2021 Annual Groundwater Monitoring Report

Monroe Power Plant Bottom Ash Impoundment
Inactive Coal Combustion Residual Unit

3500 East Front Street
Monroe, Michigan

July 2021

Prepared For:

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Executive Summary

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

DTE Electric remained in detection monitoring at the MONPP BAI CCR Unit in the 2021 monitoring period. The semiannual detection monitoring events for 2021 were completed in October 2020 and April 2021 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 the 2021 reporting period are presented in this report.

SSIs for fluoride (one well) and boron (two wells) were detected at three monitoring locations for the October 2020 monitoring event that were addressed through an Alternate Source Demonstration (ASD). For the April 2021 detection monitoring event, SSIs for fluoride (two wells) and sulfate (one well) were detected, as verified by resampling, and will be further evaluated through the ASD process.

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

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

In response to the fluoride (2) and sulfate (1) SSIs over the background limit noted during the April 2021 monitoring event, DTE Electric plans to prepare an ASD to evaluate the SSIs.

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). The CCR Rule, as amended, applies to the DTE Electric Company (DTE Electric) Monroe Power Plant (MONPP) Bottom Ash Impoundment (BAI) Inactive CCR unit. On August 5, 2016, the USEPA published the CCR Rule companion *Extension of Compliance Deadlines for Certain Inactive Surface Impoundments*, which established the compliance deadlines for CCR units that were inactive prior to April 17, 2018. Pursuant to the CCR Rule, no later than August 1, 2019, and annually thereafter, the owner or operator of an inactive CCR unit must prepare an annual groundwater monitoring and corrective action report for the CCR unit documenting the status of groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e).

As documented in the *Annual Groundwater Monitoring Report for the Monroe Power Plant Bottom Ash Impoundment Inactive Coal Combustions Residual Unit (2020 Annual Report)* (TRC, July 2020), covering 2020 reporting period (July 1, 2019 through June 30, 2020) activities, DTE Electric reported that the sulfate concentration within groundwater at monitoring well MW-7S was outside background limits. As a result, an Alternate Source Demonstration (ASD) was performed pursuant to §257.94(e) and concluded that the SSI can be attributed to the variability in groundwater quality. Therefore, no SSIs were associated with the MONPP BAI CCR unit in the 2020 reporting period and DTE Electric continued detection monitoring pursuant to §257.94 of the CCR Rule. The September 2020 ASD is provided in Appendix A.

TRC prepared this 2021 Annual Groundwater Monitoring Report (2021 Annual Report) for the MONPP BAI CCR unit on behalf of DTE Electric for the reporting period that extends from July 1, 2020 through June 30, 2021, and presents the monitoring results and the statistical evaluation of the detection monitoring parameters for the October 2020 and April 2021 semiannual groundwater monitoring events for the MONPP BAI Inactive CCR unit.

These events are the fourth and fifth detection monitoring events performed to comply with §257.94. The monitoring was performed in accordance with the *Groundwater Monitoring Work Plan Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin DTE Monroe Plant* (Work Plan) (AECOM, September 2017) and statistically evaluated per the *Groundwater Statistical Evaluation Plan Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin DTE Monroe Plant* (Stats Plan) (AECOM, April 2019, Revision 1 August 2019). As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) of detection monitoring parameters compared to background levels.

1.2 Site Overview

The MONPP is located in Section 16, Township 7 South, Range 9 East, at 7955 East Dunbar Road, Monroe in Monroe County, Michigan (Figure 1). The MONPP BAI Inactive CCR unit was

operated from the mid-1970s through 2015 and is located within the southern portion of the MONPP parcel at latitude 41° 52' 30" North and longitude 83° 20' 70" West. The MONPP BAI Inactive CCR unit is bounded by the MONPP facility to the north and northeast, Lake Erie to the southeast and south, and Plum Creek / the discharge canal to the west (Figure 2). The implementation for the BAI closure by removal is ongoing.

1.3 Geology/Hydrogeology

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

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

A detailed summary of the site hydrogeology is presented in the *Monitoring Well Installation Report Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin DTE Monroe* (Well Installation Report) (AECOM, April 2019, Revision 1 August 2019).

2.0 Groundwater Monitoring

2.1 Monitoring Well Network

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

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

- The sand unit located at the bottom of the lacustrine deposits is limited in extent. The unit is present in the inactive Bottom Ash Impoundment area and extends a limited distance north into the main Monroe Plant area. As noted above, the sand unit extends westward but also thins out and is not present in monitoring wells located greater than 500 feet west of the CCR unit. Therefore, there is no representative upgradient or background monitoring position available for the unit; and
- There is a strong confined hydraulic pressure in the sand unit aquifer. The overlying finer grained lacustrine deposits are relatively dry but water levels in the monitoring wells installed in the sand unit rise to within 2.5 to 12.0 feet below ground surface (bgs), likely driven by hydraulic pressure from the underlying bedrock aquifer system.

As such, an intrawell statistical approach was selected. An intrawell statistical approach requires that each of the downgradient wells doubles as the background and compliance well, where data from each individual well during a detection monitoring event is compared to a statistical limit developed using the background dataset from that same well. The monitoring system is comprised of monitoring wells MW-1S through MW-3S, MW-7S, and MW-9 through MW-15 located around the perimeter of the MONPP BAI (total of eleven background/downgradient monitoring wells). Additional discussion related to the selection of an intrawell statistical approach is presented in the Stats Plan.

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 Work Plan. In addition to pH, the collected field parameters included oxidation reduction potential, dissolved oxygen, specific conductivity, temperature, and turbidity.

2.2.1 Data Summary

The first semiannual groundwater detection monitoring event for the 2021 monitoring period was performed October 8, 9, and 16, 2020, by TRC personnel and samples were analyzed by Eurofins TestAmerica Laboratories, Inc. (Test America) in accordance with the Work Plan. Static

water elevation data were collected at all eleven monitoring well locations. Groundwater samples were collected from the eleven 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 3 (analytical data).

The second semiannual groundwater detection monitoring event was performed April 5 and 6, 2021, by TRC personnel and samples were analyzed by Test America in accordance with the Work Plan. Static water elevation data were collected at all eleven monitoring well locations. Groundwater samples were collected from the eleven detection monitoring wells for the Appendix III indicator parameters and field parameters. A summary of the groundwater data collected during the April 2021 event is provided on Table 1 (static groundwater elevation data), Table 2 (field data), and Table 4 (analytical data).

2.2.2 Data Quality Review

Data from the October 2020 and April 2021 detection monitoring events and associated verification resampling 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 presented in Appendix C.

2.2.3 Groundwater Flow Rate and Direction

Groundwater elevation data collected during October 2020 and April 2021 sampling events continue to show that groundwater within the uppermost aquifer generally flows toward Lake Erie to the southeast, south and southwest. Groundwater potentiometric surface elevations measured across the Site during the October 2020 and April 2021 sampling event are provided on Table 1 and were used to construct 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 gradient throughout the Site during the October 2020 event is estimated at 0.0015 ft/ft using the 575 foot contour line and MW-9, MW-11, and MW-13, resulting in an estimated average seepage velocity of approximately 0.80 ft/day or 290 ft/year. The average hydraulic gradient throughout the Site during the April 2021 event is estimated at 0.0021 ft/ft using the 575 foot contour line and MW-9, MW-11, and MW-13, resulting in an estimated average seepage velocity of approximately 1.1 ft/day or 410 ft/year. Both events used the hydraulic conductivity of 164 ft/day averaged from the hydraulic conductivity values calculated for MW-1S, MW-3S, and MW-7S during aquifer testing and the assumed effective porosity of 0.3 described in the Well Installation Report.

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

3.0 Statistical Evaluation

3.1 Establishing Background Limits

Per the Stats Plan, background limits were established for the Appendix III indicator parameters following the collection of at least eight background monitoring events using data collected from each of the eleven established detection monitoring wells (MW-1S through MW-3S, MW-7S, and MW-9 through MW-15). The statistical evaluation of the background data is presented in the 2019 Annual Report (TRC, July 2019). 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 BAI Inactive CCR unit by comparing concentrations in the detection monitoring wells to their respective background limits for each Appendix III indicator parameter.

3.2 Data Comparison to Background Limits – First Semiannual Event (October 2020)

The concentrations of the indicator parameters in each of the detection monitoring wells (MW-1S through MW-3S, MW-7S, and MW-9 through MW-15) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from MW-1S is compared to the background limit developed using the background dataset from MW-1S, and so forth). The comparisons are presented on Table 3.

The statistical evaluation of the October 2020 Appendix III indicator parameters shows potential SSIs over background for:

- Boron at MW-10 and MW-11; and
- Fluoride at MW-3S.

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

3.3 Verification Resampling – First Semiannual Event (October 2020)

Verification resampling is recommended per the Stats Plan and the *USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance, USEPA, 2009) to achieve performance standards as specified by §257.93(g) in the CCR Rule. Per the Stats Plan, if there is an exceedance of a prediction limit for one or more of the parameters, the well(s) of concern will be resampled within 30 days of the completion of the initial statistical analysis. Only constituents that initially exceed their statistical limit (i.e., have no previously recorded SSIs) will be analyzed for verification purposes. As such, verification resampling was conducted on December 3, 2020, by TRC personnel for boron at MW-10 and

MW-11, and for fluoride at MW-3S. Additionally, MW-3S was resampled on March 10, 2021 due to an anomalous fluoride concentration from the December 2020 verification event after the well was redeveloped as the top had been previously damaged. A summary of the groundwater data collected during the verification resampling events are provided on Table 3. The associated data quality review is included in Appendix C.

The December 2020 verification sampling confirmed the SSI for boron at monitoring wells MW-10 and MW-11 and the December 2020/March 2021 verification sampling events confirmed the SSI for fluoride at MW-3S. TRC reviewed the data and determined that boron is a result of natural variability in groundwater quality and fluoride is due to damage to the monitoring well sustained during site improvement activities and not attributable to the MONPP BAI CCR unit as presented in the *Alternate Source Demonstration: 2020 Second Semiannual Detection Monitoring Sampling Event for the Monroe Power Plant Bottom Ash Impoundment Coal Combustion Residual Unit*, dated March 18, 2021 (March 2021 ASD) (Appendix B). As no SSIs were found that were not addressed within an ASD, detection monitoring was continued at the MONPP BAI CCR unit in accordance with §257.94 of the CCR Rule.

3.4 Data Comparison to Background Limits – Second Semiannual Event (April 2021)

The data comparisons for the April 2021 groundwater monitoring event are presented on Table 4. Based on the statistical evaluation of the April 2021 Appendix III indicator parameters potential SSIs were identified and a resample of the following was collected in accordance with the Stats Plan:

- Fluoride at MW-3S and MW-9; and
- Sulfate at MW-13 and MW-15.

