2020 Annual Groundwater Monitoring Report

Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill Coal Combustion Residual Unit

January 2021

Prepared For:

DTE Electric Company
7955 East Dunbar Road
Monroe, Michigan

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) Monroe Power Plant (MONPP) Coal Combustion Residual Fly Ash Basin and Vertical Extension Landfill (FAB & VEL) 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 MONPP FAB & VEL CCR unit.

DTE Electric remained in detection monitoring at the MONPP FAB & VEL CCR Unit in 2020. The semiannual detection monitoring events for 2020 were completed in April 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.

Potential SSIs over prediction limits were noted for pH (one well) and sulfate (two wells) Appendix III constituents in one or more downgradient wells during the April and October 2020 monitoring events. However, these potential SSIs were not confirmed in verification sampling. Therefore, no SSIs were recorded for the 2020 monitoring period and detection monitoring will be continued at the MONPP FAB & VEL CCR unit in accordance with §257.94. In addition, based on the artesian conditions, the low permeability of the underlying natural soils, and the calculated time of travel for groundwater to flow vertically from the MONPP FAB & VEL to the uppermost aquifer, there is no reasonable probability for the uppermost aquifer to have been affected by CCR from FAB & VEL operations that began in 1975.

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) Monroe Power Plant (MONPP) Coal Combustion Residual Fly Ash Basin and Vertical Extension Landfill (FAB & VEL) 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 2020 Annual Groundwater Monitoring Report for calendar year 2020 activities at the MONPP FAB & VEL 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 April and October 2020 semiannual groundwater monitoring events for the MONPP FAB & VEL CCR unit. Detection monitoring for these events continued to be performed in accordance with the *CCR Groundwater Monitoring and Quality Assurance Project Plan – DTE Electric Company Monroe Power Plant Coal Combustion Residual Fly Ash Basin* (QAPP) (TRC, August 2016; revised March 2017) and statistically evaluated per the Stats Plan. 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 MONPP FAB & VEL is located about one mile southwest of the MONPP in Section 16, Township 7 South, Range 9 East at 7955 East Dunbar Road, Monroe, Monroe County, Michigan (Figure 1). The MONPP FAB & VEL is bounded by Dunbar Road and Plum Creek to the north and northeast, Interstate 75 to the northwest, a 200-acre peninsula into Lake Erie to the east and southeast, Lake Erie to the south, and a large open field to the southwest (Figure 2).

The property has been used continuously for the operation of the MONPP FAB & VEL since approximately 1975 and is constructed over a natural clay-rich soil base. The MONPP FAB & VEL and landfill is a Type III solid waste disposal facility owned by DTE Electric, which currently accepts coal ash from DTE Electric's MONPP. The MONPP FAB & VEL is operated in accordance with Michigan Part 115 of the Natural Resources and Environmental Protection Act (NREPA), PA 451 of 1994, as amended, and the current operating license number 9579.

1.3 Geology/Hydrogeology

The MONPP FAB & VEL CCR unit is located within 200 feet southwest of Plum Creek and immediately north of Lake Erie. The MONPP FAB & VEL CCR unit uppermost aquifer consists of saturated limestone present beneath at least 37 feet and up to 53.5 feet of thick contiguous silty clay-rich soil that serves as a natural confining hydraulic barrier that isolates the underlying uppermost aquifer. The limestone bedrock aquifer is artesian in every location except MW-16-01, where the static water level was approximately 1 to 2 feet below ground surface (ft bgs).

Potentiometric groundwater elevation data from 2016 through 2020 suggest that there is horizontal groundwater flow potential within the upper aquifer unit generally to the northeast towards Plum Creek. The average hydraulic gradient to the northeast is on the order of 0.002 foot/foot along the eastern part of the MONPP FAB & VEL to 0.004 to 0.005 foot/foot in the center and northwestern part of the FAB & VEL, with an overall mean of 0.004 foot/foot.

