2023 Annual Groundwater Monitoring and Corrective Action Report

Former JR Whiting Power Plant
Pond 1&2 and Pond 6

Erie, Michigan

January 2024

Prepared For:

Consumers Energy

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

Sarah B. Holmstrom, P.G.
Project Manager/Sr. Hydrogeologist

Vincent E. Buening, C.P.G.
Sr. Hydrogeologist

TABLE OF CONTENTS

APPENDICES

1.0 Program Summary

Coal Combustion Residuals (CCR) are regulated under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule) (USEPA, April 2015, as amended). Standards for groundwater monitoring and corrective action codified in the CCR Rule (40 CFR 257.90-98), apply to the Consumers Energy Company (Consumers Energy) Pond 1 & 2 and Pond 6 at the former JR Whiting (JRW) Power Plant Site. Pursuant to the CCR Rule, the owner or operator of a CCR unit must prepare an annual groundwater monitoring and corrective action report for the CCR unit documenting the status of groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e). On behalf of Consumers Energy, TRC has prepared this Annual Groundwater Monitoring Report for JRW Pond 1 & 2 and Pond 6 to cover the period of January 1, 2023 to December 31, 2023. The reporting schedules for Pond 1 & 2 and Pond 6 have been aligned to be due no later than January 31 of each year.

This 2023 Pond 1 & 2 and Pond 6 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 constituents (Appendix III to Part 257 of the CCR Rule) for the April and October 2023 semiannual groundwater monitoring events for Pond 1 & 2 and Pond 6. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify statistically significant increases (SSIs) in detection monitoring constituents to determine if concentrations in detection monitoring well samples exceed background levels.

No SSIs over background limits attributable to Pond 1 & 2 or Pond 6 were identified for any of the Appendix III constituents during the 2023 monitoring events. Pond 1 & 2 and Pond 6 remained in detection monitoring through the period covered by this report. As such, Consumers Energy will continue with the detection monitoring program at the JRW Pond 1 & 2 and Pond 6 in conformance with §257.90 - §257.94.

2.0 Groundwater Monitoring

The semiannual monitoring events were completed in April and October 2023 to comply with both the CCR Rule and the Michigan Department of Environment, Great Lakes, and Energy (EGLE)-approved monitoring program established for Pond 1 & 2 and Pond 6 in early 2020. Given the congruencies between the two programs, data collected and evaluated under both programs are presented together in two semiannual reports to document the 2023 monitoring activities.

No monitoring wells were installed or decommissioned in 2023. Key actions in the 2023 reporting period included performing detection monitoring for Pond 1 & 2 and Pond 6, conducting verification sampling during the first semiannual monitoring event, and an alternate source demonstration in July 2023 that attributes calcium concentrations to natural variability in groundwater at one monitoring location. No problems were encountered and thus no actions were needed to resolve problems. Key activities projected for 2024 include semi-annual detection monitoring.

2.1 First Semiannual Monitoring Event

A summary of the first semiannual groundwater monitoring event is provided in Appendix A.

2.2 Second Semiannual Monitoring Event

A summary of the second semiannual groundwater monitoring event is provided in Appendix B.

3.0 Corrective Action

There were no corrective actions needed or performed for either Pond 1 & 2 or Pond 6 within the calendar year 2023. No SSIs were recorded for the monitoring period that were attributable to either Pond 1 & 2 or Pond 6; therefore, Consumers Energy will continue with the detection monitoring program at the JRW Pond 1&2 and Pond 6 CCR unit in conformance with §257.90 - §257.94.

Appendix A
First Semiannual Monitoring Report

July 26, 2023

Brett Coulter, CPG, District Geologist
EGLE, Materials Management Division
State Office Building
301 East Louis Glick Highway
Jackson, MI 49201

TRANSMITTAL OF GROUNDWATER MONITORING RESULTS FOR JR WHITING SOLID WASTE DISPOSAL AREA

Dear Mr. Coulter,

Please find attached the First Semiannual 2023 Groundwater Monitoring Report for the JR Whiting Solid Waste Disposal Area, Facility ID 397664, prepared pursuant to the May 2020 Hydrogeological Monitoring Plan.

JR Whiting was following the groundwater monitoring waiver approved on September 2, 2009 until the federal Resource Conservation and Recovery Act (RCRA) coal combustion residuals (CCR) rule required groundwater monitoring at JR Whiting Pond 1&2 and then at Pond 6, beginning around 2016. Since then, in December 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Project Act, also known as Part 115 of PA 451 of 1994, as amended, to incorporate requirements of the federal CCR Rule. In 2019, Consumers Energy submitted a revised JR Whiting Hydrogeological Monitoring Plan, former JR Whiting Plant, Erie, Michigan (2020 HMP) (TRC, May 2020 Revision) that was finalized and approved by the Michigan Department of Environment, Great Lakes, and Energy in May 2020. The revised HMP harmonizes both the CCR Rule and state of Michigan requirements. This submittal was prepared in accordance with the July 5, 2013 OWMRP-115-29 communication under the revised HMP.

Please contact me if you have any questions regarding this transmittal.

Sincerely,

Michelle A. Marion
Sr. Environmental Engineer
Phone: (517) 937-9407
Email: michelle.marion@cmsenergy.com

cc Larry Bean, EGLE (via email)
Gary Schwerin, EGLE (via email)

First Semiannual 2023 Groundwater Monitoring Report

Former JR Whiting Power Plant Pond 1 & 2 and Pond 6

Erie, Michigan

July 2023

Prepared For:

Consumers Energy

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

Sarah B. Holmstrom, P.G.
Project Manager

Brian Yelen
Project Geologist

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 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. Standards for groundwater monitoring and corrective action codified in the CCR Rule (40 CFR 257.90-98) apply to the Consumers Energy Company (Consumers Energy) Ponds 1 and 2 (closed surface impoundment monitored as Pond 1 & 2 using a multiunit groundwater monitoring system) and Pond 6 (closed inactive surface impoundment) at the former JR Whiting (JRW) Power Plant Site (the Site). Prior to the CCR Rule, from about 2009 to 2016, JR Whiting followed the approved groundwater monitoring waiver.

On December 28, 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The December 2018 amendments to Part 115 were developed to provide the State of Michigan oversight of CCR impoundments and landfills and to better align existing state solid waste management rules and statutes with the CCR Rule. On August 8, 2019 Consumers Energy submitted a revised *JR Whiting Hydrogeological Monitoring Plan, former JR Whiting Power Plant, Erie, Michigan* (2020 HMP) (TRC, May 2020 Revision) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on May 11, 2020.

1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This JR Whiting First Semiannual 2023 Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to present groundwater monitoring data collected from the JR Whiting Pond 1 & 2 and Pond 6 during the first calendar quarter of 2023. This report was prepared in accordance with the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the July 5, 2013 Michigan Department of Environmental Quality – Office of Waste Management and Radiological Protection (MDEQ-OWMRP), now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, Format for Solid Waste Disposal Monitoring Submittals. All references herein to the EGLE are inclusive of the MDEQ. Groundwater sampling, analysis, and information contained in this report was prepared in adherence to the 2020 HMP.

1.2 Program Summary

Historically groundwater monitoring at JRW was performed under the HMP last revised on November 26, 1997 until the groundwater monitoring waiver was approved on September 2, 2009. It was then again performed pursuant to the CCR Rule beginning in 2016 until implementation of the 2020 HMP, at which time monitoring began to be conducted in accordance with both regulatory programs. In the *Second Semiannual 2022 Groundwater Monitoring Report* for the JRW Pond 1 & 2 and Pond 6 (Second Semiannual 2022 Report) (TRC, January 2023), Consumers Energy reported that no potential statistically significant increases (SSIs) were noted during the second 2022 semiannual detection monitoring event.

Therefore, Consumers Energy continued detection monitoring in the first half of 2023 at Pond 1 & 2 and Pond 6 pursuant to §257.94 of the CCR Rule, and the HMP.

This First Semiannual 2023 Report presents the monitoring results and the statistical evaluation of the detection monitoring constituents (Section 11511a(3)(c) of Part 115) for the April 2023 semiannual groundwater monitoring event for Pond 1 & 2 and Pond 6. Detection monitoring was performed in accordance with the 2020 HMP. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify SSIs of detection monitoring constituents compared to background levels.

1.3 Site Overview

The JR Whiting Plant was a coal-fired power generation facility located in Erie, Michigan, on the western shore of Lake Erie (Figure 1). The plant began producing electricity in 1952 from Units 1 and 2, with Unit 3 beginning operation in 1953. The plant ceased operation in April 2016. Figure 1 is the site location map showing the facility and the surrounding area. Site features are shown on Figure 2.

The JR Whiting Ash Disposal Area is licensed under Michigan Part 115 of the Natural Resources and Environmental Protection Act (NREPA), PA 451 of 1994, as amended.

Pond 1 & 2 is located to the east of the plant, north of the discharge canal, south of Erie Road, and west of Lake Erie and constructed in native clay soil. It was historically used for wet ash sluicing. In 2019, it received its final cover system constructed pursuant to 40 CFR 257.102(a); the Pond 1 & 2 Closure Construction Quality Assurance (CQA) Plan dated August 31, 2017; the Part 115 Administrative Rules; and Pond 1 & 2 Closure Plan submitted to the EGLE on December 18, 2017. The closure of Pond 1 & 2 was certified by the EGLE in a letter dated August 27, 2020.

Pond 6 is located to the north of the plant and was constructed in native clay soil. It was an inactive surface impoundment at the time the CCR Rule became effective on October 19, 2015 and was capped with final cover certified pursuant to the CCR Rule on December 5, 2017 and certified by the EGLE on August 24, 2018.

1.4 Geology/Hydrogeology

Pond 1 & 2 and Pond 6 are located adjacent to Lake Erie. The subsurface materials encountered at the JR Whiting site are predominately clay-rich till. The surficial CCR fill material is underlain by approximately 40 to 50 feet of laterally extensive clay-rich till that acts as a natural hydraulic barrier across the site. Limestone bedrock is present beneath the till and is considered the uppermost aquifer at the site.

Groundwater present within the uppermost aquifer is typically encountered at Pond 1 & 2 and Pond 6 around 70 to 80 feet below ground surface (ft bgs), approximately 510 to 520 feet above mean sea level (AMSL), in the limestone (beneath the till). The uppermost aquifer is confined and protected from CCR constituents by the 40- to 50-foot-thick overlying clay-rich aquitard which interfaces with the limestone at the elevation range of 510 to 520 ft. Potentiometric

surface elevation data from groundwater within the CCR monitoring wells represents the levels in which groundwater rises under hydrostatic pressure within each well and exhibit an extremely low hydraulic gradient across the site with no consistent or discernible flow direction.

2.0 Groundwater Monitoring

2.1 Monitoring Well Network

A groundwater monitoring system has been established for Pond 1 & 2 and Pond 6 for the purpose of detection monitoring. The detection monitoring well network for Pond 1 & 2 and Pond 6 currently consists of six monitoring wells for each CCR unit that are screened in the uppermost aquifer. Monitoring well locations are shown on Figure 2.

As discussed in the HMP, intrawell statistical methods for JR Whiting were selected based on the geology and hydrogeology at the Site (primarily the presence of clay/hydraulic barrier, no apparent flow direction and lack of flow potential across the 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 and similarities in concentrations in background and downgradient wells).

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. Monitoring wells JRW-MW-15001 through JRW-MW-15006 are located around the perimeter of Pond 1 & 2 and monitoring wells JRW-MW-16001 through JRW-MW-16006 are located around the perimeter of the JRW Pond 6. These monitoring wells provide data on both background and downgradient groundwater quality that has not been affected by the CCR unit (a total of six background/downgradient monitoring wells for each pond).

As shown on Figure 2, monitoring wells JRW-MW-16007 through JRW-MW-16009 are used for water level measurements only. These wells were initially installed as potential background monitoring wells during the initial stages of characterizing the site. However, based on further hydrogeological characterization of the uppermost aquifer, an intrawell statistical approach was selected which does not rely on JRW-MW-16007 through JRW-MW-16009 for statistical evaluation.

No monitoring wells have been installed or decommissioned since the previous monitoring event.

2.2 April 2023 Groundwater Monitoring

Consumers Energy Laboratory Services personnel performed gauging and sampling of monitoring wells associated with Pond 1 & 2 and Pond 6 on April 18 to 19, 2023. Groundwater monitoring was performed in accordance with the HMP. Groundwater samples collected during the April 2023 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents:

Section 11511a(3)(c) – Detection Monitoring Constituents
Boron
Calcium
Chloride
Fluoride
Iron
pH
Sulfate
Total Dissolved Solids (TDS)

Static water level measurements were collected at all locations after equilibration to atmospheric pressure. The depth to water was measured according to ASTM D 4750, "Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well" and recorded to the nearest 0.01 foot. Static water elevation data are summarized in Table 1.

Groundwater samples were collected using a peristaltic pump or submersible pump in accordance with low flow sampling protocol and were not field filtered to allow for total metals analysis. Groundwater field parameters included dissolved oxygen, oxidation reduction potential, pH, specific conductivity, temperature, and turbidity and are summarized on Table 2. All samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Consumers Energy followed chain of custody procedures to document the sample handling.

Consumers Energy collected quality assurance/quality control (QA/QC) samples from both CCR units, Pond 1 & 2 and Pond 6, during the April 2023 groundwater sampling event. The QA/QC samples per CCR unit consisted of one field blank, one equipment blank, one field duplicate (JRW-MW-15002 at Pond 1 & 2 and JHC-MW-16002 at Pond 6), and one field matrix spike/matrix spike duplicate (MS/MSD) sample collected from JRW-MW-15006 at Pond 1 & 2, and JHC-MW-16003 at Pond 6.

Groundwater analytical results from the first semiannual 2023 monitoring event are summarized in Table 3 (Pond 1 & 2) and Table 4 (Pond 6). The laboratory analytical reports are included in Appendix B. Field records are included in Appendix C.

2.2.1 Data Quality Review

Data from each round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The data were found to be complete and usable for the purposes of the CCR monitoring program. Data quality reviews are summarized in Appendix A.

2.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the background sampling events showed that the hydraulic gradient for groundwater within the uppermost aquifer is often so low, groundwater flow across Pond 1 & 2 and Pond 6 is frequently incalculable and often stagnant.

There are minor differences in hydraulic head across the monitoring wells (ranging from zero up to 0.15 feet across Pond 1 & 2 and up to 0.24 feet across Pond 6 from event to event from November 2016 through April 2023), indicating that the potentiometric surface is flat the majority of the time. In the few instances since November 2016 where a slight gradient was observed and calculable, the direction of the flow potential is highly variable event to event and has shown flow directions slightly to the northwest, east, and northeast from Pond 1 & 2 and slightly to the south, west, and northeast from Pond 6.

The most pronounced groundwater gradient between November 2016 and April 2023 at Pond 1 & 2 was observed on December 19, 2016, which showed a slight horizontal gradient of approximately 0.00016 to the northwest across Pond 1 & 2. For Pond 6, the most pronounced potentiometric head differential of 0.24 feet was observed on February 28, 2018 between JRW-MW-16001 on the north edge of Pond 6 and JRW-MW-16004 on the south edge of the Pond 6 CCR unit. Although, when considering the potentiometric surface elevation data from all of the Pond 6 CCR unit wells, the general groundwater flow direction inferred across the pond at that time is to the southwest, in order to be conservative, the maximum head difference was used to calculate the maximum groundwater flow velocity at the Pond 6 CCR unit throughout the background monitoring period. This results in a very slight horizontal gradient of approximately 0.000099 ft/ft to the south.

2.2.2.1 Pond 1 & 2

Although there was no clear flow direction when looking at water levels across the Pond 1 & 2 well network, the maximum groundwater gradient inferred on April 18, 2023 was calculated using well pair JRW-MW-15005/JRW-MW-15002. The head difference across Pond 1 & 2 ranged from 0.00 to 0.05 feet between monitoring wells, with the maximum head difference showing a slight horizontal gradient of approximately 0.000045 ft/ft. Using the highest hydraulic conductivity measured at the Pond 1 & 2 monitoring wells of 20 feet/day (ARCADIS, 2016), and an assumed effective porosity of 0.1, this results in a maximum inferred groundwater flow rate of approximately 0.0090 feet/day (approximately 3.3 feet/year). However, the actual gradient is much lower when considering the rest of the monitoring wells across Pond 1 & 2 and the lack of discernable flow direction. The Pond 1 & 2 groundwater potentiometric surface elevations measured across the Site during the April 2023 sampling event are provided on Table 1 and are summarized in plan view on Figure 3.

The extremely low gradient and lack of general flow direction is similar to that identified in previous monitoring rounds (since the background sampling events commenced in December 2016) and continues to demonstrate that the downgradient compliance wells are appropriately positioned to detect the presence of detection monitoring constituents that could potentially migrate from Pond 1 & 2.

2.2.2.2 Pond 6

Although there was no clear flow direction when looking at water levels across the Pond 6 well network, the maximum groundwater gradient inferred on April 18, 2023 was calculated using well pair JRW-MW-16006/JRW-MW-16002. The head difference across Pond 6 ranged from 0.01 to 0.04 feet between monitoring wells, with the maximum head difference showing a slight horizontal gradient of approximately 0.000036 ft/ft. Using the highest hydraulic conductivity measured at the Pond 6 CCR unit monitoring wells (11.9 feet/day from the 2016 TRC well installation report) and an assumed effective porosity of 0.1, this results in a maximum inferred groundwater flow rate of approximately 0.0043 feet/day (approximately 1.6 feet/year). Groundwater potentiometric surface elevations measured across the Site during the April 2023 sampling event are provided on Table 1 and are summarized in plan view on Figure 3.

The extremely low gradient and/or lack of a consistent or discernable general flow direction is similar to that identified in previous monitoring rounds since the background sampling events commenced in November 2016 and continues to demonstrate that the downgradient compliance wells are appropriately positioned to detect the presence of detection monitoring constituents that could potentially migrate from the JRW Pond 6.

3.0 Statistical Evaluation

Detection monitoring is continuing at JR Whiting Pond 1 & 2 and Pond 6 in accordance with the HMP. The following section summarizes the statistical approach applied to assess the first semiannual 2023 groundwater data in accordance with the detection monitoring program.

3.1 Establishing Background Limits

3.1.1 Pond 1 & 2

Per the HMP, background limits were established for the detection monitoring constituents using data collected from each of the six established detection monitoring wells (JRW-MW-15001 through JRW-MW-15006). The background limits for each monitoring well have been calculated using thirteen rounds of data collected from November 2016 through March 2019 as presented in detail in the 2019 Annual Report. These background limits will continue to be used throughout the detection monitoring program to determine whether groundwater has been impacted from Pond 1 & 2 by comparing concentrations in the detection monitoring wells to their respective background limits for each detection monitoring constituent, with the exception of iron. Iron was incorporated into the monitoring program as part of the 2020 HMP. Background limits for iron will be calculated once a minimum of eight background data points have been collected from each monitoring location.

3.1.2 Pond 6

Per the HMP, background limits were established for the detection monitoring constituents using data collected from each of the six established detection monitoring wells (JRW-MW-16001 through JRW-MW-16006). The statistical evaluation of the background data is presented in the Pond 6 July 2019 Annual Report. The detection monitoring background limits for each monitoring well will continue to be used throughout the detection monitoring period to determine whether groundwater has been impacted from Pond 6 by comparing concentrations in the detection monitoring wells to their respective background limits for each detection monitoring constituent, with the exception of iron. Iron was incorporated into to the monitoring program as part of the 2020 HMP. Background limits for iron will be calculated once a minimum of eight background data points have been collected from each monitoring location.

3.2 Data Comparison to Background Limits – Pond 1 & 2 First 2023 Semiannual Event (April 2023)

The concentrations of the constituents in each of the detection monitoring wells (JRW-MW-15001 through JRW-MW-15006) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from JRW-MW-15001 is compared to the background limit developed using the background dataset from JRW-MW-15001, and so forth). The comparisons are presented on Table 3.

Based on the statistical evaluation of the April 2023 detection monitoring parameters, a resample for the following parameters were collected in accordance with the HMP:

- Calcium at JRW-MW-15005.

The initial observation of a constituent concentration above the established background limits does not necessarily constitute an SSI. Per the Stats Plan, if there is an 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 SSIs compared to background for boron, chloride, fluoride, sulfate, or TDS.

3.3 Pond 1 & 2 Verification Resampling for the First 2023 Semiannual Event

Verification resampling is performed per the HMP (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 Part 115 Rule 299.4908 and §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.

Verification samples were collected on May 17, 2023 by Consumers Energy Trail Street personnel for calcium analysis at monitoring well JRW-MW-15005 in accordance with the HMP. A summary of the groundwater analytical data collected during the verification resampling event is provided on Table 2 (field data) and Table 3 (analytical data compared to background). The associated data quality review is included in Appendix A.

The May 2023 verification sampling confirmed the SSI slightly above the prediction limit for calcium at JRW-MW-15005. Therefore, in accordance with the HMP and the Unified Guidance, if the verification sample remains statistically significant, then statistical significance will be considered, and, per the HMP, the 14-day notification will be made. This report serves as the 14-day notification for the SSI that occurred for calcium at monitoring well JRW-MW-15005. If an SSI over background levels for one or more of the detection monitoring parameters is determined, a 30-day demonstration period will be initiated upon determining the increase to identify if the apparent increase was attributable to an error in sampling, analysis, statistical evaluation, impact from an off-site source, or natural variability in groundwater quality in accordance with Rule 299.4440(9).

In response to the potential SSI for calcium, an Alternate Source Demonstration (ASD) is also included in this report for EGLE approval. The ASD was prepared by TRC in the form of a technical memorandum dated July 14, 2023 with the subject: *Alternate Source Demonstration: April 2023 Detection Monitoring Event* (April 2023 ASD) to evaluate the SSI and demonstrate that the SSI is attributable to natural variation within the uppermost aquifer that has not yet been captured in the background data set. The April 2023 ASD is attached as Appendix D. Based on the multiple lines of evidence presented in the ASD, the SSI observed at JRW-MW-15005 is not attributed to Pond 1 & 2.

As no SSIs were found attributable to Pond 1 & 2, detection monitoring will be continued in accordance with the HMP. Per the EGLE prescribed submittal format, a statistical exceedances summary is included as Table 5 and reflects the results of the first 2023

semiannual monitoring event.

3.4 Data Comparison to Background Limits – Pond 6 First 2023 Semiannual Event (April 2023)

The data comparisons of monitoring wells JRW-MW-16001 through JRW-MW-16006 for the April 2023 groundwater monitoring event are presented on Table 4.

There were no SSIs compared to background for any of the constituents. As no SSIs were found, detection monitoring will be continued at the Pond 6 CCR unit in accordance with the HMP. Per the EGLE prescribed submittal format, a statistical exceedances summary is included as Table 5 and reflects that no statistical exceedances have occurred for the first 2023 semiannual monitoring event.

4.0 Conclusions and Recommendations

As no SSIs were found attributable to Pond 1 & 2 or Pond 6 during the April 2023 monitoring event, Consumers Energy will continue with the detection monitoring program in conformance with the HMP. No corrective actions were needed or performed for either Pond 1 & 2 or Pond 6. The next semiannual monitoring event at the JR Whiting Pond 1 & 2 and Pond 6 CCR units is scheduled for the fourth calendar quarter of 2023.

5.0 References

ARCADIS. May 13, 2016. Summary of Monitoring Well Design, Installation, and Development. JR Whiting Electric Generation Facility – Erie, Michigan. Prepared for Consumers Energy Company.

TRC Environmental Corporation. December 2016. 2016 Monitoring Well Design, Installation, Development, and Decommissioning. JR Whiting Electric Generation Facility – Erie, Michigan. Prepared for Consumers Energy Company.

TRC. February 2020. Electric Generation Facilities RCRA CCR Detection Monitoring Program for the Pond 1 & 2 and Pond 6 Areas. Sample and Analysis Plan. JR Whiting Monitoring Program – Erie, Michigan. Prepared for Consumers Energy Company.

TRC. February 2020. Groundwater Statistical Evaluation Plan – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. May 2020 Revision. Consumers Energy JR Whiting Hydrogeologic Monitoring Plan (HMP). Prepared for Consumers Energy Company.

TRC. January 2023. Second Semiannual 2022 Groundwater Monitoring Report – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6 CCR Unit, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. July 2023. Alternate Source Demonstration: April 2023 Detection Monitoring Event – Former JR Whiting Power Plant, Pond 1 and 2, Erie, Michigan. Prepared for Consumers Energy Company.

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

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

USEPA. 2016. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Extension of Compliance Deadlines for Certain Inactive Surface Impoundments; Response to Partial Vacatur. Office of Conservation and Recovery. EPA 81-FR-51082.

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

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

Tables

Table 1
Groundwater Elevation Summary – April 2023
JR Whiting Pond 1 & 2 and Pond 6
Erie, Michigan

Well Location	Ground Surface Elevation (ft)	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft)	April 18, 2023	
						Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Static Water Level Monitoring Wells							
JRW-MW-16007	579.47	582.31	Limestone	68.0 to 78.0	511.5 to 501.5	5.54	576.77
JRW-MW-16008	579.95	582.83	Limestone	68.0 to 73.0	512.0 to 507.0	6.07	576.76
JRW-MW-16009	579.90	582.60	Limestone	69.0 to 79.0	510.9 to 500.9	5.83	576.77
Ponds 1 & 2							
JRW-MW-15001(1)	NM	581.39	Limestone	78.0 to 88.0	512.7 to 502.7	4.60	576.79
JRW-MW-15002(1)	NM	590.17	Limestone	81.0 to 91.0	511.3 to 501.3	13.38	576.79
JRW-MW-15003(1)	NM	587.23	Limestone	81.0 to 91.0	510.4 to 500.4	10.40	576.83
JRW-MW-15004(1)	NM	589.32	Limestone	86.0 to 96.0	506.5 to 496.5	12.50	576.82
JRW-MW-15005(1)	NM	588.28	Limestone	86.0 to 96.0	508.3 to 498.3	11.44	576.84
JRW-MW-15006(1)	NM	580.48	Limestone	81.0 to 91.0	511.0 to 501.0	3.68	576.80
Pond 6							
JRW-MW-16001	589.19	592.33	Limestone	71.0 to 81.0	518.2 to 508.2	15.57	576.76
JRW-MW-16002	585.78	588.69	Limestone	81.0 to 91.0	504.8 to 494.8	11.97	576.72
JRW-MW-16003	586.19	589.01	Limestone	73.0 to 83.0	513.2 to 503.2	12.26	576.75
JRW-MW-16004	586.48	589.34	Limestone	75.0 to 85.0	511.5 to 501.5	12.60	576.74
JRW-MW-16005	589.29	592.14	Limestone	78.0 to 88.0	511.3 to 501.3	15.41	576.73
JRW-MW-16006	588.26	591.04	Limestone	79.0 to 89.0	509.3 to 499.3	14.28	576.76

Notes:

Top of casing elevation survey was conducted by Rowe Professional Services Company in September 2019.

Elevation in feet relative to North American Vertical Datum 1988 (NAVD 88).

TOC: Top of well casing.

ft BTOC: Feet below top of well casing.

ft BGS: Feet below ground surface.

(1) Screen interval depth below ground surface for Pond 1&2 monitoring wells approximated using an estimated final capped ground surface elevation of 590 feet above mean sea level. Screen interval elevations were measured using the original survey conducted by Sheridan Surveying Co. November 2015 at the time of monitoring well installation.

Table 2
Summary of Field Parameter Results – April 2023
JR Whiting Pond 1 & 2, and 6
Erie, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)
Ponds 1 & 2							
JRW-MW-15001	4/18/2023	0.37	-119.3	7.4	1,098	12.2	5.84
JRW-MW-15002	4/18/2023	0.39	-196.4	7.5	1,126	10.7	4.97
JRW-MW-15003	4/18/2023	0.41	-106.5	7.5	1,004	11.4	5.45
JRW-MW-15004	4/18/2023	3.07	73.9	7.4	965	11.0	7.11
JRW-MW-15005	4/18/2023	3.07	80.8	7.6	886	12.8	2.56
	5/17/2023(1)	2.89	111	7.6	877	13.2	3.24
JRW-MW-15006	4/18/2023	0.63	-101.7	7.5	987	12.1	6.52
Pond 6							
JRW-MW-16001	4/18/2023	0.57	-144.8	8.5	765	11.5	4.53
JRW-MW-16002	4/18/2023	3.79	-112.8	7.8	802	11.2	4.79
JRW-MW-16003	4/18/2023	0.52	-175.6	7.8	1,012	11.2	3.91
JRW-MW-16004	4/19/2023	0.43	-137.8	7.6	1,167	11.0	2.81
JRW-MW-16005	4/19/2023	0.43	34.2	7.3	873	11.6	5.59
JRW-MW-16006	4/19/2023	0.37	-159.6	7.6	832	11.9	2.99

Notes:
mg/L - Milligrams per Liter.
mV - Millivolts.
SU - Standard Units.
umhos/cm - Micromhos per centimeter.
°C - Degrees Celsius.
NTU - Nephelometric Turbidity Unit.
(1) Results shown for verification sampling performed on 5/17/2023.

Table 3
Comparison of Groundwater Detection Monitoring Parameter Results to Background Limits – April 2023
JR Whiting Pond 1 & 2
Erie, Michigan

Sample Location:		JRW-MW-15001		JRW-MW-15002		JRW-MW-15003		JRW-MW-15004		JRW-MW-15005			JRW-MW-15006	
Sample Date:		4/18/2023	PL	4/18/2023	PL	4/18/2023	PL	4/18/2023	PL	4/18/2023	5/17/2023	PL	4/18/2023	PL
Constituent	Unit	Data		Data		Data		Data		Data			Data	
Appendix III														
Boron	ug/L	174	240	193	220	208	230	219	270	179	--	270	194	250
Calcium	mg/L	142	180	138	180	127	160	125	140	**121**	**123**	**120**	130	140
Chloride	mg/L	45	55	42.5	56	43	55	44.7	56	31.1	--	46	41.6	53
Fluoride	ug/L	1,220	1,600	1,210	1,900	1,250	1,800	1,160	1,800	1,200	--	1,700	1,110	1,700
pH, Field	su	7.4	6.8 - 8.2	7.5	7.2 - 7.9	7.5	7.3 - 8.3	7.4	7.0 - 8.0	7.6	--	7.3 - 8.6	7.5	7.0 - 9.0
Sulfate	mg/L	382	470	386	500	344	440	287	390	291	--	350	329	410
Total Dissolved Solids	mg/L	825	1,000	852	1,100	722	940	697	880	641	--	840	725	920
Part 115 Parameters														
Iron	ug/L	860	n<8	698	n<8	428	n<8	211	n<8	30	--	n<8	664	n<8

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).

Table 4
Comparison of Groundwater Detection Monitoring Parameter Results to Background Limits – April 2023
JR Whiting Pond 6
Erie, Michigan

Sample Location:		JRW-MW-16001		JRW-MW-16002		JRW-MW-16003		JRW-MW-16004		JRW-MW-16005		JRW-MW-16006	
Sample Date:		4/18/2023	PL	4/18/2023	PL	4/18/2023	PL	4/19/2023	PL	4/19/2023	PL	4/19/2023	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
Appendix III													
Boron	ug/L	149	203	148	209	196	257	191	262	194	244	155	226
Calcium	mg/L	92.2	111	140	149	130	156	154	181	109	182	111	117
Chloride	mg/L	17.3	23.6	22	25.4	25.4	32.4	34.4	43.7	22.6	29.4	22.6	38.6
Fluoride	ug/L	1,200	2,300	< 1,000	1,400	< 1,000	1,600	1,040	1,700	1,140	1,800	1,140	2,200
pH, Field	su	8.5	7.5 - 8.9	7.8	7.5 - 8.3	7.8	7.4 - 7.9	7.6	7.4 - 8.2	7.3	7.0 - 8.0	7.6	7.5 - 8.2
Sulfate	mg/L	236	278	335	426	377	470	441	507	294	498	284	399
Total Dissolved Solids	mg/L	525	770	635	832	756	1,040	887	1,110	649	1,030	673	904
Part 115 Parameters													
Iron	ug/L	91	n<8	318	n<8	412	n<8	348	n<8	79	n<8	308	n<8

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.