3.5 Verification Resampling – Second Semiannual Event (April 2021)

Verification resampling was conducted on June 9, 2021, by TRC personnel. Groundwater samples were collected for fluoride at monitoring well MW-3S and MW-9 and for sulfate at monitoring well MW-13 and MW-15 in accordance with the Stats Plan. 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 C.

The MW-15 sulfate verification results were within the prediction limits and no SSI exists from the April 2021 event for this parameter in accordance with the Stats Plan and the Unified Guidance.

The June 2021 verification sampling confirmed the SSIs for fluoride at MW-3S and MW-9 and for sulfate at monitoring well MW-13. Per §257.94(e), DTE Electric is in the process of performing an ASD to further evaluate the fluoride SSIs at MW-3S and MW-9 and for the sulfate SSI at monitoring well MW-13.

4.0 Conclusions and Recommendations

No SSIs over background limits were recorded during the October 2020 monitoring event that were not addressed through an ASD. For the April 2021 monitoring event, fluoride and sulfate SSIs were observed at three monitoring well locations, as verified by resampling, and are being further evaluated through the ASD process.

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

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

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

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

In response to the fluoride and sulfate SSIs over the background limit noted during the April 2021 event, DTE plans to prepare an ASD to evaluate whether a source other than the MONPP BAI Inactive CCR unit caused the SSI.

The next semiannual monitoring event at the MONPP BAI is scheduled for the fourth 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 Bottom Ash Impoundment
Monroe, Michigan

CERTIFICATION

I hereby certify that the annual groundwater and corrective action report presented within this document for the MONPP BAI 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	 Stamp July 29, 2021
Company: TRC Engineers Michigan, Inc.	Date: July 29, 2021	

6.0 References

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

AECOM. April 2019, Revision 1 August 2019. Groundwater Statistical Evaluation Plan Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin, DTE Monroe Plant, Monroe, Michigan. Prepared for DTE Electric Company.

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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 – October 2020 and April 2021
Monroe Power Plant BAI Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Well ID	MW-1S		MW-2S		MW-3S		MW-7S		MW-9		MW-10		MW-11		MW-12		MW-13		MW-14		MW-15	
Date Installed	9/19/2016		9/19/2016		9/20/2016		9/28/2016		9/19/2017		9/20/2017		9/20/2017		9/21/2017		9/21/2017		9/22/2017		9/26/2017	
TOC Elevation	582.62		578.85		577.58		576.20		579.05		577.46		580.58		582.49		580.97		580.76		580.80	
Geologic Unit of Screened Interval	Silt and Sand		Sand and Sandy clay		Silt and Sand		Sand and Gravel		Sand and Gravel		Sand and Sandy clay		Silt		Silt and Sand		Clay, Silt, and Sand		Silt and Sand		Sandy Clay and Sand	
Screened Interval Elevation	538.80 to 548.80		538.20 to 548.20		538.10 to 548.10		542.60 to 552.60		541.37 to 551.37		540.79 to 550.79		537.84 to 547.84		537.90 to 547.90		543.25 to 553.25		537.87 to 547.87		539.61 to 549.61	
Unit	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft
Measurement Date	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
10/8/2020	9.13	573.49	4.19	574.66	3.11	574.47	2.17	574.03	4.88	574.17	3.33	574.13[(1)]	5.85	574.73	7.75	574.74	7.22	573.75	5.87	574.89	6.93	573.87
04/05/2021	9.17	573.45	5.16	573.69	3.80	573.78	2.10	574.10	4.78	574.27	3.10	574.36	6.70	573.88	8.80	573.69	7.29	573.68	5.49	575.27	7.15	573.65

Notes:

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

ft BTOC - feet below top of casing

NM - Not Measured.

(1) - Depth to water guaged on October 16, 2020.

Table 2
Summary of Field Parameters – October 2020 to June 2021
Monroe Power Plant BAI Inactive CCR Unit – 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-1S	10/9/2020	0.30	-78.5	6.9	1,658	14.7	70.6
	4/6/2021	1.67	53.3	7.0	1,740	12.0	39.5
MW-2S	10/8/2020	0.18	-168.9	7.7	2,156	14.9	19.9
	4/5/2021	1.97	-139.8	7.6	2,183	12.4	4.45
MW-3S	10/8/2020	0.30	-62.1	7.2	2,279	17.9	100
	12/3/2020	1.21	92.8	6.9	2,449	13.9	74.0
	4/21/2021	1.47	10.9	7.2	1,608	14.2	112
	6/9/2021	1.63	-23.6	6.9	2,180	17.3	55.7
MW-7S	10/9/2020	0.38	-89.1	7.1	1,325	16.0	8.76
	4/6/2021	1.61	-32.9	7.0	1,514	14.3	0.10
MW-9	10/8/2020	0.17	-89.9	6.8	1,403	16.3	2.21
	4/5/2021	1.59	-90.9	7.0	1,475	14.2	2.75
	6/9/2021	1.48	-61.3	6.8	1,408	16.3	4.22
MW-10	10/16/2020	0.77	-295.0	7.0	1,491	16.4	2.26
	12/3/2020	0.98	-138.8	7.1	1,486	14.8	1.42
	4/5/2021	1.50	-166.5	7.1	1,521	14.1	3.55
MW-11	10/8/2020	0.22	-104.4	7.3	2,362	15.2	76.5
	12/3/2020	1.33	74.8	7.3	2,374	12.6	12.0
	4/5/2021	2.39	-99.9	7.4	2,421	12.0	5.55
MW-12	10/8/2020	0.77	-146.5	7.6	2,015	14.4	6.38
	4/5/2021	2.95	-109.5	7.5	2,065	12.4	4.55
MW-13	10/8/2020	0.12	-125.7	6.9	914	14.5	4.88
	4/5/2021	1.75	-99.8	7.0	939	11.7	9.95
	6/9/2021	1.57	-95.0	6.8	899	14.2	4.88
MW-14	10/8/2020	0.22	-115.7	7.0	2,125	14.5	3.68
	4/5/2021	1.75	-131.9	6.9	2,394	11.6	0.50
MW-15	10/9/2020	0.17	-140.8	7.1	1,223	17.1	3.38
	4/6/2021	1.48	-117.5	7.2	1,268	15.5	0.35
	6/9/2021	1.45	-119.3	7.0	1,216	17.2	2.75

Notes:

mg/L - milligrams per liter.

mV - milliVolt.

SU - standard unit.

umhos/cm - micro-mhos per centimeter.

deg C - degrees celcius.

NTU - nephelometric turbidity units.

Table 3
Comparison of Appendix III Parameter Results to Background Limits – October 2020 to March 2021
Monroe Power Plant BAI Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-1S		MW-2S		MW-3S				MW-7S		MW-9	
Sample Date:		10/9/2020	PL	10/8/2020	PL	10/8/2020	12/3/2020(1)	3/10/2021(2)	PL	10/9/2020	PL	10/8/2020	PL
Constituent	Unit	Data		Data		Data				Data		Data	
Appendix III													
Boron	ug/L	540	870	1,000	1,000	820	--	--	980	320	1,400	560	640
Calcium	ug/L	220,000	370,000	230,000	270,000	340,000	--	--	540,000	170,000	380,000	160,000	190,000
Chloride	mg/L	92	170	11	14	13	--	--	15	42	110	39	59
Fluoride	mg/L	0.41	0.47	0.73	0.89	**1.1**	**1.7**	**1.0**	0.98	0.67	1.6	0.56	0.56
pH, Field	su	6.9	6.5 - 8.7	7.7	7.0 - 8.5	7.2	6.9	6.9	6.9 - 7.9	7.1	6.0 - 8.1	6.8	6.2 - 7.0
Sulfate	mg/L	190	850	1,200	1,600	1,300	--	--	1,400	360	590	2.7	12
Total Dissolved Solids	mg/L	1,000	1,600	1,700	2,000	1,700	--	--	2,300	870	2,000	700	810

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units; pH is a field parameter.
-- = not analyzed.
All metals were analyzed as total unless otherwise specified.
Bold font indicates an exceedance of the Prediction Limit (PL).
RESULT Shading and bold font indicates a confirmed exceedance of the Prediction Limit (PL).
(1) Results for verification sampling event performed on 12/3/2020.
(2) Result for the resample of anomalous fluoride verification data from 12/3/2020. Resample performed after well redevelopment completed

Table 3
Comparison of Appendix III Parameter Results to Background Limits – October 2020 to March 2021
Monroe Power Plant BAI Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-10			MW-11			MW-12		MW-13		MW-14		MW-15	
Sample Date:		10/16/2020	12/3/2020(1)	PL	10/8/2020	12/3/2020(1)	PL	10/8/2020	PL	10/8/2020	PL	10/8/2020	PL	10/9/2020	PL
Constituent	Unit	Data			Data			Data		Data		Data		Data	
Appendix III															
Boron	ug/L	**560**	**570**	530	**940**	**940**	920	1,100	1,100	< 100	100	1,100	1,700	2,400	2,800
Calcium	ug/L	160,000	--	170,000	250,000	--	330,000	180,000	210,000	120,000	140,000	220,000	310,000	130,000	150,000
Chloride	mg/L	55	--	80	16	--	18	10	13	95	120	220	310	110	150
Fluoride	mg/L	0.48	--	0.68	0.93	--	1.2	0.85	0.91	0.41	0.51	0.38	0.57	0.49	0.64
pH, Field	su	7.0	7.1	6.6 - 7.5	7.3	7.3	6.9 - 7.5	7.6	7.4 - 7.9	6.9	6.2 - 7.7	7.0	6.8 - 7.3	7.1	6.9 - 7.4
Sulfate	mg/L	8.2	--	19	1,400	--	1,500	1,100	1,300	1.0	1.0	360	430	< 1.0	1.0
Total Dissolved Solids	mg/L	780	--	840	1,800	--	2,100	1,600	1,800	500	1,100	1,300	1,700	620	770

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not analyzed.

All metals were analyzed as total unless otherwise specified.

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

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

(1) Results for verification sampling event performed on 12/3/2020.