2.0 Groundwater Monitoring

2.1 Monitoring Well Network

A groundwater monitoring system has been established for the MONPP FAB & VEL CCR unit as detailed in the Groundwater Monitoring System Summary Report – Monroe Power Plant Coal Combustion Residual Fly Ash Basin (GWMS Report) (TRC, October 2017). The detection monitoring well network for the MONPP FAB & VEL CCR unit currently consists of seven monitoring wells that are screened in the uppermost aquifer. Monitoring wells MW-16-01 through MW-16-07 are located around the perimeter of the MONPP FAB & VEL and provide data on both background and downgradient groundwater quality that has not been affected by the CCR unit (total of seven 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 April 8, 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 seven monitoring well locations. Groundwater samples were collected from the seven detection monitoring wells for the Appendix III indicator parameters and field parameters. A summary of the groundwater data collected during the April 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 on October 5 and 6, 2020 by TRC personnel and samples were analyzed by Eurofins in accordance with the QAPP. Static water elevation data were collected at all seven monitoring well locations. Groundwater samples were collected from the seven 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 A.

2.2.3 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the April and October 2020 sampling events continue to show that groundwater within the uppermost aquifer generally flows to the northeast across the Site. Groundwater potentiometric surface elevations measured across the Site during the April and October 2020 sampling events are provided on Table 1 and were used to construct the groundwater potentiometric surface maps shown on Figure 3 and Figure 4, respectively.

The groundwater flow rate and direction is consistent with previous monitoring events. The average hydraulic gradients throughout the MONPP FAB/VEL CCR unit during the April and October 2020 events was approximately 0.004 ft/ft. Using the aforementioned hydraulic conductivity of 5 feet/day and an assumed effective porosity of 0.1, the estimated seepage velocity for the April and October 2020 events is 0.20 feet/day (approximately 73 feet/year).

The general flow rate and direction from both 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 MONPP FAB & VEL CCR unit.

3.0 Statistical Evaluation

3.1 Establishing Background Limits

As discussed in the Stats Plan, intrawell statistical methods for MONPP FAB & VEL were selected based on the geology and hydrogeology at the Site. (primarily the presence of clay/hydraulic barrier and the hydraulic separation between the CCR unit and underlying uppermost aquifer), 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 seven established detection monitoring wells (MW-16-01 through MW-16-07). The statistical evaluation of the background data is presented in the 2017 Annual Report (TRC, January 2018). The Appendix III background limits for each monitoring well will be used throughout the detection monitoring period to determine whether groundwater has been impacted from the MONPP FAB & VEL 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 (April 2020)

The concentrations of the indicator parameters in each of the detection monitoring wells (MW-16-01 through MW-16-07) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from MW-16-01 is compared to the background limit developed using the background dataset from MW-16-01, and so forth). The comparisons for the April detection monitoring event are presented on Table 3. The statistical evaluation of the April 2020 Appendix III indicator parameters showed potential SSIs over background for:

- pH (field parameter) at MW-16-06.

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 alternative source demonstration (ASD) will not be analyzed for verification purposes.

Verification resampling was conducted on June 10, 2020, by TRC personnel. Groundwater field parameters were collected for pH at monitoring well MW-16-06 in accordance with the QAPP. A summary of the groundwater data collected during the verification event is provided on Table 3. The associated data quality review is included in Appendix A.

The verification results for pH at MW-16-06 is within the prediction limits, consequently the initial potential SSI for the April 2020 detection monitoring event is not confirmed. Therefore, in accordance with the Stats Plan and the Unified Guidance, the initial exceedances are not statistically significant, and there are no SSIs for the April 2020 detection monitoring event.

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

The concentrations of the indicator parameters in each of the detection monitoring wells (MW 16-01 through MW-16-07) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from MW-16-01 is compared to the background limit developed using the background dataset from MW-16-01, and so forth). The data comparisons for the October 2020 groundwater monitoring event are presented on Table 4. The statistical evaluation of the October 2020 Appendix III indicator parameters showed potential initial SSIs over background for:

- Sulfate at MW-16-01 and MW-16-06.

