2020 Annual Groundwater Monitoring Report

Monroe Power Plant Bottom Ash Impoundment
Inactive Coal Combustion Residual Unit

3500 East Front Street
Monroe, Michigan

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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 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).

In the July 2019 Annual Groundwater Monitoring Report for the Monroe Power Plant Bottom Ash Impoundment Inactive Coal Combustions Residual Unit covering 2019 reporting period (July 1, 2018 through June 30, 2019) activities, DTE Electric reported that the boron concentration within groundwater at monitoring well MW-8S was outside background limits. As a result, an Alternate Source Demonstration (ASD) was performed pursuant to §257.94(e) and concluded that, based on the hydrogeological conditions monitoring well MW-8S is not in a position to monitor groundwater quality associated with the BAI, and was eliminated from the monitoring program. Therefore, no SSIs were associated with the MONPP BAI CCR unit were detected in the 2019 reporting period and DTE Electric continued detection monitoring pursuant to §257.94 of the CCR Rule.

TRC prepared this Annual Groundwater Monitoring Report (Annual Report) for the MONPP BAI Inactive CCR unit on behalf of DTE Electric for the 2020 reporting period that extends from July 1, 2019 through June 30, 2020. This Annual Report was prepared in accordance with the requirements of §257.90(e) and presents the monitoring results and the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule) for the semiannual groundwater monitoring events for the MONPP BAI Inactive CCR unit performed throughout the 2020 reporting period in November 2019 and April 2020. These events mark the second and third detection monitoring events performed to comply with §257.94. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) in detection monitoring parameters to determine if concentrations in detection monitoring well samples exceed background levels.

No SSIs over background limits were noted in the downgradient wells for the November 2019 monitoring event. For the April 2020 detection monitoring event, an SSI for sulfate was detected at one monitoring location, 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 sulfate SSI over the background limit noted during the April 2020 monitoring event, DTE Electric plans to prepare an ASD to evaluate the SSI.

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 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 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).

In the Annual Groundwater Monitoring Report for the Monroe Power Plant Bottom Ash Impoundment Inactive Coal Combustions Residual Unit (2019 Annual Report) (TRC, July 2019), covering 2019 reporting period (July 1, 2018 through June 30, 2019) activities, DTE Electric reported that the boron concentration within groundwater at monitoring well MW-8S well was outside background limits. As a result, an Alternate Source Demonstration (ASD) was performed pursuant to §257.94(e) and concluded that, based on the hydrogeological conditions, monitoring well MW-8S is not in a position to monitor groundwater quality associated with the BAI, and was eliminated from the monitoring program (TRC, October 2019). Therefore, no SSIs were associated with the MONPP BAI CCR unit in the 2019 reporting period and DTE Electric continued detection monitoring pursuant to §257.94 of the CCR Rule. The October 2019 ASD is provided in Appendix A.

TRC prepared this 2020 Annual Groundwater Monitoring Report (2020 Annual Report) for the MONPP BAI CCR unit on behalf of DTE Electric for the reporting period that extends from July 1, 2019 through June 30, 2020. This Annual Report was prepared in accordance with the requirements of §257.90(e) and presents the monitoring results and the statistical evaluation of the detection monitoring parameters (Appendix III to Part 257 of the CCR Rule) for the November 2019 and April 2020 semiannual groundwater monitoring events for the MONPP BAI Inactive CCR unit. These events are the second and third 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 design preparation work and planning 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, the Inactive BAI, and Process Pond areas, 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). MW-8S was removed from the monitoring well network since it was determined in the October 2019 ASD that it was not located hydraulically downgradient from the MONPP BAI and therefore not in a position to monitor groundwater quality associated with the BAI (TRC, October 2019). 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 2020 monitoring period was performed November 4 through 6, 2019, 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 November 2019 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 6 and 7, 2020, 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 2020 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 November 2019 and April 2020 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. Particular data non-conformances are summarized in Appendix B.

2.2.3 Groundwater Flow Rate and Direction

Groundwater elevation data collected during November 2019 and April 2020 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 November 2019 and April 2020 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 November 2019 event is estimated at 0.0013 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 0.73 ft/day or 270 ft/year. The average hydraulic gradient throughout the Site during the April 2020 event is estimated at 0.0017 ft/ft using the 576 foot contour line and MW-9, MW-11, and MW-13, resulting in an estimated average seepage velocity of approximately 0.90 ft/day or 330 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 (November 2019)

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 November 2019 Appendix III indicator parameters shows potential SSIs over background for:

- Boron at MW-10;

The initial observation of 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, fluoride, sulfate, or total dissolved solids (TDS).

3.3 Verification Resampling – First Semiannual Event (November 2019)

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 January 8, 2020, by TRC personnel for boron at MW-10. A summary of the groundwater data collected during the verification resampling event is provided on Table 3. The associated data quality review is included in Appendix B.

The MW-10 boron verification result is below the prediction limit, consequently the potential boron SSI from the November 2019 event is not confirmed. Therefore, in accordance with the Stats Plan and the Unified Guidance, the initial exceedance is not statistically significant, and no SSIs will be recorded for the November 2019 monitoring event.

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

The data comparisons for the April 2020 groundwater monitoring event are presented on Table 4. Based on the statistical evaluation of the April 2020 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-1S; and
- Sulfate at MW-7S.

3.5 Verification Resampling – Second Semiannual Event (April 2020)

Verification resampling was conducted on June 10, 2020, by TRC personnel. Groundwater samples were collected for fluoride at monitoring well MW-1S and for sulfate at monitoring well MW-7S 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 B.

The MW-1S fluoride verification results were within the prediction limits and no SSI exists from the April 2020 event for this parameter in accordance with the Stats Plan and the Unified Guidance.

The June 2020 verification sampling confirmed the SSI for sulfate at monitoring well MW-7S. Per §257.94(e), DTE Electric is in the process of performing an Alternate Source Demonstration (ASD) to further evaluate the sulfate SSI at monitoring well MW-7S.

4.0 Conclusions and Recommendations

No SSIs over background limits were recorded during the November 2019 monitoring event. For the April 2020 monitoring event, a sulfate SSI was observed at one monitoring location, as verified by resampling, and is 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 sulfate SSI over the background limit noted during the April 2020 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 2020.

5.0 References

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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 – November 2019 to April 2020
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
11/04/2019	9.00	573.62	4.27	574.58	3.15	574.43	2.14	574.06	4.78	574.27	3.10	574.36	5.95	574.63	7.80	574.69	7.21	573.76	5.35	575.41	7.14	573.66
04/06/2020	7.95	574.67	3.85	575.00	2.68	574.90	1.25	574.95	4.05	575.00	2.43	575.03	5.56	575.02	7.41	575.08	6.05	574.92	5.26	575.50	5.84	574.96

Notes:

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

ft BTOC - feet below top of casing

Table 2
Summary of Field Parameters – November 2019 to June 2020
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	11/5/2019	0.23	60.6	7.1	814	12.94	60.0
	4/6/2020	0.49	77.3	7.3	1,175	11.38	65.0
	6/10/2020(1)	0.42	61.9	6.9	1,335	17.29	44.0
MW-2S	11/5/2019	0.14	-53.4	7.7	1,672	14.39	14.5
	4/6/2020	0.17	-64.1	7.8	1,562	13.40	4.7
MW-3S	11/5/2019	0.36	22.5	7.3	1,806	16.10	61.8
	4/6/2020	1.32	141.0	7.4	1,683	15.42	43.0
MW-7S	11/6/2019	0.52	-112.6	7.3	1,253	14.90	2.0
	4/7/2020	0.12	19.8	7.1	1,094	13.65	2.2
	6/10/2020	0.14	28.1	7.3	1,271	16.64	1.7
MW-9	11/4/2019	0.12	24.9	6.9	1,143	15.40	1.0
	4/6/2020	0.14	42.7	6.9	1,051	13.62	0.8
MW-10	11/4/2019	0.13	-81.1	7.1	1,217	16.24	1.8
	1/8/2020(1)	0.60	-15.5	7.0	1,090	14.00	2.4
	4/6/2020	0.16	-51.4	7.1	1,108	14.56	1.5
MW-11	11/4/2019	0.20	6.8	7.4	1,852	14.05	51.5
	4/6/2020	0.59	-1.2	7.5	1,675	12.20	44.8
MW-12	11/5/2019	0.16	-53.2	7.6	1,549	13.76	4.1
	4/6/2020	0.60	-51.6	7.6	1,438	12.43	4.5
MW-13	11/5/2019	0.10	-5.4	7.0	711	13.48	1.3
	4/6/2020	0.11	0.2	7.1	658	12.89	11.6
MW-14	11/4/2019	0.12	14.3	7.1	1,648	12.85	2.0
	4/7/2020	0.08	-24.3	7.2	1,549	11.65	1.3
MW-15	11/6/2019	0.49	-98.7	7.3	1,141	15.80	0.7
	4/7/2020	0.17	-48.8	7.2	934	14.32	1.5

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 for verfication sampling event.

Table 3
Comparison of Appendix III Parameter Results to Background Limits – November 2019
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:		11/5/2019	PL	11/5/2019	PL	11/5/2019	PL	11/6/2019	PL	11/4/2019	PL
Constituent	Unit	Data		Data		Data		Data		Data	
Appendix III											
Boron	ug/L	310	870	980	1,000	900	980	570	1,400	580	640
Calcium	ug/L	160,000	370,000	240,000	270,000	260,000	540,000	160,000	380,000	180,000	190,000
Chloride	mg/L	51	170	11	14	13	15	81	110	42	59
Fluoride	mg/L	0.18	0.47	0.71	0.89	0.89	0.98	0.85	1.6	0.53	0.56
pH, Field	su	7.1	6.5 - 8.7	7.7	7.0 - 8.5	7.3	6.9 - 7.9	7.3	6.0 - 8.1	6.9	6.2 - 7.0
Sulfate	mg/L	82	850	1,200	1,600	1,200	1,400	170	590	3.1	12
Total Dissolved Solids	mg/L	660	1,600	1,900	2,000	1,900	2,300	850	2,000	780	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).

(1) Laboratory reporting limit exceeds the prediction limit due to sample dilution.

Table 3
Comparison of Appendix III Parameter Results to Background Limits – November 2019
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:		11/4/2019	1/8/2020	PL	11/4/2019	PL	11/5/2019	PL	11/5/2019	PL	11/4/2019	PL	11/6/2019	PL
Constituent	Unit	Data			Data		Data		Data		Data		Data	
Appendix III														
Boron	ug/L	**550**	480	530	890	920	1,100	1,100	34	100	1,200	1,700	2,300	2,800
Calcium	ug/L	160,000	--	170,000	260,000	330,000	190,000	210,000	130,000	140,000	230,000	310,000	140,000	150,000
Chloride	mg/L	57	--	80	15	18	10	13	98	120	220	310	120	150
Fluoride	mg/L	0.48	--	0.68	0.95	1.2	0.88	0.91	0.39	0.51	0.33	0.57	0.49	0.64
pH, Field	su	7.1	--	6.6 - 7.5	7.4	6.9 - 7.5	7.6	7.4 - 7.9	7.0	6.2 - 7.7	7.1	6.8 - 7.3	7.3	6.9 - 7.4
Sulfate	mg/L	19	--	19	1,300	1,500	1,100	1,300	< 10(1)	1.0	360	430	< 10(1)	1.0
Total Dissolved Solids	mg/L	810	--	840	2,000	2,100	1,700	1,800	570	1,100	1,500	1,700	700	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).
(1) Laboratory reporting limit exceeds the prediction limit due to sample dilution.

Table 4
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

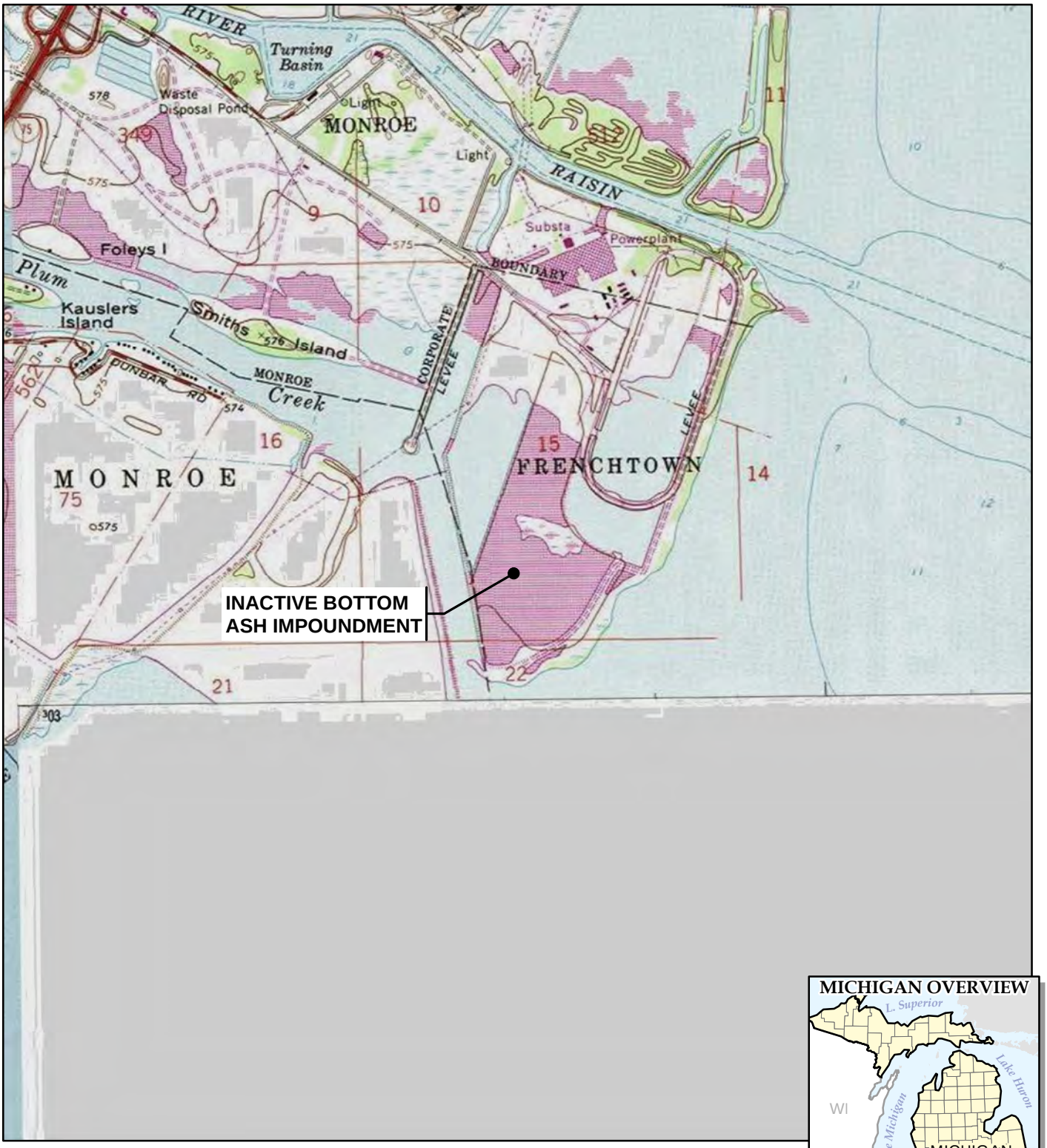
Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
SU - standard units; pH is a field parameter.
All metals were analyzed as total unless otherwise specified.
Bold font indicates an exceedance of the Prediction Limit (PL).
RESULT Shading and bold font indicates a comfirmed exceedance of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

Table 4
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.

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

FIGURE 1

S:\1-PROJECTS\DTE_Energy\MonroeMI_PP\320511_0006_Area15\370029-004slm.mxd -- Saved By: SMAJOR on 7/16/2020, 09:15:07 AM

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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:	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

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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.

0 700 1,400 FEET

1 " = 700 '

1:8,400

N

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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
NOVEMBER 2019

DRAWN BY:	S. MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	JULY 2020
PROJ. NO.:	370029.0006
FILE:	370029-005.mxd

FIGURE 3

Plot Date: 7/23/2020, 10:07:25 AM by SMAJOR -- 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

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.

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 2020

DRAWN BY:	S. MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	JULY 2020
PROJ. NO.:	370029.0006
FILE:	370029-006.mxd

FIGURE 4

Appendix A
October 2019 Alternative Source Demonstration

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Technical Memorandum

Date: October 14, 2019

To: Christopher P. Scieszka
DTE Electric Company

From: Graham Crockford, TRC
David McKenzie, TRC

Project No.: 320511.0006.0000 Phase 001, Task 001

Subject: Alternate Source Demonstration: 2019 Initial 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 2019 *Annual Groundwater Monitoring Report* (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 2019). The Annual Report included the results of the May 2019 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. This event was the initial 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 May 2019 Appendix III indicator parameters showed potential SSIs over background for:

- Boron at MW-8S;
- Sulfate at MW-9, MW-10, MW-11; and
- TDS at MW-9 and MW-10.

All other Appendix III constituents were within the statistical background limits. As discussed in the August 2019 Annual Groundwater Monitoring Report (TRC, August 2019), verification resampling was conducted on July 8 and 9, 2019, by TRC personnel for boron at MW-8S, sulfate and TDS at MW-9 and MW-10, and sulfate at MW-11. The verification resampling confirmed only the boron SSI at MW-8S.

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 boron SSI identified in the May 2019 detection monitoring event. The results of this ASD show that the SSI at MW-8S 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 twelve 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 and MW-7S 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 twelve 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-8S, sulfate and TDS at MW-9 and MW-10, and sulfate at MW-11 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 boron exceedance at MW-8S during the July 2019 verification sampling event (Table 1). The following discussion presents the ASD for the confirmed prediction limit exceedance.

Boron at MW-8S: 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. Therefore, concentrations in groundwater at MW-8S are not indicative of a release from the CCR unit.

A deep channel was historically dredged along the current location of the MONPP discharge channel to provide access to the MONPP parcel during the late 1960s/early 1970s based on the historic topographic maps (from 1952 to 1973) and aerial photographs (from 1961 and 1973) provided in Attachment A. As shown on Figure 2, the deep channel extended from the area near East Front Street (adjacent to the main plant building) toward Lake Erie to the south (between MW-8S and the MONPP BAI). Based on current available bathymetry data that was collected on July 24, 2019 using a Lowrance HDS9 sonic sonar unit, the channel was dredged to a depth of approximately 28 feet (to an elevation of approximately 546 feet above sea level per NAVD88) such that the bottom of the deep channel intersects the uppermost aquifer (Attachment B). The portion of the discharge channel south of the main channel of Plum Creek (between MW-8S and the MONPP BAI) has been partially filled with sediment since the MONPP was completed in the 1970s, as the channel was no longer maintained for navigation.

As illustrated on Figures 3 and 4, the upper portion of the uppermost aquifer at MW-7S and MW-9 is at a higher elevation than the bottom of the now partially sediment filled discharge channel. This demonstrates that the sediment fill within the discharge channel intersects the uppermost aquifer, creating a hydraulic connection between the uppermost aquifer and the discharge channel.

Groundwater and Lake Erie surface water elevation data also support the hydraulic connection between the discharge channel/Lake Erie and the uppermost aquifer. A graphical depiction of the MONPP BAI Inactive CCR unit groundwater elevations at select monitoring wells and surface water elevations in Lake Erie are shown in Figure 5. These data demonstrate that groundwater in the uppermost aquifer is interacting with surface water as shown by the monitoring well groundwater surface elevations rising and lowering concurrently with the Lake Erie surface water elevations.

Groundwater naturally flows horizontally in the downgradient direction (from high potential to low potential) along the path of least resistance toward the closest discharge features, which in this case are Plum Creek, the discharge channel, and Lake Erie. At the point of discharge, vertical groundwater flow gradients are expected as groundwater discharges to surface water. Groundwater potentiometric surface elevation data from MW-7S, MW-9 and MW-8S are consistently higher than the Lake Erie surface elevation recorded on the same date as shown on Figure 5. This demonstrates that the groundwater from the area of MW-8S will flow east and groundwater from the area of MW-7S and MW-9 will flow west toward the discharge channel and discharge into the channel, given that the surface water elevation in the channel is lower and there is a hydraulic connection between the uppermost aquifer and the channel (Figures 3 and 4). As such, groundwater beneath the MONPP BAI cannot physically flow west of the discharge channel to the area of MW-8S.

In addition, clay is present beneath the uppermost aquifer preventing downward vertical migration of groundwater in the area of the discharge channel (Figures 3 and 4). Upward vertical flow potential is observed in groundwater beneath the uppermost aquifer as evidenced by the artesian flowing conditions at MW-7D and MW-8D that are at higher groundwater elevations compared to their shallow counterparts, MW-7S and MW-8S, further demonstrating that vertical flow potential is upward beneath the uppermost aquifer (Figure 5).

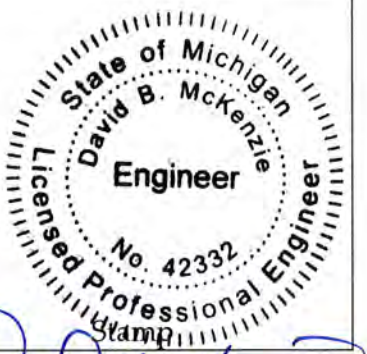
Given that groundwater from the area of the MONPP BAI cannot reach monitoring well MW-8S due to the hydraulic separation along the discharge channel, the boron SSI at MW-8S is not indicative of a release from the MONPP BAI Inactive CCR unit.

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 boron SSI determined based on the initial semiannual detection monitoring event performed in 2019 is not due to a release of CCR leachate 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 removing monitoring well MW-8S from the well network for future detection monitoring since MW-8S is not hydraulically connected to 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, 2019	
Company: TRC Engineers Michigan, Inc.	Date: 10/14/19	Stamp

References

TRC Environmental Corporation. July 2019. 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 Generalized Cross-Section A-A'
Figure 4 Generalized Cross-Section B-B'
Figure 5 MW-7S, MW-8S, MW-9, MW-7D, MW-8D, and Lake Erie Ground/Surface Water Elevation Time Series Plot

Attachment A Historic Topographic Maps and Aerial Photographs
Attachment B Bottom of Discharge Channel Depth Map

Table 1

Table 1
Comparison of Verification Sampling Results to Background Limits
Monroe Power Plant Inactive Bottom Ash Impoundment – RCRA CCR Monitoring Program
Monroe, Michigan