(2) Result for the resample of anomalous fluoride verification data from 12/3/2020. Resample performed after well redevelopment completed

Table 4
Comparison of Appendix III Parameter Results to Background Limits – April and June 2021
Monroe Power Plant BAI Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-1S		MW-2S		MW-3S			MW-7S		MW-9		
Sample Date:		4/6/2021	PL	4/5/2021	PL	4/21/2021	6/9/2021[1]	PL	4/5/2021	PL	4/5/2021	6/9/2021[1]	PL
Constituent	Unit	Data		Data		Data			Data		Data		
Appendix III													
Boron	ug/L	530	870	920	1,000	980	--	980	1,200	1,400	520	--	640
Calcium	ug/L	240,000	370,000	260,000	270,000	240,000	--	540,000	220,000	380,000	180,000	--	190,000
Chloride	mg/L	110	170	11	14	14	--	15	58	110	37	--	59
Fluoride	mg/L	0.25	0.47	0.72	0.89	**1.0**	**1.0**	0.98	0.97	1.6	**0.57**	**0.58**	0.56
pH, Field	su	7.0	6.5 - 8.7	7.6	7.0 - 8.5	7.2	--	6.9 - 7.9	7.0	6.0 - 8.1	7.0	--	6.2 - 7.0
Sulfate	mg/L	130	850	1,200	1,600	1,300	--	1,400	380	590	4.0	--	12
Total Dissolved Solids	mg/L	1,000	1,600	1,900	2,000	1,800	--	2,300	1,000	2,000	750	--	810

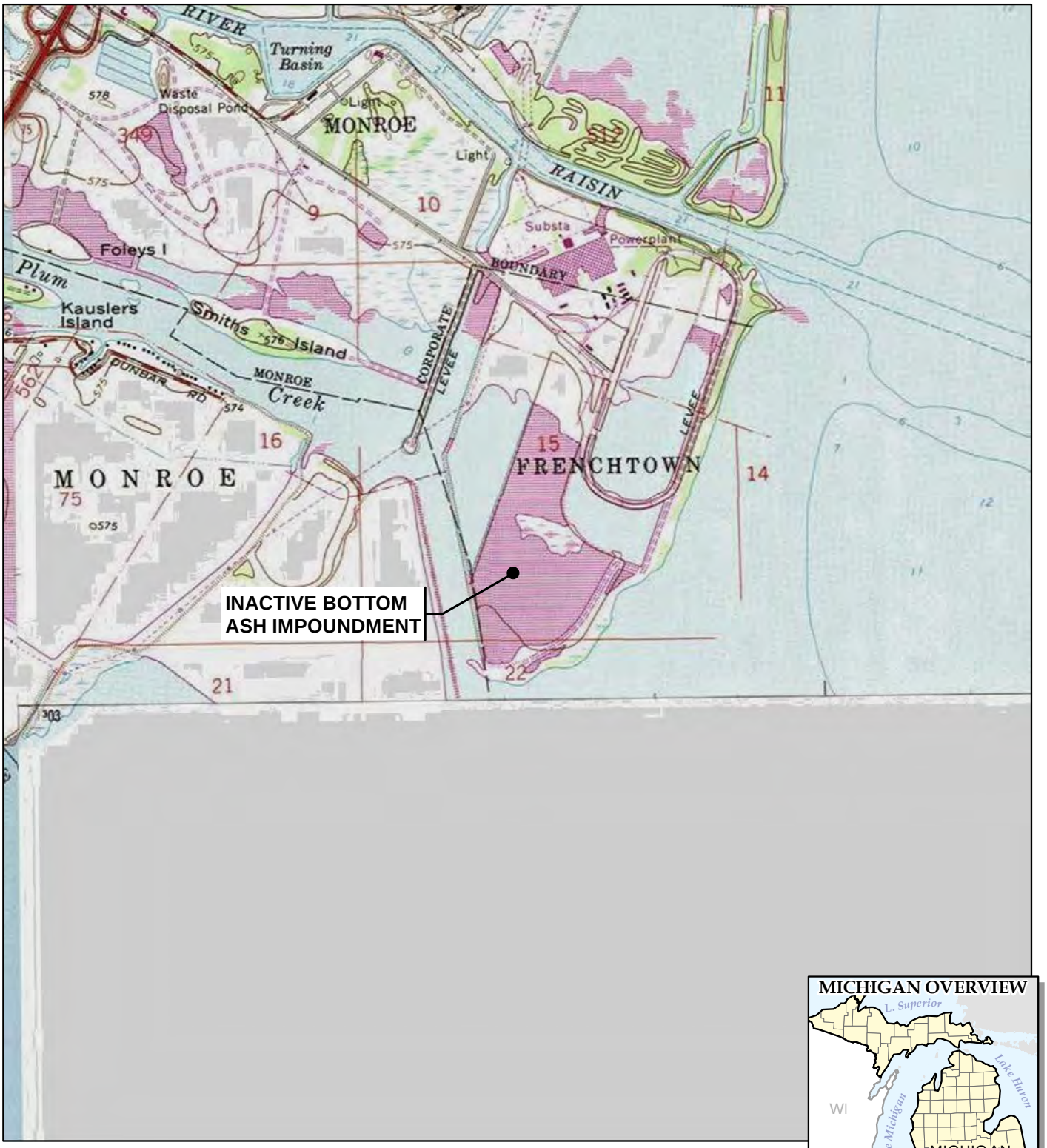
Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units; pH is a field parameter.
-- = not analyzed
All metals were analyzed as total unless otherwise specified.
Bold font indicates an exceedance of the Prediction Limit (PL).
RESULT Shading and bold font indicates a comfirmed exceedance of the Prediction Limit (PL).
(1) Results for verification sampling event performed on 6/9/2021.

Table 4
Comparison of Appendix III Parameter Results to Background Limits – April and June 2021
Monroe Power Plant BAI Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-10		MW-11		MW-12		MW-13			MW-14		MW-15		
Sample Date:		4/5/2021	PL	4/5/2021	PL	4/5/2021	PL	4/5/2021	6/9/2021[1]	PL	4/5/2021	PL	4/6/2021	6/9/2021[1]	PL
Constituent	Unit	Data		Data		Data		Data			Data		Data		
Appendix III															
Boron	ug/L	510	530	840	920	980	1,100	< 100	--	100	1,100	1,700	2,500	--	2,800
Calcium	ug/L	170,000	170,000	270,000	330,000	210,000	210,000	130,000	--	140,000	270,000	310,000	150,000	--	150,000
Chloride	mg/L	55	80	16	18	10	13	94	--	120	250	310	110	--	150
Fluoride	mg/L	0.48	0.68	0.91	1.2	0.83	0.91	0.40	--	0.51	0.37	0.57	0.51	--	0.64
pH, Field	su	7.1	6.6 - 7.5	7.4	6.9 - 7.5	7.5	7.4 - 7.9	7.0	--	6.2 - 7.7	6.9	6.8 - 7.3	7.2	--	6.9 - 7.4
Sulfate	mg/L	7.7	19	1,300	1,500	1,100	1,300	**2.2**	**2.7**	1.0	410	430	**5.2**	<1.0	1.0
Total Dissolved Solids	mg/L	810	840	2,100	2,100	1,600	1,800	530	--	1,100	770	1,700	670	--	770

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units; pH is a field parameter.
-- = not analyzed
All metals were analyzed as total unless otherwise specified.
Bold font indicates an exceedance of the Prediction Limit (PL).
RESULT Shading and bold font indicates a comfirmed exceedance of the Prediction Limit (PL).
(1) Results for verification sampling event performed on 6/9/2021.

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

N

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

0 2,000 4,000 FEET

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

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

TITLE:
SITE LOCATION MAP

DRAWN BY:	A. ADAIR
CHECKED BY:	K. REMINGA
APPROVED BY:	V. BUENING
DATE:	JULY 2021
PROJ. NO.:	413591.0006.0000
FILE:	413591.0006-001.mxd

FIGURE 1

S:\1-PROJECTS\DTE_Energy\MonroeMI_PP\413591_0006_Area15\413591.0006-001.mxd -- Saved By: AADAIR on 7/27/2021, 11:47:34 AM

Plot Date: 7/27/2021, 11:48:32 AM by AADAIR -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\DTE_Energy\MonroeMI_PP\413591_0006_Area15\413591.0006-002.mxd

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

TRC - GIS

LEGEND

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

NOTES

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

0 700 1,400 FEET

1 " = 700 '
1:8,400

N

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

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

TITLE:
INACTIVE BOTTOM ASH IMPOUNDMENT WELL LOCATION MAP

DRAWN BY:	A. ADAIR
CHECKED BY:	K. REMINGA
APPROVED BY:	V. BUENING
DATE:	JULY 2021
PROJ. NO.:	413591.0006.0000
FILE:	413591.0006-002.mxd

FIGURE 2

Plot Date: 7/28/2021, 14:43:30 PM by AADAIR -- LAYOUT: ANSI B (11"x17")
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Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet (Foot US)
Map Rotation: 0

TRC - GIS

Port Ave
Mcmillan St
E Front St
River Raisin
Discharge Canal
Plum Creek
Lake Erie

574'
575'
575'
574'

MW-15 (573.87)
MW-7S (574.03)
MW-9 (574.17)
MW-10 (574.13)
MW-3S (574.47)
MW-11 (574.73)
MW-12 (574.74)
MW-2S (574.66)
MW-13 (573.75)
MW-1S (573.49)
MW-4S (NM)
MW-14 (574.89)

Lake Erie Surface Water Elevation (573.14)

LEGEND

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

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO & PARTNERS, APRIL 2018.
2. LAKE ERIE SURFACE WATER ELEVATION MEASURED AT NOAA GAUGING STATION 9063090 NEAR THE DTE FERMI POWER PLANT, NEWPORT, MICHIGAN.

0 700 1,400 FEET

1 " = 700 '

1:8,400

N

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

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

TITLE:
GROUNDWATER CONTOUR MAP
OCTOBER 2020

DRAWN BY:	A. ADAIR
CHECKED BY:	B. YELEN
APPROVED BY:	BUENING
DATE:	JULY 2021
PROJ. NO.:	413591.0006
FILE:	413591.0006-005_GWContoursOct20.mxd

FIGURE 3

Plot Date: 7/28/2021, 14:06:08 PM by AADAIR -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\DTE_Energy\MonroeMI_PP\413591_0006_Area15\413591.0006-006B_GWContoursApril21.mxd

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

TRC - GIS

LEGEND

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

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO & PARTNERS, APRIL 2018.
2. LAKE ERIE SURFACE WATER ELEVATION MEASURED AT NOAA GAUGING STATION 9063090 NEAR THE DTE FERMI POWER PLANT, NEWPORT, MICHIGAN.

0 700 1,400 FEET

1 " = 700 '

1:8,400

N

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

PROJECT:

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

TITLE:

GROUNDWATER CONTOUR MAP
APRIL 2021

DRAWN BY:	A. ADAIR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	JULY 2021
PROJ. NO.:	413591.0006
FILE:	413591.0006-006B_GWContoursApril21.mxd

FIGURE 4

Appendix A
September 2020 Alternative Source Demonstration

1540 Eisenhower Pl.
Ann Arbor, MI 48108

T 734.971.7080
TRCcompanies.com

Technical Memorandum

Date:	September 21, 2020
To:	Christopher P. Scieszka DTE Electric Company
From:	Vincent Buening, TRC David McKenzie, TRC
Project No.:	370029.0006.0000
Subject:	Alternate Source Demonstration: 2020 First Semiannual Detection Monitoring Sampling Event Monroe Power Plant Bottom Ash Impoundment Inactive Coal Combustion Residual Unit

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), as amended July 30, 2018. The CCR Rule, which became effective on October 19, 2015 (amendment effective August 29, 2018), applies to the DTE Electric Company (DTE Electric) Monroe Power Plant (MONPP) Bottom Ash Impoundment (BAI) Inactive CCR unit. On August 5, 2016, the USEPA published the CCR Rule companion *Extension of Compliance Deadlines for Certain Inactive Surface Impoundments*, which established the compliance deadlines for CCR units that were inactive prior to October 15, 2015.

TRC prepared the *2020 Annual Groundwater Monitoring Report* (2020 Annual Report) for the MONPP BAI Inactive CCR unit on behalf of DTE Electric in accordance with the requirements of §257.90(e) (TRC, July 2020). The Annual Report included the results of the April 2020 semiannual groundwater monitoring event for the MONPP BAI Inactive CCR unit and the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule) for the MONPP BAI Inactive CCR unit. The April 2020 event was the third detection monitoring event performed to comply with §257.94. The monitoring was performed in accordance with the *Groundwater Monitoring Work Plan Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin DTE Monroe Plant* (Work Plan) (AECOM, September 2017). 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 Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Impoundment DTE Monroe Plant* (Stats Plan) (AECOM, April 2019, Revised August 2019).

The statistical evaluation of the April 2020 Appendix III indicator parameters showed potential SSIs over background for:

- Fluoride at MW-1S; and
- Sulfate at MW-7S.

All other Appendix III constituents were within the statistical background limits. As discussed in the 2020 Annual Report, verification resampling was conducted on June 10, 2020, by TRC personnel for fluoride at MW-1S and sulfate at MW-7S. The verification resampling confirmed only the sulfate SSI at MW-7S.

In accordance with §257.94(3)(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 evaluate the initial sulfate SSI identified in the April 2020 detection monitoring event. The results of this ASD show that the SSI at MW-7S is not due to a release from the MONPP BAI Inactive CCR unit.

Background

The MONPP is located in Section 15, Township 7 South, Range 9 East, at 3500 East Front Street, Monroe in Monroe County, Michigan. The site location is shown in Figure 1. The MONPP BAI Inactive CCR unit is located within the southern portion of the MONPP parcel and is bounded by the MONPP facility to the north and northeast, Lake Erie to the southeast and south, and Plum Creek/the discharge canal to the west. The MONPP BAI Inactive CCR unit was operated from the early-1970s through part of 2015.

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

The detection monitoring well network for the MONPP BAI Inactive CCR unit currently consists of eleven monitoring wells that are screened in the uppermost aquifer. As discussed in the Stats Plan, intrawell statistical methods for the MONPP BAI Inactive CCR unit were selected based on the geology and hydrogeology at the Site (the variability in the presence of the sand unit aquifer across the site and the strong confined hydraulic pressure in the sand unit 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). Monitoring wells MW-1S through MW-3S, MW-7S, and MW-9 through MW-15 are located around the perimeter of the MONPP BAI and provide data on both background and downgradient groundwater quality that has not been affected by the CCR unit (total of eleven background/downgradient monitoring wells). The monitoring well locations are shown in Figure 2. The *Monitoring Well Installation Report Coal Combustion Residuals (CCR) Rule – Inactive*

Bottom Ash Impoundment DTE Monroe (Well Installation Report) (AECOM, April 2019, Revised August 2019) details the groundwater monitoring system.

Alternate Source Demonstration

Verification resampling for sulfate at MW-7S was performed as recommended per the Stats Plan and the *USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance, USEPA, 2009) to achieve performance standards as specified by §257.93(g) in the CCR rules. The verification resampling confirmed the sulfate exceedance at MW-7S during the June 2020 verification sampling event (Table 1). The following discussion presents the ASD for the confirmed prediction limit exceedance.

Sulfate at MW-7S:

The SSI of sulfate in the groundwater at MW-7S, shown graphically as data points greater than the prediction limit in Figure 4, is the result of natural variability in the groundwater quality and not the release of CCR constituents from the MONPP BAI CCR unit. Multiple lines of evidence are provided in support of this conclusion and are as follows:

- **Insufficient background sampling timeline to account for long-term trends** – 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 MONPP BAI. The seasonal variability in sulfate concentration observed at MW-7S correlates to static water elevations which are significantly influenced by Lake Erie water levels. As shown on the Figure 3 time-series comparison of water levels and sulfate concentrations, there is a definitive correlation between Lake Erie water levels, MONPP BAI static water elevations, and sulfate concentrations; as Lake Erie water levels increase so do static water elevations and sulfate concentrations at the MONPP BAI. During the April 2020 sampling event, Lake Erie water levels approached an all-time high. This resulted in an increase of static water elevations and sulfate concentrations within groundwater at the MW-7S location. The short duration of the background sampling events limits the ability of the statistical analysis to capture the temporal variability in the groundwater quality as it relates to these significant recent Lake Erie water level changes at the MONPP BAI.
- **Lack of similar increase in other indicator parameters** – The lack of SSIs for any other parameters within the same monitoring well, and across the other wells within the monitoring well network also suggests a source other than CCR for the observed sulfate SSI at MW-7S.
- **Regional groundwater quality** – Groundwater in the region surrounding the MONPP BAI shows variability in sulfate concentrations. Regional United States Geological Survey (USGS) monitoring wells within 25 miles of MW-7S show a range on sulfate concentrations from 0.2 to 1,400 milligrams per liter (mg/L). Additionally, multiple USGS monitoring wells within 10 miles of the MONPP BAI, with screen depths of 50 feet below ground surface (BGS) or less, show a sulfate concentration range of 48 to 950 mg/L. The SSI concentration of sulfate measured in MW-7S during the April 2020 detection monitoring event was 640 mg/L and during the June 2020 verification resampling event was 680 mg/L. These sulfate concentrations at MW-7S are well within the range of regional variation near the MONPP BAI.

  Additionally, offsite monitoring well MW-8S sulfate concentrations show similar trends to the regional groundwater. Since MW-8S is screened in similar strata to MW-7S and is not hydraulically connected to groundwater beneath the MONPP BAI, it provides insight into local background groundwater quality and can be used to evaluate sulfate concentrations observed at

MW-7S. Monitoring well MW-8S is located west of the MONPP BAI, on the opposite side of the discharge channel. Based on historical site modifications that changed the underlying lithology beneath the discharge channel, groundwater in the area of monitoring well MW-8S is not hydraulically connected to groundwater in the vicinity of the MONPP BAI Inactive CCR unit. As shown on the Figure 3 time-series plot, historic groundwater data from MW-8S shows sulfate concentrations ranged from 1,190 to 1,500 mg/L from 2017 through 2019, compared to 3.1 to 680 mg/L measured at MW-7S from 2017 through 2020. This further demonstrates that the sulfate concentrations at monitoring well MW-7S are similar to background for the area.

- **Spatial variability in groundwater quality** – Sulfate concentrations vary considerably across the MONPP BAI well network but continue to remain in range of the regional sulfate concentrations. The sulfate concentrations observed in the MONPP BAI well network between 2017 and 2020 ranged from non-detect to 1,600 mg/L, similar to the regional sulfate concentrations ranges presented above. This variability in sulfate concentrations across the MONPP BAI, while remaining within regional sulfate concentration ranges, shows that the well network sulfate concentrations vary spatially throughout the site and suggests the confirmed sulfate SSI at MW-7S could be attributed to spatial variability rather than from the CCR unit.

Conclusions and Recommendations

The information provided in this report serves as the ASD for the DTE Electric MONPP BAI Inactive CCR unit, was prepared in accordance with 40 CFR 257.94(e)(2) of the CCR Rule and demonstrates that the sulfate SSI from the 2020 first semiannual detection monitoring event is not due to a release of CCR into the groundwater from the MONPP BAI Inactive CCR unit. Therefore, based on the information provided in this ASD, DTE Electric will continue detection monitoring as per 40 CFR 257.94 at the MONPP BAI Inactive CCR unit.

Certification Statement

I hereby certify that the alternative source demonstration presented within this document for the MONPP BAI Inactive 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	 Stamp
Company: TRC Engineers Michigan, Inc.	Date: September 21, 2020	

References

TRC Environmental Corporation. July 2020. Annual Groundwater Monitoring Report – DTE Electric Company Monroe Power Plant Bottom Ash Basin Inactive Coal Combustion Residual Unit, 3500 East Front Street, Monroe, Michigan. Prepared for DTE Electric Company.

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

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

AECOM. April 2019, Revised August 2019. Monitoring Well Installation Report Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Impoundment, DTE Monroe Plant, Monroe, 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.

Attachments

Table 1 Comparison of Verification Sampling Results to Background Limits

Figure 1 Site Location Map
Figure 2 Well Location Map
Figure 3 MW-7S Sulfate Time Series

Table

Table 1
Comparison of Appendix III Parameter Results to Background Limits – April 2020
Monroe Power Plant BAI Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-1S			MW-2S		MW-3S		MW-7S			MW-9	
Sample Date:		4/6/2020	6/10/2020	PL	4/6/2020	PL	4/6/2020	PL	4/7/2020	6/10/2020	PL	4/6/2020	PL
Constituent	Unit	Data			Data		Data		Data			Data	
Appendix III													
Boron	ug/L	320	--	870	980	1,000	940	980	300	--	1,400	560	640
Calcium	ug/L	260,000	--	370,000	230,000	270,000	260,000	540,000	220,000	--	380,000	170,000	190,000
Chloride	mg/L	24	--	170	11	14	13	15	19	--	110	38	59
Fluoride	mg/L	**0.54**	0.47	0.47	0.67	0.89	0.81	0.98	0.83	--	1.6	0.52	0.56
pH, Field	SU	7.3	--	6.5 - 8.7	7.8	7.0 - 8.5	7.4	6.9 - 7.9	7.1	--	6.0 - 8.1	6.9	6.2 - 7.0
Sulfate	mg/L	710	--	850	1,300	1,600	1,300	1,400	**640**	**680**	590	3.4	12
Total Dissolved Solids	mg/L	1,200	--	1,600	1,700	2,000	1,700	2,300	1,100	--	2,000	720	810

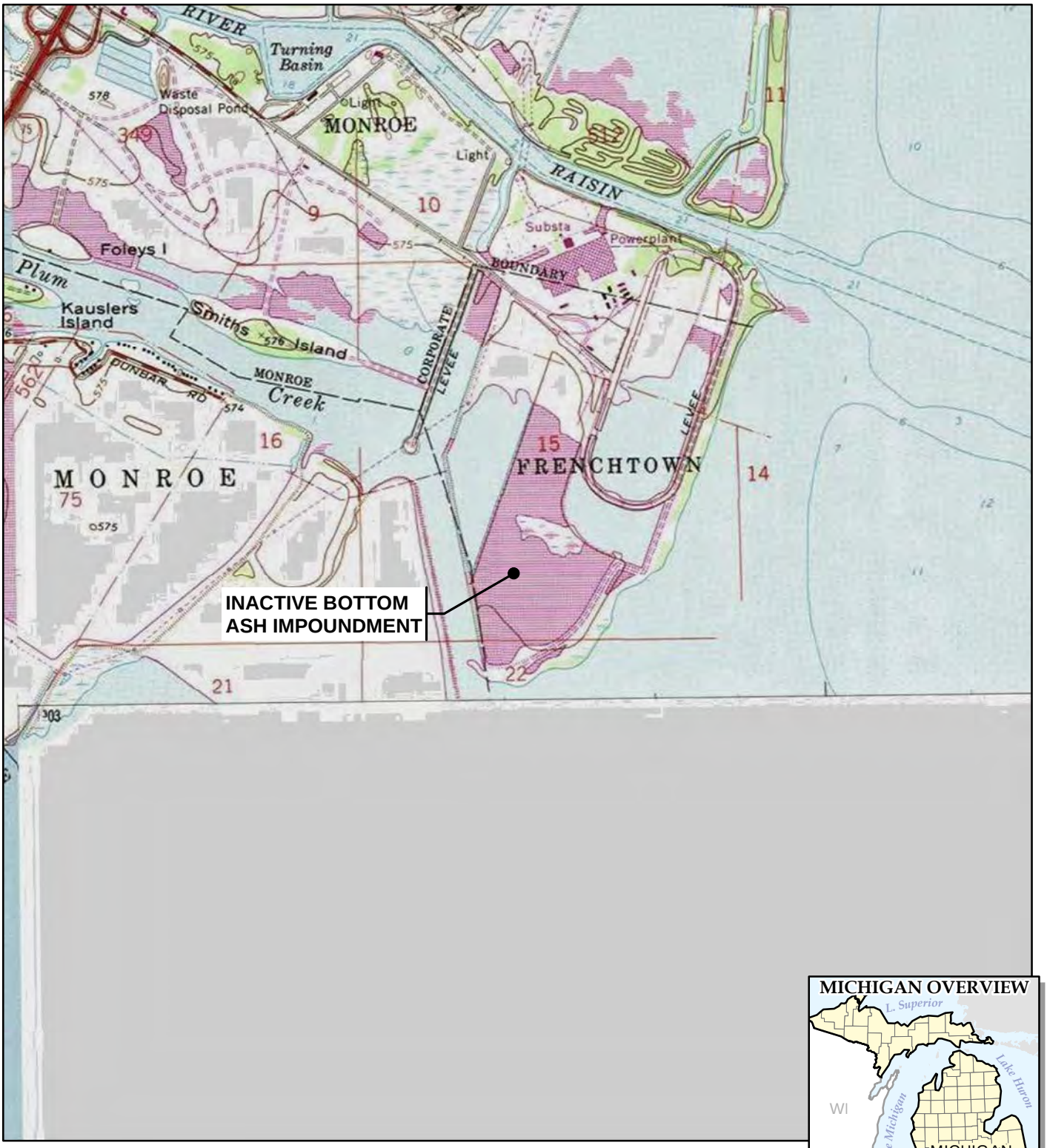
Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units; pH is a field parameter.
All metals were analyzed as total unless otherwise specified.
Bold font indicates an exceedance of the Prediction Limit (PL).
RESULT Shading and bold font indicates a comfirmed exceedance of the Prediction Limit (PL).

Table 1
Comparison of Appendix III Parameter Results to Background Limits – April 2020
Monroe Power Plant BAI Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-10		MW-11		MW-12		MW-13		MW-14		MW-15	
Sample Date:		4/6/2020	PL	4/6/2020	PL	4/6/2020	PL	4/6/2020	PL	4/7/2020	PL	4/7/2020	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
Appendix III													
Boron	ug/L	530	530	850	920	990	1,100	< 100	100	1,000	1,700	2,400	2,800
Calcium	ug/L	160,000	170,000	230,000	330,000	180,000	210,000	120,000	140,000	230,000	310,000	140,000	150,000
Chloride	mg/L	58	80	16	18	10	13	95	120	230	310	120	150
Fluoride	mg/L	0.45	0.68	0.88	1.2	0.81	0.91	0.42	0.51	0.37	0.57	0.50	0.64
pH, Field	su	7.1	6.6 - 7.5	7.5	6.9 - 7.5	7.6	7.4 - 7.9	7.1	6.2 - 7.7	7.2	6.8 - 7.3	7.2	6.9 - 7.4
Sulfate	mg/L	12	19	1,400	1,500	1,100	1,300	< 1.0	1.0	380	430	< 1.0	1.0
Total Dissolved Solids	mg/L	770	840	1,800	2,100	1,400	1,800	550	1,100	1,300	1,700	700	770

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).
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.

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

0 2,000 4,000
FEET

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

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

TITLE:
SITE LOCATION MAP

DRAWN BY:	S. MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	JULY 2020
PROJ. NO.:	370029.0006
FILE:	370029-004slm.mxd

FIGURE 1

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Plot Date: 7/16/2020, 09:29:24 AM by SMAJOR -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\DTE_Energy\MonroeMI_PP\370029_0006_Area15\370029.0006-003.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet (Foot US)
Map Rotation: 0

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LEGEND

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

NOTES

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

0 700 1,400 FEET

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N

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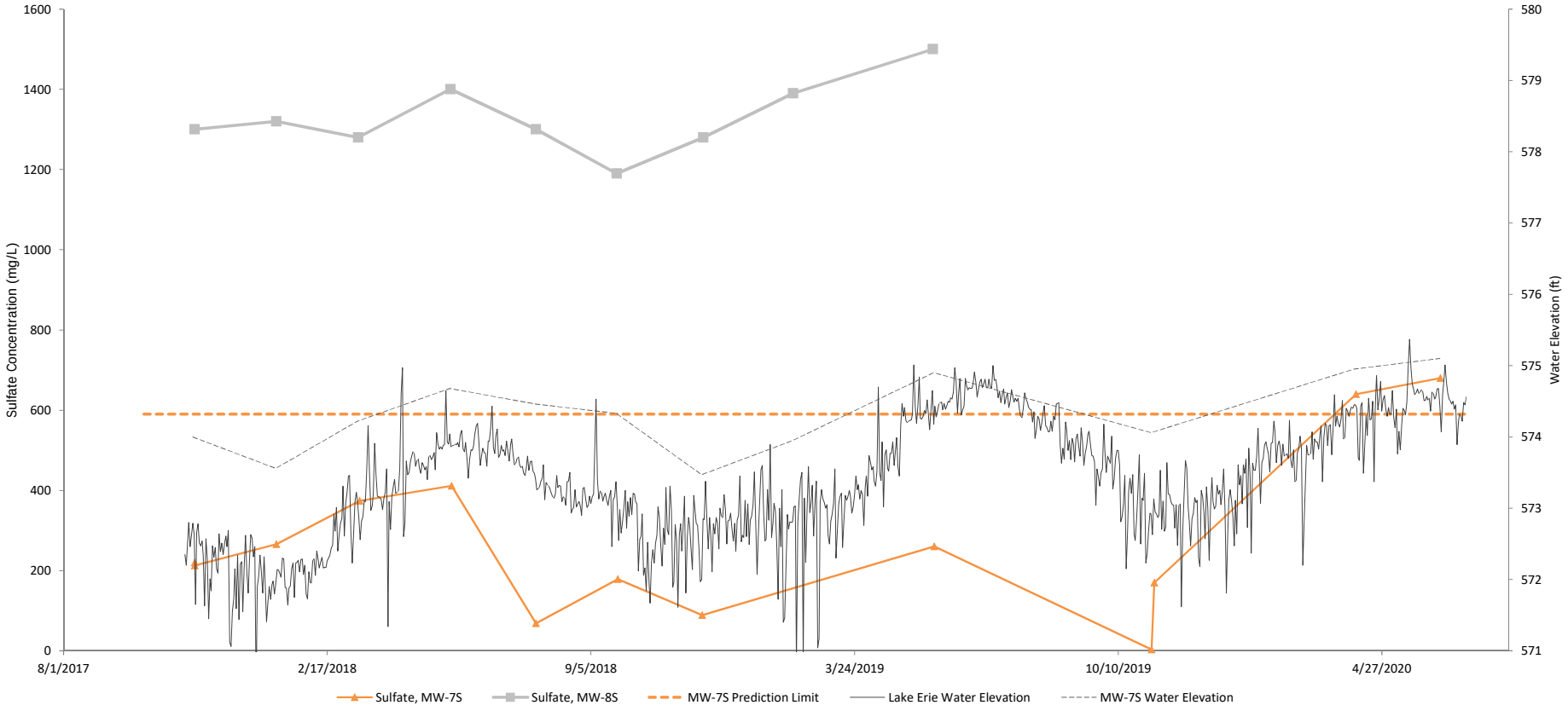
PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT
3500 EAST FRONT STREET
MONROE, MI 48161

TITLE:
INACTIVE BOTTOM ASH IMPOUNDMENT WELL LOCATION MAP

DRAWN BY:	S.MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	JULY 2020
PROJ. NO.:	370029.0006.0000
FILE:	370029.0006-003.mxd

FIGURE 2

FIGURE 3
MW-7S TIME SERIES PLOT



NOTES:
MW-7S anomalous sulfate data of 1,270 mg/L collected on 2/5/2019 removed from the dataset.

Appendix B
March 2021 Alternative Source Demonstration

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Technical Memorandum

Date:	March 18, 2021
To:	Christopher P. Scieszka DTE Electric Company
From:	Vincent Buening, TRC David McKenzie, TRC
Project No.:	413591.0006.0000
Subject:	Alternate Source Demonstration: 2020 Second Semiannual Detection Monitoring Sampling Event Monroe Power Plant Bottom Ash Impoundment Inactive Coal Combustion Residual Unit

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), as amended. The CCR Rule applies to the DTE Electric Company (DTE Electric) Monroe Power Plant (MONPP) Bottom Ash Impoundment (BAI) Inactive CCR unit. On August 5, 2016, the USEPA published the CCR Rule companion *Extension of Compliance Deadlines for Certain Inactive Surface Impoundments*, which established the compliance deadlines for CCR units that were inactive prior to October 15, 2015.

TRC conducted the second semiannual 2020 detection monitoring event for the MONPP BAI Inactive CCR unit on behalf of DTE Electric on October 8, 9 and 16, 2020 in accordance with the requirements of §257.90(e). The October 2020 semiannual groundwater monitoring event for the MONPP BAI Inactive CCR unit included the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule). The October 2020 event was the fourth detection monitoring event performed to comply with §257.94. The monitoring was performed in accordance with the *Groundwater Monitoring Work Plan Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Basin DTE Monroe Plant* (Work Plan) (AECOM, September 2017). 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 Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Impoundment DTE Monroe Plant* (Stats Plan) (AECOM, April 2019, Revised August 2019).

The statistical evaluation of the October 2020 Appendix III indicator parameters showed potential SSIs over background for:

- Boron at MW-10 and MW-11, and;
- Fluoride at MW-3S.

All other Appendix III constituents were within the statistical background limits. Verification resampling was conducted on December 3, 2020, by TRC personnel for boron at MW-10 and MW-11 and for fluoride at MW-3S. The verification resampling confirmed the boron SSI at both MW-10 and MW-11 and the fluoride SSI at MW-3S.

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 evaluate the initial boron and fluoride SSIs identified in the October 2020 detection monitoring event. The results of this ASD show that the SSIs at MW-3S, MW-10, and MW-11 are not due to a release from the MONPP BAI Inactive CCR unit.

Background

The MONPP is located in Section 15, Township 7 South, Range 9 East, at 3500 East Front Street, Monroe in Monroe County, Michigan. The site location is shown in Figure 1. The MONPP BAI Inactive CCR unit is located within the southern portion of the MONPP parcel and is bounded by the MONPP facility to the north and northeast, Lake Erie to the southeast and south, and Plum Creek/the discharge canal to the west.

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

The detection monitoring well network for the MONPP BAI Inactive CCR unit currently consists of eleven monitoring wells that are screened in the uppermost aquifer. As discussed in the Stats Plan, intrawell statistical methods for the MONPP BAI Inactive CCR unit were selected based on the geology and hydrogeology at the Site (the variability in the presence of the sand unit aquifer across the site and the strong confined hydraulic pressure in the sand unit 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). Monitoring wells MW-1S through MW-3S, MW-7S, and MW-9 through MW-15 are located around the perimeter of the MONPP BAI and provide data on both background and downgradient groundwater quality that has not been affected by the CCR unit (total of eleven background/downgradient monitoring wells). The monitoring well locations are shown in Figure 2. The *Monitoring Well Installation Report Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Impoundment DTE Monroe* (Well Installation Report) (AECOM, April 2019, Revised August

2019) details the groundwater monitoring system.

Alternate Source Demonstration

Verification resampling for boron at MW-10 and MW-11, and fluoride at MW-3S was performed as recommended per the Stats Plan and the *USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance, USEPA, 2009) to achieve performance standards as specified by §257.93(g) in the CCR Rule. The verification resampling confirmed the boron exceedances at MW-10 and MW-11, and the fluoride exceedance at MW-3S during the December 2020 verification sampling event (Table 1). The following discussion presents the ASD for the confirmed prediction limit exceedances.

Boron at MW-10 and MW-11:

The SSIs of boron in the groundwater at MW-10 and MW-11, shown graphically in Figure 3, are the result of natural variability in the groundwater quality and not the release of CCR constituents from the MONPP BAI CCR unit. Multiple lines of evidence are provided in support of this conclusion and are as follows:

- **Limited background sampling timeline to account for temporal variability** – Groundwater is transient by nature and is subject to natural temporal changes in chemistry that occur over time. The boron SSIs observed at MW-10 and MW-11 are slightly above the prediction limits and appear as a gradual change over the past 2 years (Figure 3). Similar changes are observed over the past two years at multiple other wells across the site well network, such as MW-02S and MW-12, shown on the Figure 4 time-series plot. This suggests the change is occurring at a broader scale, further indicating natural changes, and are not indicative of a release from the CCR unit. The short duration of the background data collection timeline limits the ability of the statistical analysis to capture the natural temporal trends in the groundwater quality at the MONPP BAI. This limited temporal variability can only be corrected with the collection of additional groundwater data, and the inclusion of the additional data in the background data set updated in the future, as long as data continue to show no impacts from the CCR unit.
- **Spatial variability in groundwater quality** – Boron concentrations vary considerably across the MONPP BAI well network. The boron concentrations observed in the MONPP BAI well network between 2017 and 2020 ranged from 34 to 2,400 ug/L. The boron concentrations observed at MW-10 (570 ug/L) and MW-11 (940 ug/L) during the October 2020 event are only slightly above the prediction limits and are well within the range of 34 to 2,400 ug/L observed across the entire monitoring network. This further demonstrates that boron concentrations at MW-10 and MW-11 are due to natural variability as they are within the expected range across the site.
- **Lack of similar increase in other indicator parameters** – All other detection monitoring constituents at MW-10 and MW-11 remain below their respective prediction limits (Table 1). In addition, no other SSIs are observed across the well network, with the exception of MW-3S, discussed in detail below, which sustained damage prior to the October 2020 event. The lack of SSIs observed for other detection monitoring constituents further demonstrates that the October 2020 boron concentrations at MW-10 and MW-11 are not related to the CCR unit.

Fluoride at MW-3S:

The SSI of fluoride in the groundwater at MW-3S, shown graphically in Figure 5, is the result of recent site improvement activities that caused damage to MW-3S and not the release of CCR constituents from the MONPP BAI CCR unit. The lines of evidence provided in support of this conclusion are as follows:

- **Site improvement activities and damage to MW-3S** – The recent increase of fluoride concentration in groundwater at MW-3S correlates with the timing of damage sustained to the top of the well between July and October 2020. Site improvement activities were performed near MW-3S, a flush mounted monitoring well, between the first and second 2020 semiannual groundwater monitoring events. During the completion of site improvement construction activities, damage was sustained to the top of monitoring well MW-3S where the surface protective cover, bladder pump collar, and near surface tubing are located. The surface seal on the well was compromised allowing surface infiltration to occur at the well head. The monitoring well was subsequently repaired with a new protective cover and cap on October 16, 2020, before the groundwater verification sample collection was completed.

  An anomalously high fluoride concentration, well below the EPA secondary maximum contaminant level (SMCL) of 2.0 mg/L and maximum contaminant level (MCL) of 4.0 mg/L, was noted from the verification sampling event performed on December 3, 2020 (Table 1, Figure 5). To further assess the high fluoride concentration most likely caused by surface infiltration while the well was damaged and gauge the effectiveness of the well repairs, the well was redeveloped and subsequently resampled for fluoride on March 10, 2021. The March 2021 results show that the fluoride concentration in groundwater at MW-3S was significantly lower compared to the December 2020 verification sample, dropping from 1.7 mg/L to 1.0 mg/L, and is consistent with historical high-end ranges at this well and at the site (Figure 5). This demonstrates that the improvements made to the well were successful and groundwater is in the process of re-stabilizing to pre-well damage fluoride concentrations. To further rehabilitate this monitoring well and further reduce the potential for the prior surface infiltration occurrence to influence groundwater quality at MW-3S moving forward, the well will be redeveloped prior to performing the next semiannual sampling event. The next sampling event is scheduled to be completed during the 2nd calendar quarter of 2021.

Conclusions and Recommendations

The information provided in this report serves as the ASD for the DTE Electric MONPP BAI Inactive CCR unit, was prepared in accordance with 40 CFR 257.94(e)(2) of the CCR Rule and demonstrates that the boron and fluoride SSIs from the 2020 second semiannual detection monitoring event are not due to a release of CCR into the groundwater from the MONPP BAI Inactive CCR unit. Therefore, based on the information provided in this ASD, DTE Electric will continue detection monitoring as per 40 CFR 257.94 at the MONPP BAI Inactive CCR unit.

Certification Statement

I hereby certify that the alternative source demonstration presented within this document for the MONPP BAI Inactive 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: March 18, 2021	

References

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

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

AECOM. April 2019, Revised August 2019. Monitoring Well Installation Report Coal Combustion Residuals (CCR) Rule – Inactive Bottom Ash Impoundment, DTE Monroe Plant, Monroe, 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.

Attachments

Table 1 Comparison of Verification Sampling Results to Background Limits – October 2020 to March 2021

Figure 1 Site Location Map
Figure 2 Well Location Map
Figure 3 MW-10 and MW-11 Boron Time Series Plot
Figure 4 Boron Time Series Plot (All Wells)
Figure 5 MW-3S Fluoride Time Series Plot

Table

Table 1
Comparison of Appendix III Parameter Results to Background Limits – October 2020 to March 2021
Monroe Power Plant BAI Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-1S		MW-2S		MW-3S				MW-7S		MW-9	
Sample Date:		10/9/2020	PL	10/8/2020	PL	10/8/2020	12/3/2020(1)	3/10/2021(2)	PL	10/9/2020	PL	10/8/2020	PL
Constituent	Unit	Data		Data		Data				Data		Data	
Appendix III													
Boron	ug/L	540	870	1,000	1,000	820	--	--	980	320	1,400	560	640
Calcium	ug/L	220,000	370,000	230,000	270,000	340,000	--	--	540,000	170,000	380,000	160,000	190,000
Chloride	mg/L	92	170	11	14	13	--	--	15	42	110	39	59
Fluoride	mg/L	0.41	0.47	0.73	0.89	**1.1**	**1.7**	**1.0**	0.98	0.67	1.6	0.56	0.56
pH, Field	su	6.9	6.5 - 8.7	7.7	7.0 - 8.5	7.2	6.9	6.9	6.9 - 7.9	7.1	6.0 - 8.1	6.8	6.2 - 7.0
Sulfate	mg/L	190	850	1,200	1,600	1,300	--	--	1,400	360	590	2.7	12
Total Dissolved Solids	mg/L	1,000	1,600	1,700	2,000	1,700	--	--	2,300	870	2,000	700	810

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not analyzed.

All metals were analyzed as total unless otherwise specified.

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

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

(1) Results for verification sampling event performed on 12/3/2020.

(2) Result for the resample of anomalous fluoride verification data from 12/3/2020. Resample performed on 3/10/2021.