3.5 Verification Resampling for the Second 2020 Semiannual Event

Verification resampling was conducted on December 3, 2020, by TRC personnel. Groundwater samples were collected for sulfate at monitoring wells MW-16-01 and MW-16-06 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 verification results for sulfate at MW-16-01 and MW-16-06 are below the prediction limits, consequently the initial potential SSIs for the October 2020 detection monitoring event are not confirmed. Therefore, in accordance with the Stats Plan and the Unified Guidance, the initial exceedances are not statistically significant, and there are no SSIs for the October 2020 detection monitoring event. Detection monitoring will be continued at the MONPP FAB & VEL CCR unit in accordance with §257.94 of the CCR Rule.

4.0 Conclusions and Recommendations

Potential SSIs over background limits were noted for pH (one well during the April 2020 sampling event) and sulfate (two wells during the October 2020 sampling event) in one or more downgradient wells during the 2020 semiannual groundwater monitoring events. However, these potential SSIs were not confirmed in verification sampling. Therefore, there are no SSIs for the 2020 monitoring period and detection monitoring will be continued at the MONPP FAB & VEL in accordance with §257.94.

In addition, as discussed above, and in the GWMS Report, based on the artesian conditions, the low permeability of the underlying natural soils, and the calculated time of travel for groundwater to flow vertically from the MONPP FAB & VEL to the uppermost aquifer, there is no reasonable probability for the uppermost aquifer to have been affected by CCR from FAB & VEL operations that began in 1975.

No corrective actions were performed in 2020. The next semiannual monitoring event at the MONPP FAB & VEL 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
Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill
Monroe, Michigan

CERTIFICATION

I hereby certify that the annual groundwater and corrective action report presented within this document for the MONPP FAB & VEL 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 Monroe Power Plant Coal Combustion Residual Fly Ash Basin, 7955 East Dunbar Road, Monroe, Michigan. Prepared for DTE Electric Company.

TRC. October 2017. Groundwater Monitoring System Summary Report – Monroe Power Plant Coal Combustion Residual Fly Ash Basin, 7955 East Dunbar Road, Monroe, Michigan. Prepared for DTE Electric Company.

TRC. October 2017. Groundwater Statistical Evaluation Plan –Monroe Power Plant Coal Combustion Residual Fly Ash Basin, 7955 East Dunbar Road, Monroe, Michigan. Prepared for DTE Electric Company.

TRC. January 2018. Annual Groundwater Monitoring Report – DTE Electric Company Monroe Power Plant Fly Ash Basin Coal Combustion Residual Unit, 7955 East Dunbar Road, Monroe, Michigan. Prepared for DTE Electric Company.

TRC. April 12, 2018. Alternate Source Demonstration: 2017 Initial Detection Monitoring Sampling Event Monroe Power Plant Coal Combustion Residual Fly Ash Basin, Monroe, Michigan. Prepared for DTE Electric Company.

TRC. January 30, 2020. Alternate Source Demonstration: 2019 Second Semiannual Detection Monitoring Sampling Event for the Monroe Power Plant Coal Combustion Residual Fly Ash Basin and Vertical Extension Landfill, Monroe, Michigan. Prepared for DTE Electric Company.

TRC. January 2020. 2019 Annual Groundwater Monitoring Report – DTE Electric Company, Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill, Coal Combustion Residual Unit. 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
Groundwater Elevation Summary – April and October 2020
Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill – RCRA CCR Monitoring Program
Monroe, Michigan

Well ID	MW-16-01		MW-16-02		MW-16-03		MW-16-04		MW-16-05		MW-16-06		MW-16-07	
Date Installed	2/17/2016		2/18/2016		2/16/2016		2/15/2016		4/13/2016		4/13/2016		4/14/2016	
TOC Elevation	581.74		581.81		579.95		585.54		580.42		581.94		578.40	
Geologic Unit of Screened Interval	Silt/Limestone Interface		Silt/Limestone Interface		Sand & Silty Clay Limestone Interface		Silty Sand and Gravel		Limestone		Gravel and Cobbles		Silt/Limestone Interface	
Screened Interval Elevation	530.9 to 525.9		526.4 to 521.4		540.3 to 535.3		541.6 to 536.6		540.5 to 535.5		534.2 to 529.2		540.4 to 535.4	
Unit	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft
Measurement Date	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
04/08/2020	4.10	577.64	-4.50	586.3	-11.60	591.6	-15.00	600.5	-15.00	595.4	-1.10	583.0	-6.80	585.2
10/05/2020	4.68	577.06[(1)]	-0.85	582.7	-7.30	587.3	-15.00	600.5	-11.50	591.9	0.80	581.14	-4.40	582.8

Notes:

Negative depth to water measurement indicates artesian conditions, actual measured water level is above the top of casing.