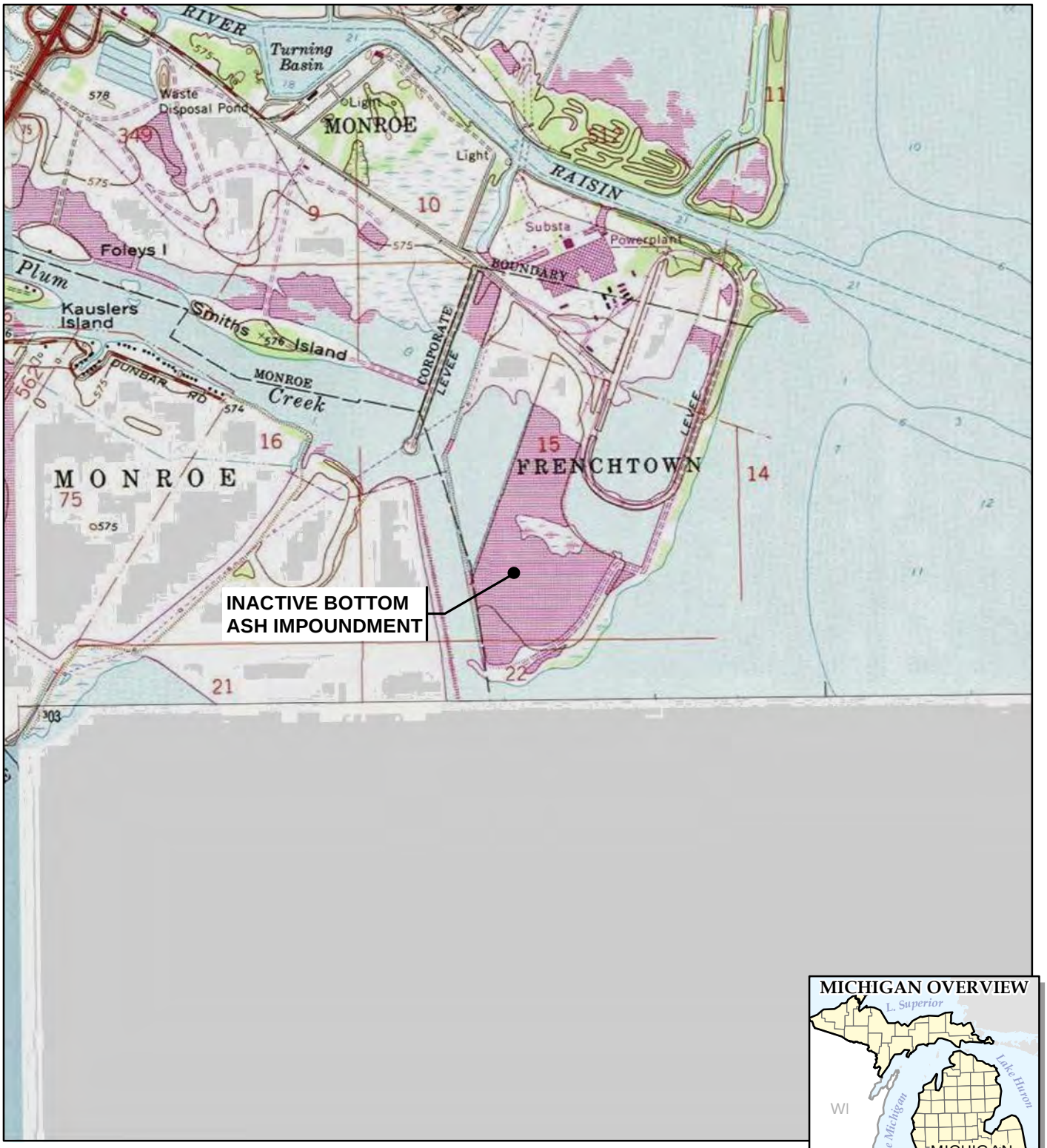
Sample Location:		MW-8S		MW-9		MW-10		MW-11	
Sample Date:		7/9/2019		7/8/2019		7/8/2019		7/8/2019	
Constituent	Unit	Data	PL	Data	PL	Data	PL	Data	PL
Appendix III									
Boron	ug/L	**490**	440	--	640	--	530	--	920
Sulfate	mg/L	--	1,600	3.6	12	3.7	19	1,300	1,500
Total Dissolved Solids	mg/L	--	2,400	800	810	830	840	--	2,100

Notes:

-- = not analyzed

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

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

N

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

0 2,000 4,000 FEET

TRC
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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:	R. SUEMNICHT
CHECKED BY:	S. HOLMSTROM
APPROVED BY:	V. BUENING
DATE:	SEPTEMBER 2019
PROJ. NO.:	320511.0006
FILE:	320511-001slm.mxd

FIGURE 1

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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
- CROSS SECTION LOCATION
- 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

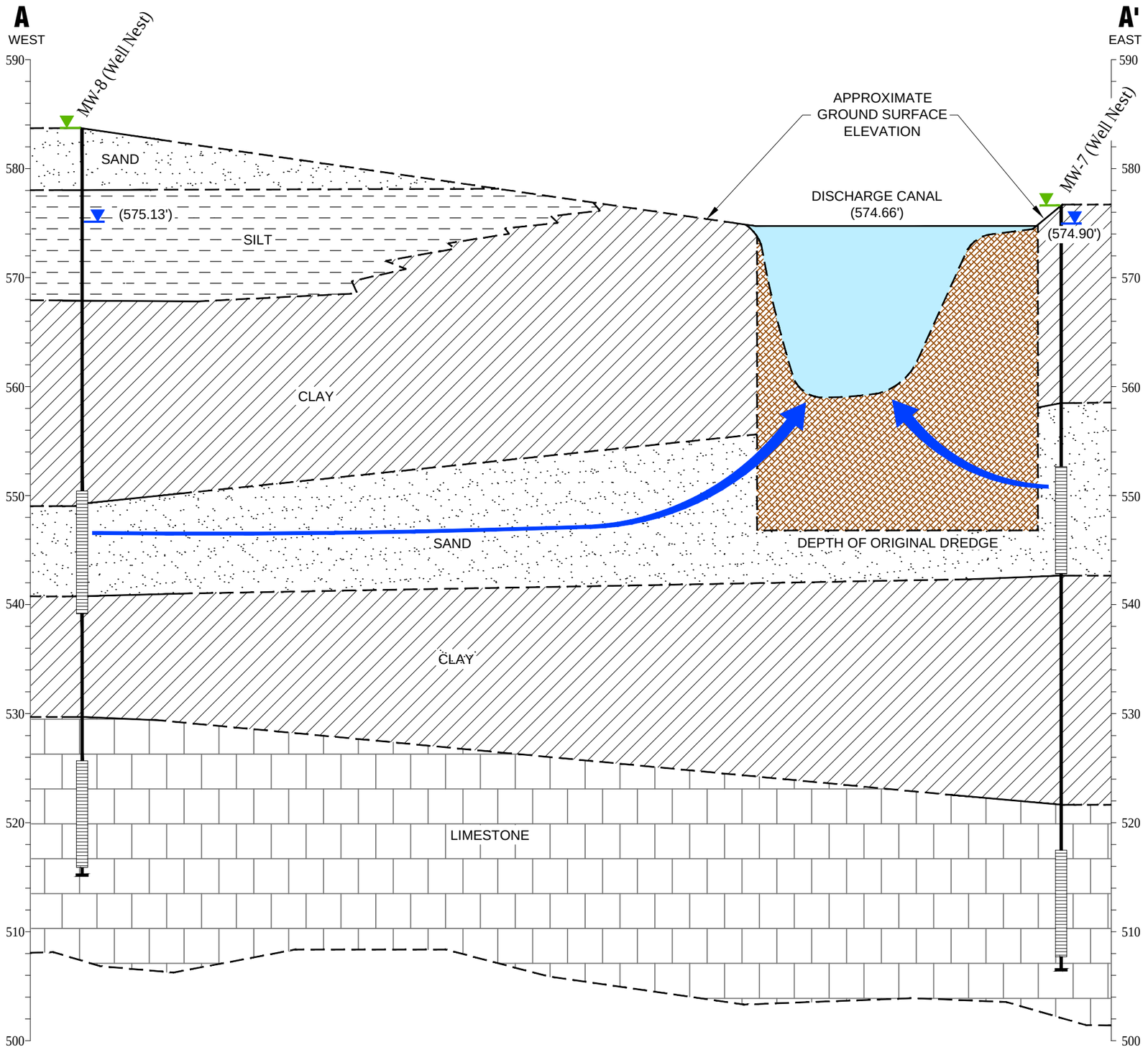
TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080

