2020 Annual Groundwater Monitoring Report

Sibley Quarry Coal Combustion Residual Landfill
801 Fort Street
Trenton, Michigan

January 2021

Prepared For:

DTE Electric Company

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

Vincent E. Buening, C.P.G.
Senior Project Manager

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

Sarah B. Holmstrom, P.G.
Senior Hydrogeologist

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

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) Sibley Quarry Landfill (SQLF) 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 Environmental Corporation (TRC), has prepared this Annual Groundwater Monitoring Report for calendar year 2020 activities at the SQLF CCR unit.

DTE Electric remained in detection monitoring at the SQLF CCR Unit in 2020. The semiannual detection monitoring events for 2020 were completed in March and October 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 observed throughout the 2020 monitoring period. Potential SSIs over prediction limits were noted for chloride (two wells) and sulfate (one well) Appendix III constituents in one or more downgradient wells during the March 2020 monitoring event. These potential SSIs were either not statistically significant (i.e. verification resampling did not confirm the exceedance) or were evaluated and determined to be a result of natural variability in groundwater quality as documented in an alternative source demonstration (ASD) and not attributable to the SQLF CCR unit.

Based on the hydrogeology at the Site, the uppermost aquifer is in an area where pumping has been performed continuously since before CCR disposal began and will continue to be dewatered, by which a continuous inward hydraulic gradient is maintained. As a result, there is no reasonable probability for the uppermost aquifer perimeter monitoring wells to have been affected by the SQLF CCR unit operations to date, nor could they be in the future under current pumping conditions. Therefore, detection monitoring will be continued at the SQLF CCR unit in accordance with §257.94 of the CCR Rule.

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) Sibley Quarry Landfill Coal Combustion Residual Landfill (SQLF) 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 SQLF CCR unit (2020 Annual Report).

As documented in the *2019 Annual Groundwater Monitoring Report for the Sibley Quarry Landfill* (2019 Annual Report) (TRC, January 2020), potentially statistically significant increases (SSIs) over prediction limits were noted for a few Appendix III constituents in one or more wells during the March and September 2019 semiannual detection monitoring events. These potential SSIs were either not statistically significant (i.e. verification resampling did not confirm the exceedance) or were evaluated and determined to be a result of natural variability in groundwater quality as documented in an alternative source demonstration (ASD) and not attributable to the SQLF CCR unit. As such, DTE Electric continued detection monitoring at the SQLF CCR Unit in 2020 pursuant to §257.94 of the CCR Rule.

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 October 2020 semiannual groundwater monitoring events for the SQLF CCR unit, along with the ASD for the first semiannual detection monitoring event (Appendix A). Detection monitoring for these events continued to be performed in accordance with the *CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill* (QAPP) (TRC, August 2016; revised March 2017) and statistically evaluated per the *Groundwater Statistical Evaluation Plan – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill* (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 SQLF is located in Section 7, Township 4 South, Range 11 East, at 801 Fort Street (a.k.a. 502 Quarry Road) in Trenton, Wayne County, Michigan (Figure 1). The SQLF is located about two miles north of the DTE Electric Trenton Power Plant. The SQLF is bounded mostly by Fort Street to the west, Sibley Road to the north, the former Detroit and Toledo Shore Line Railroad and West Jefferson Avenue to the east, and the former Vulcan Mold & Iron Company (now owned by Danou Enterprises) and the DTE Electric Jefferson Substation to the south.

The SQLF is a licensed Type III solid waste disposal facility owned and operated by DTE Electric. In 2020 the disposal facility received the majority of CCR from the Trenton Channel and River Rouge Power Plants. In addition, a small amount of CCR is also received from the Monroe Power Plant. The SQLF is operated under the current operating license number 9394 in accordance with Michigan Part 115 of the Natural Resources and Environmental Protection Act (NREPA), PA 451 of 1994, as amended.

1.3 Geology/Hydrogeology

The SQLF CCR unit is located approximately one-half mile west of the Detroit River. The Sibley quarry was originally developed to mine limestone beginning in the mid-1800s and was mined to over 300 feet below ground surface (ft bgs) in some areas before mining activities ceased. In 1951, Detroit Edison (now DTE Electric) acquired Sibley Quarry and began to manage CCR in the SQLF. As part of normal operations, the SQLF is continuously dewatered to approximately 300 ft bgs maintaining a water level in the bottom of the quarry by pumping an average of approximately 1.5 million gallons per day.

The SQLF resides in an area characterized by near surface deposits of glacio-lacustrine clay and silt units on top of thick strata of dolomite and limestone bedrock. The SQLF is located in an area where the Dundee Formation (mostly limestone) and the Detroit River Group (limestone, dolostone and some sandstone) underlie the unconsolidated glacial drift and are the uppermost aquifer. At SQLF, the Dundee Formation is overlain by anywhere from less than 15 feet to more than 70 feet of unconsolidated material, most of which is clay-rich soil with some fill. The top of the Dundee Formation limestone/dolostone bedrock was encountered at depths ranging from 16.5 to 74.5 ft bgs and including the underlying Detroit River Group limestone/dolostone/ sandstone, extends to depths ranging from 235 to over 310 ft bgs. The underlying Sylvania Sandstone was encountered at depths ranging from 235 to 300 ft bgs in some locations at the SQLF.

As expected, data show that groundwater levels are significantly lower within the bedrock in monitoring wells that are the closest to the quarry where significant pumping is occurring, with water levels ranging from 120 to more than 250 ft bgs. Groundwater flow is consistently inward toward the base of the quarry due to continuous pumping that hydraulically controls groundwater flow. The pumped water from the quarry is managed in accordance with a National Pollution Discharge Elimination System (NPDES) permit. Quarry dewatering results in all the perimeter uppermost aquifer CCR monitoring wells being upgradient of the SQLF CCR unit.

Because the uppermost aquifer is in an area where pumping has been performed continuously before CCR disposal began, and will be continued to be dewatered, a continuous inward hydraulic gradient is maintained. As a result, there is no reasonable probability for the uppermost aquifer perimeter monitoring wells to have been affected by the SQLF CCR unit operations to date, nor could they be in the future under current pumping conditions.

2.0 Groundwater Monitoring

2.1 Monitoring Well Network

A groundwater monitoring system has been established for the SQLF CCR unit as detailed in the *Groundwater Monitoring System Summary Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill* (GWMS Report) (TRC, October 2017). The detection monitoring well network for the SQLF CCR unit currently consists of eight monitoring wells, MW-101 through MW-107 and MW-108A, which replaced decommissioned monitoring well MW-108 in January 2017. Monitoring wells MW-101 through MW-107 and MW-108A are located around the perimeter of the SQLF and provide data on both background and perimeter groundwater quality that has not been affected by the CCR unit (total of eight background/compliance monitoring wells) given that inward gradients are maintained by continuous dewatering within the quarry. All monitoring wells are screened in the uppermost aquifer. 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 on March 26, 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 eight monitoring well locations. Groundwater samples were collected from the eight 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 October 7, 2020 by TRC personnel and samples were analyzed by Eurofins in accordance with the QAPP. Static water elevation data were collected at all eight monitoring well locations. Groundwater samples were collected from the eight detection monitoring wells for the Appendix III indicator parameters and field parameters. A summary of the groundwater data collected during the October 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 B.

2.2.3 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the March and October 2020 sampling events continue to show that groundwater within the uppermost aquifer flows radially into the quarry as a result of continuous pumping/dewatering at the Site. Groundwater potentiometric surface elevations measured across the site during the March 2020 and the October 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 data indicates that current groundwater flow rates and direction are consistent with previous monitoring events. The average hydraulic gradient throughout the site were the same for both 2020 monitoring events and are estimated at 0.088 ft/ft, resulting in an estimated average seepage velocity of approximately 6.0 ft/day or 2,200 ft/year, using the average hydraulic conductivity of 6.8 ft/day (Golder, 2015) and an assumed effective porosity of 0.1.

Given that groundwater flow is maintained inward toward the quarry under active pumping, all of the perimeter monitoring wells in the groundwater monitoring system are located in an upgradient position relative to the landfill. Therefore, there is no potential for groundwater to migrate away from the SQLF CCR unit.