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

ft BTOC - feet below top of casing

(1) Water level meaured on October 6, 2020.

Table 2
Summary of Groundwater Field Parameters – April and October 2020
Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill – RCRA CCR Monitoring Program
Monroe, 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-16-01	4/8/2020	1.60	72.8	7.5	2,454	11.5	2.40
	10/5/2020	0.32	83.0	7.3	1,768	12.4	3.32
	12/3/2020(2)	1.43	42.1	7.1	2,398	11.4	4.37
MW-16-02	4/8/2020	0.05	59.5	7.1	1,729	11.0	0.35
	10/6/2020	0.13	172.5	7.1	2,400	11.4	4.97
MW-16-03	4/8/2020	0.15	68.5	7.1	1,827	12.8	3.11
	10/6/2020	0.18	77.1	7.1	2,466	12.1	3.87
MW-16-04	4/8/2020	0.08	2.3	7.1	1,705	11.6	0.21
	10/5/2020	0.17	-69.6	7.4	1,719	11.2	2.55
MW-16-05	4/8/2020	0.09	27.5	7.1	1,697	11.8	4.22
	10/6/2020	0.19	100.3	7.1	2,316	11.4	2.85
MW-16-06	4/8/2020	1.36	57.6	7.5	2,473	11.9	1.97
	6/10/2020(1)	0.06	99.0	7.1	1,786	12.9	10.7
	10/6/2020	0.19	97.4	7.1	2,366	12.4	4.06
	12/3/2020(2)	1.20	30.5	7.1	2,422	10.5	52.3
MW-16-07	4/8/2020	0.98	50.4	7.3	2,407	11.9	4.95
	10/6/2020	0.31	44.5	7.1	2,297	12.4	4.25

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.
(1) Results shown for verification sampling performed on 6/10/2020.
(2) Results shown for verification sampling performed on 12/3/2020.

Table 3
Comparison of Appendix III Parameter Results to Background Limits – April 2020
Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-16-01		MW-16-02		MW-16-03		MW-16-04		MW-16-05		MW-16-06			MW-16-07	
Sample Date:		4/8/2020	PL	4/8/2020	PL	4/8/2020	PL	4/8/2020	PL	4/8/2020	PL	4/8/2020	6/10/2020[1]	PL	4/8/2020	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data			Data	
Appendix III																
Boron	ug/L	280	310	410	470	460	510	180	210	230	280	350	--	400	210	280
Calcium	ug/L	380,000	450,000	370,000	430,000	390,000	490,000	510,000	610,000	370,000	440,000	380,000	--	420,000	380,000	440,000
Chloride	mg/L	10	14	13	15	18	20	34	39	11	12	11	--	12	7.7	13
Fluoride	mg/L	1.7	2.1	1.5	1.8	1.5	1.8	0.97	1.1	1.4	1.7	1.5	--	1.8	1.5	1.8
pH, Field	SU	7.5	6.3 - 9.0	7.1	6.9 - 7.3	7.1	6.7 - 7.3	7.1	7.0 - 7.5	7.1	6.6 - 7.7	**7.5**	7.1	7.0 - 7.3	7.3	6.9 - 7.4
Sulfate	mg/L	1,400	1,500	1,400	1,700	1,500	1,700	1,300	1,500	1,400	1,600	1,400	--	1,600	1,400	1,600
Total Dissolved Solids	mg/L	1,700	2,200	2,200	2,300	2,200	2,300	2,000	2,200	2,000	2,200	2,100	--	2,300	1,900	2,200

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 for verification sampling performed on 6/10/2020.