Table 5
Summary of Statistical Exceedances – April 2023
JR Whiting Pond 1 & 2 and Pond 6
Erie, Michigan

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
SUMMARY OF STATISTICAL EXCEEDANCES

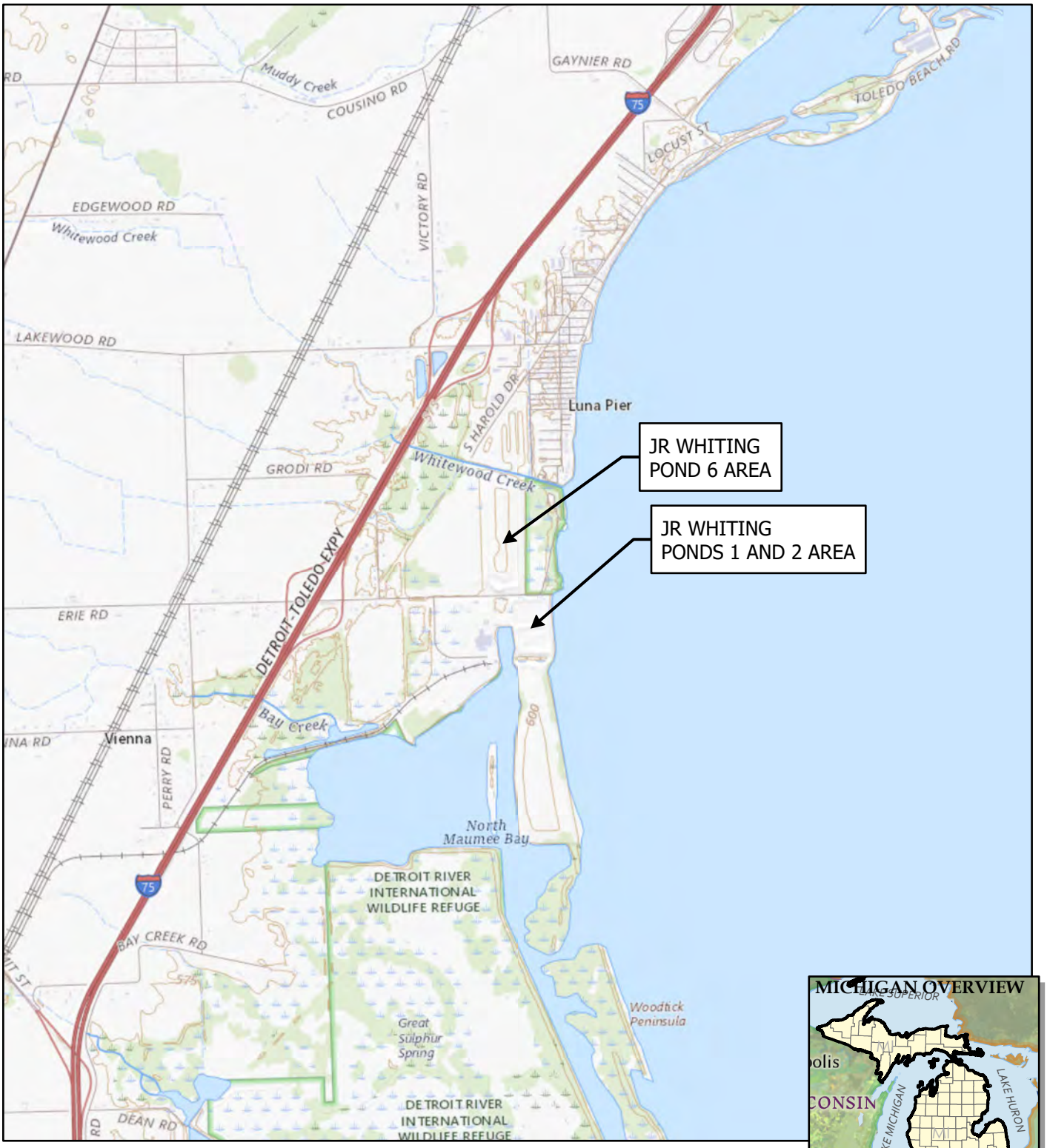
Data is in (X) ug/L or ( ) mg/L unless otherwise stated

Facility: JR Whiting – WDS# 397664

Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	2 Qtr. 2023 (**bold** >201)	4 Qtr. 2022 (**bold** >201)	2 Qtr. 2022 (**bold** >201)	4 Qtr. 2021 (**bold** >201)
JRW-MW-15002	JR Whiting Pond 1 & 2	Boron	500	220	193	225(1)	224(1)	204
JRW-MW-15003	JR Whiting Pond 1 & 2	Boron	500	230	208	241(1)	232(1)	216
JRW-MW-15005	JR Whiting Pond 1 & 2	Calcium	NC	120	121(2)	117	120	103

NOTES:
NC = No Criteria
(1) Exceedance was determined to be from natural variability as detailed in the Alternate Source Demonstration: April 2022 Detection Monitoring Event, Former JR Whiting Power Plant Ponds 1 and 2, Erie, Michigan dated July 28, 2022.
(2) Exceedance was determined to be from natural variability as detailed in the Alternate Source Demonstration: April 2023 Detection Monitoring Event, Former JR Whiting Power Plant Ponds 1 and 2, Erie, Michigan dated July 14, 2023.

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

1"=3,000'
1:36,000

0 3,000 6,000
FEET

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

PROJECT:

CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:

SITE LOCATION MAP

DRAWN BY:	A. ADAIR
CHECKED BY:	B. YELEN
APPROVED BY:	S. HOLMSTROM
DATE:	JULY 2023
PROJ. NO.:	514397
FILE:	JRWhiting.mxd

FIGURE 1

-- Saved By: AADAIR on 6/14/2023, 12:17:58 PM

LEGEND

- BACKGROUND MONITORING WELL
- CCR UNIT MONITORING WELL

NOTES:

1: BASE MAP IMAGERY FROM GOOGLE EARTH PRO AND PARTNERS, (5/7/2022).
2. STATIC WATER ONLY WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015.
3. PONDS 1 AND 2 WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES CO. ON 11/27/2019.

1:6,000
1" = 500'

0 500 1,000 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:
SITE PLAN
WITH CCR MONITORING WELL LOCATIONS

DRAWN BY:	A. ADAIR	PROJ. NO.:	517397
CHECKED BY:	B. YELEN		
APPROVED BY:	S. HOLMSTROM		FIGURE 2
DATE:	JULY 2023		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: JRWhiting.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By AADAIR on 8/14/2023 12:43:31 PM; File Path: T:\1-PROJECTS\Consumers_Energy\517397_JRWhiting\2-APRX\JRWhiting.aprx; Layout Name: Figure 2

LEGEND

- BACKGROUND MONITORING WELL
- CCR UNIT MONITORING WELL

LABEL FORMAT

MONITORING WELL ID
GROUNDWATER ELEVATION FT (MEASUREMENT DATE)

NOTES:

1: BASE MAP IMAGERY FROM GOOGLE EARTH PRO AND PARTNERS, (5/7/2022).
2. WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015.
3. PONDS 1 AND 2 WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES CO. ON 11/27/2019.
4. MONITORING WELL TOP OF CASING SURVEYED BY ROWE PROFESSIONAL SERVICES CO. ON 7/14/2020. VERTICAL DATUM IS NAVD88.

1:6,000
1" = 500'

0 500 1,000 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:
GROUNDWATER
POTENTIOMETRIC ELEVATION SUMMARY
APRIL 2023

DRAWN BY:	A. ADAIR	PROJ. NO.:	517397
CHECKED BY:	B. YELEN		
APPROVED BY:	S. HOLMSTROM		**FIGURE 3**
DATE:	JULY 2023		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: JRWhiting.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Stored By: AADAIR on 8/4/2023 - 15:15:55 PM; File Path: T:\1-PROJECTS\Consumers_Energy\517397_JRWhiting\2-APRX\JRWhiting.aprx; Layout Name: Figure 3

Appendix A
Data Quality Reviews

Pond 1 & 2

Laboratory Data Quality Review
Groundwater Sampling Event April 2023
Consumers Energy JR Whiting Pond 1 & 2

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the April 2023 groundwater monitoring sampling event. Samples were analyzed for anions, total metals, and total dissolved solids by CE Laboratory Services, located in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 23-0300.

During the April 2023 sampling event, a groundwater sample was collected from each of the following wells:

- JRW-MW-15001
- JRW-MW-15002
- JRW-MW-15003
- JRW-MW-15004
- JRW-MW-15005
- JRW-MW-15006

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

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals (Boron, Calcium, Iron)	SW-846 6020B

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 equipment blanks and field blanks. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- 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.

It should be noted that results for method blanks and laboratory control samples were not provided for review by the laboratory. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated.

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.

Findings

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable, with the exceptions noted below. The discussion that follows describes the QA/QC results and evaluation.

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 as well as iron will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One equipment blank (EB-01) and one field blank (FB-01) were collected. Target analytes were not detected in these blank samples.
- MS and MSD analyses were performed on sample JRW-MW-15006 for total metals and anions. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all MS/MSD recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-01/JRW-MW-15002. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Laboratory Data Quality Review
Groundwater Sampling Event May 2023
Consumers Energy JR Whiting Pond 1 & 2

A groundwater sample was collected by Consumers Energy (CE) Laboratory Services for the May 2023 groundwater monitoring sampling event. The sample was analyzed for total calcium by CE Laboratory Services, located in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 23-0494.

During the May 2023 sampling event, a groundwater sample was collected from the following well:

- JRW-MW-15005

The sample was analyzed for the following constituent:

Analyte Group	Method
Total Calcium	SW-846 6020B

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 equipment blanks and field blanks. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- 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.

It should be noted that results for method blanks and laboratory control samples were not provided for review by the laboratory. Therefore, potential contamination arising from laboratory

sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated.

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.

Findings

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable, with the exceptions noted below. The discussion that follows describes the QA/QC results and evaluation.

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.
- When the data are evaluated through a detection monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One equipment blank (EB-01) and one field blank (FB-01) were collected. Total calcium was not detected in these blank samples.
- MS and MSD analyses were performed on sample JRW-MW-15005 for total calcium. The recoveries were within the acceptance limits. The relative percent difference (RPD) was not provided by the laboratory and therefore was not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all MS/MSD recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-01/JRW-MW-15005. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Pond 6

Laboratory Data Quality Review
Groundwater Sampling Event April 2023
Consumers Energy JR Whiting Pond 6

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the April 2023 groundwater monitoring sampling event. Samples were analyzed for anions, total metals, and total dissolved solids by CE Laboratory Services, located in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 23-0301.

During the April 2023 sampling event, a groundwater sample was collected from each of the following wells:

- JRW-MW-16001
- JRW-MW-16002
- JRW-MW-16003
- JRW-MW-16004
- JRW-MW-16005
- JRW-MW-16006

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals (Boron, Calcium, Iron)	SW-846 6020B

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 equipment blanks and field blanks. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- 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.

It should be noted that results for method blanks and laboratory control samples were not provided for review by the laboratory. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated.

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.

Findings

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable, with the exceptions noted below. The discussion that follows describes the QA/QC results and evaluation.

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 as well as iron will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One equipment blank (EB-02) and one field blank (FB-02) were collected. Target analytes were not detected in these blank samples.
- MS and MSD analyses were performed on sample JRW-MW-16003 for total metals and anions. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since MS/MSD recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-02/JRW-MW-16002. All criteria were met with the following exception:
  - The RPD for iron (37.8%) was > 30. Therefore, the positive results for iron in all groundwater samples in this data set should be considered estimated, as summarized in the attached table, Attachment A.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Attachment A
Summary of Data Non-Conformances for Groundwater Analytical Data
JR Whiting Pond 6
Erie, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
JRW-MW-16001	4/18/2023	Iron	Field duplicate variability (relative percent difference above criteria); potential uncertainty exists for the listed results.
JRW-MW-16002	4/18/2023		
JRW-MW-16003	4/18/2023		
JRW-MW-16004	4/19/2023		
JRW-MW-16005	4/19/2023		
JRW-MW-16006	4/19/2023		
DUP-02	4/18/2023		

Appendix B
Laboratory Reports

Pond 1 & 2

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

135 W. Trail St.
Jackson, MI 49201
phone 517-788-1251
fax 517-788-2533

To: MAMarion, P22-118

From: EBlaj, T-258

Date: May 24, 2023

Subject: RCRA GROUNDWATER MONITORING – POND 1&2 VERIFICATION SAMPLE

CC: Sarah Holmstrom, Project Manager
TRC Companies, Inc.
1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 23-0494

CE Laboratory Services conducted groundwater monitoring at JR Whiting Pond 1&2 on 05/17/2023, for the 1st Semiannual monitoring requirement, and as specified in the Sampling and Analysis Plan for the site. Only JRW-MW-15005 was sampled to verify/confirm selected analytes. The samples were received in the Chemistry department of Laboratory Services on 05/17/2023.

The report that follows presents the results of the requested analytical testing; the results apply only to the samples, as received. All samples have been analyzed in accordance with the 2016 TNI Standard and the applicable A2LA accreditation scope for Laboratory Services. Any exceptions to applicable test method criteria and standard compliance are noted in the Case Narrative or flagged with applicable qualifiers in the analytical results section.

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead

ilac-MRA A2LA ACCREDITED Certificate #1097.04

Testing performed in accordance with the A2LA scope of accredidation specified in the listed certificate.

CASE NARRATIVE

I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted on the attached Sample Log-In Shipment Inspection Form during sample check-in. Identification of all samples included in the work order/project is provided in the sample summary section. All sample preservation and temperature upon receipt was verified by the sample custodian and confirmed to meet method requirements.

II. Methodology

Unless otherwise indicated, sample preparation and analysis was performed in accordance with the corresponding test methods from "Methods for the Determination of Inorganic Substances in Environmental Samples (EPA/600/R-93/100); SW-846, "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods", USEPA (latest revisions), and Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WPCF, 22nd Edition, 2012.

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section; all other quality control data is listed in the Quality Control Summary associated with the particular test method, as appropriate. Unless specifically noted in the case narrative, all method quality control requirements have been met. If any results are qualified, the corresponding data flags/qualifiers are listed on the last page of the results section. Any additional information on method performance, when applicable, is presented in this section of the case narrative. When data flags are not needed, the qualifiers text box on the last page is left blank, and a statement confirms that no exceptions occurred.

DEFINITIONS / QUALIFIERS

The following qualifiers and/or acronyms are used in the report, where applicable:

Acronym	Description
RL	Reporting Limit
ND	Result not detected or below Reporting Limit
NT	Non TNI analyte
LCS	Laboratory Control Sample
LRB	Laboratory Reagent Blank (also referred to as Method Blank)
DUP	Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
TDL	Target Detection Limit
SM	Standard Methods Compendium

Qualifier	Description
*	Generic data flag, applicable description added in the corresponding notes section
B	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
H	The maximum recommended hold time was exceeded
I	Dilution required due to matrix interference; reporting limit elevated
J	Estimated due to result found above MDL but below PQL (or RL)
K	Reporting limit raised due to matrix interference
M	The precision for duplicate analysis was not met; RPD outside acceptance criteria
N	Non-homogeneous sample made analysis questionable
PI	Possible interference may have affected the accuracy of the laboratory result
Q	Matrix Spike or Matrix Spike Duplicate recovery outside acceptance criteria
R	Result confirmed by new sample preparation and reanalysis
X	Other notation required; comment listed in sample notes and/or case narrative

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Work Order Sample Summary

Customer Name: JR Whiting Complex
Work Order ID: JR Whiting Verification Sample - April 2023
Date Received: 5/17/2023
Chemistry Project: 23-0494

Sample #	Field Sample ID	Matrix	Sample Date	Site
23-0494-01	JRW-MW-15005	Groundwater	05/17/2023 11:36	JRW RCRA GW Monitoring - Pond 1&2
23-0494-02	DUP-01	Groundwater	05/17/2023 11:36	JRW RCRA GW Monitoring - Pond 1&2
23-0494-03	JRW-MW-15005 Field MS	Groundwater	05/17/2023 11:36	JRW RCRA GW Monitoring - Pond 1&2
23-0494-04	JRW-MW-15005 Field MSD	Groundwater	05/17/2023 11:36	JRW RCRA GW Monitoring - Pond 1&2
23-0494-05	EB-01	Groundwater	05/17/2023 08:45	JRW RCRA GW Monitoring - Pond 1&2
23-0494-06	FB-01	Groundwater	05/17/2023 11:50	JRW RCRA GW Monitoring - Pond 1&2

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/24/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0494**
Field Sample ID:	**JRW-MW-15005**	Collect Date:	05/17/2023
Lab Sample ID:	23-0494-01	Collect Time:	11:36 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0494-01-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	123000		ug/L	1000	05/23/2023	AB23-0524-01

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/24/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0494**
Field Sample ID:	**DUP-01**	Collect Date:	05/17/2023
Lab Sample ID:	23-0494-02	Collect Time:	11:36 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0494-02-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	121000		ug/L	1000	05/23/2023	AB23-0524-01

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/24/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0494**
Field Sample ID:	**JRW-MW-15005 Field MS**	Collect Date:	05/17/2023
Lab Sample ID:	23-0494-03	Collect Time:	11:36 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0494-03-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	104		%	1000	05/23/2023	AB23-0524-01

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/24/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0494**
Field Sample ID:	**JRW-MW-15005 Field MSD**	Collect Date:	05/17/2023
Lab Sample ID:	23-0494-04	Collect Time:	11:36 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0494-04-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	85		%	1000	05/23/2023	AB23-0524-01

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/24/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0494**
Field Sample ID:	**EB-01**	Collect Date:	05/17/2023
Lab Sample ID:	23-0494-05	Collect Time:	08:45 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0494-05-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	ND		ug/L	1000	05/23/2023	AB23-0524-01

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/24/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0494**
Field Sample ID:	**FB-01**	Collect Date:	05/17/2023
Lab Sample ID:	23-0494-06	Collect Time:	11:50 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0494-06-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	ND		ug/L	1000	05/23/2023	AB23-0524-01

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0494

Inspection Date: 05-11-23 **Inspection By:** MLR/EB

Sample Origin/Project Name: JRW Pond 1 & 2 Verification Sample Q2.2023

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) MLR

Tracking Number._____ Shipping Form Attached· Yes _____ No ____

Shipping Containers: Enter the type and number of shipping containers received

Cooler ✓ Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container

Damaged Shipment Observed: None ✓ Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received. Opened N/A Sealed N/A

Enclosed Documents: Enter the type of documents enclosed with the shipment

CoC ✓ Work Request _____ Air Data Sheet_____ Other_____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 2.6 °C Samples Received on Ice. Yes ✓ No____

M&TE # and Expiration LS02875 Exp 11-15-23

Number and Type of Containers: Enter the total number of sample containers received

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	6				
24 mL vial (glass)					
500 mL (plastic)					
Other					

Page 2 of 2 Not Needed

CHAIN OF CUSTODY

Consumers Energy — Count on Us®

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251

SAMPLING SITE / CUSTOMER: JRW Pond 1&2 – Verification Sample Q2-2023

PROJECT NUMBER: **23-0494**

SAP CC or WO#:

REQUESTER: Michelle Marion

SAMPLING TEAM: MLR

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☐ STANDARD ☒ OTHER _____

SEND REPORT TO: Michelle Marion — email: — phone:

COPY TO: TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed): Total Metals

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	HNO_3	H_2SO_4	NaOH	HCl	MeOH	Other	Total Metals	REMARKS
23-0494-01	5/17/23	1136	GW	JRW-MW-15005	1		1						x	
-02	5/17/23	1136	GW	DUP-01	1		1						x	
-03	5/17/23	1136	GW	JRW-MW-15005 Field MS	1		1						x	
-04	5/17/23	1136	GW	JRW-MW-15005 Field MSD	1		1						x	
-05	5/17/23	0845	GW	EB-01	1		1						x	
-06	5/17/23	1150	GW	FB-01	1		1						x	

RELINQUISHED BY: [signature] DATE/TIME: 5/17/23 1445 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☒ Yes ☐ No M&TE #: LSO2875

Temperature: 2.6 °C Cal. Due Date: 11-15-23

Pond 6

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

135 W. Trail St.
Jackson, MI 49201

phone 517-788-1251
fax 517-788-2533

To: MAMarion, P22-118

From: EBlaj, T-258

Date: May 08, 2023

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 6 – 2023 Q2

CC: Sarah Holmstrom, Project Manager
TRC Environmental Corporation
1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 23-0301

CE Laboratory Services conducted groundwater monitoring at JR Whiting, Pond 6, on 04/18/2023 and 04/19/2023, for the 1st Semiannual monitoring requirement, and as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis in the Chemistry department of Laboratory Services on 04/19/2023.

The report that follows presents the results of the requested analytical testing; the results apply only to the samples as received. All samples have been analyzed in accordance with the 2016 TNI Standard and the applicable A2LA accreditation scope for Laboratory Services. Any exceptions to applicable test method criteria and standard compliance are noted in the Case Narrative, or flagged with applicable qualifiers in the analytical results section.

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead

ilac-MRA A2LA ACCREDITED Certificate #1097.04

Testing performed in accordance with the A2LA scope of accreditation specified in the listed certificate.

CASE NARRATIVE

I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted on the attached Sample Log-In Shipment Inspection Form during sample check-in. Identification of all samples included in the work order/project is provided in the sample summary section. All sample preservation and temperature upon receipt was verified by the sample custodian and confirmed to meet method requirements.

II. Methodology

Unless otherwise indicated, sample preparation and analysis was performed in accordance with the corresponding test methods from "Methods for the Determination of Inorganic Substances in Environmental Samples (EPA/600/R-93/100); SW-846, "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods", USEPA (latest revisions), and Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WPCF, 22nd Edition, 2012.

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section; all other quality control data is listed in the Quality Control Summary associated with the particular test method, as appropriate. Unless specifically noted in the case narrative, all method quality control requirements have been met. If any results are qualified, the corresponding data flags/qualifiers are listed on the last page of the results section. Any additional information on method performance, when applicable, is presented in this section of the case narrative. When data flags are not needed, the qualifiers text box on the last page is left blank, and a statement confirms that no exceptions occurred.

DEFINITIONS / QUALIFIERS

The following qualifiers and/or acronyms are used in the report, where applicable:

Acronym	Description
RL	Reporting Limit
ND	Result not detected or below Reporting Limit
NT	Non TNI analyte
LCS	Laboratory Control Sample
LRB	Laboratory Reagent Blank (also referred to as Method Blank)
DUP	Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
TDL	Target Detection Limit
SM	Standard Methods Compendium

Qualifier	Description
*	Generic data flag, applicable description added in the corresponding notes section
B	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
H	The maximum recommended hold time was exceeded
I	Dilution required due to matrix interference; reporting limit elevated
J	Estimated due to result found above MDL but below PQL (or RL)
K	Reporting limit raised due to matrix interference
M	The precision for duplicate analysis was not met; RPD outside acceptance criteria
N	Non-homogeneous sample made analysis questionable
PI	Possible interference may have affected the accuracy of the laboratory result
Q	Matrix Spike or Matrix Spike Duplicate recovery outside acceptance criteria
R	Result confirmed by new sample preparation and reanalysis
X	Other notation required; comment listed in sample notes and/or case narrative

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Work Order Sample Summary

Customer Name: JR Whiting Complex
Work Order ID: JRW RCRA GW Monitoring - Pond 6 - April 2023
Date Received: 4/19/2023
Chemistry Project: 23-0301

Sample #	Field Sample ID	Matrix	Sample Date	Site
23-0301-01	JRW-MW-16001	Groundwater	04/18/2023 17:06	JRW RCRA GW Monitoring - Pond 6
23-0301-02	JRW-MW-16002	Groundwater	04/18/2023 15:10	JRW RCRA GW Monitoring - Pond 6
23-0301-03	JRW-MW-16003	Groundwater	04/18/2023 18:00	JRW RCRA GW Monitoring - Pond 6
23-0301-04	JRW-MW-16004	Groundwater	04/19/2023 10:00	JRW RCRA GW Monitoring - Pond 6
23-0301-05	JRW-MW-16005	Groundwater	04/19/2023 10:59	JRW RCRA GW Monitoring - Pond 6
23-0301-06	JRW-MW-16006	Groundwater	04/19/2023 11:52	JRW RCRA GW Monitoring - Pond 6
23-0301-07	DUP-02	Groundwater	04/18/2023 00:00	JRW RCRA GW Monitoring - Pond 6
23-0301-08	EB-02	Water	04/18/2023 17:30	JRW RCRA GW Monitoring - Pond 6
23-0301-09	FB-02	Water	04/18/2023 17:40	JRW RCRA GW Monitoring - Pond 6
23-0301-10	JRW-MW-16003 Field MS	Groundwater	04/18/2023 18:00	JRW RCRA GW Monitoring - Pond 6
23-0301-11	JRW-MW-16003 FIeld MSD	Groundwater	04/18/2023 18:00	JRW RCRA GW Monitoring - Pond 6

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0301**
Field Sample ID:	**JRW-MW-16001**	Collect Date:	04/18/2023
Lab Sample ID:	23-0301-01	Collect Time:	05:06 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-01-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	149		ug/L	20	05/05/2023	AB23-0502-04
Calcium	92200		ug/L	1000	05/05/2023	AB23-0502-04
Iron	91		ug/L	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-01-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	17300		ug/L	1000	04/28/2023	AB23-0428-03
Fluoride	1200		ug/L	1000	04/28/2023	AB23-0428-03
Sulfate	236000		ug/L	1000	04/28/2023	AB23-0428-03

Total Dissolved Solids by SM 2540C

Aliquot: 23-0301-01-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	525		mg/L	10	04/24/2023	AB23-0424-04

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0301**
Field Sample ID:	**JRW-MW-16002**	Collect Date:	04/18/2023
Lab Sample ID:	23-0301-02	Collect Time:	03:10 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-02-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	148		ug/L	20	05/05/2023	AB23-0502-04
Calcium	140000		ug/L	1000	05/05/2023	AB23-0502-04
Iron	318		ug/L	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-02-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	22000		ug/L	1000	04/28/2023	AB23-0428-03
Fluoride	ND		ug/L	1000	04/28/2023	AB23-0428-03
Sulfate	335000		ug/L	1000	04/28/2023	AB23-0428-03

Total Dissolved Solids by SM 2540C

Aliquot: 23-0301-02-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	635		mg/L	10	04/24/2023	AB23-0424-04

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0301**
Field Sample ID:	**JRW-MW-16003**	Collect Date:	04/18/2023
Lab Sample ID:	23-0301-03	Collect Time:	06:00 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-03-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	196		ug/L	20	05/05/2023	AB23-0502-04
Calcium	130000		ug/L	1000	05/05/2023	AB23-0502-04
Iron	412		ug/L	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-03-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	25400		ug/L	1000	04/28/2023	AB23-0428-03
Fluoride	ND		ug/L	1000	04/28/2023	AB23-0428-03
Sulfate	377000		ug/L	1000	04/28/2023	AB23-0428-03

Total Dissolved Solids by SM 2540C

Aliquot: 23-0301-03-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	756		mg/L	10	04/24/2023	AB23-0424-04

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0301**
Field Sample ID:	**JRW-MW-16004**	Collect Date:	04/19/2023
Lab Sample ID:	23-0301-04	Collect Time:	10:00 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-04-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	191		ug/L	20	05/05/2023	AB23-0502-04
Calcium	154000		ug/L	1000	05/05/2023	AB23-0502-04
Iron	348		ug/L	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-04-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	34400		ug/L	1000	04/28/2023	AB23-0428-03
Fluoride	1040		ug/L	1000	04/28/2023	AB23-0428-03
Sulfate	441000		ug/L	1000	04/28/2023	AB23-0428-03

Total Dissolved Solids by SM 2540C

Aliquot: 23-0301-04-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	887		mg/L	10	04/24/2023	AB23-0424-04

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0301**
Field Sample ID:	**JRW-MW-16005**	Collect Date:	04/19/2023
Lab Sample ID:	23-0301-05	Collect Time:	10:59 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-05-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	194		ug/L	20	05/05/2023	AB23-0502-04
Calcium	109000		ug/L	1000	05/05/2023	AB23-0502-04
Iron	79		ug/L	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-05-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	22600		ug/L	1000	04/28/2023	AB23-0428-03
Fluoride	1140		ug/L	1000	04/28/2023	AB23-0428-03
Sulfate	294000		ug/L	1000	04/28/2023	AB23-0428-03

Total Dissolved Solids by SM 2540C

Aliquot: 23-0301-05-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	649		mg/L	10	04/24/2023	AB23-0424-04

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **JRW-MW-16006**
Lab Sample ID: 23-0301-06
Matrix: Groundwater

Laboratory Project: **23-0301**
Collect Date: 04/19/2023
Collect Time: 11:52 AM

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-06-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	155		ug/L	20	05/05/2023	AB23-0502-04
Calcium	111000		ug/L	1000	05/05/2023	AB23-0502-04
Iron	308		ug/L	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-06-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	22600		ug/L	1000	04/28/2023	AB23-0428-03
Fluoride	1140		ug/L	1000	04/28/2023	AB23-0428-03
Sulfate	284000		ug/L	1000	04/29/2023	AB23-0428-03

Total Dissolved Solids by SM 2540C

Aliquot: 23-0301-06-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	673		mg/L	10	04/24/2023	AB23-0424-04

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0301**
Field Sample ID:	**DUP-02**	Collect Date:	04/18/2023
Lab Sample ID:	23-0301-07	Collect Time:	12:00 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-07-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	140		ug/L	20	05/05/2023	AB23-0502-04
Calcium	121000		ug/L	1000	05/05/2023	AB23-0502-04
Iron	217		ug/L	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-07-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	22400		ug/L	1000	04/28/2023	AB23-0428-03
Fluoride	ND		ug/L	1000	04/28/2023	AB23-0428-03
Sulfate	334000		ug/L	1000	04/29/2023	AB23-0428-03

Total Dissolved Solids by SM 2540C

Aliquot: 23-0301-07-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	655		mg/L	10	04/24/2023	AB23-0424-04

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **EB-02**
Lab Sample ID: 23-0301-08
Matrix: Water

Laboratory Project: **23-0301**
Collect Date: 04/18/2023
Collect Time: 05:30 PM

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-08-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	05/05/2023	AB23-0502-04
Calcium	ND		ug/L	1000	05/05/2023	AB23-0502-04
Iron	ND		ug/L	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-08-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/28/2023	AB23-0428-03
Fluoride	ND		ug/L	1000	04/28/2023	AB23-0428-03
Sulfate	ND		ug/L	1000	04/28/2023	AB23-0428-03

Total Dissolved Solids by SM 2540C

Aliquot: 23-0301-08-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	04/24/2023	AB23-0424-04

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0301**
Field Sample ID:	**FB-02**	Collect Date:	04/18/2023
Lab Sample ID:	23-0301-09	Collect Time:	05:40 PM
Matrix:	Water		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-09-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	05/05/2023	AB23-0502-04
Calcium	ND		ug/L	1000	05/05/2023	AB23-0502-04
Iron	ND		ug/L	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-09-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/28/2023	AB23-0428-03
Fluoride	ND		ug/L	1000	04/28/2023	AB23-0428-03
Sulfate	ND		ug/L	1000	04/28/2023	AB23-0428-03

Total Dissolved Solids by SM 2540C

Aliquot: 23-0301-09-C03-A01 **Analyst: LMO**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	04/24/2023	AB23-0424-04

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0301**
Field Sample ID:	**JRW-MW-16003 Field MS**	Collect Date:	04/18/2023
Lab Sample ID:	23-0301-10	Collect Time:	06:00 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-10-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	97		%	20	05/05/2023	AB23-0502-04
Calcium	98		%	1000	05/05/2023	AB23-0502-04
Iron	102		%	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-10-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	98		%	1000	04/28/2023	AB23-0428-03
Fluoride	96		%	1000	04/28/2023	AB23-0428-03
Sulfate	97		%	1000	04/29/2023	AB23-0428-03

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 05/08/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0301**
Field Sample ID:	**JRW-MW-16003 FIeld MSD**	Collect Date:	04/18/2023
Lab Sample ID:	23-0301-11	Collect Time:	06:00 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0301-11-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	97		%	20	05/05/2023	AB23-0502-04
Calcium	93		%	1000	05/05/2023	AB23-0502-04
Iron	107		%	20	05/05/2023	AB23-0502-04

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0301-11-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	98		%	1000	04/28/2023	AB23-0428-03
Fluoride	92		%	1000	04/28/2023	AB23-0428-03
Sulfate	97		%	1000	04/29/2023	AB23-0428-03

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0301

Inspection Date: 4.20.23 **Inspection By:** LMO

Sample Origin/Project Name: JRW Pond Ce GW - Apr 2023

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) KDR

Tracking Number: _____ Shipping Form Attached: Yes _____ No ____

Shipping Containers: Enter the type and number of shipping containers received.

Cooler X Cardboard Box _____ Custom Case _____ Envelope/Mailer ____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 1.4 - 3.5°C Samples Received on Ice: Yes Y No ____

M&TE # and Expiration L5027723 5.25.23

Number and Type of Containers: Enter the total number of sample containers received.