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

TITLE:
INACTIVE BOTTOM ASH IMPOUNDMENT WELL LOCATION MAP 2019

DRAWN BY:	R. SUEMNICHT
CHECKED BY:	S. HOLMSTROM
APPROVED BY:	V. BUENING
DATE:	SEPTEMBER 2019
PROJ. NO.:	320511.0006
FILE:	320511-002.mxd

FIGURE 2



LEGEND

- STRATEGRAPHIC BOUNDARY (DASHED WHERE INFERRED)
- GROUNDWATER ELEVATION IN LIMESTONE AQUIFER WELL (ARTESIAN)
- GROUNDWATER ELEVATION IN UPPERMOST AQUIFER WELL
- MONITORING WELL
- WELL SCREEN INTERVAL
- END OF BORING

Lithology Key

- SAND
- CLAY
- SILT
- LIMESTONE
- SEDIMENT
- GROUNDWATER FLOW

NOTE

1. ALL GROUNDWATER ELEVATIONS AND SURFACE WATER ELEVATIONS ARE FROM 5/21/2019 AND ARE IN NAVD88.
2. DEPTH OF DISCHARGE CANAL APPROXIMATED FROM BIOBASE MAP - LAKE ERIE 7/24/2019 (PROVIDED IN ATTACHMENT B).

SCALE IN FEET
VERTICAL: 0, 10
HORIZONTAL: 0, 200

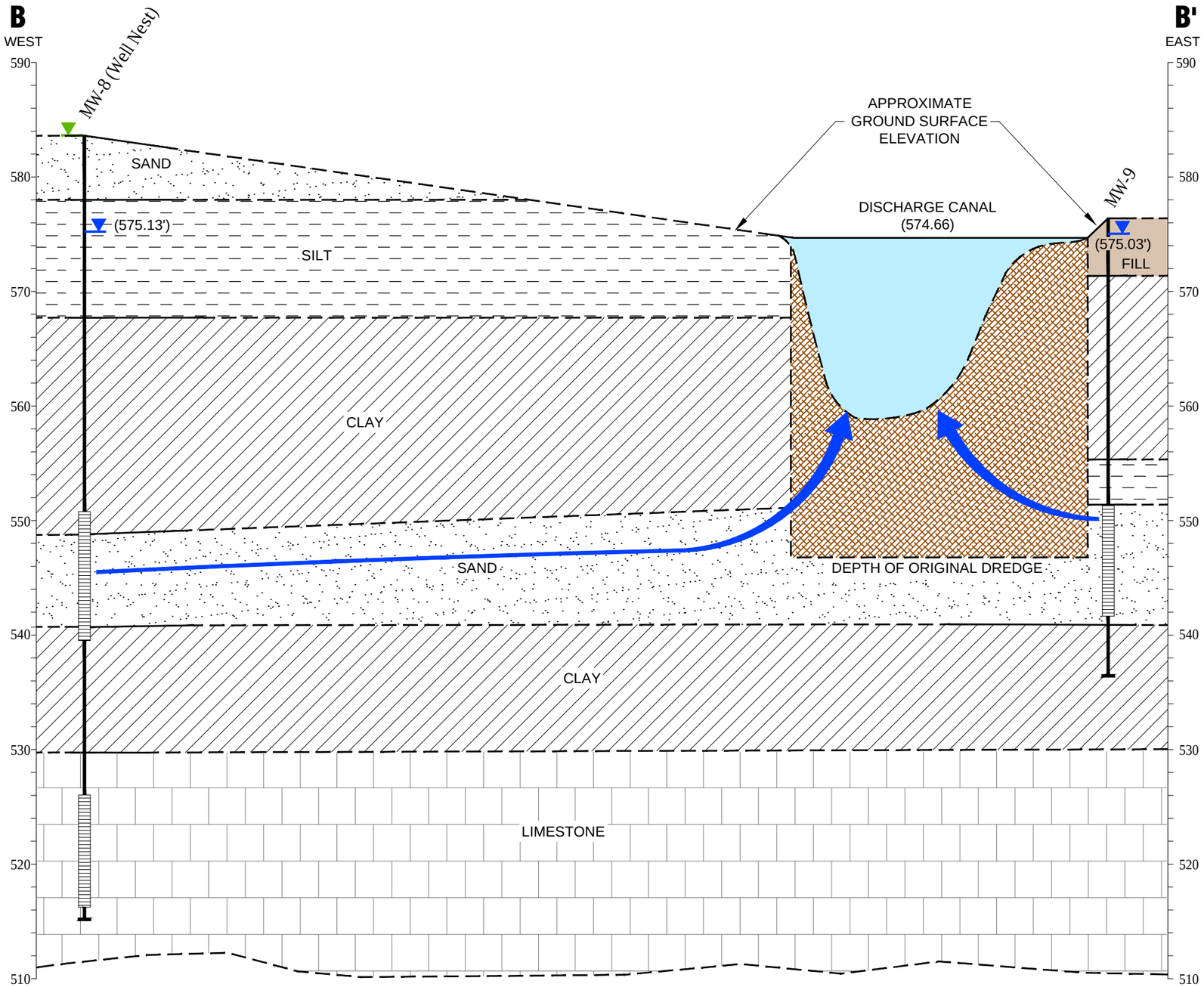
PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT
INACTIVE BOTTOM ASH IMPOUNDMENT
MONROE, MICHIGAN

TITLE:
GENERALIZED CROSS-SECTION A-A'

DRAWN BY:	D.STEHLE	PROJ NO.:	320511.0006.01
CHECKED BY:	M.BREHOB		
APPROVED BY:	V.BUENING		**FIGURE 3**
DATE:	SEPTEMBER 2019		

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

FILE NO.: 320511.0006.01.03-04 ASD.dwg



LEGEND

- STRATEGRAPHIC BOUNDARY (DASHED WHERE INFERRED)
- GROUNDWATER ELEVATION IN LIMESTONE AQUIFER WELL (ARTESIAN)
- GROUNDWATER ELEVATION IN UPPERMOST AQUIFER WELL
- MONITORING WELL
- WELL SCREEN INTERVAL
- END OF BORING

Lithology Key

- SAND
- CLAY
- SILT
- LIMESTONE
- SEDIMENT
- FILL
- GROUNDWATER FLOW

NOTE

1. ALL GROUNDWATER ELEVATIONS AND SURFACE WATER ELEVATIONS ARE FROM 5/21/2019 AND ARE IN NAVD88.
2. DEPTH OF DISCHARGE CANAL APPROXIMATED FROM BIOBASE MAP - LAKE ERIE 7/24/2019 (PROVIDED IN ATTACHMENT B).