Table 1
Comparison of Appendix III Parameter Results to Background Limits – October 2020 to March 2021
Monroe Power Plant BAI Inactive CCR Unit – RCRA CCR Monitoring Program
Monroe, Michigan

Sample Location:		MW-10			MW-11			MW-12		MW-13		MW-14		MW-15	
Sample Date:		10/16/2020	12/3/2020(1)	PL	10/8/2020	12/3/2020(1)	PL	10/8/2020	PL	10/8/2020	PL	10/8/2020	PL	10/9/2020	PL
Constituent	Unit	Data			Data			Data		Data		Data		Data	
Appendix III															
Boron	ug/L	**560**	**570**	530	**940**	**940**	920	1,100	1,100	< 100	100	1,100	1,700	2,400	2,800
Calcium	ug/L	160,000	--	170,000	250,000	--	330,000	180,000	210,000	120,000	140,000	220,000	310,000	130,000	150,000
Chloride	mg/L	55	--	80	16	--	18	10	13	95	120	220	310	110	150
Fluoride	mg/L	0.48	--	0.68	0.93	--	1.2	0.85	0.91	0.41	0.51	0.38	0.57	0.49	0.64
pH, Field	su	7.0	7.1	6.6 - 7.5	7.3	7.3	6.9 - 7.5	7.6	7.4 - 7.9	6.9	6.2 - 7.7	7.0	6.8 - 7.3	7.1	6.9 - 7.4
Sulfate	mg/L	8.2	--	19	1,400	--	1,500	1,100	1,300	1.0	1.0	360	430	< 1.0	1.0
Total Dissolved Solids	mg/L	780	--	840	1,800	--	2,100	1,600	1,800	500	1,100	1,300	1,700	620	770

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not analyzed.

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Figures

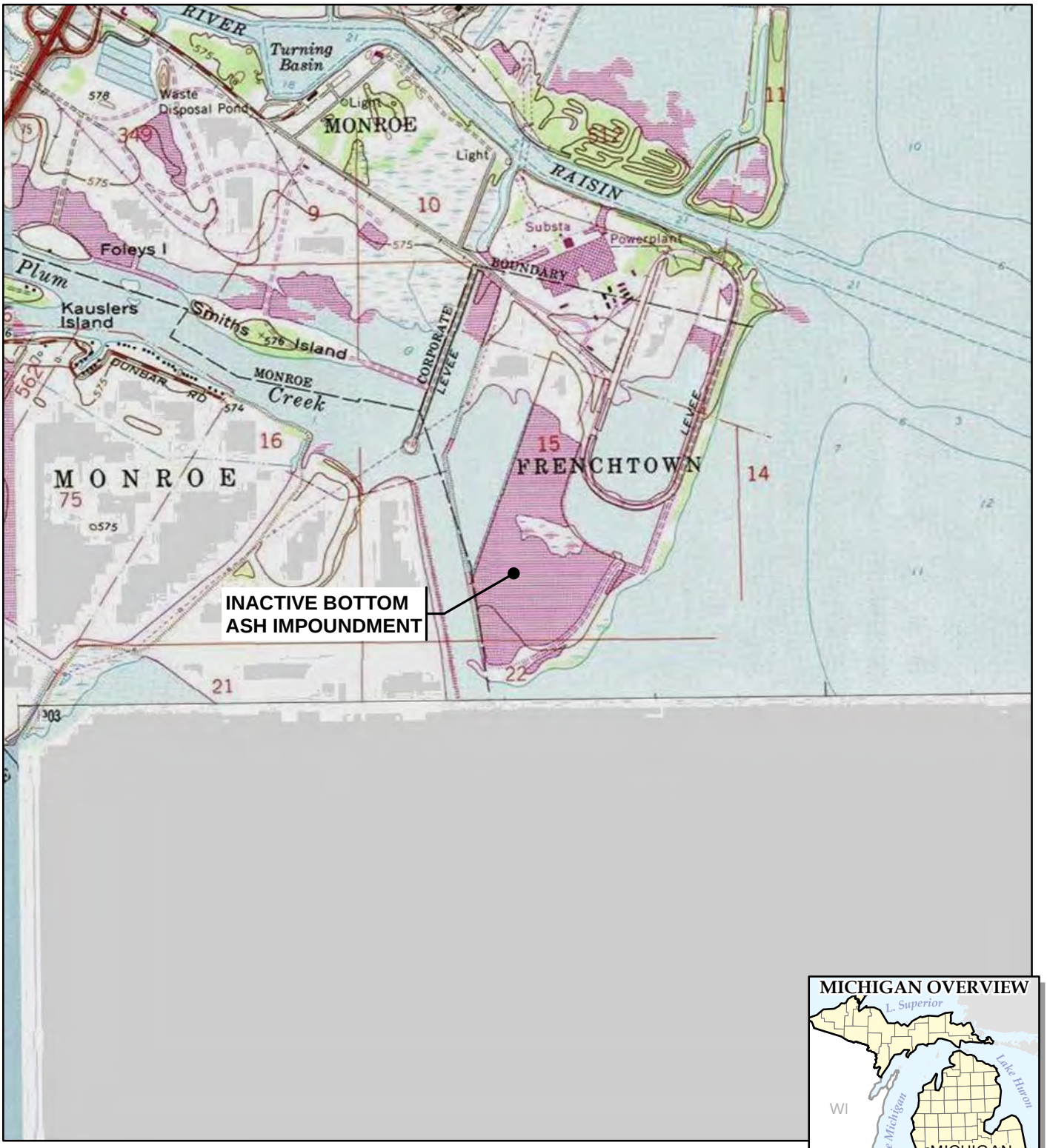

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FIGURE 1

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Map Rotation: 0

TRC - GIS

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- UNIT SEPARATION BERM
- APPROXIMATE BOUNDARY OF INACTIVE BOTTOM ASH IMPOUNDMENT
- APPROXIMATE PLANT BOUNDARY

NOTES

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PROJECT:
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MONROE POWER PLANT
3500 EAST FRONT STREET
MONROE, MI 48161

TITLE:
INACTIVE BOTTOM ASH IMPOUNDMENT WELL LOCATION MAP

DRAWN BY:	S.MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	JULY 2020
PROJ. NO.:	370029.0006.0000
FILE:	370029.0006-003.mxd

FIGURE 2

FIGURE 3

MW-10 AND MW-11 BORON TIME SERIES PLOT

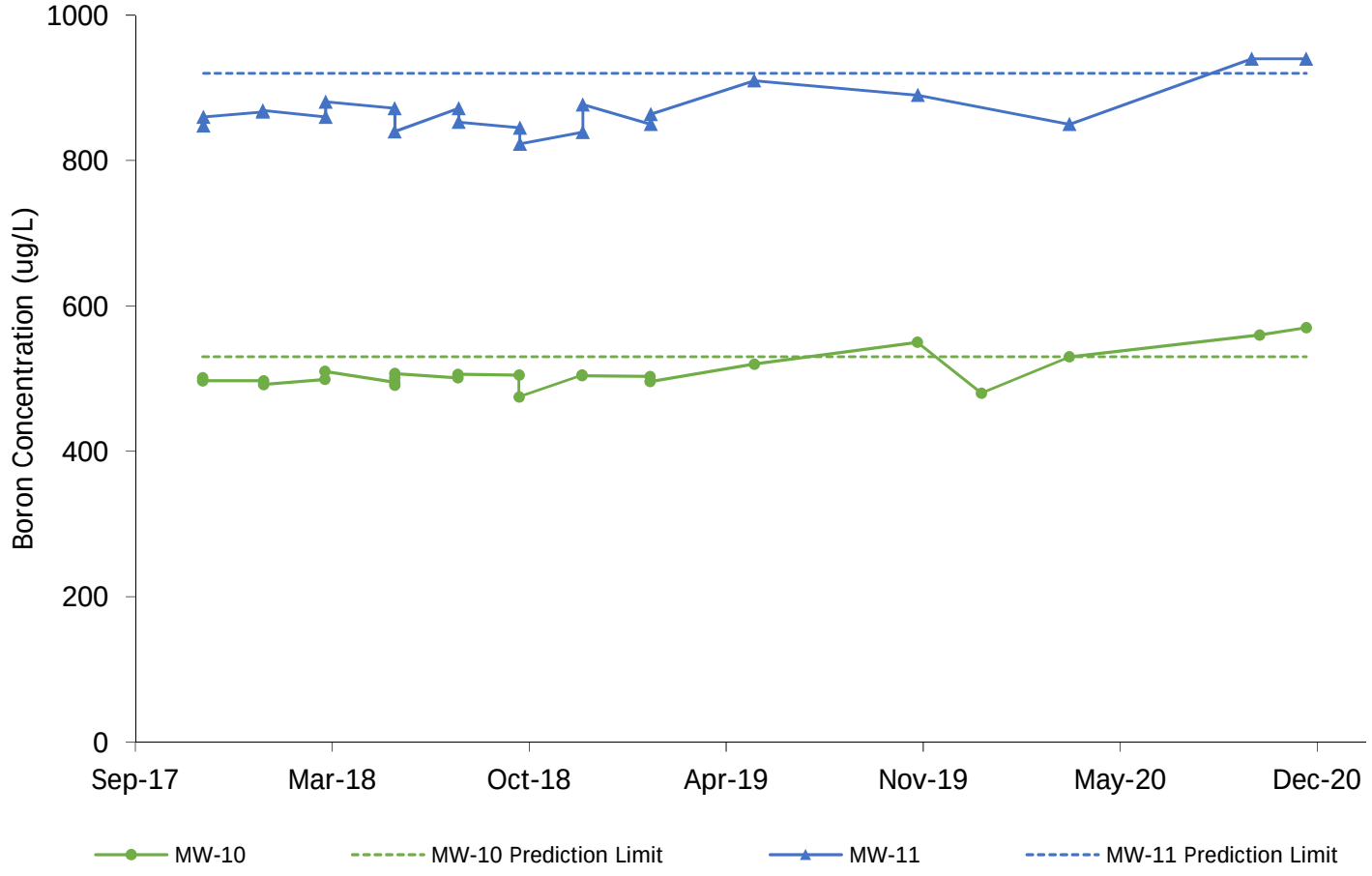


FIGURE 4
BORON TIME SERIES PLOT (All Wells)

