Annual Groundwater Monitoring Report

DTE Electric Company
Monroe Power Plant Bottom Ash Basin
Inactive Coal Combustion Residual Unit

3500 East Front Street
Monroe, Michigan

July 2019

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Prepared For
DTE Electric Company

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Executive Summary

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended July 30, 2018. The CCR Rule, which became effective on October 19, 2015 (amendment effective August 29, 2018), applies to the DTE Electric Company (DTE Electric) Monroe Power Plant (MONPP) Bottom Ash Basin (BAB) Inactive CCR unit. On August 5, 2016, the USEPA published the CCR Rule companion *Extension of Compliance Deadlines for Certain Inactive Surface Impoundments*, which established the compliance deadlines for CCR units that were inactive prior to April 17, 2018. Pursuant to the CCR Rule, no later than August 1, 2019, and annually thereafter, the owner or operator of an inactive CCR unit must prepare an annual groundwater monitoring and corrective action report for the CCR unit documenting the status of groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e).

TRC prepared this Annual Groundwater Monitoring Report (Annual Report) for the MONPP BAB Inactive CCR unit on behalf of DTE Electric. This Annual Report was prepared in accordance with the requirements of §257.90(e) and presents the monitoring results and the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule) for the May 2019 semiannual groundwater monitoring event for the MONPP BAB Inactive CCR unit. This event is the initial detection monitoring event performed to comply with §257.94. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) in detection monitoring parameters to determine if concentrations in detection monitoring well samples exceed background levels.

Potential SSIs over background limits were noted for boron, sulfate, and total dissolved solids (TDS) in one or more downgradient wells for the May 2019 monitoring event. This is the initial detection monitoring event; therefore, it is the initial identification of a potential SSI over background levels. Verification resampling was performed in July 2019 in order to confirm or refute the potential SSIs. The results of the verification resampling showed that the initial exceedances for sulfate and TDS are not statistically significant; therefore, no SSIs are recorded for those constituents during initial detection monitoring event. However, the boron concentration at one monitoring location was verified by the resampling and will be recorded as an SSI.

According to §257.94(e), if the facility determines, pursuant to §257.93(h), that there is a SSI over background levels for one or more of the Appendix III constituents, the facility will, within 90 days of detecting a SSI, establish an assessment monitoring program **<or>** demonstrate that:

- A source other than the CCR unit caused the SSI, or
- The SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

In response to the boron SSI over the background limit noted during the May 2019 monitoring event, DTE Electric plans to prepare an Alternative Source Demonstration (ASD) to evaluate the SSI. Based on the results from the ASD, DTE will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

Section 1
Introduction

1.1 Program Summary

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended July 30, 2018. The CCR Rule, which became effective on October 19, 2015 (amendment effective August 29, 2018), applies to the DTE Electric Company (DTE Electric) Monroe Power Plant (MONPP) Bottom Ash Basin (BAB) Inactive CCR unit. On August 5, 2016, the USEPA published the CCR Rule companion *Extension of Compliance Deadlines for Certain Inactive Surface Impoundments*, which established the compliance deadlines for CCR units that were inactive prior to April 17, 2018. Pursuant to the CCR Rule, no later than August 1, 2019, and annually thereafter, the owner or operator of an inactive CCR unit must prepare an annual groundwater monitoring and corrective action report for the CCR unit documenting the status of groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e).

TRC prepared this Annual Groundwater Monitoring Report (Annual Report) for the MONPP BAB CCR unit on behalf of DTE Electric. This Annual Report was prepared in accordance with the requirements of §257.90(e) and presents the monitoring results and the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule) for the May 2019 semiannual groundwater monitoring event for the MONPP BAB Inactive CCR unit. This event is the initial detection monitoring event performed to comply with §257.94. The monitoring was performed in accordance with the *Groundwater Monitoring Work Plan Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin DTE Monroe Plant* (Work Plan) (AECOM, September 2017) and statistically evaluated per the *Groundwater Statistical Evaluation Plan Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin DTE Monroe Plant* (Stats Plan) (AECOM, April 2019). As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) of detection monitoring parameters compared to background levels.

1.2 Site Overview

The MONPP is located in Section 16, Township 7 South, Range 9 East, at 7955 East Dunbar Road, Monroe in Monroe County, Michigan (Figure 1). The MONPP BAB Inactive CCR unit was operated from the mid-1970s through 2015 and is located within the southern portion of the MONPP parcel at latitude 41° 52' 30" North and longitude 83° 20' 70" West. The MONPP BAB Inactive CCR unit is bounded by the MONPP facility to the north and northeast, Lake Erie to

the southeast and south, and Plum Creek / the discharge canal to the west (Figure 2). DTE Electric is currently planning to close the MONPP BAB Inactive CCR unit by removing all CCR material from the basin. The design for the closure by removal is ongoing.

1.3 Geology/Hydrogeology

As presented in the Stats Plan, the bedrock in the site vicinity is overlain by approximately 40 to 50 feet of unconsolidated deposits of glacial origin. The deposits are comprised of two (2) distinct units: a hard glacial till immediately overlying bedrock and lacustrine (lake bed or lake shore) deposits which overlay the till unit. The till is comprised of over consolidated (highly compacted) gray silty to sandy clay with some cobbles and boulders, and ranges from approximately 20 to 50 feet in thickness. The overlying lacustrine deposits are composed of 10 to 30 feet of fine-grained sand and silt with some soft clay except where there is a thin, discontinuous coarse sand unit at the base of the lacustrine sequence.

Under parts of the Plant, the Inactive Bottom Ash Basin, and Process Pond areas, this sand unit ranges in thickness from 5 to 20 feet and yields groundwater. The sand unit thins progressively to the west, having a thickness of approximately 12 feet on the east side of the discharge canal and thinning to less than a few feet within 150 feet to the west of the discharge canal. Further to the west the sand unit is not evident in soil borings for monitoring wells drilled in 2016 around the Fly Ash Basin. This is consistent with the expectation that lake-deposited materials will decrease in thickness with distance away from Lake Erie. Accordingly, it appears that this sand unit is a localized lakeshore beach deposit formed by westward aggradation with rising lake level and subsequently blanketed by finer lacustrine deposits. Groundwater in the sand unit is under semi-confined conditions with groundwater elevations ranging between approximately 572.6 and 575.6 feet above mean sea level (msl).

A detailed summary of the site hydrogeology is presented in the *Monitoring Well Installation Report Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin DTE Monroe* (Well Installation Report) (AECOM, April 2019).

Section 2
Groundwater Monitoring

2.1 Monitoring Well Network

A groundwater monitoring system has been established for the MONPP BAB Inactive CCR unit as detailed in the Well Installation Report. The detection monitoring well network for the MONPP BAB Inactive CCR unit currently consists of twelve monitoring wells that are screened in the uppermost aquifer. The monitoring well locations are shown on Figure 2.

As discussed in the Stats Plan, the groundwater monitoring system wells do not serve as simple upgradient or downgradient monitoring points because of two main factors:

- The sand unit located at the bottom of the lacustrine deposits is limited in extent. The unit is present in the inactive Bottom Ash Basin area and extends a limited distance north into the main Monroe Plant area. As noted above, the sand unit extends westward but also thins out and is not present in monitoring wells located greater than 500 feet west of the CCR unit. As a consequence, there is no representative upgradient or background monitoring position available for the unit; and

- There is a strong confined hydraulic pressure in the sand unit aquifer. The overlying finer grained lacustrine deposits are relatively dry but water levels in the monitoring wells installed in the sand unit rise to within 2.5 to 12.0 feet below ground surface (bgs), likely driven by hydraulic pressure from the underlying bedrock aquifer system.

As such, an intrawell statistical approach was selected. An intrawell statistical approach requires that each of the downgradient wells doubles as the background and compliance well, where data from each individual well during a detection monitoring event is compared to a statistical limit developed using the background dataset from that same well. The monitoring system is comprised of monitoring wells MW-1S through MW-3S and MW-7S through MW-15 located around the perimeter of the MONPP BAB (total of twelve background/downgradient monitoring wells). Additional discussion related to the selection of an intrawell statistical approach is presented in the Stats Plan.

2.2 Background Sampling

Background groundwater monitoring was conducted by AECOM at the MONPP BAB Inactive CCR unit from January 2017 through February 2019 in accordance with the Work Plan. Data collection included eight or more background data collection events of static water elevation measurements, analysis for parameters required in the CCR Rule's Appendix III and Appendix

IV to Part 257, and field parameters (dissolved oxygen, oxidation reduction potential, pH, specific conductivity, temperature, and turbidity) from the twelve detection monitoring wells installed for the MONPP BAB Inactive CCR unit. An additional four background monitoring events, for a total of twelve events, were conducted for the initial five monitoring wells installed for the MONPP BAB (MW-1S, MW-2S, MW-3S, MW-7S, and MW-8S) from January 2017 through June 2017. The groundwater samples were analyzed by Pace Analytical Services, LLC. (Pace).

Background data are included in Appendix A Tables A1 through A3, where: Table A1 is a summary of static water elevation data; Table A2 is a summary of groundwater analytical data compared to potentially relevant criteria; and Table A3 is a summary of field data. In addition to the data tables, groundwater potentiometric elevation data are summarized for each background monitoring event with all twelve wells in Appendix A Figures 1 through 8.

2.3 Semiannual Groundwater Monitoring

The semiannual monitoring parameters for the detection groundwater monitoring program were selected per the CCR Rule's Appendix III to Part 257 – Constituents for Detection Monitoring. The Appendix III indicator parameters consist of boron, calcium, chloride, fluoride, pH (field reading), sulfate, and total dissolved solids (TDS) and were analyzed in accordance with the sampling and analysis plan included within the Work Plan. In addition to pH, the collected field parameters included oxidation reduction potential, specific conductivity, temperature, and turbidity.

2.3.1 Data Summary

The initial semiannual groundwater detection monitoring event for 2019 was performed May 21 through 23, 2019, by TRC personnel and samples were analyzed by TestAmerica Laboratories, Inc. (Test America) in accordance with the Work Plan. Static water elevation data were collected at all twelve monitoring well locations. Groundwater samples were collected from the twelve detection monitoring wells for the Appendix III indicator parameters and field parameters. A summary of the groundwater data collected during the May 2019 event is provided on Table 1 (static groundwater elevation data), Table 2 (analytical results), and Table 3 (field data).

2.3.2 Data Quality Review

Data from the May 2019 sampling round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The data were found to be complete and usable for the purposes of the CCR monitoring program. Particular data non-conformances are summarized in Appendix B.

2.3.3 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the most recent background sampling events showed that groundwater within the uppermost aquifer generally flows toward Lake Erie to the southeast, south and southwest. Groundwater potentiometric surface elevations measured across the Site during the May 2019 sampling event are provided on Table 1 and were used to construct a groundwater potentiometric surface map (Figure 3).

The map indicates that current groundwater flow is consistent with previous monitoring events. The average hydraulic gradient throughout the Site during this event is estimated at 0.0017 ft/ft using the 576 foot contour line and MW-9, MW-11, and MW-13, resulting in an estimated average seepage velocity of approximately 0.72 ft/day or 260 ft/year for this event, using the hydraulic conductivity of 125 ft/day averaged from the hydraulic conductivity values calculated for MW-1S, MW-3S, MW-7S, and MW-8S during aquifer testing and the assumed effective porosity of 0.3 described in the Well Installation Report .

The general flow direction is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells are appropriately positioned to detect the presence of Appendix III parameters that could potentially migrate from the MONPP BAB Inactive CCR unit.

Section 3
Statistical Evaluation

3.1 Establishing Background Limits

Per the Stats Plan, background limits were established for the Appendix III indicator parameters following the collection of at least eight background monitoring events using data collected from each of the twelve established detection monitoring wells (MW-1S through MW-3S and MW-7S through MW-15). The statistical evaluation of the background data is presented in detail in Appendix C. The Appendix III background limits for each monitoring well will be used throughout the detection monitoring period to determine whether groundwater has been impacted from the MONPP BAB Inactive CCR unit by comparing concentrations in the detection monitoring wells to their respective background limits for each Appendix III indicator parameter.

3.2 Data Comparison to Background Limits

The concentrations of the indicator parameters in each of the detection monitoring wells (MW-1S through MW-3S and MW-7S through MW-15) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from MW-1S is compared to the background limit developed using the background dataset from MW-1S, and so forth). The comparisons are presented on Table 3.

The statistical evaluation of the May 2019 Appendix III indicator parameters shows potential SSIs over background for:

- Boron at MW-8S;
- Sulfate at MW-9, MW-10, MW-11; and
- TDS at MW-9 and MW-10.

The initial observation of constituent concentration above the established background limits does not necessarily constitute a SSI. Per the Stats Plan, if there is an initial exceedance of a prediction limit for one or more of the constituents, the well(s) of concern can be resampled within 30 days of the completion of the initial statistical analysis for verification purposes. There were no SSIs compared to background for pH, calcium, chloride, or fluoride.

3.3 Verification Resampling

Verification resampling is recommended per the Stats Plan and the *USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance, USEPA,

2009) to achieve performance standards as specified by §257.93(g) in the CCR rules. Per the Stats Plan, if there is an exceedance of a prediction limit for one or more of the parameters, the well(s) of concern will be resampled within 30 days of the completion of the initial statistical analysis. Only constituents that initially exceed their statistical limit (i.e., have no previously recorded SSIs) will be analyzed for verification purposes. As such, verification resampling was conducted on July 8 and 9, 2019, by TRC personnel for boron at MW-8S, sulfate and TDS at MW-9 and MW-10, and sulfate at MW-11. A summary of the groundwater data collected during the verification resampling event is provided on Table 4. The associated data quality review is included in Appendix B.

The sulfate and TDS verification results are below the respective prediction limits, consequently the potential sulfate and TDS SSIs from the May 2019 event are not confirmed. Therefore, in accordance with the Stats Plan and the Unified Guidance, the initial exceedance is not statistically significant and no SSIs will be recorded for sulfate or TDS for the May 2019 monitoring event. The resample data for boron at MW-8S did, however, verify the initial concentration. As such, boron at MW-8S is recorded as an initial SSI.

Section 4
Conclusions and Recommendations

Potential SSIs over background limits were noted for boron, sulfate, and TDS in one or more downgradient wells during the May 2019 monitoring event. This is the initial detection monitoring event; therefore, it is the initial identification of a potential SSI over background levels. The results of the verification resampling showed that the initial exceedances for sulfate and TDS are not statistically significant; therefore, no SSIs are recorded for those constituents during initial detection monitoring event. However, the boron concentration at one monitoring location was verified by the resampling.

According to §257.94(e), in the event that the facility determines, pursuant to §257.93(h), that there is a SSI over background levels for one or more of the Appendix III constituents, the facility will, within 90 days of detecting a SSI, establish an assessment monitoring program **<or>** demonstrate that:

- A source other than the CCR unit caused the SSI, or
- The SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

The owner or operator must complete a written demonstration (i.e., Alternative Source Demonstration, ASD), of the above within 90 days of confirming the SSI. Based on the outcome of the ASD the following steps will be taken:

- If a successful ASD is completed, a certification from a qualified professional engineer is required, and the CCR unit may continue with detection monitoring.
- If a successful ASD is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under §257.95. The facility must also include the ASD in the annual groundwater monitoring and corrective action report required by §257.90(e), in addition to the certification by a qualified professional engineer.

In response to the boron SSI over the background limit noted during the May 2019 event, DTE plans to prepare an ASD to evaluate whether a source other than the MONPP BAB Inactive CCR unit caused the SSI prior to initiating assessment monitoring. Based on the results from the ASD, DTE will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

The next semiannual monitoring event at the MONPP BAB is scheduled for the fourth calendar quarter of 2019.

Section 5
References

AECOM. September 2017. Groundwater Monitoring Work Plan Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin, DTE Monroe Plant, Monroe, Michigan. Prepared for DTE Electric Company.

AECOM. April 2019. Groundwater Statistical Evaluation Plan Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin, DTE Monroe Plant, Monroe, Michigan. Prepared for DTE Electric Company.

AECOM. April 2019. Monitoring Well Installation Report Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin, DTE Monroe Plant, Monroe, Michigan. Prepared for DTE Electric Company.

Tables

Table 1
Groundwater Elevation Summary – May 2019
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Well ID	MW-1S		MW-2S		MW-3S		MW-7S		MW-8S		MW-9		MW-10		MW-11		MW-12		MW-13		MW-14		MW-15	
Date Installed	9/19/2016		9/19/2016		9/20/2016		9/28/2016		9/30/2017		9/19/2017		9/20/2017		9/20/2017		9/21/2017		9/21/2017		9/22/2017		9/26/2017	
TOC Elevation	582.62		578.85		577.58		576.20		586.59		579.05		577.46		580.58		582.49		580.97		580.76		580.80	
Geologic Unit of Screened Interval	Silt and Sand		Sand and Sandy clay		Silt and Sand		Sand and Gravel		Clay and Sand		Sand and Gravel		Sand and Sandy clay		Silt		Silt and Sand		Clay, Silt, and Sand		Silt and Sand		Sandy Clay and Sand	
Screened Interval Elevation	538.80 to 548.80		538.20 to 548.20		538.10 to 548.10		542.60 to 552.60		540.70 to 550.70		541.37 to 551.37		540.79 to 550.79		537.84 to 547.84		537.90 to 547.90		543.25 to 553.25		537.87 to 547.87		539.61 to 549.61	
Unit	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft
Measurement Date	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
05/21/2019	5.00	577.62	4.03	574.82	2.60	574.98	1.30	574.90[(1)]	11.46	575.13	4.02	575.03	2.42	575.04	5.70	574.88	7.60	574.89	6.22	574.75	5.25	575.51	5.95	574.85

Notes:

Elevations are reported in feet relative to the North American Vertical Datum of 1988.

ft BTOC - feet below top of casing

(1) - The static water level for MW-7S was taken on May 23, 2019.

Table 2
Summary of Field Parameters – May 2019
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location	Sample Date	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (deg C)	Turbidity (NTU)
MW-1S	5/23/2019	66.6	7.3	774	15.28	60.9
MW-2S	5/22/2019	-129.5	7.5	1,641	13.76	4.97
MW-3S	5/23/2019	-74.3	7.1	1,889	18.91	53.0
MW-7S	5/23/2019	-63.7	7.1	1,038	15.92	11.6
MW-8S	5/21/2019	-77.6	6.9	1,686	11.02	4.51
MW-9	5/22/2019	-35.7	6.8	1,130	14.35	2.73
MW-10	5/22/2019	-108.6	7.0	1,140	14.61	2.55
MW-11	5/22/2019	-69.9	7.3	1,761	12.76	74.3
MW-12	5/22/2019	-128.0	7.4	1,527	13.35	4.20
MW-13	5/22/2019	-94.0	6.9	708	13.60	11.8
MW-14	5/23/2019	-75.6	7.0	1,838	14.35	3.11
MW-15	5/23/2019	-100.7	7.0	1,007	16.71	2.75

Notes:
mg/L - milligrams per liter.
mV - milliVolt.
SU - standard unit.
umhos/cm - micro-mhos per centimeter.
deg C - degrees celcius.
NTU - nephelometric turbidity units.