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	22				
24 mL vial (glass)					
250 ~~500~~ mL (plastic)	9				
Other					

LMO 4.20.23

pH Strips 0.0-3.0
Cat No. 13-640-511
Lot 230320
Exp. 10.30.23

CHAIN OF CUSTODY

Consumers Energy — Count on Us®

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251

Page 1 of 1

SAMPLING SITE / CUSTOMER: JRW Pond 6 GW Monitoring – April 2023

PROJECT NUMBER: 23-0301

SAP CC or WO#:

REQUESTER: Michelle Marion

SAMPLING TEAM: MLR, KDR

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☒ STANDARD ☐ OTHER _____

SEND REPORT TO: Michelle Marion — email: — phone:

COPY TO: TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	REMARKS
23-0301-01	4/18/23	1706	GW	JRW-MW-16001	3	2	1						x	x	x	
-02	4/18/23	1510	GW	JRW-MW-16002	3	2	1						x	x	x	
-03	4/18/23	1800	GW	JRW-MW-16003	3	2	1						x	x	x	
-04	4.19.23	10:00	GW	JRW-MW-16004	3	2	1						x	x	x	
-05	4.19.23	10:59	GW	JRW-MW-16005	3	2	1						x	x	x	
-06	4.19.23	11:52	GW	JRW-MW-16006	3	2	1						x	x	x	
-07	4/18/23	—	GW	DUP-02	3	2	1						x	x	x	
-08	4/18/23	1730	W	EB-02	3	2	1						x	x	x	
-09	4/18/23	1740	W	FB-02	3	2	1						x	x	x	
-10	4/18/23	1800	GW	JRW-MW-16003 MS	2	1	1						x	x		
-11	4/18/23	1800	GW	JRW-MW-16003 MSD	2	1	1						x	x		

RELINQUISHED BY: Kal Rat — DATE/TIME: 4.19.23 15:06 — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: LS027723

Temperature: 1.4-3.5 °C — Cal. Due Date: 5.25.23

Appendix C
Field Notes

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

WATER LEVEL DATA

Site: JRW
Project No: 23-0300, 23-0301
Reviewed by: T 09.26.23
Analyst: KDR
Review Date:
Date: 4.18.23
Method: Electronic Tape
Tape ID: GEOTech (# 1005) S/N: LS025299

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001	10:11	4.60	4.60	81.95	
JRW MW-15002	09:41	13.38	13.38	92.22	
JRW MW-15003	09:45	10.46	10.40	90.10	
JRW MW-15004	09:52	12.50	12.50	96.27	
JRW MW-15005	10:00	11.44	11.44	93.64	
JRW MW-15006	10:06	3.68	3.68	82.96	
JRW MW-16001					marked TOC
JRW MW-16002					marked TOC
JRW MW-16003					marked TOC
JRW MW-16004					marked TOC
JRW MW-16005					marked TOC
JRW MW-16006					marked TOC
JRW MW-16007	09:18	5.54	5.54	80.99	marked TOC
JRW MW-16008	09:24	6.07	6.07	76.30	marked TOC
JRW MW-16009	09:30	5.83	5.83	81.94	marked TOC

NOTES: *TOC reference point*
DTW = Depth to Water
DTB = Depth to Bottom

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

WATER LEVEL DATA

Site: JRW

Project No: 23-0300, 23-0301 Reviewed by:

Analyst: MLR Review Date: 04-26-23

Date: 4/18/23

Method: Electronic Tape

Tape ID: Solinist S/N:

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001					
JRW MW-15002					
JRW MW-15003					
JRW MW-15004					
JRW MW-15005					
JRW MW-15006					
JRW MW-16001	1005	15.57	15.57	83.74	marked TOC
JRW MW-16002*	1010	12.60	12.00	94.13	marked TOC
JRW MW-16003	1013	12.26	12.26	85.73	marked TOC
JRW MW-16004	1017	12.60	12.60	88.58	marked TOC
JRW MW-16005	0959	15.41	15.41	91.14	marked TOC
JRW MW-16006	0955	14.28	14.28	91.45	marked TOC
JRW MW-16007	MLR 4/18/23				marked TOC
JRW MW-16008					marked TOC
JRW MW-16009					marked TOC
* JRW MW-16002	1425	11.97	11.97		

NOTES: *TOC reference point*
DTW = Depth to Water
DTB = Depth to Bottom

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

WATER LEVEL DATA

Site: JRW
Project No: 23-0300, 23-0301 Reviewed by:
Analyst: KDR Review Date: 09-26-23
Date: 4·18·23
Method: Electronic Tape
Tape ID: GEOTech (#1005) S/N: LS025299

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001	10:11	4.60	4.60	81.95	
JRW MW-15002	09:41	13.38	13.38	92.22	
JRW MW-15003	09:45	10.40	10.40	90.10	
JRW MW-15004	09:52	12.50	12.50	96.27	
JRW MW-15005	10:00	11.44	11.44	93.64	
JRW MW-15006	10:06	3.68	3.68	82.96	
JRW MW-16001					marked TOC
JRW MW-16002					marked TOC
JRW MW-16003					marked TOC
JRW MW-16004					marked TOC
JRW MW-16005					marked TOC
JRW MW-16006					marked TOC
JRW MW-16007	09:18	5.54	5.54	80.99	marked TOC
JRW MW-16008	09:24	6.07	6.07	76.30	marked TOC
JRW MW-16009	09:30	5.83	5.83	81.94	marked TOC

NOTES: *TOC reference point*
DTW = Depth to Water
DTB = Depth to Bottom

Laboratory Services

Consumers Energy Company

Monitoring Well Sampling Worksheet

Well ID JRW-MW-15001 Date 4.18.23 Control Number 23-0300-01

Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ☑20G ___21G

Depth-to-water T/PVC (ft) 4.49 Depth-To-Bottom T/PVC (ft) 81.95 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
17:11	Started pump						320	4.63	
17:14	7.47	12.3	1105	38.3	3.59	31.0	320	4.63	7.45
17:18	7.38	12.1	1095	7.8	0.82	24.3	320	4.64	13.06
17:22	7.37	12.2	1096	5.0	0.53	-2.2	320	4.64	20.62
17:23	Emptyed sonde and slowed pump rate						280		
17:25	7.38	12.0	1101	13.7	1.37	-2.7	280	4.60	5.89
17:29	7.35	12.1	1099	4.7	0.50	-31.4	280	4.60	6.21
17:33	7.36	12.1	1101	3.8	0.41	-84.6	280	4.60	5.44
17:37	7.39	12.2	1096	3.6	0.38	-106.5	280	4.60	5.67
17:41	7.40	12.3	1097	3.5	0.37	-113.4	280	4.60	5.73
17:45	7.41	12.2	1094	3.4	0.36	KDR -117.3 4.18.23	280	4.60	5.79
17:49	7.41	12.2	1098	3.5	0.37	-119.3	280	4.60	5.84
17:50	Collected sample								
17:55	End sample collection								

Total Pump Time (min): 39 Total Purge Volume (gal) : ≈3.0 Reviewed by:

Weather: 55°F, Sunny, windy Review Date: 04-26-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	"	A	N					
1	250mL	"	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15002 Date 4·18·23 Control Number 23-0300-02,07
Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☑ DUP 01 Sonde ID: ___11M ___15H ___19M ☑20G ___21G

Depth-to-water T/PVC (ft) 13.38 Depth-To-Bottom T/PVC (ft) 92.22 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
10:43	started pump						304	13.41	
10:46	7.55	10.4	1072	36.0	3.51	-82.9	304	13.41	3.38
10:50	7.45	10.8	1110	6.2	0.66	-150.8	304	13.41	6.22
10:54	7.46	10.7	1119	5.4	0.60	-164.5	304	13.41	6.02
10:55	slowed pump rate for turbidity						280	13.41	
10:59	7.47	10.7	1122	4.4	0.49	-176.3	280	13.41	6.47
4/18/23 KDR 11:03	7.47	10.5	1123	4.5	0.50	-173.9	280	13.41	3.85
11:07	7.47	10.8	1124	3.9	0.43	-181.9	280	13.41	4.51
11:11	7.47	10.7	1125	3.7	0.41	-185.4	280	13.41	4.72
11:15	7.47	10.8	1125	3.7	0.41	-191.2	280	13.41	4.81
11:19	7.47	10.8	1125	3.6	0.39	-194.4	280	13.41	4.88
11:23	7.47	10.7	1126	3.5	0.39	-196.4	280	13.41	4.97
11:24	Collected sample								
11:35	End sample collection								

Total Pump Time (min): 41 Total Purge Volume (gal) : ≈3.0 Reviewed by:
Weather: 45°F, Cloudy, windy Review Date: 04-26-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
2	125mL	HDPE	B	N					
2	125mL	↓	A	N					
2	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15003 Date 4.18.23 Control Number 23-0300-03
Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ✓20G ___21G

Depth-to-water T/PVC (ft) 10.50 Depth-To-Bottom T/PVC (ft) 90.10 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
11:48	Started Pump						288	10.55	
11:53	7.61	10.8	988	61.3	6.70	18.2	288	10.55	4.21
11:57	7.45	11.1	998	41.4	4.51	36.7	288	10.55	4.25
12:01	7.44	11.1	1000	28.7	3.12	38.5	288	10.55	4.39
12:05	7.45	11.1	1000	19.0	2.08	37.2	288	10.55	4.32
12:09	7.45	11.2	1001	14.5	1.59	33.9	288	10.55	4.44
12:13	7.45	11.2	1001	12.0	1.30	32.3	288	10.55	4.77
12:17	7.46	11.2	1002	9.3	1.02	23.8	288	10.55	4.83
12:21	7.46	11.1	1002	7.9	0.86	-7.0	288	10.55	5.60
12:25	7.47	11.1	1001	7.9	0.86	-41.9	288	10.55	5.75
12:29	7.49	11.1	1003	6.4	0.70	-65.2	288	10.55	5.16
12:33	7.49	11.2	1002	5.6	0.62	-77.4	288	10.55	5.23
12:37	7.50	11.2	1004	5.4	0.59	-86.2	288	10.55	5.29
12:41	7.50	11.3	1004	4.8	0.52	-91.1	288	10.55	5.34
12:45	7.51	11.2	1005	4.5	0.50	-97.1	288	10.55	5.25

Total Pump Time (min): on Pg. 2 Total Purge Volume (gal): on Pg. 2 Reviewed by:

Weather: 50°F, Cloudy, windy Review Date: 04-26-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125 mL	OR BHDPE	B	N					
1	125 mL	4.18.23 A	A	N					
1	250mL	A	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15003 Date 4.18.23 Control Number 23-0300-03
Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ☑ 20G ___21G

Depth-to-water T/PVC (ft) 10.50 Depth-To-Bottom T/PVC (ft) 90.10 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
12:49	7.51	11.3	1004	4.3	0.47	-100.9	288	10.55	5.42
12:53	7.52	11.4	1006	4.2	0.45	-103.1	288	10.55	5.33
12:57	7.52	11.3	1005	3.8	0.42	-105.5	288	10.55	5.38
13:01	7.52	11.4	1004	3.8	0.41	-106.5	288	10.55	5.45
13:02	collected sample								
13:08	End sample collection								

Total Pump Time (min): 74 Total Purge Volume (gal) : ≈ 5.5 Reviewed by:

Weather: 50°F, Cloudy, windy Review Date: 04.26.23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15004 Date 4.18.23 Control Number 23-0300-04
Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ✓20G ___21G

Depth-to-water T/PVC (ft) 12.44 Depth-To-Bottom T/PVC (ft) 96.27 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
13:42	started pump						260	12.46	
13:47	7.51	10.8	966	49.3	5.40	74.6	260	12.46	11.88
13:51	7.42	10.7	964	43.5	4.81	73.4	260	12.44	12.75
13:55	7.40	10.7	964	42.5	4.69	73.2	260	12.44	9.95
13:59	7.39	10.7	964	41.1	4.55	74.4	260	12.43	13.59
14:03	7.39	10.8	963	39.6	4.38	75.1	260	12.43	10.66
14:04	Emptied sonde								
14:06	7.39	10.9	964	47.9	5.20	80.3	260	12.43	9.90
14:10	7.35	11.1	966	37.5	4.12	79.8	260	12.43	7.80
14:14	7.35	11.5	964	35.8	3.90	77.7	260	12.43	6.76
14:18	7.36	11.0	963	33.9	3.72	77.4	260	12.43	7.54
14:22 KDR 4.18.23	7.36	11.1	964	32.1	3.52	76.7	260	12.43	6.88
14:26	7.36	11.3	965	30.4	3.32	75.7	260	12.43	6.95
14:30	7.36	11.0	964	28.7	3.16	75.6	260	12.43	6.99
14:34	7.36	11.0	965	27.7	3.07	73.9	260	12.43	7.11

Total Pump Time (min): 53 Total Purge Volume (gal) : ≈3.5 Reviewed by: JK

Weather: 50°F, cloudy, windy Review Date: 04-26-23

Comments: 14:35 collected sample / 14:40 End sample collection

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15005 Date 4.18.23 Control Number 23-0300-05
Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ☑20G ___21G

Depth-to-water T/PVC (ft) 11.35 Depth-To-Bottom T/PVC (ft) 93.64 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
14:56	started pump						320	11.45	
15:00	7.37	11.9	815	49.1	5.16	101.4	320	11.45	2.28
15:04	7.52	12.0	887	32.4	3.48	92.3	320	11.45	2.33
15:08	7.54	12.0	888	31.4	3.38	88.0	320	11.45	2.45
15:12	7.54	12.4	889	31.2	3.33	85.1	320	11.45	2.39
15:16	7.54	12.4	888	30.5	3.25	84.1	320	11.45	2.43
15:20	7.55	12.4	888	30.0	3.20	83.6	320	11.45	2.48
15:24	7.55	12.8	886	29.1	3.07	80.8	320	11.45	2.56
15:25	Collected sample								
15:30	End sample collection								

Total Pump Time (min): 29 Total Purge Volume (gal) : ≈2.5 Reviewed by:

Weather: 55°F, Partly sunny, windy Review Date: 04-26-23

Comments:

Bottles Filled					Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125 mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15006 Date 4.18.23 Control Number 23-0300-06,10,11
Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☑ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ✓ 20G ___21G

Depth-to-water T/PVC (ft) 3.66 Depth-To-Bottom T/PVC (ft) 82.96 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
15:41	Started pump						320	3.69	
15:45	7.55	11.9	988	67.2	7.14	96.2	320	3.69	5.36
15:49	7.38	12.1	991	50.5	5.40	97.2	320	3.69	3.24
15:53	7.37	11.9	990	42.2	4.54	96.3	320	3.69	3.55
15:57	7.37	12.3	989	36.3	3.86	94.1	320	3.69	3.69
16:01	7.38	12.2	991	28.3	KDR 4.18.23 2.98	90.5	320	3.69	3.71
16:05	7.39	12.2	989	20.5	2.19	86.6	320	3.67	3.99
16:09	7.40	11.8	989	16.1	1.73	85.3	320	3.67	4.25
16:13	7.41	11.9	988	14.5	1.55	83.0	320	3.67	4.57
16:17	7.41	12.1	988	11.6	1.24	55.1	320	3.67	4.63
16:21	7.40	12.0	989	10.5	1.13	18.4	320	3.67	4.98
16:25	7.41	12.1	988	9.1	0.97	-5.7	320	3.67	5.21
16:29	7.42	12.1	988	8.5	0.91	-20.9	320	3.67	5.71
16:33	7.43	12.0	988	7.7	0.82	-44.6	320	3.67	5.83
16:37	7.45	12.0	988	7.3	0.78	-71.6	320	3.67	6.12

Total Pump Time (min): On Pg.2 Total Purge Volume (gal) : On Pg.2 Reviewed by: JR

Weather: 55°F, Sunny, Windy Review Date: 04.26.23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
3	125mL	HDPE	B	N					
3	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy Company
Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15006 Date 4·18·23 Control Number 23-0300-06,10,11
Location JRW Well Material: ✓ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ✓ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ✓ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ✓20G ___21G

Depth-to-water T/PVC (ft) 3.66 Depth-To-Bottom T/PVC (ft) 82.96 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
16:41	7.47	11.9	988	6.5	0.70	-86.3	320	3.67	6.34
16:44	7.48	11.9	986	6.0	0.64	-93.7	320	3.67	6.42
16:47	7.49	11.9	988	6.1	0.66	-99.3	320	3.67	6.48
16:50	7.48	12.1	987	5.8	0.63	-101.7	320	3.67	6.52
16:51	Collected sample								
17:02	End sample collection								

Total Pump Time (min): 69 Total Purge Volume (gal) : ≈6.0 Reviewed by: J

Weather: 55°F, Sunny, Windy Review Date: 04.26.23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
3	125mL	HDPE	B	N					
3	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID EB-01 Date 4.18.23 Control Number 23-0300-08
Location SRW Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ✓ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: S/N:

QC SAMPLE: ☐ **MS/MSD** ☐ **DUP**____ **Sonde ID:** ___11M ___15H ___19M ___20G ___21G

Depth-to-water T/PVC (ft) _____ Depth-To-Bottom T/PVC (ft) _____ Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
18:06	Collected sample								
18:09	End sample collection								

Total Pump Time (min): — Total Purge Volume (gal) : — Reviewed by: JR

Weather: 55°F, Sunny, windy Review Date: 04.26.23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy Company

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID FB-01 Date 4.18.23 Control Number 23-0300-09

Location JRW Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☐ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: S/N:

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ___20G ___21G

Depth-to-water T/PVC (ft) _____ Depth-To-Bottom T/PVC (ft) _____ Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
18:00	Collected sample								
18:02	End sample collection								

Total Pump Time (min): – Total Purge Volume (gal) : – Reviewed by: J

Weather: 55°F, Sunny, Windy Review Date: 04-26-23

Comments:

Bottles Filled			Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____						
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

WATER LEVEL DATA

Site: JRW

Project No: 23-0300, 23-0301 Reviewed by:

Analyst: MLR Review Date: 04-26-23

Date: 4/18/23

Method: Electronic Tape

Tape ID: Solinist S/N: 501491

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001					
JRW MW-15002					
JRW MW-15003					
JRW MW-15004					
JRW MW-15005					
JRW MW-15006					
JRW MW-16001	1005	15.57	15.57	83.74	marked TOC
JRW MW-16002*	1010	12.60	12.00	94.13	marked TOC
JRW MW-16003	1013	12.26	12.26	85.73	marked TOC
JRW MW-16004	1017	12.60	12.60	88.58	marked TOC
JRW MW-16005	0959	15.41	15.41	91.14	marked TOC
JRW MW-16006	0955	14.28	14.28	91.45	marked TOC
JRW MW-16007	MLR 4/18/23				marked TOC
JRW MW-16008					marked TOC
JRW MW-16009					marked TOC
* JRW MW-16002	1425	11.97	11.97		

NOTES: *TOC reference point*
DTW = Depth to Water
DTB = Depth to Bottom

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW - MW-16001 Date 4/18/23 Control Number 23-0301-01
Location Pond 6 Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☒ Peristaltic ☐ Submersible ☐ Bladder ☒ Fultz ☐ Bailer

Depth to Water Tape: Solinst S/N: 501491

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H X 19M ___20G ___21G

Depth-to-water T/PVC (ft) 15.57 Depth-To-Bottom T/PVC (ft) 83.74 Completed by MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1055	11.82	8.4	834	74.0	8.50	21.1	180	15.57	20.83
1100	11.80	9.1	917	50.2	5.86	6.9	180	15.57	18.31
1105	Hooked up	fultz	pump			1300	180	15.57	17.82
1110	11.13	9.8	735	31.5	3.57	-9.9	1300 180	15.59	16.73
1115	9.78	9.9	709	23.0	2.60	17.0	1300 180	15.59	11.90
1120	9.12	10.1	751	12.4	1.42	34.7	1300 180	15.61	11.65
1125	8.68	9.8	767	7.6	0.86	28.0	1300 180	15.62	10.17
1130	8.47	9.8	770	6.1	0.69	59.0	1300 180	15.64	12.83
1135	8.41	9.8	775	5.8	0.67	62.1	1300 180	15.64	17.98
1140	turned up fultz to 1600						1600 180	15.65	39.17
1145	10.14	9.9	696	29.4	3.29	2.3	1600 180	15.65	42.11
1150	9.45	turned fultz to 1 gallon Per Minute = 3785 mL							
1205	8.30	un hooked fultz pump / Flushed Sonde						15.65	
1220	11.66	PH high, hooked up fultz pump again.					180 + 3785		
1330	Removed Fultz Pump								

Total Pump Time (min): 165 Total Purge Volume (gal) : 7.60 Reviewed by:

Weather: Review Date: 04.26.23

Comments: .7 gallons per Minute w/fultz.

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N

* *Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW.16001 Date _____ Control Number 23-0301-01
Location Pond 6 Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☒ Peristaltic ☐ Submersible ☐ Bladder ☒ Fultz ☐ Bailer

Depth to Water Tape: Solinst S/N: 501491

QC SAMPLE: ☐ MS/MSD ☐ DUP____ **Sonde ID:** ___11M ___15H ___19M ___20G ___21G

Depth-to-water T/PVC (ft) 15.57 Depth-To-Bottom T/PVC (ft) 83.74 Completed by MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1340	8.64	10.1	771	5.0	0.56	9.5	180	15.68	13.81

Total Pump Time (min): 165 Total Purge Volume (gal) : > 60 Reviewed by: JF

Weather: _____ Review Date: 04-26-23

Comments: Continued to purge at 180 mL/min

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW - MW-16001 Date 4/18/23 Control Number 23-0301-01
Location Pond 6 Well Material: [X] PVC [ ] SS [ ] Iron [ ] Galv. Steel

Purge Method: [X] Peristaltic [ ] Submersible [ ] Bladder [ ] Fultz [ ] Bailer

Depth to Water Tape: Solinst S/N: 501491

QC SAMPLE: [ ] MS/MSD [ ] DUP____ Sonde ID: MLR 4/18/23 ___11M ___15H [X] 19M ___20G ___21G

Depth-to-water T/PVC (ft) 15.52 Depth-To-Bottom T/PVC (ft) 183.74 Completed by MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1630	8.55	11.8	757	15.3	1.68	-77.2	180	15.52	6.23
1633	8.52	11.6	762	9.3	1.00	-118.4	180	15.52	5.87
1636	8.49	11.7	761	7.7	0.82	-126.8	180	15.52	6.28
1639	8.49	11.7	761	6.5	0.70	-131.8	180	15.52	7.18
1642	8.46	11.7	761	5.1	0.55	-135.9	180	15.52	14.78
1645	8.45	11.7	761	5.0	0.54	-135.9	180	15.52	17.38
1646	Flushed Sonde / Lowered flow rate						140		
1650	8.45	11.3	765	7.5	0.81	-132.9	140	15.52	4.59
1653	8.48	11.5	764	5.9	0.65	-138.1	140	15.52	4.36
1656	8.47	11.5	765	5.5	0.60	-141.4	140	15.52	4.47
1700	8.48	11.6	765	5.3	0.58	-143.2	140	15.52	4.21
1705	8.48	11.5	765	5.2	0.57	-144.8	140	15.52	4.53
1706	Sampled								

NOTE: Low-flow conditions after high flow rate purge from 10:55 AM to 13:40
Peristaltic pump left on @ 180 mL/min from 13:40 to 16:30

Total Pump Time (min): 36 min Total Purge Volume (gal): ~1.5 gal Reviewed by: J

Weather: Review Date: 04-26-23

Comments: Took 1 extra (filter) Metals

Bottles Filled					Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	250	P	A	N					
1	125	P	A	N					
1	125	P	B	N					
1	125	P	B	Y					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW - MW-16002 Date 4/18/23 Control Number 23-0301-02,07
Location Pond 6 Well Material: [X] PVC [ ] SS [ ] Iron [ ] Galv. Steel

Purge Method: [X] Peristaltic [ ] Submersible [ ] Bladder [ ] Fultz [ ] Bailer

Depth to Water Tape: Solinst S/N: 501491

QC SAMPLE: [ ] MS/MSD [X] DUP 02 Sonde ID: ___11M ___15H X 19M ___20G ___21G

Depth-to-water T/PVC (ft) 11.97 Depth-To-Bottom T/PVC (ft) 94.13 Completed by MJE

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1425	8.08	11.0	955	9.8	1.07	-199.8	200	11.97	5.22
1428	8.06	10.9	968	7.1	0.78	-203.6	200	11.97	6.01
1431	7.99	11.1	994	4.6	0.51	-202.6	200	11.97	8.01
1434	7.89	10.9	1007	4.5	0.50	-164.9	200	11.97	9.08
1437	7.88	11.0	1006	4.4	0.48	-177.3	200	11.97	8.87
1440	7.88	10.9	1007	4.2	0.46	-179.0	200	11.97	9.02
1445	7.88	10.9	1008	3.9	0.43	-180.9	200	11.97	9.28
1450	7.88	10.9	1007	3.8	0.41	-182.4	200	11.97	6.03
1453	7.73	11.1	810	33.4	3.64	-104.1	200	11.97	6.72
1456	7.71	11.3	807	33.7	3.69	-107.8	200	11.97	7.00
1459	7.73	11.3	795	34.6	3.78	-108.9	200	11.97	4.99
1503	7.75	11.2	796	34.7	3.81	-110.8	200	11.97	4.89
1506	7.80	11.2	802	34.6	3.79	-112.8	200	11.97	4.79
1510	Sampled								

Total Pump Time (min): 40 min Total Purge Volume (gal) : ~12 gal Reviewed by:

Weather: Review Date: 04-26-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
2	250	P	A	N					
2	125	P	B						
2	125	P	A						

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16003 Date 4/18/23 Control Number 23-0301-03
Location Pond 4 Well Material: [X] PVC [ ] SS [ ] Iron [ ] Galv. Steel

Purge Method: [X] Peristaltic [ ] Submersible [ ] Bladder [ ] Fultz [ ] Bailer

Depth to Water Tape: Solinst S/N: 501491

QC SAMPLE: [X] MS/MSD [ ] DUP____ Sonde ID: ___11M ___15H [X] 19M ___20G ___21G

Depth-to-water T/PVC (ft) 12.26 Depth-To-Bottom T/PVC (ft) 85.73 Completed by MJL

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1740	7.67	11.3	1005	10.0	1.09	-167.2	140	12.26	6.36
1743	7.74	11.2	1011	7.0	0.76	-167.3	140	12.26	3.50
1746	7.74	11.2	1012	6.1	0.67	-168.6	140	12.26	3.92
1750	7.75	11.1	1013	5.0	0.55	-173.9	140	12.26	3.89
1755	7.75	11.2	1012	4.9	0.53	-174.6	140	12.26	3.82
1758	7.75	11.2	1012	4.7	0.52	-175.6	140	12.26	3.91
1800	Sampled								

Total Pump Time (min): 20 min Total Purge Volume (gal) : ~1 gal Reviewed by: JT
Weather: _____ Review Date: 04-26-23

Comments:

Bottles Filled					Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	250	P	A	N					
3	125	P	A						
3	125	P	B						

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-116004 Date 4.19.23 Control Number 23-0301-04
Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ☑ 20G ___21G

Depth-to-water T/PVC (ft) 12.36 Depth-To-Bottom T/PVC (ft) 88.58 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
								Drawdown	
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
09:19	Started pump						220	12.41	
09:23	8.03	11.0	1097	28.1	3.07	159.8	220	12.40	1.60
09:27	7.72	10.8	1133	17.1	1.87	160.2	220	12.40	1.68
09:31	7.61	10.8	1152	8.8	0.96	110.0	220	12.40	1.78
09:35	7.58	11.0	1160	6.1	0.67	-30.9	220	12.40	1.92
09:39	7.59	11.1	1161	5.0	0.55	-94.9	220	12.40	2.29
09:43	7.60	11.1	1164	4.7	0.51	-109.6	220	12.40	2.88
09:47	7.60	11.0	1165	4.4	0.48	-120.9	220	12.40	2.82
09:51	7.60	11.0	1167	4.1	0.45	-128.5	220	12.40	2.73
09:55	7.60	10.9	1166	4.0	0.43	-134.4	220	12.40	2.76
09:59	7.59	11.0	1167	3.9	0.43	-137.8	220	12.40	2.81
10:00	Collected sample								
10:05	End sample collection								

Total Pump Time (min): 41 Total Purge Volume (gal) : ≈ 2.5 Reviewed by: [signature]
Weather: 45°F, Sunny, light wind Review Date: 04-26-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125 mL	HDPE	B	N					
1	125 mL	↓	A	N					
1	250 mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16005 Date 4.19.23 Control Number 23-0301-05
Location JRW Well Material: ✓ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ✓ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ✓20G ___21G

Depth-to-water T/PVC (ft) 15.15 Depth-To-Bottom T/PVC (ft) 91.14 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
								Drawdown	
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
10:22	Started pump						200	15.16	
10:26	7.62	11.4	888	34.7	3.70	18.0	200	15.16	3.07
10:30	7.31	11.3	873	9.2	1.00	32.2	200	15.16	3.11
10:34	7.32	11.4	873	6.7	0.73	32.5	200	15.16	3.22
10:38	7.33	11.4	871	5.3	0.58	32.2	200	15.16	3.28
10:42	7.33	11.5	874	5.6	0.61	33.8	200	15.16	5.42
10:46	7.34	11.6	872	4.6	0.50	33.6	200	15.16	5.59
10:50	7.34	11.5	872	4.3	0.46	33.6	200	15.16	5.62
10:54	7.34	11.6	873	4.1	0.45	34.1	200	15.16	5.64
10:58	7.34	11.6	873	4.0	0.43	34.2	200	15.16	5.59
10:59	Collected Sample								
11:04	End sample collection								

Total Pump Time (min): 42 Total Purge Volume (gal) : ≈ 2.5 Reviewed by: [signature]

Weather: 50°F, Sunny, light wind Review Date: 04-26-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16006 Date 4.19.23 Control Number 23-0301-06
Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech (#1005) S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___11M ___15H ___19M ✓20G ___21G

Depth-to-water T/PVC (ft) 14.03 Depth-To-Bottom T/PVC (ft) 91.45 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
								Drawdown	
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
11:15	Started pump						228	14.06	
11:19	7.33	11.8	788	20.8	2.19	16.7	228	14.06	3.99
11:23	7.47	11.5	829	6.5	0.70	-77.9	228	14.06	2.58
11:27	7.49	11.6	831	5.2	0.56	-103.8	228	14.06	2.67
11:31	7.52	11.7	831	4.4	0.47	-126.6	228	14.06	2.77
11:35	7.53	11.8	832	4.0	0.44	-137.4	228	14.06	2.81
11:39	7.55	11.8	832	3.8	0.41	-145.8	228	14.06	2.90
11:43	7.55	11.8	832	3.6	0.39	-151.9	228	14.06	2.93
11:47	7.56	11.8	832	3.5	0.38	-155.8	228	14.06	2.94
11:51	7.56	11.9	832	3.4	0.37	-159.6	228	14.06	2.99
11:52	Collected sample								
11:57	End sample collection								

Total Pump Time (min): 37 Total Purge Volume (gal) : ≈ 2.5 Reviewed by:

Weather: 55°F, Sunny, light wind Review Date: 04-26-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID EB-02 Date 4.18.23 Control Number 23-0301-08

Location JRW- Pond 6 Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☐ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: S/N:

QC SAMPLE: ☐ **MS/MSD** ☐ **DUP**____ **Sonde ID:** ___11M ___15H ___19M ___20G ___21G

Depth-to-water T/PVC (ft) _____ Depth-To-Bottom T/PVC (ft) _____ Completed by MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1730	Sampled								

Total Pump Time (min): – Total Purge Volume (gal) : – Reviewed by: JF

Weather: _____ Review Date: 04-26-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID FB-02 Date 4/18/23 Control Number 23-0301-09

Location JRW - Pond 6 Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☐ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: S/N:

QC SAMPLE: ☐ **MS/MSD** ☐ **DUP**____ **Sonde ID:** ___11M ___15H ___19M ___20G ___21G

Depth-to-water T/PVC (ft) _____ Depth-To-Bottom T/PVC (ft) _____ Completed by MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1740	Sampled								

Total Pump Time (min): — Total Purge Volume (gal) : — Reviewed by: J.

Weather: _____ Review Date: 04-26-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HPPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy Company
Laboratory Services
A CENTURY OF EXCELLENCE

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15005 Date 5/17/23 Control Number 23-6494-(01-04)
Location pond 1&2 Well Material: [X] PVC [ ] SS [ ] Iron [ ] Galv. Steel

Purge Method: [X] Peristaltic [ ] Submersible [ ] Bladder [ ] Fultz [ ] Bailer

Depth to Water Tape: Solonist S/N: 501491

QC SAMPLE: [ ] MS/MSD [ ] DUP____ Sonde ID: ___11M ___15H X 19M ___20G ___21G

Depth-to-water T/PVC (ft) 11.15 Depth-To-Bottom T/PVC (ft) 93.38 Completed by MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1100	7.35	12.8	876	31.8	3.36	125.4	180	11.15	3.45
1105	7.38	13.0	876	29.8	3.13	121.7	180	11.18	3.78
1110	7.43	13.0	876	28.1	2.95	117.3	180	11.20	6.44
1115	7.50	13.2	875	27.4	2.87	113.1	180	11.25	11.86
1120	7.52	13.2	874	26.2	2.87	112.4	180	11.27	12.01
1121	Noticed Sediment floating in Sonde, flushed Sonde							11.28	
1125	7.56	13.4	878	28.2	2.95	112.0	180	11.30	2.90
1130	7.57	13.2	878	27.8	2.92	111.2	180	11.30	3.04
1135	7.57	13.2	877	27.6	2.89	111.0	180	11.31	3.24
1136	Sampled								

Total Pump Time (min): 36min Total Purge Volume (gal): 1.5gal Reviewed by: JF
Weather: Sunny 52° moderate winds Review Date: 05-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
4	125mL	P	B						

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy
Count on Us
Laboratory Services
A CENTURY OF EXCELLENCE

Sonde ID	19M
Start Date	5/17/23
Project #	23-0494
Site	JRW Pool 1+2
Reviewed By & Date	05-18-23

Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 19M100493
Sonde Brand	YSI ProDSS S/N 19M100509
Flow Cell	EXO1 599080
DO Probe	YSI ProDSS S/N 19L103208
Turbidity Probe	YSI ProDSS S/N 19L103271
pH With ORP	YSI ProDSS S/N 22D102305
Conductivity & Temperature Probe	YSI ProDSS S/N 19L101251

- Is the same standard used for calibration and as-founds? X or N (if no, document on pg. 2)

pH Standard (± 0.1)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed end	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
4.0	GFS # 1634	22370021	9-9-24	4.07	4.04				
7.0	GFS # 1639	22330012	8-6-24	7.01	7.02				
10.0	GFS # 1645	22340019	8-17-24	10.04	10.03				
			Initials & Date:	MLR 5/16/23	MLR 5/17/23				

- Are the calibration values within ±0.10 of the standard? X or N (if no, recalibration is required)

ORP Standard (± 10mV)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed end	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
228 (mV)	22490081	G55	9-15-23	225.1	228.0				
			Initials & Date:	MLR 5/17/23	MLR 5/17/23				

- Is the same standard used for calibration and as-founds? X or N (if no, document on pg. 2)
- Are the calibration values within ±10% of the standard? X or N (if no, recalibration is required).