Table **4**

Comparison of Appendix III Parameter Results to Background Limits – October 2020

Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill – RCRA CCR Monitoring Program

Monroe, Michigan

Sample Location:		MW-16-01			MW-16-02		MW-16-03		MW-16-04		MW-16-05		MW-16-06			MW-16-07	
Sample Date:		10/5/2020	12/3/2020[1]	PL	10/6/2020	PL	10/6/2020	PL	10/5/2020	PL	10/6/2020	PL	10/6/2020	12/3/2020[1]	PL	10/6/2020	PL
Constituent	Unit	Data			Data		Data		Data		Data		Data			Data	
Appendix III																	
Boron	ug/L	280	--	310	430	470	480	510	190	210	220	280	350	--	400	220	280
Calcium	ug/L	400,000	--	450,000	390,000	430,000	410,000	490,000	530,000	610,000	370,000	440,000	380,000	--	420,000	390,000	440,000
Chloride	mg/L	10	--	14	13	15	19	20	35	39	11	12	12	--	12	7.9	13
Fluoride	mg/L	1.7	--	2.1	1.5	1.8	1.5	1.8	0.99	1.1	1.4	1.7	1.5	--	1.8	1.4	1.8
pH, Field	SU	7.3	--	6.3 - 9.0	7.1	6.9 - 7.3	7.1	6.7 - 7.3	7.4	7.0 - 7.5	7.1	6.6 - 7.7	7.1	--	7.0 - 7.3	7.1	6.9 - 7.4
Sulfate	mg/L	**1,600**	1,400	1,500	1,600	1,700	1,700	1,700	1,400	1,500	1,500	1,600	**1,700**	1,400	1,600	1,500	1,600
Total Dissolved Solids	mg/L	2,100	--	2,200	2,100	2,300	2,100	2,300	1,900	2,200	2,000	2,200	2,000	--	2,300	1,900	2,200