3.0 Statistical Evaluation

3.1 Establishing Background Limits

As discussed in the Stats Plan, intrawell statistical methods for the SQLF were selected because the uppermost aquifer is in an area where pumping has been performed continuously since before CCR disposal began, and will be continued to be dewatered, resulting in a maintained continuous inward hydraulic gradient. Given that groundwater flow is inward under pumping conditions toward the quarry, all of the perimeter monitoring wells in the groundwater monitoring system are located in an up gradient position relative to the landfill. Therefore, monitoring of the SQLF CCR unit using interwell statistical methods (upgradient to downgradient) is not possible. This also supports that the aquifer is unaffected by the CCR unit, where, as a result of the continuously maintained inward gradient, there is no reasonable probability for the perimeter monitoring wells within the uppermost aquifer to have been affected by the SQLF CCR unit operations to date, nor could they be in the future under current pumping conditions. An intrawell statistical approach requires that each of the monitoring wells double as background and compliance wells, 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 eight established detection monitoring wells (MW-101 through MW-107 and MW-108A). 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 SQLF 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-101 through MW-107 and MW-108A) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from MW-101 is compared to the background limit developed using the background dataset from MW-101, and so forth). The comparisons for the March 2020 monitoring event are presented on Table 3. The statistical evaluation of the March 2020 Appendix III indicator parameters showed initial potential SSIs over background for:

- Chloride at MW-101 and MW-106; and
- Sulfate at MW-107.

The sulfate concentration at MW-105 and the boron concentration at MW-106 have been demonstrated to be from natural variability and not from the CCR unit as presented in the ASD

included in the *2018 Annual Groundwater Monitoring Report* (2018 GWMR)(TRC, January 2019).

3.3 Verification Resampling for the First 2020 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* (Unified Guidance, USEPA, 2009) to achieve performance standards as specified by §257.93(g) in the CCR rules. Per the Stats Plan, if there is an exceedance of a prediction limit for one or more of the parameters, the well(s) of concern will be resampled within 30 days of the completion of the initial statistical analysis. Constituents that have been addressed through an ASD will not be analyzed for verification purposes.

Verification resampling for the March 2020 event was conducted on May 19 and 20, 2020 by TRC personnel in accordance with the QAPP. A summary of the analytical results collected during the May 2020 resampling event is provided on Table 3. The associated data quality review is included in Appendix B

The May 2020 verification results for sulfate (MW-107) are below the prediction limits, consequently the initial potential SSIs for the March 2020 detection monitoring event are not confirmed.

The May 2020 verification resampling confirmed the SSI for chloride at monitoring wells MW-101 and MW-106. TRC reviewed the data and determined that chloride is a result of natural variability in groundwater quality and not attributable to the SQLF CCR unit as presented in the *Alternate Source Demonstration: 2020 First Semiannual Detection Monitoring Sampling Event for the Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan*, dated August 26, 2020 (August 2020 ASD) (Appendix A).

As such, detection monitoring was continued in accordance with §257.94 of the CCR Rule.

3.4 Data Comparison to Background Limits – Second Semiannual Event (October 2020)

The concentrations of the indicator parameters in each of the detection monitoring wells (MW-101 through MW-107 and MW-108A) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from MW-101 is compared to the background limit developed using the background dataset from MW-101, and so forth). The statistical evaluation of the October 2020 Appendix III indicator parameters showed no initial potential SSIs over background.

The October 2020 data shows the boron concentration at MW-101 exceeds the statistical prediction limits. However, this exceedance has been demonstrated to be from natural variability and not from the CCR unit as presented in the ASD included in the 2018 GWMR. A summary of the analytical results collected during the October 2020 monitoring event are presented on Table 4.

4.0 Conclusions and Recommendations

No SSIs were observed throughout the 2020 monitoring period. Potential SSIs over background limits were noted for chloride (two wells) and sulfate (one well) in one or more downgradient wells during the March 2020 monitoring event. These potential SSIs were either not statistically significant (i.e. verification resampling did not confirm the exceedance) or the observed concentrations were demonstrated to be a result of natural variability in groundwater quality and not attributable to the SQLF CCR unit.

As discussed above, and in the GWMS Report, because the uppermost aquifer is in an area where pumping has been performed continuously since before CCR disposal began and will be continued to be dewatered as a continuous inward hydraulic gradient is maintained. As a result, there is no reasonable probability for the uppermost aquifer perimeter monitoring wells to have been affected by the SQLF CCR unit operations to date, nor could they be in the future under current pumping conditions. 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 being drawn inward toward the SQLF. Therefore, detection monitoring will be continued at the SQLF CCR unit in accordance with §257.94.

No corrective actions were performed in 2020. The next semiannual monitoring event at the SQLF CCR unit 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
Sibley Quarry Coal Combustion Residual Landfill
Trenton, Michigan

CERTIFICATION

I hereby certify that the annual groundwater and corrective action report presented within this document for the SQLF 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. August 2016; Revised March 2017. CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company – Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC. October 2017. Groundwater Monitoring System Summary Report – Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC. October 2017. Groundwater Statistical Evaluation Plan –DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC. January 2018. Annual Groundwater Monitoring Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC. April 12, 2018. Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan. Prepared for DTE Electric Company.

TRC. January 2019. 2018 Annual Groundwater Monitoring Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC. August 8, 2019. Alternate Source Demonstration: 2019 First Semiannual Detection Monitoring Sampling Event Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan. Prepared for DTE Electric Company.

TRC. January 30, 2020. Alternate Source Demonstration: 2019 Second Semiannual Detection Monitoring Sampling Event Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan. Prepared for DTE Electric Company.

TRC. January 2020. 2019 Annual Groundwater Monitoring Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC. August 26, 2020. Alternate Source Demonstration: 2020 First Semiannual Detection Monitoring Sampling Event Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan. 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 & October 2020
Sibley Quarry Landfill
Trenton, Michigan

Well ID	MW-101		MW-102		MW-103		MW-104		MW-105		MW-106		MW-107		MW-108A	
Date Installed	7/14/2015		7/16/2015		7/15/2015		7/16/2015		3/30/2016		3/28/2016		4/6/2016		1/24/2017	
TOC Elevation	617.67		615.03		607.23		608.39		593.28		606.75		610.03		594.06	
Geologic Unit of Screened Interval	Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Limestone Bedrock		Sandstone Bedrock	
Bottom of Open Hole Elevation	295.2		342.6		294.7		296.0		290.7		304.0		336.5		290.5	
Unit	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft
Measurement Date	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
03/26/2020	177.34	440.33	233.65	381.38	170.13	437.10	119.77	488.62	22.62	570.66	183.55	423.20	155.61	454.42	52.95	541.11
10/07/2020	177.10	440.57	240.40	374.63	179.75	427.48	119.82	488.57	23.18	570.10	183.65	423.10	155.80	454.23	55.15	538.91

Notes:

Elevations are reported in feet realative to the national geodetic vertical datum of 1929.

ft BTOC - feet below top of casing

Table 2
Summary of Field Data – March to October 2020
Sibley Quarry Landfill – RCRA CCR Monitoring Program
Trenton, 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-101	3/26/2020	2.79	-39.3	7.4	2,126	11.4	0.70
	5/19/2020	0.63	30.8	6.5	1,955	11.4	17.8
	10/7/2020	0.97	133.0	7.0	1,999	11.8	6.73
MW-102	3/26/2020	3.98	21.2	6.8	2,028	12.1	80.1
	10/7/2020	2.75	235.3	6.7	2,152	12.4	4.85
MW-103	3/26/2020	1.18	-274.9	7.3	3,591	11.6	2.20
	10/7/2020	0.24	-387.8	6.8	3,525	12.3	3.71
MW-104	3/26/2020	1.09	-268.5	7.3	3,443	11.2	2.00
	10/7/2020	0.59	-346.2	6.9	3,385	12.9	2.35
MW-105	3/26/2020	0.12	-49.1	6.8	11,211	11.8	0.52
	10/7/2020	0.20	-92.0	6.8	12,985	12.7	1.39
MW-106	3/26/2020	0.29	-214.1	7.1	3,202	13.5	32.9
	5/20/2020	0.66	-424.8	6.9	3,205	12.9	37.8
	10/7/2020	0.23	-394.3	6.9	3,375	13.8	4.54
MW-107	3/26/2020	0.92	-280.5	7.2	52,900	11.3	0.80
	5/20/2020	0.60	-423.4	6.7	48,757	11.8	1.68
	10/7/2020	0.18	-378.3	6.7	51,738	12.6	1.75
MW-108A	3/26/2020	0.09	-237.2	6.9	6,376	12.6	0.82
	10/7/2020	0.10	-190.2	6.8	7,587	12.2	2.05

Notes:

mg/L - milligrams per liter.

mV - milliVolt.