SCALE IN FEET
VERTICAL: 10 / 0
HORIZONTAL: 0 / 200

PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT
INACTIVE BOTTOM ASH IMPOUNDMENT
MONROE, MICHIGAN

TITLE:
GENERALIZED CROSS-SECTION B-B'

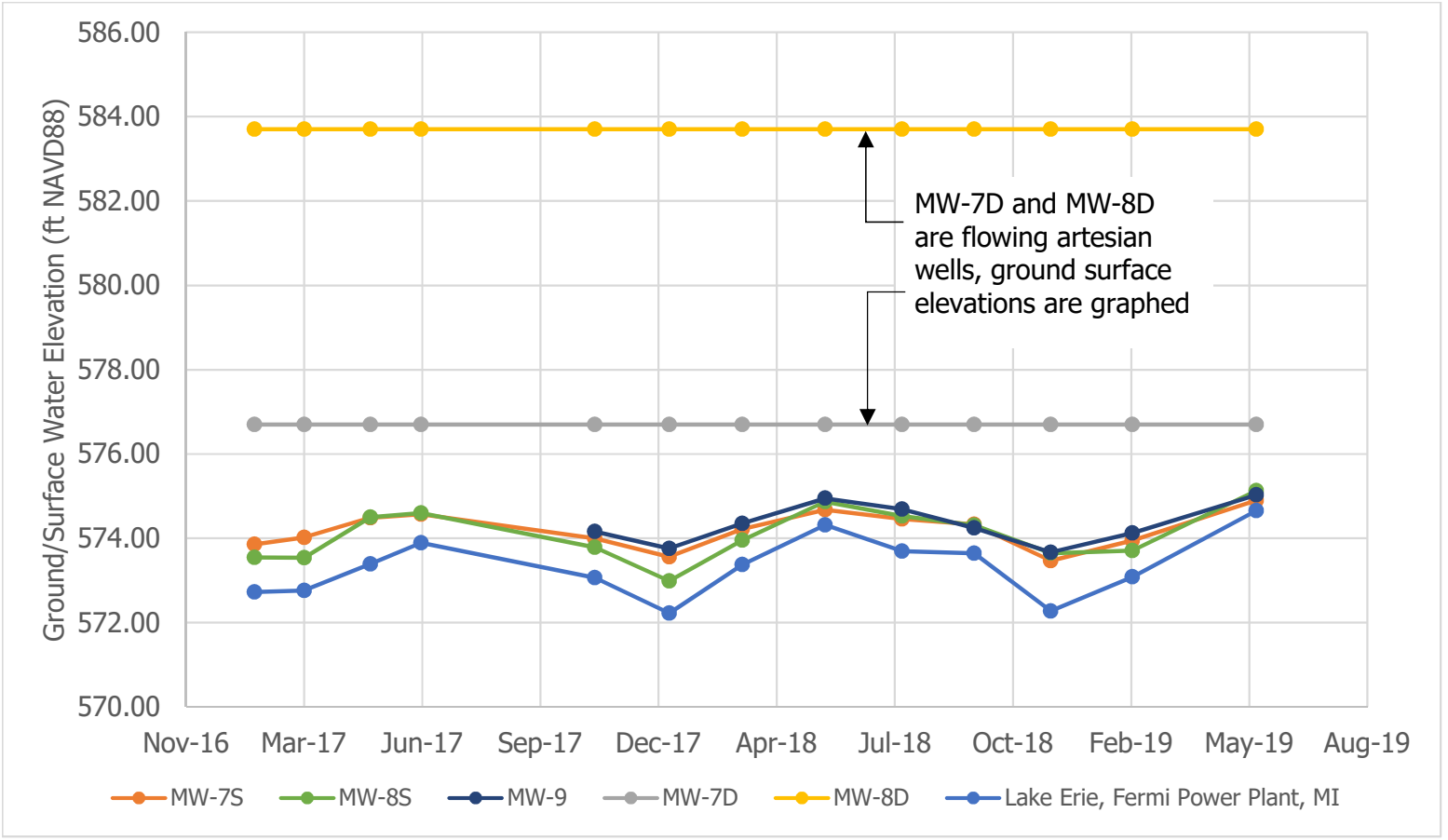
DRAWN BY:	D.STEHLE	PROJ NO.:	320511.0006.01
CHECKED BY:	M.BREHOB		
APPROVED BY:	V.BUENING		**FIGURE 4**
DATE:	SEPTEMBER 2019		

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

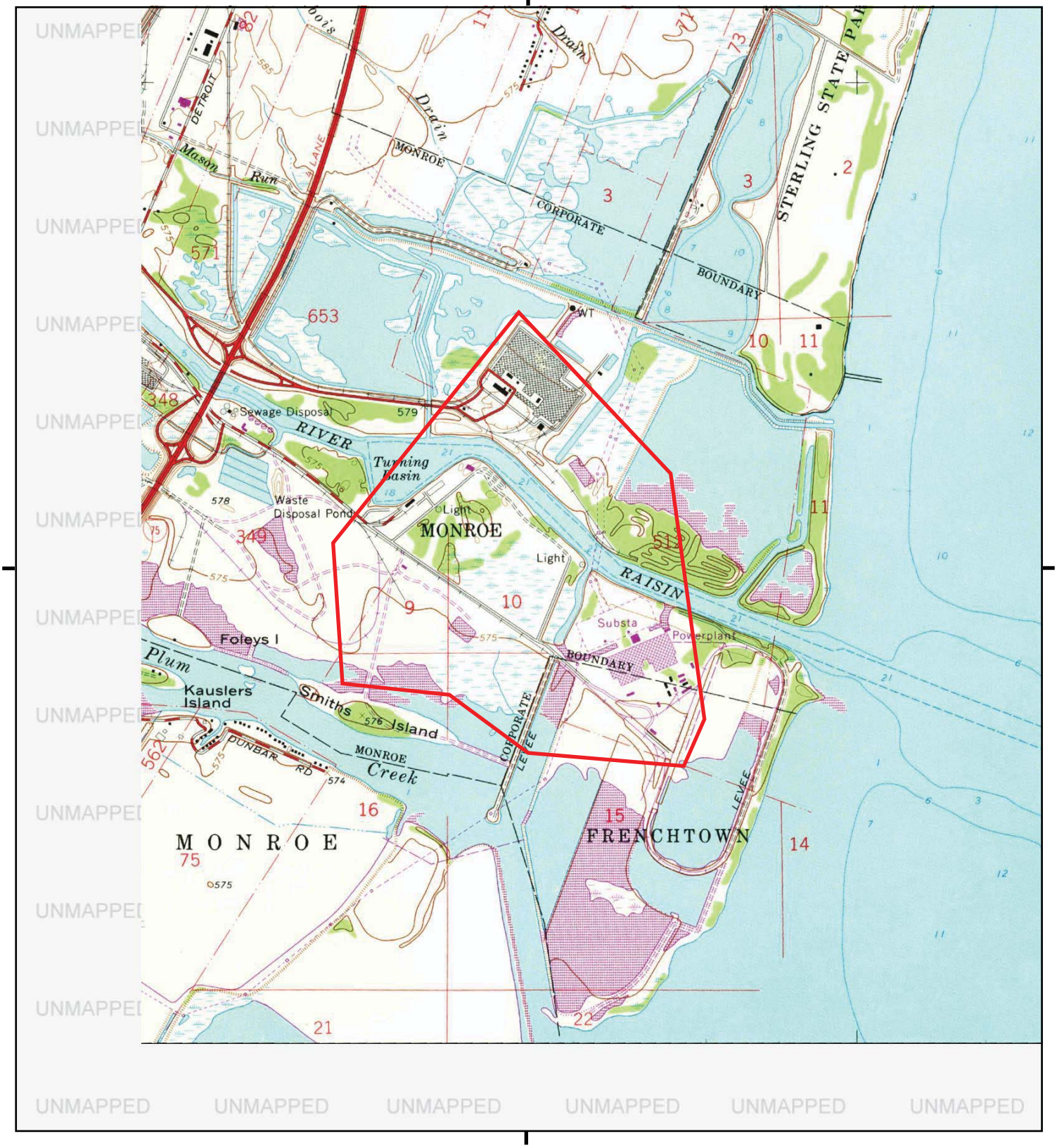
FILE NO.: 320511.0006.01.03-04 ASD.dwg

Figure 5

MW-7S, MW-8S, MW-9, MW-7D, MW-8D, and Lake Erie Ground/Surface Water Elevation Time Series Plot
Monroe Power Plant Inactive Bottom Ash Impoundment – RCRA CCR Monitoring Program



Attachment A
Historic Topographic Maps and Aerial Photographs



This report includes information from the following map sheet(s).

