Annual Groundwater Monitoring Report

DTE Electric Company
Belle River Power Plant Diversion Basin

4505 King Road
China Township, Michigan

January 2018

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Prepared For
DTE Electric Company

Graham Crockford, C.P.G
Senior Project Geologist

David B. McKenzie, P.E.
Senior Project Engineer

1540 Eisenhower Place, Ann Arbor, MI 48108 ● 734.971.7080 Phone ● 734.971.9022 Fax
www.TRCsolutions.com

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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). The CCR Rule, which became effective on October 19, 2015, applies to the DTE Electric Company (DTE Electric) Belle River Power Plant (BRPP) CCR Diversion Basin (DB) CCR unit. Pursuant to the CCR Rule, no later than January 31, 2018, and annually thereafter, the owner or operator of a 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 Engineers Michigan, Inc., the engineering entity of TRC Environmental Corporation (TRC), prepared this Annual Groundwater Monitoring Report (Annual Report) for the BRPP DB 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 October 2017 semiannual groundwater monitoring event for the BRPP DB 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.

A potential SSI over a background limit was noted for sulfate in one compliance well for the October 2017 monitoring event. This is the initial detection monitoring event; therefore, it is the initial identification of a SSI over background levels. Based on the hydrogeology at the Site, with the presence of the vertically and horizontally extensive clay-rich confining till beneath the BRPP DB CCR unit, it is not possible for the uppermost aquifer to have been affected by CCR from operations. Due to limitations on CCR Rule implementation timelines, the background data sets are of relatively short duration for capturing the occurrence of natural temporal changes in the aquifer.

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 potential sulfate SSI over the background limit noted during the October 2017 monitoring event, DTE Electric plans to collect a resample for each of the potential SSIs and prepare an Alternative Source Demonstration (ASD) to evaluate the SSIs and demonstrate that natural variation within the uppermost aquifer is the cause of the SSIs.

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). The CCR Rule, which became effective on October 19, 2015, applies to the DTE Electric Company (DTE Electric) Belle River Power Plant (BRPP) Diversion Basin (DB). Pursuant to the CCR Rule, no later than January 31, 2018, and annually thereafter, the owner or operator of a 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 Engineers Michigan, Inc., the engineering entity of TRC Environmental Corporation (TRC), prepared this Annual Groundwater Monitoring Report (Annual Report) for the BRPP DB 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 October 2017 semiannual groundwater monitoring event for the BRPP DB CCR unit. This event is the initial detection monitoring event performed to comply with §257.94. The monitoring was performed in accordance with the *CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company Belle River Power Plant Bottom Ash Basins and Diversion Basin* (QAPP) (TRC, July 2016; revised August 2017) and statistically evaluated per the *Groundwater Statistical Evaluation Plan – Belle River Power Plant Coal Combustion Residual Diversion Basin* (Stats Plan) (TRC, October 2017). 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 BRPP is located in Section 13, Township 4 North, Range 16 East, at 4505 King Road, China Township in St. Clair County, Michigan. The BRPP was constructed in the early 1980s with plant operations beginning in 1984. Prior to Detroit Edison Company's operations commencing in the 1980s, the BRPP property was generally wooded and farmland. The property has been used continuously as a coal fired power plant since Detroit Edison Company (now DTE Electric) began power plant operations at BRPP in 1984 and is generally constructed over a natural clay-rich soil base.

The DB is an incised CCR surface impoundment located west of the BRPP near the Webster Drain. Water flows into the DB from the North and South bottom ash basins (BABs) through a network of pipes and ditches. The DB discharges to the St. Clair River with other site wastewater in accordance with a National Pollution Discharge Elimination System (NPDES) permit.

1.3 Geology/Hydrogeology

The BRPP DB CCR unit is located approximately one-mile west of the St. Clair River. The BRPP DB CCR unit is underlain by more than 130 feet of unconsolidated sediments, with the lower confining Bedford Shale generally encountered from 135 to 145 feet below ground surface (bgs). In general, the BRPP DB CCR unit is initially underlain by at least 130 feet of laterally extensive low hydraulic conductivity silty clay-rich deposits. The silty clay-rich till was then underlain by two to seven feet of silt between the till and the underlying shale bedrock (not an aquifer) confining unit. Groundwater was encountered within this silt at the shale bedrock interface representing a potential confined uppermost aquifer in the BRPP DB CCR unit.

A definitive groundwater flow direction with a mean gradient in 2016 and 2017 of 0.003 foot/foot to the west-northwest within the uppermost aquifer is evident around the BRPP CCR DB CCR unit; however, potential groundwater flow within this silt-rich uppermost aquifer is very slow (on the order of one-half foot per year).

In addition, the elevation of CCR-affected water maintained within the BRPP DB is approximately 5 feet above the potentiometric surface elevations in the uppermost aquifer at the DB CCR unit area. This suggests that if the CCR affected surface water in the DB were able to penetrate the silty clay-rich underlying confining unit that the head on that release likely would travel radially away from the DB within the uppermost aquifer. However, with the very thick continuous silty clay-rich confining unit beneath the BRPP it is not possible for the uppermost aquifer to have been affected by CCR from BRPP operations that began in the 1980s.

Due to the relatively small footprint of the DB, the low vertical and horizontal groundwater flow velocity and radial flow potential outward from the CCR unit, and the fact that the uppermost saturated unit being monitored potential uppermost aquifer is isolated by a laterally contiguous silty-clay unit which significantly impedes vertical groundwater flow thus preventing the monitored saturated zone (identified as the potential uppermost aquifer) from potentially being affected by CCR, monitoring of the BRPP DB CCR unit using intrawell statistical methods is appropriate. As such, intrawell statistical approaches are being used during detection monitoring as discussed in the Stats Plan.

Section 2
Groundwater Monitoring

2.1 Monitoring Well Network

A groundwater monitoring system has been established for the BRPP DB CCR unit as detailed in the *Groundwater Monitoring System Summary Report – DTE Electric Company Belle River Power Plant Bottom Ash Basins and Diversion Basin Coal Combustion Residual Units* (GWMS Report) (TRC, October 2017). The detection monitoring well network for the DB CCR unit currently consists of six monitoring wells that are screened in the uppermost aquifer. The monitoring well locations are shown on Figure 2.

As discussed in the Stats Plan, intrawell statistical methods for the DB CCR unit were selected based on the geology and hydrogeology at the Site (primarily the presence of clay/hydraulic barrier, the relatively small footprint of the DB, combined with low vertical and horizontal groundwater flow velocity), in addition to other supporting lines of evidence that the aquifer is unaffected by the CCR unit (such as the consistency in concentrations of water quality data). 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. Monitoring wells MW-16-05 through MW-16-08, MW-16-10, and MW-16-11A are generally located around the east and west perimeter of the DB and provide data on both background and downgradient groundwater quality that has not been affected by the CCR unit (total of six background/downgradient monitoring wells).

Monitoring well MW-16-11 was found to be damaged in March 2017 and could no longer be used to obtain representative groundwater samples. A casing failure was suspected when grout was observed at the base of the well and confirmed using a downhole camera assessment that identified a crack in the casing 40 feet down. The monitoring well was properly decommissioned on May 11, 2017 and replaced on May 12, 2017, with monitoring well MW-16-11A. The replacement monitoring well is located proximal to MW-16-11 to the south, and was installed utilizing procedures consistent with those described in the QAPP.

2.2 Background Sampling

Background groundwater monitoring was conducted at the BRPP DB CCR unit from August 2016 through September 2017 in accordance with the QAPP. Data collection included eight 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 all six monitoring wells installed for the DB CCR unit, in addition to supplemental sampling events at select locations. The supplemental background sampling events were conducted for a subset of monitoring wells in August 2017 and September 2017 to expand the background data set and confirm analytical results; three additional events from monitoring well MW-16-10, and one additional event from monitoring wells MW-16-05, MW-16-06, MW-16-07, MW-16-08, and MW-16-11. The groundwater samples were analyzed by TestAmerica Laboratories, Inc. (TestAmerica).

As mentioned above, the casing at monitoring well MW-16-11 was compromised and the well had to be decommissioned and replaced. Data from the replacement well MW-16-11A is consistent with data collected from MW-16-11 and considered representative of groundwater quality at that location. As such, data collected from both monitoring well MW-16-11 and MW-16-11A make up the background data set for that compliance location.

Background data are included in Appendix A Tables 1 through 3, where: Table 1 is a summary of static water elevation data; Table 2 is a summary of groundwater analytical data compared to potentially relevant criteria; and Table 3 is a summary of field data. In addition to the data tables, groundwater potentiometric elevation data are summarized for each background monitoring event 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 QAPP. In addition to pH, the collected field parameters included dissolved oxygen, oxidation reduction potential, specific conductivity, temperature, and turbidity.

2.3.1 Data Summary

The initial semiannual groundwater detection monitoring event for 2017 was performed during October 2 and 3, 2017, by TRC personnel and samples were analyzed by TestAmerica in accordance with the QAPP. Static water elevation data were collected at all six monitoring well locations. Groundwater samples were collected from the six detection monitoring wells for the Appendix III indicator parameters and field parameters. A summary of the groundwater data collected during the October 2017 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 each 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 to the west-northwest across the BRPP DB. Groundwater potentiometric surface elevations measured across the BRPP DB during the October 2017 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 BRPP DB during this event is estimated at 0.003 ft/ft. Resulting in an estimated average seepage velocity of approximately 0.002 ft/day or 0.6 ft/year for this event, using the average hydraulic conductivity of 0.2 ft/day (TRC, 2017) and an assumed effective porosity of 0.4.

As presented in the GWMS Report, and mentioned above, there is a horizontally expansive clay with substantial vertical thickness that isolates the uppermost aquifer from the BRPP DB CCR unit. The general flow direction in the uppermost aquifer is similar to that identified in previous monitoring rounds and continues to demonstrate that the compliance wells are appropriately positioned to detect the presence of Appendix III parameters that could potentially migrate from the BRPP DB 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 six established detection monitoring wells (MW-16-05 through MW-16-08, MW-16-10, and MW-16-11/11A). 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 BRPP DB 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-16-05 through MW-16-08, MW-16-10, and MW-16-11A) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from MW-16-05 is compared to the background limit developed using the background dataset from MW-16-05, and so forth). The comparisons are presented on Table 4.

The statistical evaluation of the October 2017 Appendix III indicator parameters shows a potential SSI above background for:

- Sulfate at MW-16-07.

There were no SSIs compared to background for boron, calcium, chloride, fluoride, pH or TDS.

Section 4
Conclusions and Recommendations

A potential SSI over a background limit was noted for sulfate in one compliance well during the October 2017 monitoring event. This is the initial detection monitoring event; therefore, it is the initial identification of a potential SSI over background levels. As discussed above, and in the GWMS Report, with the presence of the vertically and horizontally extensive clay-rich confining till beneath the BRPP DB CCR unit, it is not possible for the uppermost aquifer to have been affected by CCR from operations. Due to limitations on CCR Rule implementation timelines, the background data sets are of relatively short duration for capturing the occurrence of natural temporal changes in the aquifer. In addition, although the statistical limits based on the initial background dataset were exceeded for sulfate, the calculated prediction limits and result for the potential SSI are below the USEPA's aesthetic-based secondary maximum contaminant level (SMCL) of 250 mg/L for sulfate in drinking water (USEPA, 2012).

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 potential sulfate SSI over the background limit noted for the October 2017 monitoring event, DTE Electric plans to collect a resample for each of the potential SSIs and

prepare an ASD within 90-days to evaluate the SSIs. The SSI is likely the result of temporal variability that was not captured in the background data set, given the short duration of time that the background data set was collected, but this will be further evaluated during the ASD process.

No corrective actions were performed in 2017. The next semiannual monitoring event at the BRPP DB CCR unit is scheduled for the second calendar quarter of 2018.

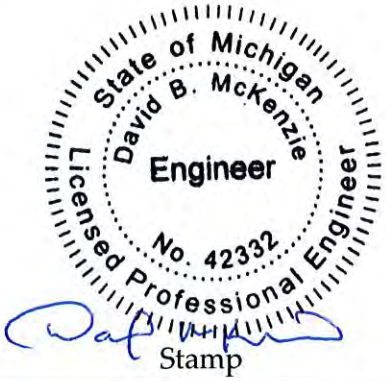
Section 5
Groundwater Monitoring Report Certification

The U.S. EPA's Disposal of Coal Combustion Residuals from Electric Utilities Final Rule Title 40 CFR Part 257 §257.90(e) requires that the owner or operator of an existing CCR unit prepare an annual groundwater monitoring and corrective action report.

Annual Groundwater Monitoring Report Certification
Belle River Power Plant Diversion Basin
China Township, Michigan

CERTIFICATION

I hereby certify that the annual groundwater and corrective action report presented within this document for the BRPP DB CCR unit has been prepared to meet the requirements of Title 40 CFR §257.90(e) of the Federal CCR Rule. This document is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of Title 40 CFR §257.90(e).

Name: David B. McKenzie, P.E.	Expiration Date: October 31, 2019	 Stamp
Company: TRC Engineers Michigan, Inc.	Date: 1/30/18	

Section 6
References

TRC Environmental Corporation. July 2016; Revised March and August 2017. CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company Belle River Power Plant Bottom Ash Basins and Diversion Basin, 4505 King Road, China Township, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. October 2017. Groundwater Monitoring System Summary Report – DTE Electric Company Belle River Power Plant Bottom Ash Basins and Diversion Basin Coal Combustion Residual Units, 4505 King Road, China Township, Michigan. Prepared for DTE Electric Company.

TRC Environmental Corporation. October 2017. Groundwater Statistical Evaluation Plan – DTE Electric Company Belle River Power Plant Coal Combustion Residual Diversion Basin, 4505 King Road, China Township, Michigan. Prepared for DTE Electric Company.

U.S. Environmental Protection Agency. April 2012. 2012 Edition of the Drinking Water Standards and Health Advisories. EPA 822-S-12-001. Office of Water, U.S. Environmental Protection Agency, Washington, DC. Spring 2012; Date of update: April, 2012.

Tables

Table 1
Summary of Groundwater Elevation Data – October 2017
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Well ID	MW-16-05		MW-16-06		MW-16-07		MW-16-08		MW-16-10		MW-16-11A	
Date Installed	3/4/2016		3/11/2016		3/9/2016		3/10/2016		6/6/2016		5/12/2017	
TOC Elevation	590.82		593.21		592.58		591.88		592.26		591.66	
Geologic Unit of Screened Interval	Clayey Silt/Shale Interface		Silt/Shale Interface		Silt/Shale Interface		Silt/Shale Interface		Gravely Silt and Silty Clay		Silt and Silty Clay	
Screened Interval Elevation	449.3 to 444.3		455.0 to 450.0		456.9 to 451.9		456.3 to 451.3		444.3 to 439.3		452.5 to 447.5	
Unit	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
10/2/2017	17.09	573.73	17.80	575.41	16.87	575.71	15.81	576.07	18.05	574.21	17.09	574.57

Notes:

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

ft BTOC - feet Below top of casing

Table 2
Summary of Groundwater Analytical Data – October 2017
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-05	MW-16-06	MW-16-07	MW-16-08	MW-16-10	MW-16-11A
Sample Date:		10/2/2017	10/2/2017	10/3/2017	10/4/2017	10/4/2017	10/4/2017
Constituent	Unit						
Appendix III							
Boron	ug/L	1,600	1,800	1,900	1,700	1,900	1,700
Calcium	ug/L	36,000	33,000	55,000	44,000	25,000	35,000
Chloride	mg/L	1,500	1,700	1,700	1,900	1,600	1,700
Fluoride	mg/L	1.2	1.2	1.1	1.2	1.1	1.0
pH, Field	SU	8.0	7.9	8.0	7.9	8.1	8.0
Sulfate	mg/L	8.9	6.4	100	2.5	32	2.5
Total Dissolved Solids	mg/L	2,400	2,700	2,900	3,000	2,800	2,800

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 3
Summary of Field Data – October 2017
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (deg C)	Turbidity (NTU)
MW-16-05	10/2/2017	0.21	-141.7	8.0	4,666	15.08	25.7
MW-16-06	10/2/2017	0.32	-166.8	7.9	5,132	17.25	4.77
MW-16-07	10/3/2017	0.19	-245.8	8.0	5,454	13.77	64.4
MW-16-08	10/4/2017	0.36	-147.9	7.9	5,604	16.14	36.4
MW-16-10	10/4/2017	0.25	-131.0	8.1	5,036	13.99	86.0
MW-16-11A	10/4/2017	0.36	-129.6	8.0	5,201	15.03	16.9

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.

Table 4
Comparison of Appendix III Results to Background Limits – October 2017
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-05		MW-16-06		MW-16-07		MW-16-08		MW-16-10		MW-16-11A	
Sample Date:		10/2/2017		10/2/2017		10/3/2017		10/4/2017		10/4/2017		10/4/2017	
Constituent	Unit	Data	PL	Data	PL	Data	PL	Data	PL	Data	PL	Data	PL
Appendix III													
Boron	ug/L	1,600	2,000	1,800	2,200	1,900	2,100	1,700	2,300	1,900	2,300	1,700	2,000
Calcium	ug/L	36,000	67,000	33,000	45,000	55,000	110,000	44,000	99,000	25,000	34,000	35,000	80,000
Chloride	mg/L	1,500	1,600	1,700	1,800	1,700	1,800	1,900	2,000	1,600	1,800	1,700	1,700
Fluoride	mg/L	1.2	1.3	1.2	1.3	1.1	1.2	1.2	1.3	1.1	1.2	1.0	1.0
pH, Field	SU	8.0	7.9 - 8.5	7.9	7.5 - 8.4	8.0	7.7 - 8.4	7.9	7.5 - 8.3	8.1	7.5 - 8.8	8.0	7.6 - 8.6
Sulfate	mg/L	8.9	20	6.4	20	**100**	98	2.5	23	32	160	2.5	20
Total Dissolved Solids	mg/L	2,400	2,700	2,700	3,000	2,900	3,400	3,000	3,200	2,800	3,100	2,800	3,000

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.

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

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
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:

SITE LOCATION MAP

DRAWN BY:	J. PAPEZ
CHECKED BY:	S HOLMSTROM
APPROVED BY:	V. BUENING
DATE:	OCTOBER 2017
PROJ. NO.:	265996.0003
FILE:	265996-SLMMB.mxd

FIGURE 1

E:\DTE\CCR_Sites\2017_265996\265996-SLMMB.mxd -- Saved By: BDEEGAN on 10/9/2017, 14:49:39 PM

LEGEND

- SOIL BORING
- MONITORING WELL
- DECOMMISSIONED MONITORING WELL

NOTES

1. BASE MAP IMAGERY FROM ST. CLAIR COUNTY INFORMATION TECHNOLOGY DEPARTMENT WEBMAP, 2015.
2. WELL LOCATIONS SURVEYED IN MARCH, APRIL, JUNE 2016, AND JUNE 2017 BY BMJ ENGINEERS & SURVEYORS, INC.

0 200 400 Feet

1 " = 200 '

1:2,400

PROJECT:
DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
SITE PLAN

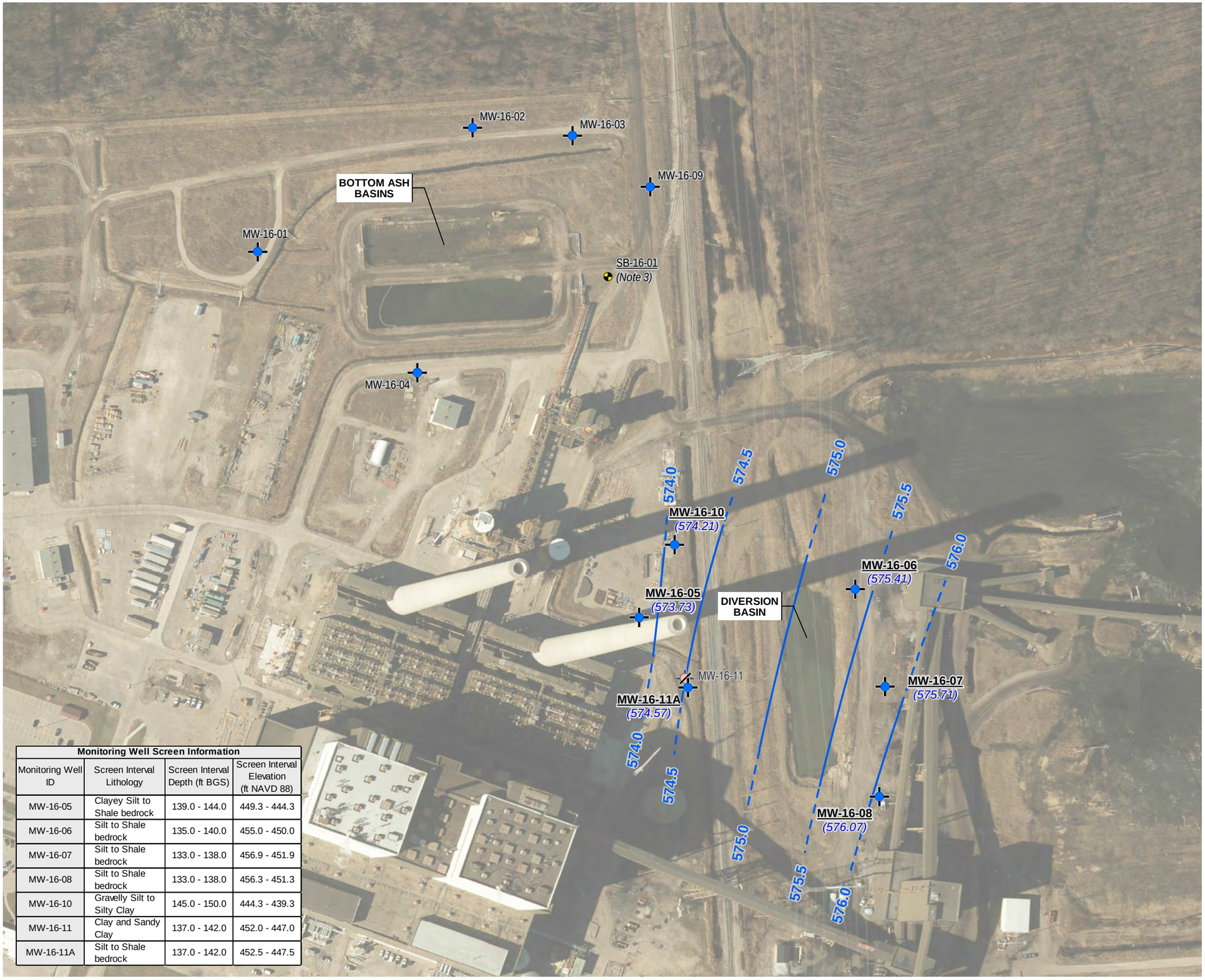
DRAWN BY:	R SUEMNICHT	PROJ NO.:	265996.0003
CHECKED BY:	S HOLMSTROM		
APPROVED BY:	V BUENING		
DATE:	OCTOBER 2017		

FIGURE 2

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080
www.trcsolutions.com

FILE NO.: 265996-0003-002.mxd

Plot Date: 10/9/2017, 15:18:14 PM by BDEEGAN -- LAYOUT: ANSI B(11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\265996-0003-002.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0
TRC - GIS



Monitoring Well Screen Information

Monitoring Well ID	Screen Interval Lithology	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft NAVD 88)
MW-16-05	Clayey Silt to Shale bedrock	139.0 - 144.0	449.3 - 444.3
MW-16-06	Silt to Shale bedrock	135.0 - 140.0	455.0 - 450.0
MW-16-07	Silt to Shale bedrock	133.0 - 138.0	456.9 - 451.9
MW-16-08	Silt to Shale bedrock	133.0 - 138.0	456.3 - 451.3
MW-16-10	Gravelly Silt to Silty Clay	145.0 - 150.0	444.3 - 439.3
MW-16-11	Clay and Sandy Clay	137.0 - 142.0	452.0 - 447.0
MW-16-11A	Silt to Shale bedrock	137.0 - 142.0	452.5 - 447.5

LEGEND

- SOIL BORING
- MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- (575.47) GROUNDWATER ELEVATION (FT NAVD 88)
- GROUNDWATER ELEVATION CONTOUR (0.5-FT INTERVAL, DASHED WHERE INFERRED)

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
2. WELL LOCATIONS SURVEYED IN MARCH, APRIL, AND JUNE 2016 BY BMJ ENGINEERS AND SURVEYORS. INC.
3. NO SAND OR GRAVEL UNIT PRESENT ABOVE BEDROCK IN THIS LOCATION.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.

N

0 200 400 Feet

1 " = 200 '

1:2,400

PROJECT: DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE: DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP OCTOBER 2017

DRAWN BY:	S.MAJOR	PROJ NO.:	265996.0003
CHECKED BY:	C. SCIESZKA		FIGURE 3
APPROVED BY:	V. BUENING		
DATE:	JANUARY 2018		

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080
www.trcsolutions.com

FILE NO.: 265996-0003-013.mxd

Plot Date: 1/12/2018, 09:57:34 AM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\265996-0003-013.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

TRC - GIS

Appendix A
Background Data

Table 1
Groundwater Elevation Summary
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Well ID	MW-16-05		MW-16-06		MW-16-07		MW-16-08		MW-16-10		MW-16-11 (1)		MW-16-11A	
Date Installed	3/4/2016		3/11/2016		3/9/2016		3/10/2016		6/6/2016		6/7/2016		5/12/2017	
TOC Elevation	590.82		593.21		592.58		591.88		592.26		591.54		591.66	
Geologic Unit of Screened Interval	Clayey Silt/Shale Interface		Silt/Shale Interface		Silt/Shale Interface		Silt/Shale Interface		Gravelly Silt and Silty Clay		Sandy Clay		Silt and Silty Clay	
Screened Interval Elevation	449.3 to 444.3		455.0 to 450.0		456.9 to 451.9		456.3 to 451.3		444.3 to 439.3		452.0 to 447.0		452.5 to 447.5	
Unit	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
8/1/2016	16.95	573.87	17.74	575.47	16.84	575.74	15.74	576.14	17.88	574.38	16.86	574.68	Not Installed	
9/19/2016	17.00	573.82	17.85	575.36	17.00	575.58	15.90	575.98	17.98	574.28	16.96	574.58		
11/7/2016	17.13	573.69	17.59	575.62	16.70	575.88	15.70	576.18	18.06	574.20	16.99	574.55		
1/9/2017	17.11	573.71	17.51	575.70	16.60	575.98	15.58	576.30	17.94	574.32	16.87	574.67		
2/27/2017	16.74	574.08	17.36	575.85	16.56	576.02	15.50	576.38	17.72	574.54	NU	NU		
4/17/2017	16.77	574.05	17.71	575.50	16.84	575.74	15.70	576.18	17.81	574.45	NU	NU		
5/18/2017	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Decommissioned		16.69	574.97
6/5/2017	16.61	574.21	17.66	575.55	16.83	575.75	15.72	576.16	17.73	574.53			16.71	574.95
6/30/2017	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM			16.83	574.83
7/24/2017	16.74	574.08	18.01	575.20	17.13	575.45	15.99	575.89	17.93	574.33			16.91	574.75

Notes:

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

ft BTOC - feet Below top of casing

NU - Not Used; monitoring well was damaged at the time of data collection.

NM - Not Measured

(1) MW-16-11 decomissioned on 5/11/2017 and replaced with MW-16-11A.