Table 3
Comparison of Appendix III Parameter Results to Background Limits – May 2019
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-1S		MW-2S		MW-3S		MW-7S		MW-8S			MW-9		
Sample Date:		5/23/2019	PL	5/22/2019	PL	5/23/2019	PL	5/23/2019	PL	5/21/2019	7/9/2019[2]	PL	5/22/2019	7/8/2019[2]	PL
Constituent	Unit	Data		Data		Data		Data		Data	Data		Data	Data	
Appendix III															
Boron	ug/L	350	870	1,000	1,000	970	980	320	1,400	**480**	**490**	440	630	--	640
Calcium	ug/L	140,000	370,000	230,000	270,000	360,000	540,000	160,000	380,000	330,000	--	430,000	170,000	--	190,000
Chloride	mg/L	31	170	11	14	13	15	77	110	14	--	16	47	--	59
Fluoride	mg/L	0.27	0.47	0.70	0.89	0.86	0.98	0.81	1.6	1.3	--	1.4	0.46	--	0.56
pH, Field	su	7.3	6.5 - 8.7	7.5	7.0 - 8.5	7.1	6.9 - 7.9	7.1	6.0 - 8.1	6.9	--	6.2 - 7.4	6.8	--	6.2 - 7.0
Sulfate	mg/L	280	850	1,200	1,600	1,400	1,400	260	590	1,500	--	1,600	**13**	3.6	12
Total Dissolved Solids	mg/L	690	1,600	1,900	2,000	2,000	2,300	920	2,000	2,100	--	2,400	**820**	800	810

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not analyzed

All metals were analyzed as total unless otherwise specified.

Bold font indicates an exceedance of the Prediction Limit (PL).

RESULT Shading and bold font indicates a comfirmed exceedance of the Prediction Limit (PL).

(1) Laboratory reporting limit exceeds the prediction limit due to sample dilution.

(2) Results shown for verification sampling performed 7/8/2019 to 7/9/2019.

Table 3
Comparison of Appendix III Parameter Results to Background Limits – May 2019
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-10			MW-11			MW-12		MW-13		MW-14		MW-15	
Sample Date:		5/22/2019	7/8/2019[2]	PL	5/22/2019	7/8/2019[2]	PL	5/22/2019	PL	5/22/2019	PL	5/23/2019	PL	5/23/2019	PL
Constituent	Unit	Data	Data		Data	Data		Data		Data		Data		Data	
Appendix III															
Boron	ug/L	520	--	530	910	--	920	1,100	1,100	< 100	100	1,300	1,700	2,400	2,800
Calcium	ug/L	150,000	--	170,000	260,000	--	330,000	180,000	210,000	130,000	140,000	230,000	310,000	140,000	150,000
Chloride	mg/L	63	--	80	16	--	18	10	13	97	120	290	310	120	150
Fluoride	mg/L	0.43	--	0.68	0.89	--	1.2	0.81	0.91	0.40	0.51	0.36	0.57	0.48	0.64
pH, Field	su	7.0	--	6.6 - 7.5	7.3	--	6.9 - 7.5	7.4	7.4 - 7.9	6.9	6.2 - 7.7	7.0	6.8 - 7.3	7.0	6.9 - 7.4
Sulfate	mg/L	**23**	3.7	19	**1,600**	1,300	1,500	1,100	1,300	< 2.0 [1]	1.0	370	430	< 1.0	1.0
Total Dissolved Solids	mg/L	**850**	830	840	2,100	--	2,100	1,700	1,800	610	1,100	1,600	1,700	710	770

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not analyzed

All metals were analyzed as total unless otherwise specified.

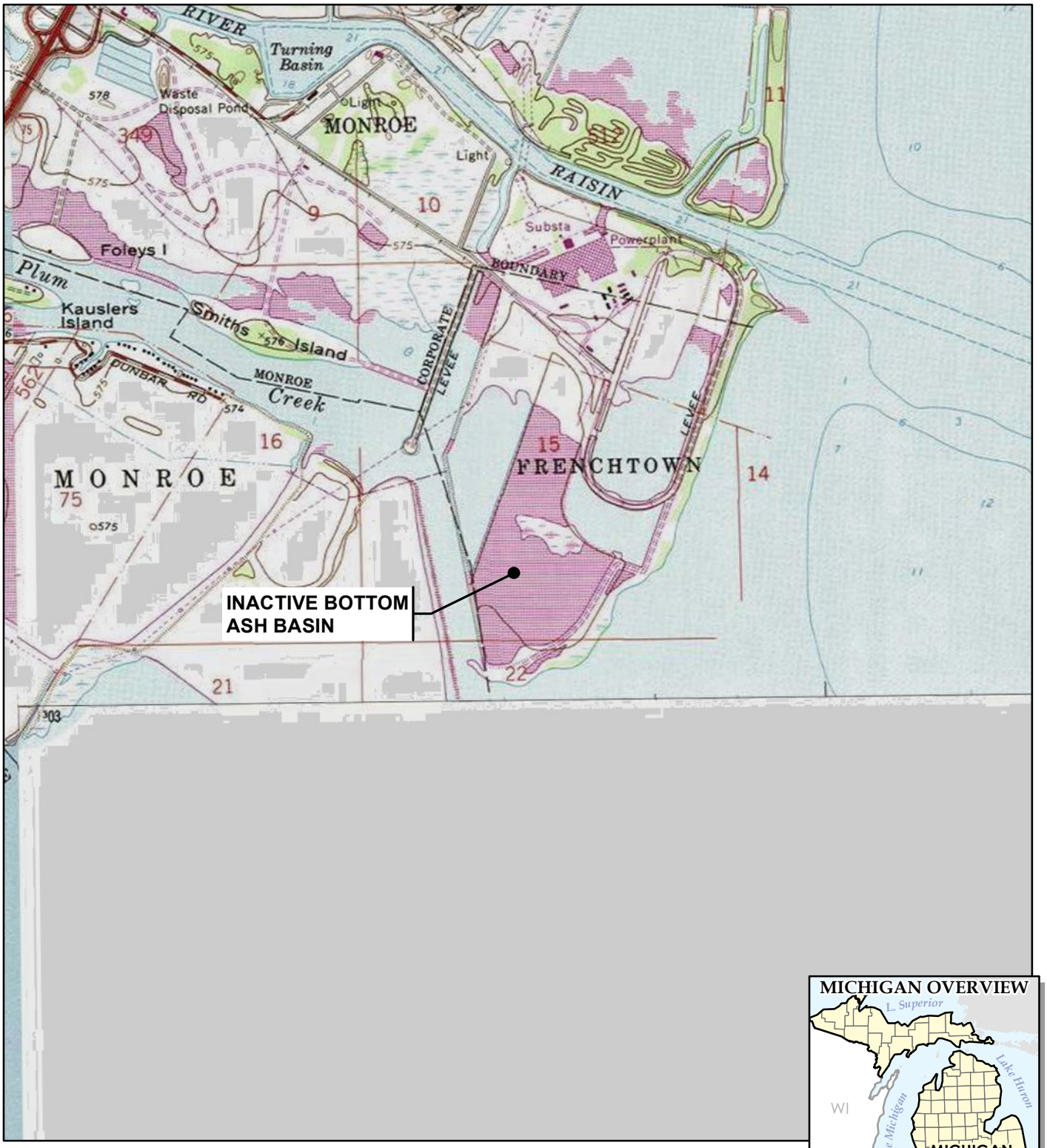
Bold font indicates an exceedance of the Prediction Limit (PL).

RESULT Shading and bold font indicates a comfirmed exceedance of the Prediction Limit (PL).

(1) Laboratory reporting limit exceeds the prediction limit due to sample dilution.

(2) Results shown for verification sampling performed 7/8/2019 to 7/9/2019.

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

N

1 " = 2,000 '
1:24,000

0 2,000 4,000
FEET

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080
TRC - GIS

PROJECT:

DTE ELECTRIC COMPANY
MONROE POWER PLANT BOTTOM ASH BASIN
3500 EAST FRONT STREET
MONROE, MI 48161

TITLE:

SITE LOCATION MAP

DRAWN BY:	R. SUEMNICHT
CHECKED BY:	S. HOLMSTROM
APPROVED BY:	V. BUENING
DATE:	JULY 2019
PROJ. NO.:	320511.0006
FILE:	320511-001slm.mxd

FIGURE 1

S:\1-PROJECTS\DTE_Energy\MonroeMI_PP\320511_0006_Area15\320511-001slm.mxd -- Saved By: RSUEMNICHT on 7/30/2019, 17:14:43 PM

Plot Date: 7/30/2019, 17:15:59 PM by RSUEMNICHT -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\DTE_Energy\MonroeMI_PP\320511_0006_Area15\320511-002.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet (Foot US)
Map Rotation: 0
TRC - GIS

LEGEND

- CCR PROGRAM MONITORING WELL
- INVESTIGATION MONITORING WELL (STATIC WATER LEVELS ONLY)
- UNIT SEPARATION BERM
- APPROXIMATE BOUNDARY OF INACTIVE BOTTOM ASH BASIN
- APPROXIMATE PLANT BOUNDARY

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO & PARTNERS, APRIL 2018.

0 700 1,400 FEET
1 " = 700 '
1:8,400
N

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080

PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT BOTTOM ASH BASIN
3500 EAST FRONT STREET
MONROE, MI 48161

TITLE:
INACTIVE BOTTOM ASH BASIN WELL LOCATION MAP 2019

DRAWN BY:	R. SUEMNICHT
CHECKED BY:	S. HOLMSTROM
APPROVED BY:	V. BUENING
DATE:	JULY 2019
PROJ. NO.:	320511.0006
FILE:	320511-002.mxd

FIGURE 2

Plot Date: 7/30/2019, 17:16:35 PM by RSUEMNICHT -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\DTE_Energy\MonroeMI_PP\320511_0006_Area15\320511-003.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet (Foot US)
Map Rotation: 0
TRC - GIS

LEGEND

- MONITORING WELL
- GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- UNIT SEPARATION BERM
- APPROXIMATE BOUNDARY OF INACTIVE BOTTOM ASH BASIN
- APPROXIMATE PLANT BOUNDARY

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO & PARTNERS, APRIL 2018.
2. ANOMALOUS DATA NOT USED TO CONSTRUCT CONTOUR MAP.

0 700 1,400 FEET
1 " = 700 '
1:8,400
N

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080

PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT BOTTOM ASH BASIN
3500 EAST FRONT STREET
MONROE, MI 48161

TITLE:
GROUNDWATER CONTOUR MAP
5/21/2019

DRAWN BY:	R. SUEMNICHT
CHECKED BY:	S. HOLMSTROM
APPROVED BY:	V. BUENING
DATE:	JULY 2019
PROJ. NO.:	320511.0006
FILE:	320511-003.mxd

FIGURE 3

Appendix A
Background Data

Table A1
Groundwater Elevation Summary
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Well ID	MW-1S		MW-2S		MW-3S		MW-4S		MW-7S		MW-8S		MW-9		MW-10		MW-11		MW-12		MW-13		MW-14		MW-15	
Date Installed	9/19/2016		9/19/2016		9/20/2016		9/26/2016		9/28/2016		9/30/2017		9/19/2017		9/20/2017		9/20/2017		9/21/2017		9/21/2017		9/22/2017		9/26/2017	
TOC Elevation	582.62		578.85		577.58		580.67		576.20		586.59		579.05		577.46		580.58		582.49		580.97		580.76		580.80	
Geologic Unit of Screened Interval	Silt and Sand		Sand and Sandy clay		Silt and Sand		Silt and Sand		Sand and Gravel		Clay and Sand		Sand and Gravel		Sand and Sandy clay		Silt		Silt and Sand		Clay, Silt, and Sand		Silt and Sand		Sandy Clay and Sand	
Screened Interval Elevation	538.80 to 548.80		538.20 to 548.20		538.10 to 548.10		541.10 to 551.10		542.60 to 552.60		540.70 to 550.70		541.37 to 551.37		540.79 to 550.79		537.84 to 547.84		537.90 to 547.90		543.25 to 553.25		537.87 to 547.87		539.61 to 549.61	
Unit	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft
Measurement Date	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
1/23/2017	9.48	573.14	5.12	573.73	3.93	573.65	5.49	575.18	2.34	573.86	13.04	573.55	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
3/6/2017	8.14	574.48	5.36	573.49	4.02	573.56	5.50	575.17	2.18	574.02	13.05	573.54	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
5/1/2017	8.79	573.83	4.78	574.07	3.30	574.28	5.23	575.44	1.71	574.49	12.09	574.50	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
6/13/2017	8.62	574.00	4.35	574.50	2.92	574.66	5.54	575.13	1.63	574.57	11.99	574.60	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
11/7/2017	9.18	573.44	4.70	574.15	3.59	573.99	5.71	574.96	2.20	574.00	12.80	573.79	4.89	574.16	3.25	574.21	6.21	574.37	8.12	574.37	7.35	573.62	5.63	575.13	7.12	573.68
1/9/2018	9.98	572.64	5.43	573.42	4.11	573.47	6.12	574.55	2.64	573.56	13.60	572.99	5.29	573.76	3.56	573.90	7.13	573.45	8.93	573.56	8.03	572.94	6.03	574.73	7.66	573.14
3/12/2018	8.92	573.70	4.98	573.87	3.72	573.86	5.44	575.23	1.98	574.22	12.63	573.96	4.70	574.35	3.06	574.40	6.78	573.80	8.58	573.91	7.22	573.75	5.34	575.42	6.99	573.81
5/21/2018	7.94	574.68	4.19	574.66	2.84	574.74	5.26	575.41	1.52	574.68	11.72	574.87	4.10	574.95	2.45	575.01	5.86	574.72	7.79	574.70	6.31	574.66	5.12	575.64	6.45	574.35
7/25/2018	8.64	573.98	4.15	574.70	2.79	574.79	5.55	575.12	1.74	574.46	12.06	574.53	4.36	574.69	2.69	574.77	5.83	574.75	7.80	574.69	6.77	574.20	5.41	575.35	6.61	574.19
9/24/2018	8.74	573.88	3.92	574.93	2.86	574.72	5.63	575.04	1.87	574.33	12.28	574.31	4.80 (1)	574.25	2.88	574.58	5.65	574.93	7.57	574.92	6.83	574.14	5.53	575.23	6.72	574.08
11/28/2018	9.93	572.69	5.01	573.84	3.90	573.68	5.88	574.79	2.73	573.47	12.94 (2)	573.65	5.38	573.67	3.60	573.86	6.84	573.74	8.64	573.85	8.10	572.87	5.78	574.98	8.08	572.72
2/5/2019	8.84	573.78	4.75	574.10	3.78	573.80	5.74	574.93	2.25	573.95	12.88	573.71	4.92	574.13	3.26	574.20	6.80	573.78	8.60	573.89	7.51	573.46	5.69	575.07	7.25	573.55

Notes:
Elevations are reported in feet relative to the North American Vertical Datum of 1988.
ft BTOC - feet below top of casing
NI - not installed
NM - not measured
(1) - Depth to water collected 7/25/2018.
(2) - Depth to water collected 11/29/2018.

Table A2
Summary of Field Parameters
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location	Sample Date	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (deg C)	Turbidity (NTU)
MW-1S	1/25/2017	170.2	7.8	800	9.2	14.9
	3/7/2017	-100.2	8.7	1,334	11.3	140
	5/2/2017	-9.3	7.1	1,714	11.9	9.3
	6/14/2017	-56.6	6.5	1,706	14.33	9.5
	11/8/2017	48.8	7.1	1,037	12.2	10
	1/10/2018	-69.8	7.0	1,716	11.94	5
	3/13/2018	-24.3	7.1	1,421	10.0	4
	5/23/2018	85.6	7.0	1,336	12.7	6
	7/27/2018	19.6	6.9	1,196	13.1	5.7
	9/27/2018	75.1	6.9	1,535	13.0	9
	11/30/2018	132.6	6.9	1,303	11.4	10
	2/7/2019	17.7	7.7	601	5.3	17
MW-2S	1/27/2017	-71.4	7.8	1,938	12.1	28.6
	3/7/2017	-216.9	7.9	1,984	12.7	62.4
	5/1/2017	-144.8	7.7	1,956	13.2	4.98
	6/14/2017	-108.6	7.4	2,027	15.32	8.70
	11/9/2017	-135.8	8.4	1,752	13.95	27
	1/9/2018	-17.6	7.8	1,957	12.08	13
	3/13/2018	-96.5	7.9	1,994	11.1	6
	5/23/2018	-310.1	7.7	2,371	13.1	8
	7/27/2018	-31.3	7.6	2,346	14.7	4.2
	9/26/2018	-144.1	7.7	2,069	14.1	5
	11/29/2018	-109.8	7.6	2,192	13.1	4
	2/7/2019	-137.7	7.8	2,102	12.1	81
MW-3S	1/26/2017	-7.1	7.2	2,128	15.2	476
	3/8/2017	-176.9	7.5	2,143	15.9	267
	5/2/2017	-122.3	7.5	2,117	15.8	65.4
	6/15/2017	-78.4	7.1	2,141	16.55	119
	11/8/2017	80.9	7.4	1,812	16.26	524
	1/9/2018	-9.1	7.7	2,053	15.23	233
	3/12/2018	-90.7	7.5	1,899	14.4	296
	5/22/2018	-343.4	7.4	2,473	16.0	149
	7/26/2018	-21.3	7.3	2,430	16.8	297
	9/27/2018	-114.8	7.3	2,113	17.0	182
	11/29/2018	-101.7	7.4	2,284	15.6	159
	2/6/2019	-106.2	7.5	2,195	14.2	771

Notes:
mg/L - milligrams per liter.
mV - milliVolt.
SU - standard unit.
umhos/cm - micro-mhos per centimeter.
deg C - degrees celcius.
NTU - nephelometric turbidity units.
NM = Not Measured

Table A2
Summary of Field Parameters
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location	Sample Date	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (deg C)	Turbidity (NTU)
MW-7S	1/24/2017	-35.0	6.4	1,043	13.2	7.5
	3/7/2017	-154.7	7.1	1,135	13.9	5.7
	5/2/2017	-84.8	7.0	1,116	13.4	4.90
	6/13/2017	-82.9	6.7	1,176	16.91	4.7
	11/8/2017	-29.6	7.2	1,339	14.9	2
	1/9/2018	-119.7	7.8	1,374	12.38	9
	3/13/2018	-39.0	7.2	1,446	12.5	5
	5/22/2018	-89.2	7.2	1,336	14.6	7
	7/25/2018	-14.3	7.1	1,034	18.7	4.4
	9/25/2018	-99.4	7.1	1,178	16.5	4
	11/28/2018	-81.1	7.2	1,184	11.4	7
	2/5/2019	-24.9	7.3	2,216	8.1	10
MW-8S	1/24/2017	-92.0	6.2	2,204	10.2	12.2
	3/8/2017	-146.1	7.3	2,403	11.1	14.4
	5/3/2017	-64.4	7.4	2,389	10.8	5.1
	6/14/2017	-65.7	6.9	2,187	11.58	3.0
	11/8/2017	88.4	7.3	2,330	10.7	3
	1/9/2018	-64.2	7.3	2,405	10.49	6
	3/12/2018	-58.5	7.4	2,337	10.4	2
	5/21/2018	-88.2	7.3	2,346	10.9	1
	7/25/2018	-27.7	7.3	2,242	11.6	4.6
	9/24/2018	-63.3	7.2	2,187	11.3	3
	11/29/2018	-64.8	7.2	2,419	10.2	1
	2/5/2019	-81.9	7.4	2,334	10.4	9
MW-9	11/8/2017	84.6	7.0	1,207	14.95	8
	1/8/2018	37.3	6.2	1,308	12.72	1
	3/12/2018	131.2	7.0	1,219	12.3	0
	5/22/2018	-364.5	6.8	1,596	14.3	1
	7/25/2018	6.5	6.8	1,315	16.4	1.7
	9/25/2018	-62.5	6.9	1,346	16.1	3
	11/28/2018	-50.9	6.8	1,492	14.1	7
	2/5/2019	-81.6	7.0	1,448	13.4	9

Notes:

mg/L - milligrams per liter.

mV - milliVolt.