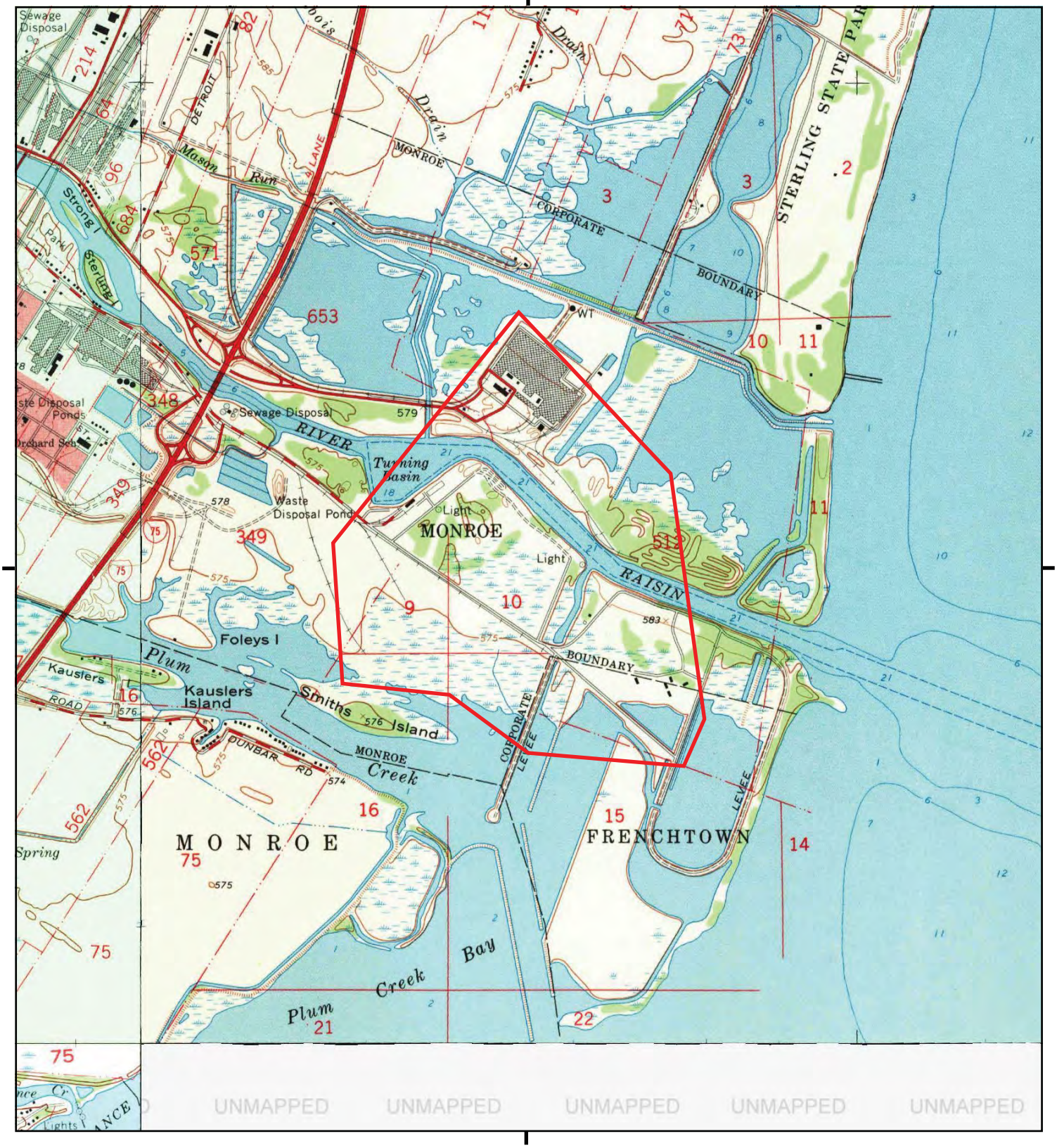
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Stony Point, 1973, 7.5-minute

SITE NAME: Port of Monroe/Gerdau Ameristeel
ADDRESS: 3000 E. Front Street
Monroe, MI 48161
CLIENT: AECOM

N



This report includes information from the following map sheet(s).

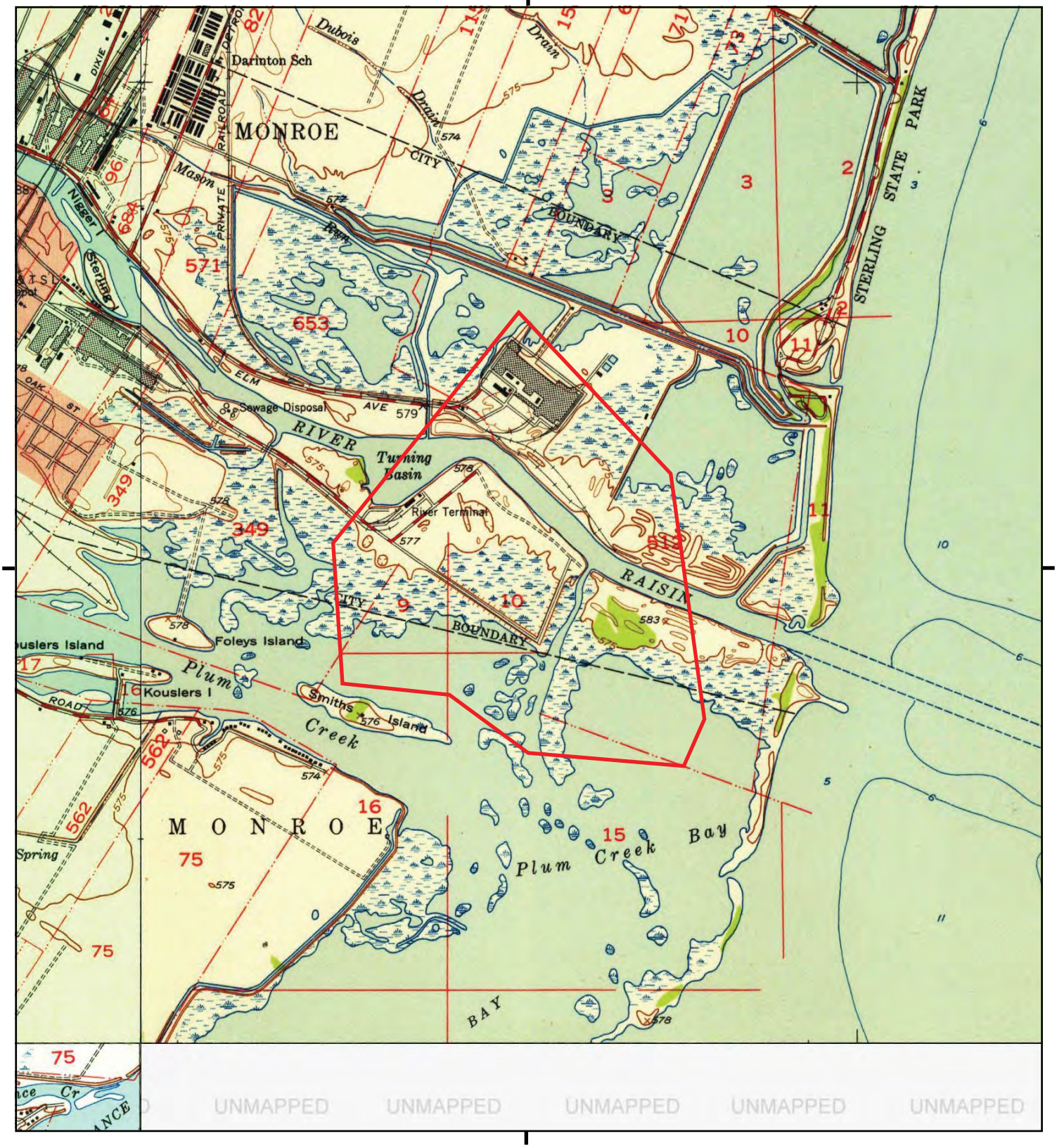
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Stony Point, 1967, 7.5-minute
SW, Erie, 1967, 7.5-minute
NW, Monroe, 1967, 7.5-minute

SITE NAME: Port of Monroe/Gerdau Ameristeel
ADDRESS: 3000 E. Front Street
Monroe, MI 48161
CLIENT: AECOM

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Stony Point, 1952, 7.5-minute
SW, Erie, 1952, 7.5-minute
NW, Monroe, 1952, 7.5-minute

SITE NAME: Port of Monroe/Gerdau Ameristeel
ADDRESS: 3000 E. Front Street
Monroe, MI 48161
CLIENT: AECOM

N

INQUIRY #: 4694578.9

YEAR: 1973

= 600'

N

EDR

INQUIRY #: 4694578.9

YEAR: 1961

= 500'

N

EDR

Attachment B
Bottom of Discharge Channel Depth Map

Lowrance HDS9 Sonic Sonar unit used to collect bathymetric data from Plum Creek and Discharge Channel.
BioBase Mapping Software used to generate figure.

Appendix B
Data Quality Review

Laboratory Data Quality Review
Groundwater Monitoring Event November 2019
DTE Electric Company Monroe Power Plant Bottom Ash Impoundment

Groundwater samples were collected by TRC for the November 2019 sampling event. Samples were analyzed for anions, total metals, and total dissolved solids by Test America Laboratories, Inc. (Test America), located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-121859-1.

During the November 2019 sampling event, a groundwater sample was collected from each of the following wells:

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

Each sample was analyzed for the following constituents:

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

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

Data Quality Review Procedure

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

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

- Data for matrix spike and matrix spike duplicate samples (MS/MSDs) , 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 performed on samples MW-1C for boron and MW-2S for calcium. The recovery of calcium in the MSD performed on sample MW-2S was below the laboratory 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 on sample MW-1S for TDS; relative percent differences (RPDs) were within the QC limits.
- DUP-01 corresponds with MW-9; RPDs between the parent and duplicate sample were within the QC limits.
- The nondetect RL for sulfate in samples MW-13 and DUP-01 (10.0 mg/L) exceeded the project-required RL (1.0 mg/L) due to a 10-fold dilution required prior to analysis because of matrix interference.

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

A groundwater sample was collected by TRC for the January 2020 verification of the second semi-annual sampling event of 2019. The sample was analyzed for boron by Eurofins Test America Laboratories, Inc., located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-124866-1.

During the January 2020 sampling event, a groundwater sample was collected from the following well:

- MW-10

Each sample was analyzed for the following constituents:

Analyte Group	Method
Boron	SW846 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 and field blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix;
- Data for matrix spike and matrix spike duplicate samples (MS/MSDs), when performed on project samples. The MS/MSDs are used to assess the accuracy and precision of the analytical method using a sample from the dataset;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are used to assess the precision of the analytical method using a sample from the dataset;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and

- Overall usability of the data.

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary:

- Target analytes were not detected in the method blank sample.
- An equipment blank was not collected with this data set.
- A field blank was not collected with this data set.
- The LCS recoveries for all target analytes were within laboratory control limits.
- MS and MSD analyses were not performed on sample in this data set.
- The field duplicate pair samples were MW-10 and DUP-01 for boron; the relative percent difference (RPD) between the parent and duplicate sample results were within the QC limits.
- Laboratory duplicate analyses were not performed on a sample from this data set.

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

Groundwater samples were collected by TRC for the April 2020 sampling event. Samples were analyzed for anions, total boron and calcium, and total dissolved solids by Eurofins-TestAmerica Laboratories, Inc., located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-128868-1.

During the April 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 the following constituents:

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

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

Data Quality Review Procedure

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

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

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

- The holding time for TDS for all samples except MW-2S and MW-13 exceeded the 7-day holding time criteria by approximately 10 minutes to nine hours. These results should be considered estimated and may be biased low as summarized in the attached table.
- Target analytes were not detected in the method blanks.
- An equipment blank was not collected.
- LCS recoveries for all target analytes were within laboratory control limits.
- MS/MSD analyses were performed on samples MW-9 for boron, MW-10 for calcium, and MW-1S for chloride and fluoride. The following issues were noted:
  - The recoveries for calcium in the MS/MSD performed on sample MW-10 were 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 MW-1S for sulfate but were likely not reported due to the re-analysis and dilution required for sulfate in this sample.
- Laboratory duplicate analysis was performed on sample MW-15 for TDS; the relative percent difference (RPD) was within the QC limits.

- DUP-01 corresponds with MW-9; RPDs between the parent and duplicate sample were within the QC limits with one exception. Sulfate was detected above the RL in sample MW-9 and was nondetect in DUP-01; the absolute difference was > the RL. Therefore, the positive and nondetect results for sulfate in all groundwater samples collected during this sampling event should be considered estimated as summarized in the attached table.

Summary of Data Non-Conformances for
Monroe Power Plant Bottom Ash Impoundment Groundwater Analytical Data
April 2020 Sampling Event
DTE Electric Company Monitoring Program
Monroe, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
MW-9	4/6/2020	Sulfate	Field duplicate variability; these positive and nondetect results should be considered estimated.
MW-10	4/6/2020		
MW-3S	4/6/2020		
MW-11	4/6/2020		
MW-12	4/6/2020		
MW-2S	4/6/2020		
MW-13	4/6/2020		
MW-1S	4/6/2020		
DUP-01	4/6/2020		
MW-7S	4/7/2020		
MW-15	4/7/2020		
MW-14	4/7/2020		
MW-9	4/6/2020	TDS	Holding time exceeded; these positive results may be biased low.
MW-10	4/6/2020		
MW-3S	4/6/2020		
MW-11	4/6/2020		
MW-12	4/6/2020		
MW-1S	4/6/2020		
DUP-01	4/6/2020		
MW-7S	4/7/2020		
MW-15	4/7/2020		
MW-14	4/7/2020		

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

Groundwater samples were collected by TRC for the June 2020 sampling event. Samples were analyzed for anions by Eurofins Test America Laboratories, Inc., located in North Canton, Ohio. The laboratory analytical results are reported in laboratory report 240-131800-1.

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

- MW-1S_20200610
- MW-7S_20200610

Each sample was analyzed for 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, 2017). The following items were included in the evaluation of the data:

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

- Overall usability of the data.

This data usability report addresses the following items:

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

Review Summary

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

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

QA/QC Sample Summary:

- Target analytes were not detected in the method blank sample.
- An equipment blank was not collected with this data set.
- A field blank was not collected with this data set.
- The LCS recoveries for all target analytes were within laboratory control limits.
- MS and MSD analyses were performed on sample MW-7S_20200610 for sulfate; recoveries and the relative percent difference (RPD) were within the acceptance limits.
- The field duplicate pair samples were MW-1S_20200610 and DUP-01 for fluoride and MW-7S_20200610 and DUP-02 for sulfate; RPDs between the parent and duplicate samples were within the QC limits.
- Laboratory duplicate analyses were not performed on a sample from this data set.