Table 2
Summary of Groundwater Analytical Results
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-05								
Sample Date:		8/3/2016	9/20/2016	11/8/2016	1/9/2017	3/1/2017	4/18/2017	6/6/2017	7/25/2017	9/13/2017
Constituent	Unit									
Appendix III										
Boron	ug/L	1,800	1,700	1,800	1,800	1,900	1,900	1,900	1,800	1,800
Calcium	ug/L	69,000	51,000	55,000	48,000	36,000	45,000	39,000	38,000	45,000
Chloride	mg/L	1,500	1,500	1,500	1,500	1,500	1,400	1,600	1,500	1,500
Fluoride	mg/L	0.96	1.1	< 1.0	1.0	1.1	1.1	1.2	1.1	1.3
pH	SU	8.05	8.0	8.0	8.0	8.1	8.2	8.0	8.0	9.1
Sulfate	mg/L	8.3	< 1.0	< 20	< 5.0	< 20	< 20	11	< 20	7.6
Total Dissolved Solids	mg/L	2,600	2,400	2,500	2,700	2,400	2,500	2,500	2,600	2,400
Appendix IV										
Antimony	ug/L	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Arsenic	ug/L	14	5.6	5.1	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	340	330	280	280	270	280	280	290	300
Beryllium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium	ug/L	24	12	9.2	6.3	4.2	6.9	2.9	4.4	5.6
Cobalt	ug/L	10	4.5	4.1	3.3	1.5	2.8	1.2	1.5	2.4
Fluoride	mg/L	0.96	1.1	< 1.0	1.0	1.1	1.1	1.2	1.1	1.3
Lead	ug/L	11	4.4	4.2	3.2	1.8	2.9	1.1	1.4	2.5
Lithium	ug/L	55	59	55	49	53	62	54	58	51
Mercury	ug/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	43	23	25	21	20	23	18	20	20
Radium-226	pCi/L	1.72	1.70	1.53	1.08	0.920	0.993	1.03	0.927	0.934
Radium-226/228	pCi/L	1.81	3.99	1.67	2.26	1.41	1.06	1.77	1.51	1.30
Radium-228	pCi/L	< 0.886	2.29	< 0.767	1.17	0.489	< 0.451	0.744	0.580	< 0.398
Selenium	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Thallium	ug/L	1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units.
pCi/L - picocuries per liter.
All metals were analyzed as total, unless otherwise specified.

Table 2
Summary of Groundwater Analytical Results
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-06											
Sample Date:		8/3/2016	8/3/2016	9/20/2016	11/9/2016	1/10/2017	2/28/2017	4/18/2017	6/6/2017	6/6/2017	7/25/2017	9/14/2017	9/14/2017
Constituent	Unit		Field Dup							Field Dup			Field Dup
Appendix III													
Boron	ug/L	1,900	1,900	1,800	2,100	1,900	2,000	2,000	2,000	2,000	2,100	2,000	2,000
Calcium	ug/L	45,000	44,000	40,000	37,000	40,000	36,000	34,000	36,000	40,000	40,000	38,000	38,000
Chloride	mg/L	1,600	1,600	1,600	1,700	1,700	1,600	1,500	1,700	1,500	1,600	1,600	1,600
Fluoride	mg/L	0.94	0.96	1.1	< 1.0	1.0	1.1	1.1	1.2	1.1	1.1	1.3	1.3
pH	SU	7.94	7.96	8.0	8.1	7.9	8.0	8.0	7.8	7.8	8.0	8.0	7.9
Sulfate	mg/L	13	14	4.4	< 20	< 5.0	< 20	< 20	7.0	< 20	< 20	4.9	4.6
Total Dissolved Solids	mg/L	2,500	2,500	2,600	2,500	3,100	2,700	2,600	2,700	2,700	2,800	2,600	2,600
Appendix IV													
Antimony	ug/L	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Arsenic	ug/L	7.9	7.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	270	270	300	260	270	270	260	270	270	300	300	300
Beryllium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium	ug/L	14	13	4.3	2.2	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Cobalt	ug/L	4.9	4.5	1.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoride	mg/L	0.94	0.96	1.1	< 1.0	1.0	1.1	1.1	1.2	1.1	1.1	1.3	1.3
Lead	ug/L	4.8	4.0	1.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	33	33	41	34	35	37	42	42	39	49	41	43
Mercury	ug/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	30	30	22	20	17	18	17	17	16	17	17	17
Radium-226	pCi/L	1.16	1.16	0.862	1.53	0.985	0.634	0.617	0.733	0.658	0.623	0.545	0.791
Radium-226/228	pCi/L	1.21	1.91	1.53	2.15	1.90	1.31	0.990	1.08	1.21	1.23	1.20	1.08
Radium-228	pCi/L	< 0.948	< 0.909	< 0.836	< 0.769	0.911	0.680	0.373	0.347	0.554	0.607	0.655	< 0.374
Selenium	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Thallium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units.
pCi/L - picocuries per liter.
All metals were analyzed as total, unless otherwise specified.

Table 2
Summary of Groundwater Analytical Results
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-07								
Sample Date:		8/3/2016	9/22/2016	11/9/2016	1/10/2017	2/27/2017	4/18/2017	6/6/2017	7/25/2017	9/14/2017
Constituent	Unit									
Appendix III										
Boron	ug/L	2,000	1,700	2,100	2,100	2,100	2,100	2,100	2,000	2,100
Calcium	ug/L	110,000	62,000	77,000	50,000	61,000	60,000	50,000	76,000	59,000
Chloride	mg/L	1,700	1,800	1,700	1,800	1,600	1,600	1,700	1,700	1,600
Fluoride	mg/L	0.94	1.1	< 1.0	0.97	1.1	1.0	1.1	< 1.0	1.2
pH	SU	7.97	8.0	8.1	8.0	8.1	8.1	8.0	8.0	8.0
Sulfate	mg/L	75	67	63	56	73	74	81	95	88
Total Dissolved Solids	mg/L	2,800	2,900	2,800	3,400	2,900	3,000	2,900	2,700	2,800
Appendix IV										
Antimony	ug/L	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Arsenic	ug/L	28	8.1	8.7	< 5.0	6.8	7.2	< 5.0	11	6.2
Barium	ug/L	450	370	330	290	320	300	290	330	330
Beryllium	ug/L	1.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	1.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium	ug/L	53	19	18	6.1	12	11	7.6	14	8.0
Cobalt	ug/L	21	7.2	8.6	3.1	5.4	5.2	4.2	9.2	4.0
Fluoride	mg/L	0.94	1.1	< 1.0	0.97	1.1	1.0	1.1	< 1.0	1.2
Lead	ug/L	23	6.6	7.2	2.6	5.3	5.2	3.6	8.7	5.0
Lithium	ug/L	78	76	63	51	56	65	56	69	57
Mercury	ug/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	73	38	33	24	25	24	19	22	19
Radium-226	pCi/L	3.05	2.26	3.00	1.44	1.44	1.20	1.46	1.53	1.15
Radium-226/228	pCi/L	3.26	4.09	4.48	1.85	1.78	1.88	2.46	2.54	1.86
Radium-228	pCi/L	< 0.968	1.83	< 1.61	< 1.03	< 0.531	0.678	0.998	1.01	0.715
Selenium	ug/L	5.3	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Thallium	ug/L	2.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0	< 1.0

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units.
pCi/L - picocuries per liter.
All metals were analyzed as total, unless otherwise specified.

Table 2
Summary of Groundwater Analytical Results
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-08								
Sample Date:		8/3/2016	9/19/2016	11/8/2016	1/10/2017	2/28/2017	4/18/2017	6/7/2017	7/25/2017	9/12/2017
Constituent	Unit									
Appendix III										
Boron	ug/L	2,000	1,900	2,200	2,100	2,100	2,100	2,200	2,000	1,900
Calcium	ug/L	90,000	91,000	77,000	66,000	46,000	59,000	45,000	60,000	55,000
Chloride	mg/L	1,800	1,800	1,900	2,000	1,800	1,700	1,800	1,800	1,800
Fluoride	mg/L	1.0	1.1	1.1	1.0	1.1	1.1	1.2	1.1	1.3
pH	SU	7.95	8.0	8.0	7.8	7.9	7.9	7.9	8.0	8.0
Sulfate	mg/L	23	3.7	< 20	< 5.0	< 20	< 20	10	< 20	2.4
Total Dissolved Solids	mg/L	2,800	2,900	3,000	3,200	3,100	3,000	2,900	2,900	2,900
Appendix IV										
Antimony	ug/L	2.1	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Arsenic	ug/L	21	15	12	9.2	< 5.0	7.2	< 5.0	5.4	< 5.0
Barium	ug/L	390	430	330	320	290	310	300	370	380
Beryllium	ug/L	1.2	1.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	1.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium	ug/L	36	40	20	15	8.0	11	5.6	12	8.6
Cobalt	ug/L	13	16	9.4	8.1	2.8	5.1	2.4	5.2	3.3
Fluoride	mg/L	1.0	1.1	1.1	1.0	1.1	1.1	1.2	1.1	1.3
Lead	ug/L	16	14	8.5	6.4	2.9	5.0	1.8	4.7	3.5
Lithium	ug/L	77	96	75	66	62	79	64	76	65
Mercury	ug/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	58	46	44	37	35	39	32	30	28
Radium-226	pCi/L	2.17	1.27	4.39	1.42	1.24	1.06	1.11	1.60	1.47
Radium-226/228	pCi/L	2.84	1.82	5.14	2.58	1.91	1.47	1.80	3.05	1.65
Radium-228	pCi/L	< 0.932	< 1.79	< 1.62	< 1.31	< 0.682	< 0.434	0.685	1.45	< 0.579
Selenium	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Thallium	ug/L	1.3	1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units.
pCi/L - picocuries per liter.
All metals were analyzed as total, unless otherwise specified.

Table 2
Summary of Groundwater Analytical Results
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-10												
Sample Date:		8/2/2016	9/19/2016	11/8/2016	1/11/2017	2/28/2017	4/18/2017	6/6/2017	7/26/2017	8/9/2017	8/9/2017	8/30/2017	8/30/2017	9/12/2017
Constituent	Unit										Field Dup		Field Dup	
Appendix III														
Boron	ug/L	1,800	1,900	2,100	2,100	1,800	1,500	1,300	2,100	2,100	2,200	2,200	2,100	2,200
Calcium	ug/L	31,000	25,000	24,000	27,000	68,000	120,000	170,000	30,000	32,000	33,000	29,000	28,000	30,000
Chloride	mg/L	1,500	1,500	1,600	1,700	1,200	890	860	1,500	1,500	1,500	1,500	1,600	1,600
Fluoride	mg/L	0.81	0.98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1	1.1	1.2
pH	SU	8.14	8.1	8.0	8.1	7.7	7.6	7.6	8.1	8.2	8.1	8.1	8.1	8.0
Sulfate	mg/L	40	25	32	46	620	980	1,300	140	69	68	59	59	40
Total Dissolved Solids	mg/L	2,500	2,500	2,600	2,800	3,100	3,400	3,400	2,700	2,800	2,900	2,700	2,700	2,700
Appendix IV														
Antimony	ug/L	2.1	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Arsenic	ug/L	11	5.5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	150	150	120	110	100	75	65	110	110	120	100	99	140
Beryllium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium	ug/L	21	14	8.1	4.8	< 2.0	< 2.0	< 2.0	9.7	7.3	7.4	9.5	7.9	13
Cobalt	ug/L	12	5.8	3.3	2.6	< 1.0	< 1.0	< 1.0	3.8	3.7	3.5	3.0	2.9	5.9
Fluoride	mg/L	0.81	0.98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1	1.1	1.2
Lead	ug/L	7.0	3.3	1.7	1.6	< 1.0	< 1.0	< 1.0	1.7	2.3	2.6	1.7	1.7	3.4
Lithium	ug/L	65	77	65	74	88	120	130	88	85	87	75	71	91
Mercury	ug/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	33	22	21	15	20	23	21	16	18	18	16	15	16
Radium-226	pCi/L	1.37	0.967	1.40	0.736	0.471	0.528	0.668	0.619	0.688	0.541	0.568	0.550	0.752
Radium-226/228	pCi/L	2.04	1.89	2.24	1.50	0.934	0.900	1.32	1.41	1.35	1.61	1.40	1.35	1.48
Radium-228	pCi/L	< 0.851	< 1.67	< 0.851	< 0.846	0.463	0.372	0.650	0.794	0.666	1.06	0.831	0.803	0.724
Selenium	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Thallium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units.
pCi/L - picocuries per liter.
All metals were analyzed as total, unless otherwise specified.

Table 2
Summary of Groundwater Analytical Results
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location:		MW-16-11				MW-16-11A						
Sample Date:		8/2/2016	9/22/2016	11/7/2016	1/11/2017	5/18/2017	5/18/2017	6/6/2017	6/30/2017	6/30/2017	7/25/2017	9/12/2017
Constituent	Unit						Field Dup			Field Dup		
Appendix III												
Boron	ug/L	1,600	1,600	1,900	1,800	1,800	1,800	1,800	1,800	1,800	1,900	1,900
Calcium	ug/L	39,000	76,000	23,000	61,000	36,000	36,000	35,000	37,000	38,000	42,000	41,000
Chloride	mg/L	1,500	1,700	1,600	1,600	1,600	1,600	1,500	1,500	1,500	1,600	1,600
Fluoride	mg/L	0.85	0.95	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0
pH	SU	7.99	7.9	7.9	7.8	8.3	8.3	8.1	8.0	7.9	8.1	8.1
Sulfate	mg/L	19	< 10	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	2.8
Total Dissolved Solids	mg/L	2,400	2,500	2,700	3,000	2,500	2,500	2,600	2,400	2,400	2,600	2,900
Appendix IV												
Antimony	ug/L	2.1	< 2.0	< 2.0	< 2.0	3.3	3.1	2.4	2.0	< 2.0	< 2.0	< 2.0
Arsenic	ug/L	9.7	17	< 5.0	9.0	5.4	5.4	< 5.0	5.3	5.2	< 5.0	< 5.0
Barium	ug/L	300	480	120	360	270	290	260	270	270	300	310
Beryllium	ug/L	< 1.0	1.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium	ug/L	10	39	8.3	8.0	9.4	8.5	3.0	< 2.0	< 2.0	6.6	3.1
Cobalt	ug/L	3.0	14	3.3	3.4	2.8	2.4	< 1.0	< 1.0	< 1.0	2.1	< 1.0
Fluoride	mg/L	0.85	0.95	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0
Lead	ug/L	3.6	26	1.8	5.2	2.6	2.4	< 1.0	1.9	< 1.0	1.7	< 1.0
Lithium	ug/L	56	110	64	58	41	44	34	39	39	52	52
Mercury	ug/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	32	32	21	19	18	18	17	18	18	19	17
Radium-226	pCi/L	5.46	1.12	0.933	1.00	0.868	0.923	0.837	0.873	0.815	0.854	0.773
Radium-226/228	pCi/L	6.94	2.15	1.72	1.33	1.63	1.43	1.45	1.65	1.68	1.58	1.30
Radium-228	pCi/L	< 1.79	< 1.10	< 0.827	< 0.670	0.763	0.504	0.612	0.782	0.869	0.728	0.526
Selenium	ug/L	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Thallium	ug/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units.
pCi/L - picocuries per liter.
All metals were analyzed as total, unless otherwise specified.

Table 3
Summary of Field Parameters
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (deg C)	Turbidity (NTU)
MW-16-05	8/3/2016	0.65	-14.9	8.07	4,532	18.13	73.0
	9/20/2016	0.44	-13.4	8.47	4,852	18.63	248
	11/8/2016	0.32	20.6	8.14	4,071	12.22	146
	1/9/2017	0.67	-58.4	7.95	3,312	8.04	63.9
	3/1/2017	1.00	46.9	8.10	3,343	10.74	28.5
	4/18/2017	0.51	-106.3	8.02	4,668	12.29	54.4
	6/6/2017	0.83	-145.3	7.92	4,732	14.56	20.8
	7/25/2017	0.52	-136.2	7.94	4,609	15.47	39.7
	9/13/2017	0.23	-165.9	7.92	4,575	15.50	49.5
MW-16-06	8/3/2016	0.48	35.9	8.02	4,378	15.50	138
	9/20/2016	0.68	34.1	8.12	5,149	18.67	52.9
	11/9/2016	0.55	40.6	8.07	3,979	13.00	37.4
	1/10/2017	0.63	19.3	7.71	3,792	8.01	12.7
	2/28/2017	0.46	36.3	8.11	3,156	9.23	14.0
	4/18/2017	0.54	-109.4	7.97	4,984	14.54	7.48
	6/6/2017	1.63	-135.7	7.73	5,003	14.56	4.30
	7/25/2017	0.26	-166.3	7.97	4,969	16.37	9.58
	9/14/2017	0.61	-143.2	7.70	5,249	13.71	8.43
MW-16-07	8/3/2016	0.48	32.5	8.04	4,945	16.33	1813
	9/22/2016	0.47	-9.6	8.29	4,812	15.49	261
	11/9/2016	0.46	-7.9	8.09	4,110	11.27	326
	1/10/2017	0.92	-81.3	7.81	4,052	7.67	54.7
	2/27/2017	0.69	-6.4	8.10	3,873	7.67	80.0
	4/18/2017	0.31	-212.9	8.00	5,407	13.94	86.0
	6/6/2017	0.51	-261.8	8.00	5,454	14.05	56.7
	7/25/2017	0.16	-259.3	7.91	5,174	15.10	93.0
	9/14/2017	0.19	-287.1	7.88	5,685	14.35	47.1
MW-16-08	8/3/2016	0.51	29.7	8.04	5,044	16.23	579
	9/19/2016	4.16	109.5	8.16	6,174	20.70	969
	11/8/2016	5.96	68.6	7.81	4,992	12.01	70.2
	1/10/2017	2.64	45.6	7.64	4,311	8.52	167
	2/28/2017	1.48	93.7	8.07	3,767	11.27	143
	4/18/2017	1.20	-65.3	7.84	5,207	15.79	77.0
	6/7/2017	0.44	-113.4	7.80	5,411	12.64	116
	7/25/2017	0.36	-171.8	7.91	5,275	15.10	65.0
	9/12/2017	0.13	-132.6	7.94	5,451	14.06	40.0

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
Summary of Field Parameters
Belle River Power Plant Diversion Basin – RCRA CCR Monitoring Program
China Township, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (deg C)	Turbidity (NTU)
MW-16-10	8/2/2016	0.95	91.5	8.35	4,032	18.02	250
	9/19/2016	3.40	124.8	8.59	5,286	19.12	320
	11/8/2016	6.03	148.0	8.16	4,615	14.10	231
	1/11/2017	0.77	90.5	7.96	3,550	7.96	58.9
	2/28/2017	1.56	116.4	7.85	3,530	11.45	51.4
	4/18/2017	1.69	98.4	7.50	4,964	14.53	31.6
	6/6/2017	1.66	8.4	7.42	5,257	13.21	11.3
	7/25/2017	0.62	-85.5	8.00	4,989	17.17	92.8
	8/9/2017	0.34	-105.8	8.05	4,925	15.87	69.4
	8/30/2017	0.23	-64.9	8.02	4,825	14.24	59.2
	9/12/2017	0.17	-64.5	8.07	4,951	14.06	102
MW-16-11	8/2/2016	1.11	107.6	8.19	3,951	17.13	82.3
	9/22/2016	3.29	83.9	8.35	4,961	20.36	147
	11/7/2016	2.05	138.6	7.91	3,947	13.31	64.0
	1/11/2017	4.82	102.3	7.70	3,502	8.60	95.8
MW-16-11A	5/18/2017	0.37	54.1	8.28	4,738	15.86	129
	6/6/2017	0.36	35.3	8.11	4,937	13.52	25.0
	6/30/2017	0.43	-20.4	8.00	4,692	15.50	15.5
	7/25/2017	0.26	-107.7	8.08	4,915	15.21	63.6
	9/12/2017	0.20	-83.9	8.03	4,961	13.62	35.8

Notes:

mg/L - milligrams per liter.

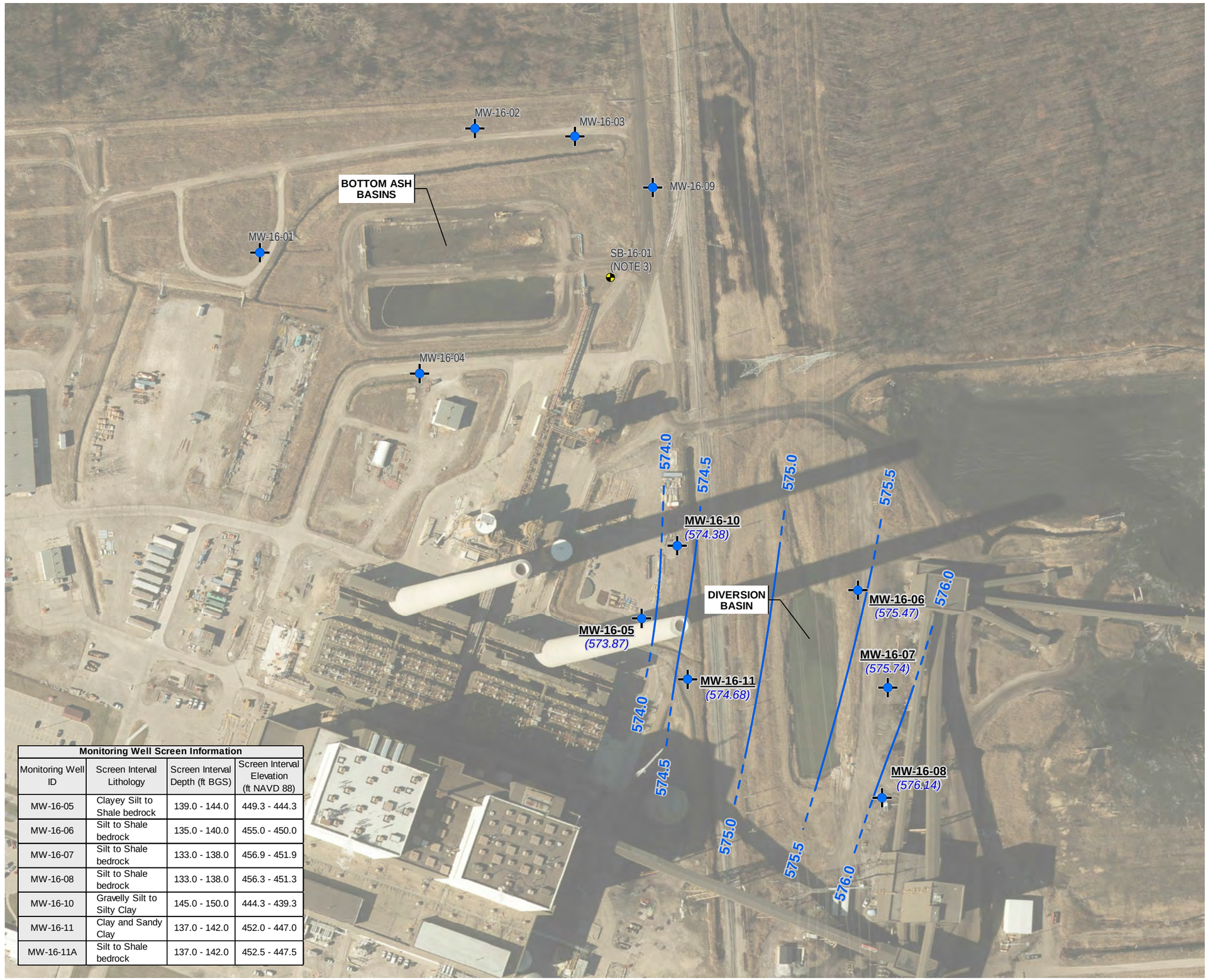
mV - milliVolt.

SU - standard unit.

umhos/cm - micro-mhos per centimeter.

deg C - degrees celcius.

NTU - nephelometric turbidity units.



LEGEND

- SOIL BORING
- MONITORING WELL
- (575.47) GROUNDWATER ELEVATION (FT NAVD 88)
- GROUNDWATER ELEVATION CONTOUR (0.5-FT INTERVAL, DASHED WHERE INFERRED)

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
2. WELL LOCATIONS SURVEYED IN MARCH, APRIL AND JUNE 2016 AND JUNE 2017 BY BMJ ENGINEERS & SURVEYORS, INC.
3. NO SAND OR GRAVEL UNIT PRESENT ABOVE BEDROCK IN THIS LOCATION.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.

