Screened Section	<u>35.7 ft</u>
Depth Bottom of Silt Trap	<u>35.8 ft</u>
Depth Bottom of Filter Material	<u>35.8 ft</u>
Depth Top of Seal	<u>NA</u>
Type of Seal	<u>NA</u>
Depth Bottom of Seal	<u>NA</u>
Type of Backfill below Filter Material	<u>Holliston sand</u>
Bottom of Borehole	<u>35.8</u>

Notes:

