2020 Annual Groundwater Monitoring Report

Belle River Power Plant Diversion Basin
4505 King Road
China Township, Michigan

January 2021

Prepared For:

DTE Electric Company

Prepared By:

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Executive Summary

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended. The CCR Rule, which became effective on October 19, 2015 (with amendments in 2018 and 2020), applies to the DTE Electric Company (DTE Electric) Belle River Power Plant (BRPP) 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). On behalf of DTE Electric, TRC Engineers Michigan, Inc., the engineering entity of TRC, has prepared this Annual Groundwater Monitoring Report for calendar year 2020 activities at the BRPP DB CCR unit.

DTE Electric remained in detection monitoring at the BRPP DB CCR unit in 2020.The semiannual detection monitoring events for 2020 were completed in March and September 2020 and included sampling and analyzing groundwater within the groundwater monitoring system for the indicator parameters listed in Appendix III to the CCR Rule. 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. Detection monitoring data that has been collected and evaluated in 2020 are presented in this report.

No SSIs were recorded for the 2020 monitoring period and detection monitoring will be continued at the BRPP DB CCR unit in accordance with §257.94.

1.0 Introduction

1.1 Program Summary

On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule), as amended. The CCR Rule, which became effective on October 19, 2015 (with amendments in 2018 and 2020), 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). On behalf of DTE Electric, TRC Engineers Michigan, Inc., the engineering entity of TRC Environmental Corporation (TRC), has prepared this Annual Groundwater Monitoring Report for calendar year 2020 activities at the BRPP DB CCR unit (2020 Annual Report).

This 2020 Annual Report presents the monitoring results and the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule) for the March and September 2020 semiannual groundwater monitoring events for the BRPP DB CCR unit. Detection monitoring continued to be 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 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 has been in use by the BRPP since it began operation and has collected CCR bottom ash that is periodically cleaned out and either sold for beneficial reuse or disposed of at the Range Road Landfill (RRLF).

The DB is an incised CCR surface impoundment located east of the BRPP. 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 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.

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 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.

2.0 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. 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). The monitoring well locations are shown on Figure 2.

2.2 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.

2.2.1 Data Summary

The first semiannual groundwater detection monitoring event for 2020 was performed during March 17 through 19, 2020 by TRC personnel and samples were analyzed by Eurofins TestAmerica (Eurofins) 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 March 2020 event is provided on Table 1 (static groundwater elevation data), Table 2 (field data), and Table 3 (analytical results).

The second semiannual groundwater detection monitoring event for 2020 was performed during September 14 and 16, 2020 by TRC personnel and samples were analyzed by Eurofins 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 September 2020 event is provided on Table 1 (static groundwater elevation data), Table 2 (field data), and Table 4 (analytical results).

2.2.2 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. Data quality reviews are summarized in Appendix A.

2.2.3 Groundwater Flow Rate and Direction

The general flow rate and direction from both groundwater monitoring events are similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells are appropriately positioned to detect the presence of Appendix III parameters that could potentially migrate from the BRPP DB CCR unit. Groundwater elevation data collected during the March and September 2020 sampling events show that groundwater within the uppermost aquifer generally flows to the west-northwest across the BRPP DB, consistent with previous events. Groundwater potentiometric surface elevations measured across the BRPP DB during the March and September 2020 sampling events are provided on Table 1 and were used to construct the groundwater potentiometric surface maps shown on Figures 3 and 4, respectively.

The average hydraulic gradient throughout the BRPP DB during both of the 2020 semiannual events is estimated at approximately 0.003 ft/ft, resulting in an estimated average groundwater flow velocity of approximately 0.002 ft/day or 0.6 ft/year 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, 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.

3.0 Statistical Evaluation

3.1 Establishing Background Limits

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 downgradient well doubles as a 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.

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 the 2017 Annual Report. 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 – First 2020 Semiannual Event (March 2020)

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 of the March 2020 monitoring event data to background limits are presented in Table 3. The statistical evaluation of the March 2020 Appendix III indicator parameters data shows that there were no concentrations above background limits for any Appendix III indicator parameter during the first semiannual 2020 detection monitoring event.

3.3 Data Comparison to Background Limits – Second 2020 Semiannual Event (September 2020)

As done for the March 2020 analytical data, 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.

The comparisons of the September 2020 monitoring event data to background limits are presented in Table 4. The statistical evaluation of the September 2020 Appendix III indicator parameter data showed potential initial SSIs over background for:

- Chloride at MW-16-08 and MW-16-11A

There were no exceedances compared to background for calcium, fluoride, pH, boron, fluoride, sulfate or TDS.

3.4 Verification Resampling for the Second Semiannual Event

Verification resampling is performed per the Stats Plan and the *USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA, 2009) (Unified Guidance), to achieve performance standards as specified by §257.93(g) in the CCR rules. Per the Stats Plan, if there is an exceedance of a prediction limit for one or more of the parameters, the well(s) of concern will be resampled within 30 days of the completion of the initial statistical analysis. Constituents that have been addressed by an alternative source demonstration (ASD) will not be analyzed for verification purposes.

Verification resampling for the September 2020 event was conducted on November 17, 2020, by TRC personnel, in accordance with the QAPP. A summary of the groundwater data collected during the verification resampling event is provided on Table 4. The associated data quality review is included in Appendix A.

The chloride verification results are below the prediction limits in both monitoring wells and no SSI will be recorded from the September 2020 detection monitoring event in accordance with the Stats Plan and the Unified Guidance. As such, detection monitoring will be continued in accordance with §257.94 of the CCR Rule.

4.0 Conclusions and Recommendations

Potential SSIs were noted for chloride at MW-16-08 and MW-16-11A during the September 2020 monitoring event. This potential SSI was not statistically significant (i.e. verification sampling did not confirm the exceedance). Therefore, no SSIs were recorded for the 2020 monitoring period and detection monitoring will be continued at the BRPP DB CCR unit in accordance with §257.94. 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, there is no reasonable probability for the uppermost aquifer to have been affected by CCR from operations.

No corrective actions were performed in 2020. The next semiannual monitoring event is scheduled for the second calendar quarter of 2021.

5.0 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, 2021	
Company: TRC Engineers Michigan, Inc.	Date: January 29, 2021	

6.0 References

TRC. 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. 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. 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.

TRC. January 2018. Annual Groundwater Monitoring Report – DTE Electric Company Belle River Power Plant Diversion Basin, 4505 King Road, China Township, Michigan. Prepared for DTE Electric Company.

TRC. April 12, 2018. Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Belle River Power Plant Coal Combustion Residual Diversion Basin. Prepared for DTE Electric Company.

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA facilities, Unified Guidance. Office of Conservation and Recovery. EPA 530/R-09-007.

USEPA. April 2015. 40 CFR Parts 257 and 261. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. 80 Federal Register 74 (April 17, 2015), pp. 21301-21501 (80 FR 21301).

USEPA. July 2018. 40 CFR Part 257. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One); Final Rule. 83 Federal Register 146 (July 30, 2018), pp. 36435-36456 (83 FR 36435).

USEPA. April 2018. Barnes Johnson (Office of Resource Conservation and Recovery) to James Roewer (c/o Edison Electric Institute) and Douglas Green, Margaret Fawal (Venable LLP). Re: Coal Combustion Residuals Rule Groundwater Monitoring Requirements. April 30, 2018. United States Environmental Protection Agency, Washington, D.C. 20460. Office of Solid Waste and Emergency Response, now the Office of Land and Emergency Management.

Tables

Table 1
Summary of Groundwater Elevation Data – March and September 2020
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
03/17/2020	16.76	574.06	17.50	575.71	16.62	575.96	15.57	576.31	17.74	574.52	16.81	574.85
09/14/2020	16.85	573.97	17.60	575.61	16.71	575.87	15.60	576.28	17.83	574.43	16.88	574.78

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 Field Data – March and September 2020
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	3/19/2020	0.30	-241.0	8.0	4,587	10.06	58.2
	9/16/2020	0.87	-254.7	8.0	4,004	12.60	52.7
MW-16-06	3/19/2020	0.24	-173.8	8.0	4,973	10.48	9.43
	9/15/2020	0.77	-226.7	8.1	4,440	13.50	9.46
MW-16-07	3/19/2020	0.20	-219.6	8.1	5,328	10.76	160
	9/15/2020	0.73	-286.1	8.0	4,807	13.80	158
MW-16-08	3/18/2020	0.15	-126.3	8.0	5,241	11.27	127
	9/15/2020	0.84	-160.5	8.1	4,822	12.10	146
MW-16-10	3/18/2020	0.29	-67.3	8.0	4,661	9.86	169
	9/15/2020	0.95	-61.0	7.8	4,115	11.90	128
MW-16-11A	3/18/2020	0.23	-102.3	8.0	4,893	10.51	5.83
	9/15/2020	0.86	-135.7	8.1	4,510	12.60	8.55

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

Table 3
Comparison of Appendix III Results to Background Limits – March 2020
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:		3/19/2020	PL	3/19/2020	PL	3/19/2020	PL	3/18/2020	PL	3/18/2020	PL	3/18/2020	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
Appendix III													
Boron	ug/L	1,800	2,000	2,000	2,200	2,100	2,100	1,900	2,300	1,900	2,300	1,600	2,000
Calcium	ug/L	37,000	67,000	37,000	45,000	47,000	110,000	49,000	99,000	29,000	34,000	39,000	80,000
Chloride	mg/L	1,500	1,600	1,600	1,800	1,700	1,800	1,800	2,000	1,500	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	8.0	7.5 - 8.4	8.1	7.7 - 8.4	8.0	7.5 - 8.3	8.0	7.5 - 8.8	8.0	7.6 - 8.6
Sulfate	mg/L	12	20	< 5.0	20	63	98	< 5.0	23	55	160	< 5.0	20
Total Dissolved Solids	mg/L	2,300	2,700	2,900	3,000	2,700	3,400	3,200	3,200	2,700	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.

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

Table 4
Comparison of Appendix III Results to Background Limits – September and November 2020
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:		9/16/2020	PL	9/15/2020	PL	9/15/2020	PL	9/15/2020	11/17/2020[1]	PL	9/15/2020	PL	9/15/2020	11/17/2020[1]	PL
Constituent	Unit	Data		Data		Data		Data			Data		Data		
Appendix III															
Boron	ug/L	1,700	2,000	1,900	2,200	1,900	2,100	1,800	--	2,300	1,800	2,300	1,800	--	2,000
Calcium	ug/L	35,000	67,000	37,000	45,000	48,000	110,000	46,000	--	99,000	33,000	34,000	37,000	--	80,000
Chloride	mg/L	1,500	1,600	1,700	1,800	1,800	1,800	**2,200**	1,900	2,000	1,600	1,800	**1,800**	1,700	1,700
Fluoride	mg/L	1.2	1.3	1.1	1.3	1.1	1.2	1.2	--	1.3	1.2	1.2	1.0	--	1.0
pH, Field	SU	8.0	7.9 - 8.5	8.1	7.5 - 8.4	8.0	7.7 - 8.4	8.1	7.9	7.5 - 8.3	7.8	7.5 - 8.8	8.1	7.9	7.6 - 8.6
Sulfate	mg/L	6.8	20	< 2.0	20	57	98	< 2.0	--	23	91	160	< 2.0	--	20
Total Dissolved Solids	mg/L	2,100	2,700	2,200	3,000	2,500	3,400	2,700	--	3,200	1,900	3,100	2,300	--	3,000

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

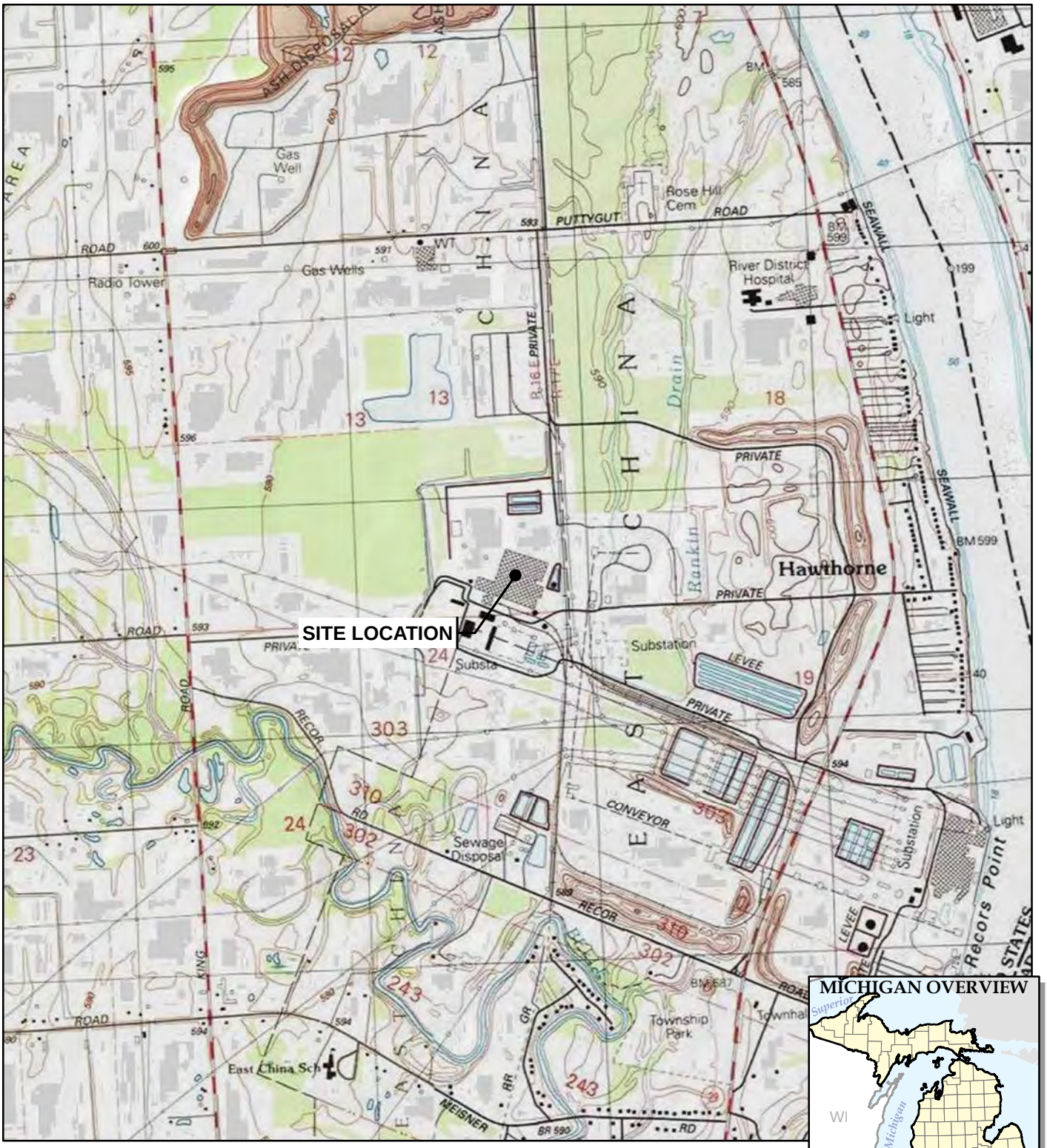
-- = not analyzed

All metals were analyzed as total unless otherwise specified.

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

(1) - Results shown for verification sampling performed on 11/17/2020.

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

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TRC - GIS

PROJECT:

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

TITLE:

SITE LOCATION MAP

DRAWN BY:	S. MAJOR
CHECKED BY:	J. KRENZ
APPROVED BY:	V. BUENING
DATE:	JANUARY 2021
PROJ. NO.:	370029.0003
FILE:	370029-0003-008.mxd

FIGURE 1

E:\DTE\CCR_Sites\2017_265996\370029-0003-008.mxd -- Saved By: SMAJOR on 1/27/2021, 12:26:26 PM

LEGEND

- SOIL BORING
- MONITORING WELL
- DECOMMISSIONED MONITORING WELL

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO. & PARTNERS, (3/24/2019).
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 BOTTOM ASH BASIN
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE:
SITE PLAN

DRAWN BY:	S. MAJOR	PROJ NO.:	370029.0003.0000
CHECKED BY:	J. KRENZ		
APPROVED BY:	V. BUENING		**FIGURE 2**
DATE:	JANUARY 2021		

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

FILE NO.: 370029-0003-009.mxd

Plot Date: 1/27/2021, 12:36:48 PM by SMAJOR - - LAYOUT: ANSI B (11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\370029-0003-009.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

TRC - GIS

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 GOOGLE EARTH PRO, (3/24/2019).
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.

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 DIVERSION BASIN
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

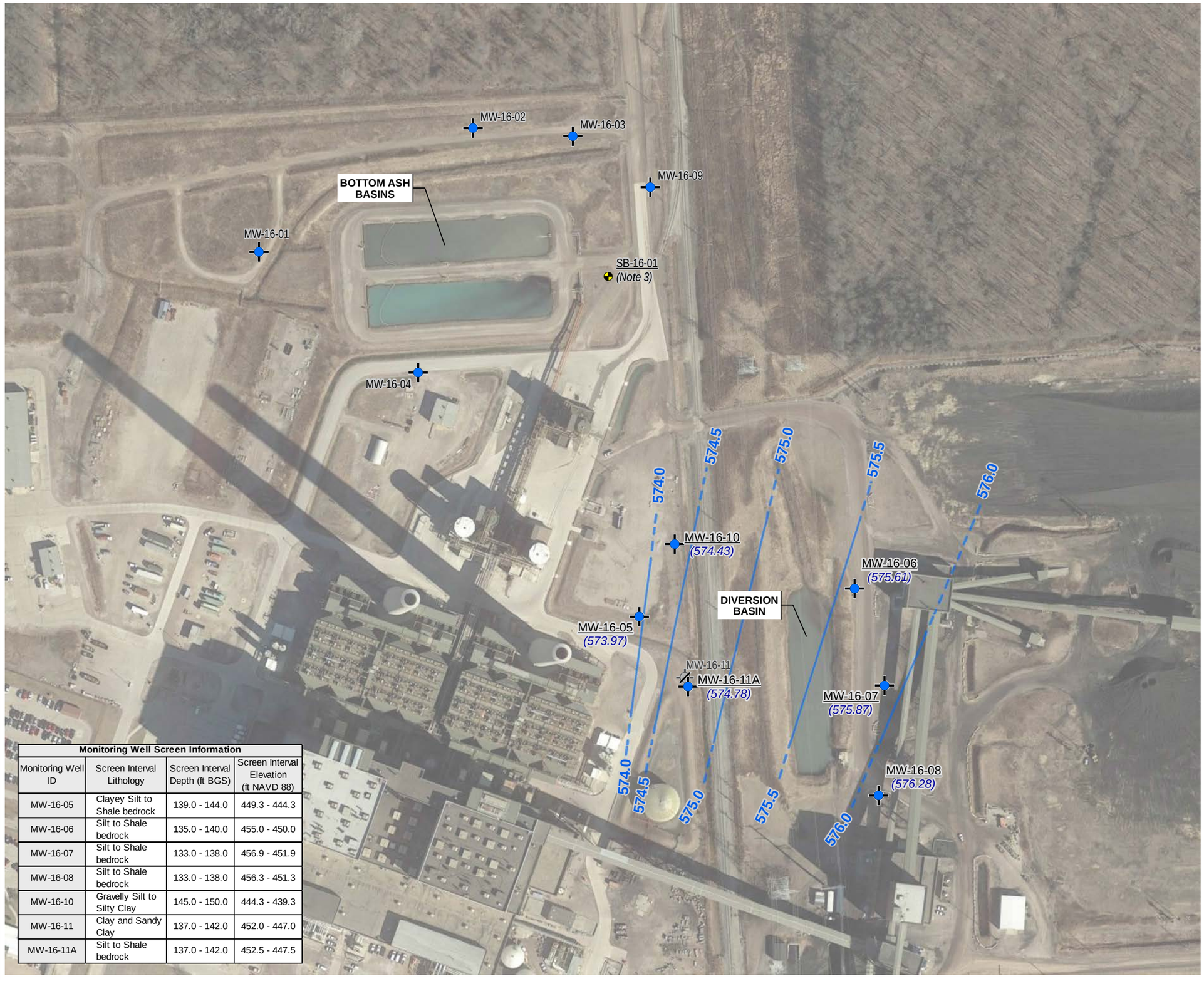
TITLE: DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP MARCH 2020

DRAWN BY:	S. MAJOR	PROJ NO.:	370029.0003
CHECKED BY:	J. KRENZ		
APPROVED BY:	V. BUENING		FIGURE 3
DATE:	JANUARY 2021		

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

FILE NO.: 370029-0003-007.mxd

TRC - GIS
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0
Plot Date: 1/27/2021, 13:22:38 PM by SMAJOR - - LAYOUT: ANSI B (11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\370029-0003-007.mxd



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 GOOGLE EARTH PRO, (3/24/2019).
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.

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 DIVERSION BASIN
4505 KING ROAD
CHINA TOWNSHIP, MICHIGAN

TITLE: DIVERSION BASIN GROUNDWATER POTENTIOMETRIC SURFACE MAP SEPTEMBER 2020

DRAWN BY:	S. MAJOR	PROJ NO.:	370029.0003
CHECKED BY:	J. KRENZ		
APPROVED BY:	V. BUENING		FIGURE 4
DATE:	JANUARY 2021		

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FILE NO.: 370029-0003-011.mxd

TRC - GIS
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Appendix A
Data Quality Reviews

Laboratory Data Quality Review
Groundwater Monitoring Event March 2020 (Detection Monitoring)
DTE Electric Company Belle River Power Plant (DTE BRPP)

Groundwater samples were collected by TRC for the March 2020 sampling event for the Bottom Ash Basins and Diversion Basin at the DTE BRPP. Samples were analyzed for anions, total boron, total calcium, and total dissolved solids by Eurofins-Test America Laboratories, Inc. (Eurofins-TA), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory reports 240-127905-1 and 240-128049-1.

During the March 2020 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)	SW846 9056A
Total Boron	SW846 3005A/6010B
Total Calcium	SW846 3005A/6020
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.

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

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

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

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary:

- There was one equipment blank submitted with this dataset (EB-01) which was associated with the low hydraulic conductivity wells (MW-16-08, MW 16-10, and MW-16-11A). Boron (32 J µg/L), calcium (44,000 µg/L), chloride (51 mg/L), fluoride (0.79 mg/L), sulfate (55 mg/L), and TDS (430 mg/L) were detected in this equipment blank. However, the sample results for boron were detected at concentrations greater than five times the blank concentration and sulfate was not detected in samples MW-16-08 and MW-16-11A; thus, there was no impact on data usability. The positive results for calcium, chloride, fluoride, and TDS in all samples, and sulfate in sample MW-16-10 were less than five times the blank concentration and are potentially biased high, as summarized in the attached table.
- Target analytes were not detected in the method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were performed on sample MW-16-01 for chloride, fluoride, and sulfate, and samples MW-16-05 and MW-16-10 for fluoride and sulfate; the percent recoveries (%Rs) and relative percent differences (RPDs) were acceptable.
- MS/MSD analyses were not performed for boron and calcium in this data set. Per the project QAPP, MS/MSD analyses are required for boron and calcium at a frequency of 1 per 20 samples.

- Laboratory duplicate analyses were not performed for TDS. Per the project QAPP, laboratory duplicate analyses are required for TDS at a frequency of 1 per 20 samples.
- DUP-01 corresponds with MW-16-01; RPDs between the parent and duplicate sample were within the QC limits.
- The nondetect reporting limits (5.0 mg/L) for sulfate in samples MW-16-06, MW-16-08, and MW-16-11A were above the QAPP-specified RL (1.0 mg/L) due to a 5-fold dilution which was likely the result of elevated chloride concentrations.

Laboratory Data Quality Review
Groundwater Monitoring Event September 2020 (Detection Monitoring)
DTE Electric Company Belle River Power Plant (DTE BRPP)

Groundwater samples were collected by TRC for the September 2020 sampling event for the Bottom Ash Basins and Diversion Basin at the DTE BRPP. Samples were analyzed for anions, total recoverable metals, and total dissolved solids by Eurofins-Test America Laboratories, Inc. (Eurofins-TA), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-136634-1.

During the September 2020 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)	SW846 9056A
Total Recoverable Boron	SW846 3005A/6010B
Total Recoverable Calcium	SW846 3005A/6020
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.

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

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

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

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

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary:

- There was one equipment blank submitted with this dataset (EB-01). TDS was detected at 130 mg/L in this equipment blank. However, TDS was detected at concentrations greater than five times the blank concentration in the associated wells; thus, there was no impact on data usability.
- Target analytes were not detected in the method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were performed on sample EB-01 for anions; the percent recoveries (%Rs) and relative percent differences (RPDs) were acceptable for chloride and fluoride. The MS %R for sulfate exceeded the acceptance criteria; however, no data were affected as an equipment blank sample is not representative of the groundwater matrix.
- Laboratory duplicate analyses were performed for TDS on sample MW-16-05. The RPD met the acceptance criteria.
- Dup-01 corresponds with MW-16-01; RPDs between the parent and duplicate sample were within the QC limits.

- The nondetect reporting limits (2.0 mg/L) for sulfate in samples MW-16-06, MW-16-08, and MW-16-11A were above the QAPP-specified RL (1.0 mg/L) due to a 2-fold dilution which was likely the result of elevated chloride concentrations.

Laboratory Data Quality Review
Groundwater Monitoring Event November 2020 (Detection Monitoring)
DTE Electric Company Belle River Power Plant (DTE BRPP)

Groundwater samples were collected by TRC for the November 2020 sampling event for the Diversion Basin at the DTE BRPP. Samples were analyzed for chloride by Eurofins-Test America Laboratories, Inc. (Eurofins-TA), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-140437-1.

During the November 2020 sampling event, a groundwater sample was collected from each of the following wells:

- MW-16-11A
- MW-16-08

Each sample was analyzed for the following constituents:

Analyte Group	Method
Chloride	SW846 9056A

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

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks and equipment blanks, where applicable. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix;
- Data for matrix spike and matrix spike duplicate samples (MS/MSDs), where applicable. The MS/MSDs are used to assess the accuracy and precision of the analytical method using a sample from the dataset;
- Data for laboratory duplicates, where applicable. The laboratory duplicates are used to assess the precision of the analytical method using a sample from the dataset;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary:

- Chloride was not detected in the method blank.
- The LCS recovery for chloride was within laboratory control limits.
- There was one equipment blank submitted with this dataset (EB-01) and chloride was not detected in the equipment blank.
- MS/MSD analyses were not performed on a sample from this data set.
- DUP-01 corresponds with MW-16-11A; the relative percent difference between the parent and duplicate sample was within the QC limits.