0 200 400 Feet

1 " = 200 '

1:2,400

Monitoring Well Screen Information

Monitoring Well ID	Screen Interval Lithology	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft NAVD 88)
MW-16-05	Clayey Silt to Shale bedrock	139.0 - 144.0	449.3 - 444.3
MW-16-06	Silt to Shale bedrock	135.0 - 140.0	455.0 - 450.0
MW-16-07	Silt to Shale bedrock	133.0 - 138.0	456.9 - 451.9
MW-16-08	Silt to Shale bedrock	133.0 - 138.0	456.3 - 451.3
MW-16-10	Gravelly Silt to Silty Clay	145.0 - 150.0	444.3 - 439.3
MW-16-11	Clay and Sandy Clay	137.0 - 142.0	452.0 - 447.0
MW-16-11A	Silt to Shale bedrock	137.0 - 142.0	452.5 - 447.5

PROJECT:
DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP AUGUST 2016

DRAWN BY:	J. PAPEZ	PROJ NO.:	265996.0003
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		**FIGURE 1**
DATE:	JANUARY 2018		

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
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FILE NO.: 265996-0003-004.mxd

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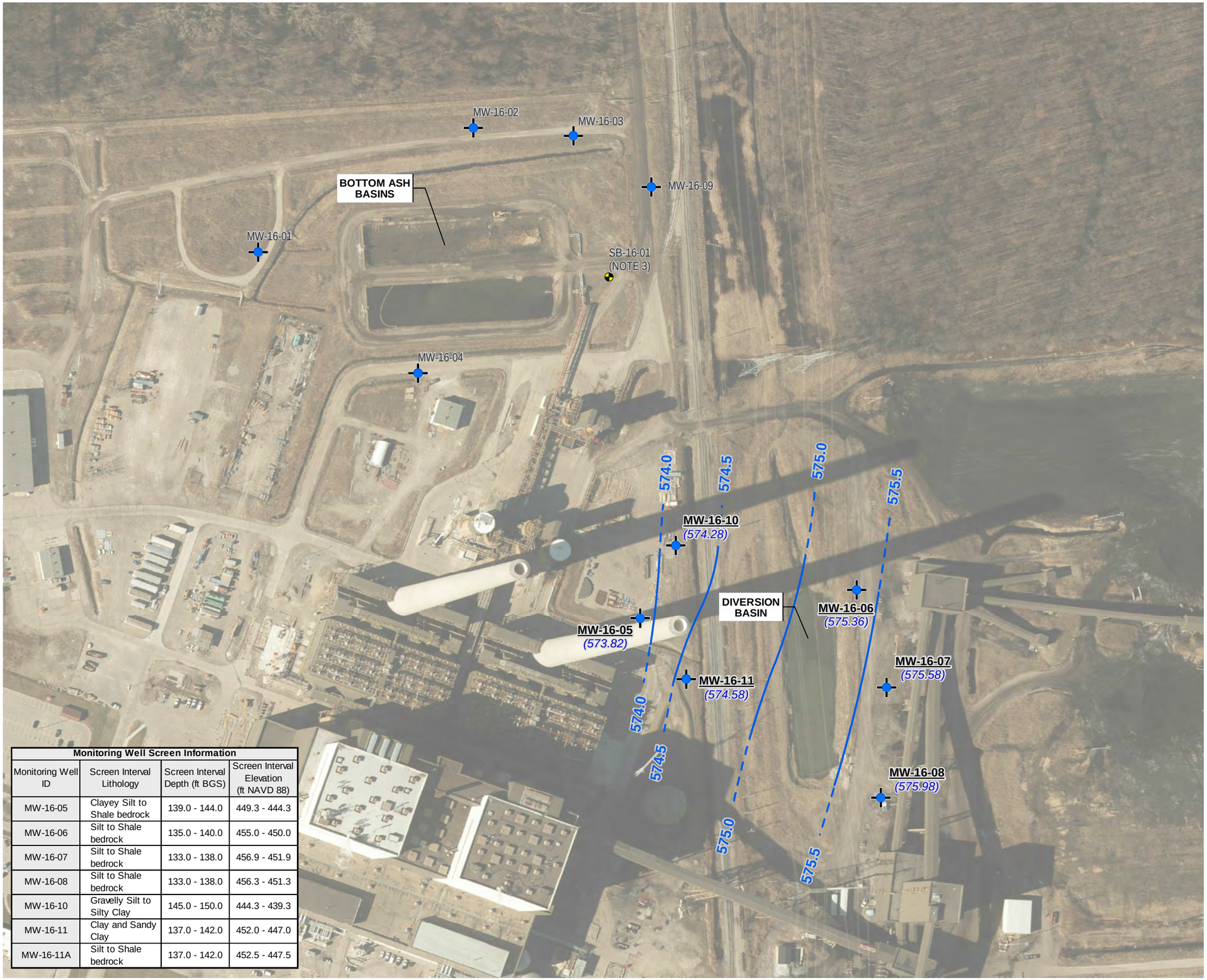
TRC - GIS



Monitoring Well Screen Information

Monitoring Well ID	Screen Interval Lithology	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft NAVD 88)
MW-16-05	Clayey Silt to Shale bedrock	139.0 - 144.0	449.3 - 444.3
MW-16-06	Silt to Shale bedrock	135.0 - 140.0	455.0 - 450.0
MW-16-07	Silt to Shale bedrock	133.0 - 138.0	456.9 - 451.9
MW-16-08	Silt to Shale bedrock	133.0 - 138.0	456.3 - 451.3
MW-16-10	Gravelly Silt to Silty Clay	145.0 - 150.0	444.3 - 439.3
MW-16-11	Clay and Sandy Clay	137.0 - 142.0	452.0 - 447.0
MW-16-11A	Silt to Shale bedrock	137.0 - 142.0	452.5 - 447.5

LEGEND

- SOIL BORING
- MONITORING WELL
- *(575.47)* GROUNDWATER ELEVATION (FT NAVD 88)
- GROUNDWATER ELEVATION CONTOUR (0.5-FT INTERVAL, DASHED WHERE INFERRED)

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
2. WELL LOCATIONS SURVEYED IN MARCH, APRIL AND JUNE 2016 AND JUNE 2017 BY BMJ ENGINEERS & SURVEYORS, INC.
3. NO SAND OR GRAVEL UNIT PRESENT ABOVE BEDROCK IN THIS LOCATION.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.

0 200 400 Feet

1 " = 200 '

1:2,400

PROJECT:
DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP SEPTEMBER 2016

DRAWN BY:	J. PAPEZ	PROJ NO.:	265996.0003
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		**FIGURE 2**
DATE:	JANUARY 2018		

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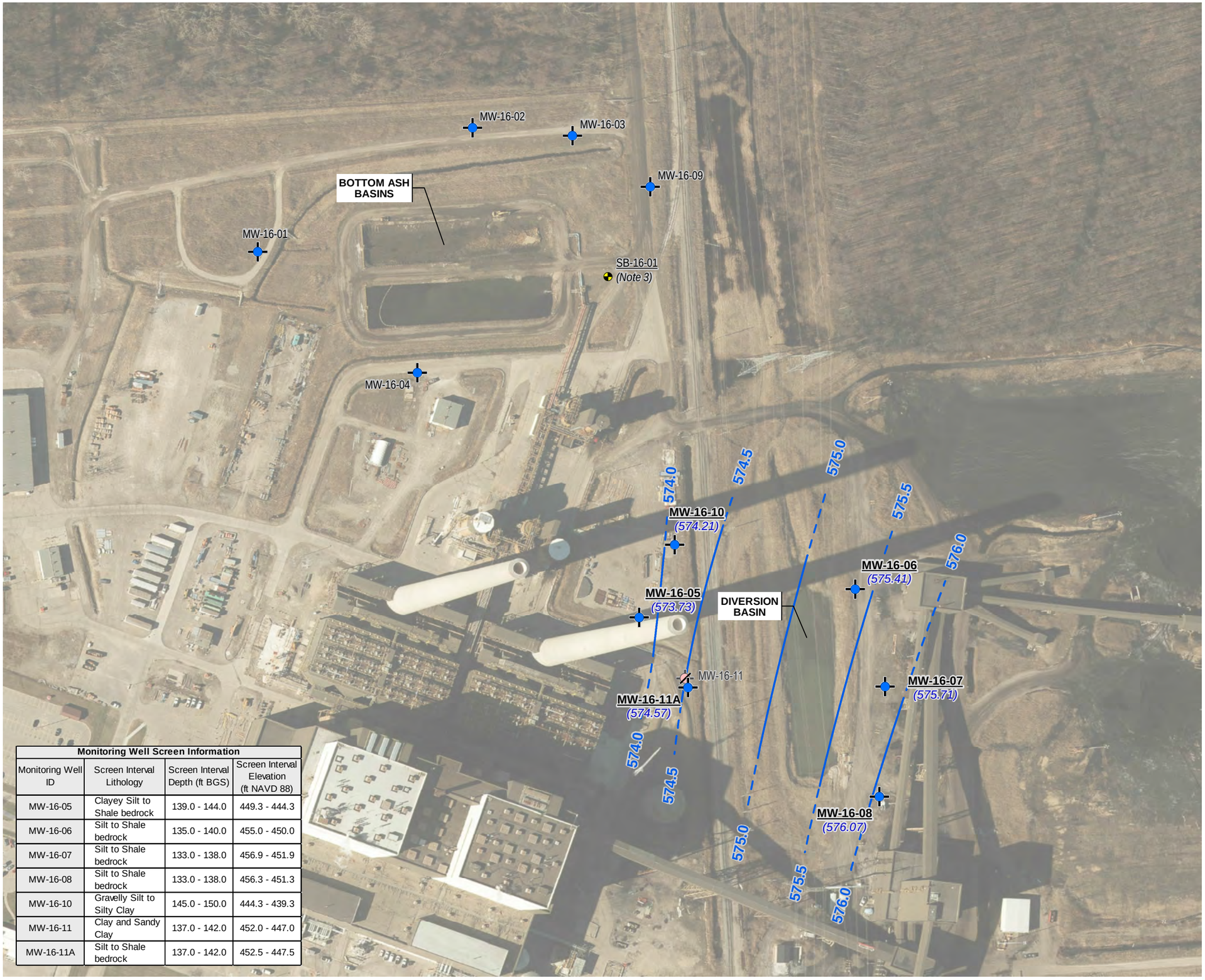
Map Rotation: 0

TRC - GIS



Monitoring Well Screen Information

Monitoring Well ID	Screen Interval Lithology	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft NAVD 88)
MW-16-05	Clayey Silt to Shale bedrock	139.0 - 144.0	449.3 - 444.3
MW-16-06	Silt to Shale bedrock	135.0 - 140.0	455.0 - 450.0
MW-16-07	Silt to Shale bedrock	133.0 - 138.0	456.9 - 451.9
MW-16-08	Silt to Shale bedrock	133.0 - 138.0	456.3 - 451.3
MW-16-10	Gravelly Silt to Silty Clay	145.0 - 150.0	444.3 - 439.3
MW-16-11	Clay and Sandy Clay	137.0 - 142.0	452.0 - 447.0
MW-16-11A	Silt to Shale bedrock	137.0 - 142.0	452.5 - 447.5

LEGEND

- SOIL BORING
- MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- (575.47) GROUNDWATER ELEVATION (FT NAVD 88)
- GROUNDWATER ELEVATION CONTOUR (0.5-FT INTERVAL, DASHED WHERE INFERRED)

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
2. WELL LOCATIONS SURVEYED IN MARCH, APRIL, AND JUNE 2016 BY BMJ ENGINEERS AND SURVEYORS. INC.
3. NO SAND OR GRAVEL UNIT PRESENT ABOVE BEDROCK IN THIS LOCATION.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.

N

0 200 400 Feet

1 " = 200 '

1:2,400

PROJECT: DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE: DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP OCTOBER 2017

DRAWN BY:	S.MAJOR	PROJ NO.:	265996.0003
CHECKED BY:	C. SCIESZKA		FIGURE 3
APPROVED BY:	V. BUENING		
DATE:	JANUARY 2018		

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FILE NO.: 265996-0003-013.mxd

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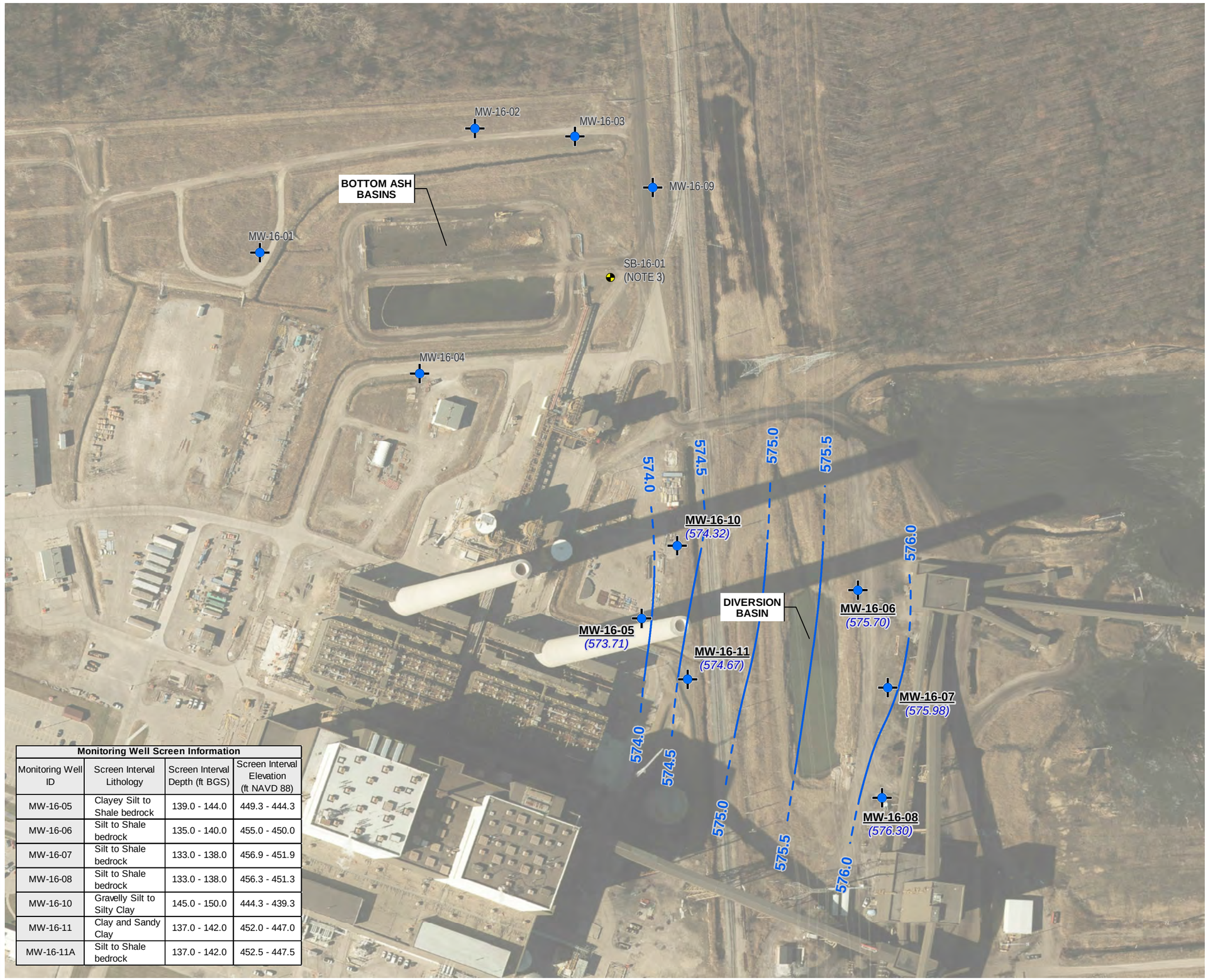
TRC - GIS



Monitoring Well Screen Information

Monitoring Well ID	Screen Interval Lithology	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft NAVD 88)
MW-16-05	Clayey Silt to Shale bedrock	139.0 - 144.0	449.3 - 444.3
MW-16-06	Silt to Shale bedrock	135.0 - 140.0	455.0 - 450.0
MW-16-07	Silt to Shale bedrock	133.0 - 138.0	456.9 - 451.9
MW-16-08	Silt to Shale bedrock	133.0 - 138.0	456.3 - 451.3
MW-16-10	Gravelly Silt to Silty Clay	145.0 - 150.0	444.3 - 439.3
MW-16-11	Clay and Sandy Clay	137.0 - 142.0	452.0 - 447.0
MW-16-11A	Silt to Shale bedrock	137.0 - 142.0	452.5 - 447.5

LEGEND

- SOIL BORING
- MONITORING WELL
- (575.47) GROUNDWATER ELEVATION (FT NAVD 88)
- GROUNDWATER ELEVATION CONTOUR (0.5-FT INTERVAL, DASHED WHERE INFERRED)

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
2. WELL LOCATIONS SURVEYED IN MARCH, APRIL AND JUNE 2016 AND JUNE 2017 BY BMJ ENGINEERS & SURVEYORS, INC.
3. NO SAND OR GRAVEL UNIT PRESENT ABOVE BEDROCK IN THIS LOCATION.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.

N

0 200 400 Feet

1 " = 200 '

1:2,400

PROJECT:
DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP JANUARY 2017

DRAWN BY:	J. PAPEZ	PROJ NO.:	265996.0003
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		**FIGURE 4**
DATE:	JANUARY 2018		

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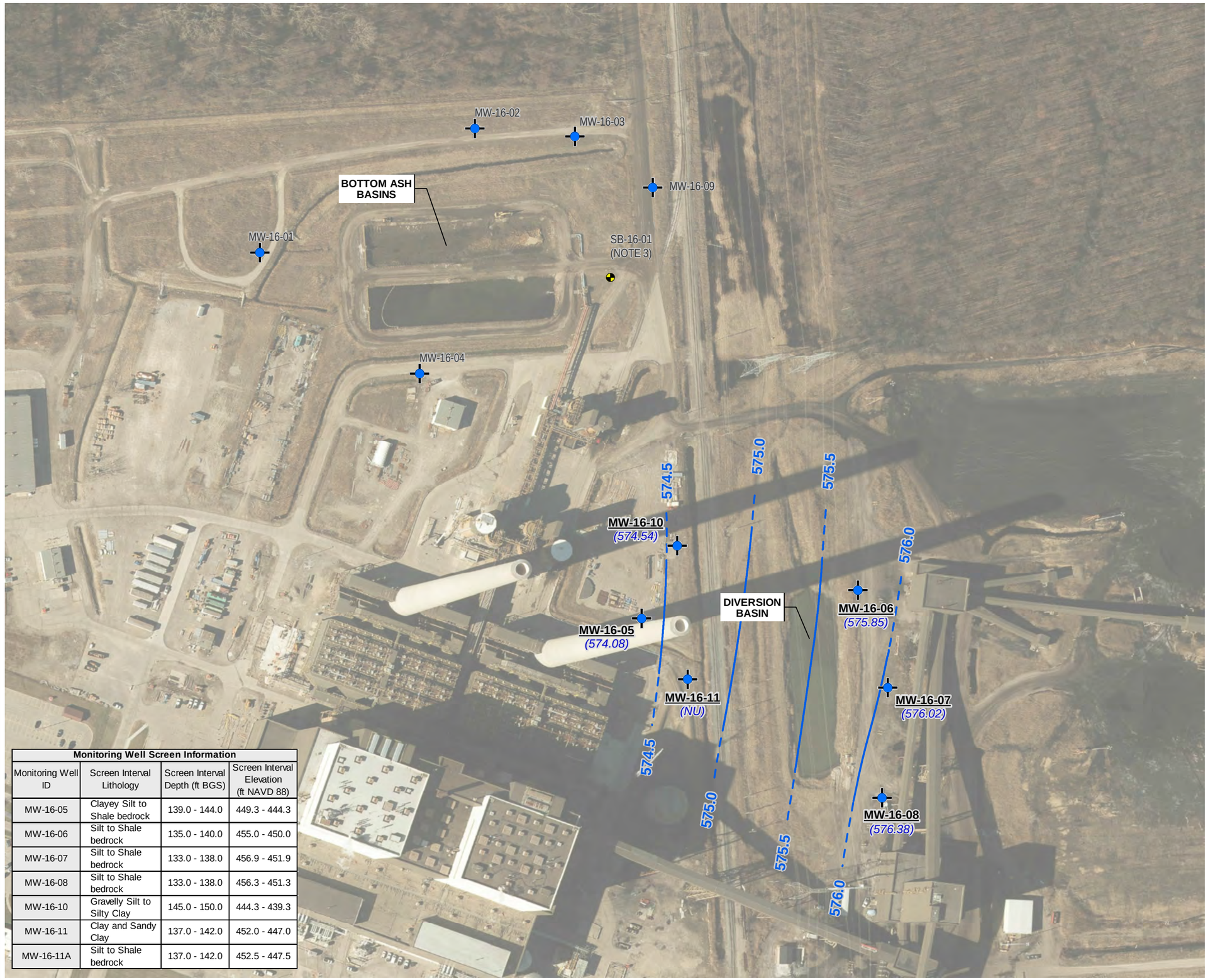

LEGEND

- SOIL BORING
- MONITORING WELL
- (575.47) GROUNDWATER ELEVATION (FT NAVD 88)
- GROUNDWATER ELEVATION CONTOUR (0.5-FT INTERVAL, DASHED WHERE INFERRED)

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
2. WELL LOCATIONS SURVEYED IN MARCH, APRIL, AND JUNE 2016 BY BMJ ENGINEERS AND SURVEYORS. INC.
3. NO SAND OR GRAVEL UNIT PRESENT ABOVE BEDROCK IN THIS LOCATION.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.
5. NU = NOT USED, MONITORING WELL COMPROMISED, GROUNDWATER ELEVATION DATA IS NOT REPRESENTATIVE.

Monitoring Well Screen Information

Monitoring Well ID	Screen Interval Lithology	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft NAVD 88)
MW-16-05	Clayey Silt to Shale bedrock	139.0 - 144.0	449.3 - 444.3
MW-16-06	Silt to Shale bedrock	135.0 - 140.0	455.0 - 450.0
MW-16-07	Silt to Shale bedrock	133.0 - 138.0	456.9 - 451.9
MW-16-08	Silt to Shale bedrock	133.0 - 138.0	456.3 - 451.3
MW-16-10	Gravelly Silt to Silty Clay	145.0 - 150.0	444.3 - 439.3
MW-16-11	Clay and Sandy Clay	137.0 - 142.0	452.0 - 447.0
MW-16-11A	Silt to Shale bedrock	137.0 - 142.0	452.5 - 447.5

0 200 400 Feet

1 " = 200 '

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PROJECT: DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE: DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP FEBRUARY 2017

DRAWN BY:	J. PAPEZ	PROJ NO.:	265996.0003
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		FIGURE 5
DATE:	JANUARY 2018		

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FILE NO.: 265996-0003-008.mxd

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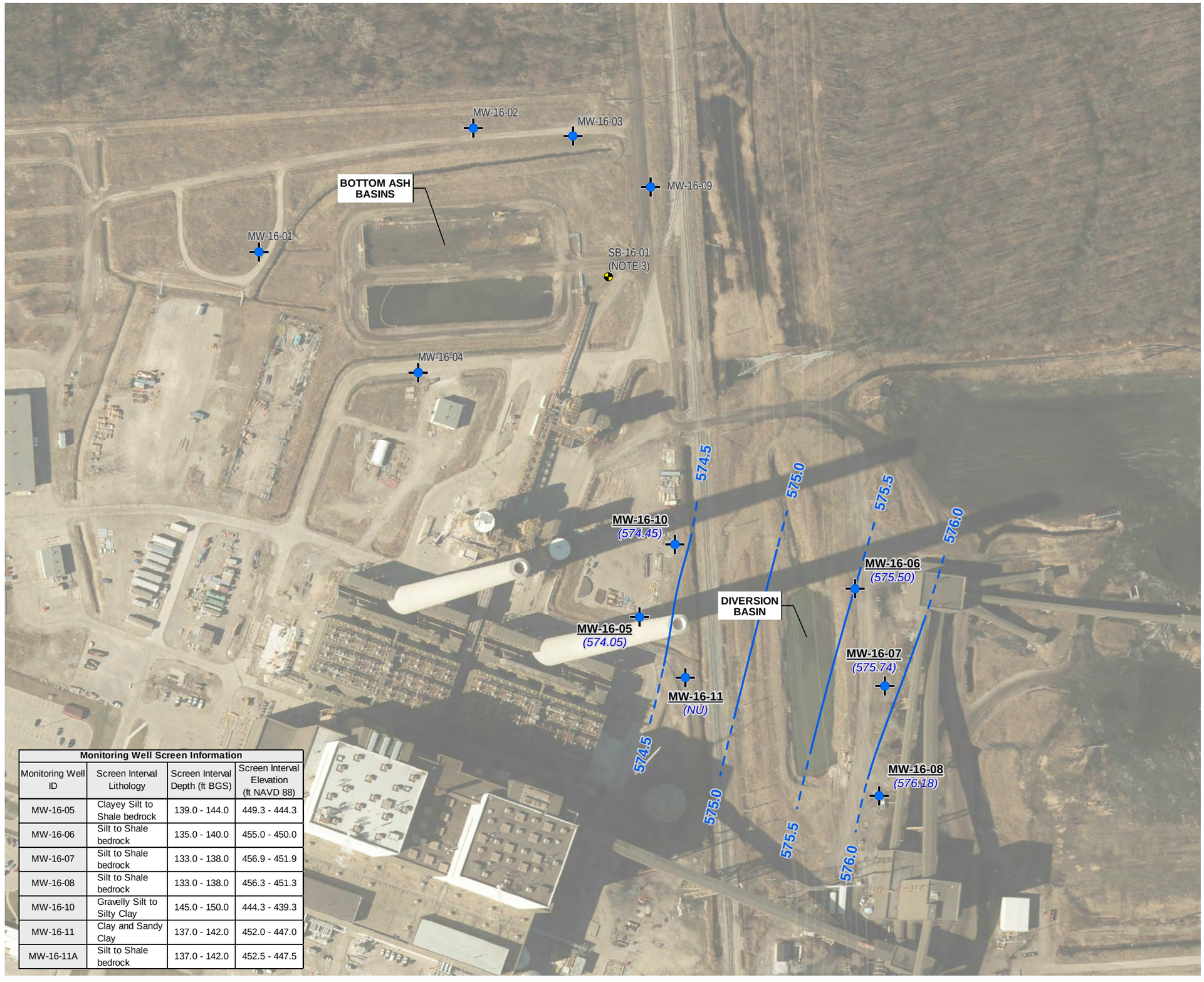
TRC - GIS



LEGEND

- SOIL BORING
- MONITORING WELL
- (575.47) GROUNDWATER ELEVATION (FT NAVD 88)
- GROUNDWATER ELEVATION CONTOUR (0.5-FT INTERVAL, DASHED WHERE INFERRED)

NOTES

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0 200 400 Feet

1 " = 200 '

1:2,400

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MW-16-11	Clay and Sandy Clay	137.0 - 142.0	452.0 - 447.0
MW-16-11A	Silt to Shale bedrock	137.0 - 142.0	452.5 - 447.5

PROJECT: DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE: DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP APRIL 2017

DRAWN BY:	J. PAPEZ	PROJ NO.:	265996.0003
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		FIGURE 6
DATE:	JANUARY 2018		

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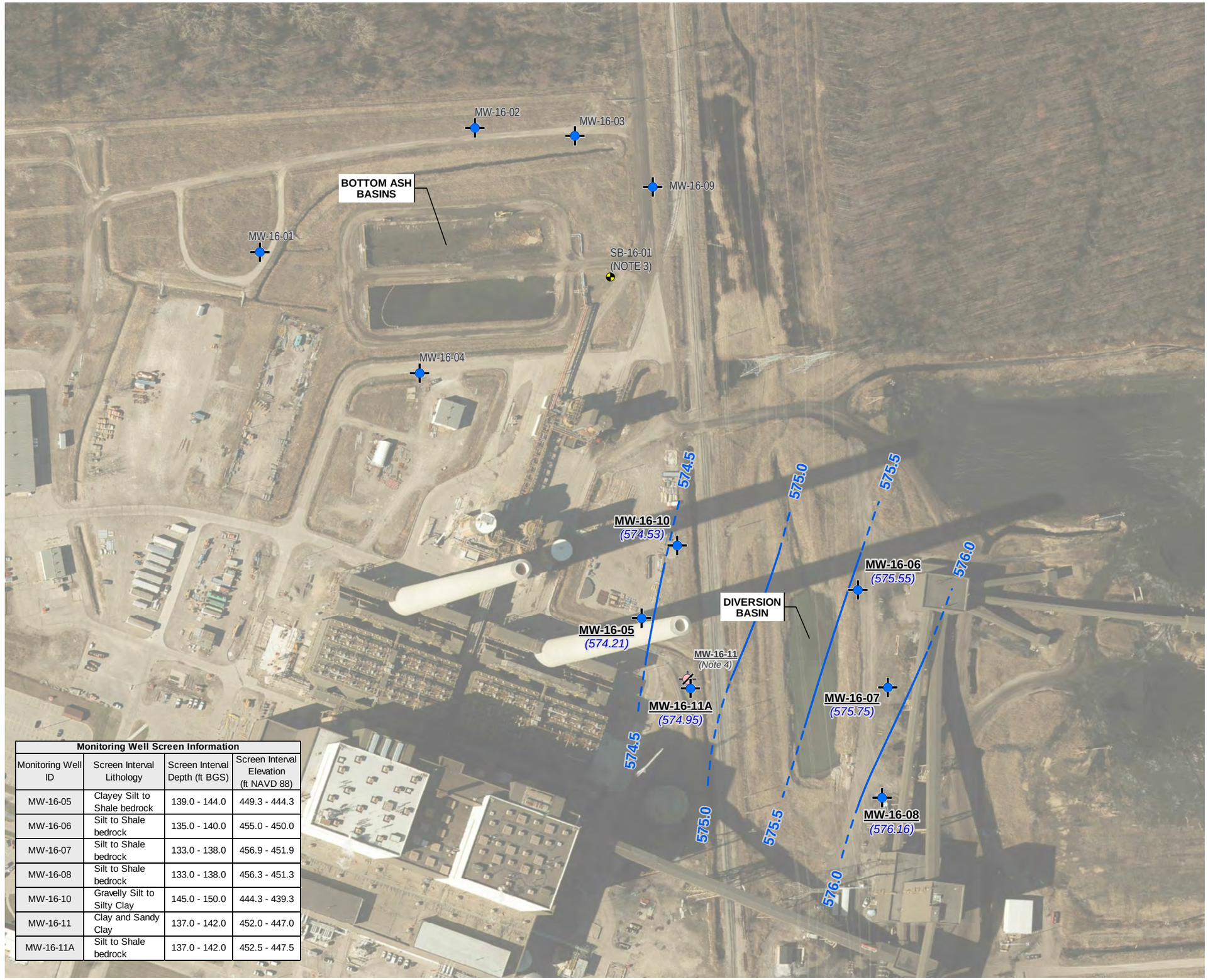

LEGEND

- SOIL BORING
- MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- (575.47) GROUNDWATER ELEVATION (FT NAVD 88)
- GROUNDWATER ELEVATION CONTOUR (0.5-FT INTERVAL, DASHED WHERE INFERRED)

NOTES

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3. NO SAND OR GRAVEL UNIT PRESENT ABOVE BEDROCK IN THIS LOCATION.
4. MONITORING WELL MW-16-11 WAS DECOMMISSIONED AND REPLACED BY MW-16-11A IN MAY 2017.
5. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.

0 200 400 Feet

1 " = 200 '

1:2,400

Monitoring Well Screen Information

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MW-16-11A	Silt to Shale bedrock	137.0 - 142.0	452.5 - 447.5

PROJECT:
DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP JUNE 2017

DRAWN BY:	J. PAPEZ	PROJ NO.:	265996.0003
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		**FIGURE 7**
DATE:	JANUARY 2018		

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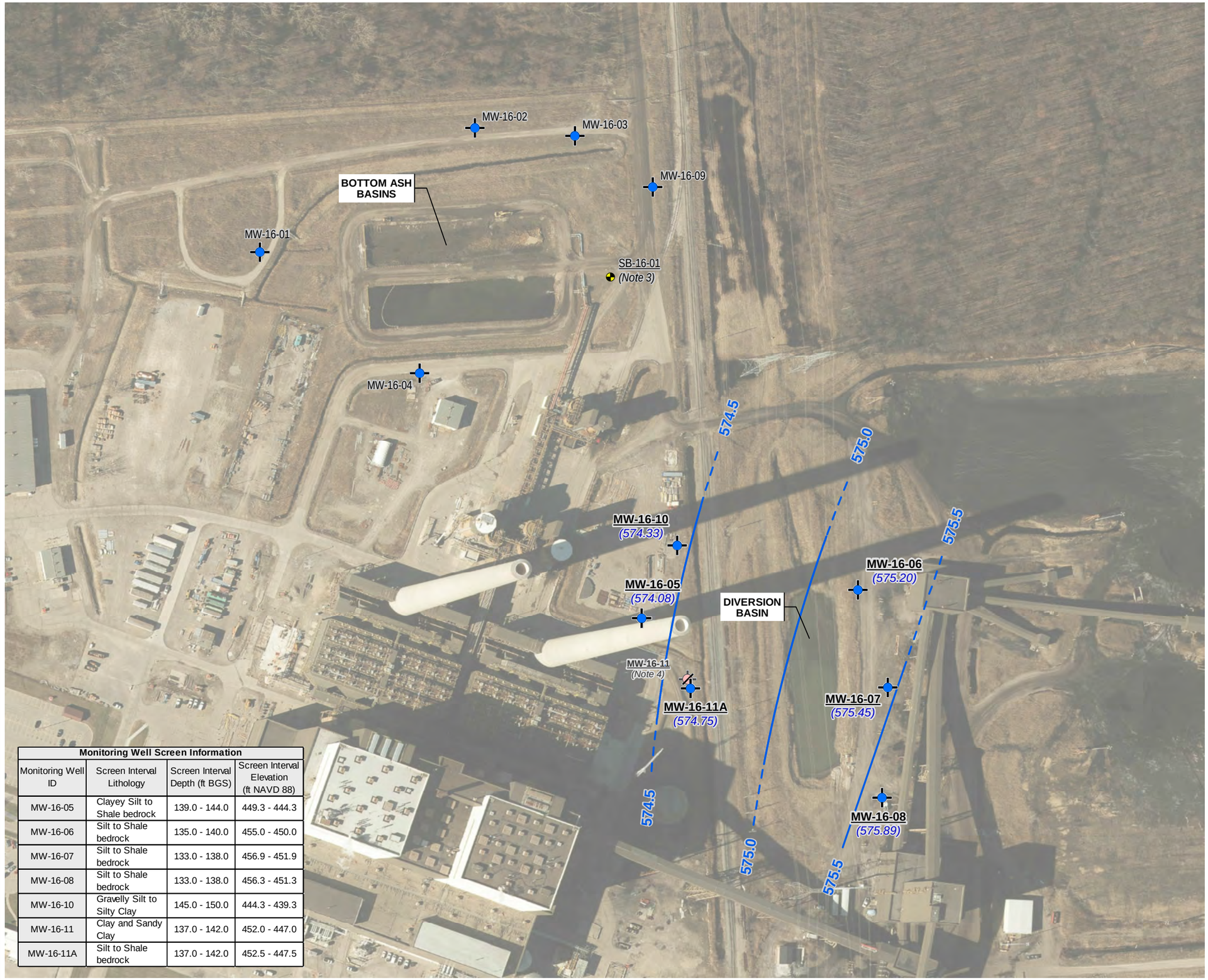
TRC - GIS



LEGEND

- SOIL BORING
- MONITORING WELL
- DECOMMISSIONED MONITORING
- (575.47) GROUNDWATER ELEVATION (FT NAVD 88)
- GROUNDWATER ELEVATION CONTOUR (0.5-FT INTERVAL, DASHED WHERE INFERRED)

NOTES

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3. NO SAND OR GRAVEL UNIT PRESENT ABOVE BEDROCK IN THIS LOCATION.
4. MONITORING WELL MW-16-11 WAS DECOMMISSIONED AND REPLACED BY MW-16-11A IN MAY 2017.
5. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.

0 200 400 Feet

1 " = 200 '

1:2,400

Monitoring Well Screen Information

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PROJECT:
DTE ELECTRIC COMPANY
BELLE RIVER POWER PLANT
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP JULY 2017

DRAWN BY:	J. PAPEZ	PROJ NO.:	265996.0003
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		**FIGURE 8**
DATE:	JANUARY 2018		

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Ann Arbor, MI 48108-3284
Phone: 734.971.7080
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FILE NO.: 265996-0003-012.mxd

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Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
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Appendix B
Data Quality Review

Laboratory Data Quality Review
Groundwater Monitoring Event October 2017
DTE Electric Company Belle River Power Plant (DTE BRPP)

Groundwater samples were collected by TRC for the October 2017 sampling event for the Bottom Ash Basins and Diversion Basin at the DTE BRPP. Samples were analyzed for anions, pH, total metals, and total dissolved solids by Test America Laboratories, Inc. (Test America), located in Canton, Ohio. The laboratory analytical results are reported in laboratory report J86174-1.

During the October 2017 sampling event, a groundwater sample was collected from each of the following wells:

Bottom Ash Basins:

- MW-16-01
- MW-16-02
- MW-16-03
- MW-16-04
- MW-16-09

Diversion Basin:

- MW-16-05
- MW-16-06
- MW-16-07
- MW-16-08
- MW-16-10
- MW-16-11A

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	EPA 9056A
pH	EPA 9040C
Total Metals	EPA 6010B
Total Dissolved Solids	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;

- Data for method blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD). Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Reporting limits (RLs) compared to project-required RLs;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix;
- Data for laboratory duplicates. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method; 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.
- When the data are evaluated through a detection monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary:

- Target analytes were not detected in the method blank.
- Dup-01 corresponds with MW-16-01; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.
- Laboratory duplicates were performed on sample MW-16-01 and MW-16-10 for pH and sample MW-16-02 for total dissolved solids; RPDs between the parent and duplicate sample were within the QC limits.

- MS/MSD analyses were performed on sample MW-16-01 for calcium and boron, and samples MW-16-02 and MW-16-09 for anions (chloride, fluoride, and sulfate). The boron recovery in the MSD were above the upper laboratory control limits. The boron concentration in the parent sample was >4x the spike concentration; therefore, the laboratory control limits are not applicable. Data usability is not affected.

Appendix C
Statistical Background Limits

Technical Memorandum

Date: January 15, 2018

To: DTE Electric Company

From: Darby Litz, TRC
Sarah Holmstrom, TRC
Jane Li, TRC

Project No.: 265996.0003.0000 Phase 001, Task 001

Subject: Background Statistical Evaluation – DTE Electric Company, Belle River Power Plant Coal Combustion Residual Diversion Basin

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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, 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). This memorandum presents the background statistical limits derived for the DTE Electric Company (DTE Electric) Belle River Power Plant (BRPP) Coal Combustion Residual Diversion Basin (DB) CCR unit.

The property has been used continuously as a coal fired power plant since Detroit Edison Company (now DTE Electric) began power plant operations at BRPP in 1984 and is generally constructed over a natural clay-rich soil base. The DB is an incised CCR surface impoundment located west of the BRPP near the Webster Drain. Water flows into the DB from the North and South BABs through a network of pipes and ditches. The DB discharges to the St. Clair River with other site wastewater in accordance with a National Pollution Discharge Elimination System (NPDES) permit.

At the DB CCR unit, more than 125 feet of contiguous silty clay-rich till is present above the bedrock, with saturation observed along the interface of silt-rich till and the underlying shale bedrock. The underlying shale does not yield groundwater, rather it is an aquiclude that prevents groundwater flow (i.e., is not an aquifer). Although the encountered zone of saturation along the interface did not yield significant groundwater, it was conservatively interpreted as the first underlying saturated zone that would presumably become affected with CCR constituents since it was saturated, and although the hydraulic conductivity was low, exhibited a much higher conductivity than the clay-rich soils between the bottom of the basin and the monitored zone.

A groundwater monitoring system has been established for BRPP DB CCR unit (TRC, October 2017), which established the following locations for detection monitoring.

MW-16-05	MW-16-06	MW-16-07
MW-16-08	MW-16-10	MW-16-11/MW-16-11A

Monitoring well MW-16-11 was found to be damaged in March 2017. A casing failure was suspected when grout was observed at the base of the well and confirmed using a downhole camera assessment that identified a crack in the casing 40 feet down. The monitoring well was properly decommissioned on May 11, 2017 and replaced on May 12, 2017, with monitoring well MW-16-11A. The replacement monitoring well is located proximal to MW-16-11 to the south. The data for MW-16-11A is consistent with the concentrations observed at MW-16-11. Therefore, the data from MW-16-11 and MW-16-11A were combined for the background data set.

Following the baseline data collection period (August 2016 through October 2017), the background data for the BRPP DB CCR unit were evaluated in accordance with the *Groundwater Statistical Evaluation Plan* (Stats Plan) (TRC, October 2017). Background data were evaluated utilizing 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 six background wells utilized for the DB CCR Unit includes MW-16-05 through MW-16-08, MW-16-10, and MW-16-11/MW-16-11A. An intrawell statistical approach requires that each of the monitoring system 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/baseline dataset from that same well. 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.

Data Quality

Data from each sampling round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The review was completed using the following quality control (QC) information which at a minimum included chain-of-custody forms, investigative sample results including blind field duplicates, and, as provided by the laboratory, method blanks, laboratory control spikes, laboratory duplicates. The data were found to be complete and usable for the purposes of the CCR monitoring program.

Time versus Concentration Graphs

The time versus concentration (T v. C) graphs (Attachment A) showed potential or suspect outliers for MW-16-10 for many of the Appendix III parameters for data collected on 4/18/2017 and 6/6/2017. The T v. C graphs also showed potential or suspect outliers for the data collected for MW-16-10 on 2/28/2017 for calcium, chloride, and sulfate.

The T v. C graphs showed that additional sampling events conducted in August 2017 for MW-16-10 are not temporally independent from the previous and subsequent sampling events. At monitoring well MW-16-10 sample collected on 8/9/17 was collected only 14 days after the sampling event conducted on 7/26/2017 and the sample collected on 8/30/2017 was collected only 13 days before the sampling event conducted on 9/12/17. Data for the additional sampling events conducted in August 2017 for MW-16-10 were similar to the July and September results, thus removed to avoid potential biasing of the data set for that time-frame.

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. After removing the August 2017 data from the MW-16-10 data set, probability plots of data residuals (Attachment B) were used to further evaluate the potential outliers in the Appendix III data for MW-16-10 that were identified in

the T v. C graphs. In general, probability plots of the data residuals for MW-16-10 show that data collected on 4/18/2017 and 6/6/2017 were from a different distribution than the remaining data. This pattern was observed for most of the Appendix III parameters for MW-16-10. Prior to outlier removal, many of the parameters exhibited a non-normal distribution. Subsequent to outlier removal, the data sets for the majority of the parameters exhibited a normal distribution. As such, data collected from monitoring well MW-16-10 on 4/18/2017 and 6/6/2017 were removed from the background data set. In addition, the calcium, chloride, and sulfate data collected on 2/28/2017 were further evaluated as potential outliers.

After the removal of the data collected on 4/18/2017 and 6/6/2017 from the background data set for MW-16-10, the probability plots showed that the distributions for calcium and sulfate remained non-normal; however, the chloride data distribution was normal so the chloride result for 2/28/2017 was not further considered for outlier removal. The MW-16-10 calcium result for 2/28/2017 was approximately twice the concentrations observed for the other sampling events. After the removal of the calcium data collected on 2/28/2017, the distribution of the background data set was normal. The MW-16-10 sulfate result for 2/28/2017 was an order of magnitude greater than the majority of the remaining data. Because the distribution of the sulfate data was non-normal, the maximum baseline concentration would be used as the prediction limit; therefore, the suspected outlier was removed to avoid calculating a biased high prediction limit. After the removal of the sulfate result for 2/28/2017, an evaluation of the probability plots showed that the sulfate data set was log-normal, and therefore, was not removed from the dataset.

Distribution of the Data Sets

ChemStat™ was utilized to evaluate each data set for normality. If the skewness coefficient was calculated to be between negative one and one, then the data were assumed to be approximately normally distributed. If the skewness coefficient was calculated as greater than one (or less than negative one) then the calculation was performed on the natural log (Ln) of the data. If the Ln of the data still determined that the data appeared to be skewed, then the Shapiro-Wilk test of normality (Shapiro-Wilk) was performed. The Shapiro-Wilk statistic was calculated on both non-transformed data, and the Ln-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 normal and lognormal distributions, PLs are calculated for 95 percent confidence using parametric methods. For nonnormal background datasets, a nonparametric PL is utilized, resulting in the highest value from the background dataset as the PL. The achieved confidence levels for nonparametric 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 – Probability Plots for MW-16-10 Outlier Evaluation
Attachment C – ChemStat™ Prediction Limit Outputs

Tables

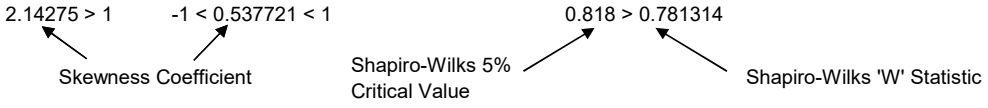
Table 1
Summary of Outlier Evaluation
Background Statistical Evaluation
DTE Electric Company – Belle River Power Plant Diversion Basin

Parameter	Units	Monitoring Well	Sample Date	Data Outlier	Basis for Removal of Outlier
Boron	ug/L	MW-16-10	04/18/17	1,500	Anomalous concentrations observed for many parameters.
		MW-16-10	06/06/17	1,300	Anomalous concentrations observed for many parameters.
		MW-16-10	08/09/17	2,100	Removed to maintain temporal independence.
		MW-16-10	08/30/17	2,200	Removed to maintain temporal independence.
Calcium	ug/L	MW-16-10	02/28/17	68,000	Anomalously high concentration.
		MW-16-10	04/18/17	120,000	Anomalous concentrations observed for many parameters.
		MW-16-10	06/06/17	170,000	Anomalous concentrations observed for many parameters.
		MW-16-10	08/09/17	32,000	Removed to maintain temporal independence.
		MW-16-10	08/30/17	29,000	Removed to maintain temporal independence.
Chloride	mg/L	MW-16-10	04/18/17	890	Anomalous concentrations observed for many parameters.
		MW-16-10	06/06/17	860	Anomalous concentrations observed for many parameters.
		MW-16-10	08/09/17	1,500	Removed to maintain temporal independence.
		MW-16-10	08/30/17	1,500	Removed to maintain temporal independence.
Fluoride	mg/L	MW-16-10	04/18/17	< 1.0	Anomalous concentrations observed for many parameters.
		MW-16-10	06/06/17	< 1.0	Anomalous concentrations observed for many parameters.
		MW-16-10	08/09/17	< 1.0	Removed to maintain temporal independence.
		MW-16-10	08/30/17	1.1	Removed to maintain temporal independence.
pH, Field	SU	MW-16-10	04/18/17	7.6	Anomalous concentrations observed for many parameters.
		MW-16-10	06/06/17	7.6	Anomalous concentrations observed for many parameters.
		MW-16-10	08/09/17	8.2	Removed to maintain temporal independence.
		MW-16-10	08/30/17	8.1	Removed to maintain temporal independence.
Sulfate	mg/L	MW-16-10	02/28/17	620	Anomalously high concentration.
		MW-16-10	04/18/17	980	Anomalous concentrations observed for many parameters.
		MW-16-10	06/06/17	1,300	Anomalous concentrations observed for many parameters.
		MW-16-10	08/09/17	69	Removed to maintain temporal independence.
		MW-16-10	08/30/17	59	Removed to maintain temporal independence.
Total Dissolved Solids	mg/L	MW-16-10	04/18/17	3,400	Anomalous concentrations observed for many parameters.
		MW-16-10	06/06/17	3,400	Anomalous concentrations observed for many parameters.
		MW-16-10	08/09/17	2,800	Removed to maintain temporal independence.
		MW-16-10	08/30/17	2,700	Removed to maintain temporal independence.

Table 2
Summary of Descriptive Statistics and Prediction Limit Calculations
Background Statistical Evaluation
DTE Electric Company – Belle River Power Plant Diversion Pond

Monitoring Well	Skewness Test		Shapiro-Wilks Test (5% Critical Value)		Outliers Removed	Prediction Limit Test	Prediction Limit
	Un-Transformed Data	Natural Log Transformed Data	Un-Transformed Data	Natural Log Transformed Data			
Appendix III							
Boron (ug/L)							
MW-16-05	-1 < -0.209922 < 1	--	--	--	N	Parametric	2,000
MW-16-06	-1 < -0.413737 < 1	--	--	--	N	Parametric	2,200
MW-16-07	-2.02355 < -1	-2.0825 < -1	0.829 > 0.591306	0.829 > 0.57886	N	Non-Parametric	2,100
MW-16-08	-1 < -0.145054 < 1	--	--	--	N	Parametric	2,300
MW-16-10	-1 < -0.248039 < 1	--	--	--	Y	Parametric	2,300
MW-16-11/MW-16-11A	-1 < -0.781322 < 1	--	--	--	N	Parametric	2,000
Calcium (ug/L)							
MW-16-05	-1 < 0.964441 < 1	--	--	--	N	Parametric	67,000
MW-16-06	-1 < 0.671136 < 1	--	--	--	N	Parametric	45,000
MW-16-07	1.39794 > 1	-1 < 0.963222 < 1	--	--	N	Parametric	110,000
MW-16-08	-1 < 0.405924 < 1	--	--	--	N	Parametric	99,000
MW-16-10	-1 < -0.240775 < 1	--	--	--	Y	Parametric	34,000
MW-16-11/MW-16-11A	1.04182 > 1	-1 < 0.305846 < 1	--	--	N	Parametric	80,000
Chloride (mg/L)							
MW-16-05	-1 < 0 < 1	--	--	--	N	Parametric	1,600
MW-16-06	-1 < -0.209922 < 1	--	--	--	N	Parametric	1,800
MW-16-07	-1 < 0.178166 < 1	--	--	--	N	Parametric	1,800
MW-16-08	-1 < 0.961665 < 1	--	--	--	N	Parametric	2,000
MW-16-10	-1.08052 < -1	-1.27003 < -1	0.803 < 0.852887	--	Y	Parametric	1,800
MW-16-11/MW-16-11A	-1 < 0.209922 < 1	--	--	--	N	Parametric	1,700
Fluoride (mg/L)							
MW-16-05	-1.56445 < -1	-1.99614 < -1	0.829 > 0.79413	0.829 > 0.689952	N	Non-Parametric	1.3
MW-16-06	-1.51854 < -1	-1.9587 < -1	0.829 > 0.805322	0.829 > 0.701562	N	Non-Parametric	1.3
MW-16-07	-1 < 0.0133153 < 1	--	--	--	N	Parametric	1.2
MW-16-08	-1 < 0.778388 < 1	--	--	--	N	Parametric	1.3
MW-16-10	>50% Non-Detect	--	--	--	Y	Non-Parametric	1.2
MW-16-11/MW-16-11A	>50% Non-Detect	--	--	--	N	Non-Parametric	1.0

Notes:

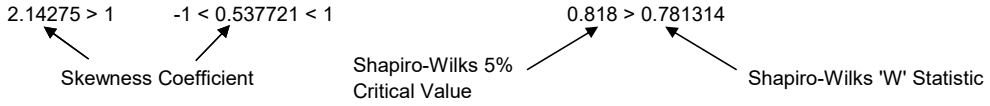


PQL = Practical Quantitation Limit
ug/L = micrograms per liter
mg/L = milligrams per liter
SU = standard units

Table 2
Summary of Descriptive Statistics and Prediction Limit Calculations
Background Statistical Evaluation
DTE Electric Company – Belle River Power Plant Diversion Pond

Monitoring Well	Skewness Test		Shapiro-Wilks Test (5% Critical Value)		Outliers Removed	Prediction Limit Test	Prediction Limit
	Un-Transformed Data	Natural Log Transformed Data	Un-Transformed Data	Natural Log Transformed Data			
pH, Field (SU)							
MW-16-05	1.54056 > 1	1.50606 > 1	0.829 > 0.788573	0.829 > 0.795257	N	Non-Parametric	7.9 - 8.5
MW-16-06	-1 < -0.430346 < 1	--	--	--	N	Parametric	7.5 - 8.4
MW-16-07	-1 < 0.484456 < 1	--	--	--	N	Parametric	7.7 - 8.4
MW-16-08	-1 < -0.0573378 < 1	--	--	--	N	Parametric	7.5 - 8.3
MW-16-10	-1 < 0.734401 < 1	--	--	--	Y	Parametric	7.5 - 8.8
MW-16-11/MW-16-11A	-1 < -0.425657 < 1	--	--	--	N	Parametric	7.6 - 8.6
Sulfate (mg/L)							
MW-16-05	>50% Non-Detect	--	--	--	N	Non-Parametric	20
MW-16-06	>50% Non-Detect	--	--	--	N	Non-Parametric	20
MW-16-07	-1 < 0.184263 < 1	--	--	--	N	Parametric	98
MW-16-08	>50% Non-Detect	--	--	--	N	Non-Parametric	23
MW-16-10	1.67072 > 1	1.26305 > 1	0.788 > 0.661019	0.788 < 0.823046	Y	Parametric	160
MW-16-11/MW-16-11A	>50% Non-Detect	--	--	--	N	Non-Parametric	20
Total Dissolved Solids (mg/L)							
MW-16-05	-1 < 0.455599 < 1	--	--	--	N	Parametric	2,700
MW-16-06	1.33709 > 1	1.21616 > 1	0.829 < 0.835537	--	N	Parametric	3,000
MW-16-07	1.65457 > 1	1.53322 > 1	0.829 > 0.779319	0.829 > 0.804854	N	Non-Parametric	3,400
MW-16-08	-1 < 0.673575 < 1	--	--	--	N	Parametric	3,200
MW-16-10	-1 < 0.957922 < 1	--	--	--	Y	Parametric	3,100
MW-16-11/MW-16-11A	-1 < 0.710301 < 1	--	--	--	N	Parametric	3,000

Notes:

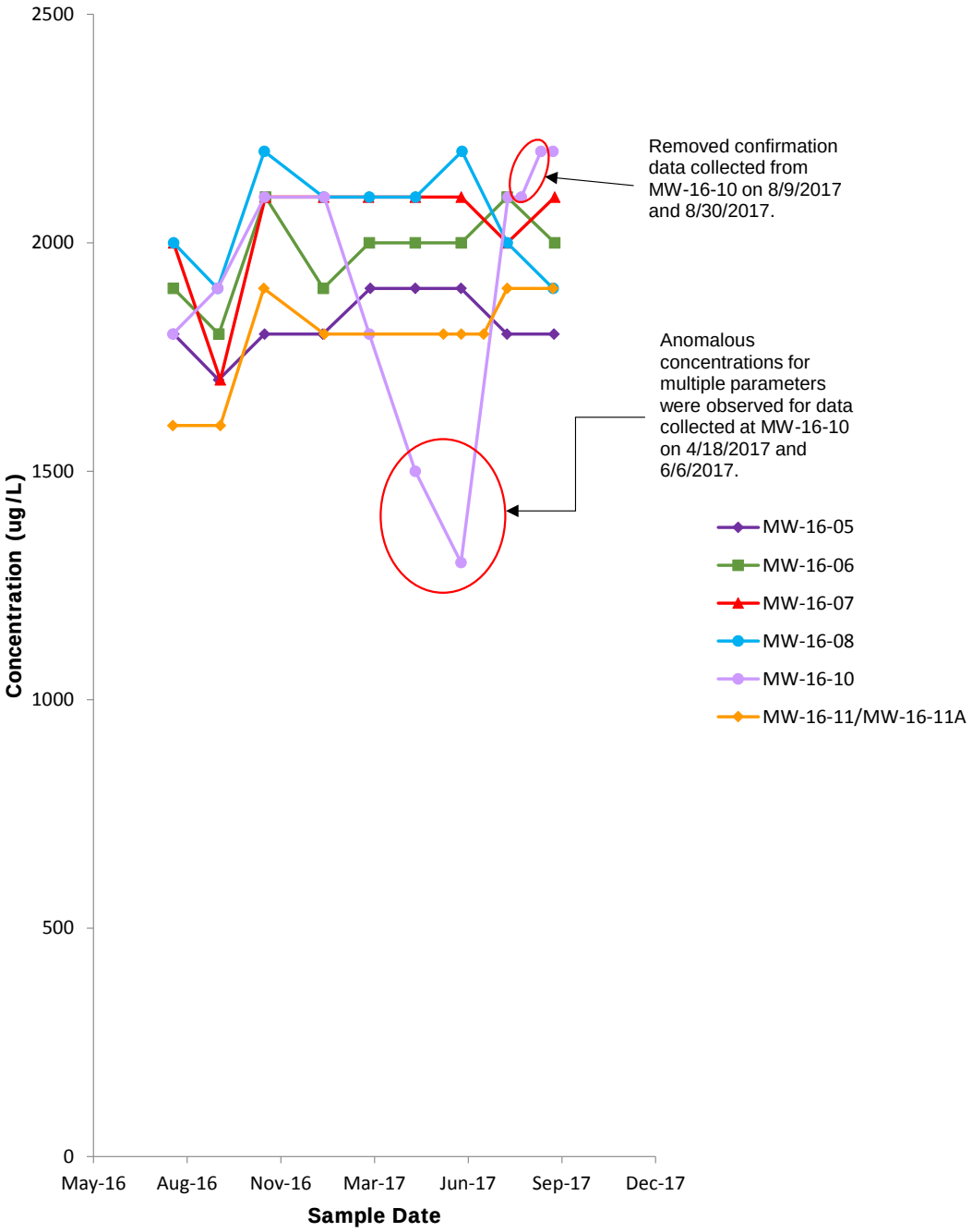


PQL = Practical Quantitation Limit
ug/L = micrograms per liter
mg/L = milligrams per liter
SU = standard units

Attachment A

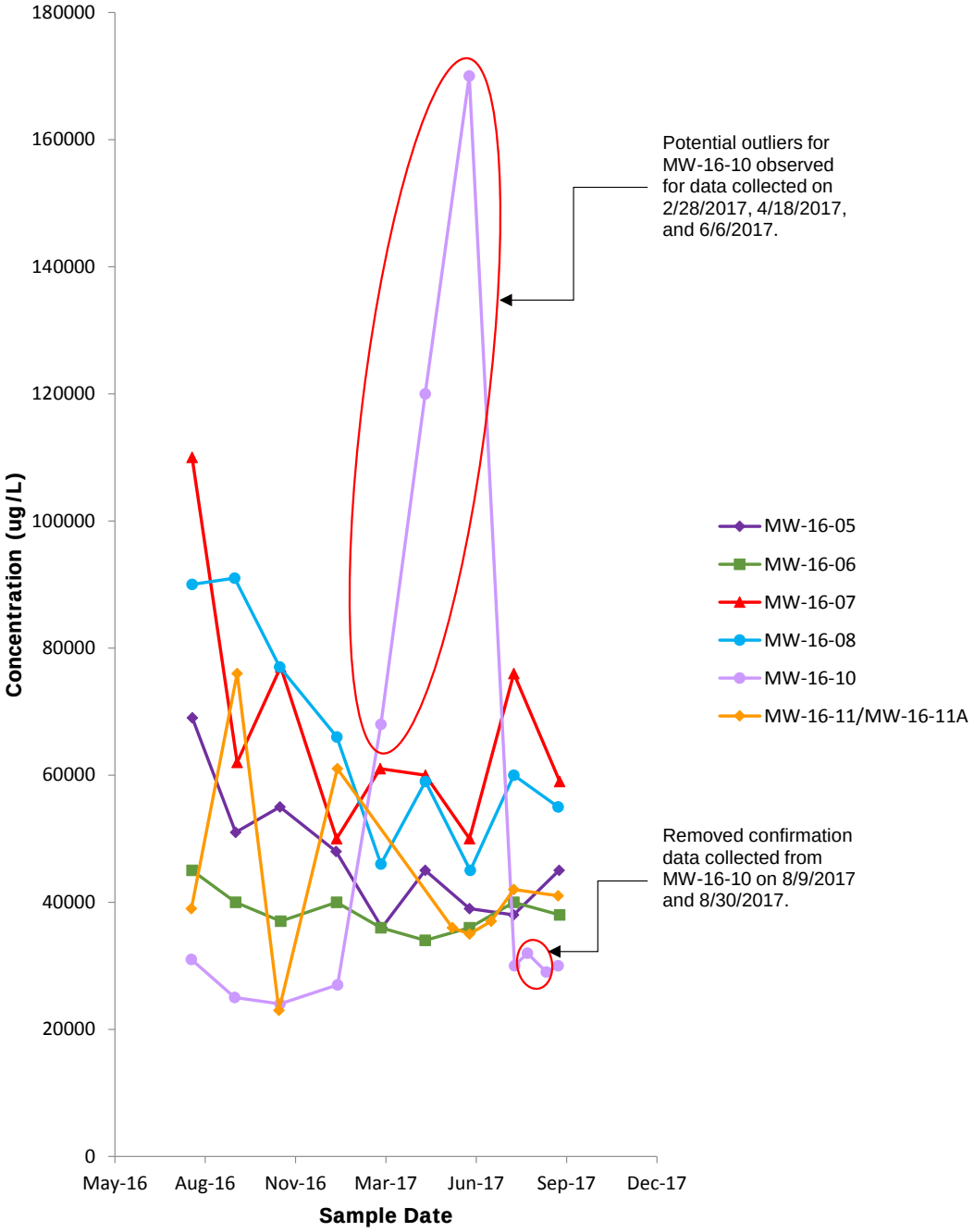
Background Concentration Time-Series Charts

Time-Series Plots
DTE Electric Company - Belle River Power Plant Diversion Basin
China Township, Michigan
Boron



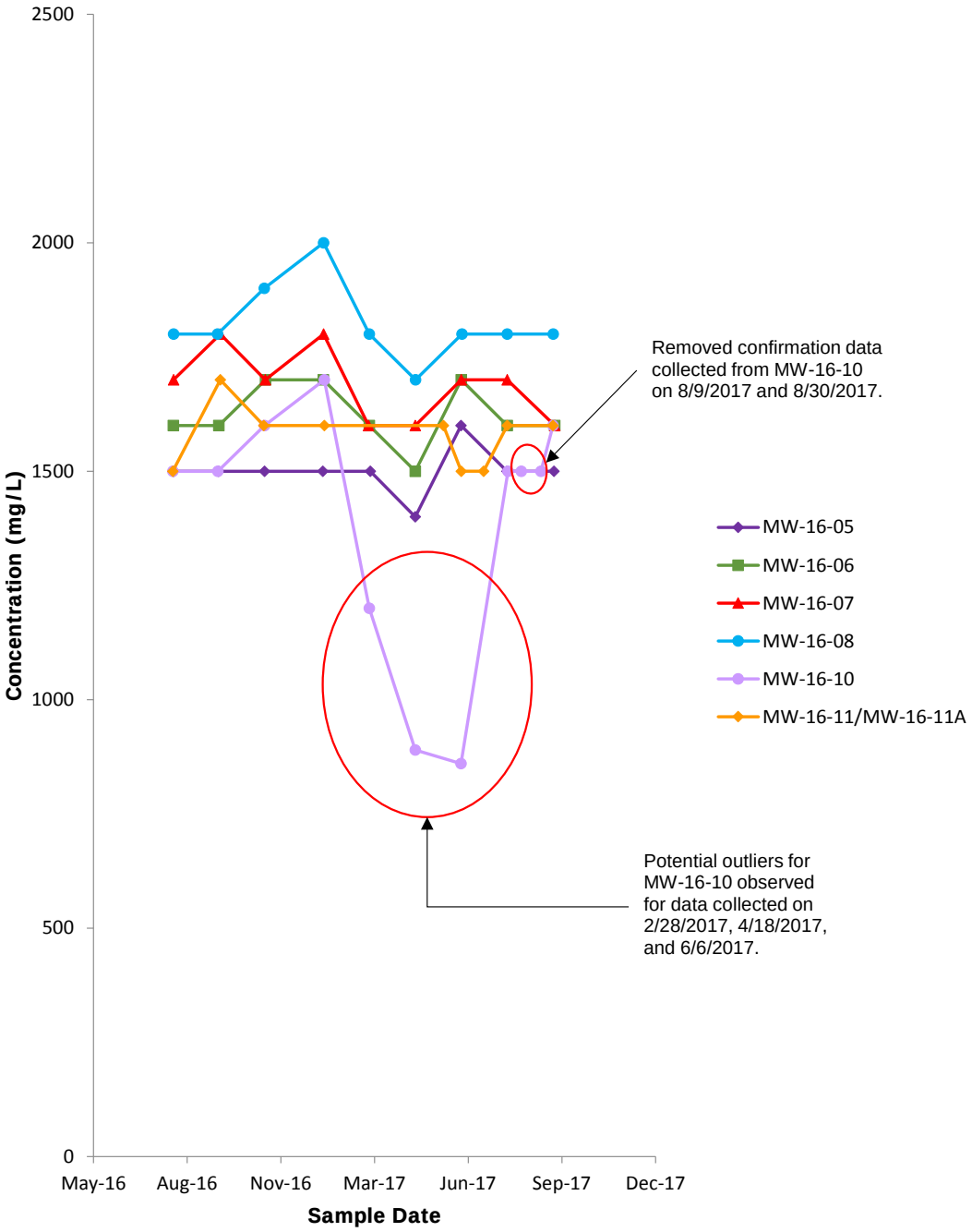
Open symbols denote non-detect concentrations.

Time-Series Plots
DTE Electric Company - Belle River Power Plant Diversion Basin
China Township, Michigan
Calcium



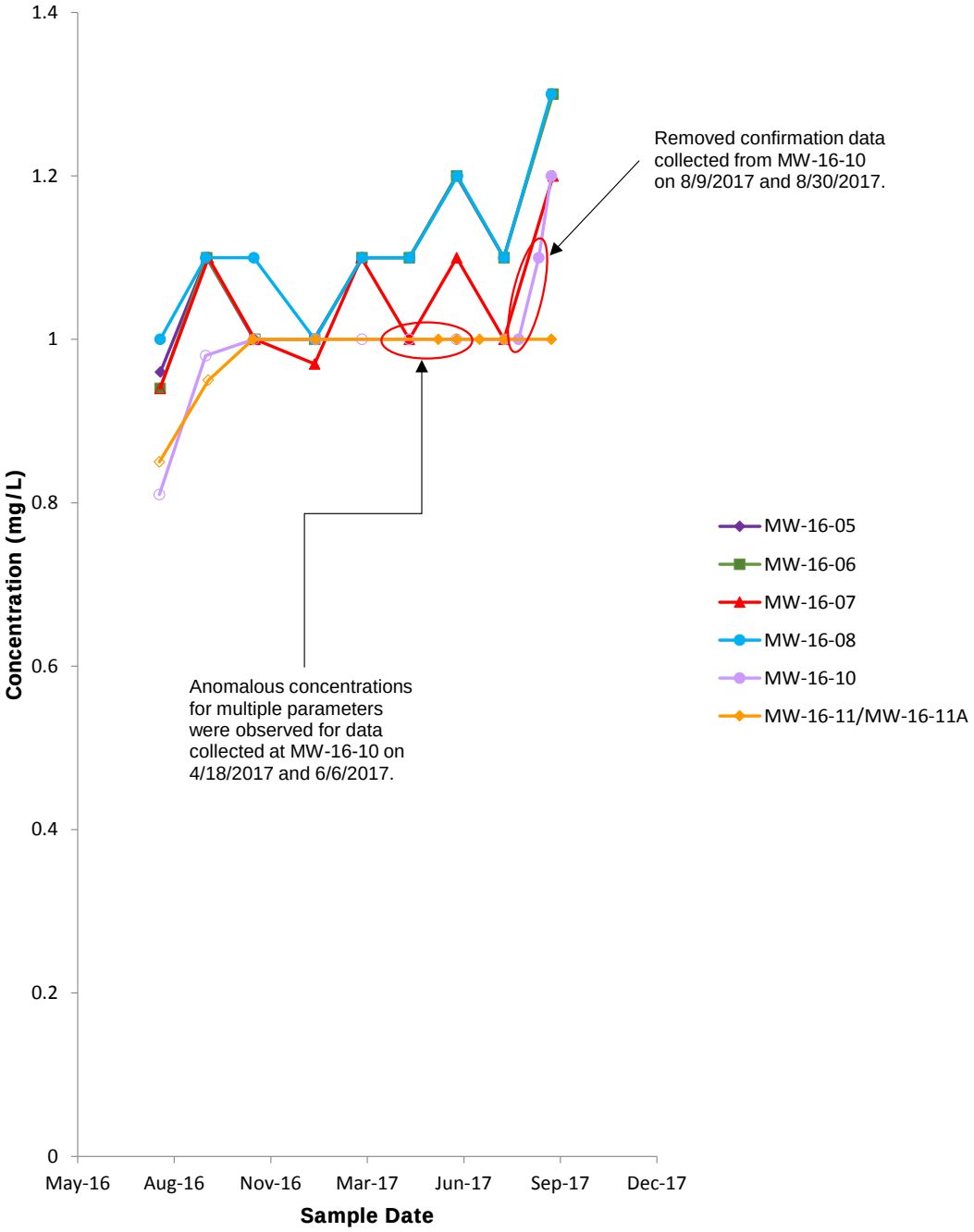
Open symbols denote non-detect concentrations.

Time-Series Plots
DTE Electric Company - Belle River Power Plant Diversion Basin
China Township, Michigan
Chloride



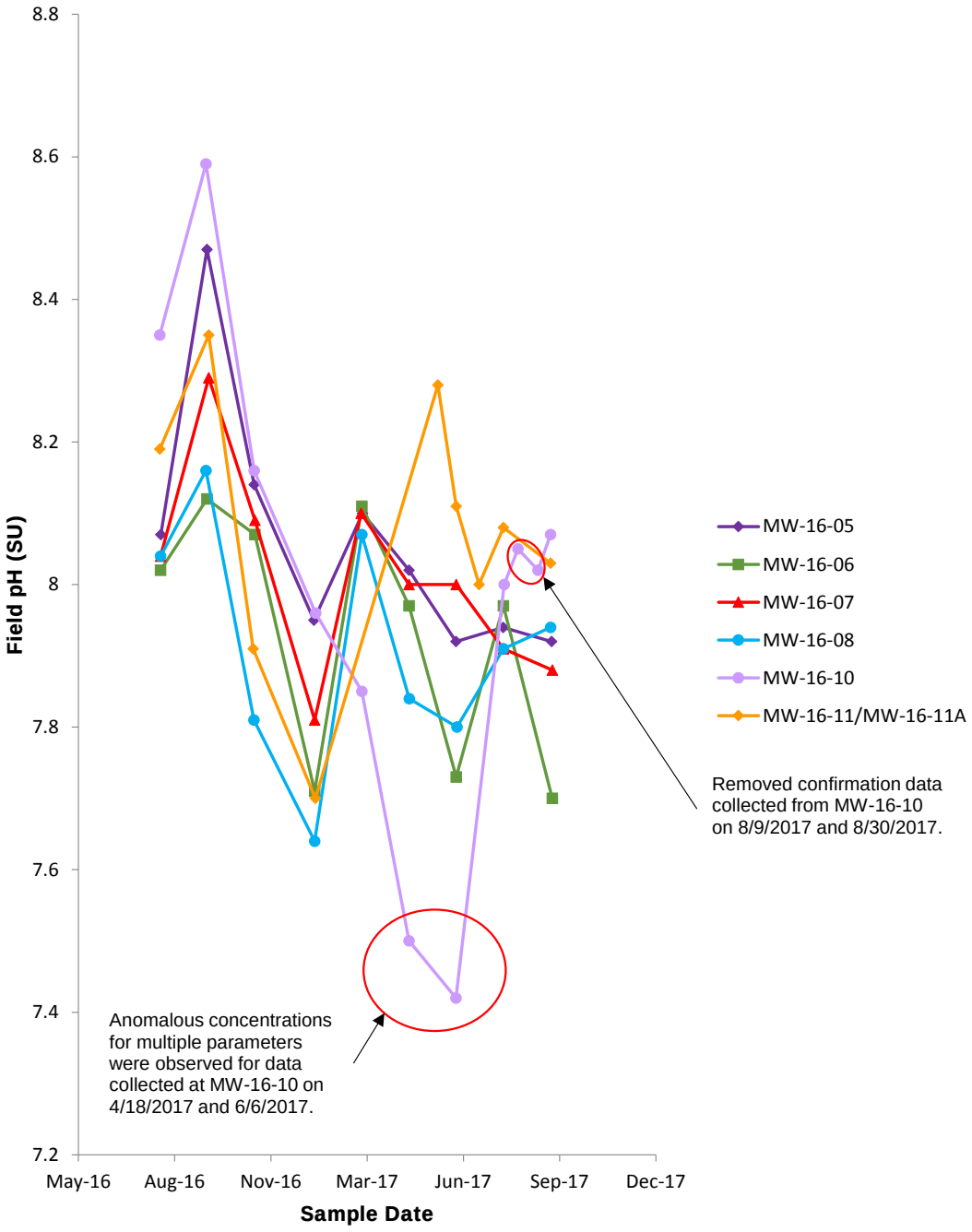
Open symbols denote non-detect concentrations.

Time-Series Plots
DTE Electric Company - Belle River Power Plant Diversion Basin
China Township, Michigan
Fluoride

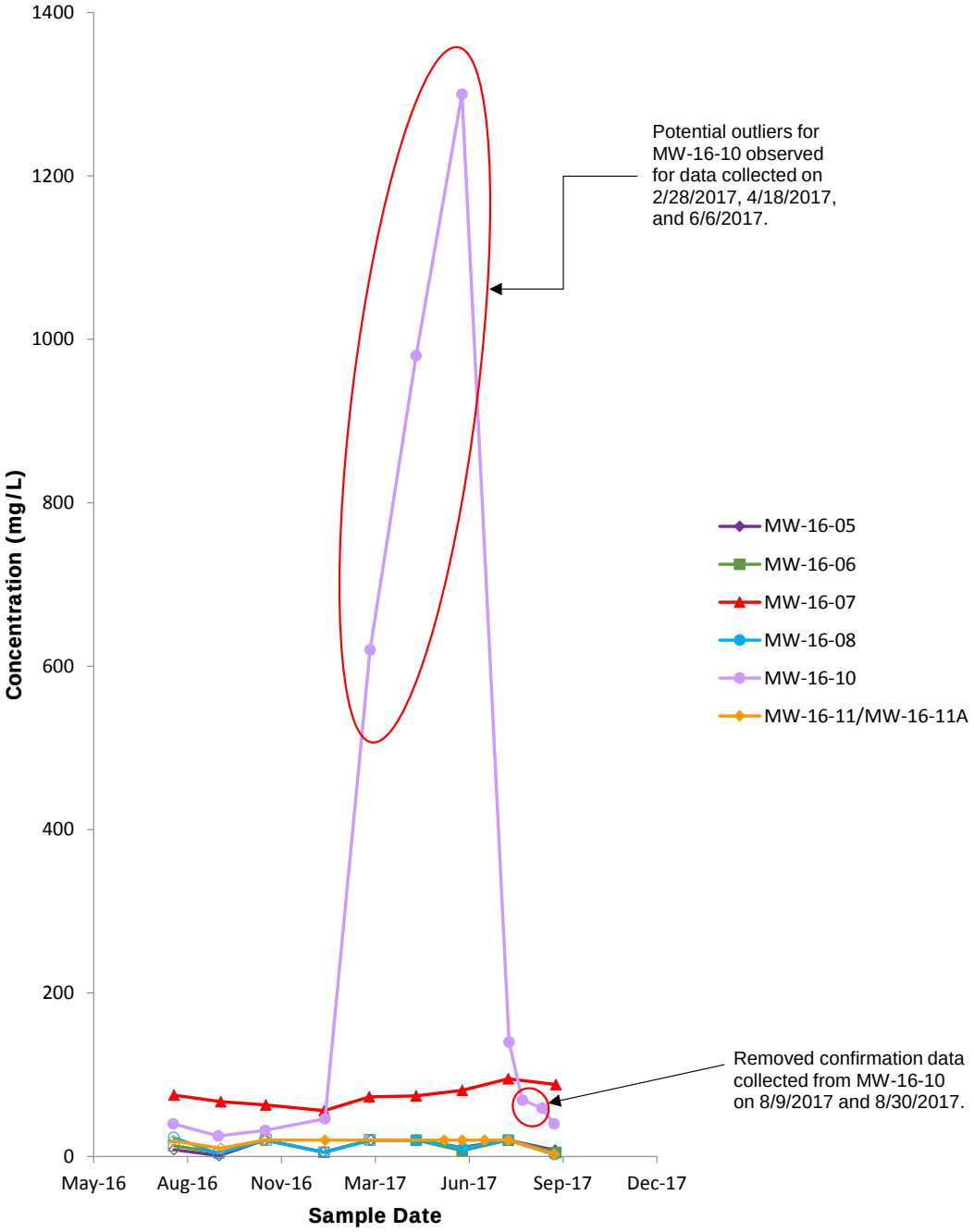


Open symbols denote non-detect concentrations.

Time-Series Plots
DTE Electric Company - Belle River Power Plant Diversion Basin
China Township, Michigan
pH, Field

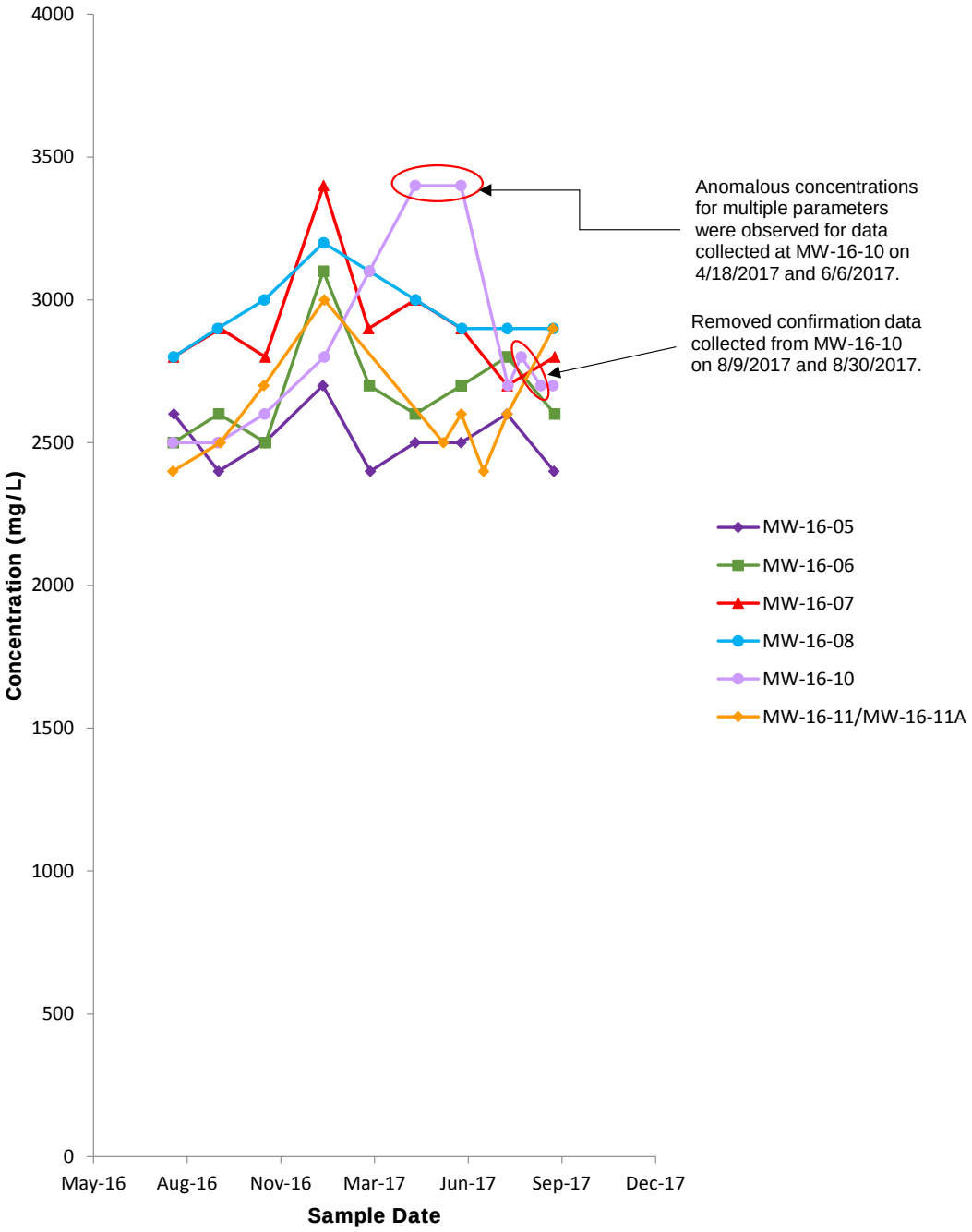


Time-Series Plots
DTE Electric Company - Belle River Power Plant Diversion Basin
China Township, Michigan
Sulfate



Open symbols denote non-detect concentrations.

Time-Series Plots
DTE Electric Company - Belle River Power Plant Diversion Basin
China Township, Michigan
Total Dissolved Solids

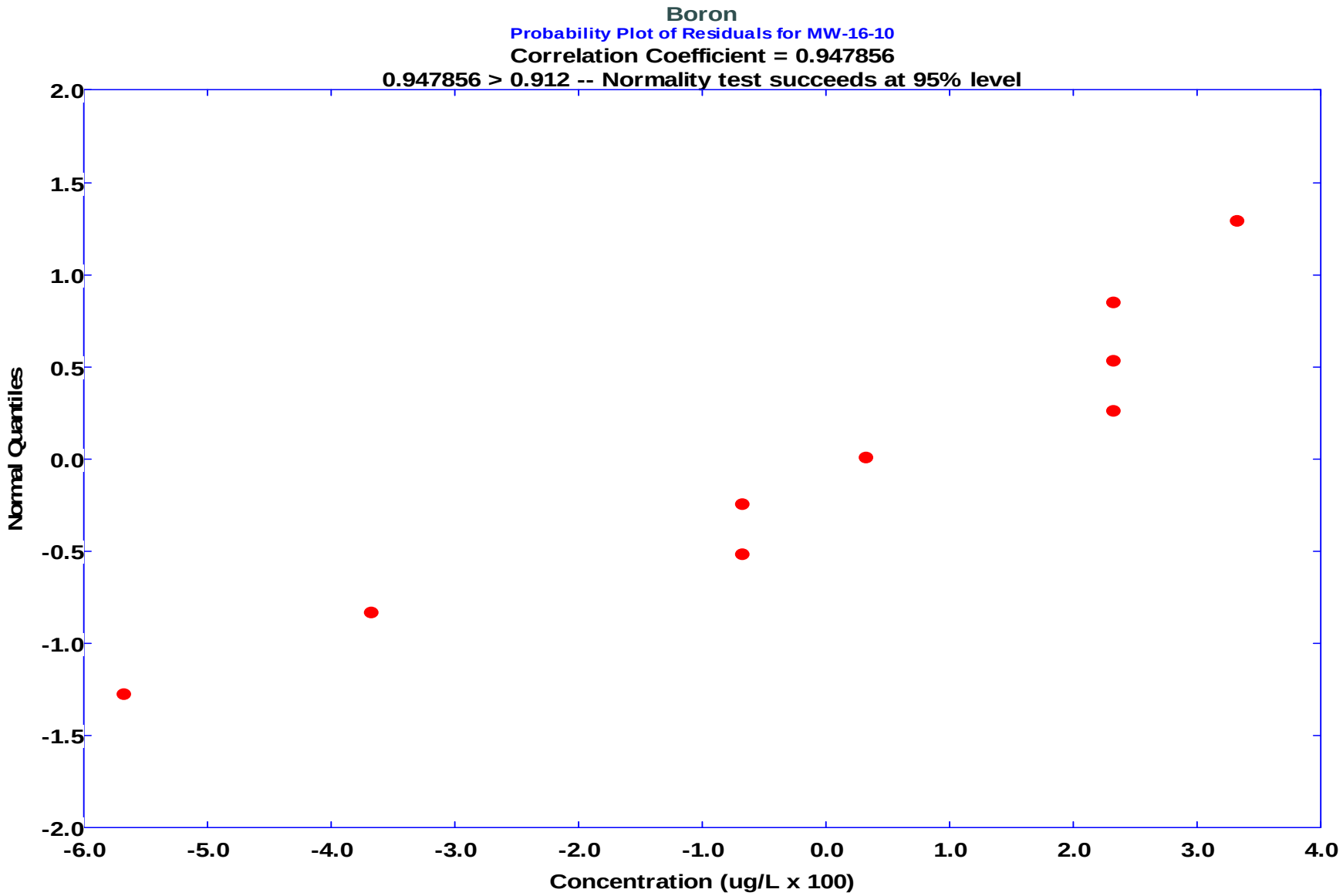


Open symbols denote non-detect concentrations.