SU - standard unit.

umhos/cm - micro-mhos per centimeter.

deg C - degrees celcius.

NTU - nephelometric turbidity units.

NM = Not Measured

Table A2
Summary of Field Parameters
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location	Sample Date	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (deg C)	Turbidity (NTU)
MW-10	11/8/2017	-63.5	7.0	1,176	16.09	8
	1/9/2018	-95.5	6.9	1,328	12.54	1
	3/12/2018	-65.3	7.2	1,228	12.4	0
	5/22/2018	-353.2	7.1	1,592	14.5	1
	7/25/2018	-107.7	7.0	1,368	16.4	2.0
	9/25/2018	-138.8	6.9	1,460	16.2	2
	11/28/2018	-156.2	7.0	1,475	14.7	6
	2/5/2019	-180.3	7.2	1,447	14.0	10
MW-11	11/9/2017	-89.9	7.4	2,279	13.4	97
	1/8/2018	-2.1	6.9	2,185	10.03	6
	3/13/2018	-16.0	7.5	2,219	10.4	42
	5/22/2018	-363.3	7.4	2,624	13.4	42
	7/26/2018	-6.3	7.3	2,585	14.7	31.1
	9/26/2018	-85.3	7.4	2,302	14.5	47
	11/29/2018	-95.7	7.4	2,433	12.8	79
	2/6/2019	-111.1	7.5	2,347	12.1	384
MW-12	11/9/2017	-152.7	7.6	1,913	13.5	13
	1/9/2018	-55.3	7.6	1,832	11.68	4
	3/13/2018	-78.6	7.7	1,876	10.7	0
	5/22/2018	-362.7	7.6	2,250	13.7	1
	7/26/2018	-41.2	7.5	2,205	14.1	1.6
	9/26/2018	-140.3	7.6	1,955	14.1	2
	11/29/2018	-126.9	7.6	2,064	12.8	6
	2/6/2019	-145.0	7.7	2,002	12.4	14
MW-13	11/9/2017	-123.8	7.1	786	13.33	21
	1/10/2018	-38.3	6.5	854	10.77	3
	3/13/2018	-54.4	7.1	860	11.9	1
	5/23/2018	-288.8	7.0	1,024	12.9	4
	7/26/2018	4.1	6.8	1,007	14.8	1.8
	9/27/2018	-86.9	6.9	885	13.8	3
	11/29/2018	-91.2	6.9	941	13.0	19
	2/7/2019	-103.2	7.1	910	12.3	11

Notes:

mg/L - milligrams per liter.

mV - milliVolt.

SU - standard unit.

umhos/cm - micro-mhos per centimeter.

deg C - degrees celcius.

NTU - nephelometric turbidity units.

NM = Not Measured

Table A2
Summary of Field Parameters
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location	Sample Date	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (deg C)	Turbidity (NTU)
MW-14	11/8/2017	-59.9	7.0	2,388	12.6	5
	1/8/2018	-73.1	7.1	2,306	11.67	7
	3/13/2018	25.3	7.0	2,465	11.4	3
	5/22/2018	-90.4	7.1	2,494	12.9	3
	7/26/2018	10.8	6.9	2,741	13.0	1.1
	9/25/2018	-114.6	7.0	2,264	13.0	1
	11/28/2018	-114.3	7.0	2,501	11.4	5
	2/7/2019	-101.2	7.1	2,366	10.9	5
MW-15	11/8/2017	-99.6	7.2	1,181	15.5	3
	1/8/2018	-65.0	7.3	1,136	13.57	2
	3/13/2018	-100.2	7.2	1,212	14.2	1
	5/22/2018	-125.1	7.2	1,242	15.0	2
	7/25/2018	-43.5	7.1	1,175	17.6	1.2
	9/25/2018	-102.5	7.1	1,145	15.9	1
	11/28/2018	-85.6	7.0	1,263	14.7	9
	2/5/2019	-126.4	7.3	1,230	14.4	5

Notes:

mg/L - milligrams per liter.

mV - milliVolt.

SU - standard unit.

umhos/cm - micro-mhos per centimeter.

deg C - degrees celcius.

NTU - nephelometric turbidity units.

NM = Not Measured

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-1S												
Sample Date:		1/25/2017	3/7/2017	5/2/2017	6/14/2017	11/8/2017	1/10/2018	3/13/2018	5/23/2018	7/27/2018	9/27/2018	11/30/2018	11/30/2018	2/7/2019
Constituent	Unit												Field Dup	
Appendix III														
Boron	ug/L	158	226	446	501	446	622	254	472	587	553	428	404	146
Calcium	ug/L	103,000	224,000	267,000	252,000	173,000	268,000	225,000	192,000	235,000	221,000	194,000	189,000	80,800
Chloride	mg/L	21.1	47.7	78.6	102	66.0	119	50.2	78.8	117	95.7	73.1	72.8	18.9
Fluoride	mg/L	0.11	<0.10	0.19	<0.10	0.14	0.31	0.16	0.34	0.28	0.30	0.21	0.21	0.19
pH, Field	su	7.8	8.7	7.1	6.5	7.1	7.0	7.1	7.0	6.9	6.9	6.9	--	7.7
Sulfate	mg/L	182	416	324	85.8	124	78.3	448	135	107	135	137	135	168
Total Dissolved Solids	mg/L	487	923	1,180	1,040	715	1,040	1,030	860	1,060	1,030	788	790	410

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-2S											
Sample Date:		1/27/2017	3/7/2017	5/1/2017	6/14/2017	11/9/2017	1/9/2018	3/13/2018	5/23/2018	7/27/2018	9/26/2018	11/30/2018	2/7/2019
Constituent	Unit												
Appendix III													
Boron	ug/L	859	895	917	872	894	934	982	969	908	899	967	928
Calcium	ug/L	233,000	223,000	221,000	239,000	240,000	244,000	251,000	247,000	232,000	228,000	257,000	250,000
Chloride	mg/L	11.4	11.8	11.5	11.9	12.2	11.4	12.5	12.4	12.3	12.4	10.6	10.7
Fluoride	mg/L	0.53	0.48	0.62	0.53	0.44	0.63	0.59	0.68	0.69	0.75	0.68	0.71
pH, Field	su	7.8	7.9	7.7	7.4	8.4	7.8	7.9	7.7	7.6	7.7	7.6	7.8
Sulfate	mg/L	1,070	1,150	1,140	1,190	1,090	1,170	1,160	1,310	1,160	1,110	1,370	1,460
Total Dissolved Solids	mg/L	1,690	1,680	1,790	1,800	1,800	1,780	1,810	1,860	1,790	1,830	1,830	1,890

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-3S											
Sample Date:		1/26/2017	3/8/2017	5/2/2017	6/15/2017	11/8/2017	1/9/2018	3/12/2018	5/22/2018	7/26/2018	9/27/2018	11/29/2018	2/6/2019
Constituent	Unit												
Appendix III													
Boron	ug/L	869	900	887	826	903	895	942	919	904	848	910	895
Calcium	ug/L	382,000	344,000	240,000	306,000	464,000	330,000	404,000	278,000	310,000	272,000	307,000	448,000
Chloride	mg/L	13.0	12.7	12.9	13.2	13.3	12.8	14.0	13.4	12.8	13.7	12.0	12.1
Fluoride	mg/L	0.33	0.80	0.90	0.73	0.58	0.85	0.79	0.87	0.87	0.98	0.83	0.85
pH, Field	su	7.2	7.5	7.5	7.1	7.4	7.7	7.5	7.4	7.3	7.3	7.4	7.5
Sulfate	mg/L	1,190	1,270	1,210	1,260	1,140	1,200	1,190	1,330	1,240	1,120	1,240	1,320
Total Dissolved Solids	mg/L	1,890	1,930	2,260	1,930	1,870	1,920	1,910	1,940	7,620	1,860	1,910	2,020

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-7S													
Sample Date:		1/24/2017	1/24/2017	3/7/2017	5/2/2017	6/13/2017	11/8/2017	11/8/2017	1/9/2018	3/13/2018	5/22/2018	7/25/2018	9/25/2018	11/28/2018	2/5/2019
Constituent	Unit		Field Dup					Field Dup							
Appendix III															
Boron	ug/L	860	867	892	1020	989	708	718	601	574	443	306	407	384	239
Calcium	ug/L	135,000	134,000	137,000	140,000	143,000	173,000	175,000	176,000	207,000	206,000	130,000	175,000	142,000	376,000
Chloride	mg/L	104	106	110	106	109	85.5	85.8	83.8	83.3	69.3	87.5	72.5	83.6	12.2
Fluoride	mg/L	0.44	0.43	0.37	0.47	0.29	0.40	0.40	0.55	0.60	0.70	0.66	0.71	0.59	1.3
pH, Field	su	6.4	--	7.1	7.0	6.7	7.2	--	7.8	7.2	7.2	7.1	7.1	7.2	7.3
Sulfate	mg/L	1.8	1.8	<0.25	1.1	2.1	220	213	266	374	411	68.2	179	88.7	1,270
Total Dissolved Solids	mg/L	633	624	639	1,970	675	833	845	827	974	982	649	859	647	1,990

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-8S											
Sample Date:		1/24/2017	3/8/2017	5/3/2017	6/14/2017	11/8/2017	1/9/2018	3/12/2018	5/21/2018	7/25/2018	9/24/2018	11/29/2018	2/5/2019
Constituent	Unit												
Appendix III													
Boron	ug/L	383	389	401	406	404	408	426	415	400	393	417	397
Calcium	ug/L	380,000	396,000	378,000	386,000	340,000	356,000	378,000	357,000	327,000	335,000	378,000	343,000
Chloride	mg/L	15.2	14.7	14.1	14.3	14.7	13.9	15.1	14.5	14.0	14.5	13.3	13.8
Fluoride	mg/L	0.77	1.1	1.1	1.1	0.77	1.2	1.1	1.2	1.3	1.4	1.2	1.2
pH, Field	su	6.2	7.3	7.4	6.9	7.3	7.3	7.4	7.3	7.3	7.2	7.2	7.4
Sulfate	mg/L	1,420	1,510	1,350	1,430	1,300	1,320	1,280	1,400	1,300	1,190	1,280	1,390
Total Dissolved Solids	mg/L	2,180	2,290	2,250	2,200	2,140	2,100	2,070	2,120	2,100	2,080	2,040	2,110

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-9							
Sample Date:		11/8/2017	1/8/2018	3/12/2018	5/22/2018	7/25/2018	9/25/2018	11/28/2018	2/5/2019
Constituent	Unit								
Appendix III									
Boron	ug/L	610	593	592	622	593	583	590	596
Calcium	ug/L	176,000	186,000	177,000	174,000	170,000	173,000	179,000	176,000
Chloride	mg/L	43.3	47.7	52.2	49.0	45.1	45.3	39.9	39.6
Fluoride	mg/L	0.34	0.53	0.45	0.52	0.51	0.53	0.50	0.56
pH, Field	su	7.0	6.2	7.0	6.8	6.8	6.9	6.8	7.0
Sulfate	mg/L	3.4	0.56	3.2	8.0	6.6	5.7	3.8	3.9
Total Dissolved Solids	mg/L	760	728	754	771	732	778	761	762

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-10									
Sample Date:		11/8/2017	1/9/2018	3/13/2018	5/22/2018	5/22/2018	7/25/2018	9/25/2018	11/28/2018	2/5/2019	2/5/2019
Constituent	Unit					Field Dup					Field Dup
Appendix III											
Boron	ug/L	497	492	510	501	507	506	475	504	496	494
Calcium	ug/L	150,000	145,000	158,000	150,000	152,000	153,000	145,000	158,000	151,000	152,000
Chloride	mg/L	60.2	64.0	70.1	66.9	70.2	71.4	59.7	59.4	59.0	60.1
Fluoride	mg/L	0.32	0.51	0.38	0.49	0.46	0.46	0.49	0.47	0.53	0.53
pH, Field	su	7.0	6.9	7.2	7.1	--	7.0	6.9	7.0	7.2	--
Sulfate	mg/L	18.3	5.1	4.2	3.7	3.6	3.9	18.5	3.6	4.0	3.7
Total Dissolved Solids	mg/L	764	737	751	780	801	789	790	772	804	816

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-11							
Sample Date:		11/9/2017	1/8/2018	3/13/2018	5/22/2018	7/26/2018	9/26/2018	11/29/2018	2/6/2019
Constituent	Unit								
Appendix III									
Boron	ug/L	860	869	881	872	853	823	877	864
Calcium	ug/L	254,000	244,000	262,000	256,000	241,000	240,000	279,000	302,000
Chloride	mg/L	16.0	15.6	17.0	16.6	15.4	16.0	15.5	14.9
Fluoride	mg/L	0.63	0.86	0.82	0.94	0.92	1.0	0.87	0.89
pH, Field	su	7.4	6.9	7.5	7.4	7.3	7.4	7.4	7.5
Sulfate	mg/L	1,240	1,260	1,260	1,380	1,280	1,180	1,320	1,420
Total Dissolved Solids	mg/L	2,070	2,040	2,020	2,070	2,040	2,040	2,050	2,030

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-12							
Sample Date:		11/9/2017	1/9/2018	3/13/2018	5/22/2018	7/26/2018	9/26/2018	11/29/2018	2/6/2019
Constituent	Unit								
Appendix III									
Boron	ug/L	927	986	1,030	1,000	1,000	970	1,020	980
Calcium	ug/L	170,000	170,000	186,000	180,000	177,000	179,000	198,000	190,000
Chloride	mg/L	10.7	11.1	11.7	11.3	11.2	11.3	12.1	11.3
Fluoride	mg/L	0.38	0.85	0.71	0.87	0.85	0.91	0.83	0.91
pH, Field	su	7.6	7.6	7.7	7.6	7.5	7.6	7.6	7.7
Sulfate	mg/L	987	1,020	1,040	1,140	1,060	959	1,050	1,180
Total Dissolved Solids	mg/L	1,640	1,600	1,610	1,660	1,620	1,650	1,650	1,720

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-13							
Sample Date:		11/9/2017	1/10/2018	3/13/2018	5/23/2018	7/26/2018	9/27/2018	11/29/2018	2/7/2019
Constituent	Unit								
Appendix III									
Boron	ug/L	<100	<100	<100	<100	<100	<100	<100	<100
Calcium	ug/L	125,000	121,000	129,000	125,000	120,000	118,000	126,000	120,000
Chloride	mg/L	97.1	102	109	104	93.6	92.7	102	97.9
Fluoride	mg/L	0.29	0.42	0.32	0.37	0.36	0.37	0.39	0.42
pH, Field	su	7.1	6.5	7.1	7.0	6.8	6.9	6.9	7.1
Sulfate	mg/L	<0.25	<0.25	<0.25	<0.25	0.27	<0.25	<0.25	<0.25
Total Dissolved Solids	mg/L	587	492	1,050	601	589	565	531	521

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-14								
Sample Date:		11/8/2017	1/8/2018	3/13/2018	5/22/2018	7/26/2018	9/25/2018	9/25/2018	11/28/2018	2/7/2019
Constituent	Unit							Field Dup		
Appendix III										
Boron	ug/L	1,580	1,580	1,620	1,590	1,570	1,500	1,520	1,510	1,450
Calcium	ug/L	269,000	283,000	289,000	282,000	265,000	258,000	263,000	280,000	263,000
Chloride	mg/L	269	271	283	313	274	266	262	275	273
Fluoride	mg/L	0.20	0.40	0.25	0.37	0.36	0.36	0.35	0.33	0.41
pH, Field	su	7.0	7.1	7.0	7.1	6.9	7.0	--	7.0	7.1
Sulfate	mg/L	329	347	332	396	350	322	322	311	358
Total Dissolved Solids	mg/L	1,540	1,580	1,590	1,620	1,610	1,590	1,570	1,500	1,560

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

Table A3
Summary of Groundwater Analytical Data
Monroe Power Plant BAB Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-15							
Sample Date:		11/8/2017	1/8/2018	3/13/2018	5/22/2018	7/25/2018	9/25/2018	11/28/2018	2/5/2019
Constituent	Unit								
Appendix III									
Boron	ug/L	2,190	2,250	2,440	2,620	2,280	2,430	2,490	2,350
Calcium	ug/L	136,000	135,000	146,000	145,000	141,000	138,000	146,000	140,000
Chloride	mg/L	122	124	119	141	116	119	126	121
Fluoride	mg/L	0.37	0.52	0.42	0.48	0.46	0.49	0.47	0.54
pH, Field	su	7.2	7.3	7.2	7.2	7.1	7.1	7.0	7.3
Sulfate	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Total Dissolved Solids	mg/L	641	629	657	707	704	697	635	665

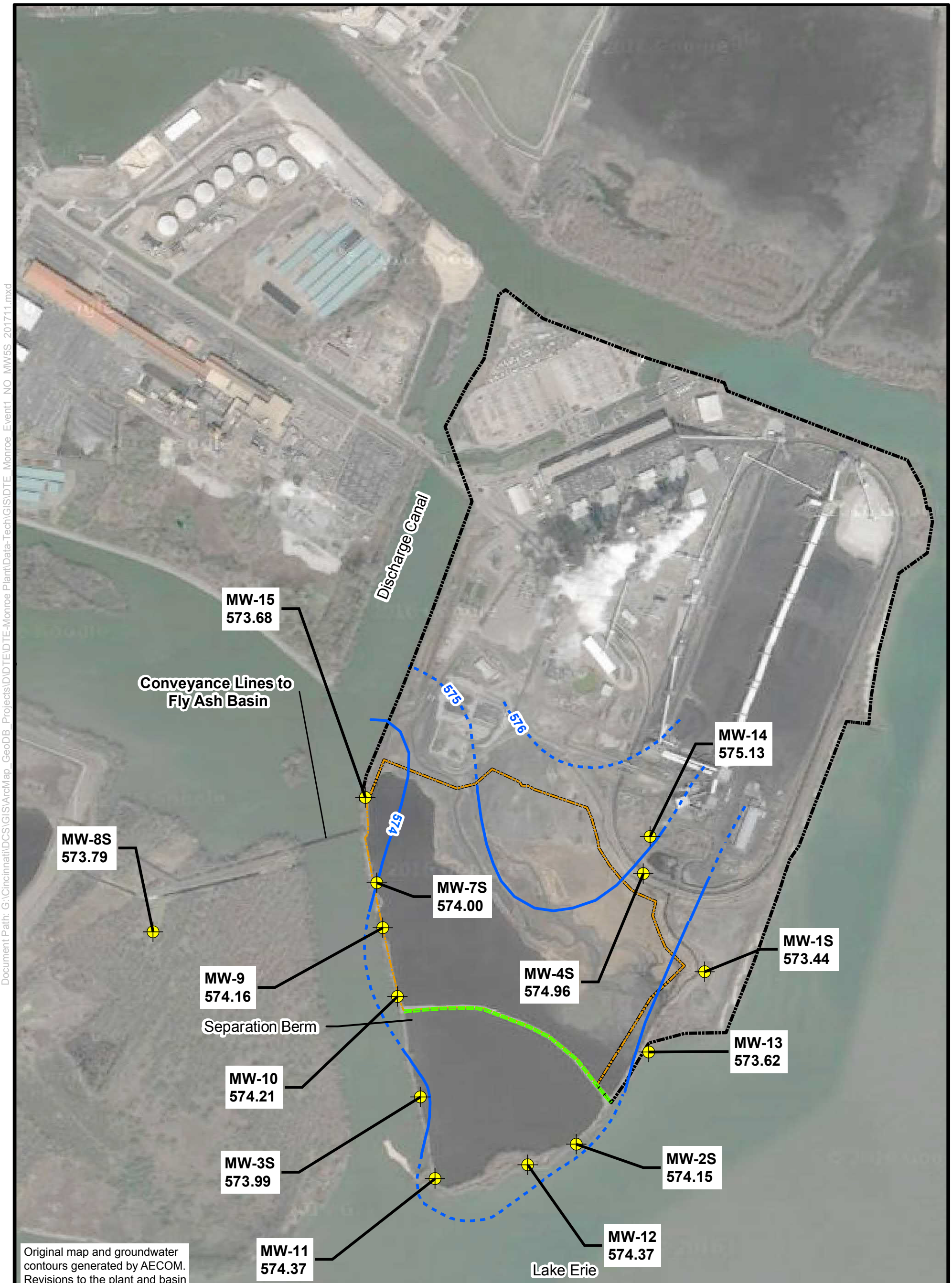
Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.