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

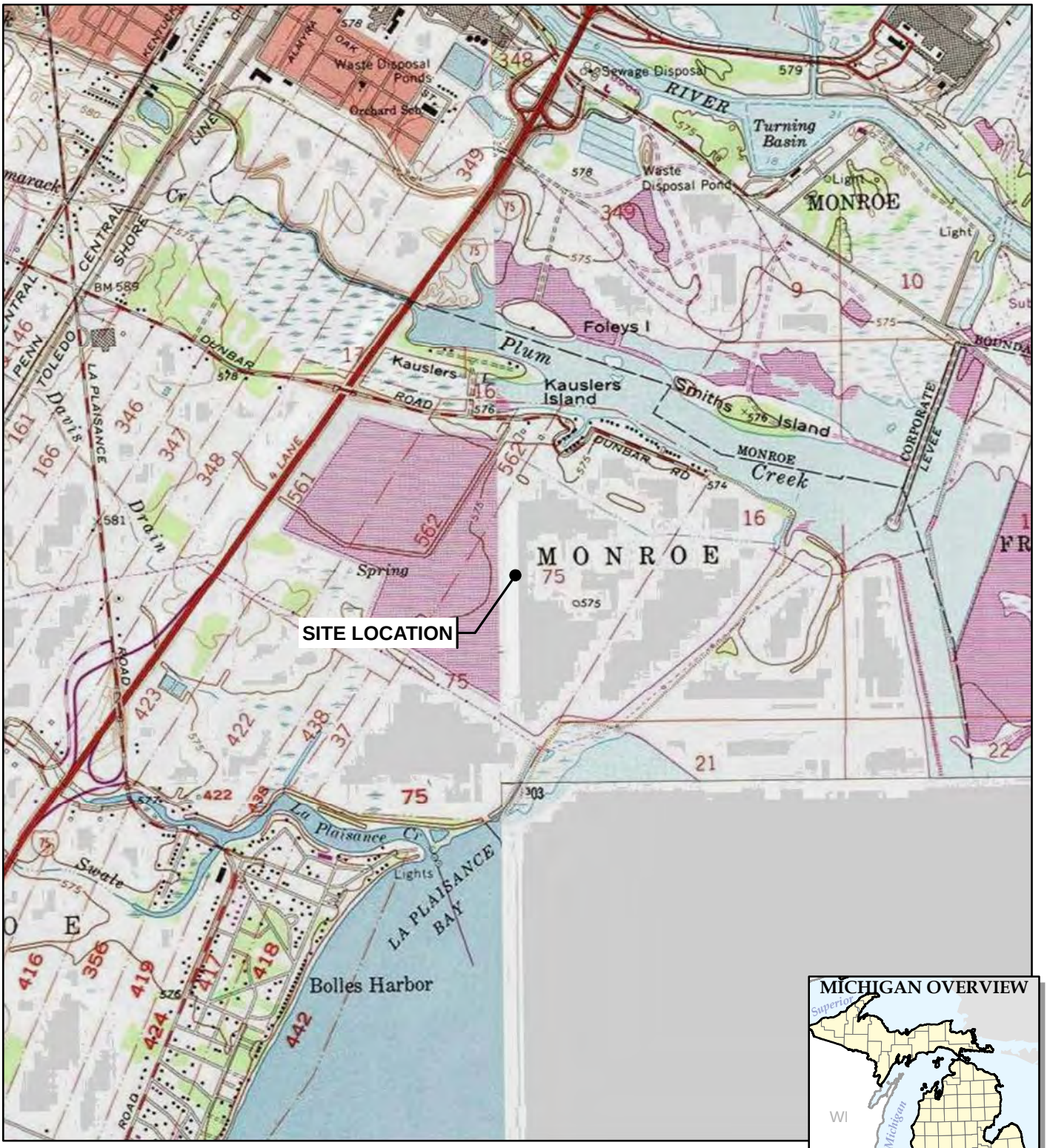
-- = not analyzed

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 12/3/2020.

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

PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT
FLY ASH BASIN AND VERTICAL EXTENSION LANDFILL
7955 EAST DUNBAR ROAD
MONROE, MICHIGAN

TITLE:
SITE LOCATION MAP

DRAWN BY:	S.MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V.BUENING
DATE:	JANUARY 2021
PROJ. NO.:	370029.0001
FILE:	370029-0001-003.mxd

FIGURE 1

E:\DTE\CCR_Sites\2017_265996\370029-0001-003.mxd -- Saved By: SMAJOR on 12/16/2020, 15:30:11 PM

LEGEND

- MONITORING WELLS
- APPROXIMATE BOUNDARY OF FLY ASH BASIN
- APPROXIMATE BOUNDARY OF VERTICAL EXTENSION LANDFILL

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2018.
2. WELL LOCATIONS SURVEYED BY BMJ ENGINEERS AND SURVEYORS INC. IN MARCH AND MAY 2016.
3. SURFACE WATER SAMPLE LOCATION IS APPROXIMATE.

N

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT
FLY ASH BASIN AND VERTICAL EXTENSION LANDFILL
7955 EAST DUNBAR ROAD
MONROE, MICHIGAN

TITLE:
MONITORING NETWORK AND SITE PLAN

DRAWN BY:	S. MAJOR	PROJ NO.:	370029.0001
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.: 370029-0001-005.mxd

TRC - GIS
Coordinate System: NAD 1983 UTM Zone 17N (Meter)
Map Rotation: 0
Plot Date: 12/24/2020, 06:51:24 AM by SMAJOR -- LAYOUT:ANSI B(11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\370029-0001-005.mxd

LEGEND

- MONITORING WELL
- APPROXIMATE BOUNDARY OF FLY ASH BASIN
- APPROXIMATE BOUNDARY OF VERTICAL EXTENSION LANDFILL
- POTENTIOMETRIC SURFACE CONTOUR LINE (5-FT INTERVAL,DASHED WHERE INFERRED)
- (582.84) STATIC WATER ELEVATION IN FEET (NAVD, 1988)

NOTES

1. BASE MAP IMAGERY FROM GOOGLE & PARTNERS GOOGLE EARTH PRO, 04/2018.
2. WELL LOCATIONS SURVEYED BY BMJ ENGINEERS AND SURVEYORS INC. IN MARCH AND MAY 2016.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.

N

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT
FLY ASH BASIN AND VERTICAL EXTENSION LANDFILL
7955 EAST DUNBAR ROAD
MONROE, MICHIGAN

TITLE:
POTENTIOMETRIC SURFACE MAP APRIL 2020

DRAWN BY:	S. MAJOR	PROJ NO.:	3700029.0001
CHECKED BY:	B. YELEN		
APPROVED BY:	S. HOLMSTROM		
DATE:	JANUARY 2021		

FIGURE 3

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

FILE NO.: 370029-0001-006.mxd

Plot Date: 1/27/2021, 09:22:46 AM by SMAJOR - - LAYOUT: ANSI B (11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\3700029-0001-006.mxd
Coordinate System: NAD 1983 UTM Zone 17N (Meter)
Map Rotation: 0

TRC - GIS

LEGEND

- MONITORING WELL
- APPROXIMATE BOUNDARY OF FLY ASH BASIN
- APPROXIMATE BOUNDARY OF VERTICAL EXTENSION LANDFILL
- POTENTIOMETRIC SURFACE CONTOUR LINE (5-FT INTERVAL,DASHED WHERE INFERRED)
- (582.84) STATIC WATER ELEVATION IN FEET (NAVD, 1988)

NOTES

1. BASE MAP IMAGERY FROM GOOGLE & PARTNERS GOOGLE EARTH PRO, 04/2018.
2. WELL LOCATIONS SURVEYED BY BMJ ENGINEERS AND SURVEYORS INC. IN MARCH AND MAY 2016.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988.
4. SURFACE WATER SAMPLE LOCATION IS APPROXIMATE.

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT
FLY ASH BASIN AND VERTICAL EXTENSION LANDFILL
7955 EAST DUNBAR ROAD
MONROE, MICHIGAN

TITLE:
POTENTIOMETRIC SURFACE MAP
OCTOBER 2020

DRAWN BY:	S. MAJOR	PROJ NO.:	3700029.0001
CHECKED BY:	B. YELEN		
APPROVED BY:	S. HOLMSTROM		FIGURE 4
DATE:	JANUARY 2021		

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

FILE NO.: 370029-0001-007.mxd

Plot Date: 1/27/2021, 09:08:18 AM by SMAJOR - - LAYOUT: ANSI B (11"x17")
Path: E:\DTE\CCR_Sites\2017_2659963\370029-0001-007.mxd
Coordinate System: NAD 1983 UTM Zone 17N (Meter)
Map Rotation: 0
TRC - GIS

Appendix A
Data Quality Reviews

Laboratory Data Quality Review
Groundwater Monitoring Event April 2020 (Detection Monitoring)
DTE Electric Company Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill (DTE MONPP FAB & VEL)

Groundwater samples were collected by TRC for the April 2020 sampling event. Samples were analyzed for anions, total boron, total calcium, total iron, 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 240-128875-1.

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

- MW-16-01
- MW-16-02
- MW-16-03
- MW-16-04
- MW-16-05
- MW-16-06
- MW-16-07
- MP-001F

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	SW846 9056A
Total Boron	SW846 6010B
Total Calcium, Total Iron	SW846 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. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical 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 as well as 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:

- The holding time for TDS for all samples exceeded the 7-day holding time criteria by approximately two to five hours. These results should be considered estimated and may be biased low as noted 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 samples MW-16-01 for boron, MW-16-02 for calcium and iron, and MP-001F for chloride and fluoride. Recoveries and relative percent differences (RPDs) were within the QC limits except as noted below.
  - The recovery for calcium in the MSD performed on sample MW-16-02 was outside of the control limits. However, the concentration of calcium in the parent sample was >4x the spike concentration; therefore, the control limits are not applicable. Data usability is not affected.
  - MS/MSD analyses were not performed for sulfate in this data set. Per the project QAPP, MS/MSD analyses are required for sulfate at a frequency of 1 per 20 samples. MS/MSD analyses were likely performed on sample MP-001F for sulfate but were likely not reported due to the re-analysis and dilution required for sulfate in this sample.
- Laboratory duplicate analyses were performed on samples MW-16-06 and MP-001F for TDS; RPDs between the parent and duplicate sample were within the QC limits.
- Dup-01 corresponds with MW-16-05; RPDs between the parent and duplicate sample were within the QC limits.