DO	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed end	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
90-110% saturation	DI Water	N/A	N/A	97.3	97.0				
			Initials & Date:	MLR 5/16/23	MLR 5/17/23				

- Is the same standard used for calibration and as-founds? X or N (if no, document on pg. 2)
- Are the calibration values within 90-110%? X or N (if no, recalibration is required)

Sonde ID	19M	Project # :
Start Date	5/17/23	25-0494
Reviewed By & Date:	05-18-25	Site: JRW Pond 1+2

Specific Conductance (uS/cm)	Source	Source Lot #	Source Exp. Date	Pre-Project Calibration Value	1st Daily Field Checks Completed (End)	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Field Checks Completed	End Project Calibration Value
1413	GFS	23020074	3/13/24	1413	1412				
MLR 5/17/23			Initials & Date:	MLR 5/17/23	MLR 5/17/23				

- Is the same standard used for calibration and as-founds? (X) or N (if no, document on pg. 2)
- Are the calibration values within range of the standard? (X) or N (if no, recalibration is required)

Turbidity (NTUs)	Source	Source Lot #	Source Exp. Date	Pre-Project Calibration Value	1st Daily Field Checks Completed (End)	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Field Checks Completed	End Project Calibration Value
0	DI Water	--	--	0.00	0.01				
40.0 (± 4.0 NTUs)	Hach 2746356	A2122	May 24	43.01	46.01				
800.0 (± 80.0 NTUs)	Hach 2660553	A2188	7-24	867.34	817.02				
			Initials & Date:	MLR 5/16/23	MLR 5/17/23				

- Is the same standard used for calibration and as-founds? (X) or N (if no, document on pg. 2)
- Are the calibration values within ±10% of the standard? (X) or N (if no, recalibration is required)

Additional Information for calibration standards

Standard	Source	Source Lot #	Source Exp. Date	Standard	Source	Source Lot #	Source Exp. Date
pH 4.0	GFS Chemicals			pH 9.0 Check	GFS Chemicals		
pH 7.0	GFS Chemicals						
pH 10.0	GFS Chemicals						
Sp. Conductivity	GFS Chemicals						
40.0 Turbidity	GFS Chemicals						
10.0 Turbidity	GFS Chemicals						

Appendix D
July 2023 Alternate Source Demonstration

A CMS Energy Company

Date: July 14, 2023

To: Operating Record

From: Harold D. Register, Jr., P.E.

RE: Alternate Source Demonstration Professional Engineer Certification, §257.94(e)2
Former JR Whiting Power Plant, Ponds 1 and 2

Professional Engineer Certification Statement [40 CFR 257.94(e)2]

I hereby certify that the alternative source demonstration presented within this document for the JR Whiting Ponds 1 and 2 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.

Signature

July 14, 2023
Date of Certification

Harold D. Register, Jr., P.E.
Name

6201056266
Professional Engineer Certification Number

07/14/2023

ENCLOSURES

TRC (July 2023). "*Alternate Source Demonstration: April 2023 Detection Monitoring Event, Former JR Whiting Power Plant Ponds 1 and 2, Erie, Michigan*"

1540 Eisenhower Pl.
Ann Arbor, MI 48108

T 734.971.7080
TRCcompanies.com

July 14, 2023

Michelle Marion, Consumers Energy Company
Harold D. Register, Jr., P.E., Consumers Energy Company
Environmental Services – Landfill Operations Compliance
Consumers Energy Company
1945 W. Parnall Road
Jackson, MI 49201

Subject: Alternate Source Demonstration: April 2023 Detection Monitoring Event
Former JR Whiting Power Plant Ponds 1 and 2, Erie, Michigan

Dear Ms. Marion and Mr. Register:

TRC was retained by Consumers Energy Company (Consumers Energy) to conduct routine groundwater monitoring activities at the JR Whiting (JRW) Ponds 1 and 2 coal combustion residual (CCR) unit (closed surface impoundment monitored as Pond 1 & 2 using a multiunit groundwater monitoring system), located in Erie, Michigan (the Site). Routine groundwater monitoring at the JRW Pond 1 & 2 is conducted in accordance with the Michigan Department of Environment, Great Lakes, and Energy (EGLE)-approved *JR Whiting Hydrogeological Monitoring Plan, former JR Whiting Power Plant, Erie, Michigan (2020 HMP) (TRC, May 2020 Revision)* and the United States Environmental Protection Agency (USEPA) final rule for the regulation and management of CCR under the Resource Conservation and Recovery Act (RCRA), as amended (the CCR Rule) (USEPA, April 2015).

As discussed in the *First Semiannual 2023 Groundwater Monitoring Report* for the Site (TRC, July 2023), the statistical evaluation of the April 2023 detection monitoring indicator parameters at Pond 1 & 2 indicated potential statistically significant increases (SSIs) for:

- Calcium at JRW-MW-15005.

Verification resampling for the April 2023 event was conducted on May 17, 2023. The verification result for calcium at JRW-MW-15005 (123 mg/L) was above the prediction limit (PL) of 120 mg/L, confirming the initial potential SSI for calcium at JRW-MW-15005. Therefore, in accordance with the *Groundwater Statistical Evaluation Plan – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6* (Stats Plan) (TRC, February 2020) and the *USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance) (USEPA, 2009), the initial exceedance was statistically significant, and a SSI will be recorded for calcium at JRW-MW-15005.

In accordance with §257.94(e)(2) and the HMP, Consumers Energy may demonstrate that a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. This Alternate Source Demonstration (ASD) has been prepared to address the aforementioned calcium SSI identified in the April 2022 detection monitoring event. The results of this ASD show that the calcium SSI at JRW-MW-15005 is attributable to natural variability and is not due to a release from Pond 1 & 2.

Background

The JR Whiting Plant was a coal-fired power generation facility located in Erie, Michigan, on the western shore of Lake Erie (Figure 1). The plant began producing electricity in 1952 from Units 1 and 2, with Unit 3 beginning operation in 1953. The plant ceased operation in April 2016. The JR Whiting Ash Disposal Area is licensed under Michigan Part 115 of the Natural Resources and Environmental Protection Act (NREPA), PA 451 of 1994, as amended. Figure 1 is a site location map showing the facility and the surrounding area. Site features are shown on Figure 2.

Pond 1 & 2 is located to the east of the plant, north of the discharge canal, south of Erie Road, and west of Lake Erie and constructed in native clay soil. It was historically used for wet ash sluicing. In 2019, it received its final cover system constructed pursuant to 40 CFR 257.102(a); the Pond 1 & 2 Closure Construction Quality Assurance (CQA) Plan dated August 31, 2017; the Part 115 Administrative Rules; and Pond 1 & 2 Closure Plan submitted to the EGLE on December 18, 2017. The closure of Pond 1 & 2 was certified by the EGLE in a letter dated August 27, 2020.

The subsurface materials encountered at the JR Whiting site are predominately clay-rich till. The surficial CCR fill material is underlain by approximately 40 to 50 feet of laterally extensive clay-rich till that acts as a natural hydraulic barrier across the Site. Limestone bedrock is present beneath the till and is considered the uppermost aquifer at the Site. Groundwater present within the uppermost aquifer is typically encountered at Pond 1 & 2 around 70 to 80 feet below ground surface (ft bgs), approximately 510 to 520 feet above mean sea level (AMSL) in the limestone (beneath the till). The uppermost aquifer is confined and protected from CCR constituents by the 40- to 50-foot-thick overlying clay-rich aquitard which interfaces with the limestone at the elevation range of 510 to 520 ft. Potentiometric surface elevation data from groundwater within the CCR monitoring wells represents the levels in which groundwater rises under hydrostatic pressure within each well and exhibit an extremely low hydraulic gradient across the Site with no consistent or discernible flow direction.

There are minor differences in hydraulic head across the monitoring wells (ranging from zero up to 0.13 feet across Pond 1 & 2 from event to event from November 2016 through April 2023), indicating that the potentiometric surface is flat the majority of the time. Given that the hydraulic gradient is often so low, groundwater flow across Pond 1 & 2 is frequently incalculable and often stagnant. The most pronounced groundwater gradient between November 2016 and April 2023 was observed on December 19, 2016, which showed a slight horizontal gradient of approximately 0.00016 to the northwest across Pond 1 & 2.

As a result of site-specific geologic and hydrogeologic conditions, there is no hydraulic connection between Pond 1 & 2 and the uppermost aquifer, and downward migration of CCR leachate is not expected. Please refer to the 2017 through 2022 Annual Reports for further details regarding site-specific hydrogeology, groundwater potentiometric surface data, and groundwater analytical results (TRC, January 2018, January 2019, January 2020, January 2021, January 2022, and January 2023). Following the establishment of the HMP, the January 2021 through January 2023 annual reports contain the semiannual monitoring reports submitted to the EGLE.

The detection monitoring well network for Pond 1 & 2 currently consists of six monitoring wells that are screened in the uppermost aquifer as documented in the October 17, 2017, Groundwater Monitoring System Certification, 257.91(f) (CEC, 2017). The monitoring well locations are shown in Figure 2.

Alternate Source Demonstration

As discussed above, verification resampling for calcium at JRW-MW-15005, was performed as recommended per the Stats Plan and the Unified Guidance, to achieve performance standards as specified in the HMP and by §257.93(g) in the CCR Rule. The May 2023 verification resampling confirmed the calcium exceedance at JRW-MW-15005 (Table 1). The following discussion presents the ASD for the confirmed prediction limit exceedance.

Calcium at JRW-MW-15005

The calcium SSI in the groundwater at JRW-MW-15005, shown on Table 1, is due to natural variation groundwater quality. The result falls within the laboratory precision and accuracy range of the analysis relative to the PL as discussed below and is not due to the release of CCR constituents from Pond 1 & 2. The lines of evidence provided in support of this conclusion are as follows:

- **Laboratory precision and accuracy in calcium analysis** – The laboratory reported calcium concentration for the JRW-MW-15005 groundwater sample collected during the first semiannual 2023 sampling event is within the precision (+/- 10%) and accuracy (+/- 10%) range of the analytical method relative to the PL for the April 2023 original sample and the May 2023 confirmation sample. In other words, the PL is within the margin of error of the laboratory result. The initial result from April 2023 was 121 mg/L and the verification result was 123 mg/L, compared to a PL of 120 mg/L. The SSI concentration is less than 1% of the PL concentration. Taking the +/- 10% analytical precision and accuracy into account, the margin of error for the initial result is from 109 mg/L to 133 mg/L and 111 to 135 mg/L in the verification sample. The data quality review (DQR) of the results indicates that the data quality objectives and laboratory completeness goals for the project were met. DQRs for the April 2023 event and the June 2023 verification event are included as Attachment 1.
- **Limited background sampling timeline to capture natural variability** – As mentioned above, potentiometric data show that groundwater flow is very low and often stagnant with no apparent groundwater flow direction. Due to the limitations on CCR Rule implementation timelines, the background data collection monitoring events for JR Whiting were timed at a frequency of one to two months apart to ensure the collection of the eight background samples prior to October 17, 2017. Background data are included in the 2017 Annual Groundwater Monitoring Report (TRC, January 2018). Additional semiannual data were incorporated into the background dataset in March 2019, however, given that groundwater flow is so low with no consistent flow direction, temporal variability is still limited.

  Conservatively high groundwater flow rates of 1.8 ft/yr to 12.8 ft/yr have been estimated using the maximum head difference in the monitoring wells each semiannual sampling event performed in November 2017 through April 2023 even though there was no clear discernable flow direction. As discussed in the semiannual reports, the potentiometric surface elevation is generally flat across the pond the majority of the time. Based on this frequency and the general lack of groundwater flow at the Site, limited temporal variability is represented in the background data set at this Site. The short duration of the background sampling events limits the ability of the statistical analysis to capture the natural temporal trends in the groundwater quality at JRW in addition to a relatively

short period of semiannual groundwater monitoring (6.5 years) when considering the low groundwater flow rates. Using the aforementioned conservatively high groundwater flow rates, and assuming groundwater was moving in a consistent direction (although it is not), indicates that groundwater travel within those 6.5 years potentially ranged from 9 ft to 64 ft. Given that the flow direction is non-existent or inconsistent, the travel time is actually much lower.

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.

- **Hydraulic isolation and time of travel analysis** – The clay formation immediately beneath Pond 1 & 2 provides a natural hydraulic barrier that prevents vertical migration of CCR constituents to the underlying limestone aquifer. Permeameter tests completed on eight samples of the Site clay produced hydraulic conductivity values ranging from 5.5×10^{-9} cm/s to 2.23×10^{-8} cm/s (TRC, December 2018). The vertical extent of the clay layer beneath the CCR unit is shown in cross sections A-A' and C-C' respectively (Figures 3 through 5). As presented in detail in the Natural Clay Liner Equivalency Evaluation Report prepared by TRC, the conservatively calculated time of travel for water from the base of the JRW Pond 1 & 2 to migrate through approximately 35 feet of clay to the underlying uppermost aquifer, is approximately 1,900 years (TRC, December 2018). The JRW Power Plant operated for 64 years between 1952 and ended in 2016. Based on the calculated travel time of 1,900 years and the lack of hydraulic connection between Pond 1 & 2 and the uppermost aquifer, leachate could not have migrated to the upper aquifer within the operational or post-operational period.
- **Pond 1 & 2 is capped and closed** – Pond 1 & 2 has been closed in place with final cover established in 2019, the cap is maintained to eliminate potential for future migration from infiltration within the Pond 1 & 2 footprint and groundwater detection monitoring continues to be performed post-closure. As detailed in the Consumers Energy provided notice of the intent to initiate closure of Pond 1 & 2 on November 14, 2017, CCR was placed to design grade and the pond was closed with an engineered cap in 2019 and documented in the J.R. Whiting Generating Facility, Ponds 1 and 2 Construction Documentation Report (Golder, July 2020). The closure was performed in general accordance with the EGLE approved J.R. Whiting Generating Facility, Ponds 1-2 Closure Plan dated December 18, 2017 (Golder, December 2017) and certified closed by the EGLE on August 27, 2020. Although the underlying native clay provides a natural hydraulic barrier to prevent downward migration from leachate within the CCR unit, the closure of Pond 1 & 2 further eliminates that potential.
- **Spatial variability in groundwater quality** – Calcium concentrations observed at JRW-MW-15005 are within the historical ranges at Pond 1 & 2. The calcium concentrations observed in the Pond 1 & 2 well network between 2017 and 2023 ranged from 87.1 mg/L to 150 mg/L. The calcium concentrations observed at JRW-MW-15005 (123 mg/L) during the May 2023 verification event are only slightly above their respective prediction limits and are well within the range of 87.1 mg/L to 150 mg/L observed across the entire monitoring network (Figure 6 and Figure 7).
- **Temporal variability in groundwater quality** – Natural variability in groundwater concentrations is expected due to heterogeneity that occurs within an aquifer system over time. Variability often occurs seasonally or periodically and can occur due to a variety of reasons such as variations in groundwater recharge and interactions between bedrock material and groundwater. Temporal variability has been observed historically in groundwater at the JRW Site, including the calcium dataset collected across the Pond 1 & 2 monitoring well network. A time-series plot is included as Figure 7 that illustrates this variability in calcium concentrations measured over time since groundwater monitoring began in 2016 and shows that the variability is generally consistent across

the entire Pond 1 & 2 well network. Periods of increasing concentrations are followed by periods of decreasing concentrations that occur similarly at all of the monitoring wells with no apparent trend of overall increasing or decreasing concentration over time (Figure 7), indicating a natural change over time. This periodic change occurs beyond the Pond 1 & 2 monitoring network. As shown on Figure 8, a similar change in calcium over time is observed at the Pond 6 monitoring well network located to the north of Pond 1 & 2 (Figure 2). The fact that the calcium concentrations are changing consistently across the Site and are within the range of concentrations historically observed across the site, indicates natural variability as the reason for the exceedances of calcium at JRW-MW-15005.

- **Regional groundwater quality** – Groundwater in the region surrounding JRW Pond 1 & 2 shows variability in calcium concentrations. Regional United States Geological Survey (USGS) monitoring wells in Monroe County show a range of calcium concentrations from 29 mg/L to 460 mg/L (USGS, 2016). The SSI concentration of calcium measured in JRW-MW-15005 during the April 2023 detection monitoring event was 121 mg/L and the May 2023 verification event was 123 mg/L. These calcium concentrations at JRW-MW-15005 are well within the range of regional variation near the JRW Pond 1 & 2 inactive CCR unit. USGS historical calcium data is included as Attachment 3.
- **No other SSIs identified** – All other detection monitoring constituents in groundwater at JRW-MW-15005, and the other remaining Pond 1 & 2 wells, were below or within their respective prediction limits (Table 1). The lack of SSIs observed for other detection monitoring constituents further demonstrates that the April 2023 calcium concentrations observed at JRW-MW-15005 are not related to the CCR unit and the aquifer is unaffected from Pond 1 & 2 leachate.

Conclusions

Based on the multiple lines of evidence presented above, the calcium SSI observed at JRW-MW-15005 in the April 2023 semiannual sampling event cannot be attributed to the JRW Pond 1 & 2 CCR unit. The information provided in this report serves as the ASD for Pond 1 & 2, was prepared in accordance with 40 CFR 257.94(e)(2) of the CCR Rule and demonstrates that the calcium SSI identified during the semiannual detection monitoring event performed in April 2023 is not due to a release of CCR leachate into the groundwater. Therefore, based on the information provided in this ASD, CEC will continue detection monitoring as per 40 CFR 257.94 at the Pond 1 & 2 CCR unit.

Sincerely,

TRC

Sarah B. Holmstrom, P.G.
Project Manager/Sr. Hydrogeologist

Brian Yelen
Project Geologist

Attachments

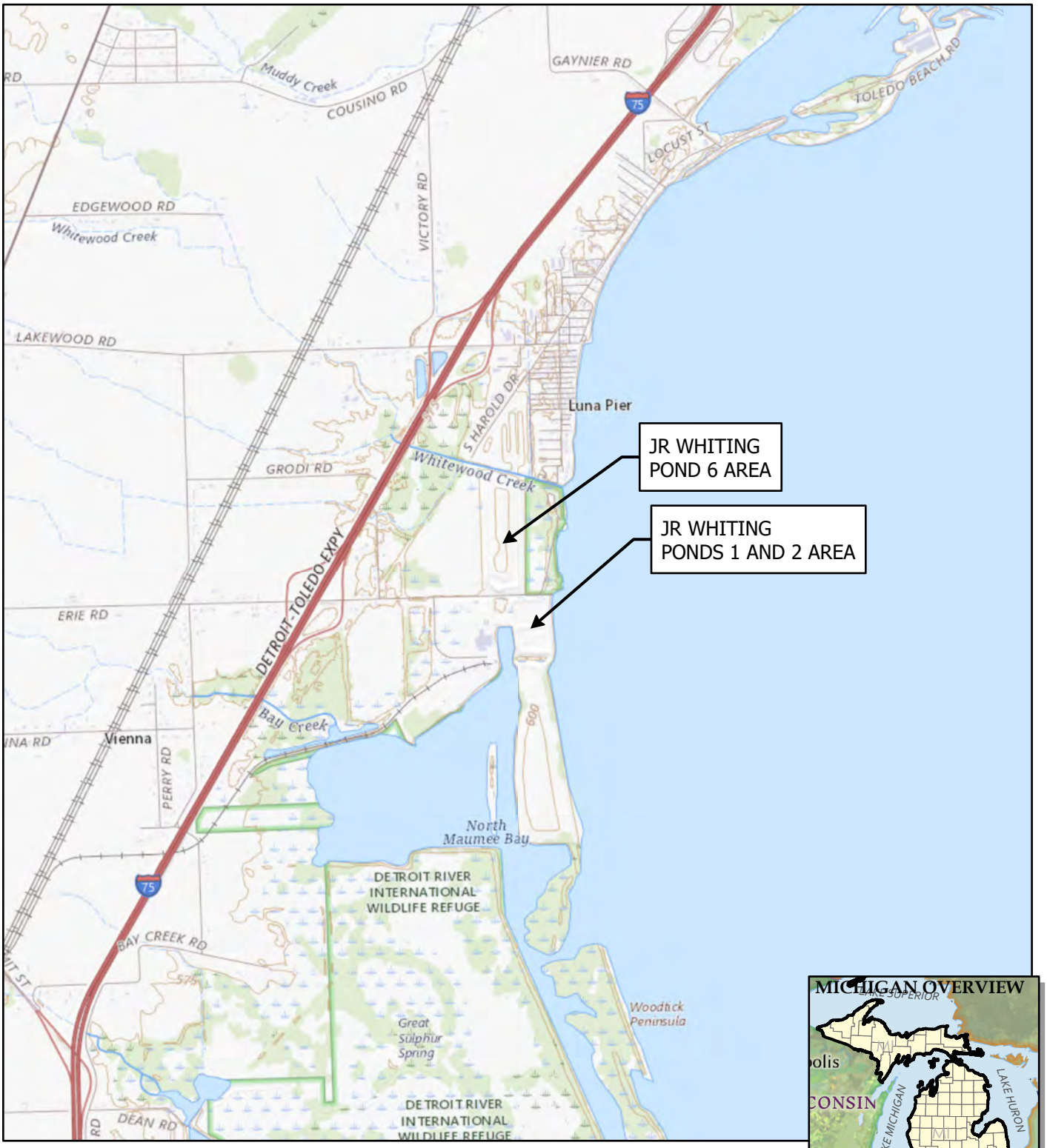
Tables

Table 1
Comparison of Groundwater Monitoring Parameter Results to Background Limits – April 2023
JR Whiting Pond 1 & 2
Erie, Michigan

Sample Location:		JRW-MW-15001		JRW-MW-15002		JRW-MW-15003		JRW-MW-15004		JRW-MW-15005			JRW-MW-15006	
Sample Date:		4/18/2023	PL	4/18/2023	PL	4/18/2023	PL	4/18/2023	PL	4/18/2023	5/17/2023	PL	4/18/2023	PL
Constituent	Unit	Data		Data		Data		Data		Data			Data	
Appendix III														
Boron	ug/L	174	240	193	220	208	230	219	270	179	--	270	194	250
Calcium	mg/L	142	180	138	180	127	160	125	140	**121**	**123**	**120**	130	140
Chloride	mg/L	45	55	42.5	56	43	55	44.7	56	31.1	--	46	41.6	53
Fluoride	ug/L	1,220	1,600	1,210	1,900	1,250	1,800	1,160	1,800	1,200	--	1,700	1,110	1,700
pH, Field	su	7.4	6.8 - 8.2	7.5	7.2 - 7.9	7.5	7.3 - 8.3	7.4	7.0 - 8.0	7.6	--	7.3 - 8.6	7.5	7.0 - 9.0
Sulfate	mg/L	382	470	386	500	344	440	287	390	291	--	350	329	410
Total Dissolved Solids	mg/L	825	1,000	852	1,100	722	940	697	880	641	--	840	725	920
Part 115 Parameters														
Iron	ug/L	860	n<8	698	n<8	428	n<8	211	n<8	30	--	n<8	664	n<8

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).

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

1"=3,000'
1:36,000

0 3,000 6,000
FEET

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

PROJECT:

CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:

SITE LOCATION MAP

DRAWN BY:	A. ADAIR
CHECKED BY:	B. YELEN
APPROVED BY:	S. HOLMSTROM
DATE:	JULY 2023
PROJ. NO.:	514397
FILE:	JRWhiting.mxd

FIGURE 1

-- Saved By: AADAIR on 6/14/2023, 12:17:58 PM

LEGEND

- BACKGROUND MONITORING WELL
- CCR UNIT MONITORING WELL

NOTES:

1: BASE MAP IMAGERY FROM GOOGLE EARTH PRO AND PARTNERS, (5/7/2022).
2. STATIC WATER ONLY WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015.
3. PONDS 1 AND 2 WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES CO. ON 11/27/2019.

1:6,000
1" = 500'

0 500 1,000 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:
SITE PLAN
WITH CCR MONITORING WELL LOCATIONS

DRAWN BY:	A. ADAIR	PROJ. NO.:	517397
CHECKED BY:	B. YELEN		
APPROVED BY:	S. HOLMSTROM		FIGURE 2
DATE:	JULY 2023		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: JRWhiting.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By AADAIR on 8/14/2023 12:43:31 PM; File Path: T:\1-PROJECTS\Consumers_Energy\517397_JRWhiting\2-APRX\JRWhiting.aprx; Layout Name: Figure 2

LEGEND

- MONITORING WELL (STATIC WATER LEVEL ONLY)
- CCR UNIT MONITORING WELL
- CROSS SECTION LOCATION

NOTES

1. BASE MAP IMAGERY FROM NEARMAP, 4/12/2017.
2. WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015 AND 11/30/2016.

N

0 500 1,000 Feet

1 " = 500 '

1:6,000

PROJECT:

CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:

CROSS SECTION LOCATION MAP

DRAWN BY:	S. MAJOR	PROJ NO.:	332751-001
CHECKED BY:	S. HOLMSTROM		
APPROVED BY:	V. BUENING		**FIGURE 3**
DATE:	MAY 2019		

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

FILE NO.: 332751-001-005.mxd

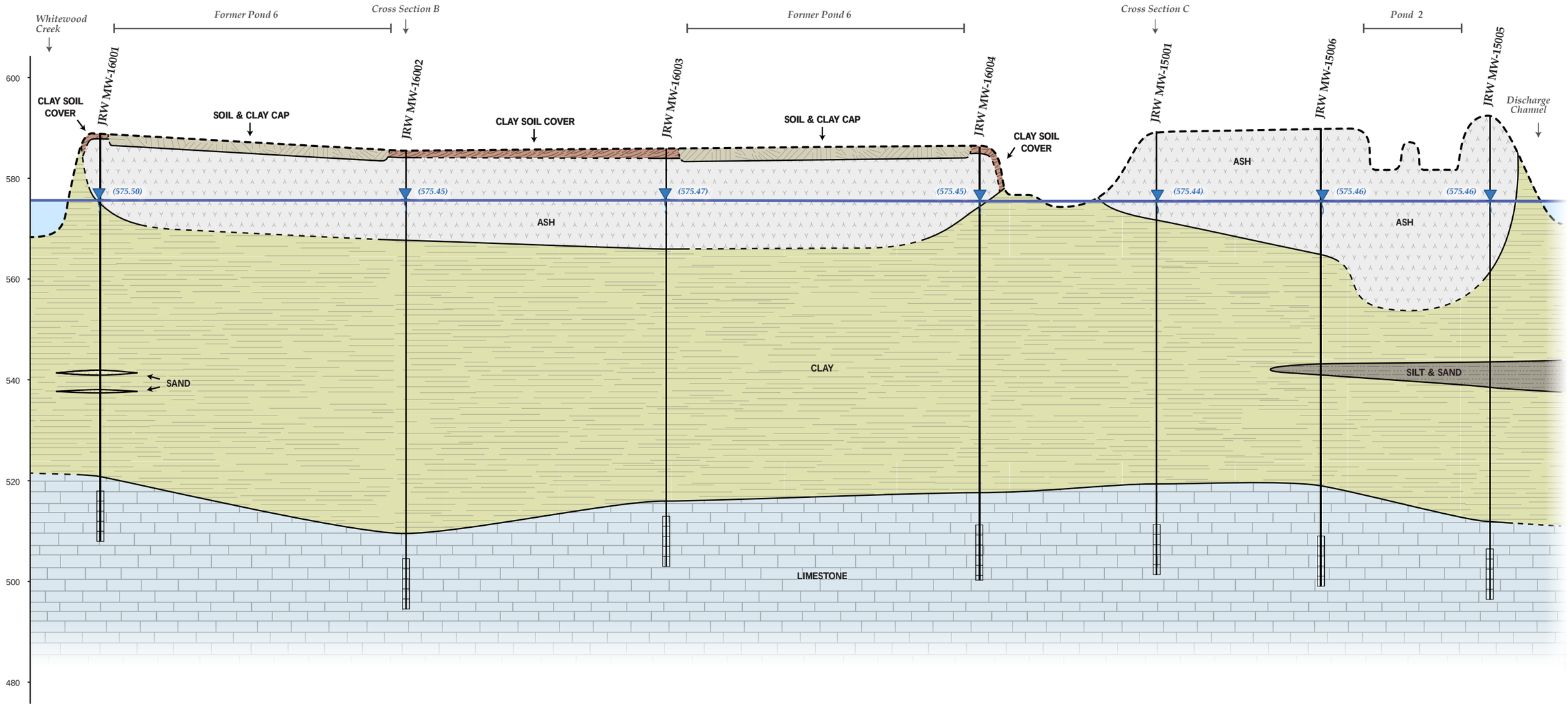
Plot Date: 5/21/2019, 11:39:04 AM by SMAJOR -- LAYOUT: ANSI B(11"x17")
Path: E:\ConsumersEnergy\CCR_GW\2017_26976\332751-001-005.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

TRC - GIS

Generalized Geologic Cross Section

A
(North)

A′
(South)



LEGEND

- GROUND SURFACE PROFILE, DASHED WHERE INFERRED
- STRATIGRAPHIC BOUNDARY, DASHED WHERE INFERRED
- APPROXIMATE CONFINED GROUNDWATER POTENTIOMETRIC ELEVATION (JULY 31, 2017)

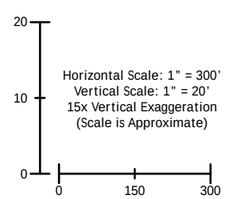
SOIL UNIT LITHOLOGY

- SOIL & CLAY CAP
- CLAY SOIL COVER
- ASH
- CLAY
- LIMESTONE
- SILT & SAND
- SAND

- WELL BOREHOLE
- WELL SCREEN

NOTES

1. FEATURE LOCATIONS AND SCALE ARE APPROXIMATE.
2. CROSS SECTION BASED UPON INFORMATION FROM ASH POND MATERIAL CHARACTERIZATION (GOLDER, 2016), SUMMARY OF MONITORING WELL DESIGN, INSTALLATION, AND DEVELOPMENT (ARCADIS, 2016), AND 2016 MONITORING WELL DESIGN, INSTALLATION, DEVELOPMENT, AND DECOMISSIONING (TRC, 2016).