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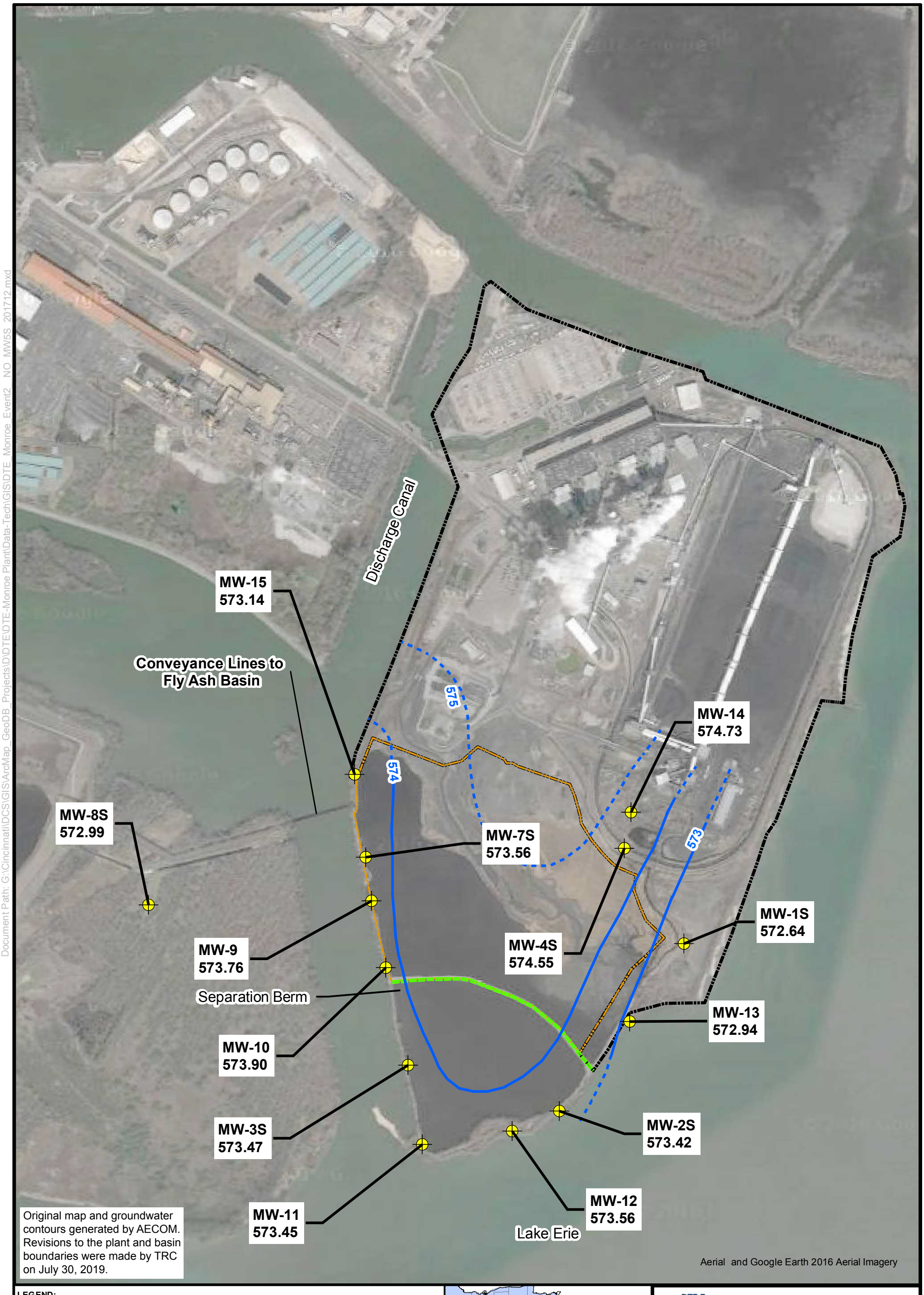

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Discharge Canal

MW-15
573.81

Conveyance Lines to
Fly Ash Basin

MW-14
575.42

MW-8S
573.96

MW-7S
574.22

MW-9
574.35

MW-4S
575.23

MW-1S
573.70

Separation Berm

MW-13
573.75

MW-10
574.40

MW-3S
573.86

MW-2S
573.87

MW-12
573.91

MW-11
573.80

Lake Erie

576
574
575
574

Original map and groundwater contours generated by AECOM. Revisions to the plant and basin boundaries were made by TRC on July 30, 2019.

Aerial and Google Earth 2016 Aerial Imagery

LEGEND:

- Monitoring Well
- Groundwater Contour (Dashed where inferred)
- Unit Separation Berm
- Approximate Plant Boundary (Updated by TRC on July 30, 2019)
- Approximate Boundary of Inactive Bottom Ash Basin (Updated by TRC on July 30, 2019)

N

0 700 1,400 Feet

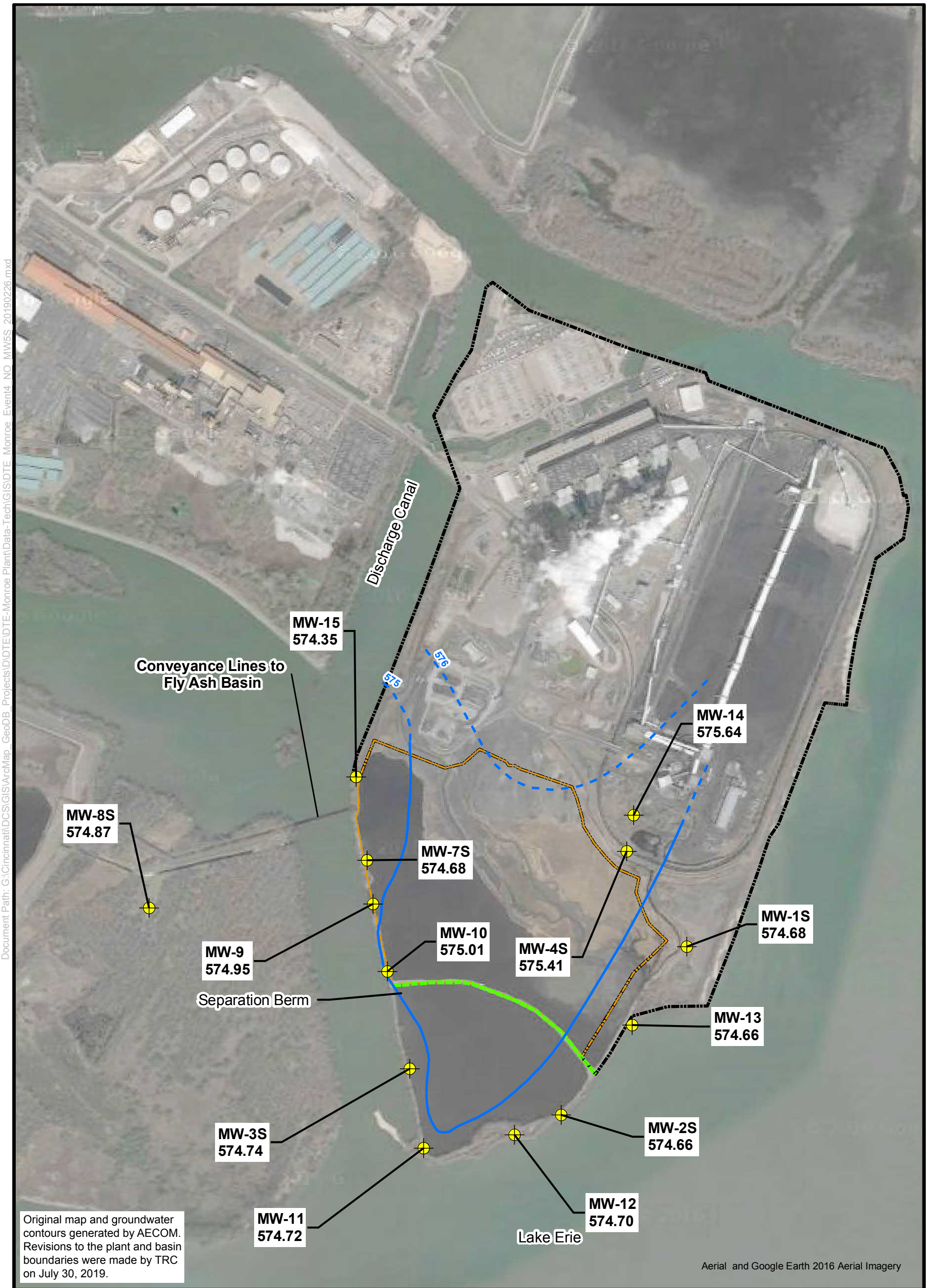
Monroe County, Michigan

DTE Energy

Monroe Power Plant

EVENT 3 (NO MW-5S)
GROUNDWATER CONTOUR MAP
3/12/2018

DATE: 2/22/2019	SCALE 1 inch = 720 feet
JOB NO. 60516675	



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Discharge Canal

MW-15
574.19

Conveyance Lines to
Fly Ash Basin

575

576

MW-14
575.35

MW-8S
574.53

MW-7S
574.46

MW-9
574.69

MW-10
574.77

MW-4S
574.12

MW-1S
573.98

Separation Berm

MW-13
574.20

574

MW-3S
574.79

MW-2S
574.70

MW-11
574.75

MW-12
574.69

Lake Erie

Original map and groundwater contours generated by AECOM. Revisions to the plant and basin boundaries were made by TRC on July 30, 2019.

Aerial and Google Earth 2016 Aerial Imagery

LEGEND:

- Monitoring Well
- Groundwater Contour (Dashed where inferred)
- Unit Separation Berm
- Approximate Plant Boundary (Updated by TRC on July 30, 2019)
- Approximate Boundary of Inactive Bottom Ash Basin (Updated by TRC on July 30, 2019)

N

0 700 1,400 Feet

Monroe County, Michigan

DTE Energy

Monroe Power Plant

EVENT 5 (NO MW-5S)
GROUNDWATER CONTOUR MAP
7/25/2018

DATE: 2/26/2019	SCALE 1 inch = 720 feet
JOB NO. 60516675	

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Discharge Canal

576

575

574

MW-15S
574.08

Conveyance Lines to
Fly Ash Basin

MW-14S
575.23

MW-4S
575.04

MW-7S
574.33

MW-8S
574.31

MW-9S
574.25

MW-1S
573.88

MW-13S
574.14

MW-10S
574.58

Separation Berm

MW-3S
574.72

MW-2S
574.93

MW-11S
574.93

MW-12S
574.92

Lake Erie

Original map and groundwater contours generated by AECOM. Revisions to the plant and basin boundaries were made by TRC on July 30, 2019.

Aerial and Google Earth 2016 Aerial Imagery

LEGEND:

- Monitoring Well
- Goundwater Contour (Dashed where inferred)
- Unit Separation Berm
- Approximate Plant Boundary (Updated by TRC on July 30, 2019)
- Approximate Boundary of Inactive Bottom Ash Basin (Updated by TRC on July 30, 2019)

N

0 700 1,400 Feet

Monroe County, Michigan

DTE Energy

Monroe Power Plant

EVENT 6 (NO MW-5S)
GROUNDWATER CONTOUR MAP
9/24/2018

DATE: 2/26/2019	SCALE 1 inch = 720 feet
JOB NO. 60516675	

Discharge Canal

574

573

575

573

MW-15S
572.72

Conveyance Lines to
Fly Ash Basin

MW-14S
574.98

MW-4S
574.79

MW-7S
573.47

MW-8S
NM

MW-9S
573.67

MW-1S
572.69

MW-10S
573.86

MW-13S
572.87

Separation Berm

MW-3S
573.68

MW-2S
573.84

MW-11S
573.74

MW-12S
573.85

Lake Erie

Original map and groundwater contours generated by AECOM. Revisions to the plant and basin boundaries were made by TRC on July 30, 2019.

Aerial and Google Earth 2016 Aerial Imagery

LEGEND:

- Monitoring Well
- Goundwater Contour (Dashed where inferred)
- Unit Separation Berm
- Approximate Plant Boundary (Updated by TRC on July 30, 2019)
- Approximate Boundary of Inactive Bottom Ash Basin (Updated by TRC on July 30, 2019)

N

0 700 1,400 Feet

Monroe County, Michigan

DTE Energy

Monroe Power Plant

EVENT 7 (NO MW-5S)
GROUNDWATER CONTOUR MAP
11/28/2018

DATE: 2/26/2019	SCALE 1 inch = 720 feet
JOB NO. 60516675	

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Discharge Canal

576

575

574

MW-15S
573.55

Conveyance Lines to
Fly Ash Basin

MW-14S
575.07

MW-4S
574.79

MW-7S
573.95

MW-8S
573.71

MW-9S
574.13

MW-1S
573.78

MW-10S
574.20

MW-13S
573.46

Separation Berm

MW-3S
573.68

MW-2S
574.10

MW-11S
573.78

MW-12S
573.89

Lake Erie

Original map and groundwater contours generated by AECOM. Revisions to the plant and basin boundaries were made by TRC on July 30, 2019.

Aerial and Google Earth 2016 Aerial Imagery

LEGEND:

- Monitoring Well
- Goundwater Contour (Dashed where inferred)
- Unit Separation Berm
- Approximate Plant Boundary (Updated by TRC on July 30, 2019)
- Approximate Boundary of Inactive Bottom Ash Basin (Updated by TRC on July 30, 2019)

N

0 700 1,400 Feet

Monroe County, Michigan

DTE Energy

Monroe Power Plant

EVENT 8 (NO MW-5S)
GROUNDWATER CONTOUR MAP
02/05/2019

DATE: 2/26/2019	SCALE 1 inch = 720 feet
JOB NO. 60516675	

Appendix B
Data Quality Review

Laboratory Data Quality Review
Groundwater Monitoring Event May 2019
DTE Electric Company Monroe Power Plant Bottom Ash Basin

Groundwater samples were collected by TRC for the May 2019 sampling event. Samples were analyzed for anions, total metals, pH, and total dissolved solids by Test America Laboratories, Inc. (Test America), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory reports 240-113250-1 and 240-113304-1.

During the May 2019 sampling event, a groundwater sample was collected from each of the following wells:

- MW-1S
- MW-2S
- MW-3S
- MW-7S
- MW-8S
- MW-9
- MW-10
- MW-11
- MW-12
- MW-13
- MW-14
- MW-15

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	SW846 9056A
Total Boron	SW846 3005A/6010B
Total Calcium	SW846 3005A/6020
Total Dissolved Solids	SM 2540C
pH	SW846 9040C

TRC reviewed the laboratory data to assess data usability. The following sections summarize the data review procedure and the results of the review.

Data Quality Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks and equipment blanks, where applicable. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or

analytical procedures. Equipment blanks are used to assess potential contamination arising from field procedures;

- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix;
- Data for matrix spike and matrix spike duplicate samples (MS/MSDs) , when performed on project samples. The MS/MSDs are used to assess the accuracy and precision of the analytical method using a sample from the dataset;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are used to assess the precision of the analytical method using a sample from the dataset;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

- Usability of the data if quality control (QC) results suggest potential problems with all or some of the data;
- Actions regarding specific QC criteria exceedances.

Review Summary

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable for their intended purpose. A summary of the data quality review, including non-conformances and issues identified in this evaluation are noted below.

- Appendix III constituents will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.

QA/QC Sample Summary:

- Boron was detected below the reporting limit in the method blank for batch 383371 at 30.4 J μg/L. However data usability was not affected due to all results being either non-detect below the RL or detected at more than five times the blank concentration.

- LCS recoveries for all target analytes were within laboratory control limits.

- MS/MSD analyses were performed on samples MW-8S for boron and calcium, and MW-9 for anions. The recovery for calcium in the MS performed on sample MW-8S exceeded the laboratory limits. However, data usability was not affected since the concentration of calcium in the parent sample was greater than four times the spike concentration.

- Laboratory duplicate analyses were performed on samples MW-14 and DUP-01 for pH, MW-1S and MW-9 for TDS; relative percent differences (RPDs) were within the QC limits.

- DUP-01 corresponds with MW-10; RPDs between the parent and duplicate sample were within the QC limits.

- The nondetect RL for sulfate in sample MW-13 (2.0 mg/L) exceeded the project-required RL (1.0 mg/L) due to a 2-fold dilution required prior to analysis because of matrix interference. There is no impact on data usability since the RL for sulfate in this sample is below the proposed project action level for sulfate (10 mg/L).

Laboratory Data Quality Review
Groundwater Monitoring Event July 2019
DTE Electric Company Monroe Power Plant Inactive Bottom Ash Basin

Groundwater samples were collected by TRC for the July 2019 verification sampling event. Samples were analyzed for total boron by Euorfins Test America Laboratories, Inc. (Test America), located in North Canton, Ohio, and sulfate and/or total dissolved solids by Test America, located in Irvine, California. The laboratory analytical results are reported in laboratory report numbers 240-115568-1 and/or 440-245494-1.

During the July 2019 verification sampling event, a groundwater sample was collected from each of the following wells:

- MW-8S
- MW-9
- MW-10
- MW-11

The samples were analyzed for one or more of the following constituents:

Analyte Group	Method
Sulfate	SW846 9056A
Total Boron	SW846 3005A/6010B
Total Dissolved Solids (TDS)	SM 2540C

TRC reviewed the laboratory data to assess data usability. The following sections summarize the data review procedure and the results of the review.

Data Quality Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks and equipment blanks, where applicable. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix;

- Data for matrix spike and matrix spike duplicate samples (MS/MSDs), when performed on project samples. The MS/MSDs are used to assess the accuracy and precision of the analytical method using a sample from the dataset;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are used to assess the precision of the analytical method using a sample from the dataset;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

- Usability of the data if quality control (QC) results suggest potential problems with all or some of the data;
- Actions regarding specific QC criteria exceedances.

Review Summary

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable for their intended purpose. A summary of the data quality review, including non-conformances and issues identified in this evaluation are noted below.

- The reported Appendix III constituents will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.

QA/QC Sample Summary:

- The holding time and sample preservation criteria were met.
- Target analytes were not detected in the laboratory method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were performed on sample MW-9 for boron. The recoveries and relative percent difference (RPD) were within laboratory control limits.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- DUP-01 corresponds with MW-9; RPDs between the parent and duplicate sample were within the QC limits.