SU - standard unit.

umhos/cm - micro-mhos per centimeter.

deg C - degrees celcius.

NTU - nephelometric turbidity units.

Table 3
Comparison of Appendix III Parameter Results to Background Limits – March & May 2020
Sibley Quarry Landfill – RCRA CCR Monitoring Program
Trenton, Michigan

Sample Location:		MW-101			MW-102		MW-103		MW-104		MW-105		MW-106			MW-107			MW-108A	
Sample Date:		3/26/2020	5/19/2020	PL	3/26/2020	PL	3/26/2020	PL	3/26/2020	PL	3/26/2020	PL	3/26/2020	5/20/2020	PL	3/26/2020	5/20/2020	PL	3/26/2020	PL
Constituent	Unit	Data			Data		Data		Data		Data		Data			Data			Data	
Appendix III																				
Boron	ug/L	280	--	280	140	200	760	810	730	970	2,100	2,600	**1,600**(1)	--	810	1,500	--	1,500	1,300	1,400
Calcium	ug/L	200,000	--	270,000	230,000	310,000	550,000	630,000	450,000	530,000	630,000	830,000	520,000	--	650,000	1,200,000	--	1,500,000	380,000	470,000
Chloride	mg/L	**220**	**230**(2)	200	210	270	140	160	210	800	3,200	4,800	**150**	**140**(2)	130	20,000	--	21,000	1,800	1,900
Fluoride	mg/L	1.8	--	2.1	1.7	1.9	1.9	2.1	1.7	2.8	0.84	5.8	1.6	--	3.0	< 2.5	--	2.5	1.1	2.5
pH, Field	SU	7.4	--	6.8 - 7.8	6.8	6.5 - 7.6	7.3	6.7 - 7.6	7.3	6.8 - 7.9	6.8	6.6 - 7.9	7.1	--	6.5 - 7.6	7.2	--	6.5 - 7.6	6.9	6.7 - 6.9
Sulfate	mg/L	500	--	740	540	770	1,800	2,100	1,600	1,900	**2,100**(1)	2,000	1,900	--	2,100	**7,800**	3,300	3,800	980	1,100
Total Dissolved Solids	mg/L	1,300	--	1,400	1,400	1,800	2,800	3,700	2,500	4,100	7,300	9,700	2,400	--	3,200	24,000	--	41,000	4,000	4,900

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).

(1) - Concentraton addressed through the Alternate Source Demonstration: 2017 Initial Detection Monitoring Samplng Event, TRC April 12, 2018.

(2) - Concentraton addressed through the Alternate Source Demonstration: 2020 First Semiannual Detection Monitoring Sampling Event, TRC August 26, 2020.

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

Table 4
Comparison of Appendix III Parameter Results to Background Limits – October 2020
Sibley Quarry Landfill – RCRA CCR Monitoring Program
Trenton, Michigan

Sample Location:		MW-101		MW-102		MW-103		MW-104		MW-105		MW-106		MW-107		MW-108A	
Sample Date:		10/7/2020	PL	10/7/2020	PL	10/7/2020	PL	10/7/2020	PL	10/7/2020	PL	10/7/2020	PL	10/7/2020	PL	10/7/2020	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data		Data		Data	
Appendix III																	
Boron	ug/L	**290**[(1)]	280	140	200	760	810	750	970	2,500	2,600	750	810	1,500	1,500	1,400	1,400
Calcium	ug/L	210,000	270,000	270,000	310,000	530,000	630,000	450,000	530,000	650,000	830,000	520,000	650,000	1,200,000	1,500,000	390,000	470,000
Chloride	mg/L	190	200	160	270	140	160	220	800	3,600	4,800	120	130	21,000	21,000	1,900	1,900
Fluoride	mg/L	1.8	2.1	1.8	1.9	1.8	2.1	1.6	2.8	1.3	5.8	1.7	3.0	2.2	2.5	1.2	2.5
pH, Field	SU	7.0	6.8 - 7.8	6.7	6.5 - 7.6	6.8	6.7 - 7.6	6.9	6.8 - 7.9	6.8	6.6 - 7.9	6.9	6.5 - 7.6	6.7	6.5 - 7.6	6.8	6.7 - 6.9
Sulfate	mg/L	520	740	630	770	2,000	2,100	1,800	1,900	2,000	2,000	1,900	2,100	3,300	3,800	1,100	1,100
Total Dissolved Solids	mg/L	1,300	1,400	1,400	1,800	2,900	3,700	2,500	4,100	7,200	9,700	2,700	3,200	21,000	41,000	3,500	4,900

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

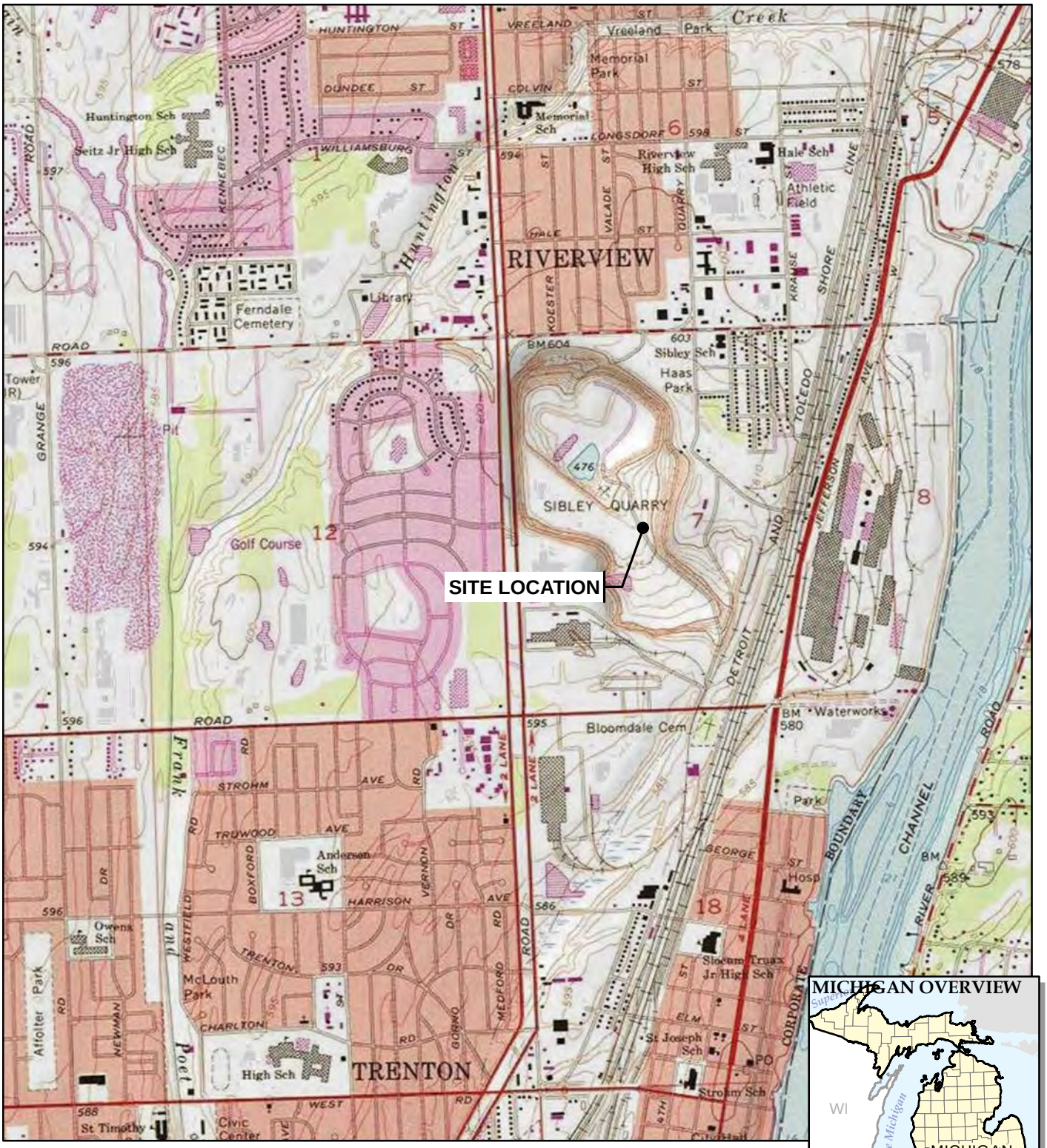
-- = not analyzed

All metals were analyzed as total unless otherwise specified.

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

(1) - Concentraton addressed through the Alternate Source Demonstration: 2017 Initial Detection Monitoring Samplng Event, TRC April 12, 2018.

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
www.trccompanies.com
TRC - GIS

PROJECT:
DTE ELECTRIC COMPANY
SIBLEY QUARRY LANDFILL
801 FORT STREET
TRENTON, MICHIGAN

TITLE:
SITE LOCATION MAP

DRAWN BY:	S. MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	AUGUST 2020
PROJ. NO.:	370029.0002
FILE:	370029-0002-SLMMB.mxd

FIGURE 1

E:\DTE\CCR_Sites\2017_265996\370029-0002-SLMMB.mxd -- Saved By: SMAJOR on 8/4/2020, 09:02:55 AM

LEGEND

- MONITORING WELLS
- DECOMMISSIONED MONITORING WELL
- SIBLEY QUARRY PROPERTY LINE
- SOLID WASTE DISPOSAL AREA BOUNDARY
- 1 FILL AREA DESIGNATION

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 4/23/2019.
2. SITE LAYOUT INFORMATION FROM GEOREFERENCED CAD FILE. FEATURES ARE APPROXIMATE.
3. SURVEY PERFORMED BY THE DTE SURVEY GROUP IN AUGUST 2015, MAY 2016 AND JANUARY 2017.

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:
DTE ELECTRIC COMPANY
SIBLEY QUARRY LANDFILL
801 FORT STREET
TRENTON, MICHIGAN

TITLE:
MONITORING NETWORK AND SITE PLAN

DRAWN BY:	S. MAJOR	PROJ NO.:	370029.0002
CHECKED BY:	B. YELEN		
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.: 370029-0002-006.mxd

Plot Date: 12/24/2020, 08:55:36 AM by SMAJOR -- LAYOUT: ANSI B (11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\370029-0002-006.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0
TRC - GIS

TRC - GIS

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

Plot Date: 8/4/2020, 09:47:39 AM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: E:\DTE\CR_Sites\2017_265996\370029-0002-003.mxd

MW-107 (454.42)
MW-103 (437.10)
MW-102 (381.38)
MW-106 (423.20)
MW-101 (440.33)
MW-104 (488.62)
MW-105 (570.66)
MW-108 (Abandoned)
MW-108A (541.11)

QUARRY BOTTOM WATER ELEVATION ~304 FT MSL

450
400
350
500
550

1
3
4

Sibley Rd
Ray St
Fort St
Wedgewood
Hampton St
Wedgewood Rd
Brandywine St
Tall Oaks Dr
Heritage St
Greentrees St
Hamilton St
Foxboro St
Kingswood St
Maplewood St
Kings Forest
Tudor St
Balmoral St
Woody Ct
Vernon St
Fritz Dr
King Rd
Park Pl
Washington St
New York St
Cleveland St
Detroit St
Roehrig St
Chicago St
Buffalo Ave
W Jefferson Ave
85

N 5,000
N 4,000
N 3,000
N 2,000
N 1,000
N 0
E 0
E 1,000
E 2,000
E 3,000

LEGEND

- MONITORING WELLS
- DECOMMISSIONED MONITORING WELL
- SIBLEY QUARRY PROPERTY LINE
- SOLID WASTE DISPOSAL AREA BOUNDARY
- 1 — FILL AREA DESIGNATION
- (439.08) — GROUNDWATER ELEVATION (FT NGVD 1929)
- POTENTIOMETRIC SURFACE CONTOUR (50-FT INTERVAL, DASHED WHERE INFERRED)
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 4/23/2019.
2. SITE LAYOUT INFORMATION FROM GEOREFERENCED CAD FILE. FEATURES ARE APPROXIMATE.
3. SURVEY PERFORMED BY THE DTE SURVEY GROUP IN AUGUST 2015, MAY 2016 AND JANURARY 2017.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.

N

0 600 1,200 Feet

1 " = 600 '
1:7,200

PROJECT: DTE ELECTRIC COMPANY
SIBLEY QUARRY
801 FORT STREET
TRENTON, MICHIGAN

TITLE: GROUNDWATER POTENTIOMETRIC SURFACE MAP
MARCH 2020

DRAWN BY:	S. MAJOR	PROJ NO.:	370029.0002
CHECKED BY:	B. YELEN		FIGURE 3
APPROVED BY:	V. BUENING		
DATE:	AUGUST 2020		

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

FILE NO.: 370029-0002-003.mxd

LEGEND

- MONITORING WELLS
- DECOMMISSIONED MONITORING WELL
- SIBLEY QUARRY PROPERTY LINE
- SOLID WASTE DISPOSAL AREA BOUNDARY
- 1 FILL AREA DESIGNATION
- (439.08) GROUNDWATER ELEVATION (FT NGVD 1929)
- POTENTIOMETRIC SURFACE CONTOUR (50-FT INTERVAL, DASHED WHERE INFERRED)
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 4/23/2019.
2. SITE LAYOUT INFORMATION FROM GEOREFERENCED CAD FILE. FEATURES ARE APPROXIMATE.
3. SURVEY PERFORMED BY THE DTE SURVEY GROUP IN AUGUST 2015, MAY 2016 AND JANURARY 2017.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:
DTE ELECTRIC COMPANY
SIBLEY QUARRY
801 FORT STREET
TRENTON, MICHIGAN

TITLE:
GROUNDWATER POTENTIOMETRIC SURFACE MAP
OCTOBER 2020

DRAWN BY:	S. MAJOR	PROJ NO.:	370029.0002
CHECKED BY:	B. YELEN		
APPROVED BY:	V. BUENING		**FIGURE 4**
DATE:	JANUARY 2021		

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

FILE NO.: 370029-0002-007.mxd

TRC - GIS

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

Plot Date: 12/24/2020, 09:05:29 AM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\370029-0002-007.mxd

Appendix A
Alternate Source Demonstration: 2020 First Semiannual Detection Monitoring Sampling Event

1540 Eisenhower Pl.
Ann Arbor, MI 48108

T 734.971.7080
TRCcompanies.com

Technical Memorandum

Date:	August 26, 2020
To:	Christopher P. Scieszka DTE Electric Company
From:	Vincent E. Buening, TRC David McKenzie, TRC
Project No.:	370029.0002.0000 Phase 001, Task 001
Subject:	Alternate Source Demonstration: 2020 First Semiannual Detection Monitoring Sampling Event Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan

Introduction

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) Sibley Quarry Coal Combustion Residual Landfill (SQLF) CCR unit.

TRC Engineers Michigan, Inc. (TRC) conducted the first semiannual 2020 detection monitoring event for the SQLF on behalf of DTE Electric on March 26, 2020 in accordance with the CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company Sibley Quarry Coal Ash Landfill (QAPP) (TRC, August 2016; Revised March 2017). The semiannual groundwater monitoring event included the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule). This event was the sixth 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. The statistical analysis was performed pursuant to §257.93(f) and (g), and in accordance with the Groundwater Statistical Evaluation Plan (Stats Plan) (TRC, 2017).

The statistical evaluation of the March 2020 Appendix III indicator parameters showed a potential SSI over background for:

- Chloride at MW-101 and MW-106;
- Sulfate at MW-105 and MW-107; and
- Boron at MW-106.

Verification sampling conducted in May 2020 confirmed the SSIs slightly over their respective prediction limits for chloride at MW-101 and MW-106. The sulfate concentration at MW-107 was not confirmed during the verification sampling event. All other Appendix III constituents were within the statistical background limits or were previously addressed within the Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Sibley Quarry Coal Combustion Residual Landfill, Trenton, Michigan, dated April 12, 2018.

In accordance with §257.94(e)(2), DTE Electric may demonstrate that a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. This Alternate Source Demonstration (ASD) has been prepared to address the potential SSIs identified in the March 2020 detection monitoring event.

Background

The SQLF is located in Section 7, Township 4 South, Range 11 East, at 801 Fort Street in Trenton, Wayne County, Michigan. The site location is shown in Figure 1. The former limestone quarry began operations in the mid-1800s and was mined to over 300 feet below ground surface (ft bgs). Quarry dewatering activities were necessary to facilitate limestone mining. The groundwater elevation is currently maintained at a depth of approximately 300 feet below ground surface. In 1951, Detroit Edison (now DTE Electric) acquired the quarry for the purpose of CCR landfilling. (TRC, January 2018). The SQLF is approximately 207 acres with 92.1 acres designated for active CCR landfill development (TRC, October 2017).

The SQLF resides in an area characterized by near surface deposits of approximately 16.5 to 74.5 feet of glacio-lacustrine clay and silt units on top of thick strata of dolomite and limestone bedrock. Limestone bedrock strata underlaying the clay-rich soil extends to over 310 ft bgs and is considered the uppermost aquifer at the site (TRC, January 2018). The CCR detection monitoring well network for the SQLF currently consists of eight monitoring wells installed in the uppermost aquifer, details for which can be found in the Groundwater Monitoring System Summary Report – DTE Electric Sibley Quarry Coal Combustion Residual Landfill (TRC, October 2017). Monitoring well locations are shown in Figure 2.

Due to the dewatering of the quarry, at a rate of approximately 1.5 million gallons per day (MGD), groundwater levels are significantly lower within the bedrock monitoring wells that are closest to the quarry. The pumping creates an inward hydraulic gradient and prevents groundwater contact with the CCR material. All CCR monitoring network wells are therefore considered upgradient of the CCR disposal unit. Based on the site-specific hydrogeological conditions, the uppermost aquifer cannot be affected by CCR disposal operations. A current potentiometric map of the site is provided in Figure 3.

Alternate Source Demonstration

Verification resampling was performed as recommended per the Statistical Evaluation Plan and the USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance (Unified Guidance, USEPA, 2009) to achieve performance standards as specified by §257.93(g) in the CCR rules. Per the Statistical Evaluation Plan, if there is an exceedance of a prediction limit for one or more of the parameters, the well(s) of concern will be resampled within 30 days of the

completion of the initial statistical analysis. Only constituents that initially exceed their statistical limit (i.e., have no previously recorded SSIs) will be analyzed for verification purposes. As such, verification resampling was conducted on May 20, 2020, by TRC personnel, and groundwater samples were collected in accordance with the Quality Assurance Project Plan (TRC, August 2016; Revised March 2017). A summary of the groundwater data collected during the verification resampling event is provided on Table 1. The associated data quality review is included in Attachment A.

The verification resampling confirmed the exceedance for chloride at MW-101 and MW-106.

The following discussion presents the Alternative Source Demonstration (ASD) for the confirmed prediction limit exceedance for chloride at MW-101 and MW-106. As mentioned above, quarry dewatering activities strongly support that Appendix III concentrations in groundwater are from a source other than the SQLF CCR unit. Prior to and during CCR landfilling operations, which began at the Sibley Quarry in 1951, dewatering has occurred via a sump in the bottom of the 300-foot-deep excavation. The groundwater discharge rate is kept at approximately 1.5 MGD to maintain the water level at the bottom of the quarry at approximately 300 ft bgs. Dewatering operations will continue, ensuring that no direct contact between the groundwater and the CCR waste occurs, and that an inward hydraulic gradient will be maintained, preventing any release of CCR constituents. As a result of dewatering activities, the groundwater monitoring wells are all upgradient and it is likely that changes in groundwater constituent concentrations are derived from natural conditions within the aquifer and/or other off-site anthropogenic sources. Additional supporting lines of evidence specific to the SSI are presented below.

Chloride at MW-101 and MW-106: The SSI of chloride in the groundwater at MW-101 and MW-106, shown graphically as data points greater than the prediction limit in Figure 4 and Figure 5, respectively, is the result of natural variability in the groundwater quality and/or from an off-site source and not the release of CCR constituents from the SQLF CCR unit. Multiple lines of evidence are provided in support of this conclusion and are as follows:

- **Dominant groundwater type** – Groundwater at the SQLF is from a fractured limestone and dolomite formation underlain by a chloride-rich groundwater within a sandstone formation. This is apparent in the background monitoring data for the monitoring wells at the SQLF, which provide a reported range of chloride concentrations from 100 mg/L to 20,000 mg/L. The SSI concentration of chloride measured in MW-101 during the March 2020 detection monitoring event was 220 mg/L and the May 2020 verification resample is reported as 230 mg/L. The SSI chloride concentration at MW-106 during the March 2020 detection monitoring event was 150 mg/L and the May 2020 verification resample was reported at 140 mg/L. Chloride concentrations for the detection monitoring event and verification resample event for both MW-101 and MW-106 are well within the range of background variation at the SQLF.
- **Off-site anthropogenic sources** - The SQLF has groundwater pumped at approximately 1.5 MGD drawing groundwater from off-site onto the SQLF CCR unit as shown on Figure 3, including from the west into the area of MW-106 and from the east into the area of MW-101. Fort Street to the west of the SQLF CCR unit, and immediately west of MW-106, is a major north-south road that has had road salt (a significant source of chloride) applied to it for many decades in the winter to melt ice and snow. In addition, the former McLouth Steel Mill, located to the east of the

SQLF CCR unit and east of MW-101, is another potential source for off-site chloride from decades of road maintenance as well. The McLouth Steel Mill was active from approximately 1950 until 1995 and is currently a Superfund site. These off-site operations and maintenance activities have the potential to contribute anthropogenic sources of chloride to groundwater that is not from the SQLF CCR unit operations.

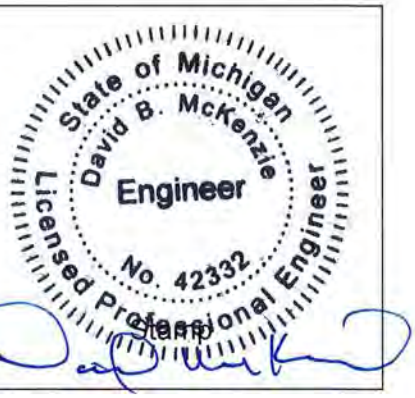
- **Insufficient background sampling timeline to account for long-term trends** – Variability in chloride concentrations observed in the groundwater at SQLF during the background sampling events provides evidence of the heterogeneity of this constituent in groundwater. The short duration of the background sampling events limited the ability of the statistical analysis to capture the temporal variability in the groundwater quality at the SQLF and, as can be seen in the time series on Figure 5 for chloride concentrations at MW-106, there is significant variability in chloride concentrations in groundwater at this well location.

Conclusions and Recommendations

The information provided in this report serves as the ASD for the DTE Electric SQLF CCR unit. This report was prepared in accordance with 40 CFR 257.94(e)(2) of the CCR Rule and demonstrates that the SSI detected during the first semiannual detection monitoring event performed in 2020 is not due to CCR. Therefore, based on the information provided in this ASD, DTE Electric will continue detection monitoring per 40 CFR 257.94 at the SQLF CCR unit.

Certification Statement

I hereby certify that the alternative source demonstration presented within this document for the SQLF CCR unit has been prepared to meet the requirements of Title 40 CFR §257.94(e) 2 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 §257.94(e) 2.

Name: David B. McKenzie, P.E.	Expiration Date: October 31, 2021	
Company: TRC Engineers Michigan, Inc.	Date: August 26, 2020	

References

Golder Associates. October 2015. Closure Evaluation Sibley Quarry – Trenton, Michigan. Prepared for DTE Electric.

Reeves, Howard W., Kirsten V. Wright, and J. R. Nicholas, 2004. Hydrogeology and Simulation of Regional Ground-Water-Level Declines in Monroe County, Michigan: U.S. Geological Survey Water-Resources Investigations Report 03-4312, 72 p. Date Posted: May 24, 2007

TRC Environmental Corporation. January 2018. Annual Groundwater Monitoring Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC Environmental. October 2017. Groundwater Monitoring System Summary Report – DTE Electric Company Sibley Quarry Coal Combustion Residual Landfill, 801 Fort Street, Trenton, Michigan. Prepared for DTE Electric Company.