Summary of Data Non-Conformances for
Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill Groundwater Analytical Data
April 2020 Sampling Event
DTE Electric Company Monitoring Program
Monroe, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-16-01	4/8/2020	TDS	Holding time exceeded; these positive results may be biased low.
MW-16-02	4/8/2020		
MW-16-03	4/8/2020		
MW-16-04	4/8/2020		
MW-16-05	4/8/2020		
DUP-01	4/8/2020		
MW-16-06	4/8/2020		
MW-16-07	4/8/2020		
MP-001F	4/8/2020		

Field Parameter Data Quality Review
Groundwater Sampling Event June 2020 Verification Resampling
DTE Electric Company Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill (DTE MONPP FAB & VEL)

On June 10, 2020, TRC Environmental Corporation (TRC) collected groundwater parameters at monitoring well MW-16-06 to verify initial pH (field measured) results that were outside of prediction limits during the April 2020 detection monitoring event. Prior to field parameter collection, three well volumes of groundwater were purged and stabilized in accordance with the *Hydrogeological Monitoring Plan for the DTE Electric Company Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill* (TRC, November 2019).

TRC routinely reviews the field parameter data to assess data usability. The following sections summarize the data review procedure and the results of this review.

Data Quality Review Procedure

The following items were included in the evaluation of the field parameter data:

- Review of sonde calibration data;
- Confirm field parameter stabilization criteria were met;
- Compare field parameters to historical data;
- Compare field parameters to prediction limits, and;
- Overall usability of data based on these items.

Findings

The data quality objectives for the project were met and the data are usable. The discussion that follows describes the QA/QC results and evaluation.

- Sonde calibration readings were within the calibration range for all field parameters.
- Field parameters met stabilization criteria for three successive readings.
- Field parameter readings were comparable to historical data.
- Field parameter readings were within prediction limits.
- Data are usable for purposes of verification resampling.

Laboratory Data Quality Review
Groundwater Monitoring Event October 2020
DTE Electric Company Monroe Power Plant Fly Ash Basin (FAB-VEL)

Groundwater 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. (Test America), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-137924-1.

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

- MW-16-01
- MW-16-02
- MW-16-03
- MW-16-04
- MW-16-05
- MW-16-06
- MW-16-07
- MW-001F

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) , 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 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 samples MW-16-01 for calcium and iron, and DUP-01 for chloride and fluoride. The recoveries of calcium in the MS/MSD performed on sample MW-16-01 were below the laboratory acceptance limits. However, data usability was not affected since the concentration of calcium in the parent sample was greater than four times the spike concentration.
- Laboratory duplicate analyses were performed for TDS on samples MW-16-06 and MW-001F. The relative percent differences (RPDs) met the acceptance criteria.
- DUP-01 corresponds with MW-16-04; RPDs between the parent and duplicate sample were within the QC limits.

Laboratory Data Quality Review
Groundwater Verification Sampling Event December 2020
DTE Electric Company Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill (DTE MONPP FAB & VEL)

Groundwater samples were collected by TRC for the December 2020 sampling event. Samples were analyzed for sulfate by Eurofins-Test America Laboratories, Inc. (Eurofins-TA), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-141428-1.

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

- MW-16-01
- MW-16-06

Each sample was analyzed for the following constituent:

Analyte Group	Method
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 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:

- Sulfate was not detected in the method blanks.
- LCS recoveries for sulfate were within laboratory control limits.
- MS/MSD analyses were not performed on a sample from this data set.
- DUP-01_20201203 corresponds with MW-16-01_20201203; the relative percent difference between the parent and duplicate sample was within the QC limits.