Appendix C
Statistical Background Limits

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Technical Memorandum

Date: July 16, 2019

To: DTE Electric Company

From: Sarah Holmstrom, TRC
Meredith Brehob, TRC
Kristin Lowery, TRC

Project No.: 320511.0006.0000 Phase 001

Subject: Background Statistical Evaluation – DTE Electric Company, Monroe Power Plant Bottom Ash Basin, Monroe, Michigan

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Pursuant to the United States Environmental Protection Agency's (U.S. EPA's) Resource Conservation and Recovery Act (RCRA) Federal Final Rule for Hazardous and Solid Waste Management System Disposal of Coal Combustion Residuals from Electric Utilities (herein after "the CCR Rule") promulgated on April 17, 2015 (effective October 19, 2015), as amended July 30, 2018, the owner or operator of a CCR Unit must collect a minimum of eight rounds of background groundwater data to initiate a detection monitoring program and evaluate statistically significant increases above background (40 CFR §257.94). On August 5, 2016, the U.S. EPA published the CCR Rule companion *Extension of Compliance Deadlines for Certain Inactive Surface Impoundments,* which established the compliance deadlines for inactive CCR units that were inactive prior to April 17, 2018. This memorandum presents the background statistical limits derived for the DTE Electric Company (DTE Electric) Monroe Power Plant (MONPP) Bottom Ash Basin (BAB) Inactive CCR unit (the Site).

A groundwater monitoring system has been established for MONPP BAB Inactive CCR unit (AECOM, April 2019), which established the following locations for detection monitoring.

MW-1S	MW-2S	MW-3S
MW-7S	MW-8S	MW-9
MW-10	MW-11	MW-12
MW-13	MW-14	MW-15

Following the baseline data collection period (January 2017 through February 2019 for MW-1S, MW-2S, MW-3S, MW-7S, and MW-8S and November 2017 through February 2019 for MW-9 through MW-15), the background data for the Site were evaluated in accordance with the *Groundwater Statistical*

Evaluation Plan (Stats Plan) (AECOM, April 2019). Background data were evaluated in ChemStat™ statistical software. ChemStat™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in U.S. EPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (Unified Guidance; UG). Within the ChemStat™ statistical program (and the UG), prediction limits (PLs) were selected to perform the statistical calculation for background limits. Use of PLs is recommended by the UG to provide high statistical power and is an acceptable approach for intrawell detection monitoring under the CCR rule. PLs were calculated for each of the CCR Appendix III parameters. The following narrative describes the methods employed and the results obtained and the ChemStat™ output files are included as an attachment.

The set of background wells utilized for MONPP BAB Inactive CCR Unit includes MW-1S through MW-3S and MW-7S through MW-15. The background evaluation included the following steps:

- Review of data quality checklists for the baseline/background data sets for CCR Appendix III constituents;
- Graphical representation of the baseline data as time versus concentration (T v. C) by well/constituent pair;
- Outlier testing of individual data points that appear from the graphical representations as potential outliers;
- Evaluation of percentage of nondetects for each baseline/background well-constituent (w/c) pair;
- Distribution of the data; and
- Calculation of the upper PLs for each cumulative baseline/background data set (upper and lower PLs were calculated for field pH).

The results of these evaluations are presented and discussed below.

Time versus Concentration Graphs

The time versus concentration (T v. C) graphs (Attachment A) showed potential or suspect outliers for sulfate at MW-7S in February 2019 and total dissolved solids at MW-3S in July 2018.

While variations in results are present, the graphs show consistent baseline data and do not suggest that data sets, as a whole, likely have overall trending or seasonality. However, due to limitations on CCR Rule implementation timelines, the data sets are of relatively short duration for making such observations regarding overall trending or seasonality.

Outlier Testing

Outlier removal from the background data set is summarized in Table 1. The Dixon's Outlier Test was used to evaluate the potential outliers for sulfate at MW-7S in February 2019 and total dissolved solids data at MW-3S in July 2018. The suspect data points were found to be outliers at the 0.05 significance level. Sulfate was detected at MW-13 in July 2018 at a concentration of 0.27 mg/L. Since this was the only detection of sulfate in the background dataset at MW-13 and it was not confirmed by the subsequent consecutive sampling event, the single detection was classified as an outlier per the Double Quantification Rule as outlined in the Stats Plan and the UG. The outlier data points will be excluded from the baseline PL calculations.

Distribution of the Data Sets

ChemStat™ was utilized to evaluate each data set for normality. The Shapiro-Wilk statistic was calculated on non-transformed data, natural log-transformed data, cube root-transformed data, and square root-transformed data. If the Shapiro-Wilk statistic indicated that normal distributional assumptions were not valid, then the parameter was considered a candidate for non-parametric statistical evaluation. The data distributions are summarized in Table 2.

Prediction Limits

Table 2 presents the calculated PLs for the background/baseline data sets. For normalized distributions, in order to maintain an appropriate site-wide false positive rate (SWFPR), PLs are calculated for 99 percent confidence using parametric methods. For non-normal background datasets, a non-parametric PL is utilized, resulting in the highest value from the background dataset as the PL. For sulfate at MW-13 and MW-15, which were 100% non-detect, the practical quantitation limit (PQL) for the most recent round of data (May 2019) is used as the PL. The achieved confidence levels for non-parametric prediction limits depend entirely on the number of background data points, which are shown in the ChemStat™ outputs. Verification resampling (1 of 2) is recommended per the Stats Plan and UG to achieve performance standards specified in the CCR rules.

Attachments

Table 1 – Summary of Outlier Evaluation
Table 2 – Summary of Descriptive Statistics and Prediction Limit Calculations

Attachment A – Background Concentration Time-Series Charts
Attachment B – ChemStat™ Prediction Limit Outputs

Tables

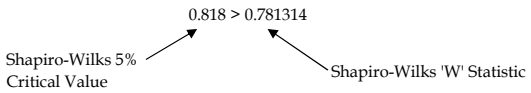
Table 1
Summary of Outlier Evaluation
Background Statistical Evaluation
DTE Electric Company - Monroe Bottom Ash Basin

Parameter	Units	Monitoring Well	Sample Date	Data Outlier	Basis for Removal of Outlier
Sulfate	mg/L	MW-7S	2/5/2019	1,270	Anomalously high lab result
Sulfate	mg/L	MW-13	7/26/2018	0.27	Single detection above laboratory reporting limit
Total Dissolved Solids	mg/L	MW-3S	7/26/2018	7,620	Anomalously high lab result

Table 2
Summary of Descriptive Statistics and Prediction Limit Calculations
Background Statistical Evaluation
DTE Electric Company - Monroe Bottom Ash Basin

Monitoring Well	Shapiro-Wilks Test (5% Critical Value)				Outliers Removed	Prediction Limit Test	Prediction Limit
	Un-Transformed Data	Natural Log Transformed Data	Cube Root Transformed Data	Square Root Transformed Data			
Appendix III							
Boron (ug/L)							
MW-1S	0.859 < 0.904701	--	--	--	N	Parametric	870
MW-2S	0.859 < 0.953534	--	--	--	N	Parametric	1,000
MW-3S	0.859 < 0.936908	--	--	--	N	Parametric	980
MW-7S	0.859 < 0.931927	--	--	--	N	Parametric	1,400
MW-8S	0.859 < 0.990464	--	--	--	N	Parametric	440
MW-9	0.818 < 0.856005	--	--	--	N	Parametric	640
MW-10	0.818 < 0.902199	--	--	--	N	Parametric	530
MW-11	0.818 < 0.86654	--	--	--	N	Parametric	920
MW-12	0.818 < 0.946417	--	--	--	N	Parametric	1,100
MW-13	100% Non-Detect	--	--	--	N	Non-Parametric	100
MW-14	0.818 < 0.911015	--	--	--	N	Parametric	1,700
MW-15	0.818 < 0.972368	--	--	--	N	Parametric	2,800
Calcium (ug/L)							
MW-1S	0.859 < 0.880048	--	--	--	N	Parametric	370,000
MW-2S	0.859 < 0.965873	--	--	--	N	Parametric	270,000
MW-3S	0.859 < 0.941655	--	--	--	N	Parametric	540,000
MW-7S	0.859 > 0.671732	0.859 > 0.791553	0.859 > 0.753805	0.859 > 0.733821	N	Non-Parametric	380,000
MW-8S	0.859 < 0.921986	--	--	--	N	Parametric	430,000
MW-9	0.818 < 0.928069	--	--	--	N	Parametric	190,000
MW-10	0.818 < 0.898852	--	--	--	N	Parametric	170,000
MW-11	0.818 < 0.871723	--	--	--	N	Parametric	330,000
MW-12	0.818 < 0.94286	--	--	--	N	Parametric	210,000
MW-13	0.818 < 0.931515	--	--	--	N	Parametric	140,000
MW-14	0.818 < 0.925732	--	--	--	N	Parametric	310,000
MW-15	0.818 < 0.899743	--	--	--	N	Parametric	150,000
Chloride (mg/L)							
MW-1S	0.859 < 0.948469	--	--	--	N	Parametric	170
MW-2S	0.859 < 0.900501	--	--	--	N	Parametric	14
MW-3S	0.859 < 0.968387	--	--	--	N	Parametric	15
MW-7S	0.859 > 0.795891	0.859 > 0.565423	0.859 > 0.643747	0.859 > 0.6842	N	Non-Parametric	110
MW-8S	0.859 < 0.976916	--	--	--	N	Parametric	16
MW-9	0.818 < 0.959056	--	--	--	N	Parametric	59
MW-10	0.818 < 0.851968	--	--	--	N	Parametric	80
MW-11	0.818 < 0.963692	--	--	--	N	Parametric	18
MW-12	0.818 < 0.927696	--	--	--	N	Parametric	13
MW-13	0.818 < 0.957733	--	--	--	N	Parametric	120
MW-14	0.818 > 0.718421	0.818 > 0.735349	0.818 > 0.72969	0.818 > 0.726866	N	Non-Parametric	310
MW-15	0.818 > 0.798757	0.818 < 0.820792	--	--	N	Parametric	150
Fluoride (mg/L)							
MW-1S	0.859 < 0.910606	--	--	--	N	Parametric	0.47
MW-2S	0.859 < 0.949234	--	--	--	N	Parametric	0.89
MW-3S	0.859 > 0.801564	0.859 > 0.691178	0.859 > 0.729303	0.859 > 0.74804	N	Non-Parametric	0.98
MW-7S	0.859 > 0.822174	0.859 < 0.958767	--	--	N	Parametric	1.6
MW-8S	0.859 > 0.856448	0.859 > 0.805338	0.859 > 0.823355	0.859 > 0.832049	N	Non-Parametric	1.4
MW-9	0.818 > 0.804076	0.818 > 0.755731	0.818 > 0.77204	0.818 > 0.780141	N	Non-Parametric	0.56
MW-10	0.818 < 0.866115	--	--	--	N	Parametric	0.68
MW-11	0.818 < 0.882051	--	--	--	N	Parametric	1.2
MW-12	0.818 > 0.699753	0.818 > 0.630018	0.818 > 0.652978	0.818 > 0.664632	N	Non-Parametric	0.91
MW-13	0.818 < 0.930359	--	--	--	N	Parametric	0.51
MW-14	0.818 < 0.871719	--	--	--	N	Parametric	0.57
MW-15	0.818 < 0.960977	--	--	--	N	Parametric	0.64

Notes:

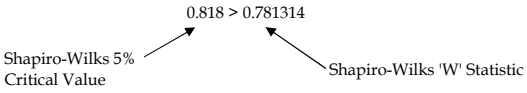


ug/L = micrograms per liter
mg/L = milligrams per liter
SU = standard units

Table 2
Summary of Descriptive Statistics and Prediction Limit Calculations
Background Statistical Evaluation
DTE Electric Company - Monroe Bottom Ash Basin

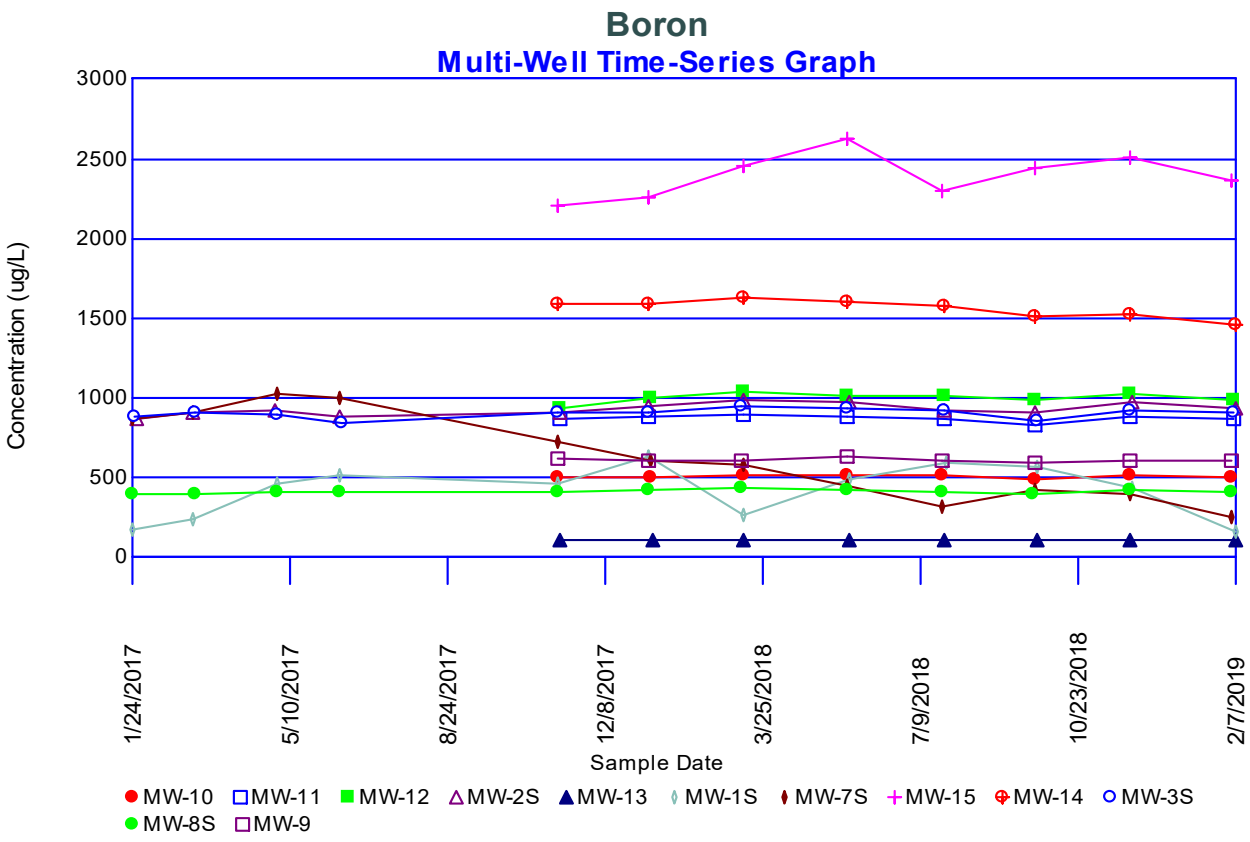
Monitoring Well	Shapiro-Wilks Test (5% Critical Value)				Outliers Removed	Prediction Limit Test	Prediction Limit
	Un-Transformed Data	Natural Log Transformed Data	Cube Root Transformed Data	Square Root Transformed Data			
pH (SU)							
MW-1S	0.859 > 0.824132	0.859 > 0.849948	0.859 > 0.841583	0.859 > 0.837307	N	Non-Parametric	6.5 - 8.7
MW-2S	0.859 < 0.874411	--	--	--	N	Parametric	7.0 - 8.5
MW-3S	0.859 < 0.976388	--	--	--	N	Parametric	6.9 - 7.9
MW-7S	0.859 < 0.897397	--	--	--	N	Parametric	6.0 - 8.1
MW-8S	0.859 > 0.612011	0.859 > 0.595642	0.859 > 0.601076	0.859 > 0.603802	N	Non-Parametric	6.2 - 7.4
MW-9	0.818 > 0.644887	0.818 > 0.634469	0.818 > 0.637923	0.818 > 0.639657	N	Non-Parametric	6.2 - 7.0
MW-10	0.818 < 0.938878	--	--	--	N	Parametric	6.6 - 7.5
MW-11	0.818 > 0.763984	0.818 > 0.754709	0.818 > 0.757805	0.818 > 0.759351	N	Non-Parametric	6.9 - 7.5
MW-12	0.818 < 0.973946	--	--	--	N	Parametric	7.4 - 7.9
MW-13	0.818 < 0.921142	--	--	--	N	Parametric	6.2 - 7.7
MW-14	0.818 < 0.900299	--	--	--	N	Parametric	6.8 - 7.3
MW-15	0.818 < 0.957825	--	--	--	N	Parametric	6.9 - 7.4
Sulfate (mg/L)							
MW-1S	0.859 > 0.786198	0.859 < 0.900081	--	--	N	Parametric	850
MW-2S	0.859 > 0.846432	0.859 < 0.867688	--	--	N	Parametric	1,600
MW-3S	0.859 < 0.967209	--	--	--	N	Parametric	1,400
MW-7S	0.85 < 0.852974	--	--	--	Y	Parametric	590
MW-8S	0.859 < 0.974022	--	--	--	N	Parametric	1,600
MW-9	0.818 < 0.960687	--	--	--	N	Parametric	12
MW-10	0.818 > 0.621563	0.818 > 0.681199	0.818 > 0.65807	0.818 > 0.647669	N	Non-Parametric	19
MW-11	0.818 < 0.955156	--	--	--	N	Parametric	1,500
MW-12	0.818 < 0.942255	--	--	--	N	Parametric	1,300
MW-13	100% Non-Detect	--	--	--	Y	Non-Parametric	1.0
MW-14	0.818 < 0.92891	--	--	--	N	Parametric	430
MW-15	100% Non-Detect	--	--	--	N	Non-Parametric	1.0
Total Dissolved Solids (mg/L)							
MW-1S	0.859 < 0.883695	--	--	--	N	Parametric	1,600
MW-2S	0.859 < 0.904946	--	--	--	N	Parametric	2,000
MW-3S	0.85 > 0.671727	0.85 > 0.693423	0.85 > 0.686173	0.85 > 0.682554	Y	Non-Parametric	2,300
MW-7S	0.859 > 0.680757	0.859 > 0.776857	0.859 > 0.745215	0.859 > 0.728984	N	Non-Parametric	2,000
MW-8S	0.859 < 0.929221	--	--	--	N	Parametric	2,400
MW-9	0.818 < 0.902727	--	--	--	N	Parametric	810
MW-10	0.818 < 0.97446	--	--	--	N	Parametric	840
MW-11	0.818 < 0.906557	--	--	--	N	Parametric	2,100
MW-12	0.818 < 0.907284	--	--	--	N	Parametric	1,800
MW-13	0.818 > 0.624608	0.818 > 0.701231	0.818 > 0.674518	0.818 > 0.661548	N	Non-Parametric	1,100
MW-14	0.818 < 0.937448	--	--	--	N	Parametric	1,700
MW-15	0.818 < 0.882418	--	--	--	N	Parametric	770