TRC Environmental. January 31, 2018. Technical Memorandum – Sibley Quarry Landfill Background Data, RCRA CCR Monitoring, Trenton, Michigan.

Attachments

Table 1 Comparison of Verification Sampling Results to Background Limits

Figure 1 Site Location Map
Figure 2 Monitoring Network and Site Plan
Figure 3 Groundwater Potentiometric Surface Map – March 2020
Figure 4 MW-101 Chloride Time Series Plot
Figure 5 MW-106 Chloride Time Series Plot

Attachment A Data Quality Review

Table 1

Table 1
Comparison of Appendix III Parameter Results to Background Limits – March & May 2020
Sibley Quarry Landfill – RCRA CCR Monitoring Program
Trenton, Michigan

Sample Location:		MW-101			MW-102		MW-103		MW-104		MW-105		MW-106			MW-107			MW-108A	
Sample Date:		3/26/2020	5/19/2020	PL	3/26/2020	PL	3/26/2020	PL	3/26/2020	PL	3/26/2020	PL	3/26/2020	5/20/2020	PL	3/26/2020	5/20/2020	PL	3/26/2020	PL
Constituent	Unit	Data			Data		Data		Data		Data		Data			Data			Data	
Appendix III																				
Boron	ug/L	280	--	280	140	200	760	810	730	970	2,100	2,600	**1600**(1)	--	810	1,500	--	1,500	1,300	1,400
Calcium	ug/L	200,000	--	270,000	230,000	310,000	550,000	630,000	450,000	530,000	630,000	830,000	520,000	--	650,000	1,200,000	--	1,500,000	380,000	470,000
Chloride	mg/L	**220**	**230**	200	210	270	140	160	210	800	3,200	4,800	**150**	**140**	130	20,000	--	21,000	1,800	1,900
Fluoride	mg/L	1.8	--	2.1	1.7	1.9	1.9	2.1	1.7	2.8	0.84	5.8	1.6	--	3.0	< 2.5	--	2.5	1.1	2.5
pH, Field	SU	7.4	--	6.8 - 7.8	6.8	6.5 - 7.6	7.3	6.7 - 7.6	7.3	6.8 - 7.9	6.8	6.6 - 7.9	7.1	--	6.5 - 7.6	7.2	--	6.5 - 7.6	6.9	6.7 - 6.9
Sulfate	mg/L	500	--	740	540	770	1,800	2,100	1,600	1,900	**2100**(1)	2,000	1,900	--	2,100	**7,800**	3,300	3,800	980	1,100
Total Dissolved Solids	mg/L	1,300	--	1,400	1,400	1,800	2,800	3,700	2,500	4,100	7,300	9,700	2,400	--	3,200	24,000	--	41,000	4,000	4,900

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

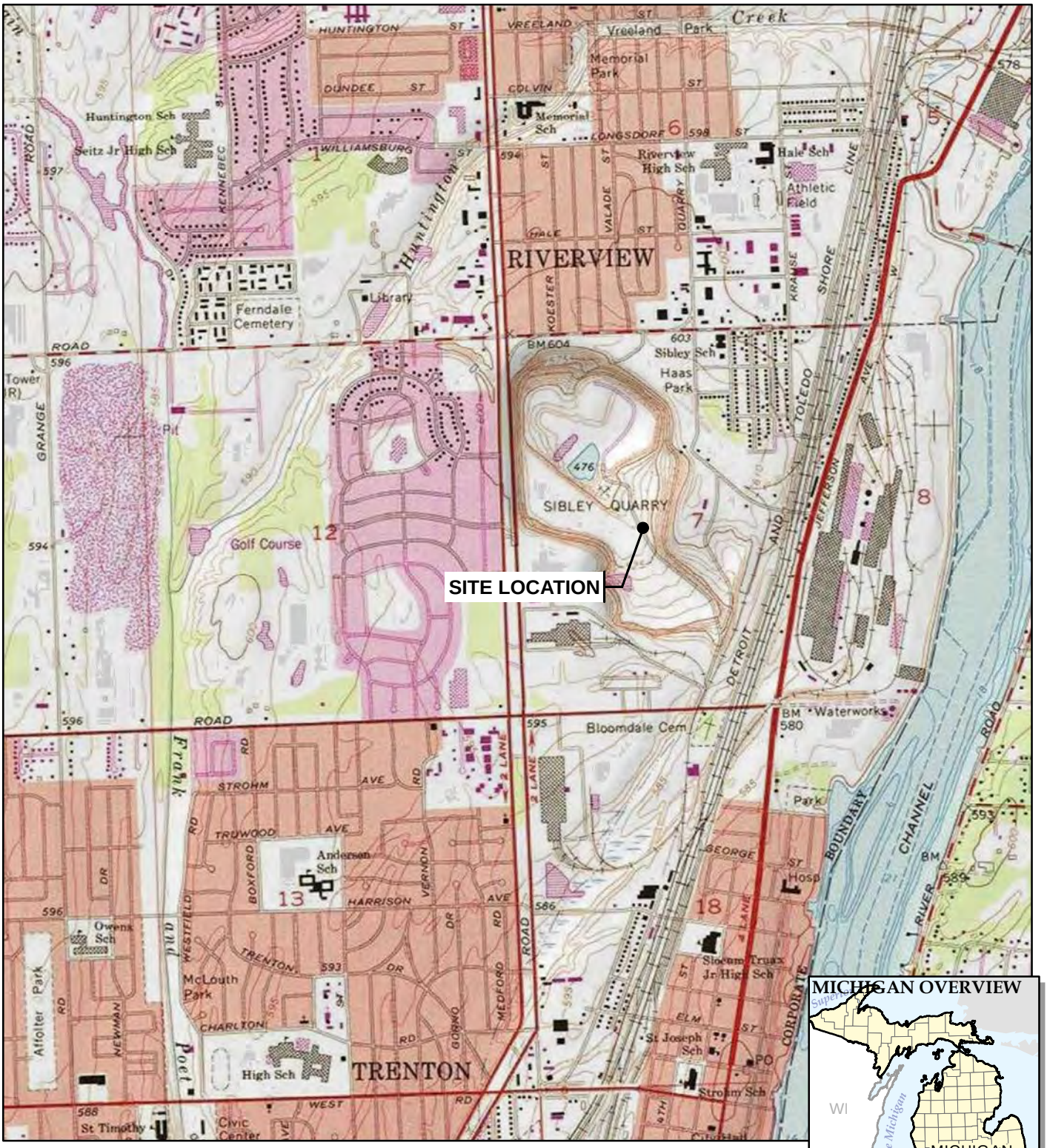
All metals were analyzed as total unless otherwise specified.

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

(1) - Concentraton addressed through initial alternate source demonstration

RESULT Shading and bold font indicates a comfirmed 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
www.trccompanies.com
TRC - GIS

PROJECT:
DTE ELECTRIC COMPANY
SIBLEY QUARRY LANDFILL
801 FORT STREET
TRENTON, MICHIGAN

TITLE:
SITE LOCATION MAP

DRAWN BY:	S. MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	AUGUST 2020
PROJ. NO.:	370029.0002
FILE:	370029-0002-SLMMB.mxd

FIGURE 1

E:\DTE\CCR_Sites\2017_265996\370029-0002-SLMMB.mxd -- Saved By: SMAJOR on 8/4/2020, 09:02:55 AM

LEGEND

- MONITORING WELLS
- DECOMMISSIONED MONITORING WELL
- SIBLEY QUARRY PROPERTY LINE
- SOLID WASTE DISPOSAL AREA BOUNDARY
- 1 FILL AREA DESIGNATION

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 4/23/2019.
2. SITE LAYOUT INFORMATION FROM GEOREFERENCED CAD FILE. FEATURES ARE APPROXIMATE.
3. SURVEY PERFORMED BY THE DTE SURVEY GROUP IN AUGUST 2015, MAY 2016 AND JANUARY 2017.