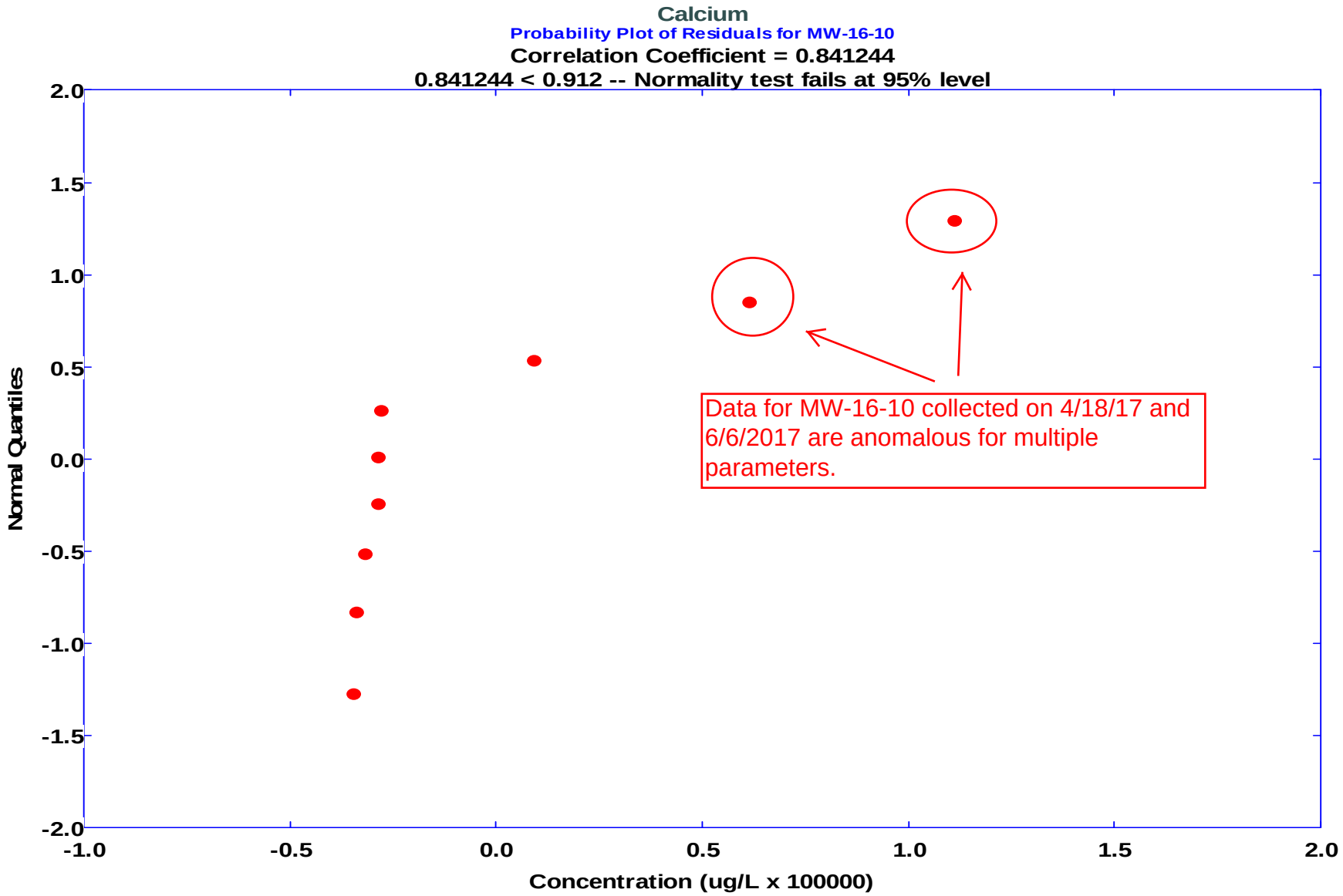
Attachment B

Probability Plots for MW-16-10 Outlier Evaluation

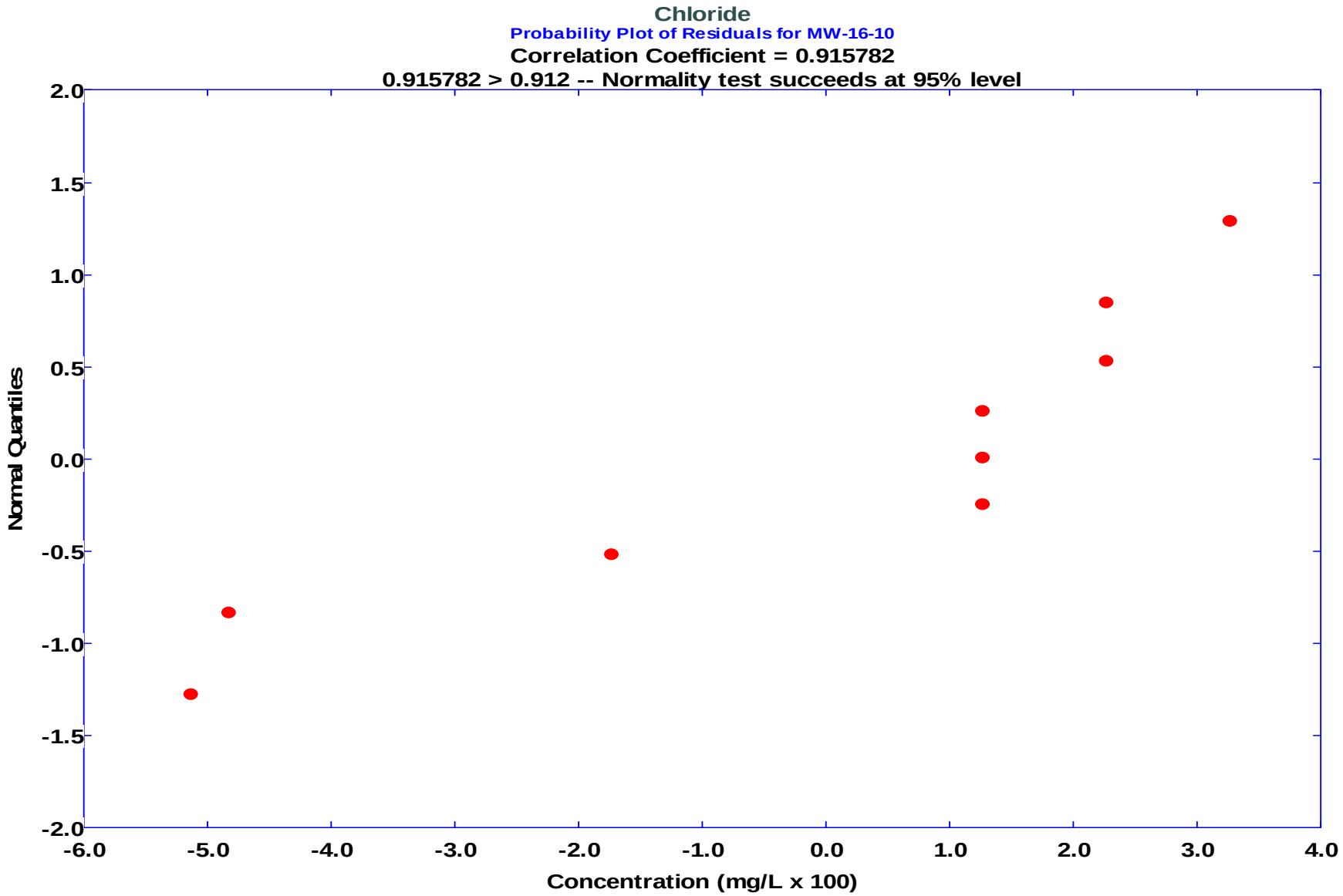
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017.



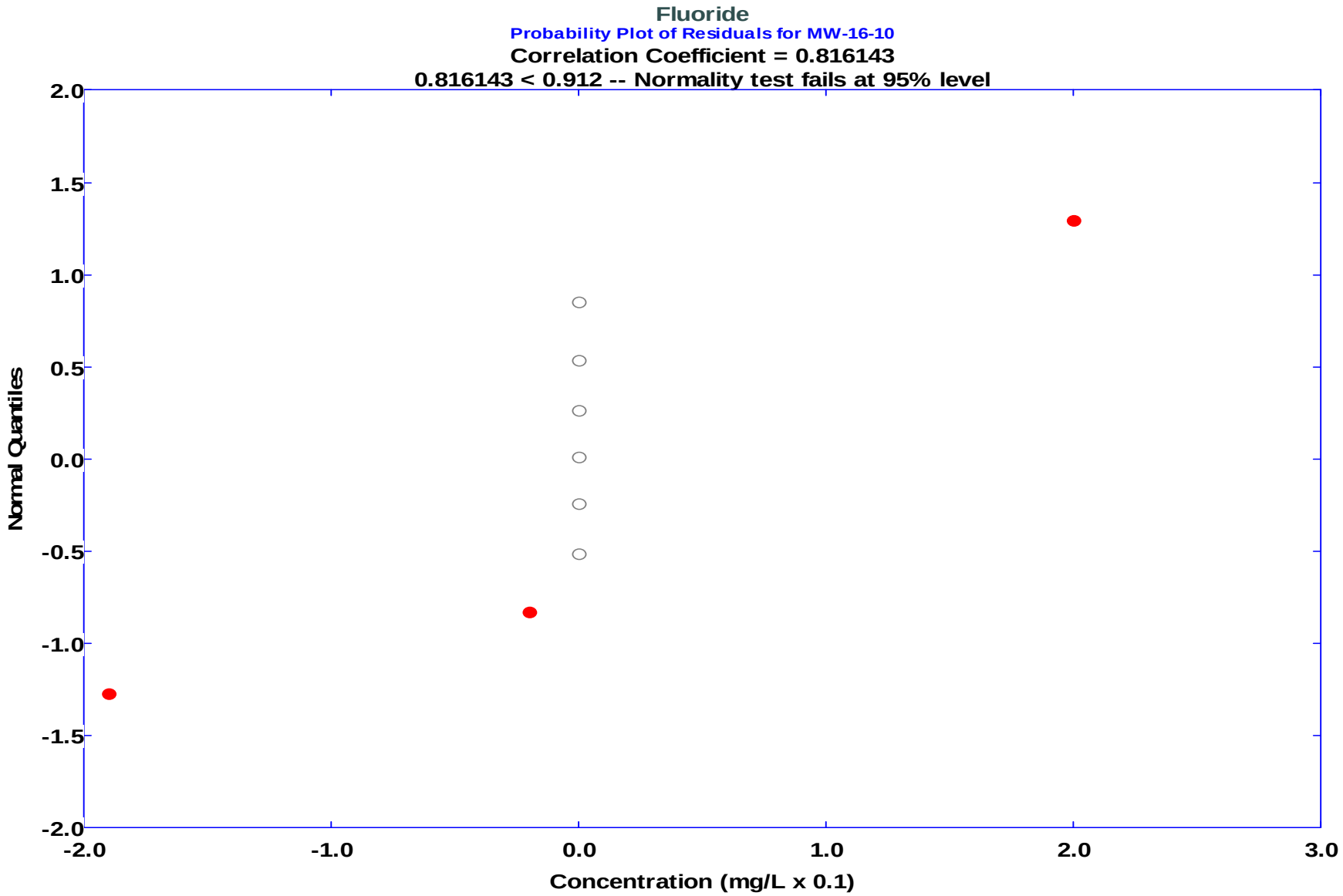
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017.



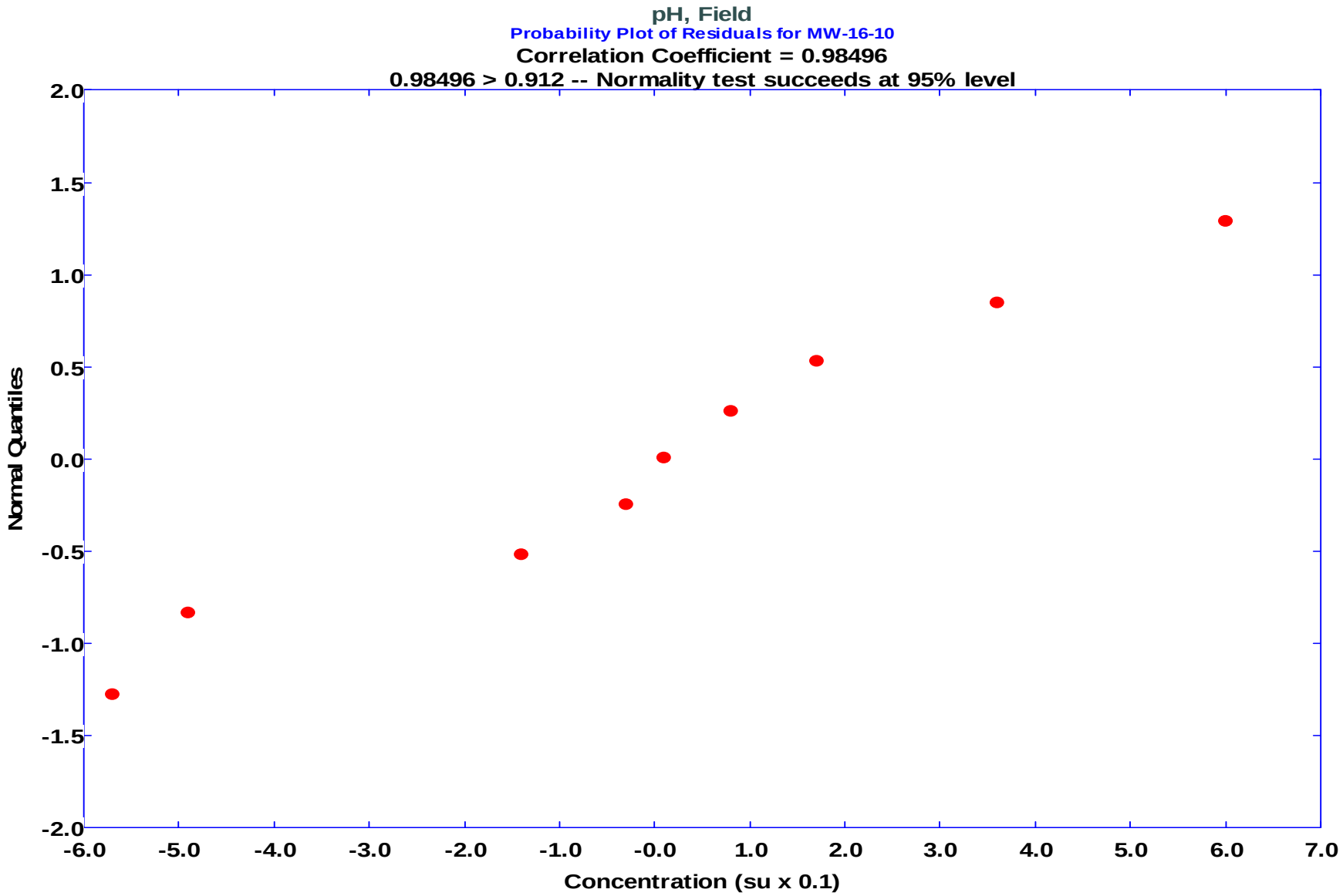
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017.



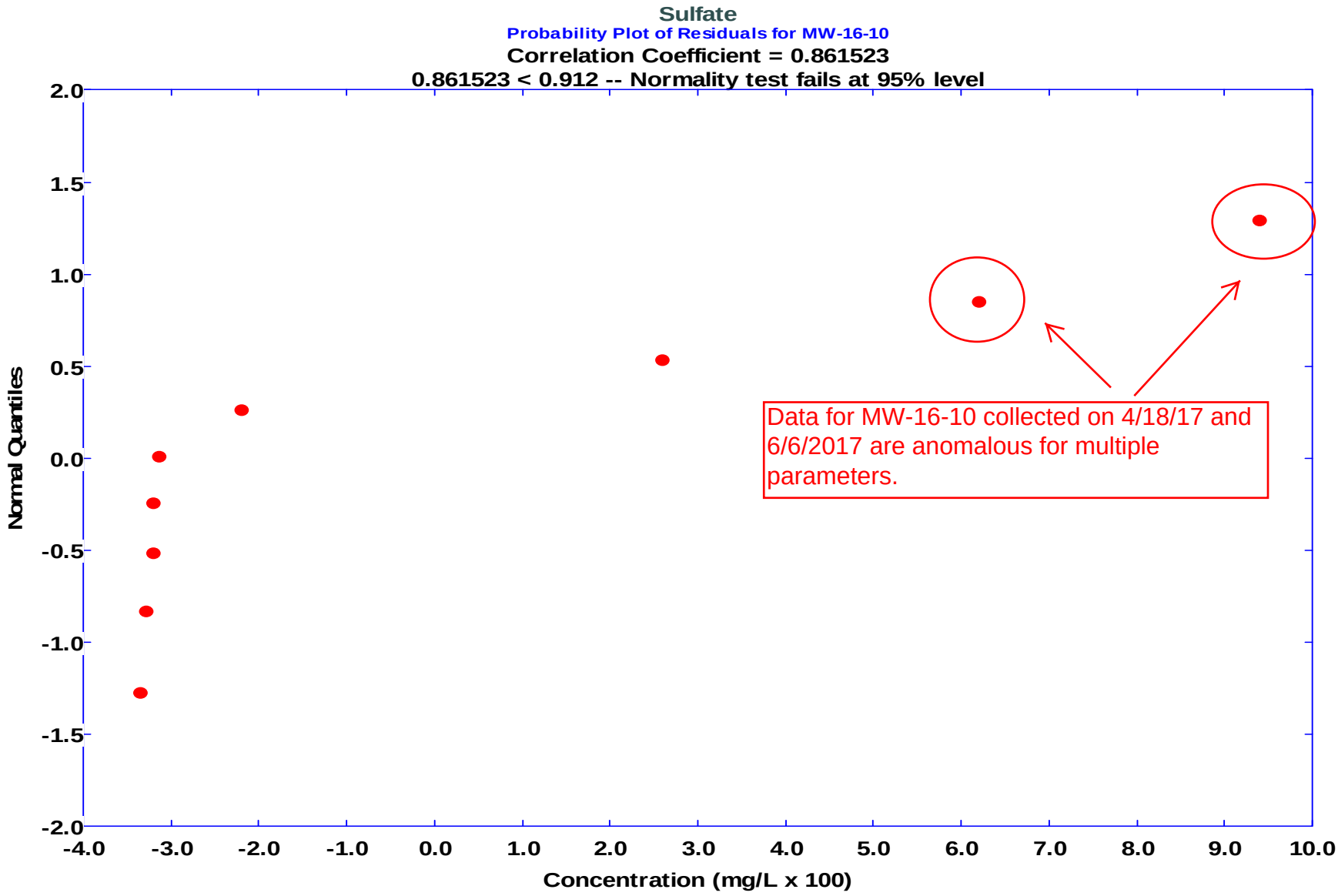
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017.



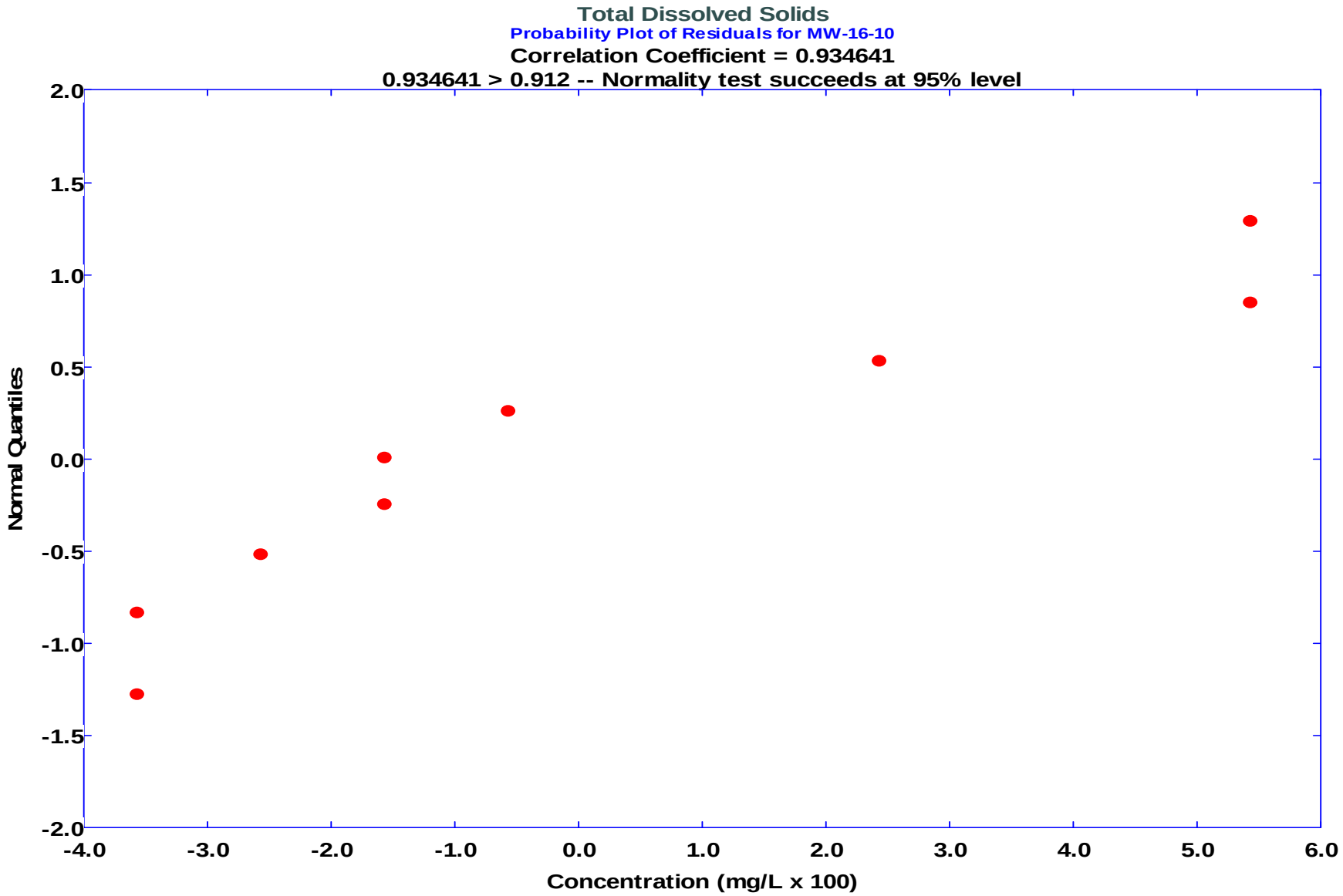
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017.



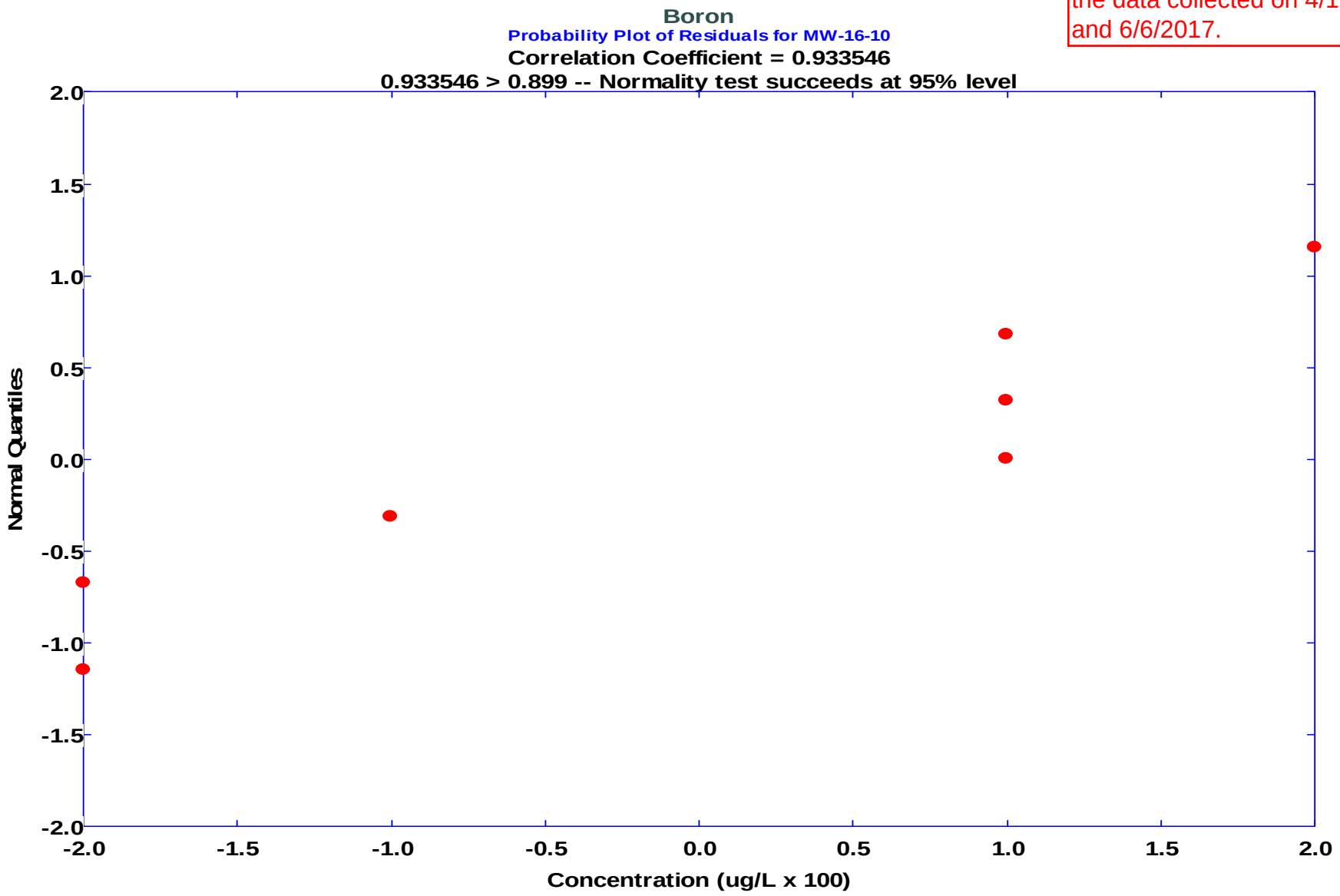
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017.