Notes:



ug/L = micrograms per liter
mg/L = milligrams per liter
SU = standard units

Attachment A
Background Concentration Time-Series Charts


Boron
Multi-Well Time-Series Graph
Concentration (ug/L)
3000
2500
2000
1500
1000
500
0
1/24/2017
5/10/2017
8/24/2017
12/8/2017
3/25/2018
7/9/2018
10/23/2018
2/7/2019
Sample Date
MW-10
MW-11
MW-12
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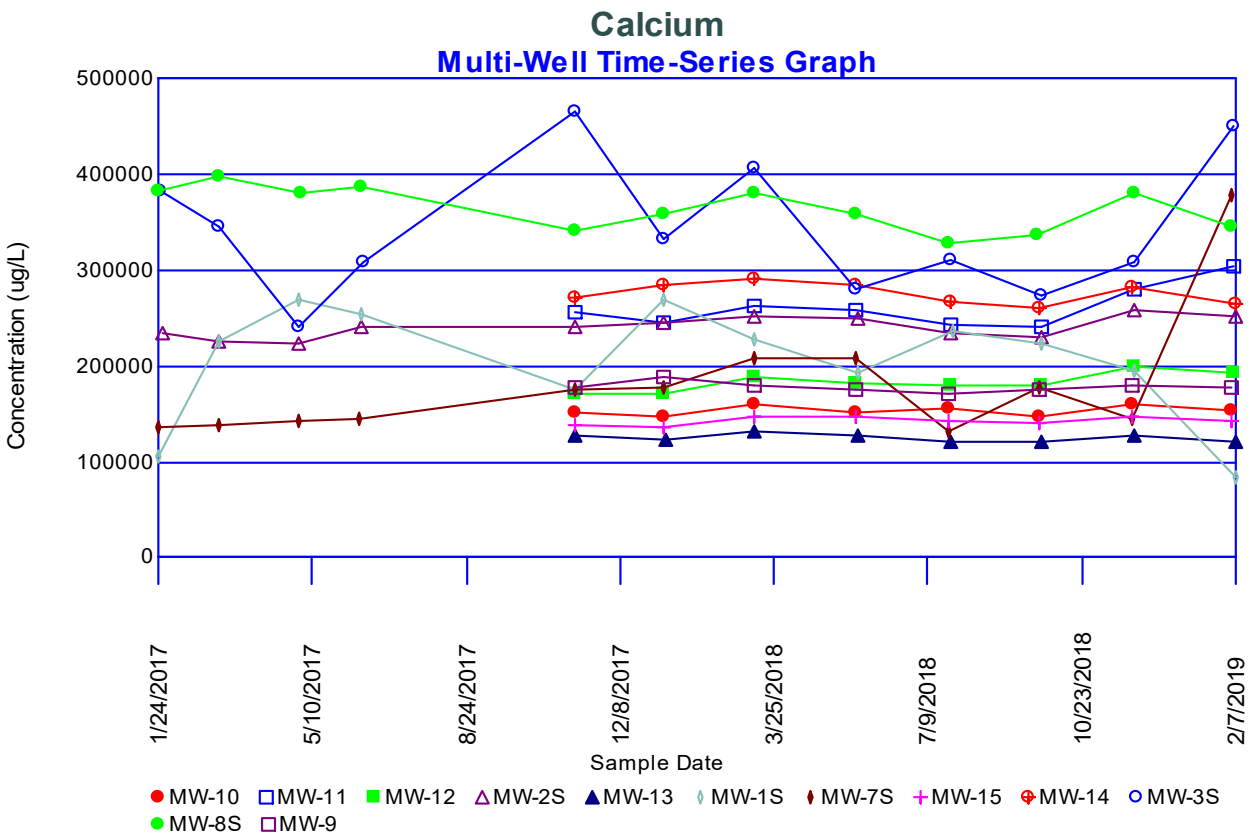
MW-15
MW-14
MW-3S
MW-8S
MW-9


Calcium
Multi-Well Time-Series Graph
Concentration (ug/L)
500000
400000
300000
200000
100000
0
1/24/2017
5/10/2017
8/24/2017
12/8/2017
3/25/2018
7/9/2018
10/23/2018
2/7/2019
Sample Date
MW-10
MW-11
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MW-13
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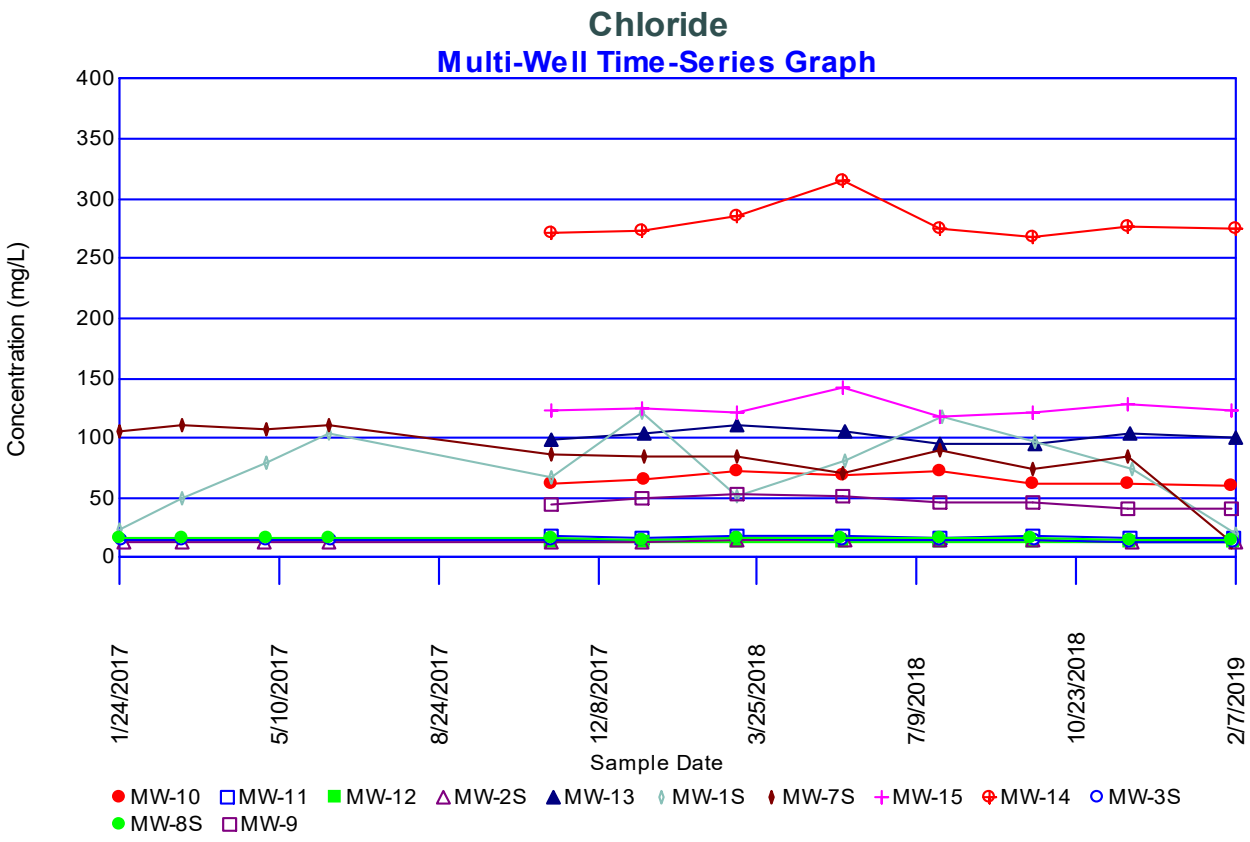
MW-7S
MW-15
MW-14
MW-3S
MW-8S
MW-9


Chloride
Multi-Well Time-Series Graph
Concentration (mg/L)
400
350
300
250
200
150
100
50
0
1/24/2017
5/10/2017
8/24/2017
12/8/2017
3/25/2018
7/9/2018
10/23/2018
2/7/2019
Sample Date
MW-10
MW-11
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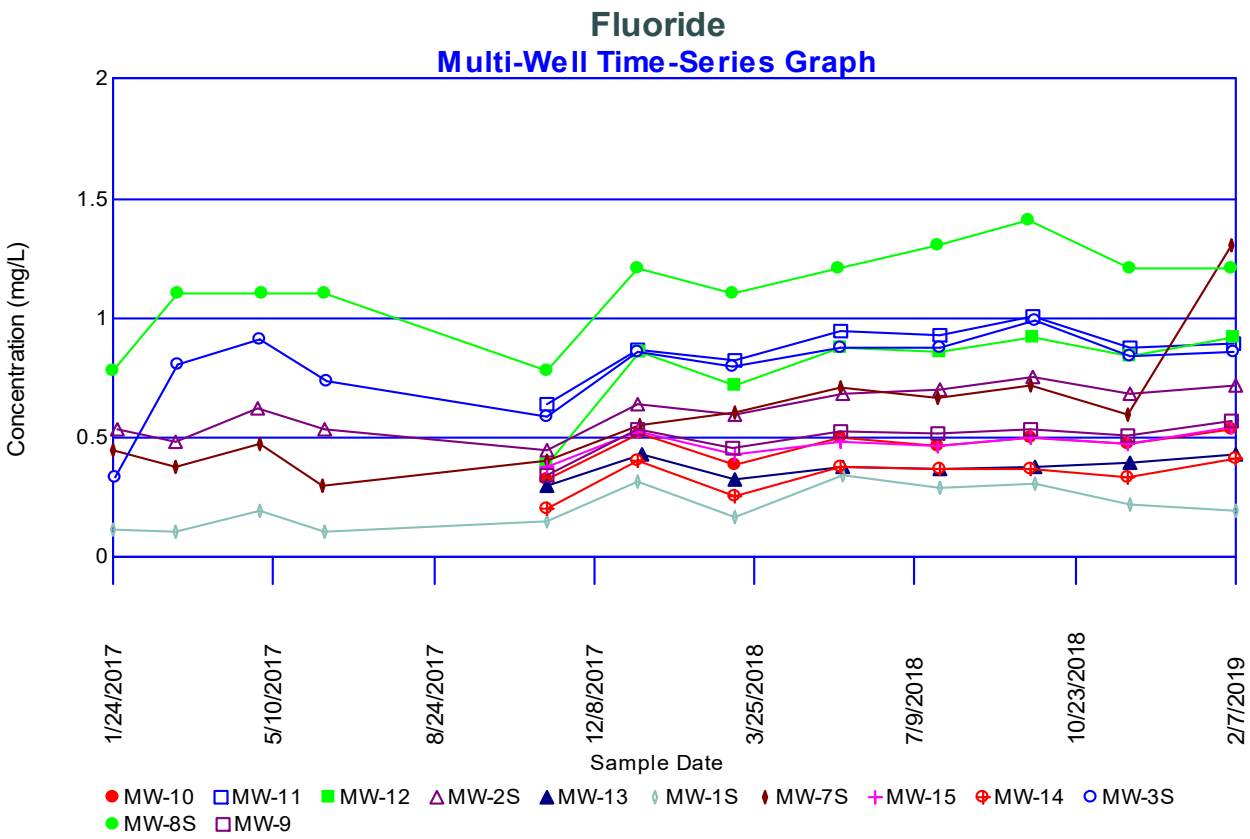
MW-15
MW-14
MW-3S
MW-8S
MW-9


Fluoride
Multi-Well Time-Series Graph
Concentration (mg/L)
2
1.5
1
0.5
0
1/24/2017
5/10/2017
8/24/2017
12/8/2017
3/25/2018
7/9/2018
10/23/2018
2/7/2019
Sample Date
MW-10
MW-11
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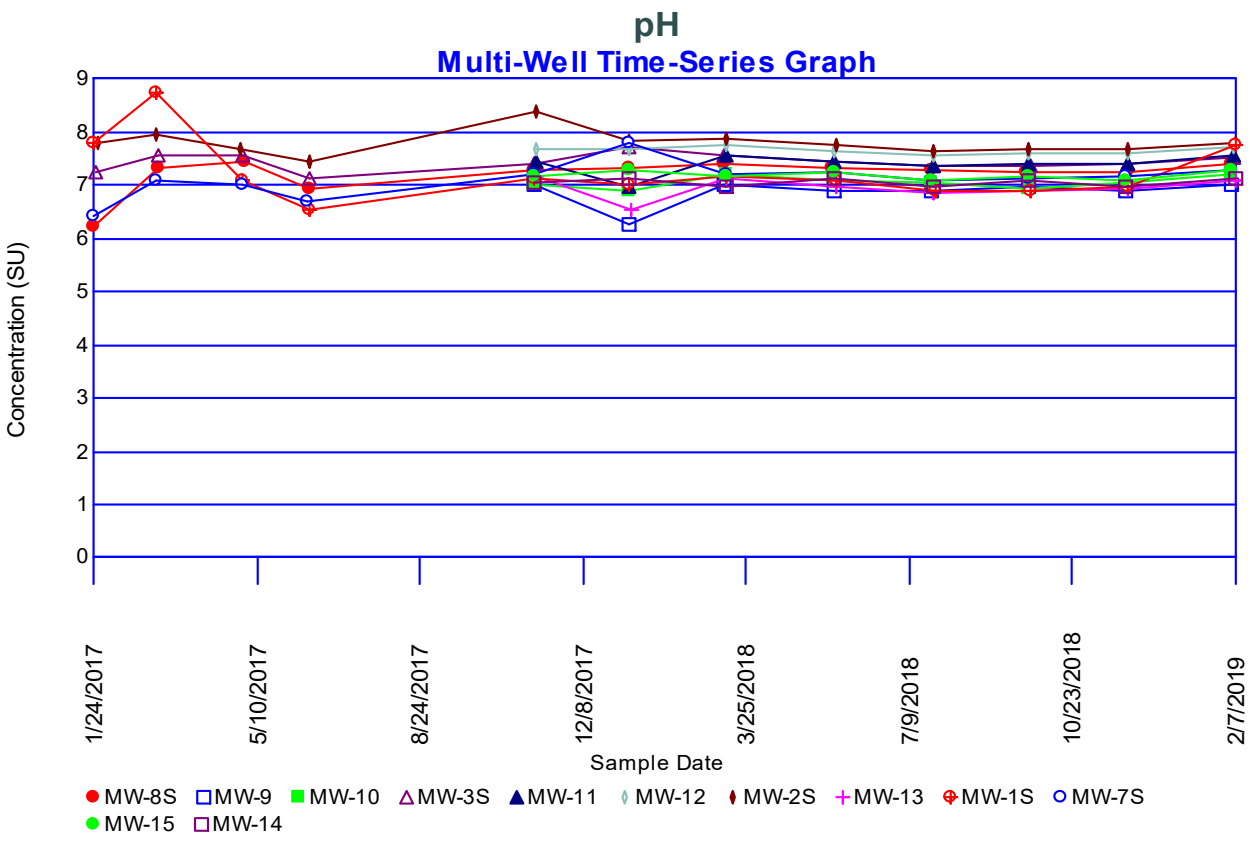
MW-14
MW-3S
MW-8S
MW-9


pH
Multi-Well Time-Series Graph
Concentration (SU)
9
8
7
6
5
4
3
2
1
0
1/24/2017
5/10/2017
8/24/2017
12/8/2017
3/25/2018
7/9/2018
10/23/2018
2/7/2019
Sample Date
MW-8S
MW-9
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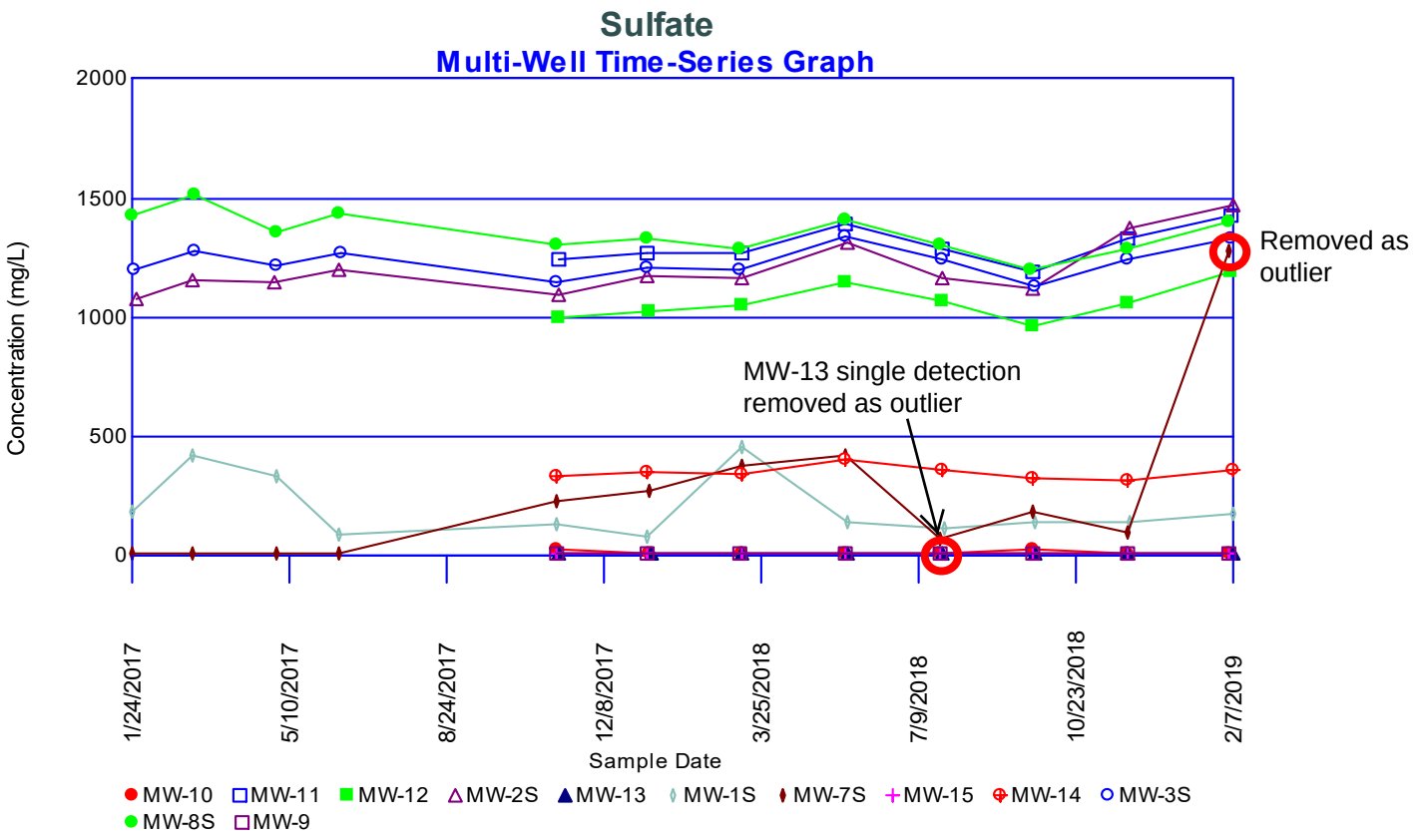
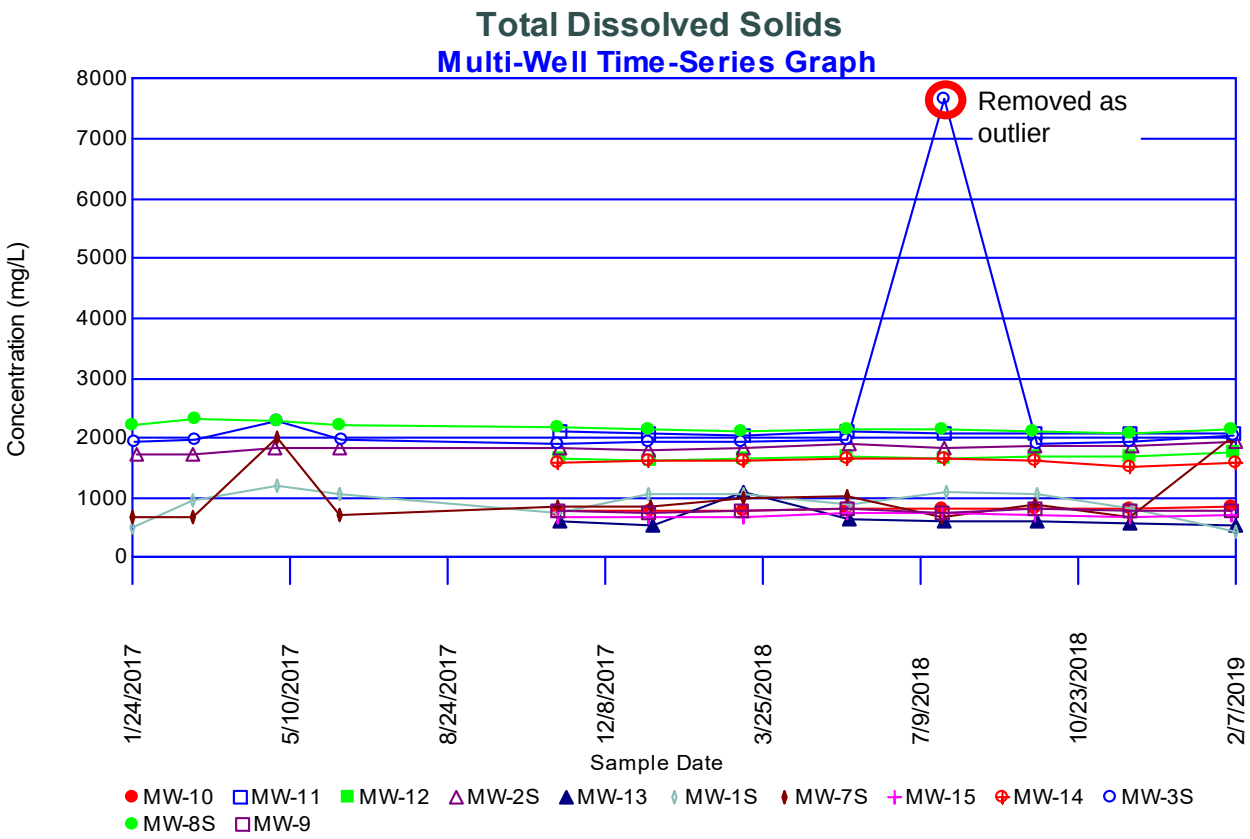
MW-12
MW-2S
MW-13
MW-1S
MW-7S
MW-15
MW-14