PROJECT:
CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:
GENERALIZED GEOLOGIC CROSS SECTION A-A'

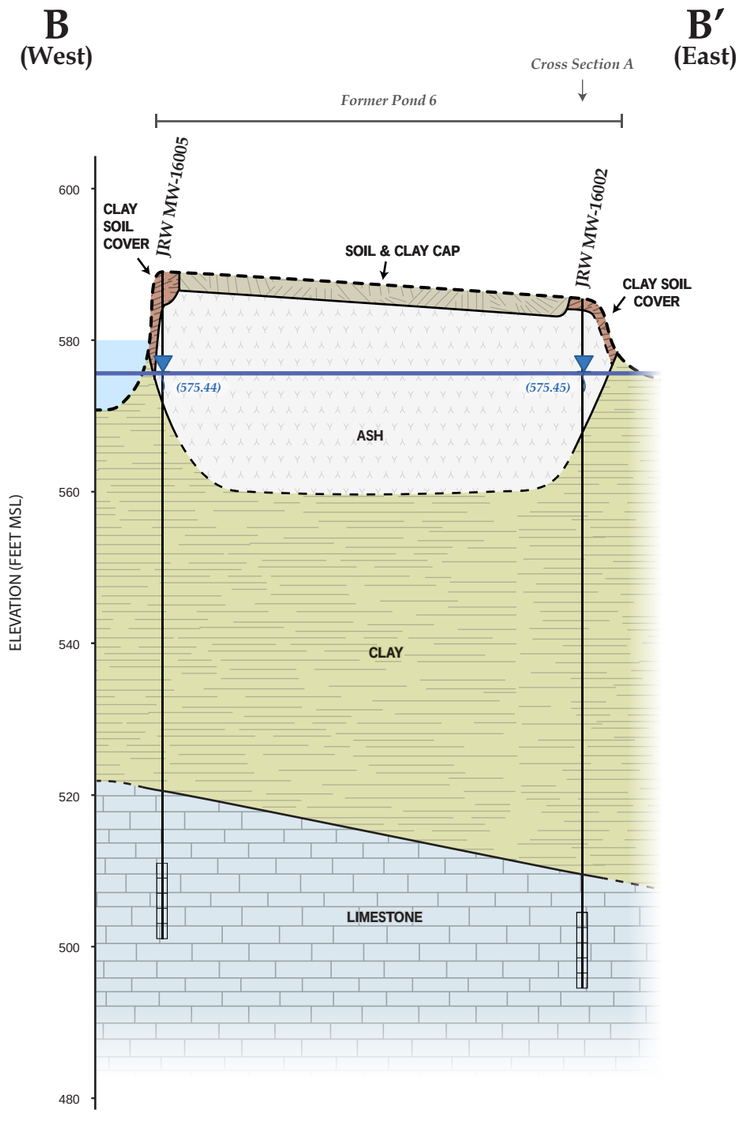
DRAWN BY:	S.MAJOR	PROJ NO.:	332751
CHECKED BY:	S. HOLMSTROM		
APPROVED BY:	V. BUENING		**FIGURE 4**
DATE:	MAY 2019		

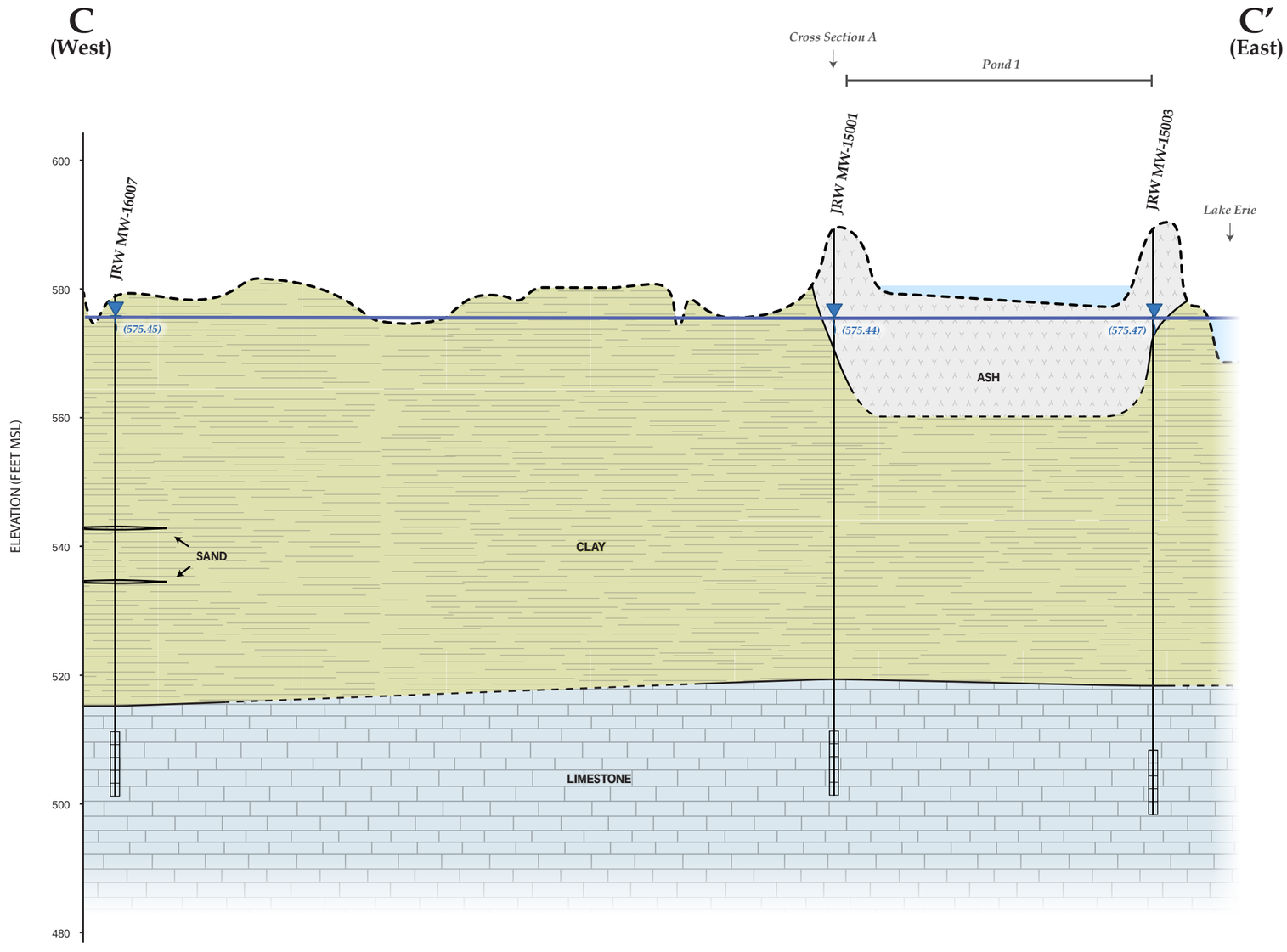
TRC
1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080

FILE NO.: 332751-001-ai01

File Path: E:\WI_DOT\2015_229576\A\l269767-004-ai01.ai

Generalized Geologic Cross Sections





LEGEND

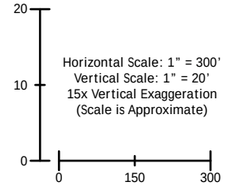
- GROUND SURFACE PROFILE, DASHED WHERE INFERRED
- STRATIGRAPHIC BOUNDARY, DASHED WHERE INFERRED
- APPROXIMATE CONFINED GROUNDWATER POTENTIOMETRIC ELEVATION (JULY 31, 2017)

SOIL UNIT LITHOLOGY

- SOIL & CLAY CAP
- CLAY SOIL COVER
- ASH
- CLAY
- LIMESTONE
- SAND
- WELL BOREHOLE
- WELL SCREEN

NOTES

1. FEATURE LOCATIONS AND SCALE ARE APPROXIMATE.
2. CROSS SECTION BASED UPON INFORMATION FROM ASH POND MATERIAL CHARACTERIZATION (GOLDER, 2016), SUMMARY OF MONITORING WELL DESIGN, INSTALLATION, AND DEVELOPMENT (ARCADIS, 2016), AND 2016 MONITORING WELL DESIGN, INSTALLATION, DEVELOPMENT, AND DECOMISSIONING (TRC, 2016).



Horizontal Scale: 1" = 300'
Vertical Scale: 1" = 20'
15x Vertical Exaggeration
(Scale is Approximate)

PROJECT:
CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:
GENERALIZED GEOLOGIC CROSS SECTIONS B-B' AND C-C'

DRAWN BY:	S.MAJOR	PROJ NO.:	332751
CHECKED BY:	S. HOLMSTROM		
APPROVED BY:	V. BUENING		**FIGURE 5**
DATE:	MAY 2019		

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

FILE NO.: 322751-001-ai02.ai

File Path: E:\WI_DOT\2015_229576\AI\322751-001-ai02.ai

Figure 6
Calcium Time-Series Plot
JR Whiting Monitoring Well: JRW-MW-15005

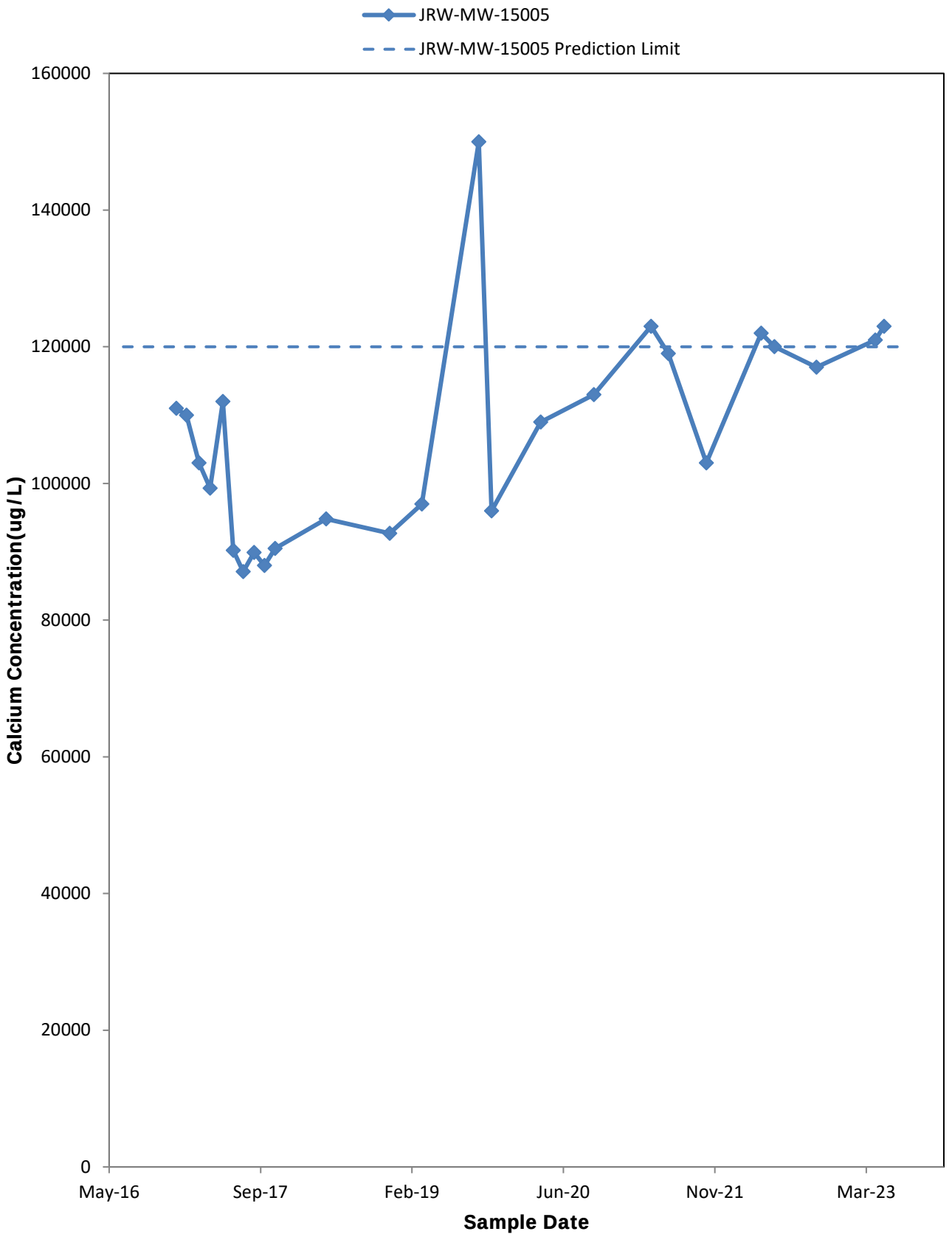


Figure 7
Calcium Time-Series Plot
JR Whiting Pond 1 & 2

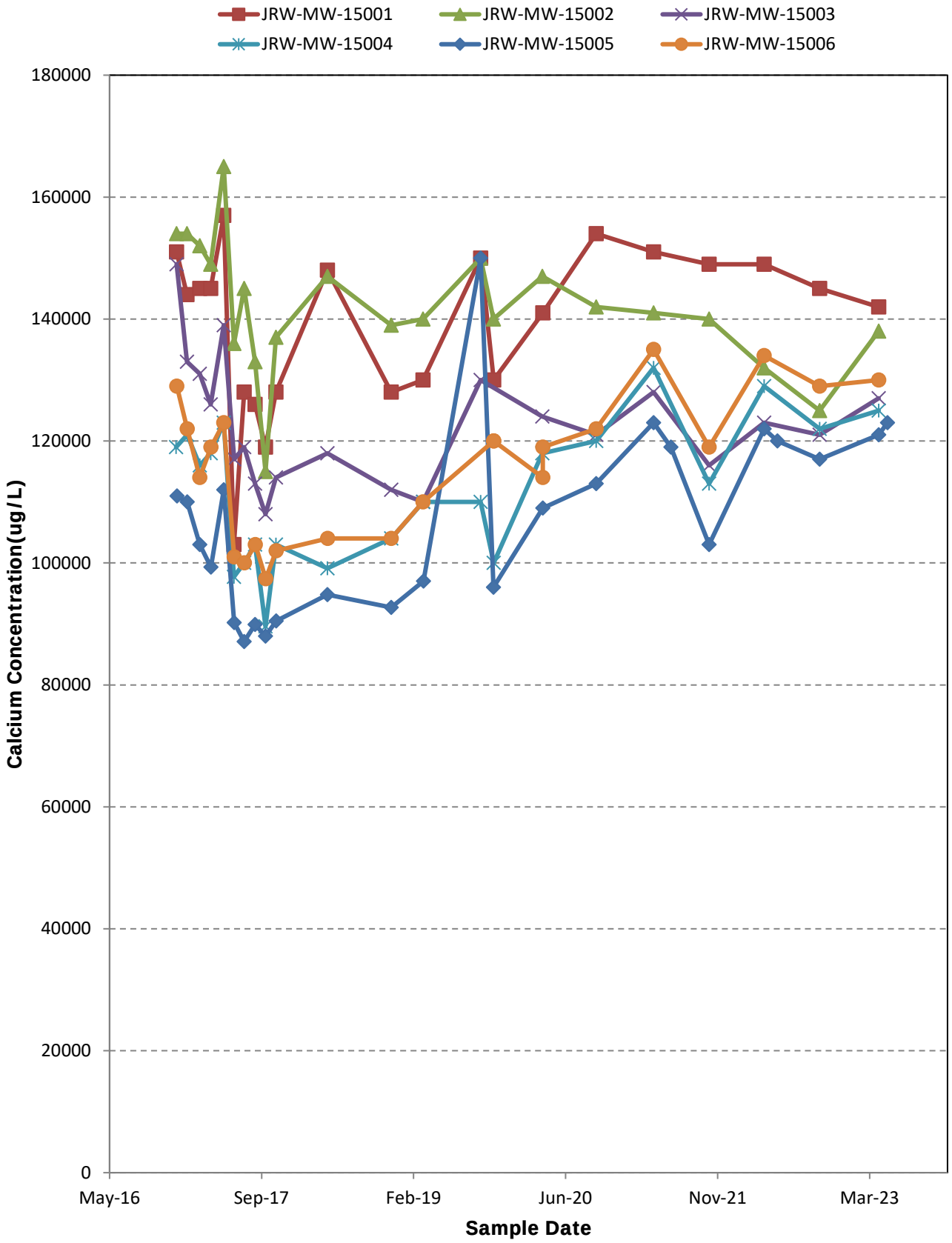
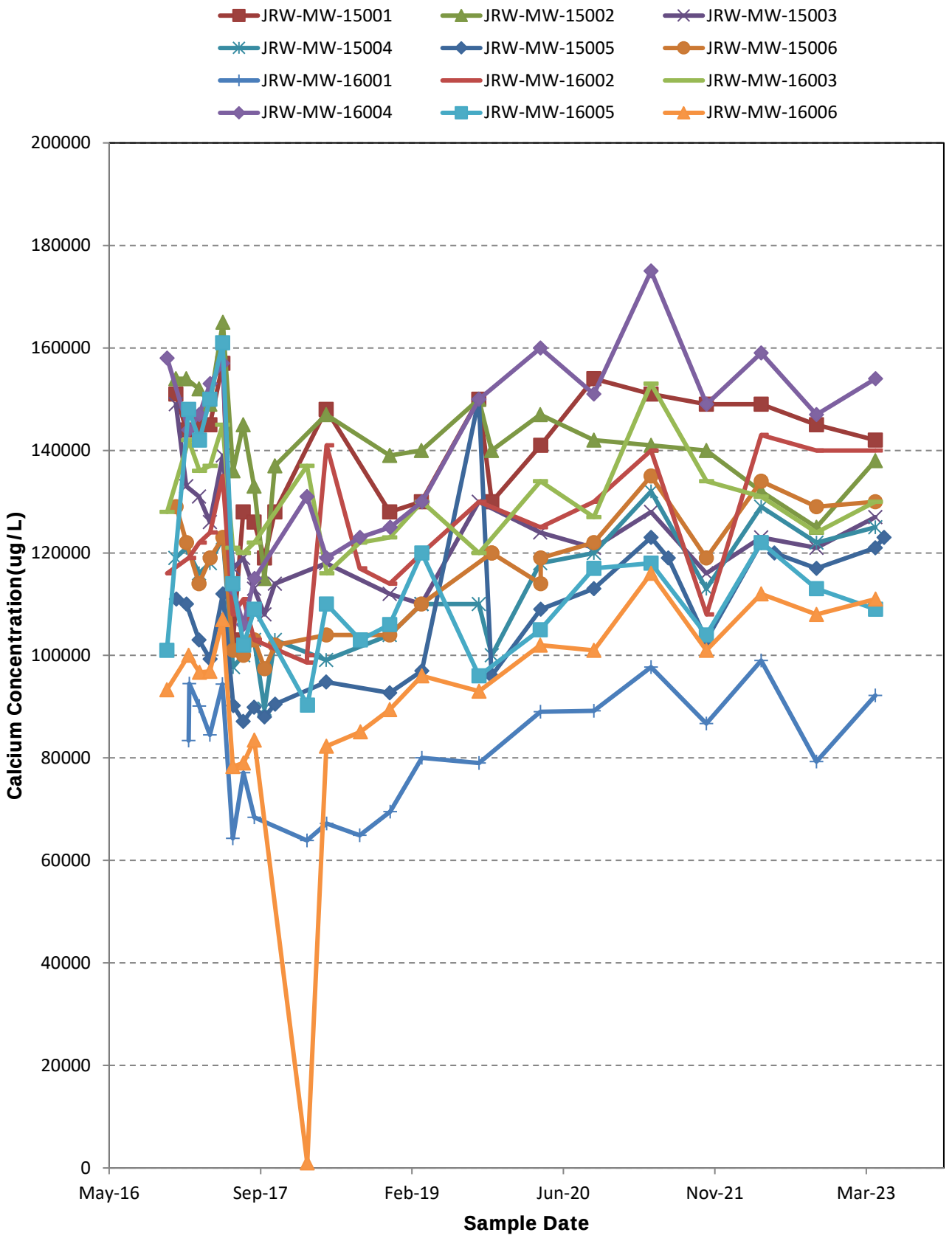


Figure 8
Calcium Time-Series Plot
JR Whiting Pond 1 & 2 and Pond 6



Attachment 1
Data Quality Review

Laboratory Data Quality Review
Groundwater Sampling Event April 2023
Consumers Energy JR Whiting Pond 1 & 2

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the April 2023 groundwater monitoring sampling event. Samples were analyzed for anions, total metals, and total dissolved solids by CE Laboratory Services, located in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 23-0300.

During the April 2023 sampling event, a groundwater sample was collected from each of the following wells:

- JRW-MW-15001
- JRW-MW-15002
- JRW-MW-15003
- JRW-MW-15004
- JRW-MW-15005
- JRW-MW-15006

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

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals (Boron, Calcium, Iron)	SW-846 6020B

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 equipment blanks and field blanks. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- 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.

It should be noted that results for method blanks and laboratory control samples were not provided for review by the laboratory. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated.

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.

Findings

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable, with the exceptions noted below. The discussion that follows describes the QA/QC results and evaluation.

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 as well as iron will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One equipment blank (EB-01) and one field blank (FB-01) were collected. Target analytes were not detected in these blank samples.
- MS and MSD analyses were performed on sample JRW-MW-15006 for total metals and anions. The recoveries were within the acceptance limits. Relative percent differences (RPDs) were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all MS/MSD recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-01/JRW-MW-15002. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Laboratory Data Quality Review
Groundwater Sampling Event May 2023
Consumers Energy JR Whiting Pond 1 & 2

A groundwater sample was collected by Consumers Energy (CE) Laboratory Services for the May 2023 groundwater monitoring sampling event. The sample was analyzed for total calcium by CE Laboratory Services, located in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 23-0494.

During the May 2023 sampling event, a groundwater sample was collected from the following well:

- JRW-MW-15005

The sample was analyzed for the following constituent:

Analyte Group	Method
Total Calcium	SW-846 6020B

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 equipment blanks and field blanks. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- 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.

It should be noted that results for method blanks and laboratory control samples were not provided for review by the laboratory. Therefore, potential contamination arising from laboratory

sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated.

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.

Findings

The data quality objectives and laboratory completeness goals for the project were met, and the data are usable, with the exceptions noted below. The discussion that follows describes the QA/QC results and evaluation.

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.
- When the data are evaluated through a detection monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One equipment blank (EB-01) and one field blank (FB-01) were collected. Total calcium was not detected in these blank samples.
- MS and MSD analyses were performed on sample JRW-MW-15005 for total calcium. The recoveries were within the acceptance limits. The relative percent difference (RPD) was not provided by the laboratory and therefore was not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all MS/MSD recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-01/JRW-MW-15005. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Attachment 2
References

References

Consumers Energy Company. October 2017. Groundwater Monitoring System Certification, §257.91(f) JR Whiting Power Plant, Ponds 1 & 2.

Golder Associates Inc. December 2017. J.R. Whiting Generating Facility, Ponds 1-2 Closure Plan. Prepared for Consumers Energy Company, dated December 18, 2017.

Golder Associates Inc. July 2020. J.R. Whiting Generating Facility, Ponds 1 and 2 – Construction Documentation Report. Prepared for Consumers Energy Company, dated July 30, 2020.

TRC. October 2017. Groundwater Statistical Evaluation Plan – Former JR Whiting Power Plant, Ponds 1 and 2, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. January 2018. Annual Groundwater Monitoring Report – Former JR Whiting Power Plant, Ponds 1 and 2, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. December 2018. Natural Clay Liner Equivalency Report – Six Southeast Michigan Coal Combustion Residual Units. Prepared for DTE Electric Company and Consumers Energy Company.

TRC. January 2019. 2018 Annual Groundwater Monitoring Report – Former JR Whiting Power Plant, Ponds 1 and 2, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. January 2020. 2019 Annual Groundwater Monitoring and Corrective Action Report – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. February 2020. Electric Generation Facilities RCRA CCR Detection Monitoring Program for the Ponds 1 & 2 and Pond 6 Areas. Sample and Analysis Plan. JR Whiting Monitoring Program – Erie, Michigan. Prepared for Consumers Energy Company.

TRC. February 2020. Groundwater Statistical Evaluation Plan – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. May 2020 Revision. Consumers Energy JR Whiting Hydrogeologic Monitoring Plan (HMP). Prepared for Consumers Energy Company.

TRC. January 2021. 2020 Annual Groundwater Monitoring and Corrective Action Report – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. January 2022. 2021 Annual Groundwater Monitoring and Corrective Action Report – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. January 2023. 2022 Annual Groundwater Monitoring and Corrective Action Report – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6, Erie, Michigan. Prepared for Consumers Energy Company.

U.S. Environmental Protection Agency. April 2012. 2012 Edition of the Drinking Water Standards and Health Advisories. EPA 822-S-12-001. Office of Water, U.S. Environmental Protection Agency, Washington, DC. Spring 2012; Date of update: April 2012.

U.S. Geological Survey. 2016. National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed June 12, 2023, at URL http://waterdata.usgs.gov/nwis/qwdata.

Attachment 3
Historical USGS Calcium Data

USGS Michigan Water Science Center Calcium Groundwater Data
Monroe County, Michigan

Location	Sample Date	Sample Time	Result Identifier	Calcium Concentration (mg/L - dissolved)
USGS-415344083422201	3/1/1961	--	NWIS-60968067	90
USGS-420445083405601	10/31/1967	--	NWIS-60996674	74
USGS-420432083410601	10/31/1967	--	NWIS-60996645	96
USGS-420452083410101	10/31/1967	--	NWIS-60996699	62
USGS-420459083405401	10/31/1967	--	NWIS-60996726	52
USGS-415344083422101	8/18/1971	--	NWIS-61028155	99
USGS-415950083232001	8/19/1971	--	NWIS-61028280	95
USGS-420300083223001	8/19/1971	--	NWIS-61028465	200
USGS-420040083302001	8/19/1971	--	NWIS-61028363	170
USGS-420320083354001	8/19/1971	--	NWIS-61028499	35
USGS-415115083291001	8/19/1971	--	NWIS-61027962	150
USGS-415206083414401	8/9/1979	10:50:00	NWIS-61214113	34
USGS-415206083414401	12/11/1984	16:00:00	NWIS-61350758	32
USGS-415435083342601	8/29/1986	9:45:00	NWIS-61374410	200
USGS-415753083413601	9/3/1986	14:00:00	NWIS-61374619	68
USGS-415305083234501	9/3/1986	11:00:00	NWIS-61384638	400
USGS-420019083311201	8/29/1986	12:00:00	NWIS-61374481	130
USGS-414829083345601	10/29/1991	14:45:00	NWIS-61464939	130
USGS-414731083450101	10/29/1991	10:30:00	NWIS-61465118	120
USGS-415839083221501	11/5/1991	11:00:00	NWIS-61467213	230
USGS-420314083225501	11/5/1991	15:00:00	NWIS-61466451	460
USGS-414452083385201	10/29/1991	13:30:00	NWIS-61465066	63
USGS-420325083440901	10/30/1991	12:30:00	NWIS-61465170	32
USGS-420425083270001	11/5/1991	13:30:00	NWIS-61466607	340
USGS-415431083343201	10/30/1991	9:45:00	NWIS-61464887	170
USGS-420248083372601	11/4/1991	12:00:00	NWIS-61466555	52
USGS-420414083351501	11/4/1991	14:00:00	NWIS-61466503	29
USGS-420218083130401	4/27/1992	13:00:00	NWIS-61470604	350
USGS-420107083403201	4/28/1992	10:00:00	NWIS-61470713	100
USGS-414509083291001	4/28/1992	14:30:00	NWIS-61471094	220
USGS-415244083415201	4/29/1992	9:30:00	NWIS-61471366	45
USGS-415721083331601	4/28/1992	13:15:00	NWIS-61470769	69
USGS-420246083285901	5/20/1992	12:00:00	NWIS-61473386	210
USGS-414601083375801	4/28/1992	17:00:00	NWIS-61471041	54
USGS-415754083420901	5/19/1992	12:00:00	NWIS-61473488	61
USGS-420123083300001	5/5/1992	12:00:00	NWIS-61472878	140
USGS-420055083175601	4/27/1992	15:00:00	NWIS-61470657	460
USGS-414559083325501	5/6/1992	16:00:00	NWIS-61472929	79
USGS-415437083413001	1/23/1992	13:10:00	NWIS-61468446	39
USGS-415527083402001	1/23/1992	11:45:00	NWIS-61468394	54
USGS-414854083382201	5/19/1992	15:30:00	NWIS-61473286	220
USGS-415923083272101	4/28/1992	15:30:00	NWIS-61470825	88
USGS-415400083262801	5/20/1992	10:00:00	NWIS-61473335	380
USGS-414353083422801	5/19/1992	14:00:00	NWIS-61473437	120
USGS-415133083274801	1/23/1992	16:45:00	NWIS-61468550	85
USGS-415824083162901	5/6/1992	12:30:00	NWIS-61473133	180
USGS-415204083323101	5/19/1992	16:30:00	NWIS-61473235	350
USGS-415749083282001	5/7/1992	10:00:00	NWIS-61472980	150
USGS-415236083365401	1/23/1992	15:15:00	NWIS-61468498	120
USGS-415228083242401	5/6/1992	14:30:00	NWIS-61473031	430
USGS-420503083192101	5/5/1992	15:00:00	NWIS-61473184	410
USGS-415115083400201	4/29/1992	12:00:00	NWIS-61470986	64
USGS-414748083305501	4/28/1992	12:45:00	NWIS-61471147	390
USGS-415234083413801	4/29/1992	9:45:00	NWIS-61471309	37
USGS-415648083405601	1/23/1992	10:15:00	NWIS-61468342	270
USGS-415156083441501	4/29/1992	12:00:00	NWIS-61470933	43
USGS-420123083213801	5/6/1992	10:30:00	NWIS-61473082	190
USGS-415710083192501	4/28/1992	9:15:00	NWIS-61470878	410

Appendix B
Second Semiannual Monitoring Report

January 30, 2024

Brett Coulter, CPG, District Geologist
EGLE, Materials Management Division
State Office Building
301 East Louis Glick Highway
Jackson, MI 49201

via email: CoulterB1@michigan.gov

TRANSMITTAL OF GROUNDWATER MONITORING RESULTS FOR JR WHITING SOLID WASTE DISPOSAL AREA

Dear Mr. Coulter,

Please find attached the Second Semiannual 2024 Groundwater Monitoring Report for the JR Whiting Solid Waste Disposal Area, Facility ID 397664, prepared pursuant to the May 2020 Hydrogeological Monitoring Plan.

JR Whiting was following the groundwater monitoring waiver approved on September 2, 2009 until the federal Resource Conservation and Recovery Act (RCRA) coal combustion residuals (CCR) rule required groundwater monitoring at JR Whiting Pond 1&2 and then at Pond 6, beginning around 2016. Since then, in December 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Project Act, also known as Part 115 of PA 451 of 1994, as amended, to incorporate requirements of the federal CCR Rule. In 2019, Consumers Energy submitted a revised JR Whiting Hydrogeological Monitoring Plan, former JR Whiting Plant, Erie, Michigan (2020 HMP) (TRC, May 2020 Revision) that was finalized and approved by the Michigan Department of Environment, Great Lakes, and Energy in May 2020. The revised HMP harmonizes both the CCR Rule and state of Michigan requirements. This submittal was prepared in accordance with the July 5, 2013 OWMRP-115-29 communication under the revised HMP.

Please contact me if you have any questions regarding this transmittal.

Sincerely,

Harold D. Register, Jr., P.E.
Sr. Principal Environmental Engineer
Phone: (517) 788-2982
Email: harold.registerjr@cmsenergy.com

cc Gary Schwerin, EGLE (via email)

Second Semiannual 2023 Groundwater Monitoring Report

Former JR Whiting Power Plant Pond 1 & 2 and Pond 6

Erie, Michigan

January 2024

Prepared For:

Consumers Energy

Prepared By:

TRC
1540 Eisenhower Place
Ann Arbor, Michigan 48108

Sarah B. Holmstrom, P.G.
Project Manager

Vincent E. Buening, C.P.G.
Sr. Hydrogeologist

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 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. Standards for groundwater monitoring and corrective action codified in the CCR Rule (40 CFR 257.90-98) apply to the Consumers Energy Company (Consumers Energy) Ponds 1 and 2 (closed surface impoundment monitored as Pond 1 & 2 using a multiunit groundwater monitoring system) and Pond 6 (closed inactive surface impoundment) at the former JR Whiting (JRW) Power Plant Site (the Site). Prior to the CCR Rule, from about 2009 to 2016, JR Whiting followed the approved groundwater monitoring waiver.

On December 28, 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The December 2018 amendments to Part 115 were developed to provide the State of Michigan oversight of CCR impoundments and landfills and to better align existing state solid waste management rules and statutes with the CCR Rule. On August 8, 2019 Consumers Energy submitted a revised *JR Whiting Hydrogeological Monitoring Plan, former JR Whiting Power Plant, Erie, Michigan* (2020 HMP) (TRC, May 2020 Revision) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The HMP was approved by the EGLE on May 11, 2020.

1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This JR Whiting Second Semiannual 2023 Hydrogeological Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to present groundwater monitoring data collected from the JR Whiting Pond 1 & 2 and Pond 6 during the fourth calendar quarter of 2023. This report was prepared in accordance with the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the July 5, 2013 Michigan Department of Environmental Quality – Office of Waste Management and Radiological Protection (MDEQ-OWMRP), now the EGLE Materials Management Division (MMD), communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, Format for Solid Waste Disposal Monitoring Submittals. All references herein to the EGLE are inclusive of the MDEQ. Groundwater sampling, analysis, and information contained in this report was prepared in adherence to the 2020 HMP.

1.2 Program Summary

Historically groundwater monitoring at JRW was performed under the HMP last revised on November 26, 1997 until the groundwater monitoring waiver was approved on September 2, 2009. It was then again performed pursuant to the CCR Rule beginning in 2016 until implementation of the 2020 HMP, at which time monitoring began to be conducted in accordance with both regulatory programs. In the *First Semiannual 2023 Groundwater Monitoring Report* for the JRW Pond 1 & 2 and Pond 6 (First Semiannual 2023 Report) (TRC, July 2023), Consumers Energy reported that no potential statistically significant increases (SSIs) were noted during the first 2023 semiannual detection monitoring event. Therefore,

Consumers Energy continued detection monitoring in the second half of 2023 at Pond 1 & 2 and Pond 6 pursuant to §257.94 of the CCR Rule, and the HMP.

This Second Semiannual 2023 Report presents the monitoring results and the statistical evaluation of the detection monitoring constituents (Section 11511a(3)(c) of Part 115) for the October 2023 semiannual groundwater monitoring event for Pond 1 & 2 and Pond 6. Detection monitoring was performed in accordance with the 2020 HMP. As part of the statistical evaluation, the data collected during detection monitoring events are evaluated to identify SSIs of detection monitoring constituents compared to background levels.

1.3 Site Overview

The JR Whiting Plant was a coal-fired power generation facility located in Erie, Michigan, on the western shore of Lake Erie (Figure 1). The plant began producing electricity in 1952 from Units 1 and 2, with Unit 3 beginning operation in 1953. The plant ceased operation in April 2016. Figure 1 is the site location map showing the facility and the surrounding area. Site features are shown on Figure 2.

The JR Whiting Ash Disposal Area is licensed under Michigan Part 115 of the Natural Resources and Environmental Protection Act (NREPA), PA 451 of 1994, as amended.