N

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:

DTE ELECTRIC COMPANY
SIBLEY QUARRY LANDFILL
801 FORT STREET
TRENTON, MICHIGAN

TITLE:

MONITORING NETWORK AND SITE PLAN

DRAWN BY:	S. MAJOR	PROJ NO.:	370029.0002
CHECKED BY:	B. YELEN		
APPROVED BY:	V. BUENING		**FIGURE 2**
DATE:	AUGUST 2020		

TRC

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

FILE NO.: 370029-0002-002.mxd

Plot Date: 8/4/2020, 09:11:57 AM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\370029-0002-002.mxd

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

TRC - GIS

TRC - GIS

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

Plot Date: 8/4/2020, 09:47:39 AM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: E:\DTE\CR_Sites\2017_265996\370029-0002-003.mxd

MW-107 (454.42)
MW-103 (437.10)
MW-102 (381.38)
MW-106 (423.20)
MW-101 (440.33)
MW-104 (488.62)
MW-105 (570.66)
MW-108 (Abandoned)
MW-108A (541.11)

QUARRY BOTTOM WATER ELEVATION ~304 FT MSL

450
400
350
500
550

1
3
4

Sibley Rd
Ray St
Fort St
Wedgewood
Hampton St
Wedgewood Rd
Brandywine St
Tall Oaks Dr
Heritage St
Greentrees St
Hamilton St
Foxboro St
Kingswood St
Maplewood St
Kings Forest
Tudor St
Balmoral St
Woody Ct
Vernon St
Fritz Dr
King Rd
Park Pl
Washington St
New York St
Cleveland St
Detroit St
Roehrig St
Chicago St
Buffalo Ave
W Jefferson Ave
85

N 5,000
N 4,000
N 3,000
N 2,000
N 1,000
N 0
E 0
E 1,000
E 2,000
E 3,000

LEGEND

- MONITORING WELLS
- DECOMMISSIONED MONITORING WELL
- SIBLEY QUARRY PROPERTY LINE
- SOLID WASTE DISPOSAL AREA BOUNDARY
- 1 — FILL AREA DESIGNATION
- (439.08) — GROUNDWATER ELEVATION (FT NGVD 1929)
- POTENTIOMETRIC SURFACE CONTOUR (50-FT INTERVAL, DASHED WHERE INFERRED)
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 4/23/2019.
2. SITE LAYOUT INFORMATION FROM GEOREFERENCED CAD FILE. FEATURES ARE APPROXIMATE.
3. SURVEY PERFORMED BY THE DTE SURVEY GROUP IN AUGUST 2015, MAY 2016 AND JANURARY 2017.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.

N

0 600 1,200 Feet

1 " = 600 '
1:7,200

PROJECT: DTE ELECTRIC COMPANY
SIBLEY QUARRY
801 FORT STREET
TRENTON, MICHIGAN

TITLE: GROUNDWATER POTENTIOMETRIC SURFACE MAP
MARCH 2020

DRAWN BY:	S. MAJOR	PROJ NO.:	370029.0002
CHECKED BY:	B. YELEN		FIGURE 3
APPROVED BY:	V. BUENING		
DATE:	AUGUST 2020		

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

FILE NO.: 370029-0002-003.mxd

FIGURE 4
MW-101 CHLORIDE TIME SERIES PLOT

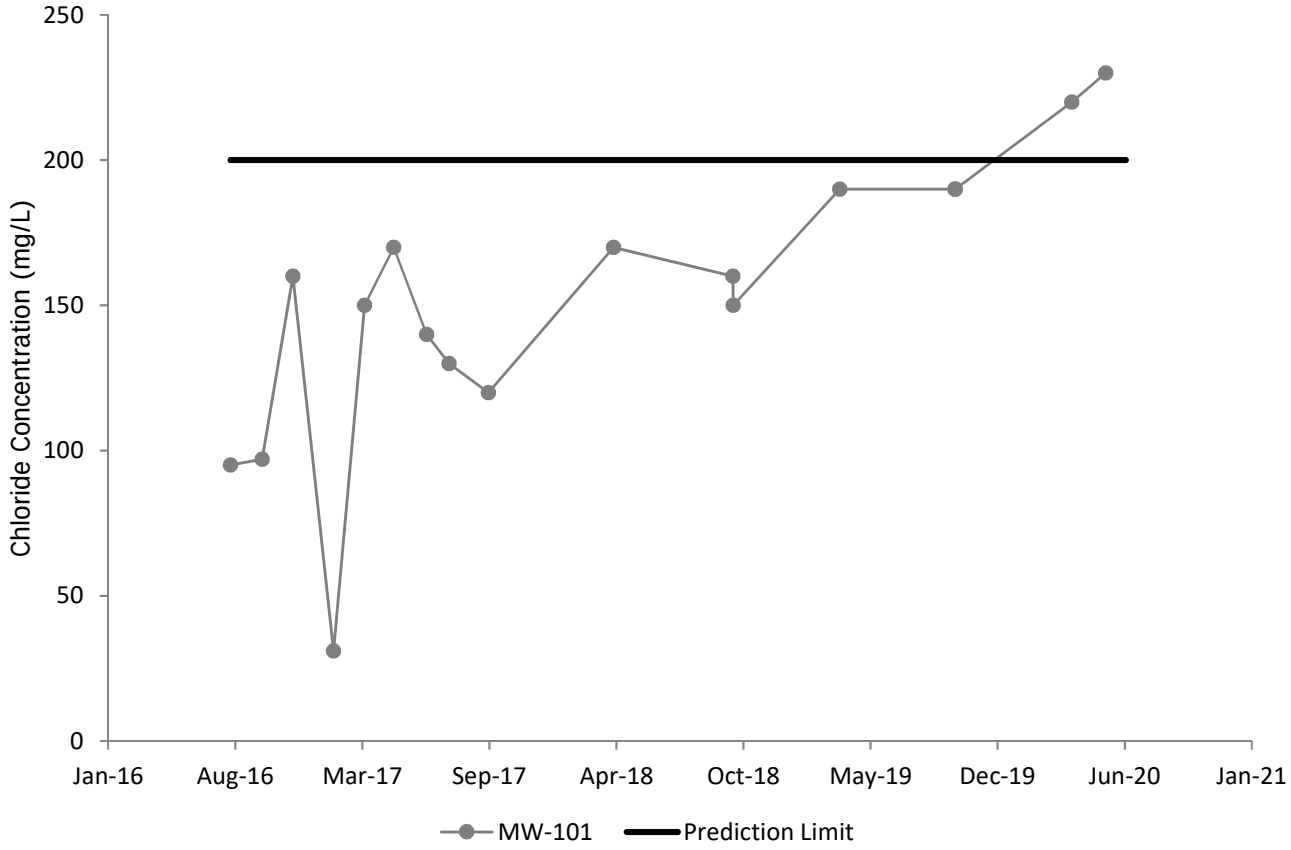
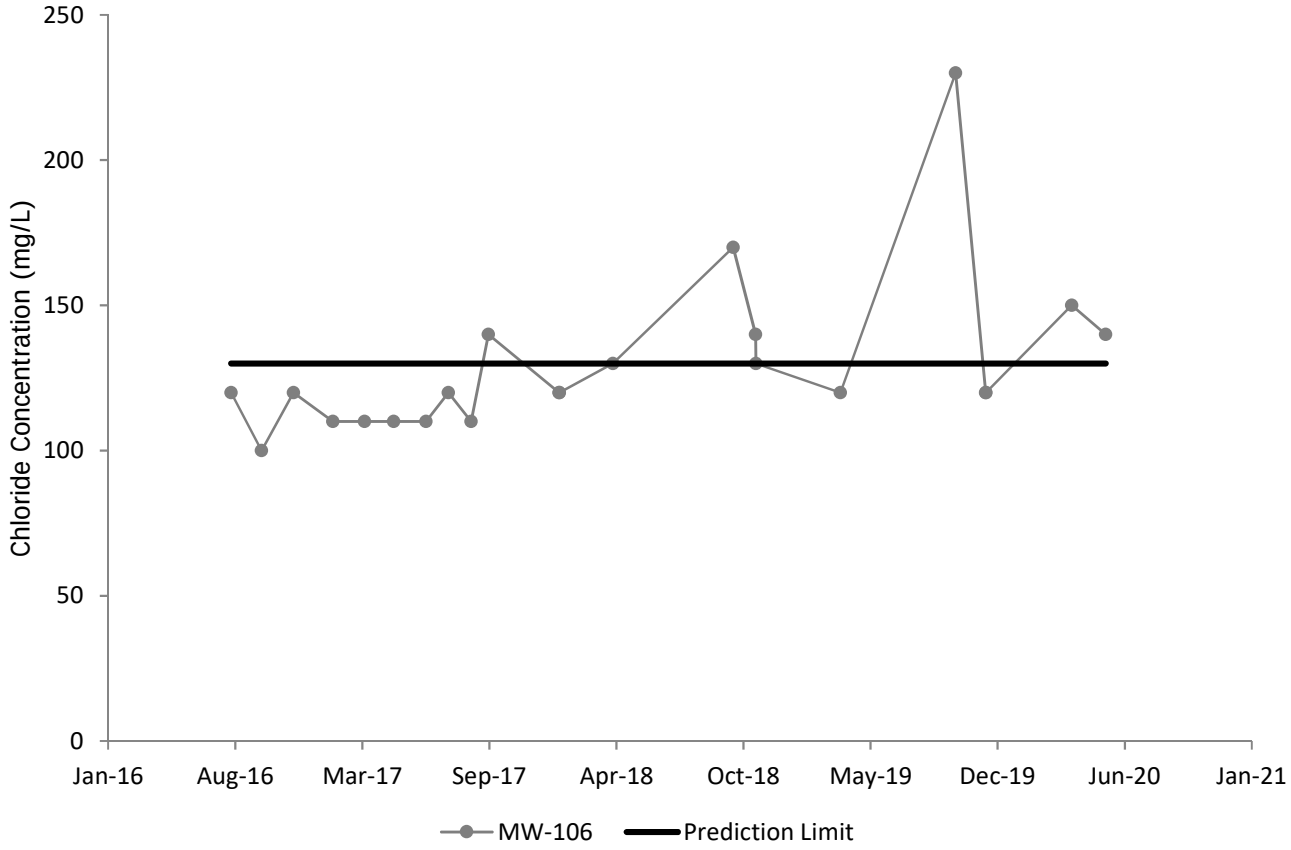