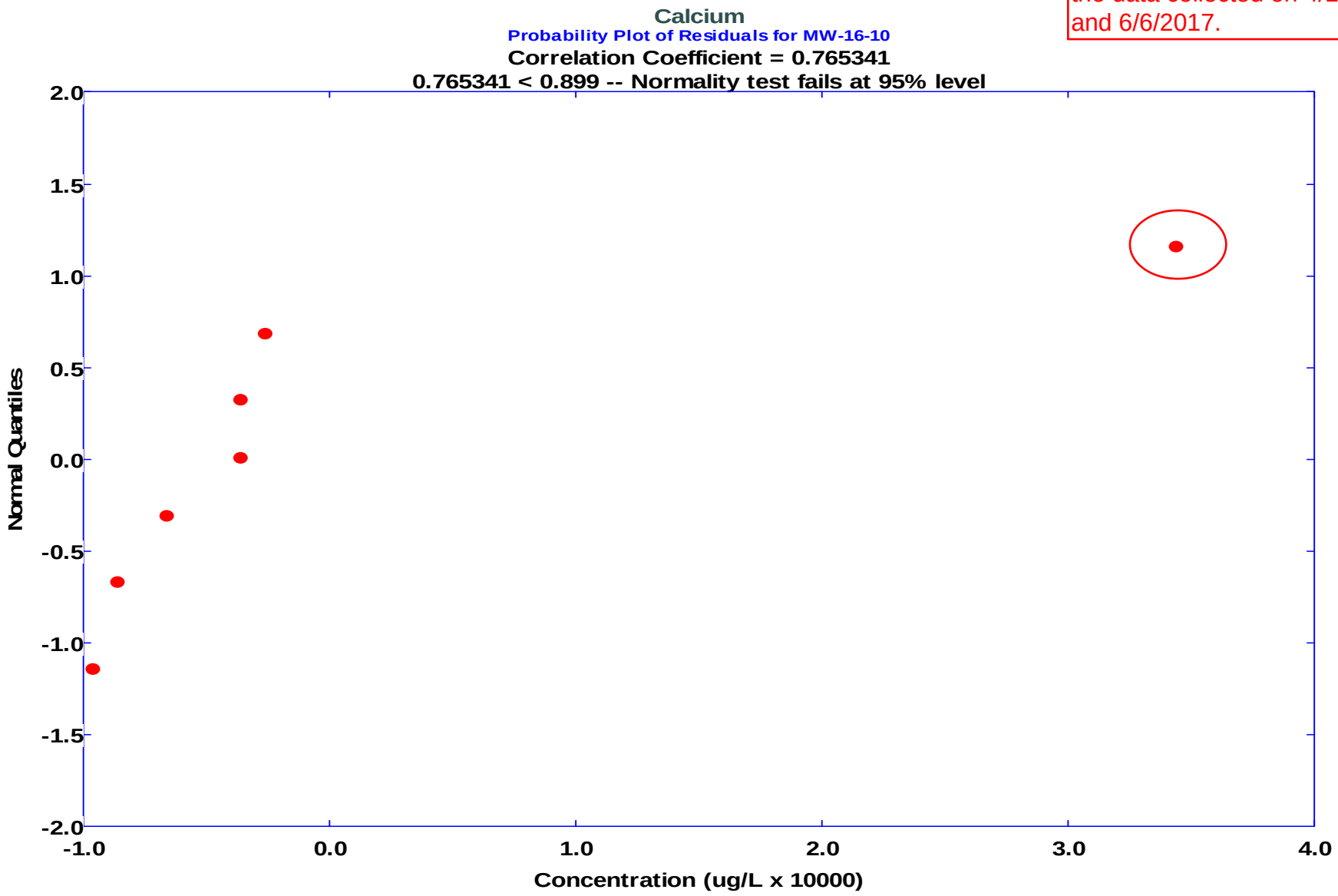
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017.



Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, and the data collected on 4/18/17 and 6/6/2017.

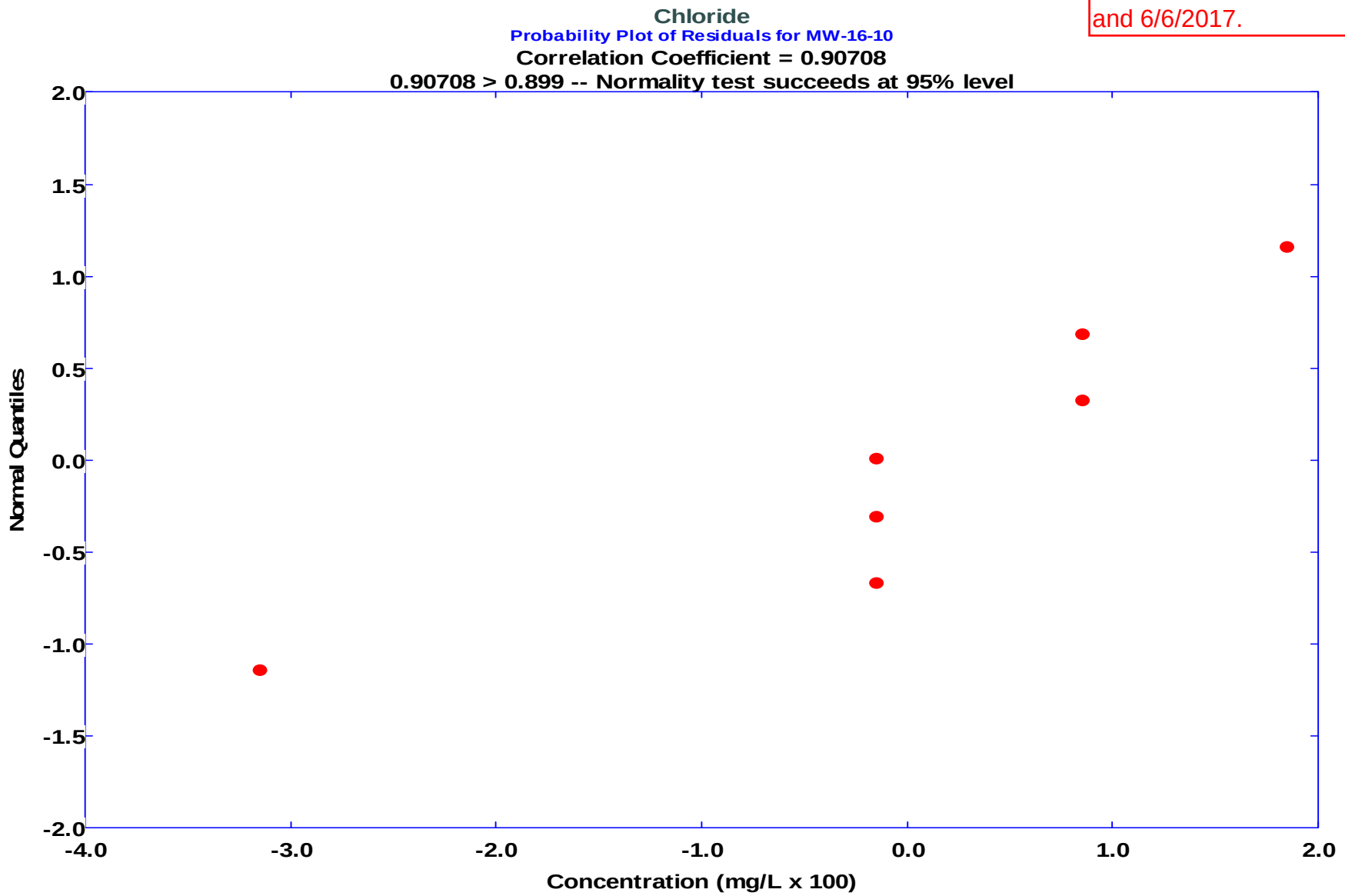


Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, and the data collected on 4/18/17 and 6/6/2017.

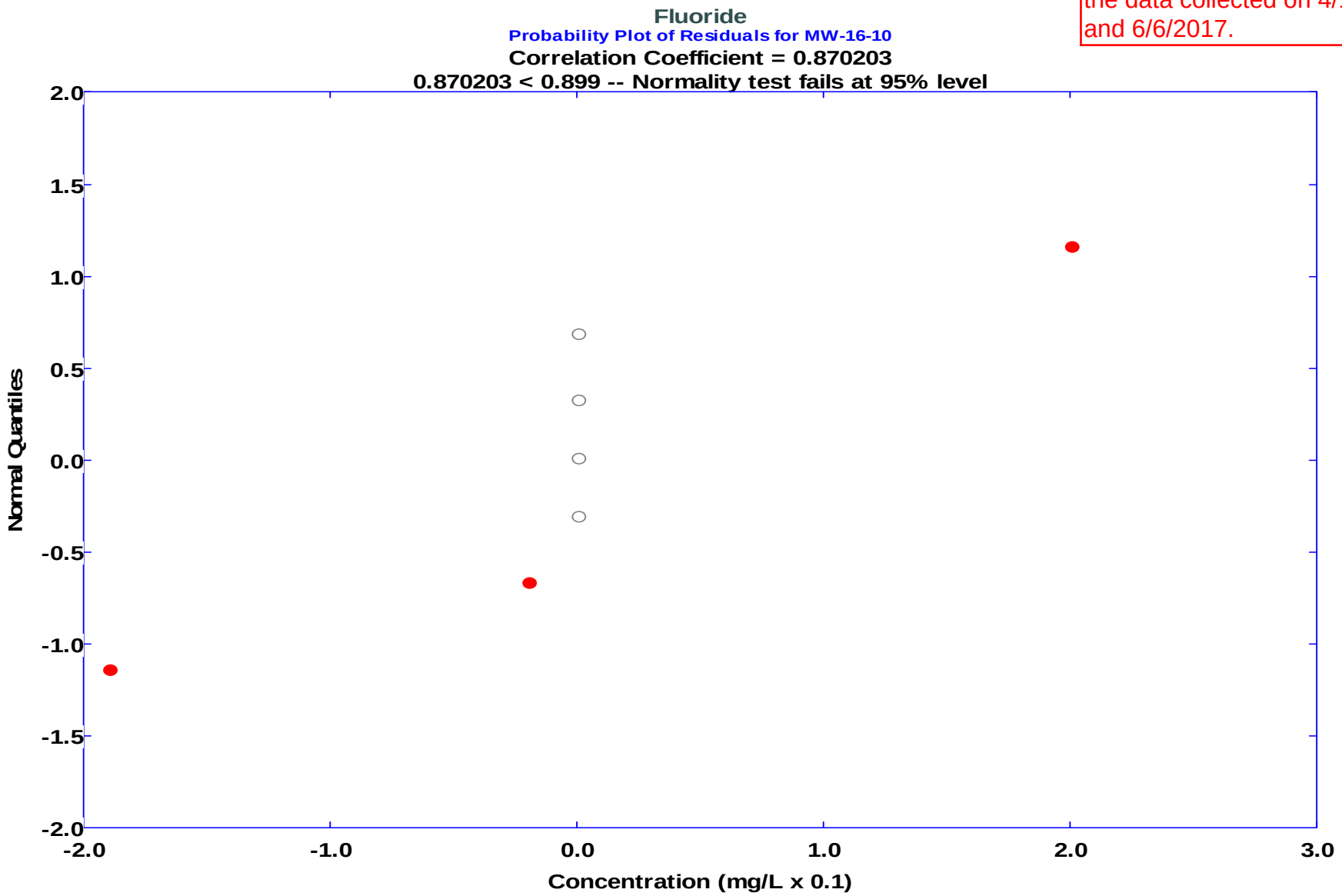


Calcium data for MW-16-10 collected on 2/28/17 is anomalous.

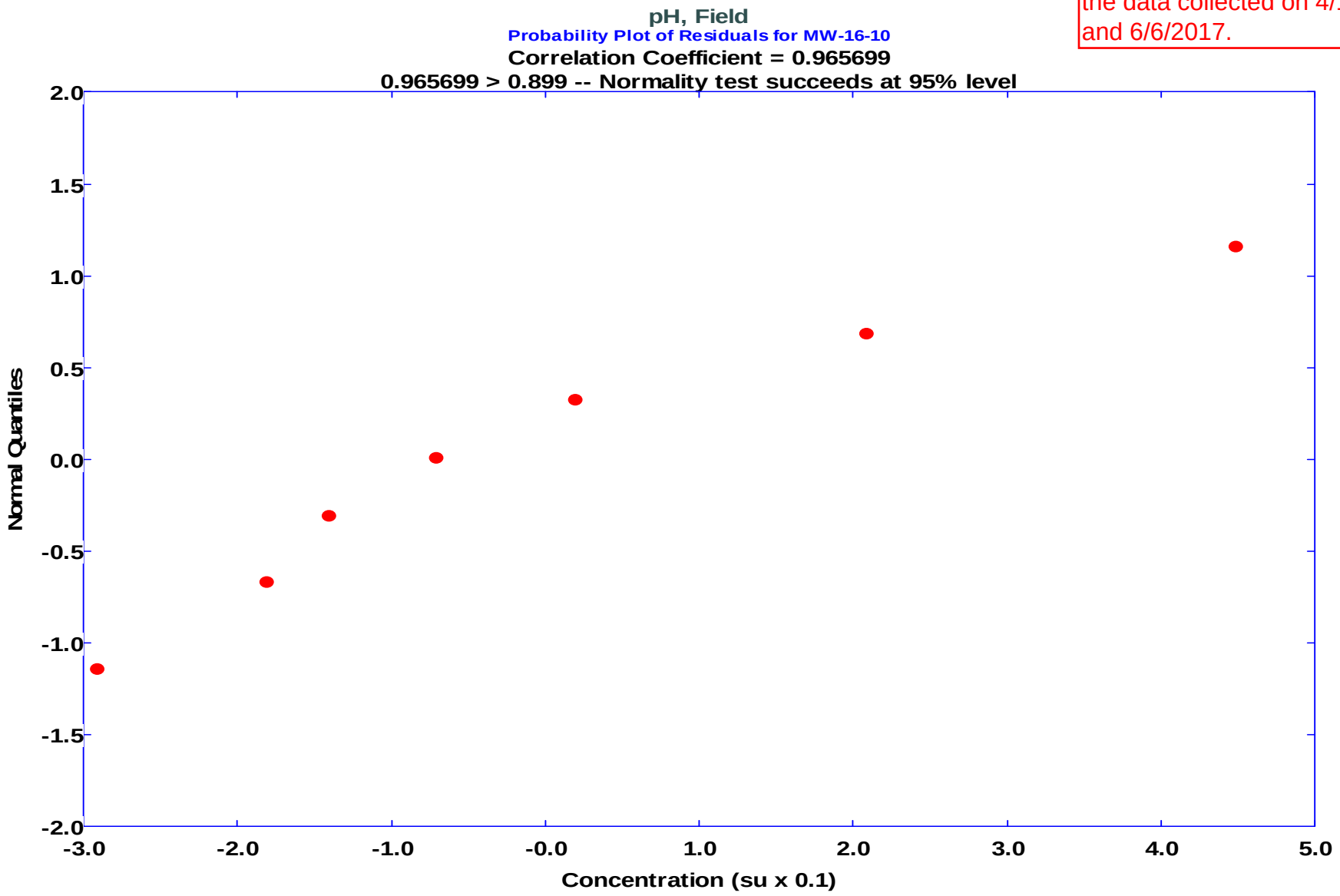
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, and the data collected on 4/18/17 and 6/6/2017.



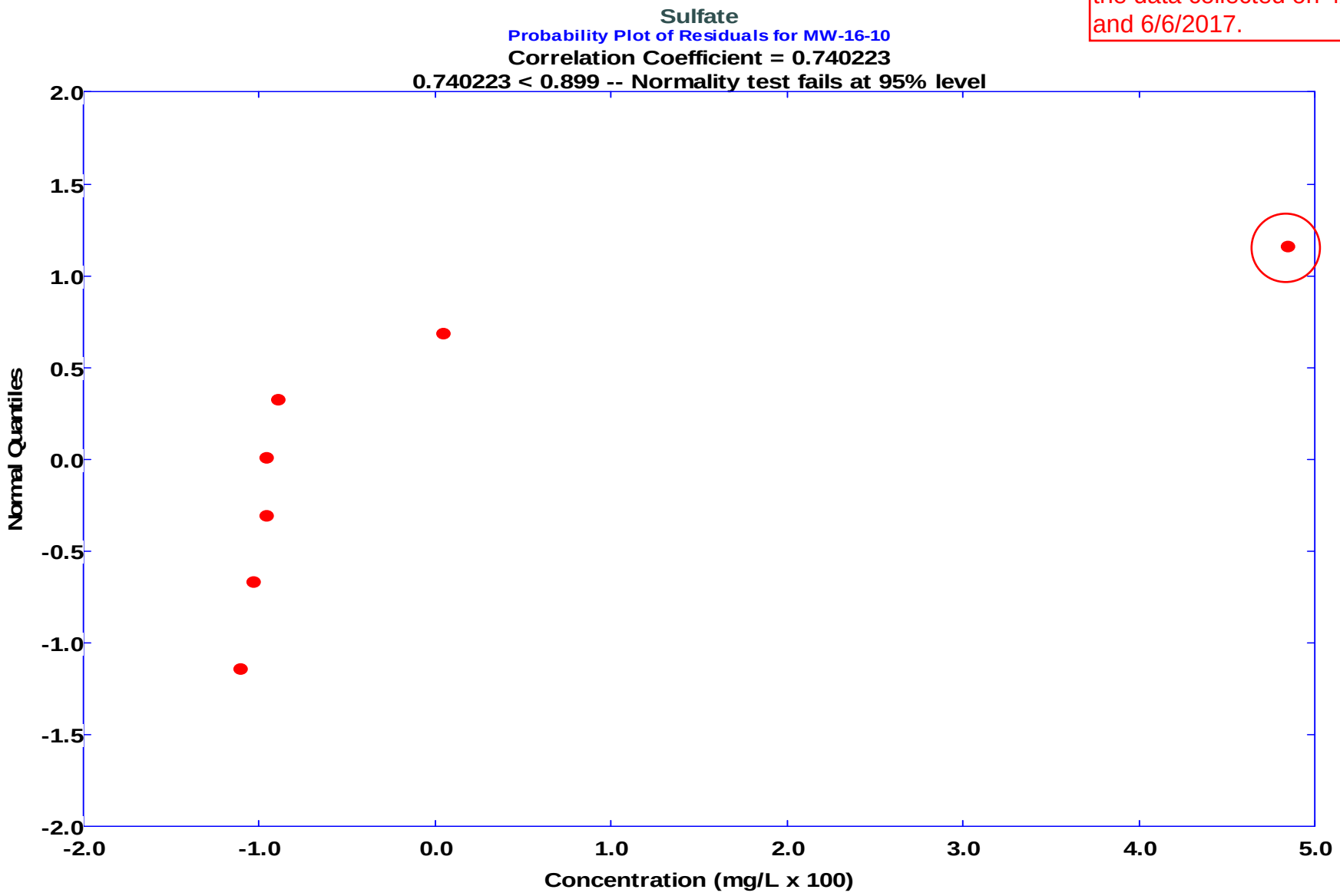
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, and the data collected on 4/18/17 and 6/6/2017.



Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, and the data collected on 4/18/17 and 6/6/2017.

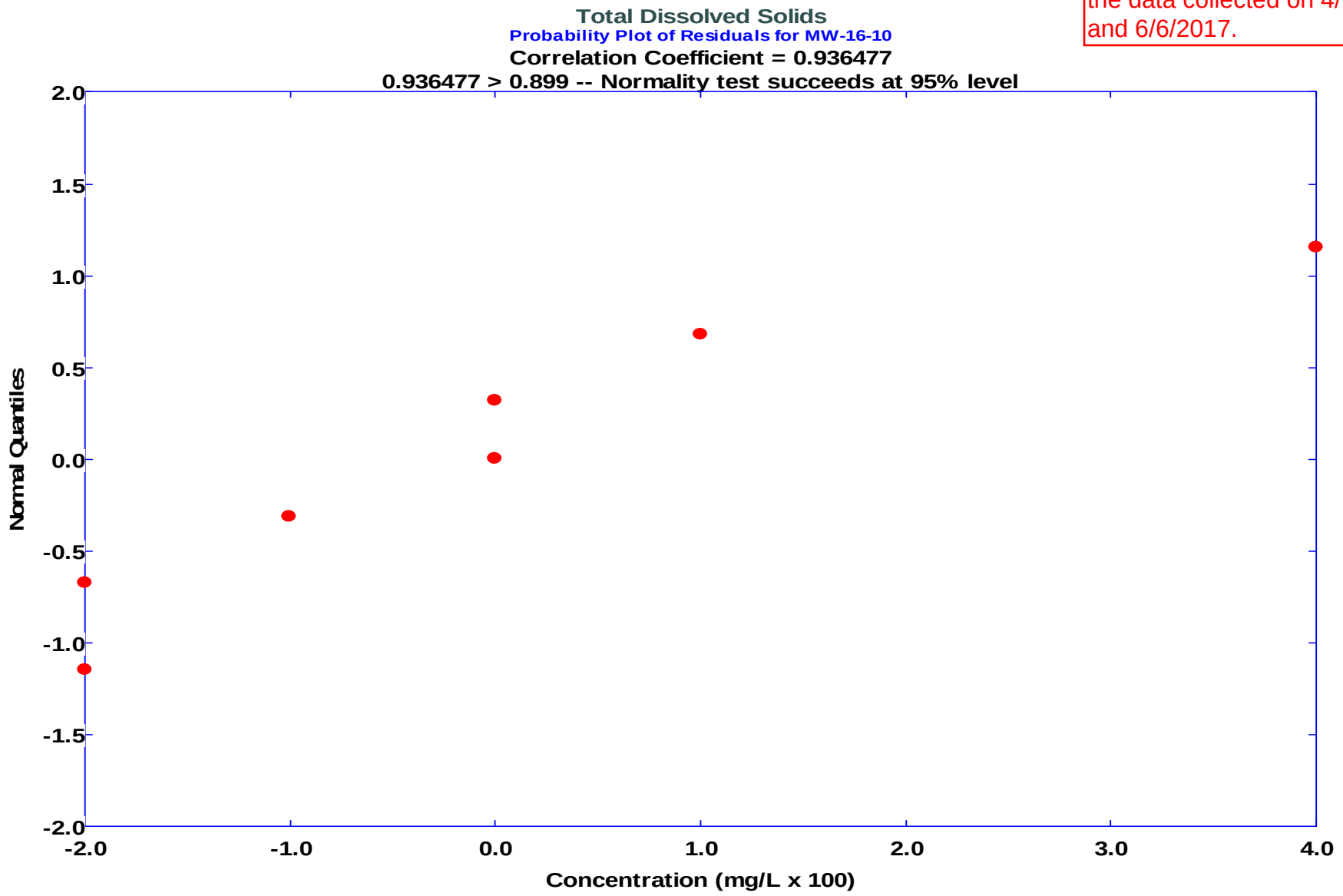


Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, and the data collected on 4/18/17 and 6/6/2017.

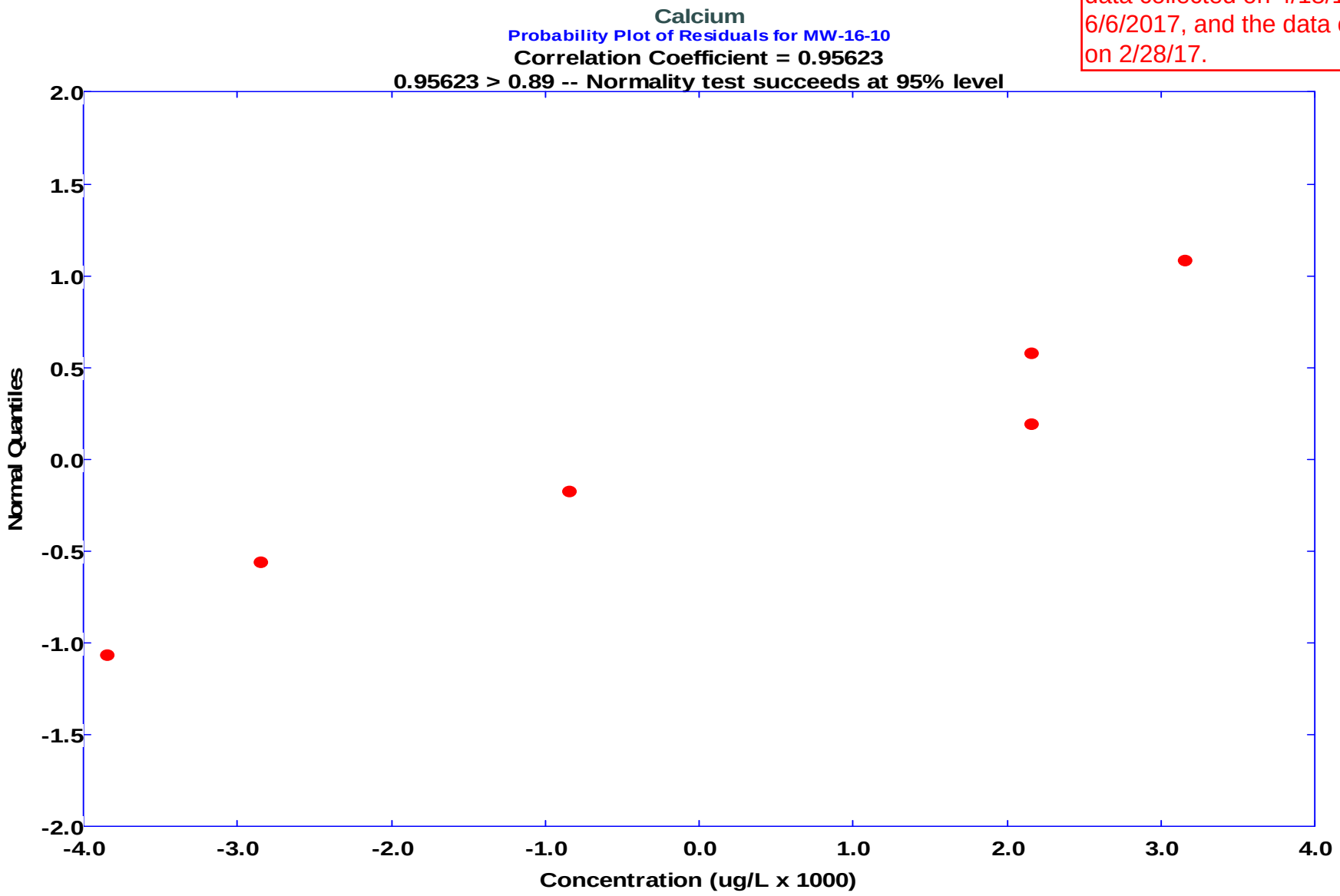


Sulfate data for MW-16-10 collected on 2/28/17 is anomalous.