Pond 1 & 2 is located to the east of the plant, north of the discharge canal, south of Erie Road, and west of Lake Erie and constructed in native clay soil. It was historically used for wet ash sluicing. In 2019, it received its final cover system constructed pursuant to 40 CFR 257.102(a); the Pond 1 & 2 Closure Construction Quality Assurance (CQA) Plan dated August 31, 2017; the Part 115 Administrative Rules; and Pond 1 & 2 Closure Plan submitted to the EGLE on December 18, 2017. The closure of Pond 1 & 2 was certified by the EGLE in a letter dated August 27, 2020.

Pond 6 is located to the north of the plant and was constructed in native clay soil. It was an inactive surface impoundment at the time the CCR Rule became effective on October 19, 2015 and was capped with final cover certified pursuant to the CCR Rule on December 5, 2017 and certified by the EGLE on August 24, 2018.

1.4 Geology/Hydrogeology

Pond 1 & 2 and Pond 6 are located adjacent to Lake Erie. The subsurface materials encountered at the JR Whiting site are predominately clay-rich till. The surficial CCR fill material is underlain by approximately 40 to 50 feet of laterally extensive clay-rich till that acts as a natural hydraulic barrier across the Site. Limestone bedrock is present beneath the till and is considered the uppermost aquifer at the Site.

Groundwater present within the uppermost aquifer is typically encountered at Pond 1 & 2 and Pond 6 around 70 to 80 feet below ground surface (ft bgs), approximately 510 to 520 feet above mean sea level (AMSL), in the limestone (beneath the till). The uppermost aquifer is confined and protected from CCR constituents by the 40- to 50-foot-thick overlying clay-rich aquitard that interfaces with the limestone at the elevation range of 510 to 520 ft. Potentiometric surface

elevation data from groundwater within the CCR monitoring wells represents the levels in which groundwater rises under hydrostatic pressure within each well and exhibit an extremely low hydraulic gradient across the Site with no consistent or discernible flow direction.

2.0 Groundwater Monitoring

2.1 Monitoring Well Network

A groundwater monitoring system has been established for Pond 1 & 2 and Pond 6 for the purpose of detection monitoring. The detection monitoring well network for Pond 1 & 2 and Pond 6 currently consists of six monitoring wells for each CCR unit that are screened in the uppermost aquifer. Monitoring well locations are shown on Figure 2.

As discussed in the HMP, intrawell statistical methods for JR Whiting were selected based on the geology and hydrogeology at the Site (primarily the presence of clay/hydraulic barrier, no apparent flow direction and lack of flow potential across the 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 and similarities in concentrations in wells JRW-MW-16007 through JRW-MW-16009 and the Pond 1 & 2 and Pond 6 monitoring wells).

An intrawell statistical approach requires that each of the downgradient wells double 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. Monitoring wells JRW-MW-15001 through JRW-MW-15006 are located around the perimeter of Pond 1 & 2 and monitoring wells JRW-MW-16001 through JRW-MW-16006 are located around the perimeter of Pond 6. These monitoring wells provide data on both background and downgradient groundwater quality that has not been affected by the CCR unit (a total of six background/downgradient monitoring wells for each pond).

As shown on Figure 2, monitoring wells JRW-MW-16007 through JRW-MW-16009 are used for water level measurements only. These wells were initially installed as potential background monitoring wells during the initial stages of characterizing the Site. However, based on further hydrogeological characterization of the uppermost aquifer, an intrawell statistical approach was selected, which does not rely on JRW-MW-16007 through JRW-MW-16009 for statistical evaluation.

No monitoring wells have been installed or decommissioned since the previous monitoring event.

2.2 October 2023 Groundwater Monitoring

Consumers Energy Laboratory Services personnel performed gauging and sampling of monitoring wells associated with Pond 1 & 2 and Pond 6 on October 5, 2023. Groundwater monitoring was performed in accordance with the HMP. Groundwater samples collected during the October 2023 event were submitted to Consumers Energy Laboratory Services in Jackson, Michigan, for analysis of the following metals and inorganic indicator constituents:

Section 11511a(3)(c) – Detection Monitoring Constituents
Boron
Calcium
Chloride
Fluoride
Iron
pH
Sulfate
Total Dissolved Solids (TDS)

Static water level measurements that represent the potentiometric surface were collected at all locations after equilibration to atmospheric pressure. The depth to water was measured according to ASTM D 4750, "Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well" and recorded to the nearest 0.01 foot. Static water elevation data are summarized in Table 1.

Groundwater samples were collected using a peristaltic pump or submersible pump in accordance with low flow sampling protocol and were not field filtered to allow for total metals analysis. Groundwater field parameters included dissolved oxygen, oxidation reduction potential, pH, specific conductivity, temperature, and turbidity and are summarized on Table 2. All samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. Consumers Energy followed chain of custody procedures to document the sample handling.

Consumers Energy collected quality assurance/quality control (QA/QC) samples from both CCR units, Pond 1 & 2 and Pond 6, during the October 2023 groundwater sampling event. The QA/QC samples per CCR unit consisted of one field blank, one equipment blank, one field duplicate (JRW-MW-15001 at Pond 1 & 2 and JHC-MW-16002 at Pond 6), and one field matrix spike/matrix spike duplicate (MS/MSD) sample collected from JRW-MW-15006 at Pond 1 & 2, and JHC-MW-16003 at Pond 6.

Groundwater analytical results from the second semiannual 2023 monitoring event are summarized in Table 3 (Pond 1 & 2) and Table 4 (Pond 6). The laboratory analytical reports are included in Appendix B. Field records are included in Appendix C.

2.2.1 Data Quality Review

Data from each round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The data were found to be complete and usable for the purposes of the CCR monitoring program. Data quality reviews are summarized in Appendix A.

2.2.2 Groundwater Flow Rate and Direction

Groundwater elevation data collected during the background sampling events showed that the hydraulic gradient for groundwater within the uppermost aquifer is often so low that groundwater flow across Pond 1 & 2 and Pond 6 is frequently incalculable and often stagnant.

There are minor differences in hydraulic head across the monitoring wells (ranging from zero up to 0.15 feet across Pond 1 & 2 and up to 0.24 feet across Pond 6 from event to event from November 2016 through October 2023), indicating that the potentiometric surface is flat the majority of the time. In the few instances since November 2016 where a slight gradient was observed and calculable, the direction of the flow potential was highly variable event to event with flow directions slightly to the northwest, east, and northeast from Pond 1 & 2 and slightly to the south, west, and northeast from Pond 6.

The most pronounced groundwater gradient between November 2016 and October 2023 at Pond 1 & 2 was observed on December 19, 2016, which showed a slight horizontal gradient of approximately 0.00016 to the northwest across Pond 1 & 2. For Pond 6, the most pronounced potentiometric head differential of 0.24 feet was observed on February 28, 2018 between JRW-MW-16001 on the north edge of Pond 6 and JRW-MW-16004 on the south edge of the Pond 6 CCR unit. Although, when considering the potentiometric surface elevation data from all of the Pond 6 CCR unit wells, the general groundwater flow direction inferred across the pond at that time is to the southwest, in order to be conservative, the maximum head difference was used to calculate the maximum groundwater flow velocity at the Pond 6 CCR unit throughout the background monitoring period. This results in a very slight horizontal gradient of approximately 0.000099 ft/ft to the south.

2.2.2.1 Pond 1 & 2

Although there was no clear flow direction when looking at water levels across the Pond 1 & 2 well network, the maximum groundwater gradient inferred on October 5, 2023 was calculated using well pair JRW-MW-15005/JRW-MW-15004 to conservatively demonstrate the low groundwater flow rate potential. The head difference across Pond 1 & 2 ranged from 0.00 to 0.04 feet between monitoring wells, with the maximum head difference showing a slight horizontal gradient of approximately 0.000081 ft/ft. Using the highest hydraulic conductivity measured at the Pond 1 & 2 monitoring wells of 20 feet/day (ARCADIS, 2016), and an assumed effective porosity of 0.1, this results in a maximum inferred groundwater flow rate of approximately 0.016 feet/day (approximately 5.9 feet/year). However, the actual gradient is much lower when considering the low head difference in the rest of the monitoring wells across Pond 1 & 2 and the lack of discernable flow direction. The Pond 1 & 2 groundwater potentiometric surface elevations measured during the October 2023 sampling event are provided on Table 1 and are summarized in plan view on Figure 3.

The extremely low gradient and lack of general flow direction is similar to that identified in previous monitoring rounds (since the background sampling events commenced in December 2016) and continues to demonstrate that the downgradient compliance wells are appropriately positioned to detect the presence of detection monitoring constituents that could potentially migrate from Pond 1 & 2.

2.2.2.2 Pond 6

Although there was no clear flow direction when looking at water levels across the Pond 6 well network, the maximum groundwater gradient inferred on October 5, 2023 was calculated using well pair JRW-MW-16006/JRW-MW-16002 to conservatively demonstrate the low groundwater flow rate potential. The head difference across Pond 6 ranged from 0.00 to 0.05 feet between monitoring wells, with the maximum head difference showing a slight horizontal gradient of approximately 0.000055 ft/ft. Using the highest hydraulic conductivity measured at the Pond 6 CCR unit monitoring wells (11.9 feet/day from the 2016 TRC well installation report) and an assumed effective porosity of 0.1, this results in a maximum inferred groundwater flow rate of approximately 0.0.0065 feet/day (approximately 2.4 feet/year). Groundwater potentiometric surface elevations measured during the October 2023 sampling event are provided on Table 1 and are summarized in plan view on Figure 3.

The extremely low gradient and/or lack of a consistent or discernable general flow direction is similar to that identified in previous monitoring rounds since the background sampling events commenced in November 2016 and continues to demonstrate that the downgradient compliance wells are appropriately positioned to detect the presence of detection monitoring constituents that could potentially migrate from the JRW Pond 6.

3.0 Statistical Evaluation

Detection monitoring is continuing at JR Whiting Pond 1 & 2 and Pond 6 in accordance with the HMP. The following section summarizes the statistical approach applied to assess the semiannual groundwater data in accordance with the detection monitoring program.

3.1 Establishing Background Limits

3.1.1 Pond 1 & 2

Per the HMP, background limits were established for the detection monitoring constituents using data collected from each of the six established detection monitoring wells (JRW-MW-15001 through JRW-MW-15006). The background limits for each monitoring well have been calculated using thirteen rounds of data collected from November 2016 through March 2019 as presented in detail in the 2019 Annual Report. These background limits will continue to be used throughout the detection monitoring program to determine whether groundwater has been impacted from Pond 1 & 2 by comparing concentrations in the detection monitoring wells to their respective background limits for each detection monitoring constituent, with the exception of iron.

Iron was incorporated into the monitoring program as part of the 2020 HMP. The initial background limits for iron have been calculated using data collected through the October 2023 event, which marks the event in which the minimum of eight background data points have been collected from each monitoring location. The iron background limit calculations and resulting prediction limits are included in Appendix D of this report. These prediction limits will be used to compare to iron groundwater results beginning with the forthcoming first semiannual 2024 detection monitoring event.

3.1.2 Pond 6

Per the HMP, background limits were established for the detection monitoring constituents using data collected from each of the six established detection monitoring wells (JRW-MW-16001 through JRW-MW-16006). The statistical evaluation of the background data is presented in the Pond 6 July 2019 Annual Report. The detection monitoring background limits for each monitoring well will continue to be used throughout the detection monitoring period to determine whether groundwater has been impacted from Pond 6 by comparing concentrations in the detection monitoring wells to their respective background limits for each detection monitoring constituent, with the exception of iron.

Iron was incorporated into to the monitoring program as part of the 2020 HMP. The initial background limits for iron have been calculated using data collected through the October 2023 event, which marks the event in which the minimum of eight background data points have been collected from each monitoring location. The iron background limit calculations and resulting prediction limits are included in Appendix D of this report. These prediction limits will be used to compare to iron groundwater results beginning with the forthcoming first semiannual 2024 detection monitoring event.

3.2 Data Comparison to Background Limits – Pond 1 & 2 Second Semiannual Event (October 2023)

The concentrations of the constituents in each of the detection monitoring wells (JRW-MW-15001 through JRW-MW-15006) were compared to their respective statistical background limits calculated from the background data collected from each individual well (i.e., monitoring data from JRW-MW-15001 is compared to the background limit developed using the background dataset from JRW-MW-15001, and so forth). The comparisons are presented on Table 3.

There were no SSIs compared to background for any of the constituents. As no SSIs were identified, detection monitoring will be continued in accordance with the HMP. Per the EGLE prescribed submittal format, a statistical exceedances summary is included as Table 5 that reflects the four most recent monitoring events.

3.3 Data Comparison to Background Limits – Pond 6 Second Semiannual Event (October 2023)

The data comparisons of monitoring wells JRW-MW-16001 through JRW-MW-16006 for the October 2023 groundwater monitoring event are presented on Table 4.

There were no SSIs compared to background for any of the constituents. As no SSIs were found, detection monitoring will be continued at the Pond 6 CCR unit in accordance with the HMP. Per the EGLE prescribed submittal format, a statistical exceedances summary is included as Table 5 that reflects the four most recent monitoring events.

4.0 Conclusions and Recommendations

No SSIs occurred at Pond 1 & 2 or Pond 6 during the October 2023 monitoring event; therefore, Consumers Energy will continue with the detection monitoring program in conformance with the HMP. No corrective actions were needed or performed for either Pond 1 & 2 or Pond 6. The next semiannual monitoring event at the JR Whiting Pond 1 & 2 and Pond 6 CCR units is scheduled for the second calendar quarter of 2024.

5.0 References

ARCADIS. May 13, 2016. Summary of Monitoring Well Design, Installation, and Development. JR Whiting Electric Generation Facility – Erie, Michigan. Prepared for Consumers Energy Company.

TRC Environmental Corporation. December 2016. 2016 Monitoring Well Design, Installation, Development, and Decommissioning. JR Whiting Electric Generation Facility – Erie, Michigan. Prepared for Consumers Energy Company.

TRC. February 2020. Electric Generation Facilities RCRA CCR Detection Monitoring Program for the Pond 1 & 2 and Pond 6 Areas. Sample and Analysis Plan. JR Whiting Monitoring Program – Erie, Michigan. Prepared for Consumers Energy Company.

TRC. February 2020. Groundwater Statistical Evaluation Plan – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6, Erie, Michigan. Prepared for Consumers Energy Company.

TRC. May 2020 Revision. Consumers Energy JR Whiting Hydrogeologic Monitoring Plan (HMP). Prepared for Consumers Energy Company.

TRC. July 2023. First Semiannual 2023 Groundwater Monitoring Report – Former JR Whiting Power Plant, Pond 1 & 2 and Pond 6 CCR Unit, Erie, Michigan. Prepared for Consumers Energy Company.

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

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

USEPA. 2016. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Extension of Compliance Deadlines for Certain Inactive Surface Impoundments; Response to Partial Vacatur. Office of Conservation and Recovery. EPA 81-FR-51082.

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 2023
JR Whiting Pond 1 & 2 and Pond 6
Erie, Michigan

Well Location	Ground Surface Elevation (ft)	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Depth (ft BGS)	Screen Interval Elevation (ft)	October 5, 2023	
						Depth to Water (ft BTOC)	Groundwater Elevation (ft)
Static Water Level Monitoring Wells							
JRW-MW-16007	579.47	582.31	Limestone	68.0 to 78.0	511.5 to 501.5	6.01	576.30
JRW-MW-16008	579.95	582.83	Limestone	68.0 to 73.0	512.0 to 507.0	6.53	576.30
JRW-MW-16009	579.90	582.60	Limestone	69.0 to 79.0	510.9 to 500.9	6.29	576.31
Ponds 1 & 2							
JRW-MW-15001(1)	590	581.39	Limestone	78.0 to 88.0	512.7 to 502.7	5.08	576.31
JRW-MW-15002(1)	590	590.17	Limestone	81.0 to 91.0	511.3 to 501.3	13.86	576.31
JRW-MW-15003(1)	590	587.23	Limestone	81.0 to 91.0	510.4 to 500.4	10.92	576.31
JRW-MW-15004(1)	590	589.32	Limestone	86.0 to 96.0	506.5 to 496.5	13.03	576.29
JRW-MW-15005(1)	590	588.28	Limestone	86.0 to 96.0	508.3 to 498.3	11.95	576.33
JRW-MW-15006(1)	590	580.48	Limestone	81.0 to 91.0	511.0 to 501.0	4.18	576.30
Pond 6							
JRW-MW-16001	589.19	592.33	Limestone	71.0 to 81.0	518.2 to 508.2	16.01	576.32
JRW-MW-16002	585.78	588.69	Limestone	81.0 to 91.0	504.8 to 494.8	12.42	576.27
JRW-MW-16003	586.19	589.01	Limestone	73.0 to 83.0	513.2 to 503.2	12.71	576.30
JRW-MW-16004	586.48	589.34	Limestone	75.0 to 85.0	511.5 to 501.5	13.06	576.28
JRW-MW-16005	589.29	592.14	Limestone	78.0 to 88.0	511.3 to 501.3	15.85	576.29
JRW-MW-16006	588.26	591.04	Limestone	79.0 to 89.0	509.3 to 499.3	14.74	576.30

Notes:

Top of casing elevation survey was conducted by Rowe Professional Services Company in July 2020.

Elevation in feet relative to North American Vertical Datum 1988 (NAVD 88).

TOC: Top of well casing.

ft BTOC: Feet below top of well casing.

ft BGS: Feet below ground surface.

(1) Screen interval depth below ground surface for Pond 1&2 monitoring wells approximated using an estimated final capped ground surface elevation of 590 feet above mean sea level. Screen interval elevations were measured using the original survey conducted by Sheridan Surveying Co. November 2015 at the time of monitoring well installation.

Table 2
Summary of Field Parameter Results – October 2023
JR Whiting Ponds 1,2, and 6 – RCRA CCR Monitoring Program
Erie, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)
Ponds 1 & 2							
JRW-MW-15001	10/5/2023	0.28	-125.3	7.6	1,064	14.9	7.5
JRW-MW-15002	10/5/2023	0.37	-179.0	7.6	1,092	13.7	2.9
JRW-MW-15003	10/5/2023	2.04	42.1	7.5	975	14.1	4.0
JRW-MW-15004	10/5/2023	0.84	31.4	7.5	938	15.4	3.9
JRW-MW-15005	10/5/2023	0.91	-1.0	7.6	869	15.3	2.7
JRW-MW-15006	10/5/2023	0.07	-142.6	7.6	959	15.2	6.6
Pond 6							
JRW-MW-16001	10/5/2023	0.35	-122.4	7.9	748	14.0	6.0
JRW-MW-16002	10/5/2023	0.35	-147.8	7.7	980	13.6	2.4
JRW-MW-16003	10/5/2023	0.34	-156.5	7.8	942	13.6	3.9
JRW-MW-16004	10/5/2023	0.33	-166.7	7.7	1,132	13.5	1.9
JRW-MW-16005	10/5/2023	0.33	-67.9	7.7	913	14.0	1.8
JRW-MW-16006	10/5/2023	0.39	-122.0	7.8	802	13.7	2.0

Notes:
mg/L -Milligrams per Liter.
mV - Millivolts.
SU - Standard Units.
umhos/cm - Micromhos per centimeter.
°C - Degrees Celsius.
NTU - Nephelometric Turbidity Unit

Table 3
Comparison of Groundwater Detection Monitoring Parameter Results to Background Limits – October 2023
JR Whiting Pond 1 & 2
Erie, Michigan

Sample Location:		JRW-MW-15001		JRW-MW-15002		JRW-MW-15003		JRW-MW-15004		JRW-MW-15005		JRW-MW-15006	
Sample Date:		10/5/2023	PL	10/5/2023	PL	10/5/2023	PL	10/5/2023	PL	10/5/2023	PL	10/5/2023	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
Appendix III													
Boron	ug/L	189	240	202	220	226	230	227	270	194	270	205	250
Calcium	mg/L	142	180	140	180	122	160	117	140	114	120	129	140
Chloride	mg/L	47	55	47	56	44.3	55	47	56	33.6	46	43.8	53
Fluoride	ug/L	< 1,000	1,600	< 1,000	1,900	< 1,000	1,800	< 1,000	1,800	< 1,000	1,700	< 1,000	1,700
pH, Field	su	7.6	6.8 - 8.2	7.6	7.2 - 7.9	7.5	7.3 - 8.3	7.5	7.0 - 8.0	7.6	7.3 - 8.6	7.6	7.0 - 9.0
Sulfate	mg/L	398	470	414	500	345	440	326	390	299	350	342	410
Total Dissolved Solids	mg/L	800	1,000	818	1,100	710	940	721	880	635	840	717	920
Part 115 Parameters													
Iron	ug/L	930	n<8	767	n<8	77	n<8	73	n<8	38	n<8	1,150	n<8

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 confirmed exceedance of the PL.

Table 4
Comparison of Groundwater Detection Monitoring Parameter Results to Background Limits – October 2023
JR Whiting Pond 6
Erie, Michigan

Sample Location:		JRW-MW-16001		JRW-MW-16002		JRW-MW-16003		JRW-MW-16004		JRW-MW-16005		JRW-MW-16006	
Sample Date:		10/5/2023	PL	10/5/2023	PL	10/5/2023	PL	10/5/2023	PL	10/5/2023	PL	10/5/2023	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
Appendix III													
Boron	ug/L	161	203	176	209	219	257	207	262	212	244	176	226
Calcium	mg/L	44.5	111	139	149	121	156	148	181	118	182	102	117
Chloride	mg/L	20.3	23.6	21.6	25.4	26.4	32.4	37.9	43.7	25	29.4	23.6	38.6
Fluoride	ug/L	< 1,000	2,300	< 1,000	1,400	< 1,000	1,600	< 1,000	1,700	< 1,000	1,800	< 1,000	2,200
pH, Field	su	7.9	7.5 - 8.9	7.7	7.5 - 8.3	7.8	7.4 - 7.9	7.7	7.4 - 8.2	7.7	7.0 - 8.0	7.8	7.5 - 8.2
Sulfate	mg/L	243	278	415	426	382	470	464	507	347	498	297	399
Total Dissolved Solids	mg/L	421	770	777	832	733	1,040	891	1,110	689	1,030	608	904
Part 115 Parameters													
Iron	ug/L	< 20	n<8	314	n<8	389	n<8	395	n<8	194	n<8	305	n<8

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 confirmed exceedance of the PL.

Table 5
Summary of Statistical Exceedances – October 2023
JR Whiting Pond 1 & 2 and Pond 6
Erie, Michigan

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
SUMMARY OF STATISTICAL EXCEEDANCES

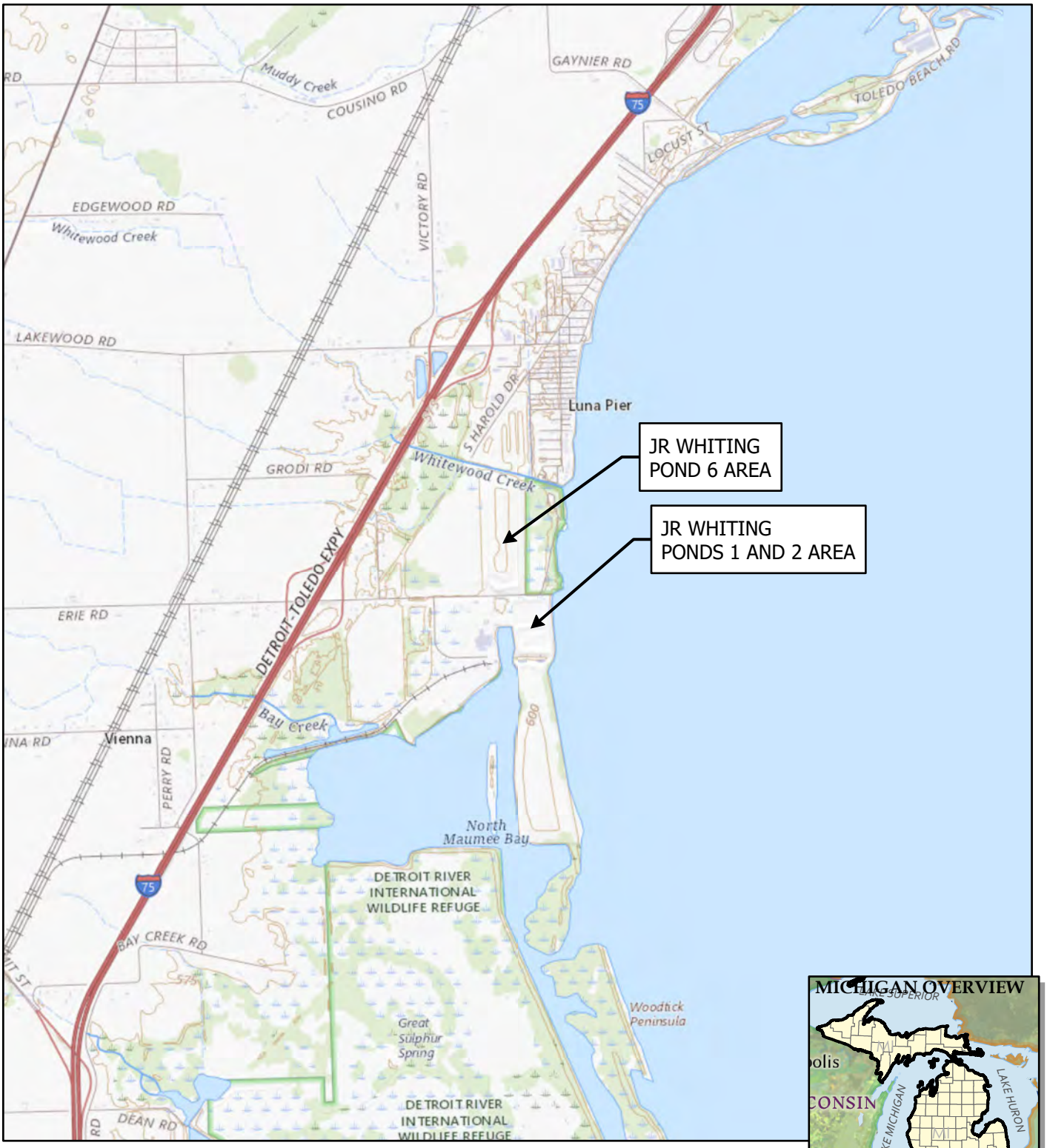
Data is in (X) ug/L or ( ) mg/L unless otherwise stated

Facility: JR Whiting – WDS# 397664

Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	4 Qtr. 2023 (**bold** >201)	2 Qtr. 2023 (**bold** >201)	4 Qtr. 2022 (**bold** >201)	2 Qtr. 2022 (**bold** >201)
JRW-MW-15002	JR Whiting Pond 1 & 2	Boron	500	220	202	193	225(1)	224(1)
JRW-MW-15003	JR Whiting Pond 1 & 2	Boron	500	230	226	208	241(1)	232(1)
JRW-MW-15005	JR Whiting Pond 1 & 2	Calcium	NC	120	114	121(2)	117	120

NOTES:
NC = No Criteria
(1) Exceedance was determined to be from natural variability as detailed in the Alternate Source Demonstration: April 2022 Detection Monitoring Event, Former JR Whiting Power Plant Ponds 1 and 2, Erie, Michigan dated July 28, 2022.
(2) Exceedance was determined to be from natural variability as detailed in the Alternate Source Demonstration: April 2023 Detection Monitoring Event, Former JR Whiting Power Plant Ponds 1 and 2, Erie, Michigan dated July 14, 2023.

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

1"=3,000'
1:36,000

0 3,000 6,000
FEET

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

PROJECT:

CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:

SITE LOCATION MAP

DRAWN BY:	A. ADAIR
CHECKED BY:	V. BUENING
APPROVED BY:	S. HOLMSTROM
DATE:	JANUARY 2024
PROJ. NO.:	514397
FILE:	JRWhiting.mxd

FIGURE 1

-- Saved By: AADAIR on 1/2/2024, 09:53:02 AM

LEGEND

- MONITORING WELL (STATIC WATER LEVEL ONLY)
- CCR UNIT MONITORING WELL

NOTES:

1: BASE MAP IMAGERY FROM GOOGLE EARTH PRO AND PARTNERS, (5/7/2022).
2. STATIC WATER ONLY WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015.
3. PONDS 1 AND 2 WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES CO. ON 11/27/2019.

1:6,000
1" = 500'

0 500 1,000 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:
SITE PLAN
WITH CCR MONITORING WELL LOCATIONS

DRAWN BY:	A. ADAIR	PROJ. NO.:	517397
CHECKED BY:	V. BUENING		
APPROVED BY:	S. HOLMSTROM		FIGURE 2
DATE:	JANUARY 2024		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: JRWhiting.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Saved By AADAIR on 1/22/2024 09:58:33 AM; File Path: T:\PROJECTS\Consumers_Energy\517397_JRWhiting\2-ARPX\JRWhiting.aprx; Layout Name: 2024_01 Figure 2

LEGEND

- MONITORING WELL (STATIC WATER LEVEL ONLY)
- CCR UNIT MONITORING WELL

LABEL FORMAT

MONITORING WELL ID
GROUNDWATER ELEVATION FT (MEASUREMENT DATE)

NOTES:

1: BASE MAP IMAGERY FROM GOOGLE EARTH PRO AND PARTNERS, (5/7/2022).
2. WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015.
3. PONDS 1 AND 2 WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES CO. ON 11/27/2019.
4. MONITORING WELL TOP OF CASING SURVEYED BY ROWE PROFESSIONAL SERVICES CO. ON 7/14/2020. VERTICAL DATUM IS NAVD88.

N

1:6,000
1" = 500'

0 500 1,000 FEET

PROJECT:
CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:
GROUNDWATER
POTENTIOMETRIC ELEVATION SUMMARY
OCTOBER 2023

DRAWN BY:	A. ADAIR	PROJ. NO.:	517397
CHECKED BY:	R. PAALANEN		
APPROVED BY:	S. HOLMSTROM		**FIGURE 3**
DATE:	JANUARY 2024		

TRC
1540 EISENHOWER PLACE
ANN ARBOR, MI 48108-3284
PHONE: 734.971.7080

FILE: JRWhiting.aprx

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl; Map Rotation: 0
Stored By: AADAIR on 1/4/2024 09:41:08 AM; File Path: T:\1_PROJECTS\Consumers_Energy\517397_JRWhiting\2-APRX\JRWhiting.aprx; Layout Name: 2024_01 Figure 3

Appendix A
Data Quality Reviews

Pond 1 & 2

Laboratory Data Quality Review
Groundwater Sampling Event October 2023
Consumers Energy JR Whiting Ponds 1 & 2

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the October 2023 groundwater monitoring event. Samples were analyzed for anions, total metals, and total dissolved solids by CE Laboratory Services, located in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 23-0969.

During the October 2023 sampling event, a groundwater sample was collected from each of the following wells:

- JRW-MW-15001
- JRW-MW-15002
- JRW-MW-15003
- JRW-MW-15004
- JRW-MW-15005
- JRW-MW-15006

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals (Boron, Calcium, Iron)	SW-846 6020B

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 equipment blanks and field blanks. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- 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.

It should be noted that results for method blanks and laboratory control samples were not provided for review by the laboratory. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated.

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 as well as iron will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One equipment blank (EB-01) and one field blank (FB-01) were collected. Target analytes were not detected in these blank samples.
- MS and MSD analyses were performed on sample JRW-MW-15006 for total metals and anions. The recoveries were within the acceptance limits. Relative percent differences were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all MS/MSD recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- Samples DUP-01 and JRW-MW-15001 were submitted as the field duplicate pair with this data set; all criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- The nondetect RL for TDS (10 mg/L) in samples EB-01 and FB-01 was below the RL specified in the Sampling and Analysis Plan (SAP) (20 mg/L). No adverse impact on data usability since reported RL is lower than SAP RL.
- The nondetect RL for sulfate (1,000 ug/L) in samples EB-01 and FB-01 was below the RL specified in the SAP (2,000 ug/L). There is no adverse impact on data usability since the reported RL is lower than the SAP RL.

Pond 6

Laboratory Data Quality Review
Groundwater Sampling Event October 2023
Consumers Energy JR Whiting Pond 6

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the October 2023 groundwater monitoring sampling event. Samples were analyzed for anions, total metals, and total dissolved solids by CE Laboratory Services, located in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 23-0970.

During the October 2023 sampling event, a groundwater sample was collected from each of the following wells:

- JRW-MW-16001
- JRW-MW-16002
- JRW-MW-16003
- JRW-MW-16004
- JRW-MW-16005
- JRW-MW-16006

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C
Total Metals (Boron, Calcium, Iron)	SW-846 6020B

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 equipment blanks and field blanks. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- 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.
- It should be noted that results for method blanks and laboratory control samples were not provided for review by the laboratory. Therefore, potential contamination arising from laboratory sample preparation and/or analytical procedures and the accuracy of the analytical method using a clean matrix could not be evaluated.

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 as well as iron will be utilized for the purposes of a detection monitoring program.
- Data are usable for the purposes of the detection monitoring program.
- When the data are evaluated through a detection monitoring statistical program, findings below may be used to support the removal of outliers.