Sulfate
Multi-Well Time-Series Graph
Concentration (mg/L)
2000
1500
1000
500
0
MW-13 single detection
removed as outlier
Removed as
outlier
1/24/2017
5/10/2017
8/24/2017
12/8/2017
3/25/2018
7/9/2018
10/23/2018
2/7/2019
Sample Date
MW-10
MW-11
MW-12
MW-2S
MW-13
MW-1S
MW-7S
MW-15
MW-14
MW-3S
MW-8S
MW-9


Total Dissolved Solids
Multi-Well Time-Series Graph
Removed as outlier
Concentration (mg/L)
8000
7000
6000
5000
4000
3000
2000
1000
0
1/24/2017
5/10/2017
8/24/2017
12/8/2017
3/25/2018
7/9/2018
10/23/2018
2/7/2019
Sample Date
MW-10
MW-11
MW-12
MW-2S
MW-13
MW-1S
MW-7S
MW-15
MW-14
MW-3S
MW-8S
MW-9

Attachment B
ChemStat™ Prediction Limit Outputs

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1S

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/25/2017	158
	3/7/2017	226
	5/2/2017	446
	6/14/2017	501
	11/8/2017	446
	1/8/2018	622
	3/13/2018	254
	5/23/2018	472
	7/27/2018	587
	9/27/2018	553
	11/30/2018	428
	2/7/2019	146

From 12 baseline samples
Baseline mean = 403.25
Baseline std Dev = 165.861

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	350	[0, 872.482]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-2S

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/27/2017	859
	3/7/2017	895
	5/1/2017	917
	6/14/2017	872
	11/9/2017	894
	1/8/2018	934
	3/13/2018	982
	5/23/2018	969
	7/26/2018	908
	9/26/2018	899
	11/30/2018	967
	2/7/2019	928

From 12 baseline samples
Baseline mean = 918.667
Baseline std Dev = 38.8618

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	1000	[0, 1028.61]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-3S

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/26/2017	869
	3/8/2017	900
	5/2/2017	887
	6/15/2017	826
	11/8/2017	903
	1/8/2018	895
	3/12/2018	942
	5/22/2018	919
	7/26/2018	904
	9/27/2018	848
	11/29/2018	910
	2/6/2019	895

From 12 baseline samples
Baseline mean = 891.5
Baseline std Dev = 31.2512

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	970	[0, 979.912]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-7S

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/24/2017	860
	3/7/2017	892
	5/2/2017	1020
	6/13/2017	989
	11/8/2017	708
	1/9/2018	601
	3/13/2018	574
	5/22/2018	443
	7/25/2018	306
	9/25/2018	407
	11/28/2018	384
	2/5/2019	239

From 12 baseline samples
Baseline mean = 618.583
Baseline std Dev = 272.045

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	320	[0, 1388.22]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-8S

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/24/2017	383
	3/8/2017	389
	5/3/2017	401
	6/14/2017	406
	11/8/2017	404
	1/8/2018	408
	3/12/2018	426
	5/21/2018	415
	7/25/2018	400
	9/24/2018	393
	11/29/2018	417
	2/5/2019	397

From 12 baseline samples
Baseline mean = 403.25
Baseline std Dev = 12.241

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	480	[0, 437.88]	TRUE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-9

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	610
	1/8/2018	593
	3/12/2018	592
	5/22/2018	622
	7/25/2018	593
	9/25/2018	583
	11/28/2018	590
	2/5/2019	596

From 8 baseline samples
Baseline mean = 597.375
Baseline std Dev = 12.5121

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	630	[0, 637.161]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-10

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	497
	1/9/2018	492
	3/13/2018	510
	5/22/2018	501
	7/25/2018	506
	9/25/2018	475
	11/28/2018	504
	2/5/2019	496

From 8 baseline samples
Baseline mean = 497.625
Baseline std Dev = 10.8356

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	520	[0, 532.08]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-11

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	860
	1/8/2018	869
	3/13/2018	881
	5/22/2018	872
	7/26/2018	853
	9/26/2018	823
	11/29/2018	877
	2/6/2019	864

From 8 baseline samples
Baseline mean = 862.375
Baseline std Dev = 18.2986

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	910	[0, 920.561]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-12

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	927
	1/9/2018	986
	3/13/2018	1030
	5/22/2018	1000
	7/26/2018	1000
	9/26/2018	970
	11/29/2018	1020
	2/6/2019	980

From 8 baseline samples
Baseline mean = 989.125
Baseline std Dev = 32.0243

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	1100	[0, 1090.96]	TRUE

Using the appropriate number of significant figures, the value is equal to but does not exceed the prediction limit.

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-13

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 100%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 100
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	11/9/2017	ND<100
	1/10/2018	ND<100
	3/13/2018	ND<100
	5/23/2018	ND<100
	7/26/2018	ND<100
	9/27/2018	ND<100
	11/29/2018	ND<0
	2/7/2019	ND<100

Date	Count	Mean	Significant
5/22/2019	1	34	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-14

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	1580
	1/8/2018	1580
	3/13/2018	1620
	5/22/2018	1590
	7/26/2018	1570
	9/25/2018	1500
	11/28/2018	1510
	2/7/2019	1450

From 8 baseline samples
Baseline mean = 1550
Baseline std Dev = 57.0714

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	1300	[0, 1731.48]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-15

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	2190
	1/8/2018	2250
	3/13/2018	2440
	5/22/2018	2620
	7/25/2018	2280
	9/25/2018	2430
	11/28/2018	2490
	2/5/2019	2350

From 8 baseline samples
Baseline mean = 2381.25
Baseline std Dev = 141.263

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	2400	[0, 2830.44]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1S

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/25/2017	103000
	3/7/2017	224000
	5/2/2017	267000
	6/14/2017	252000
	11/8/2017	173000
	1/8/2018	268000
	3/13/2018	225000
	5/23/2018	192000
	7/27/2018	235000
	9/27/2018	221000
	11/30/2018	194000
	2/7/2019	80800

From 12 baseline samples
Baseline mean = 202900
Baseline std Dev = 59566.4

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	140000	[0, 371417]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-2S

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/27/2017	233000
	3/7/2017	223000
	5/1/2017	221000
	6/14/2017	239000
	11/9/2017	240000
	1/8/2018	244000
	3/13/2018	251000
	5/23/2018	247000
	7/26/2018	232000
	9/26/2018	228000
	11/30/2018	257000
	2/7/2019	250000

From 12 baseline samples
Baseline mean = 238750
Baseline std Dev = 11537.5

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	230000	[0, 271390]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-3S

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/26/2017	382000
	3/8/2017	344000
	5/2/2017	240000
	6/15/2017	306000
	11/8/2017	464000
	1/8/2018	330000
	3/12/2018	404000
	5/22/2018	278000
	7/26/2018	310000
	9/27/2018	272000
	11/29/2018	307000
	2/6/2019	448000

From 12 baseline samples
Baseline mean = 340417
Baseline std Dev = 70470.4

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	360000	[0, 539782]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-7S

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 376000
Confidence Level = 92.3%
False Positive Rate = 7.7%

Baseline Measurements	Date	Value
	1/24/2017	135000
	3/7/2017	137000
	5/2/2017	140000
	6/13/2017	143000
	11/8/2017	173000
	1/9/2018	176000
	3/13/2018	207000
	5/22/2018	206000
	7/25/2018	130000
	9/25/2018	175000
	11/28/2018	142000
	2/5/2019	376000

Date	Count	Mean	Significant
5/23/2019	1	160000	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-8S

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/24/2017	380000
	3/8/2017	396000
	5/3/2017	378000
	6/14/2017	386000
	11/8/2017	340000
	1/8/2018	356000
	3/12/2018	378000
	5/21/2018	357000
	7/25/2018	327000
	9/24/2018	335000
	11/29/2018	378000
	2/5/2019	343000

From 12 baseline samples
Baseline mean = 362833
Baseline std Dev = 22715

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	330000	[0, 427095]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-9

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	176000
	1/8/2018	186000
	3/12/2018	177000
	5/22/2018	174000
	7/25/2018	170000
	9/25/2018	173000
	11/28/2018	179000
	2/5/2019	176000

From 8 baseline samples
Baseline mean = 176375
Baseline std Dev = 4749.06

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	170000	[0, 191476]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-10

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	150000
	1/9/2018	145000
	3/13/2018	158000
	5/22/2018	150000
	7/25/2018	153000
	9/25/2018	145000
	11/28/2018	158000
	2/5/2019	151000

From 8 baseline samples
Baseline mean = 151250
Baseline std Dev = 5007.14

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	150000	[0, 167172]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-11

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	254000
	1/8/2018	244000
	3/13/2018	262000
	5/22/2018	256000
	7/26/2018	241000
	9/26/2018	240000
	11/29/2018	279000
	2/6/2019	302000

From 8 baseline samples
Baseline mean = 259750
Baseline std Dev = 21372.5

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	260000	[0, 327711]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-12

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	170000
	1/9/2018	170000
	3/13/2018	186000
	5/22/2018	180000
	7/26/2018	177000
	9/26/2018	179000
	11/29/2018	198000
	2/6/2019	190000

From 8 baseline samples
Baseline mean = 181250
Baseline std Dev = 9691.68

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	180000	[0, 212068]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-13

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	125000
	1/10/2018	121000
	3/13/2018	129000
	5/23/2018	125000
	7/26/2018	120000
	9/27/2018	118000
	11/29/2018	126000
	2/7/2019	120000

From 8 baseline samples
Baseline mean = 123000
Baseline std Dev = 3779.64

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	130000	[0, 135019]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-14

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	269000
	1/8/2018	283000
	3/13/2018	289000
	5/22/2018	282000
	7/26/2018	265000
	9/25/2018	258000
	11/28/2018	280000
	2/7/2019	263000

From 8 baseline samples
Baseline mean = 273625
Baseline std Dev = 11262.3

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	230000	[0, 309437]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-15

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	136000
	1/8/2018	135000
	3/13/2018	146000
	5/22/2018	145000
	7/25/2018	141000
	9/25/2018	138000
	11/28/2018	146000
	2/5/2019	140000

From 8 baseline samples
Baseline mean = 140875
Baseline std Dev = 4421.94

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	140000	[0, 154936]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1S

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/25/2017	21.1
	3/7/2017	47.7
	5/2/2017	78.6
	6/14/2017	102
	11/8/2017	66
	1/8/2018	119
	3/13/2018	50.2
	5/23/2018	78.8
	7/27/2018	117
	9/27/2018	95.7
	11/30/2018	73.1
	2/7/2019	18.9

From 12 baseline samples
Baseline mean = 72.3417
Baseline std Dev = 33.4358

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	31	[0, 166.934]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-2S

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/27/2017	11.4
	3/7/2017	11.8
	5/1/2017	11.5
	6/14/2017	11.9
	11/9/2017	12.2
	1/8/2018	11.4
	3/13/2018	12.5
	5/23/2018	12.4
	7/26/2018	12.3
	9/26/2018	12.4
	11/30/2018	10.6
	2/7/2019	10.7

From 12 baseline samples
Baseline mean = 11.7583
Baseline std Dev = 0.651513

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	11	[0, 13.6015]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-3S

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/26/2017	13
	3/8/2017	12.7
	5/2/2017	12.9
	6/15/2017	13.2
	11/8/2017	13.3
	1/8/2018	12.8
	3/12/2018	14
	5/22/2018	13.4
	7/26/2018	12.8
	9/27/2018	13.7
	11/29/2018	12
	2/6/2019	12.1

From 12 baseline samples
Baseline mean = 12.9917
Baseline std Dev = 0.585364

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	13	[0, 14.6477]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-7S

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 110
Confidence Level = 92.3%
False Positive Rate = 7.7%

Baseline Measurements	Date	Value
	1/24/2017	104
	3/7/2017	110
	5/2/2017	106
	6/13/2017	109
	11/8/2017	85.5
	1/9/2018	83.8
	3/13/2018	83.3
	5/22/2018	69.3
	7/25/2018	87.5
	9/25/2018	72.5
	11/28/2018	83.6
	2/5/2019	12.2

Date	Count	Mean	Significant
5/23/2019	1	77	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-8S

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/24/2017	15.2
	3/8/2017	14.7
	5/3/2017	14.1
	6/14/2017	14.3
	11/8/2017	14.7
	1/8/2018	13.9
	3/12/2018	15.1
	5/21/2018	14.5
	7/25/2018	14
	9/24/2018	14.5
	11/29/2018	13.3
	2/5/2019	13.8

From 12 baseline samples
Baseline mean = 14.3417
Baseline std Dev = 0.553433

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	14	[0, 15.9074]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-9

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	43.3
	1/8/2018	47.7
	3/12/2018	52.2
	5/22/2018	49
	7/25/2018	45.1
	9/25/2018	45.3
	11/28/2018	39.9
	2/5/2019	39.6

From 8 baseline samples
Baseline mean = 45.2625
Baseline std Dev = 4.35462

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	47	[0, 59.1093]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-10

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	60.2
	1/9/2018	64
	3/13/2018	70.1
	5/22/2018	66.9
	7/25/2018	71.4
	9/25/2018	59.7
	11/28/2018	59.4
	2/5/2019	59

From 8 baseline samples
Baseline mean = 63.8375
Baseline std Dev = 5.06047

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	63	[0, 79.9288]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-11

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	16
	1/8/2018	15.6
	3/13/2018	17
	5/22/2018	16.6
	7/26/2018	15.4
	9/26/2018	16
	11/29/2018	15.5
	2/6/2019	14.9

From 8 baseline samples
Baseline mean = 15.875
Baseline std Dev = 0.677706

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	16	[0, 18.03]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-12

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	10.7
	1/9/2018	11.1
	3/13/2018	11.7
	5/22/2018	11.3
	7/26/2018	11.2
	9/26/2018	11.3
	11/29/2018	12.1
	2/6/2019	11.3

From 8 baseline samples
Baseline mean = 11.3375
Baseline std Dev = 0.413824

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	10	[0, 12.6534]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-13

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	97.1
	1/10/2018	102
	3/13/2018	109
	5/23/2018	104
	7/26/2018	93.6
	9/27/2018	92.7
	11/29/2018	102
	2/7/2019	97.9

From 8 baseline samples
Baseline mean = 99.7875
Baseline std Dev = 5.49946

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	97	[0, 117.275]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-14

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 313
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	11/8/2017	269
	1/8/2018	271
	3/13/2018	283
	5/22/2018	313
	7/26/2018	274
	9/25/2018	266
	11/28/2018	275
	2/7/2019	273

Date	Count	Mean	Significant
5/23/2019	1	290	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-15

Parameter: Chloride

Natural Logarithm Transformation

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	4.80402
	1/8/2018	4.82028
	3/13/2018	4.77912
	5/22/2018	4.94876
	7/25/2018	4.75359
	9/25/2018	4.77912
	11/28/2018	4.83628
	2/5/2019	4.79579

From 8 baseline samples
Baseline mean = 4.81462
Baseline std Dev = 0.0600075

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	4.78749	[0, 5.00543]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1S

Parameter: Fluoride

Original Data (Not Transformed)

Cohen's Adjustment

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/25/2017	0.11
	3/7/2017	ND<0.1
	5/2/2017	0.19
	6/14/2017	ND<0.1
	11/8/2017	0.14
	1/8/2018	0.31
	3/13/2018	0.16
	5/23/2018	0.34
	7/27/2018	0.28
	9/27/2018	0.3
	11/30/2018	0.21
	2/7/2019	0.19

From 12 baseline samples
Baseline mean = 0.193522
Baseline std Dev = 0.0994666

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	0.27	[0, 0.474919]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-2S

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/27/2017	0.53
	3/7/2017	0.48
	5/1/2017	0.62
	6/14/2017	0.53
	11/9/2017	0.44
	1/8/2018	0.63
	3/13/2018	0.59
	5/23/2018	0.68
	7/26/2018	0.69
	9/26/2018	0.75
	11/30/2018	0.68
	2/7/2019	0.71

From 12 baseline samples
Baseline mean = 0.610833
Baseline std Dev = 0.0978364

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	0.7	[0, 0.887619]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-3S

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 0.98
Confidence Level = 92.3%
False Positive Rate = 7.7%

Baseline Measurements	Date	Value
	1/26/2017	0.33
	3/8/2017	0.8
	5/2/2017	0.9
	6/15/2017	0.73
	11/8/2017	0.58
	1/8/2018	0.85
	3/12/2018	0.79
	5/22/2018	0.87
	7/26/2018	0.87
	9/27/2018	0.98
	11/29/2018	0.83
	2/6/2019	0.85

Date	Count	Mean	Significant
5/23/2019	1	0.86	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-7S

Parameter: Fluoride

Natural Logarithm Transformation

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/24/2017	-0.820981
	3/7/2017	-0.994252
	5/2/2017	-0.755023
	6/13/2017	-1.23787
	11/8/2017	-0.916291
	1/9/2018	-0.597837
	3/13/2018	-0.510826
	5/22/2018	-0.356675
	7/25/2018	-0.415515
	9/25/2018	-0.34249
	11/28/2018	-0.527633
	2/5/2019	0.262364

From 12 baseline samples
Baseline mean = -0.601086
Baseline std Dev = 0.387489

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	-0.210721	[0, 0.495147]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-8S

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 1.4
Confidence Level = 92.3%
False Positive Rate = 7.7%