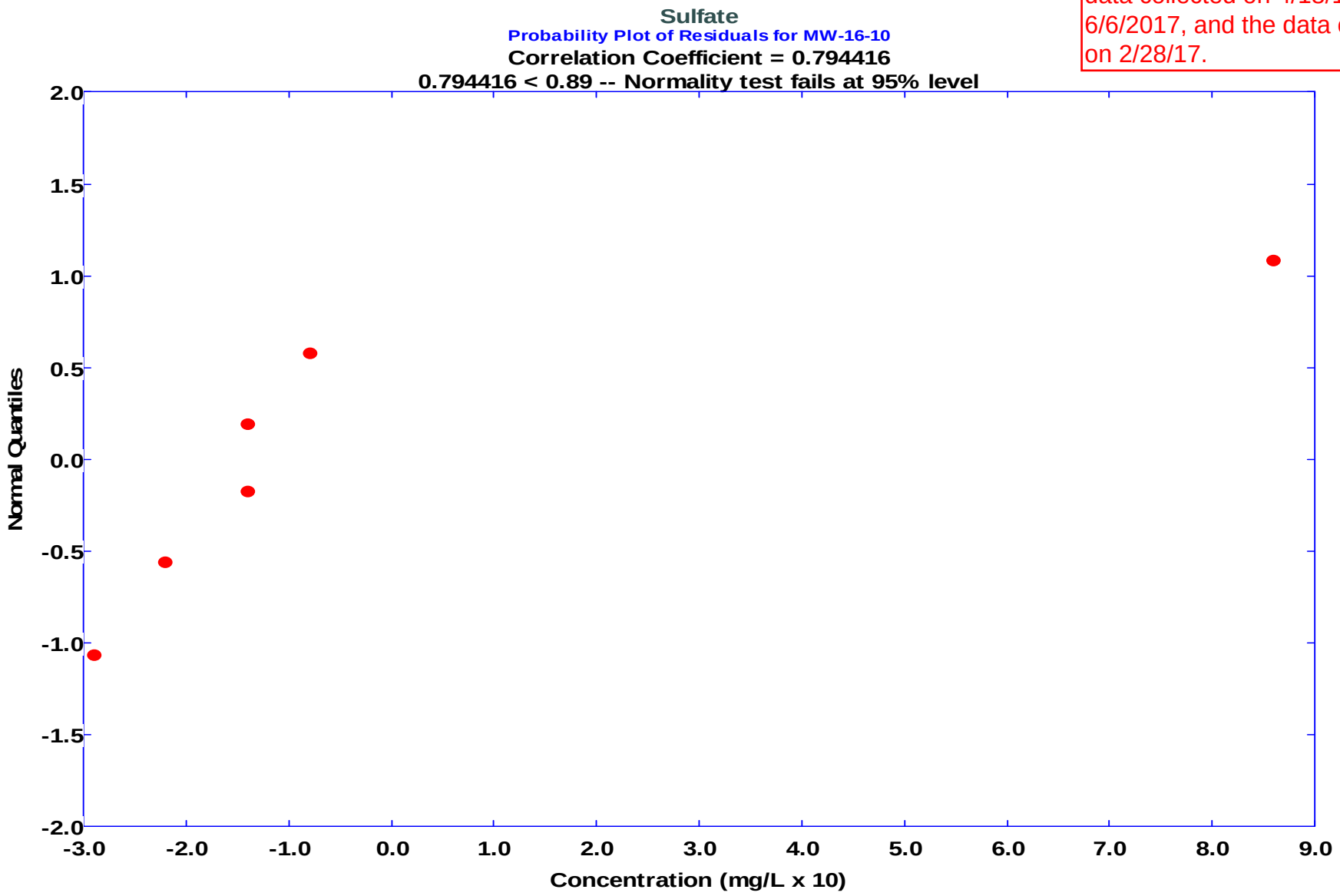
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, and the data collected on 4/18/17 and 6/6/2017.



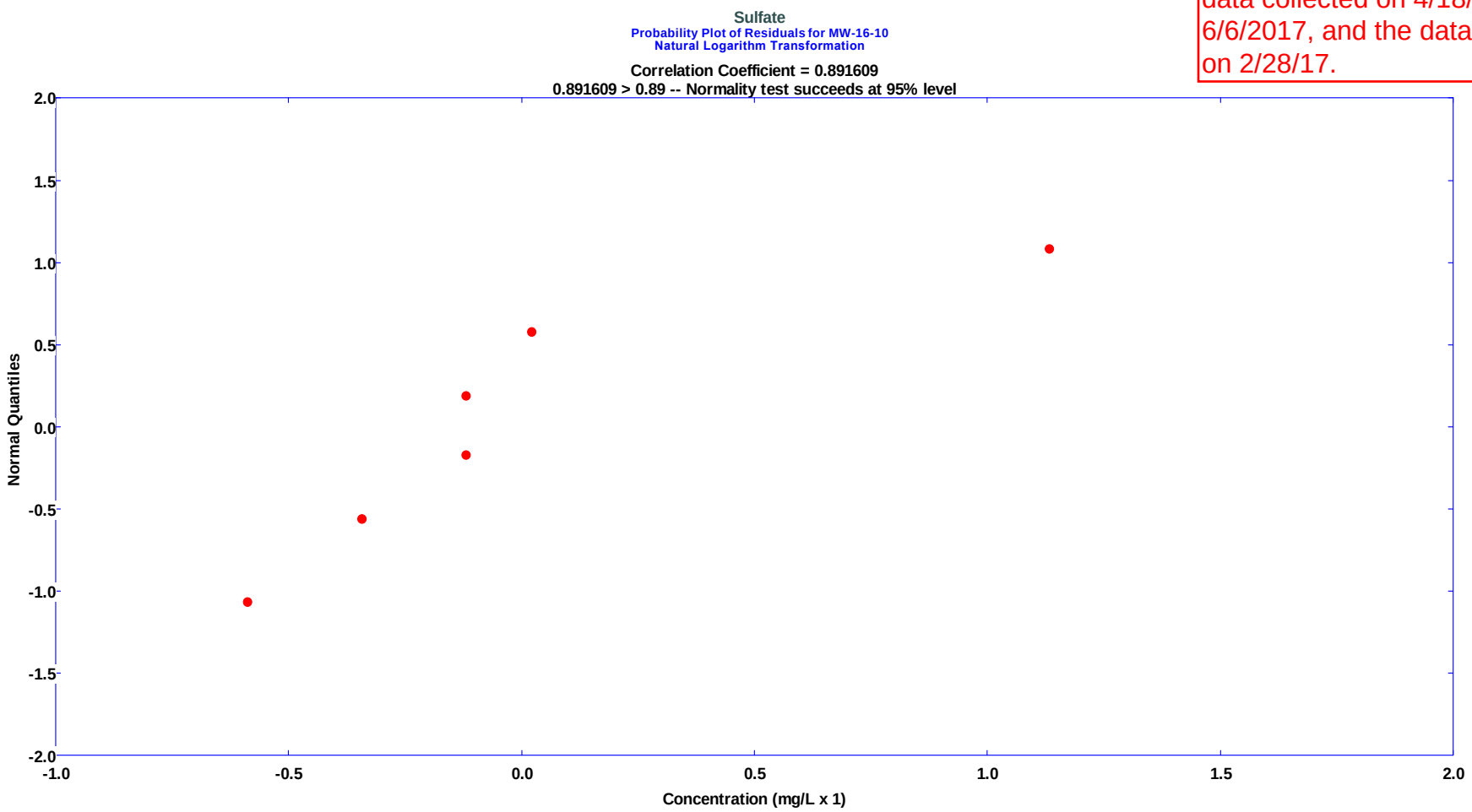
Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, the data collected on 4/18/17 and 6/6/2017, and the data collected on 2/28/17.



Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, the data collected on 4/18/17 and 6/6/2017, and the data collected on 2/28/17.



Probability plot after removal of data collected from MW-16-10 on 8/9/2017 and 8/30/2017, the data collected on 4/18/17 and 6/6/2017, and the data collected on 2/28/17.



Attachment C

ChemStat™ Prediction Limit Outputs

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-05
Parameter: Boron
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	1800
	9/20/2016	1700
	11/8/2016	1800
	1/9/2017	1800 B
	3/1/2017	1900
	4/18/2017	1900
	6/6/2017	1900 B
	7/25/2017	1800
	9/13/2017	1800

From 9 baseline samples
Baseline mean = 1822.22
Baseline std Dev = 66.6667

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/2/2017	1	1600	[0, 1952.9]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-06
Parameter: Boron
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	1900
	9/20/2016	1800
	11/9/2016	2100
	1/10/2017	1900 B
	2/28/2017	2000
	4/18/2017	2000
	6/6/2017	2000 B
	7/25/2017	2100
	9/14/2017	2000

From 9 baseline samples
Baseline mean = 1977.78
Baseline std Dev = 97.1825

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/2/2017	1	1800	[0, 2168.27]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-07
Parameter: Boron
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) = 9
Maximum Baseline Concentration = 2100
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/3/2016	2000
	9/22/2016	1700
	11/9/2016	2100
	1/10/2017	2100 B
	2/27/2017	2100
	4/18/2017	2100
	6/6/2017	2100 B
	7/25/2017	2000
	9/14/2017	2100

Date	Count	Mean	Significant
10/3/2017	1	1900	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-08
Parameter: Boron
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	2000
	9/19/2016	1900
	11/8/2016	2200
	1/10/2017	2100 B
	2/28/2017	2100
	4/18/2017	2100
	6/7/2017	2200 B
	7/25/2017	2000
	9/12/2017	1900

From 9 baseline samples
Baseline mean = 2055.56
Baseline std Dev = 113.039

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/4/2017	1	1700	[0, 2277.13]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-10
Parameter: Boron
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	1800
	9/19/2016	1900
	11/8/2016	2100
	1/11/2017	2100 B
	2/28/2017	1800
	7/26/2017	2100
	9/12/2017	2200

From 7 baseline samples
Baseline mean = 2000
Baseline std Dev = 163.299

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 7 (background observations) - 1
t(0.95, 7) = 1.94318

Date	Samples	Mean	Interval	Significant
10/4/2017	1	1900	[0, 2339.23]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-11/MW-16-11A
Parameter: Boron
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	1600
	9/22/2016	1600
	11/7/2016	1900
	1/11/2017	1800 B
	5/18/2017	1800
	6/6/2017	1800 B
	6/30/2017	1800 B
	7/25/2017	1900
	9/12/2017	1900

From 9 baseline samples
Baseline mean = 1788.89
Baseline std Dev = 116.667

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/4/2017	1	1700	[0, 2017.57]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-05
Parameter: Calcium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	69000
	9/20/2016	51000
	11/8/2016	55000
	1/9/2017	48000
	3/1/2017	36000
	4/18/2017	45000
	6/6/2017	39000
	7/25/2017	38000
	9/13/2017	45000

From 9 baseline samples
Baseline mean = 47333.3
Baseline std Dev = 10234.7

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/2/2017	1	36000	[0, 67394.8]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-06
Parameter: Calcium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	45000
	9/20/2016	40000
	11/9/2016	37000
	1/10/2017	40000
	2/28/2017	36000
	4/18/2017	34000
	6/6/2017	36000
	7/25/2017	40000
	9/14/2017	38000

From 9 baseline samples
Baseline mean = 38444.4
Baseline std Dev = 3244.65

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/2/2017	1	33000	[0, 44804.4]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-07
Parameter: Calcium
Natural Logarithm Transformation
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	11.6082
	9/22/2016	11.0349
	11/9/2016	11.2516
	1/10/2017	10.8198
	2/27/2017	11.0186
	4/18/2017	11.0021
	6/6/2017	10.8198
	7/25/2017	11.2385
	9/14/2017	10.9853

From 9 baseline samples
Baseline mean = 11.0865
Baseline std Dev = 0.247354

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/3/2017	1	10.9151	[0, 11.5714]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-08
Parameter: Calcium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	90000
	9/19/2016	91000
	11/8/2016	77000
	1/10/2017	66000
	2/28/2017	46000
	4/18/2017	59000
	6/7/2017	45000
	7/25/2017	60000
	9/12/2017	55000

From 9 baseline samples
Baseline mean = 65444.4
Baseline std Dev = 17198.2

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/4/2017	1	44000	[0, 99155.2]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-10
Parameter: Calcium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	31000
	9/19/2016	25000
	11/8/2016	24000
	1/11/2017	27000
	7/26/2017	30000
	9/12/2017	30000

From 6 baseline samples
Baseline mean = 27833.3
Baseline std Dev = 2926.89

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 6 (background observations) - 1
t(0.95, 6) = 2.01505

Date	Samples	Mean	Interval	Significant
10/4/2017	1	25000	[0, 34203.7]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-11/MW-16-11A
Parameter: Calcium
Natural Logarithm Transformation
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	10.5713
	9/22/2016	11.2385
	11/7/2016	10.0432
	1/11/2017	11.0186
	5/18/2017	10.4913
	6/6/2017	10.4631
	6/30/2017	10.5187
	7/25/2017	10.6454
	9/12/2017	10.6213

From 9 baseline samples
Baseline mean = 10.6235
Baseline std Dev = 0.340668

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/4/2017	1	10.4631	[0, 11.2913]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-05
Parameter: Chloride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	1500
	9/20/2016	1500
	11/8/2016	1500
	1/9/2017	1500
	3/1/2017	1500
	4/18/2017	1400
	6/6/2017	1600
	7/25/2017	1500
	9/13/2017	1500

From 9 baseline samples
Baseline mean = 1500
Baseline std Dev = 50

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/2/2017	1	1500	[0, 1598.01]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-06
Parameter: Chloride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	1600
	9/20/2016	1600
	11/9/2016	1700
	1/10/2017	1700
	2/28/2017	1600
	4/18/2017	1500
	6/6/2017	1700
	7/25/2017	1600
	9/14/2017	1600

From 9 baseline samples
Baseline mean = 1622.22
Baseline std Dev = 66.6667

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/2/2017	1	1700	[0, 1752.9]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-07
Parameter: Chloride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	1700
	9/22/2016	1800
	11/9/2016	1700
	1/10/2017	1800
	2/27/2017	1600
	4/18/2017	1600
	6/6/2017	1700
	7/25/2017	1700
	9/14/2017	1600

From 9 baseline samples
Baseline mean = 1688.89
Baseline std Dev = 78.1736

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/3/2017	1	1700	[0, 1842.12]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-08
Parameter: Chloride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	1800
	9/19/2016	1800
	11/8/2016	1900
	1/10/2017	2000
	2/28/2017	1800
	4/18/2017	1700
	6/7/2017	1800
	7/25/2017	1800
	9/12/2017	1800

From 9 baseline samples
Baseline mean = 1822.22
Baseline std Dev = 83.3333

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/4/2017	1	1900	[0, 1985.57]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-10
Parameter: Chloride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	1500
	9/19/2016	1500
	11/8/2016	1600
	1/11/2017	1700
	2/28/2017	1200
	7/26/2017	1500
	9/12/2017	1600

From 7 baseline samples
Baseline mean = 1514.29
Baseline std Dev = 157.359

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 7 (background observations) - 1
t(0.95, 7) = 1.94318

Date	Samples	Mean	Interval	Significant
10/4/2017	1	1600	[0, 1841.18]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-11/MW-16-11A
Parameter: Chloride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	1500
	9/22/2016	1700
	11/7/2016	1600
	1/11/2017	1600
	5/18/2017	1600
	6/6/2017	1500
	6/30/2017	1500
	7/25/2017	1600
	9/12/2017	1600

From 9 baseline samples
Baseline mean = 1577.78
Baseline std Dev = 66.6667

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/4/2017	1	1700	[0, 1708.45]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-05
Parameter: Fluoride
Original Data (Not Transformed)
Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 11.1111%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 9
Maximum Baseline Concentration = 1.3
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/3/2016	0.96
	9/20/2016	1.1
	11/8/2016	ND<0.5 U
	1/9/2017	1
	3/1/2017	1.1
	4/18/2017	1.1
	6/6/2017	1.2
	7/25/2017	1.1
	9/13/2017	1.3

Date	Count	Mean	Significant
10/2/2017	1	1.2	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-06
Parameter: Fluoride
Original Data (Not Transformed)
Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 11.1111%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 9
Maximum Baseline Concentration = 1.3
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/3/2016	0.94
	9/20/2016	1.1
	11/9/2016	ND<0.5 U
	1/10/2017	1
	2/28/2017	1.1
	4/18/2017	1.1
	6/6/2017	1.2
	7/25/2017	1.1
	9/14/2017	1.3

Date	Count	Mean	Significant
10/2/2017	1	1.2	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-07
Parameter: Fluoride
Original Data (Not Transformed)
Cohen's Adjustment

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	0.94
	9/22/2016	1.1
	11/9/2016	ND<1 U
	1/10/2017	0.97
	2/27/2017	1.1
	4/18/2017	1
	6/6/2017	1.1
	7/25/2017	ND<1 U
	9/14/2017	1.2

From 9 baseline samples
Baseline mean = 1.05857
Baseline std Dev = 0.0917294

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/3/2017	1	1.1	[0, 1.23837]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-08
Parameter: Fluoride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	1
	9/19/2016	1.1
	11/8/2016	1.1
	1/10/2017	1
	2/28/2017	1.1
	4/18/2017	1.1
	6/7/2017	1.2
	7/25/2017	1.1
	9/12/2017	1.3

From 9 baseline samples
Baseline mean = 1.11111
Baseline std Dev = 0.0927961

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/4/2017	1	1.2	[0, 1.293]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-10
Parameter: Fluoride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 44.4444%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 9
Maximum Baseline Concentration = 1.2
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/2/2016	0.81
	9/19/2016	0.98
	11/8/2016	ND<1 U
	1/11/2017	ND<1 U
	2/28/2017	ND<1 U
	7/26/2017	ND<1 U
	9/12/2017	1.2
	10/4/2017	1.1

Date	Count	Mean	Significant
10/4/2017	1	1.1	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-11/MW-16-11A
Parameter: Fluoride
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 66.6667%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 9
Maximum Baseline Concentration = 1
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/2/2016	0.85
	9/22/2016	0.95
	11/7/2016	ND<1 U
	1/11/2017	ND<1 U
	5/18/2017	ND<1 U
	6/6/2017	ND<1 U
	6/30/2017	ND<1 U
	7/25/2017	ND<1 UF1
	9/12/2017	1

Date	Count	Mean	Significant
10/4/2017	1	1	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-05
Parameter: pH, Field
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) = 9
Maximum Baseline Concentration = 8.47 **Minimum Baseline Concentration = 7.92**
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/3/2016	8.07
	9/20/2016	8.47
	11/8/2016	8.14
	1/9/2017	7.95
	3/1/2017	8.1
	4/18/2017	8.02
	6/6/2017	7.92
	7/25/2017	7.94
	9/13/2017	7.92

Date	Count	Mean	Significant
10/2/2017	1	7.95	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-06
Parameter: pH, Field
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% Two-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	8.02
	9/20/2016	8.12
	11/9/2016	8.07
	1/10/2017	7.71
	2/28/2017	8.11
	4/18/2017	7.97
	6/6/2017	7.73
	7/25/2017	7.97
	9/14/2017	7.7

From 9 baseline samples
Baseline mean = 7.93333
Baseline std Dev = 0.173421

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 97.5 %
t is Percentile of Student's T-Test (0.95/1/2) = 0.975
Degrees of Freedom = 9 (background observations) - 1
t(0.975, 9) = 2.30601

Date	Samples	Mean	Interval	Significant
10/2/2017	1	7.86	[7.51, 8.35]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-07
Parameter: pH, Field
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% Two-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	8.04
	9/22/2016	8.29
	11/9/2016	8.09
	1/10/2017	7.81
	2/27/2017	8.1
	4/18/2017	8
	6/6/2017	8
	7/25/2017	7.91
	9/14/2017	7.88

From 9 baseline samples
Baseline mean = 8.01333
Baseline std Dev = 0.141774

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 97.5 %
t is Percentile of Student's T-Test (0.95/1/2) = 0.975
Degrees of Freedom = 9 (background observations) - 1
t(0.975, 9) = 2.30601

Date	Samples	Mean	Interval	Significant
10/3/2017	1	7.99	[7.67, 8.36]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-08
Parameter: pH, Field
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% Two-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	8.04
	9/19/2016	8.16
	11/8/2016	7.81
	1/10/2017	7.64
	2/28/2017	8.07
	4/18/2017	7.84
	6/7/2017	7.8
	7/25/2017	7.91
	9/12/2017	7.94

From 9 baseline samples
Baseline mean = 7.91222
Baseline std Dev = 0.160373

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 97.5 %
t is Percentile of Student's T-Test (0.95/1/2) = 0.975
Degrees of Freedom = 9 (background observations) - 1
t(0.975, 9) = 2.30601

Date	Samples	Mean	Interval	Significant
10/4/2017	1	7.86	[7.52, 8.3]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-10
Parameter: pH, Field
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% Two-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	8.35
	9/19/2016	8.59
	11/8/2016	8.16
	1/11/2017	7.96
	2/28/2017	7.85
	7/25/2017	8
	9/12/2017	8.07

From 7 baseline samples
Baseline mean = 8.14
Baseline std Dev = 0.254296

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 97.5 %
t is Percentile of Student's T-Test (0.95/1/2) = 0.975
Degrees of Freedom = 7 (background observations) - 1
t(0.975, 7) = 2.44691

Date	Samples	Mean	Interval	Significant
10/4/2017	1	8.11	[7.47, 8.81]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-11/MW-16-11A
Parameter: pH, Field
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% Two-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	8.19
	9/22/2016	8.35
	11/7/2016	7.91
	1/11/2017	7.7
	5/18/2017	8.28
	6/6/2017	8.11
	6/30/2017	8
	7/25/2017	8.08
	9/12/2017	8.03

From 9 baseline samples
Baseline mean = 8.07222
Baseline std Dev = 0.196073

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1)/2 = 97.5 %
t is Percentile of Student's T-Test (0.95/1/2) = 0.975
Degrees of Freedom = 9 (background observations) - 1
t(0.975, 9) = 2.30601

Date	Samples	Mean	Interval	Significant
10/4/2017	1	8.01	[7.6, 8.55]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-05
Parameter: Sulfate
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 66.6667%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 9
Maximum Baseline Concentration = 20
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/3/2016	8.3
	9/20/2016	ND<1 U
	11/8/2016	ND<20 U
	1/9/2017	ND<5 U
	3/1/2017	ND<20 U
	4/18/2017	ND<20 U
	6/6/2017	11
	7/25/2017	ND<20 U
	9/13/2017	7.6

Date	Count	Mean	Significant
10/2/2017	1	8.9	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-06
Parameter: Sulfate
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 55.5556%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 9
Maximum Baseline Concentration = 20
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/3/2016	13
	9/20/2016	4.4
	11/9/2016	ND<20 U
	1/10/2017	ND<5 U
	2/28/2017	ND<20 U
	4/18/2017	ND<20 U
	6/6/2017	7
	7/25/2017	ND<20 U
	9/14/2017	4.9

Date	Count	Mean	Significant
10/2/2017	1	6.4	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-07
Parameter: Sulfate
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	75
	9/22/2016	67
	11/9/2016	63
	1/10/2017	56
	2/27/2017	73
	4/18/2017	74
	6/6/2017	81
	7/25/2017	95
	9/14/2017	88

From 9 baseline samples
Baseline mean = 74.6667
Baseline std Dev = 12.1347

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/3/2017	1	100	[0, 98.4523]	TRUE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-08
Parameter: Sulfate
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 55.5556%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 9
Maximum Baseline Concentration = 23
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/3/2016	23
	9/19/2016	3.7
	11/8/2016	ND<20 U
	1/10/2017	ND<5 U
	2/28/2017	ND<20 U
	4/18/2017	ND<20 U
	6/7/2017	10
	7/25/2017	ND<20 U
	9/12/2017	2.4

Date	Count	Mean	Significant
10/4/2017	1	2.5	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-10
Parameter: Sulfate
Natural Logarithm Transformation
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	3.68888
	9/19/2016	3.21888
	11/8/2016	3.46574
	1/11/2017	3.82864
	7/26/2017	4.94164
	9/12/2017	3.68888

From 6 baseline samples
Baseline mean = 3.80544
Baseline std Dev = 0.596343

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 6 (background observations) - 1
t(0.95, 6) = 2.01505

Date	Samples	Mean	Interval	Significant
10/4/2017	1	3.46574	[0, 5.10338]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-11/MW-16-11A
Parameter: Sulfate
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 77.7778%
Future Samples (k) = 1
Recent Dates = 1
Baseline Measurements (n) = 9
Maximum Baseline Concentration = 20
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/2/2016	19
	9/22/2016	ND<10 U
	11/7/2016	ND<20 U
	1/11/2017	ND<20 U
	5/18/2017	ND<20 U
	6/6/2017	ND<20 U
	6/30/2017	ND<20 U
	7/25/2017	ND<20 U
	9/12/2017	2.8

Date	Count	Mean	Significant
10/4/2017	1	2.5	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-05
Parameter: Total Dissolved Solids
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	2600
	9/20/2016	2400
	11/8/2016	2500
	1/9/2017	2700
	3/1/2017	2400
	4/18/2017	2500
	6/6/2017	2500
	7/25/2017	2600
	9/13/2017	2400

From 9 baseline samples
Baseline mean = 2511.11
Baseline std Dev = 105.409

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/2/2017	1	2400	[0, 2717.73]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-06
Parameter: Total Dissolved Solids
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	2500
	9/20/2016	2600
	11/9/2016	2500
	1/10/2017	3100
	2/28/2017	2700
	4/18/2017	2600
	6/6/2017	2700
	7/25/2017	2800
	9/14/2017	2600

From 9 baseline samples
Baseline mean = 2677.78
Baseline std Dev = 185.592

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/2/2017	1	2700	[0, 3041.56]	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-16-07
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) = 9
Maximum Baseline Concentration = 3400
Confidence Level = 90%
False Positive Rate = 10%

Baseline Measurements	Date	Value
	8/3/2016	2800
	9/22/2016	2900
	11/9/2016	2800
	1/10/2017	3400
	2/27/2017	2900
	4/18/2017	3000
	6/6/2017	2900
	7/25/2017	2700
	9/14/2017	2800

Date	Count	Mean	Significant
10/3/2017	1	2900	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-08
Parameter: Total Dissolved Solids
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/3/2016	2800
	9/19/2016	2900
	11/8/2016	3000
	1/10/2017	3200
	2/28/2017	3100
	4/18/2017	3000
	6/7/2017	2900
	7/25/2017	2900
	9/12/2017	2900

From 9 baseline samples
Baseline mean = 2966.67
Baseline std Dev = 122.474

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/4/2017	1	3000	[0, 3206.73]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-10
Parameter: Total Dissolved Solids
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	2500
	9/19/2016	2500
	11/8/2016	2600
	1/11/2017	2800
	2/28/2017	3100
	7/26/2017	2700
	9/12/2017	2700

From 7 baseline samples
Baseline mean = 2700
Baseline std Dev = 208.167

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 7 (background observations) - 1
t(0.95, 7) = 1.94318

Date	Samples	Mean	Interval	Significant
10/4/2017	1	2800	[0, 3132.43]	FALSE

Parametric Prediction Interval Analysis

Intra-Well Comparison for MW-16-11/MW-16-11A
Parameter: Total Dissolved Solids
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well Unified Guid. Formula 95% One-Sided Comparison

Baseline Samples	Date	Result
	8/2/2016	2400
	9/22/2016	2500
	11/7/2016	2700
	1/11/2017	3000
	5/18/2017	2500
	6/6/2017	2600
	6/30/2017	2400
	7/25/2017	2600
	9/12/2017	2900

From 9 baseline samples
Baseline mean = 2622.22
Baseline std Dev = 210.819

For 1 recent sampling event(s)
Actual confidence level is 1.0 - (0.05/1) = 95 %
t is Percentile of Student's T-Test (0.95/1) = 0.95
Degrees of Freedom = 9 (background observations) - 1
t(0.95, 9) = 1.85955

Date	Samples	Mean	Interval	Significant
10/4/2017	1	2800	[0, 3035.46]	FALSE