QA/QC Sample Summary

- One equipment blank (EB-02) and one field blank (FB-02) were collected. Target analytes were not detected in these blank samples.
- MS and MSD analyses were performed on sample JRW-MW-16003 for total metals and anions. The recoveries were within the acceptance limits. Relative percent differences were not provided by the laboratory and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since MS/MSD recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- Samples DUP-02 and JRW-MW-16006 were submitted as the field duplicate pair with this data set; all criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- The nondetect RL for TDS (10 mg/L) in samples EB-02 and FB-02 was below the RL specified in the Sampling and Analysis Plan (SAP) (20 mg/L). No adverse impact on data usability since reported RL is lower than SAP RL.
- The nondetect RL for sulfate (1,000 ug/L) in samples EB-02 and FB-02 was below the RL specified in the SAP (2,000 ug/L). No adverse impact on data usability since reported RL is lower than SAP RL.

Appendix B
Laboratory Reports

Pond 1 & 2

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

135 W. Trail St.
Jackson, MI 49201

phone 517-788-1251
fax 517-788-2533

To: BLSwanberg, P22-119

From: EBlaj, T-258

Date: October 19, 2023

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 1 & 2 – 2023 Q4

CC: Sarah Holmstrom, Project Manager
TRC Environmental Corporation
1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 23-0969

CE Laboratory Services conducted groundwater monitoring at JR Whiting, Pond 1 & 2 on 10/05/2023, for the 2nd Semiannual monitoring requirement, and as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis by the Chemistry department of Laboratory Services on 10/05/2023.

The report that follows presents the results of the requested analytical testing; the results apply only to the samples as received. All samples have been analyzed in accordance with the 2016 TNI Standard and the applicable A2LA accreditation scope for Laboratory Services. Any exceptions to applicable test method criteria and standard compliance are noted in the Case Narrative, or flagged with applicable qualifiers in the analytical results section.

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted on the attached Sample Log-In Shipment Inspection Form during sample check-in. Identification of all samples included in the work order/project is provided in the sample summary section. All sample preservation and temperature upon receipt was verified by the sample custodian and confirmed to meet method requirements.

II. Methodology

Unless otherwise indicated, sample preparation and analysis was performed in accordance with the corresponding test methods from "Methods for the Determination of Inorganic Substances in Environmental Samples (EPA/600/R-93/100); SW-846, "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods", USEPA (latest revisions), and Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WPCF, 22nd Edition, 2012.

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section; all other quality control data is listed in the Quality Control Summary associated with the particular test method, as appropriate. Unless specifically noted in the case narrative, all method quality control requirements have been met. If any results are qualified, the corresponding data flags/qualifiers are listed on the last page of the results section. Any additional information on method performance, when applicable, is presented in this section of the case narrative. When data flags are not needed, the qualifiers text box on the last page is left blank, and a statement confirms that no exceptions occurred.

DEFINITIONS / QUALIFIERS

The following qualifiers and/or acronyms are used in the report, where applicable:

Acronym	Description
RL	Reporting Limit
ND	Result not detected or below Reporting Limit
NT	Non TNI analyte
LCS	Laboratory Control Sample
LRB	Laboratory Reagent Blank (also referred to as Method Blank)
DUP	Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
TDL	Target Detection Limit
SM	Standard Methods Compendium

Qualifier	Description
*	Generic data flag, applicable description added in the corresponding notes section
B	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
H	The maximum recommended hold time was exceeded
I	Dilution required due to matrix interference; reporting limit elevated
J	Estimated due to result found above MDL but below PQL (or RL)
K	Reporting limit raised due to matrix interference
M	The precision for duplicate analysis was not met; RPD outside acceptance criteria
N	Non-homogeneous sample made analysis questionable
PI	Possible interference may have affected the accuracy of the laboratory result
Q	Matrix Spike or Matrix Spike Duplicate recovery outside acceptance criteria
R	Result confirmed by new sample preparation and reanalysis
X	Other notation required; comment listed in sample notes and/or case narrative

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Work Order Sample Summary

Customer Name: JR Whiting Complex
Work Order ID: JRW RCRA GW Monitoring - Pond 1&2 - October 2023
Date Received: 10/5/2023
Chemistry Project: 23-0969

Sample #	Field Sample ID	Matrix	Sample Date	Site
23-0969-01	JRW-MW-15001	Groundwater	10/05/2023 11:44	JRW RCRA GW Monitoring - Pond 1&2
23-0969-02	JRW-MW-15002	Groundwater	10/05/2023 16:01	JRW RCRA GW Monitoring - Pond 1&2
23-0969-03	JRW-MW-15003	Groundwater	10/05/2023 15:35	JRW RCRA GW Monitoring - Pond 1&2
23-0969-04	JRW-MW-15004	Groundwater	10/05/2023 14:49	JRW RCRA GW Monitoring - Pond 1&2
23-0969-05	JRW-MW-15005	Groundwater	10/05/2023 13:51	JRW RCRA GW Monitoring - Pond 1&2
23-0969-06	JRW-MW-15006	Groundwater	10/05/2023 12:51	JRW RCRA GW Monitoring - Pond 1&2
23-0969-07	DUP-01	Groundwater	10/05/2023 00:00	JRW RCRA GW Monitoring - Pond 1&2
23-0969-08	EB-01	Water	10/05/2023 14:10	JRW RCRA GW Monitoring - Pond 1&2
23-0969-09	FB-01	Water	10/05/2023 14:04	JRW RCRA GW Monitoring - Pond 1&2
23-0969-10	JRW-MW-15006 Field MS	Groundwater	10/05/2023 12:51	JRW RCRA GW Monitoring - Pond 1&2
23-0969-11	JRW-MW-15006 FIeld MSD	Groundwater	10/05/2023 12:51	JRW RCRA GW Monitoring - Pond 1&2

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0969**
Field Sample ID:	**JRW-MW-15001**	Collect Date:	10/05/2023
Lab Sample ID:	23-0969-01	Collect Time:	11:44 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-01-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	189		ug/L	20	10/11/2023	AB23-1012-02
Calcium	142000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	930		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-01-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	47000		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	398000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0969-01-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	800		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0969**
Field Sample ID:	**JRW-MW-15002**	Collect Date:	10/05/2023
Lab Sample ID:	23-0969-02	Collect Time:	04:01 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-02-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	202		ug/L	20	10/11/2023	AB23-1012-02
Calcium	140000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	767		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-02-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	47000		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	414000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0969-02-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	818		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0969**
Field Sample ID:	**JRW-MW-15003**	Collect Date:	10/05/2023
Lab Sample ID:	23-0969-03	Collect Time:	03:35 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-03-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	226		ug/L	20	10/11/2023	AB23-1012-02
Calcium	122000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	77		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-03-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	44300		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	345000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0969-03-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	710		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0969**
Field Sample ID:	**JRW-MW-15004**	Collect Date:	10/05/2023
Lab Sample ID:	23-0969-04	Collect Time:	02:49 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-04-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	227		ug/L	20	10/11/2023	AB23-1012-02
Calcium	117000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	73		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-04-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	47000		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	326000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0969-04-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	721		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0969**
Field Sample ID:	**JRW-MW-15005**	Collect Date:	10/05/2023
Lab Sample ID:	23-0969-05	Collect Time:	01:51 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-05-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	194		ug/L	20	10/11/2023	AB23-1012-02
Calcium	114000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	38		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-05-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	33600		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	299000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0969-05-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	635		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0969**
Field Sample ID:	**JRW-MW-15006**	Collect Date:	10/05/2023
Lab Sample ID:	23-0969-06	Collect Time:	12:51 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-06-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	205		ug/L	20	10/11/2023	AB23-1012-02
Calcium	129000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	1150		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-06-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	43800		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	342000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0969-06-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	717		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0969**
Field Sample ID:	**DUP-01**	Collect Date:	10/05/2023
Lab Sample ID:	23-0969-07	Collect Time:	12:00 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-07-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	198		ug/L	20	10/11/2023	AB23-1012-02
Calcium	142000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	939		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-07-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	47700		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	402000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0969-07-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	800		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **EB-01**
Lab Sample ID: 23-0969-08
Matrix: Water

Laboratory Project: **23-0969**
Collect Date: 10/05/2023
Collect Time: 02:10 PM

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-08-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/11/2023	AB23-1012-02
Calcium	ND		ug/L	1000	10/11/2023	AB23-1012-02
Iron	ND		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-08-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	ND		ug/L	1000	10/11/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0969-08-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **FB-01**
Lab Sample ID: 23-0969-09
Matrix: Water

Laboratory Project: **23-0969**
Collect Date: 10/05/2023
Collect Time: 02:04 PM

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-09-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/11/2023	AB23-1012-02
Calcium	ND		ug/L	1000	10/11/2023	AB23-1012-02
Iron	ND		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-09-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	ND		ug/L	1000	10/11/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0969-09-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0969**
Field Sample ID:	**JRW-MW-15006 Field MS**	Collect Date:	10/05/2023
Lab Sample ID:	23-0969-10	Collect Time:	12:51 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-10-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	97		%	20	10/11/2023	AB23-1012-02
Calcium	99		%	1000	10/11/2023	AB23-1012-02
Iron	100		%	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-10-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	111		%	1000	10/11/2023	AB23-1010-02
Fluoride	93		%	1000	10/11/2023	AB23-1010-02
Sulfate	111		%	1000	10/12/2023	AB23-1010-02

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**23-0969**
Field Sample ID:	**JRW-MW-15006 FIeld MSD**	Collect Date:	10/05/2023
Lab Sample ID:	23-0969-11	Collect Time:	12:51 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0969-11-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	97		%	20	10/11/2023	AB23-1012-02
Calcium	100		%	1000	10/11/2023	AB23-1012-02
Iron	95		%	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0969-11-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	111		%	1000	10/11/2023	AB23-1010-02
Fluoride	93		%	1000	10/11/2023	AB23-1010-02
Sulfate	111		%	1000	10/12/2023	AB23-1010-02

Data Qualifiers	Exception Summary
	No exceptions occurred.

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0969

Inspection Date: 10.06.23 **Inspection By:** LMO

Sample Origin/Project Name: _____

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) KDR

Tracking Number: _____ Shipping Form Attached: Yes _____ No _____

Shipping Containers: Enter the type and number of shipping containers received.

Cooler X Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed X

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 2.1-5.1 °C Samples Received on Ice: Yes X No _____

M&TE # and Expiration LS028751 11.15.23

Number and Type of Containers: Enter the total number of sample containers received.

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	22				
24 mL vial (glass)					
250 ~~500~~ mL (plastic)	9				
Other					

LMO 10.6.23

CHAIN OF CUSTODY

Consumers Energy — Count on Us®

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251

SAMPLING SITE / CUSTOMER: JRW Pond 1&2 GW Monitoring – October 2023

PROJECT NUMBER: 23-0969

SAP CC or WO#:

REQUESTER: Michelle Marion

SAMPLING TEAM: KDR

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☒ STANDARD ☐ OTHER _____

SEND REPORT TO: Michelle Marion | email: | phone:

COPY TO: TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	REMARKS
23-0969-01	10.5.23	11:44	GW	JRW-MW-15001	3	2	1						x	x	x	
-02	10.5.23	16:01	GW	JRW-MW-15002	3	2	1						x	x	x	
-03	10.5.23	15:35	GW	JRW-MW-15003	3	2	1						x	x	x	
-04	10.5.23	14:49	GW	JRW-MW-15004	3	2	1						x	x	x	
-05	10.5.23	13:51	GW	JRW-MW-15005	3	2	1						x	x	x	
-06	10.5.23	12:51	GW	JRW-MW-15006	3	2	1						x	x	x	
-07	10.5.23	—	GW	DUP-01	3	2	1						x	x	x	
-08	10.5.23	14:10	W	EB-01	3	2	1						x	x	x	
-09	10.5.23	14:04	W	FB-01	3	2	1						x	x	x	
-10	10.5.23	12:51	GW	JRW-MW-15006 MS	2	1	1						x	x		
-11	10.5.23	12:51	GW	JRW-MW-15006 MSD	2	1	1						x	x		

RELINQUISHED BY: Kal Rankat — DATE/TIME: 10.5.23/18:55 — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No — M&TE #: LS028757

Temperature: 2.1-5.2 °C — Cal. Due Date: 11.15.23

Pond 6

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

135 W. Trail St.
Jackson, MI 49201

phone 517-788-1251
fax 517-788-2533

To: BLSwanberg, P22-119

From: EBlaj, T-258

Date: October 19, 2023

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 6 – 2023 Q4

CC: Sarah Holmstrom, Project Manager
TRC Environmental Corporation
1540 Eisenhower Place
Ann Arbor, MI 48108

Chemistry Project: 23-0970

CE Laboratory Services conducted groundwater monitoring at JR Whiting, Pond 6 on 10/05/2023, for the 2nd Semiannual monitoring requirement, and as specified in the Sampling and Analysis Plan for the site. The samples were received for analysis in the Chemistry department of Laboratory Services on 10/05/2023.

The report that follows presents the results of the requested analytical testing; the results apply only to the samples as received. All samples have been analyzed in accordance with the 2016 TNI Standard and the applicable A2LA accreditation scope for Laboratory Services. Any exceptions to applicable test method criteria and standard compliance are noted in the Case Narrative or flagged with applicable qualifiers in the analytical results section.

Reviewed and approved by:

Emil Blaj
Sr. Technical Analyst
Project Lead

ilac-MRA A2LA ACCREDITED Certificate #1097.04

CASE NARRATIVE

I. Sample Receipt

All samples were received within hold time and in good conditions; no anomalies were noted on the attached Sample Log-In Shipment Inspection Form during sample check-in. Identification of all samples included in the work order/project is provided in the sample summary section. All sample preservation and temperature upon receipt was verified by the sample custodian and confirmed to meet method requirements.

II. Methodology

Unless otherwise indicated, sample preparation and analysis was performed in accordance with the corresponding test methods from "Methods for the Determination of Inorganic Substances in Environmental Samples (EPA/600/R-93/100); SW-846, "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods", USEPA (latest revisions), and Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WPCF, 22nd Edition, 2012.

III. Results/Quality Control

Analytical results for this report are presented by laboratory sample ID, container, & aliquot number. Results for the field blanks, field duplicates, and recoveries of the field matrix spike & matrix spike duplicate samples are included in the results section; all other quality control data is listed in the Quality Control Summary associated with the particular test method, as appropriate. Unless specifically noted in the case narrative, all method quality control requirements have been met. If any results are qualified, the corresponding data flags/qualifiers are listed on the last page of the results section. Any additional information on method performance, when applicable, is presented in this section of the case narrative. When data flags are not needed, the qualifiers text box on the last page is left blank, and a statement confirms that no exceptions occurred.

DEFINITIONS / QUALIFIERS

The following qualifiers and/or acronyms are used in the report, where applicable:

Acronym	Description
RL	Reporting Limit
ND	Result not detected or below Reporting Limit
NT	Non TNI analyte
LCS	Laboratory Control Sample
LRB	Laboratory Reagent Blank (also referred to as Method Blank)
DUP	Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
TDL	Target Detection Limit
SM	Standard Methods Compendium

Qualifier	Description
*	Generic data flag, applicable description added in the corresponding notes section
B	The analyte was detected in the LRB at a level which is significant relative to sample result
D	Reporting limit elevated due to dilution
E	Estimated due to result exceeding the linear range of the analyzer
H	The maximum recommended hold time was exceeded
I	Dilution required due to matrix interference; reporting limit elevated
J	Estimated due to result found above MDL but below PQL (or RL)
K	Reporting limit raised due to matrix interference
M	The precision for duplicate analysis was not met; RPD outside acceptance criteria
N	Non-homogeneous sample made analysis questionable
PI	Possible interference may have affected the accuracy of the laboratory result
Q	Matrix Spike or Matrix Spike Duplicate recovery outside acceptance criteria
R	Result confirmed by new sample preparation and reanalysis
X	Other notation required; comment listed in sample notes and/or case narrative

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Work Order Sample Summary

Customer Name: JR Whiting Complex
Work Order ID: JRW RCRA GW Monitoring - Pond 6 - October 2023
Date Received: 10/5/2023
Chemistry Project: 23-0970

Sample #	Field Sample ID	Matrix	Sample Date	Site
23-0970-01	JRW-MW-16001	Groundwater	10/05/2023 12:26	JRW RCRA GW Monitoring - Pond 6
23-0970-02	JRW-MW-16002	Groundwater	10/05/2023 13:21	JRW RCRA GW Monitoring - Pond 6
23-0970-03	JRW-MW-16003	Groundwater	10/05/2023 13:56	JRW RCRA GW Monitoring - Pond 6
23-0970-04	JRW-MW-16004	Groundwater	10/05/2023 14:41	JRW RCRA GW Monitoring - Pond 6
23-0970-05	JRW-MW-16005	Groundwater	10/05/2023 12:06	JRW RCRA GW Monitoring - Pond 6
23-0970-06	JRW-MW-16006	Groundwater	10/05/2023 10:56	JRW RCRA GW Monitoring - Pond 6
23-0970-07	DUP-02	Groundwater	10/05/2023 00:00	JRW RCRA GW Monitoring - Pond 6
23-0970-08	EB-02	Water	10/05/2023 14:53	JRW RCRA GW Monitoring - Pond 6
23-0970-09	FB-02	Water	10/05/2023 14:57	JRW RCRA GW Monitoring - Pond 6
23-0970-10	JRW-MW-16003 Field MS	Groundwater	10/05/2023 13:56	JRW RCRA GW Monitoring - Pond 6
23-0970-11	JRW-MW-16003 FIeld MSD	Groundwater	10/05/2023 13:56	JRW RCRA GW Monitoring - Pond 6

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**JRW-MW-16001**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-01	Collect Time:	12:26 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-01-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	161		ug/L	20	10/11/2023	AB23-1012-02
Calcium	44500		ug/L	1000	10/11/2023	AB23-1012-02
Iron	ND		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-01-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	20300		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	243000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0970-01-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	421		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**JRW-MW-16002**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-02	Collect Time:	01:21 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-02-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	176		ug/L	20	10/11/2023	AB23-1012-02
Calcium	139000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	314		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-02-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	21600		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	415000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0970-02-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	777		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**JRW-MW-16003**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-03	Collect Time:	01:56 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-03-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	219		ug/L	20	10/11/2023	AB23-1012-02
Calcium	121000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	389		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-03-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	26400		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	382000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0970-03-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	733		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**JRW-MW-16004**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-04	Collect Time:	02:41 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-04-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	207		ug/L	20	10/11/2023	AB23-1012-02
Calcium	148000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	395		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-04-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	37900		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	464000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0970-04-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	891		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**JRW-MW-16005**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-05	Collect Time:	12:06 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-05-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	212		ug/L	20	10/11/2023	AB23-1012-02
Calcium	118000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	194		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-05-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	25000		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	347000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0970-05-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	689		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**JRW-MW-16006**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-06	Collect Time:	10:56 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-06-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	176		ug/L	20	10/11/2023	AB23-1012-02
Calcium	102000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	305		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-06-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	23600		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	297000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0970-06-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	608		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**DUP-02**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-07	Collect Time:	12:00 AM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-07-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	177		ug/L	20	10/11/2023	AB23-1012-02
Calcium	103000		ug/L	1000	10/11/2023	AB23-1012-02
Iron	290		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-07-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	23500		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	296000		ug/L	1000	10/12/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0970-07-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	638		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **EB-02**
Lab Sample ID: 23-0970-08
Matrix: Water

Laboratory Project: **23-0970**
Collect Date: 10/05/2023
Collect Time: 02:53 PM

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-08-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/11/2023	AB23-1012-02
Calcium	ND		ug/L	1000	10/11/2023	AB23-1012-02
Iron	ND		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-08-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	ND		ug/L	1000	10/11/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0970-08-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**FB-02**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-09	Collect Time:	02:57 PM
Matrix:	Water		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-09-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/11/2023	AB23-1012-02
Calcium	ND		ug/L	1000	10/11/2023	AB23-1012-02
Iron	ND		ug/L	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-09-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Fluoride	ND		ug/L	1000	10/11/2023	AB23-1010-02
Sulfate	ND		ug/L	1000	10/11/2023	AB23-1010-02

Total Dissolved Solids by SM 2540C

Aliquot: 23-0970-09-C03-A01 **Analyst: SLK**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/09/2023	AB23-1009-13

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**JRW-MW-16003 Field MS**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-10	Collect Time:	01:56 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-10-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	104		%	20	10/11/2023	AB23-1012-02
Calcium	103		%	1000	10/11/2023	AB23-1012-02
Iron	99		%	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-10-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	107		%	1000	10/11/2023	AB23-1010-02
Fluoride	96		%	1000	10/11/2023	AB23-1010-02
Sulfate	105		%	1000	10/12/2023	AB23-1010-02

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

Analytical Report

Report Date: 10/19/23

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**23-0970**
Field Sample ID:	**JRW-MW-16003 FIeld MSD**	Collect Date:	10/05/2023
Lab Sample ID:	23-0970-11	Collect Time:	01:56 PM
Matrix:	Groundwater		

Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals

Aliquot: 23-0970-11-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	102		%	20	10/11/2023	AB23-1012-02
Calcium	101		%	1000	10/11/2023	AB23-1012-02
Iron	101		%	20	10/11/2023	AB23-1012-02

Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous

Aliquot: 23-0970-11-C02-A01 **Analyst: KDR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	106		%	1000	10/11/2023	AB23-1010-02
Fluoride	97		%	1000	10/11/2023	AB23-1010-02
Sulfate	106		%	1000	10/12/2023	AB23-1010-02

Data Qualifiers	Exception Summary
	No exceptions occurred.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 23-0970

Inspection Date: 10.06.23 **Inspection By:** LMO

Sample Origin/Project Name: _____

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) CLE

Tracking Number: _____ Shipping Form Attached: Yes _____ No _____

Shipping Containers: Enter the type and number of shipping containers received.

Cooler X Cardboard Box _____ Custom Case _____ Envelope/Mailer _____

Loose/Unpackaged Containers _____ Other _____

Condition of Shipment: Enter the as-received condition of the shipment container.

Damaged Shipment Observed: None X Dented _____ Leaking _____

Other _____

Shipment Security: Enter if any of the shipping containers were opened before receipt.

Shipping Containers Received: Opened _____ Sealed _____

Enclosed Documents: Enter the type of documents enclosed with the shipment.

CoC X Work Request _____ Air Data Sheet _____ Other _____

Temperature of Containers: Measure the temperature of several sample containers.

As-Received Temperature Range 0.3-3.6 °C Samples Received on Ice: Yes X No _____

M&TE # and Expiration ~~0.3-3.6~~ LS028757 11.15.23
LMO 10.6.23

Number and Type of Containers: Enter the total number of sample containers received.

Container Type	Water	Soil	Other	Broken	Leaking
VOA (40mL or 60mL)					
Quart/Liter (g/p)					
9-oz (amber glass jar)					
2-oz (amber glass)					
125 mL (plastic)	22				
24 mL vial (glass)					
250 ~~500~~ mL (plastic)	9				
Other					

LMO 10.06.23

CHAIN OF CUSTODY

Consumers Energy — Count on Us®

CONSUMERS ENERGY COMPANY – LABORATORY SERVICES

135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251

SAMPLING SITE / CUSTOMER: JRW Pond 6 GW Monitoring – October 2023

PROJECT NUMBER: 23-0970

SAP CC or WO#:

REQUESTER: Michelle Marion

SAMPLING TEAM: Casey Ehlert

TURNAROUND TIME REQUIRED: ☐ 24 HR ☐ 48 HR ☐ 3 DAYS ☒ STANDARD ☐ OTHER _____

SEND REPORT TO: Michelle Marion — email: — phone:

COPY TO: TRC

MATRIX CODES: GW = Groundwater; WW = Wastewater; W = Water / Aqueous Liquid; S = Soil / General Solid; O = Oil; OX = Other _____; SL = Sludge; A = Air; WP = Wipe; WT = General Waste

ANALYSIS REQUESTED (Attach List if More Space is Needed)

QA REQUIREMENT: ☐ NPDES ☒ TNI ☐ ISO 17025 ☐ 10 CFR 50 APP. B ☐ INTERNAL INFO ☐ OTHER _____

LAB SAMPLE ID	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	MATRIX	FIELD SAMPLE ID / LOCATION	CONTAINERS TOTAL #	PRESERVATIVE None	PRESERVATIVE HNO_3	PRESERVATIVE H_2SO_4	PRESERVATIVE NaOH	PRESERVATIVE HCl	PRESERVATIVE MeOH	PRESERVATIVE Other	Total Metals	Anions	TDS	REMARKS
23-0970-01	10.05.23	1226	GW	JRW-MW-16001	3	2	1						x	x	x	
-02		1321	GW	JRW-MW-16002	3	2	1						x	x	x	
-03		1356	GW	JRW-MW-16003	3	2	1						x	x	x	
-04		1441	GW	JRW-MW-16004	3	2	1						x	x	x	
-05		1206	GW	JRW-MW-16005	3	2	1						x	x	x	
-06		1056	GW	JRW-MW-16006	3	2	1						x	x	x	
-07		–	GW	DUP-02	3	2	1						x	x	x	
-08		1453	W	EB-02	3	2	1						x	x	x	
-09		1457	W	FB-02	3	2	1						x	x	x	
-10		1356	GW	JRW-MW-16003 MS	2	1	1						x	x		
-11		1356	GW	JRW-MW-16003 MSD	2	1	1						x	x		

RELINQUISHED BY: [signature] DATE/TIME: 10.5.23 1820 RECEIVED BY: [signature]

RELINQUISHED BY: DATE/TIME: RECEIVED BY:

COMMENTS:

Received on Ice? ☑ Yes ☐ No M&TE #: LS028757

Temperature: 0.3 – 3.6 °C Cal. Due Date: 11.15.23

Appendix C
Field Notes

Pond 1 & 2

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

WATER LEVEL DATA

Site: JR Whiting

Project No: 23-0969 **Reviewed by:** [signature]

Analyst: KDR **Review Date:** 10-18-23

Date: 10·5·23

Method: Electronic Tape

Tape ID: Geotech # 1005 **S/N:** LS025299

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001	10:12	5.08	5.08	81.95	Good locked
JRW MW-15002	09:46	13.86	13.86	92.26	Good locked
JRW MW-15003	09:52	10.92	10.92	90.09	Good locked
JRW MW-15004	09:56	13.03	13.03	96.45	Good locked
JRW MW-15005	10:00	11.95	11.95	93.63	Good locked
JRW MW-15006	10:07	4.18	4.18	82.79	Good locked
JRW MW-16001					marked TOC
JRW MW-16002					marked TOC
JRW MW-16003					marked TOC
JRW MW-16004					marked TOC
JRW MW-16005					marked TOC
JRW MW-16006					marked TOC
JRW MW-16007	09:12	6.01	6.01	81.01	marked TOC
JRW MW-16008	09:17	6.53	6.53	76.29	marked TOC
JRW MW-16009	09:23	6.29	6.29	81.94	marked TOC

NOTES: *TOC reference point*
DTW = Depth to Water
DTB = Depth to Bottom

Consumers Energy
Count on Us
Laboratory Services
A CENTURY OF EXCELLENCE

Sonde ID	22J
Start Date	10·4·23
Project #	23-0969, 0970
Site	JRW
Reviewed By & Date	10-18-23

Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 22L102214
Sonde Brand	YSI ProDSS S/N 22J103704
Flow Cell	EXO1 599080
DO Probe 97.0	YSI ProDSS S/N 23B101266
Turbidity Probe	YSI ProDSS S/N 22K100049
pH With ORP	YSI ProDSS S/N 23A103253
Conductivity & Temperature Probe	YSI ProDSS S/N 23C105385

pH Standard (± 0.1)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
4.0	GFS # 1634	24000424	2·23·25	3.99					3.98
7.0	GFS # 1639	24000423	3·4·25	7.01					7.05
10.0	GFS # 1645	23060188	2·16·25	9.99					9.99
			Initials & Date:	10·4·23 KDR					10·6·23 KDR

- Is the same standard used for calibration and as-founds? (Y) or N (if no, document on pg. 2)
- Are the calibration values within ±0.10 of the standard? (Y) or N (if no, recalibration is required)

ORP Standard (± 10mV)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
+228.0 (mV)	GFS# 5525	24002850	2·17·24	228.0					227.7
			Initials & Date:	10·4·23 KDR					10·6·23 KDR

- Is the same standard used for calibration and as-founds? (Y) or N (if no, document on pg. 2)
- Are the calibration values within ±10% of the standard? (Y) or N (if no, recalibration is required).

DO	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
90-110% saturation	DI Water	N/A	N/A	97.0					97.3
			Initials & Date:	10·4·23 KDR					10·6·23 KDR

- Is the same standard used for calibration and as-founds? (Y) or N (if no, document on pg. 2)
- Are the calibration values within 90-110%? (Y) or N (if no, recalibration is required)

Sonde ID	22J	Project #:
Start Date	10.4.23	23-0969,0970
Reviewed By & Date:	10-18-23	Site: JRW

Specific Conductance (uS/cm)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Field Checks Completed	End Project Calibration Value
1424 (1399-1427)	GFS # 2174	24001219	4.5.24	1424					1420
			Initials & Date:	10.4.23 KDR					10.6.23 KDR

- Is the same standard used for calibration and as-founds? (Y) or N (if no, document on pg. 2)
- Are the calibration values within range of the standard? (Y) or N (if no, recalibration is required)

Turbidity (NTUs)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Field Checks Completed	End Project Calibration Value
0	DI Water	--	--	0.00					0.00
40.0 (± 4.0 NTUs)	Hach 2746356	A2122	5.24	40.00					39.72
800.0 (± 80.0 NTUs)	Hach 2660553	A2188	7.24	800.00					811.33
			Initials & Date:	10.4.23 KDR					10.6.23 KDR

- Is the same standard used for calibration and as-founds? (Y) or N (if no, document on pg. 2)
- Are the calibration values within ±10% of the standard? (Y) or N (if no, recalibration is required)

Additional Information for calibration standards

Standard	Source	Source Lot #	Source Exp. Date	Standard	Source	Source Lot #	Source Exp. Date
pH 4.0				pH 9.0 Check			
pH 7.0				ORP			
pH 10.0							
Sp. Conductivity							
40.0 Turbidity							
10.0 Turbidity							

Consumers Energy
Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW MW-15001 Date 10.5.23 Control Number 23-0969-01, 07
Location JRW Well Material: ✓ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ✓ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech #1005 S/N: LS025299

QC SAMPLE: ☐ MS/MSD ✓ DUP 01 Sonde ID: ___15M ___19H ___20M ___21G V 22J

Depth-to-water T/PVC (ft) 5.08 Depth-To-Bottom T/PVC (ft) 81.95 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
10:35	Started pump						200	5.15	
10:39	7.65	15.8	1067	49.2	4.85	88.0	200	5.15	3.69
10:43	7.63	15.5	1071	44.2	4.40	91.3	200	5.15	4.33
10:47	7.61	15.4	1070	34.1	3.88	88.6	200	5.15	4.98
10:51	7.57	15.4	1070	31.5	3.13	53.2	200	5.15	5.04
10:55	7.56	15.4	1070	25.1	2.51	8.0	200	5.15	5.63
10:59	7.55	15.3	1070	19.9	1.98	-30.9	200	5.15	5.69
11:03	7.56	15.2	1069	13.7	1.36	-54.0	200	5.15	5.72
11:07	7.56	15.1	1071	10.8	1.08	-54.3	200	5.15	5.79
11:11	7.56	15.1	1069	8.2	0.82	-95.6	200	5.15	5.91
11:15	7.56	15.1	1068	6.7	0.68	-102.9	200	5.15	5.99
11:19	7.56	15.0	1066	5.7	0.58	-107.8	200	5.15	6.22
11:23	7.56	15.0	1065	5.2	0.52	-112.3	200	5.15	6.42
11:27	7.56	14.9	1070	4.1	0.42	-117.8	200	5.15	6.61
11:31	7.57	14.9	1070	3.8	0.38	-119.2	200	5.15	6.73

Total Pump Time (min): Pg.2 Total Purge Volume (gal): Pg.2 Reviewed by: JF

Weather: Cloudy, 70°F, light wind Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
2	125mL	HDPE	B	N					
2	125mL	↓	A	N					
2	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy
Gas and Oil
Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW MW-15001 Date 10.5.23 Control Number 23-0969-01,07
Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech #1005 S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☑ DUP 01 Sonde ID: ___15M ___19H ___20M ___21G ✓22J

Depth-to-water T/PVC (ft) 5.08 Depth-To-Bottom T/PVC (ft) 81.95 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
11:35	7.56	14.9	1067	3.2	0.32	-121.9	200	5.15	7.01
11:39	7.57	14.9	1065	3.0	0.30	-124.3	200	5.15	7.23
11:43	7.56	14.9	1064	2.9	0.28	-125.3	200	5.15	7.45
11:44	Collected sample								
11:48	End sample collection								

Total Pump Time (min): 70 Total Purge Volume (gal) : ≈3.5 Reviewed by:
Weather: Cloudy, 70°F, light wind Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
2	125mL	HDPE	B	N					
2	125mL	↓	A	N					
2	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy Company
Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW 5002 Date 10.5.23 Control Number 23-0969-02
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 7371

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ☑ 21G ___22J

Depth-to-water T/PVC (ft) 13.76 Depth-To-Bottom T/PVC (ft) 92.26 Completed by CLE

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1530	Started pump						220	13.80	
1535	7.60	14.2	1058	5.0	0.51	-148.0	220	13.80	3.92
1540	7.64	14.1	1096	4.5	0.46	-166.2	220	13.80	3.62
1545	7.64	14.1	1097	4.2	0.43	-172.2	220	13.80	3.90
1550	7.64	13.9	1095	3.9	0.40	-176.8	220	13.80	3.73
1555	7.64	13.8	1095	3.7	0.38	-178.0	220	13.80	2.89
1600	7.64	13.7	1092	3.6	0.37	-179.0	220	13.80	2.93
1601	Collected Sample								