FIGURE 5
MW-106 CHLORIDE TIME SERIES PLOT



Attachment A
Data Quality Review

Laboratory Data Quality Review
Groundwater Monitoring Event March 2020 (Detection Monitoring)
DTE Electric Company Sibley Quarry Landfill (DTE SQLF)

Groundwater samples were collected by TRC for the March 2020 sampling event. 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 report 240-128302-1.

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

- MW-101
- MW-102
- MW-103
- MW-104
- MW-105
- MW-106
- MW-107
- MW-108A

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.

Data Quality Review Procedure

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

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

- The holding time for TDS for samples MW-101, MW-103, MW-104, MW-105, MW-106, MW-107, and DUP-01 exceeded the 7-day holding time criteria by approximately one to five hours. The positive results for TDS in these samples are estimated and may be biased low (see 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-101 for boron, chloride, sulfate, and fluoride, and sample MW-102 for calcium; all criteria were met with the following exceptions:
  - The results for calcium in sample MW-102 were >4x the spike amount; therefore, MS/MSD results were not applicable and not evaluated.
  - The recovery for sulfate (135%) in the MS performed on sample MW-101 was above the acceptance criteria (80-120%). However, the MS was diluted 10-fold after the spike was added; therefore, MS recoveries were not applicable. There was no impact on data usability.
- Laboratory duplicate analysis was performed on sample MW-104 for TDS; all criteria were met.
- DUP-01 corresponds with MW-103; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.
- The reporting limit (2.5 mg/L) for the nondetect fluoride result in sample MW-107 was above the QAPP-specified RL (0.05 mg/L) due to a 50-fold dilution as a result of matrix interference (i.e., the elevated concentration of chloride).

Summary of Data Non-Conformances for Sibley Quarry Landfill Groundwater Analytical Data
March 2020 Sampling Events
DTE Electric Company Monitoring Program
Trenton, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-101	3/26/2020	TDS	Holding time exceeded; these positive results may be biased low.
MW-103	3/26/2020		
MW-104	3/26/2020		
MW-105	3/26/2020		
MW-106	3/26/2020		
MW-107	3/26/2020		
DUP-01	3/26/2020		

Appendix B
Data Quality Review

Laboratory Data Quality Review
Groundwater Monitoring Event March 2020 (Detection Monitoring)
DTE Electric Company Sibley Quarry Landfill (DTE SQLF)

Groundwater samples were collected by TRC for the March 2020 sampling event. 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 report 240-128302-1.

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

- MW-101
- MW-102
- MW-103
- MW-104
- MW-105
- MW-106
- MW-107
- MW-108A

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.

Data Quality Review Procedure

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

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

- The holding time for TDS for samples MW-101, MW-103, MW-104, MW-105, MW-106, MW-107, and DUP-01 exceeded the 7-day holding time criteria by approximately one to five hours. The positive results for TDS in these samples are estimated and may be biased low (see 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-101 for boron, chloride, sulfate, and fluoride, and sample MW-102 for calcium; all criteria were met with the following exceptions:
  - The results for calcium in sample MW-102 were >4x the spike amount; therefore, MS/MSD results were not applicable and not evaluated.
  - The recovery for sulfate (135%) in the MS performed on sample MW-101 was above the acceptance criteria (80-120%). However, the MS was diluted 10-fold after the spike was added; therefore, MS recoveries were not applicable. There was no impact on data usability.
- Laboratory duplicate analysis was performed on sample MW-104 for TDS; all criteria were met.
- DUP-01 corresponds with MW-103; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.
- The reporting limit (2.5 mg/L) for the nondetect fluoride result in sample MW-107 was above the QAPP-specified RL (0.05 mg/L) due to a 50-fold dilution as a result of matrix interference (i.e., the elevated concentration of chloride).

Summary of Data Non-Conformances for Sibley Quarry Landfill Groundwater Analytical Data
March 2020 Sampling Events
DTE Electric Company Monitoring Program
Trenton, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-101	3/26/2020	TDS	Holding time exceeded; these positive results may be biased low.
MW-103	3/26/2020		
MW-104	3/26/2020		
MW-105	3/26/2020		
MW-106	3/26/2020		
MW-107	3/26/2020		
DUP-01	3/26/2020		

Laboratory Data Quality Review
Groundwater Monitoring Event May 2020
DTE Electric Company Sibley Quarry Landfill (DTE SQLF)

Groundwater samples were collected by TRC for the May 2020 sampling event. Samples were analyzed for anions by Eurofins Test America Laboratories, Inc., located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-130571-1.

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

- MW-101
- MW-106
- MW-107

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride, Sulfate)	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.

Data Quality Review Procedure

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

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

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary:

- Target analytes were not detected in the method blank sample.
- An equipment blank was not collected with this data set.
- A field blank was not collected with this data set.
- The LCS recoveries for all target analytes were within laboratory control limits.
- MS and MSD analyses were not performed on a sample from this data set.
- The field duplicate pair samples were MW-101 and DUP-01 for chloride and MW-107 and DUP-02 for sulfate; relative percent differences (RPDs) between the parent and duplicate samples were within the QC limits.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Laboratory Data Quality Review
Groundwater Monitoring Event October 2020 (Detection Monitoring)
DTE Electric Company Sibley Quarry Landfill (DTE SQLF)

Groundwater and effluent samples were collected by TRC for the October 2020 sampling event. 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 reports 240-138063-1.

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

- MW-101
- MW-102
- MW-103
- MW-104
- MW-105
- MW-106
- MW-107
- MW-108A

Additionally, an effluent sample was collected from the following locations:

- DISCHARGE
- SUMP

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 and Iron	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.

Data Quality Review Procedure

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

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

- Data for matrix spike and matrix spike duplicate samples (MS/MSDs), 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 and iron 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:

- An equipment blank was not collected with this dataset.
- 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-102 for anions; all criteria were met.
- Laboratory duplicate analyses were performed on samples MW-101 and MW-108A for TDS; all criteria were met.
- DUP-01 corresponds with MW-107; relative percent differences (RPDs) between the parent and duplicate sample were within the QC limits.