Baseline Measurements	Date	Value
	1/24/2017	0.77
	3/8/2017	1.1
	5/3/2017	1.1
	6/14/2017	1.1
	11/8/2017	0.77
	1/8/2018	1.2
	3/12/2018	1.1
	5/21/2018	1.2
	7/25/2018	1.3
	9/24/2018	1.4
	11/29/2018	1.2
	2/5/2019	1.2

Date	Count	Mean	Significant
5/22/2019	1	1.3	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-9

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.56
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	11/8/2017	0.34
	1/8/2018	0.53
	3/12/2018	0.45
	5/22/2018	0.52
	7/25/2018	0.51
	9/25/2018	0.53
	11/28/2018	0.5
	2/5/2019	0.56

Date	Count	Mean	Significant
5/22/2019	1	0.46	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-10

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	0.32
	1/9/2018	0.51
	3/13/2018	0.38
	5/22/2018	0.49
	7/25/2018	0.46
	9/25/2018	0.49
	11/28/2018	0.47
	2/5/2019	0.53

From 8 baseline samples
Baseline mean = 0.45625
Baseline std Dev = 0.0708998

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	0.43	[0, 0.681698]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-11

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	0.63
	1/8/2018	0.86
	3/13/2018	0.82
	5/22/2018	0.94
	7/26/2018	0.92
	9/26/2018	1
	11/29/2018	0.87
	2/6/2019	0.89

From 8 baseline samples
Baseline mean = 0.86625
Baseline std Dev = 0.110057

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	0.89	[0, 1.21621]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-12

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.91
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	11/9/2017	0.38
	1/9/2018	0.85
	3/13/2018	0.71
	5/22/2018	0.87
	7/26/2018	0.85
	9/26/2018	0.91
	11/29/2018	0.83
	2/6/2019	0.91

Date	Count	Mean	Significant
5/22/2019	1	0.81	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-13

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	0.29
	1/10/2018	0.42
	3/13/2018	0.32
	5/23/2018	0.37
	7/26/2018	0.36
	9/27/2018	0.37
	11/29/2018	0.39
	2/7/2019	0.42

From 8 baseline samples
Baseline mean = 0.3675
Baseline std Dev = 0.0452769

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	0.4	[0, 0.511472]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-14

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	0.2
	1/8/2018	0.4
	3/13/2018	0.25
	5/22/2018	0.37
	7/26/2018	0.36
	9/25/2018	0.36
	11/28/2018	0.33
	2/7/2019	0.41

From 8 baseline samples
Baseline mean = 0.335
Baseline std Dev = 0.0734847

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	0.36	[0, 0.568667]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-15

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	0.37
	1/8/2018	0.52
	3/13/2018	0.42
	5/22/2018	0.48
	7/25/2018	0.46
	9/25/2018	0.49
	11/28/2018	0.47
	2/5/2019	0.54

From 8 baseline samples
Baseline mean = 0.46875
Baseline std Dev = 0.0540998

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	0.48	[0, 0.640777]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-1S

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 8.7
Confidence Level = 92.3%
False Positive Rate = 7.7%

Baseline Measurements	Date	Value
	1/25/2017	7.77
	3/7/2017	8.7
	5/2/2017	7.07
	6/14/2017	6.5
	11/8/2017	7.09
	1/8/2018	6.98
	3/13/2018	7.14
	5/23/2018	7.04
	7/27/2018	6.85
	9/27/2018	6.85
	11/30/2018	6.92
	2/7/2019	7.72

Date	Count	Mean	Significant
5/23/2019	1	7.29	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-2S

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% Two-Sided Comparison

Baseline Samples	Date	Result
	1/27/2017	7.76
	3/7/2017	7.9
	5/1/2017	7.66
	6/14/2017	7.4
	11/9/2017	8.35
	1/8/2018	7.8
	3/13/2018	7.85
	5/23/2018	7.72
	7/26/2018	7.59
	9/26/2018	7.65
	11/30/2018	7.63
	2/7/2019	7.77

From 12 baseline samples
Baseline mean = 7.75667
Baseline std Dev = 0.228924

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 99.5 %
t is Percentile of Student's T-Test (0.99/1/2) = 0.995
Degrees of Freedom = 12 (background observations) - 1
t(0.995, 12) = 3.10582

Date	Samples	Mean	Interval	Significant
5/22/2019	1	7.48	[7.02, 8.5]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-3S

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% Two-Sided Comparison

Baseline Samples	Date	Result
	1/26/2017	7.22
	3/8/2017	7.52
	5/2/2017	7.51
	6/15/2017	7.11
	11/8/2017	7.36
	1/8/2018	7.7
	3/12/2018	7.54
	5/22/2018	7.42
	7/26/2018	7.34
	9/27/2018	7.33
	11/29/2018	7.37
	2/6/2019	7.49

From 12 baseline samples
Baseline mean = 7.40917
Baseline std Dev = 0.156986

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 99.5 %
t is Percentile of Student's T-Test (0.99/1/2) = 0.995
Degrees of Freedom = 12 (background observations) - 1
t(0.995, 12) = 3.10582

Date	Samples	Mean	Interval	Significant
5/23/2019	1	7.13	[6.9, 7.92]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-7S

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% Two-Sided Comparison

Baseline Samples	Date	Result
	1/24/2017	6.4
	3/7/2017	7.06
	5/2/2017	6.97
	6/13/2017	6.68
	11/8/2017	7.17
	1/9/2018	7.76
	3/13/2018	7.16
	5/22/2018	7.2
	7/25/2018	7.05
	9/25/2018	7.11
	11/28/2018	7.15
	2/5/2019	7.27

From 12 baseline samples
Baseline mean = 7.08167
Baseline std Dev = 0.32599

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 99.5 %
t is Percentile of Student's T-Test (0.99/1/2) = 0.995
Degrees of Freedom = 12 (background observations) - 1
t(0.995, 12) = 3.10582

Date	Samples	Mean	Interval	Significant
5/23/2019	1	7.12	[6.03, 8.14]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-8S

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 7.41
Confidence Level = 92.3%
False Positive Rate = 7.7%

Baseline Measurements	Date	Value
	1/24/2017	6.19
	3/8/2017	7.31
	5/3/2017	7.41
	6/14/2017	6.91
	11/8/2017	7.27
	1/8/2018	7.31
	3/12/2018	7.36
	5/21/2018	7.29
	7/25/2018	7.27
	9/24/2018	7.23
	11/29/2018	7.21
	2/5/2019	7.36

Date	Count	Mean	Significant
5/21/2019	1	6.9	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-9

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 6.99
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	11/8/2017	6.97
	1/8/2018	6.21
	3/12/2018	6.99
	5/22/2018	6.84
	7/25/2018	6.84
	9/25/2018	6.92
	11/28/2018	6.84
	2/5/2019	6.99

Date	Count	Mean	Significant
5/21/2019	1	6.8	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-10

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% Two-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	6.99
	1/9/2018	6.86
	3/13/2018	7.19
	5/22/2018	7.05
	7/25/2018	7.01
	9/25/2018	6.89
	11/28/2018	7.03
	2/5/2019	7.17

From 8 baseline samples
Baseline mean = 7.02375
Baseline std Dev = 0.116978

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 99.5 %
t is Percentile of Student's T-Test (0.99/1/2) = 0.995
Degrees of Freedom = 8 (background observations) - 1
t(0.995, 8) = 3.49948

Date	Samples	Mean	Interval	Significant
5/22/2019	1	7.04	[6.59, 7.46]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-11

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 7.53
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	11/9/2017	7.41
	1/8/2018	6.93
	3/13/2018	7.53
	5/22/2018	7.41
	7/26/2018	7.33
	9/26/2018	7.36
	11/29/2018	7.38
	2/6/2019	7.51

Date	Count	Mean	Significant
5/22/2019	1	7.27	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-12

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% Two-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	7.63
	1/9/2018	7.64
	3/13/2018	7.74
	5/22/2018	7.62
	7/26/2018	7.53
	9/26/2018	7.58
	11/29/2018	7.56
	2/6/2019	7.69

From 8 baseline samples
Baseline mean = 7.62375
Baseline std Dev = 0.0686477

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 99.5 %
t is Percentile of Student's T-Test (0.99/1/2) = 0.995
Degrees of Freedom = 8 (background observations) - 1
t(0.995, 8) = 3.49948

Date	Samples	Mean	Interval	Significant
5/22/2019	1	7.35	[7.37, 7.88]	TRUE

Using the appropriate number of significant figures, the value is equal to but does not exceed the prediction limit.

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-13

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% Two-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	7.14
	1/10/2018	6.5
	3/13/2018	7.09
	5/23/2018	6.95
	7/26/2018	6.8
	9/27/2018	6.85
	11/29/2018	6.88
	2/7/2019	7.05

From 8 baseline samples
Baseline mean = 6.9075
Baseline std Dev = 0.203943

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 99.5 %
t is Percentile of Student's T-Test (0.99/1/2) = 0.995
Degrees of Freedom = 8 (background observations) - 1
t(0.995, 8) = 3.49948

Date	Samples	Mean	Interval	Significant
5/22/2019	1	6.92	[6.15, 7.66]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-14

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% Two-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	7.01
	1/8/2018	7.08
	3/13/2018	6.95
	5/22/2018	7.08
	7/26/2018	6.92
	9/25/2018	7.04
	11/28/2018	6.95
	2/7/2019	7.1

From 8 baseline samples
Baseline mean = 7.01625
Baseline std Dev = 0.0694751

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 99.5 %
t is Percentile of Student's T-Test (0.99/1/2) = 0.995
Degrees of Freedom = 8 (background observations) - 1
t(0.995, 8) = 3.49948

Date	Samples	Mean	Interval	Significant
5/23/2019	1	6.98	[6.76, 7.27]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-15

Parameter: pH

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% Two-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	7.15
	1/8/2018	7.24
	3/13/2018	7.15
	5/22/2018	7.2
	7/25/2018	7.07
	9/25/2018	7.13
	11/28/2018	7.04
	2/5/2019	7.26

From 8 baseline samples
Baseline mean = 7.155
Baseline std Dev = 0.0769044

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 99.5 %
t is Percentile of Student's T-Test (0.99/1/2) = 0.995
Degrees of Freedom = 8 (background observations) - 1
t(0.995, 8) = 3.49948

Date	Samples	Mean	Interval	Significant
5/23/2019	1	7.03	[6.87, 7.44]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1S

Parameter: Sulfate

Natural Logarithm Transformation

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/25/2017	5.20401
	3/7/2017	6.03069
	5/2/2017	5.78074
	6/14/2017	4.45202
	11/8/2017	4.82028
	1/8/2018	4.36055
	3/13/2018	6.10479
	5/23/2018	4.90527
	7/27/2018	4.67283
	9/27/2018	4.90527
	11/30/2018	4.91998
	2/7/2019	5.12396

From 12 baseline samples
Baseline mean = 5.1067
Baseline std Dev = 0.578845

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	5.63479	[0, 6.74429]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-2S

Parameter: Sulfate

Natural Logarithm Transformation

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/27/2017	6.97541
	3/7/2017	7.04752
	5/1/2017	7.03878
	6/14/2017	7.08171
	11/9/2017	6.99393
	1/8/2018	7.06476
	3/13/2018	7.05618
	5/23/2018	7.17778
	7/26/2018	7.05618
	9/26/2018	7.01212
	11/30/2018	7.22257
	2/7/2019	7.28619

From 12 baseline samples
Baseline mean = 7.08443
Baseline std Dev = 0.0949856

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	7.09008	[0, 7.35315]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-3S

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/26/2017	1190
	3/8/2017	1270
	5/2/2017	1210
	6/15/2017	1260
	11/8/2017	1140
	1/8/2018	1200
	3/12/2018	1190
	5/22/2018	1330
	7/26/2018	1240
	9/27/2018	1120
	11/29/2018	1240
	2/6/2019	1320

From 12 baseline samples
Baseline mean = 1225.83
Baseline std Dev = 64.1672

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	1400	[0, 1407.37]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-7S

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/24/2017	1.8
	3/7/2017	ND<0.25
	5/2/2017	1.1
	6/13/2017	2.1
	11/8/2017	220
	1/9/2018	266
	3/13/2018	374
	5/22/2018	411
	7/25/2018	68.2
	9/25/2018	179
	11/28/2018	88.7

From 11 baseline samples
Baseline mean = 146.559
Baseline std Dev = 153.703

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 11 (background observations) - 1
t(0.99, 10) = 2.76377

Date	Samples	Mean	Interval	Significant
5/23/2019	1	260	[0, 590.249]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-8S

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/24/2017	1420
	3/8/2017	1510
	5/3/2017	1350
	6/14/2017	1430
	11/8/2017	1300
	1/8/2018	1320
	3/12/2018	1280
	5/21/2018	1400
	7/25/2018	1300
	9/24/2018	1190
	11/29/2018	1280
	2/5/2019	1390

From 12 baseline samples
Baseline mean = 1347.5
Baseline std Dev = 86.4581

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	1500	[0, 1592.1]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-9

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	3.4
	1/8/2018	0.56
	3/12/2018	3.2
	5/22/2018	8
	7/25/2018	6.6
	9/25/2018	5.7
	11/28/2018	3.8
	2/5/2019	3.9

From 8 baseline samples
Baseline mean = 4.395
Baseline std Dev = 2.30792

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	13	[0, 11.7337]	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-10

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 18.5
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	11/8/2017	18.3
	1/9/2018	5.1
	3/13/2018	4.2
	5/22/2018	3.7
	7/25/2018	3.9
	9/25/2018	18.5
	11/28/2018	3.6
	2/5/2019	4

Date	Count	Mean	Significant
5/22/2019	1	23	TRUE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-11

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	1240
	1/8/2018	1260
	3/13/2018	1260
	5/22/2018	1380
	7/26/2018	1280
	9/26/2018	1180
	11/29/2018	1320
	2/6/2019	1420

From 8 baseline samples
Baseline mean = 1292.5
Baseline std Dev = 77.7817

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	1600	[0, 1539.83]	TRUE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-12

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	987
	1/9/2018	1020
	3/13/2018	1040
	5/22/2018	1140
	7/26/2018	1060
	9/26/2018	959
	11/29/2018	1050
	2/6/2019	1180

From 8 baseline samples
Baseline mean = 1054.5
Baseline std Dev = 73.8609

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	1100	[0, 1289.36]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-14

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	329
	1/8/2018	347
	3/13/2018	332
	5/22/2018	396
	7/26/2018	350
	9/25/2018	322
	11/28/2018	311
	2/7/2019	358

From 8 baseline samples
Baseline mean = 343.125
Baseline std Dev = 26.4058

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	370	[0, 427.09]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-1S

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/25/2017	487
	3/7/2017	923
	5/2/2017	1180
	6/14/2017	1040
	11/8/2017	715
	1/8/2018	1040
	3/13/2018	1030
	5/23/2018	860
	7/27/2018	1060
	9/27/2018	1030
	11/30/2018	788
	2/7/2019	410

From 12 baseline samples
Baseline mean = 880.25
Baseline std Dev = 239.675

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/23/2019	1	690	[0, 1558.31]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-2S

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/27/2017	1690
	3/7/2017	1680
	5/1/2017	1790
	6/14/2017	1800
	11/9/2017	1800
	1/8/2018	1780
	3/13/2018	1810
	5/23/2018	1860
	7/26/2018	1790
	9/26/2018	1830
	11/30/2018	1830
	2/7/2019	1890

From 12 baseline samples
Baseline mean = 1795.83
Baseline std Dev = 60.6717

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	1900	[0, 1967.48]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-3S

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 11
Maximum Baseline Concentration = 2260
Confidence Level = 91.7%
False Positive Rate = 8.3%

Baseline Measurements	Date	Value
	1/26/2017	1890
	3/8/2017	1930
	5/2/2017	2260
	6/15/2017	1930
	11/8/2017	1870
	1/8/2018	1920
	3/12/2018	1910
	5/22/2018	1940
	9/27/2018	1860
	11/29/2018	1910
	2/6/2019	2020

Date	Count	Mean	Significant
5/23/2019	1	2000	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-7S

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 1990
Confidence Level = 92.3%
False Positive Rate = 7.7%

Baseline Measurements	Date	Value
	1/24/2017	633
	3/7/2017	639
	5/2/2017	1970
	6/13/2017	675
	11/8/2017	833
	1/9/2018	827
	3/13/2018	974
	5/22/2018	982
	7/25/2018	649
	9/25/2018	859
	11/28/2018	647
	2/5/2019	1990

Date	Count	Mean	Significant
5/23/2019	1	920	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-8S

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	1/24/2017	2180
	3/8/2017	2290
	5/3/2017	2250
	6/14/2017	2200
	11/8/2017	2140
	1/8/2018	2100
	3/12/2018	2070
	5/21/2018	2120
	7/25/2018	2100
	9/24/2018	2080
	11/29/2018	2040
	2/5/2019	2110

From 12 baseline samples
Baseline mean = 2140
Baseline std Dev = 75.5585

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 12 (background observations) - 1
t(0.99, 11) = 2.71808

Date	Samples	Mean	Interval	Significant
5/22/2019	1	2100	[0, 2353.76]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-9

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	760
	1/8/2018	728
	3/12/2018	754
	5/22/2018	771
	7/25/2018	732
	9/25/2018	778
	11/28/2018	761
	2/5/2019	762

From 8 baseline samples
Baseline mean = 755.75
Baseline std Dev = 17.5235

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	820	[0, 811.471]	TRUE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-10

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	764
	1/9/2018	737
	3/13/2018	751
	5/22/2018	780
	7/25/2018	789
	9/25/2018	790
	11/28/2018	772
	2/5/2019	804

From 8 baseline samples
Baseline mean = 773.375
Baseline std Dev = 22.0903

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	850	[0, 843.618]	TRUE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-11

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	2070
	1/8/2018	2040
	3/13/2018	2020
	5/22/2018	2070
	7/26/2018	2040
	9/26/2018	2040
	11/29/2018	2050
	2/6/2019	2030

From 8 baseline samples
Baseline mean = 2045
Baseline std Dev = 17.7281

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	2100	[0, 2101.37]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-12

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/9/2017	1640
	1/9/2018	1600
	3/13/2018	1610
	5/22/2018	1660
	7/26/2018	1620
	9/26/2018	1650
	11/29/2018	1650
	2/6/2019	1720

From 8 baseline samples
Baseline mean = 1643.75
Baseline std Dev = 37.3927

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/22/2019	1	1700	[0, 1762.65]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-13

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 0%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 1050
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	11/9/2017	587
	1/10/2018	492
	3/13/2018	1050
	5/23/2018	601
	7/26/2018	589
	9/27/2018	565
	11/29/2018	531
	2/7/2019	521

Date	Count	Mean	Significant
5/22/2019	1	610	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-14

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	1540
	1/8/2018	1580
	3/13/2018	1590
	5/22/2018	1620
	7/26/2018	1610
	9/25/2018	1590
	11/28/2018	1500
	2/7/2019	1560

From 8 baseline samples
Baseline mean = 1573.75
Baseline std Dev = 39.2565

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	1600	[0, 1698.58]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-15

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 99% One-Sided Comparison

Baseline Samples	Date	Result
	11/8/2017	641
	1/8/2018	629
	3/13/2018	657
	5/22/2018	707
	7/25/2018	704
	9/25/2018	697
	11/28/2018	635
	2/5/2019	665

From 8 baseline samples
Baseline mean = 666.875
Baseline std Dev = 31.8857

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.01/1) = 99 %
t is Percentile of Student's T-Test (0.99/1) = 0.99
Degrees of Freedom = 8 (background observations) - 1
t(0.99, 7) = 2.99795

Date	Samples	Mean	Interval	Significant
5/23/2019	1	710	[0, 768.265]	FALSE