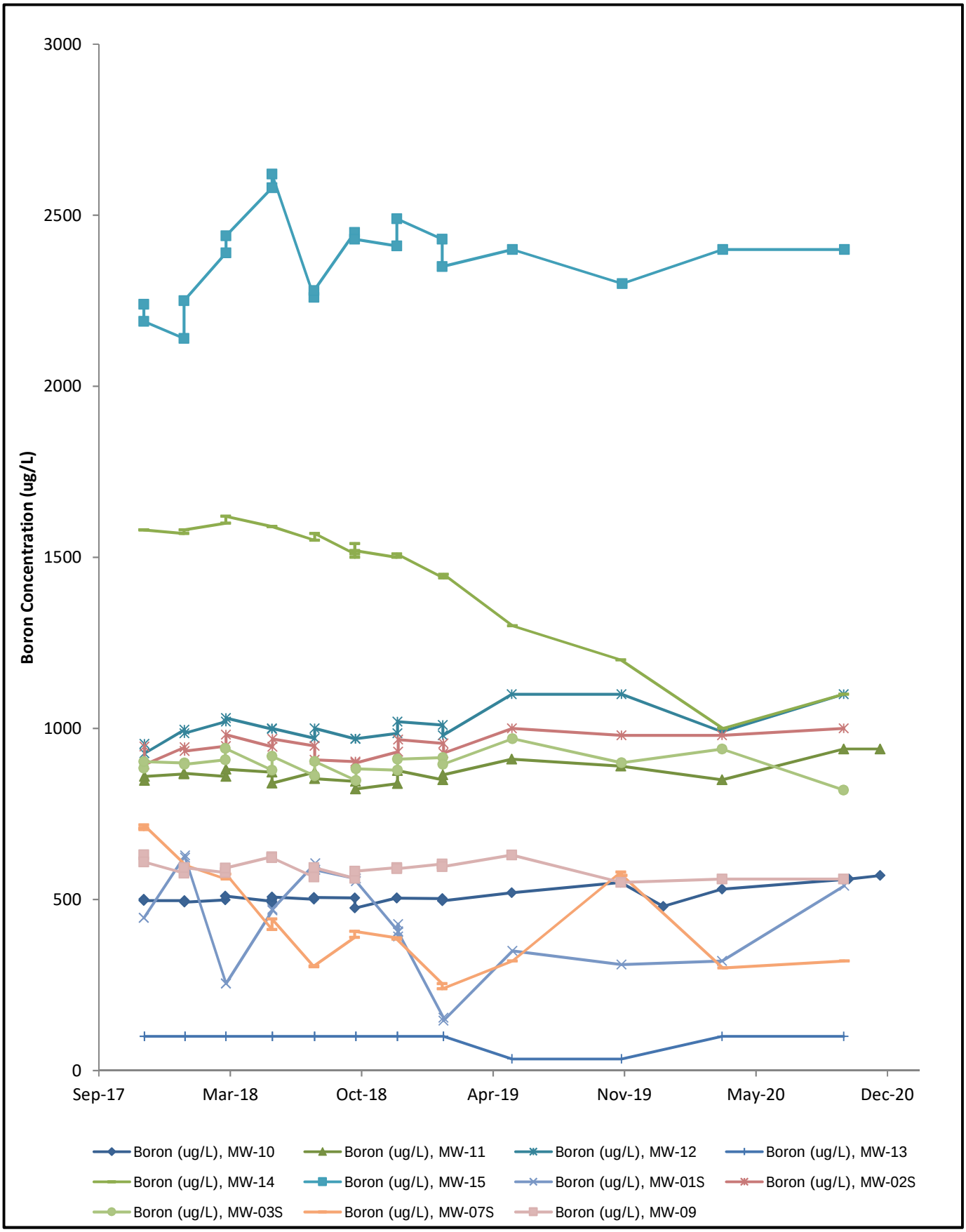
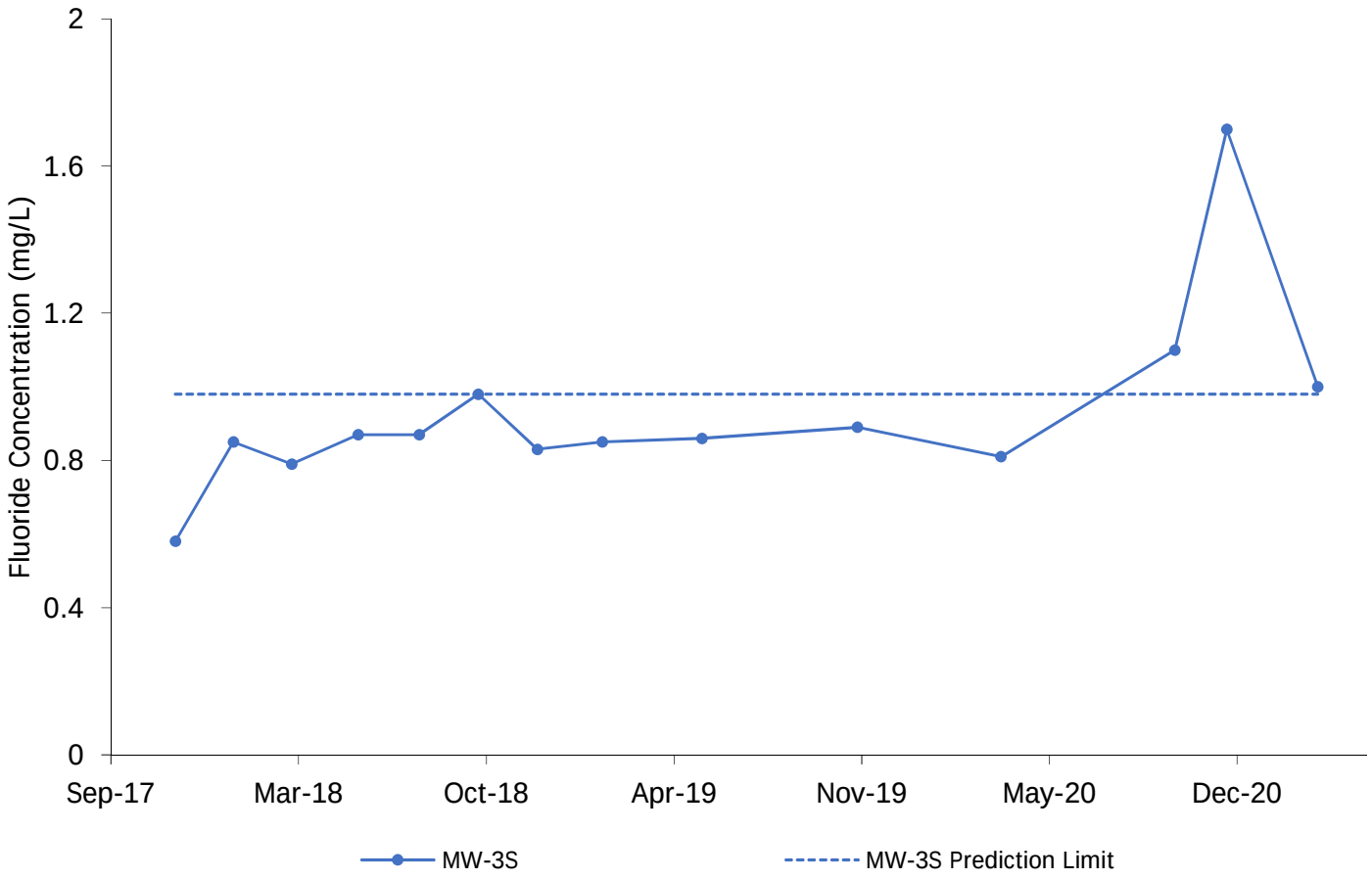


FIGURE 5

MW-3S FLUORIDE TIME SERIES PLOT



Appendix C
Data Quality Review

Laboratory Data Quality Review
Groundwater Monitoring Event October 2020
DTE Electric Company Monroe Power Plant Bottom Ash Impoundment

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. (Eurofins-TA), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory reports 240-138057-1, 240-138136-1 and 240-138637-1.

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

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

Each sample was analyzed for one or more of the following constituents:

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

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

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:

- Target analytes were not detected in the method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS and MSD analyses were performed on sample MW-2S_20201008 for total recoverable boron, samples MW-3S_20201008. MW-1S_20201009, and MW-10_20201016 for total recoverable calcium. The recoveries of calcium were outside of the control limits in the MS or MSD analysis performed on samples MW-1S_20201009 and MW-10_20201016. The results for calcium in the parent samples were >4x the spike concentration; therefore, the MS/MSD control limits are not applicable.
- Laboratory duplicate analyses were performed on samples MW-2S_20201008 and MW-15_20201009 for TDS; relative percent differences (RPDs) were within the QC limits.
- DUP-01_20201008 corresponds with MW-9_20201008; 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 Bottom Ash Impoundment

Groundwater samples were collected by TRC for the December 2020 sampling event. Samples were analyzed for fluoride and total recoverable boron by Eurofins-Test America Laboratories, Inc. (Eurofins-TA), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory reports 240-141431-1 and 240-141432-1.

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

- MW-3S
- MW-10
- MW-11

Each sample was analyzed for one of the following constituents:

Analyte Group	Method
Fluoride	SW846 9056A
Total Recoverable Boron	SW846 3005A/6010B

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

- Target analytes were not detected in the method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were not performed on a sample from this data set.
- DUP-01_20201203 corresponds with MW-3S_20201203 for fluoride and DUP-02_20201203 corresponds with MW-10_20201203 for total recoverable boron; relative percent differences (RPDs) between the parent and duplicate samples were within the QC limits.

Laboratory Data Quality Review
Groundwater Monitoring Event March and April 2021
DTE Electric Company Monroe Power Plant Bottom Ash Impoundment

Groundwater samples were collected by TRC for the March and April 2021 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 240-145779-1, 240-147151-1 and 240-148190-1.

During the March and April 2021 sampling event, a groundwater sample was collected from each of the following wells:

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

Each sample was analyzed for one or more of 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

- Target analytes were not detected in the method blanks.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS and MSD analyses were performed on sample DUP-01_20210310 for fluoride, sample MW-1S for total recoverable boron and anions, sample MW-15 for anions, and sample MW-2S for total recoverable calcium and iron. The recoveries of calcium were outside of the control limits in the MS and MSD analyses performed on sample MW-2S; the result for calcium in the parent sample was >4x the spike concentration; therefore, the MS/MSD control limits are not applicable.
- Laboratory duplicate analyses were performed on sample MW-3S for TDS; relative percent differences (RPDs) were within the QC limits.
- DUP-01_20210310 corresponds with MW-3S_20210310 and DUP-01 corresponds with MW-11; RPDs between the parent and duplicate samples were within the QC limits.

Laboratory Data Quality Review
Groundwater Monitoring Event June 2021
DTE Electric Company Monroe Power Plant Bottom Ash Impoundment Verification Testing

Groundwater samples were collected by TRC for the June 2021 sampling event. Samples were analyzed for anions by Eurofins-Test America Laboratories, Inc. (Eurofins-TA), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-151061-1.

During the June 2021 sampling event, a groundwater sample was collected from each of the following wells:

- MW-3S
- MW-09
- MW-13
- MW-15

Each sample was analyzed for one or more of the following constituents:

Analyte Group	Method
Anions (Fluoride, 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, 2020). 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, equipment blanks, and field blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- 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 blanks.
- A field blank and equipment blank were not submitted with this sample set.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS and MSD analyses were performed on sample MW-15_20210609 for sulfate; percent recoveries (%R) and the relative percent difference (RPD) were within QC limits.
- DUP-01 corresponds with MW-3S_20210609 for fluoride and DUP-02 corresponds with MW-13_20210609 for sulfate; RPDs between the parent and duplicate samples were within the QC limits.