Total Pump Time (min): 31 Total Purge Volume (gal) : ≈ 2.0 Reviewed by:

Weather: 65°F, Rain Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F -							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	plastic	B	N					
1	↓	↓	A	↓					
1	250mL	↓	A	↓					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company

Monitoring Well Sampling Worksheet

Well ID SRW-MW-15003 Date 10.5.23 Control Number 23-0969-03

Location SRW Well Material: ✓ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ✓ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech #1005 S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ___21G ✓22J

Depth-to-water T/PVC (ft) 10.80 Depth-To-Bottom T/PVC (ft) 90.09 Completed by ICDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
15:06	Started pump						192	10.85	
15:10	7.54	14.4	979	30.8	3.07	45.0	192	10.85	3.18
15:14	7.53	14.2	978	24.9	2.55	41.9	192	10.85	3.20
15:18	7.52	14.2	977	23.4	2.39	42.1	192	10.85	3.29
15:22	7.52	14.1	977	22.6	2.31	42.7	192	10.85	3.60
15:26	7.52	14.2	976	21.3	2.17	42.3	192	10.85	3.77
15:30	7.52	14.2	976	20.4	2.08	41.9	192	10.85	3.83
15:34	7.52	14.1	975	20.0	2.04	42.1	192	10.85	4.02
15:35	Collected sample								
15:39	End sample collection								

Total Pump Time (min): 28 Total Purge Volume (gal) : ≈1.5 Reviewed by:

Weather: Cloudy, Rain, 60°F, light wind Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company

Monitoring Well Sampling Worksheet

Well ID JRW-MW15004 Date 10.5.23 Control Number 23-0969-04

Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech #1005 S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ___21G ✓22J

Depth-to-water T/PVC (ft) 12.90 Depth-To-Bottom T/PVC (ft) 96.45 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
14:18	Started pump						176	12.90	
14:24	7.49	15.7	945	18.3	1.80	30.9	176	12.90	2.62
14:28	7.47	15.5	941	11.0	1.10	28.4	176	12.90	3.52
14:32	7.47	15.6	941	9.6	0.96	28.6	176	12.90	3.88
14:36	7.46	15.4	940	9.0	0.89	29.5	176	12.90	3.40
14:40	7.46	15.4	939	8.7	0.87	30.3	176	12.90	3.75
14:44	7.46	15.4	938	8.5	0.85	30.8	176	12.90	3.79
14:48	7.46	15.4	938	8.4	0.84	31.4	176	12.90	3.88
14:49	Collected sample								
14:52	End sample collection								

Total Pump Time (min): 30 Total Purge Volume (gal) : ≈1.5 Reviewed by: KDR

Weather: Cloudy, Rain, 60°F, light wind Review Date: 10-18-23

Comments:

Bottles Filled					Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	"	A	N					
1	250mL	"	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company

Monitoring Well Sampling Worksheet

Well ID JRW MW-15005 Date 10.5.23 Control Number 23-0969-05

Location JRW Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech #1005 S/N: LS025299

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ___21G ✓22J

Depth-to-water T/PVC (ft) 11.86 Depth-To-Bottom T/PVC (ft) 93.63 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
13:15	Started pump						184	11.90	
13:22	7.65	15.3	871	19.3	1.89	-13.9	184	11.90	2.49
13:26	7.64	15.3	869	11.6	1.15	-12.9	184	11.90	2.58
13:30	7.63	15.4	869	10.3	1.03	~~-5~~ KDR 10.5.23 -10.6	184	11.90	2.68
13:34	7.63	15.4	869	10.1	1.01	-9.0	184	11.90	2.63
13:38	7.63	15.3	869	9.7	0.96	-6.8	184	11.90	2.81
13:42	7.63	15.3	869	9.6	0.96	-5.0	184	11.90	2.83
13:46	7.63	15.3	869	9.3	0.93	-2.8	184	11.90	2.68
13:50	7.63	15.3	869	9.1	0.91	-1.0	184	11.90	2.71
13:51	Collected sample								
13:53	End sample collection								

Total Pump Time (min): 35 Total Purge Volume (gal) : ≈2.0 Reviewed by: KDR

Weather: Cloudy, 65°F, light rain, light wind Review Date: 10-18-23

Comments:

Bottles Filled					Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy
Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW MW-15006 Date 10.5.23 Control Number 23-0969-06,10,11
Location JRW Well Material: ✓ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ✓ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech #1005 S/N: LS025299

QC SAMPLE: ✓ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ___21G ✓22J

Depth-to-water T/PVC (ft) 4.15 Depth-To-Bottom T/PVC (ft) 82.79 Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
12:05	Started Pump						200	4.17	
12:10	7.50	15.9	970	14.1	1.37	-25.3	200	4.17	6.42
12:14	7.49	15.5	968	5.0	6.50	-34.9	200	4.17	5.77
12:18	7.49	15.4	967	3.1	6.30	-41.7	200	4.17	5.41
12:22	7.50	15.3	966	2.0	0.20	-54.9	200	4.17	5.79
12:26	7.52	15.3	966	1.7	0.17	-77.5	200	4.17	5.87
12:30	7.55	15.2	965	1.3	0.13	-97.5	200	4.17	5.84
12:34	7.57	15.2	964	1.1	0.11	-112.2	200	4.17	6.07
12:38	7.60	15.2	963	0.9	0.09	-126.5	200	4.17	6.22
12:42	7.61	15.2	961	0.8	0.08	-133.6	200	4.17	6.29
12:46	7.63	15.2	961	0.8	0.07	-139.9	200	4.17	6.39
12:50	7.64	15.2	959	0.8	0.07	-142.6	200	4.17	6.56
12:51	Collected sample								
12:55	End sample Collection								

Total Pump Time (min): 50 Total Purge Volume (gal) : ≈2.5 Reviewed by:

Weather: Cloudy, 70°F, light wind Review Date: 10-18-23

Comments:

Bottles Filled					Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
2	125mL	HDPE	B	N					
2	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy
Count on Us
Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID EB-01 Date 10.5.23 Control Number 23-0969-08
Location SRW Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: S/N:

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ___21G ___22J

Depth-to-water T/PVC (ft) _____ Depth-To-Bottom T/PVC (ft) _____ Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
14:10	Collected sample								
14:13	End sample Collection								

Total Pump Time (min): — Total Purge Volume (gal) : — Reviewed by:

Weather: Cloudy, Rain, 60°F, light wind Review Date: 10-18-23

Comments:

Bottles Filled					Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	"	A	N					
1	250mL	"	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy
Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID FB-01 Date 10.5.23 Control Number 23-0969-09
Location SRW Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☐ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: S/N:

QC SAMPLE: ☐ MS/MSD ☐ DUP____ **Sonde ID:** ___15M ___19H ___20M ___21G ___22J

Depth-to-water T/PVC (ft) _____ Depth-To-Bottom T/PVC (ft) _____ Completed by KDR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
14:04	Collected sample								
14:06	End sample collection								

Total Pump Time (min): — Total Purge Volume (gal) : — Reviewed by:

Weather: Cloudy, 65°F, Rain, light wind Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	125mL	↓	A	N					
1	250mL	↓	A	N					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Pond 6

Consumers Energy
Count on Us®
Laboratory Services
A CENTURY OF EXCELLENCE

WATER LEVEL DATA

Site: JR Whiting

Project No: 23-0970 **Reviewed by:** [signature]

Analyst: CLE **Review Date:** 10-18-23

Date: 10.5.23

Method: Electronic Tape

Tape ID: GeoTech **S/N:** 7371

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001					
JRW MW-15002					
JRW MW-15003					
JRW MW-15004					
JRW MW-15005					
JRW MW-15006					
JRW MW-16001	0949	16.01	83.99	83.99	marked TOC
JRW MW-16002	0945	12.42	12.42	94.40	marked TOC
JRW MW-16003	0940	12.71	12.71	86.00	marked TOC
JRW MW-16004	0935	13.06	13.06	88.83	marked TOC
JRW MW-16005	0957	15.85	15.85	91.37	marked TOC
JRW MW-16006	1001	14.74	14.74	91.65	marked TOC
JRW MW-16007					marked TOC
JRW MW-16008					marked TOC
JRW MW-16009					marked TOC

NOTES: *TOC reference point*
DTW = Depth to Water
DTB = Depth to Bottom

Consumers Energy
Count on Us
Laboratory Services
A CENTURY OF EXCELLENCE

Sonde ID	21G
Start Date	10.5.23
Project #	23-0970
Site	JR Whiting Pond 6
Reviewed By & Date	10-18-23

Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 21G102278
Sonde Brand	YSI ProDSS S/N 21G105848
Flow Cell	EXO1 599080
DO Probe 97.0%	YSI ProDSS S/N 21G101534
Turbidity Probe	YSI ProDSS S/N 21G101646
pH With ORP	YSI ProDSS S/N 21H101604
Conductivity & Temperature Probe	YSI ProDSS S/N 21G101888

pH Standard (± 0.1)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
4.0	GFS # 1634	24000424	2-28-25	3.97					4.00
7.0	GFS # 1639	24000423	3.4.25	7.00					7.01
10.0	GFS # 1645	23060188	2.16.25	9.99					9.94
			Initials & Date:	10-3-23 CLE					10.5.23 CLE

- Is the same standard used for calibration and as-founds? (Y) or N (if no, document on pg. 2)
- Are the calibration values within ±0.10 of the standard? (Y) or N (if no, recalibration is required)

ORP Standard (± 10mV)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
+228 (mV)	GFS GS25	24002850	2.17.24	237					230.2
			Initials & Date:	10-3-23 CLE					CLE 10.5.23

- Is the same standard used for calibration and as-founds? (Y) or N (if no, document on pg. 2)
- Are the calibration values within ±10% of the standard? (Y) or N (if no, recalibration is required).

DO	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
90-110% saturation	DI Water	N/A	N/A	96.9					96%
			Initials & Date:	10-3-23 CLE					CLE 10.5.23

- Is the same standard used for calibration and as-founds? (Y) or N (if no, document on pg. 2)
- Are the calibration values within 90-110%? (Y) or N (if no, recalibration is required)

Sonde ID	21G	Project #:
Start Date	10.5.23	73-0970
Reviewed By & Date:	10-18-23	Site: JR Whiting POND 6

Specific Conductance (uS/cm)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Field Checks Completed	End Project Calibration Value
1424 (1377-1423)	GFS 2174	24001219	4.5.24	1427					1425
			Initials & Date:	CLE 10-03-24					CJE 10.5.23

- Is the same standard used for calibration and as-founds? Y or N (if no, document on pg. 2)
- Are the calibration values within range of the standard? Y or N (if no, recalibration is required)

Turbidity (NTUs)	Source	Source Lot #	Source Exp. Date	Pre -Project Calibration Value	1st Daily Field Checks Completed	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Field Checks Completed	End Project Calibration Value
0	DI Water	--	--	0.20					0.13
40.0 (± 4.0 NTUs)	Hach 2746356	A2122	05-24	38.80					39.56
800.0 (± 80.0 NTUs)	Hach 2660553	A2188	07-24	796.3					802.41
			Initials & Date:	CLE 10-3-23					CJE 10.5.23

- Is the same standard used for calibration and as-founds? Y or N (if no, document on pg. 2)
- Are the calibration values within ±10% of the standard? Y or N (if no, recalibration is required)

Additional Information for calibration standards

Standard	Source	Source Lot #	Source Exp. Date	Standard	Source	Source Lot #	Source Exp. Date
pH 4.0				pH 9.0 Check			
pH 7.0				ORP			
pH 10.0							
Sp. Conductivity							
40.0 Turbidity							
10.0 Turbidity							

Laboratory Services

Consumers Energy Company

Monitoring Well Sampling Worksheet

Well ID JRW-MW-16001 Date 10.5.23 Control Number 23.0970-01

Location JRWhiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 7371

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ☑21G ___22J

Depth-to-water T/PVC (ft) 16.09 Depth-To-Bottom T/PVC (ft) 83.99 Completed by CLE

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
0955	Started high volume purge w/ peristaltic @ 500 mL/min / pH = 9.63								
1205	Stopped high volume purge, lowered pump to 200 mL/min / pH = 7.87								
1210	7.88	14.0	755	4.0	0.41	-103.3	200	16.06	7.34
1215	7.89	13.9	751	3.6	0.37	-119.1	200	16.06	6.18
1220	7.89	13.9	750	3.5	0.36	-121.6	200	16.06	5.86
1225	7.89	14.0	748	3.4	0.35	-122.4	200	16.06	6.03
1226	Collected sample								

(196 min)

Total Pump Time (min): 3 hrs 16 min Total Purge Volume (gal) : ~25.0 Reviewed by:

Weather: 68°F, cloudy Review Date: 10-18-23

Comments: ~25 gallons total purged to lower pH

Bottles Filled					Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F -				
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	plastic	B	N					
1	125mL	↓	A	↓					
1	250mL	↓	A	↓					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16002 Date 10.5.23 Control Number 23-0970-02
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 7371

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ☑ 21G ___22J

Depth-to-water T/PVC (ft) 12.43 Depth-To-Bottom T/PVC (ft) 94.40 Completed by CLE

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1248	Started pump - replaced top 15' tubing due to cracks						200	12.44	
1255	7.85	13.8	963	5.5	0.56	-147.7	200	12.44	7.99
1300	7.78	13.8	978	4.1	0.43	-159.8	200	12.44	3.59
1305	7.75	13.8	985	4.0	0.41	-154.0	200	12.44	3.33
1310	7.74	13.7	983	3.5	0.37	-148.7	200	12.44	3.43
1315	7.74	13.6	981	3.4	0.36	-148.0	200	12.44	2.70
1320	7.74	13.6	980	3.4	0.35	-147.8	200	12.44	2.36
1321	Collected sample								

Total Pump Time (min): 32 Total Purge Volume (gal) : ~1.75 Reviewed by:

Weather: 108°F, Cloudy Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	Plastic	B	N					
1	125mL	↓	A	↓					
1	250mL	↓	A	↓					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company

Monitoring Well Sampling Worksheet

Well ID JRW-MW-16003 Date 10.5.23 Control Number 23.0970.03

Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 7371

QC SAMPLE: ☑ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ☑ 21G ___22J

Depth-to-water T/PVC (ft) 12.71 Depth-To-Bottom T/PVC (ft) 86.00 Completed by CE

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1332	Started pump. Replaced top 5' due to cracks in tubing.						200	86.02	
1340	7.73	13.7	952	3.7	0.39	-162.4	200	86.02	7.21
1345	7.74	13.7	948	3.5	0.36	-158.2	200	86.02	5.67
1350	7.75	13.6	946	3.4	0.35	-157.4	200	86.02	4.36
1355	7.75	13.6	942	3.3	0.34	-156.5	200	86.02	3.89
~~1400~~									
1356	collected samples								

Total Pump Time (min): 27 Total Purge Volume (gal) : 71.5 Reviewed by:

Weather: 66°F, cloudy, light rain Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
3	125mL	plastic	B	N					
3	↓	↓	A	↓					
1	250mL	↓	A	↓					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Consumers Energy Company
Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16004 Date 10.5.23 Control Number 23.0970-04
Location JR Whiting Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 7371

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ☑21G ___22J

Depth-to-water T/PVC (ft) 13.05 Depth-To-Bottom T/PVC (ft) 88.83 Completed by CG

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1415	started pump						200	88.83	
1420	7.82	13.6	1112	3.8	0.40	-143.2	200	88.83	2.11
1425	7.79	13.5	1130	3.6	0.37	-155.0	200	88.83	2.16
1430	7.75	13.6	1134	3.4	0.35	-162.1	200	88.83	1.46
1435	7.72	13.5	1131	3.2	0.33	-160.4	200	88.83	1.58
1440	7.72	13.5	1132	3.2	0.33	-166.7	200	88.83	1.90
1441	Collected sample								

Total Pump Time (min): 26 Total Purge Volume (gal) : 11.5 Reviewed by:

Weather: 68°F, cloudy, light rain Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F -							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	plastic	B	N					
1	↓	↓	A	↓					
1	250mL	↓	A	↓					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16005 Date 10.5.23 Control Number 23-097D-05
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 7371

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ✓ 21G ___22J

Depth-to-water T/PVC (ft) 15.85 Depth-To-Bottom T/PVC (ft) 91.37 Completed by CLE

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	+/- 0.1	NA	+/- 3%	+/- 10%	+/- 0.3ppm	+/- 10mV	*	< 0.33	+/- 10%
Stablization parameters for the last three readings									
1100	Started pump						220	15.88	
1120	7.70	14.2	831	3.6	0.37	-27.8	220	15.88	3.84
1125	7.71	14.1	834	3.5	0.36	-33.1	220	15.88	2.59
1130	7.70	14.1	848	3.5	0.36	-34.0	220	15.88	1.69
1135	7.68	14.0	862	3.5	0.36	-45.8	220	15.88	1.75
1140	7.68	13.9	876	3.4	0.35	-64.9	220	15.88	2.24
1145	7.67	14.0	886	3.3	0.34	-79.3	220	15.88	2.37
1150	7.67	14.1	904	3.3	0.34	-56.7	220	15.88	2.21
1155	7.67	14.0	908	3.3	0.34	-64.5	220	15.88	2.37
1200	7.67	14.0	909	3.3	0.33	-65.8	220	15.88	1.76
1205	7.67	14.0	913	3.2	0.33	-67.9	220	15.88	1.81
1206	Collected sample								

Total Pump Time (min): 58 Total Purge Volume (gal) : ~ 3.5 Reviewed by:

Weather: 68°F, cloudy Review Date: 10-18-23

Comments:

Bottles Filled					Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	plastic	B	N					
1	↓	↓	A	↓					
1	250mL	↓	A	↓					

* Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.

Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16000 Date 10-5-23 Control Number 23-0970-06, -07
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 7371

QC SAMPLE: ☐ MS/MSD ☑ DUP-02 Sonde ID: ___15M ___19H ___20M ☑ 21G ___22J

Depth-to-water T/PVC (ft) 14.74 Depth-To-Bottom T/PVC (ft) 91.65 Completed by CLE

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1015	Started pump						250	14.76	
1020	7.78	13.5	797	5.5	0.57	-84.9	250	14.76	9.70
1025	7.79	13.3	796	4.7	0.49	-101.1	250	14.76	8.56
1030	7.80	13.3	795	4.2	0.44	-110.1	250	14.76	5.32
1035	7.81	13.3	794	4.0	0.42	-117.9	250	14.76	4.11
1040	7.83	13.6	802	4.1	0.42	-110.9	250	14.76	3.70
1045	7.84	13.7	802	3.9	0.41	-115.6	250	14.76	2.15
1050	7.84	13.7	802	3.9	0.40	-119.0	250	14.76	2.13
1055	7.84	13.7	802	3.8	0.39	-122.0	250	14.76	2.02
1056	Collected sample and field DUPLICATE								

Total Pump Time (min): 45 Total Purge Volume (gal) : 13.0 Reviewed by:

Weather: 68°F, cloudy, sprinkle rain Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
2	125mL	Plastic	B	N					
2	↓	↓	A	↓					
1	250mL	↓	A	↓					

** Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Laboratory Services

Consumers Energy Company

Monitoring Well Sampling Worksheet

Well ID EB-02 Date 10-5-23 Control Number 23-0970-08

Location JRWhiting Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☐ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: S/N:

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ___21G ___22J

Depth-to-water T/PVC (ft) _____ Depth-To-Bottom T/PVC (ft) _____ Completed by CLB

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
Collected Sample @ 1453.									

Total Pump Time (min): — Total Purge Volume (gal) : — Reviewed by:

Weather: 65°F, Rain Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	plastic	A	N					
1	↓	↓	A	↓					

* Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.

Laboratory Services

Consumers Energy Company

Monitoring Well Sampling Worksheet

Well ID FB-02 Date 10.5.23 Control Number _____

Location JR Whiting Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☐ Peristaltic ☐ Submersible ☐ Bladder ☐ Fultz ☐ Bailer

Depth to Water Tape: S/N:

QC SAMPLE: ☐ MS/MSD ☐ DUP____ Sonde ID: ___15M ___19H ___20M ___21G ___22J

Depth-to-water T/PVC (ft) _____ Depth-To-Bottom T/PVC (ft) _____ Completed by CLG

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 0.3ppm*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
Collected Sample @ 1457									

Total Pump Time (min): – Total Purge Volume (gal) : – Reviewed by:

Weather: 65°F, Rain Review Date: 10-18-23

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	Plastic	A	N					
1	↓	↓	A	N					

* *Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.*

Appendix D
Iron Prediction Limit Calculations

Pond 1 & 2

1540 Eisenhower Pl.
Ann Arbor, MI 48108

T 734.971.7080
TRCcompanies.com

Technical Memorandum

Date:	January 19, 2024
To:	Harold D. Register, Jr., Consumers Energy
From:	Sarah Holmstrom, TRC Kristin Lowery, TRC Rebecca Paalanen, TRC
Project No.:	514397.0000.0000 Phase 1, Task 2
Subject:	Iron Prediction Limit Calculation – Consumers Energy, JR Whiting Pond 1 & 2 CCR Unit

Starting in 2015, groundwater monitoring activities have been conducted at the JR Whiting ponds in accordance with the United States Environmental Protection Agency's (U.S. EPA's) Resource Conservation and Recovery Act (RCRA) Coal Combustion Residual rule ("CCR Rule") promulgated on April 17, 2015, as amended, which requires that the owner or operator of a CCR Unit must implement a detection monitoring program and evaluate statistically significant increases above background (40 CFR §257.94). Statistical background limits for Appendix III parameters[1] for the JR Whiting Power Plant Ponds 1 and 2 (closed surface impoundment monitored as Pond 1 & 2 using a multiunit groundwater monitoring system) were calculated as described in the October 31, 2019 *Appendix III Prediction Limit Update* technical memorandum, included in the *2019 Annual Groundwater Monitoring Report*.[2]

On December 28, 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). PA 640 was developed to provide the State of Michigan oversight of CCR impoundments and landfills and to better align existing state solid waste management rules and statutes with the CCR Rule. On August 8, 2019 Consumers Energy submitted a revised *JR Whiting Hydrogeological Monitoring Plan, former JR Whiting Power Plant, Erie, Michigan* (2020 HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The 2020 HMP was approved by the EGLE on May 11, 2020 and was implemented beginning in second calendar quarter of 2020.

[1] Detection monitoring parameters defined in Appendix III of the CCR Rule include boron, calcium, chloride, fluoride, sulfate, total dissolved solids, and pH.
[2] TRC. January 2020. 2018 Annual Groundwater Monitoring Report – Former JR Whiting Power Plant, Ponds 1 and 2, Erie, Michigan.

Iron was incorporated into the detection monitoring program as part of the 2020 HMP in accordance with PA 640. Baseline data for iron was collected over eight semiannual monitoring events from April 2020 through October 2023. This memorandum presents the background iron statistical limits derived for Pond 1 & 2.

The Pond 1 & 2 CCR unit is located adjacent to Lake Erie. Groundwater present within the uppermost aquifer at the CCR unit is confined and protected from CCR constituents by the overlying clay-rich aquitard and is typically encountered around 50 feet below ground surface (bgs) in the limestone beneath the till. Potentiometric surface elevation data from groundwater within the CCR monitoring wells exhibit an extremely low hydraulic gradient across the site with no apparent flow direction. There are minor differences in hydraulic head across the monitoring wells (ranging from zero up to 0.13 feet across Pond 1 & 2 from event to event from November 2016 through July 2017), indicating that the potentiometric surface is flat the majority of the time. In the few instances since November 2016 where a slight gradient was observed and calculable, the direction of the flow potential was slightly to the northwest (two events) and to the east (one event). Given that the hydraulic gradient is often so low, groundwater flow across Pond 1 & 2 is frequently incalculable and often stagnant. Based on potentiometric data, horizontal travel times within the aquifer are low, on the order of 5 ft/year or less, and it is likely that groundwater proximal to the monitoring wells is stagnant or slightly moving back and forth across the borehole, potentially extending the residence time of groundwater in the vicinity of each monitoring well and resulting in limited temporal variability in the dataset.

As a result of site-specific geologic and hydrogeologic conditions, downward migration of CCR leachate is not expected, and groundwater data continue to show no impacts from the CCR unit. This is supported by the information presented in the Annual Groundwater Monitoring Reports prepared from 2017 through 2023 (TRC, January 2018 through January 2024), which provide further details regarding site-specific hydrogeology and groundwater analytical results. Per the 2020 HMP, an intrawell statistical approach is being implemented for detection monitoring. This statistical method was selected based on the hydrogeology at the site, particularly the extremely low to non-existent gradient or lack of flow direction, in addition to the presence of 40 to 50 feet of laterally extensive clay-rich till that acts as a natural hydraulic barrier across the site and lack of observed impacts from the CCR unit.

The background data for the Pond 1 & 2 CCR unit were evaluated in accordance with the *Groundwater Statistical Evaluation Plan* (Stats Plan) (TRC, February 2020). The site groundwater data are maintained within a database accessible through Sanitas™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in U.S. EPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (Unified Guidance; UG). Within the Sanitas™ statistical program (and the UG), intrawell prediction limits were selected to perform the statistical calculation for background/baseline limits. Use of prediction limits is recommended by the UG to provide high statistical power and is an acceptable approach for intrawell detection monitoring under the CCR Rule and Part 115. Prediction limits (PLs) were calculated for iron based on a single future value. The following narrative describes the methods employed and the results obtained and the Sanitas™ output files are included as an attachment.

The set of downgradient monitoring wells utilized for compliance in the Pond 1 & 2 detection monitoring program includes JRW-MW-15001 through JRW-MW-15006. As described above, an intrawell

statistical approach is being implemented for detection monitoring at Pond 1 & 2. 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/baseline dataset from that same well. The baseline evaluation included the following steps:

- Review of data quality reports for the baseline/background data sets for iron;
- Graphical representation of the baseline data as time versus concentration (T v. C) by well/constituent pair;
- Outlier testing of individual data points that appear from the graphical representations as potential outliers;
- Evaluation of percentage of non-detects for each baseline/background well-constituent (w/c) pair;
- Distribution of the data; and
- Calculation of the intrawell PL for each monitoring well for iron.

The results of these evaluations are presented and discussed below.

Data Quality

Data from each sampling round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The review was completed using the following quality control (QC) information which at a minimum included chain-of-custody forms, investigative sample results including blind field duplicates, and matrix spike and matrix spike duplicates (MS/MSDs) recoveries, and, as provided by the laboratory, method blanks, laboratory control spikes, and laboratory duplicates.

The data were found to be complete and usable for the purposes of the CCR monitoring program.

Time versus Concentration Graphs

The time versus concentration (T v. C) graphs (Sanitas™ Output Files) do not show potential or suspect outliers for iron.

While variations in results are present, the graphs show consistent baseline data and do not suggest that data sets, as a whole, likely have overall trending or seasonality. Although visual trends were present in several monitoring wells, these trends were not statistically significant. However, as discussed above, due to lack of groundwater flow potential there is limited temporal independence in the background dataset collected within the HMP implementation timeline. Accordingly, the data sets are of relatively short duration for making such observations regarding overall trending or seasonality. This will be addressed over time as more data become available and are incorporated into the background dataset.

Outlier Testing

The baseline T v. C graphs (Sanitas™ Output Files) did not show potential outliers; therefore, outlier testing was not performed for the baseline data sets. Had candidate values been present, the Dixon's Outlier Test in Sanitas™ would have been used to evaluate potential outlier removal.

Percentage of Non-detects

Background concentrations that are reported as non-detects were evaluated differently depending upon the percentage of non-detects (e.g., less than 15%, 15 to 50%, and greater than 50%) for the reported concentrations for a given parameter at a given monitoring well. Non-detect data were handled in accordance with the procedures in the Stats Plan.

Distribution of the Data Sets

The distribution of each data set is determined by the Sanitas™ software during calculation of the upper PL. The Shapiro-Wilk test is used to test normality of data sets for sample sizes fewer than 50. If the data appear to be non-normal, mathematical transformations of the data may be utilized such that the transformed data follow a normal distribution (e.g., lognormal distributions). Alternatively, non-parametric tests may be utilized when data cannot be normalized. Table 1 summarizes the distributions determined by the Sanitas™ software.

Upper Prediction Limits

Table 1 presents the calculated PLs (with one future event) for the baseline data sets. The PL is calculated based on the distribution listed on the table. For non-normal background datasets, a non-parametric prediction limit is utilized, resulting in the highest value from the background dataset as the PL. The achieved confidence and/or coverage rates depend entirely on the number of background data points, and coverage rates for various confidence levels are shown in the Sanitas™ outputs for non-parametric prediction limits. Verification resampling (1 of 2) is recommended per the Stats Plan and UG to achieve the performance standards specified in the CCR Rule and the 2020 HMP.

Table 1
Summary of Iron Baseline Data Distributions and Intrawell Prediction Limits

Well	Distribution	Prediction Limit
JRW-MW-15001	Normal	1,800
JRW-MW-15002	Normal	1,200
JRW-MW-15003	Normal	820
JRW-MW-15004	Normal	490
JRW-MW-15005	Normalized by square root transformation	660
JRW-MW-15006	Normal	1,900

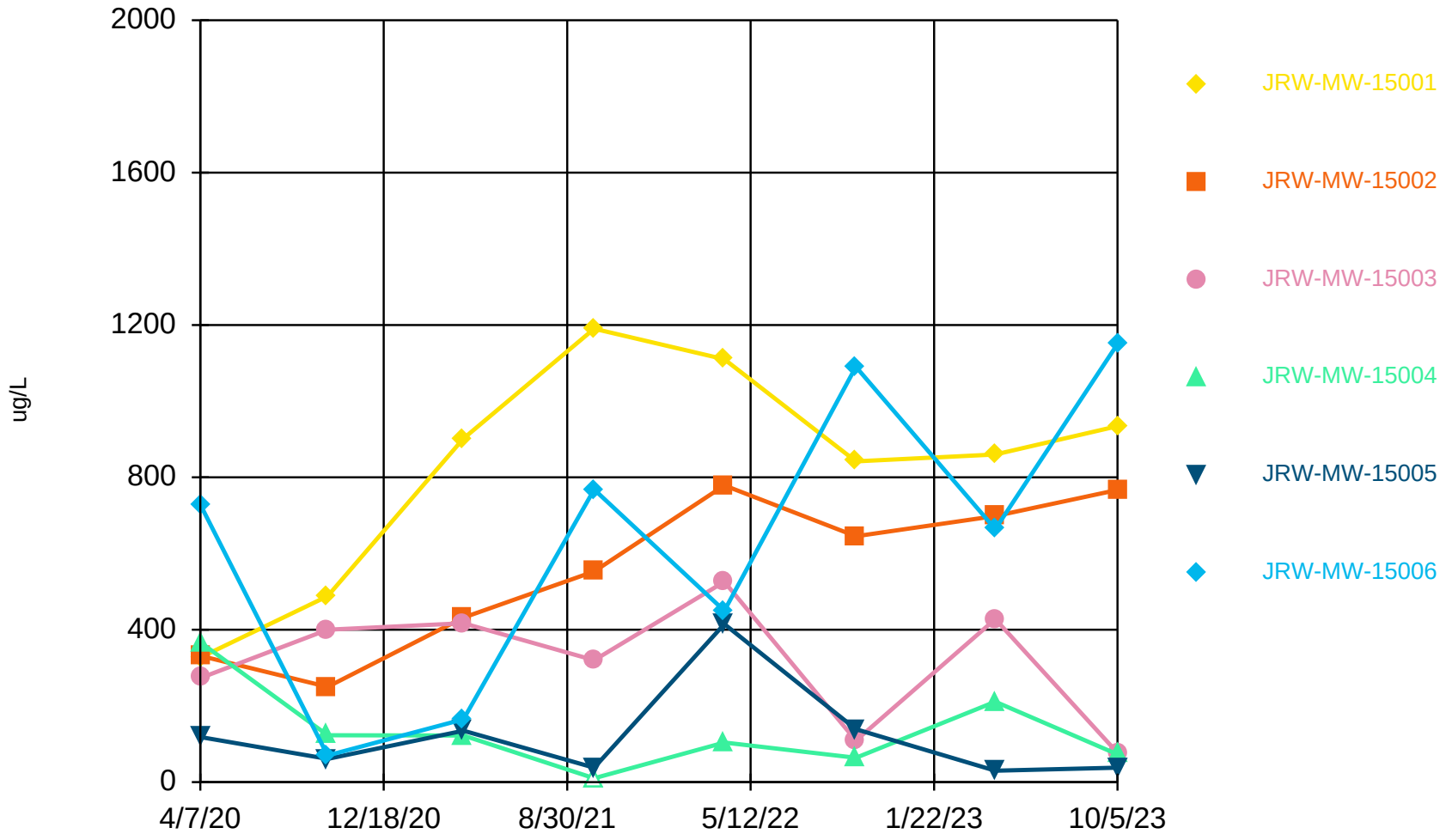
Attachments:

Attachment 1 - Sanitas™ Output

Attachment 1
Sanitas™ Output

Sanitas™ v.10.0.15 Sanitas software licensed to Consumers Energy. EPA
Hollow symbols indicate censored values.

Iron, Total

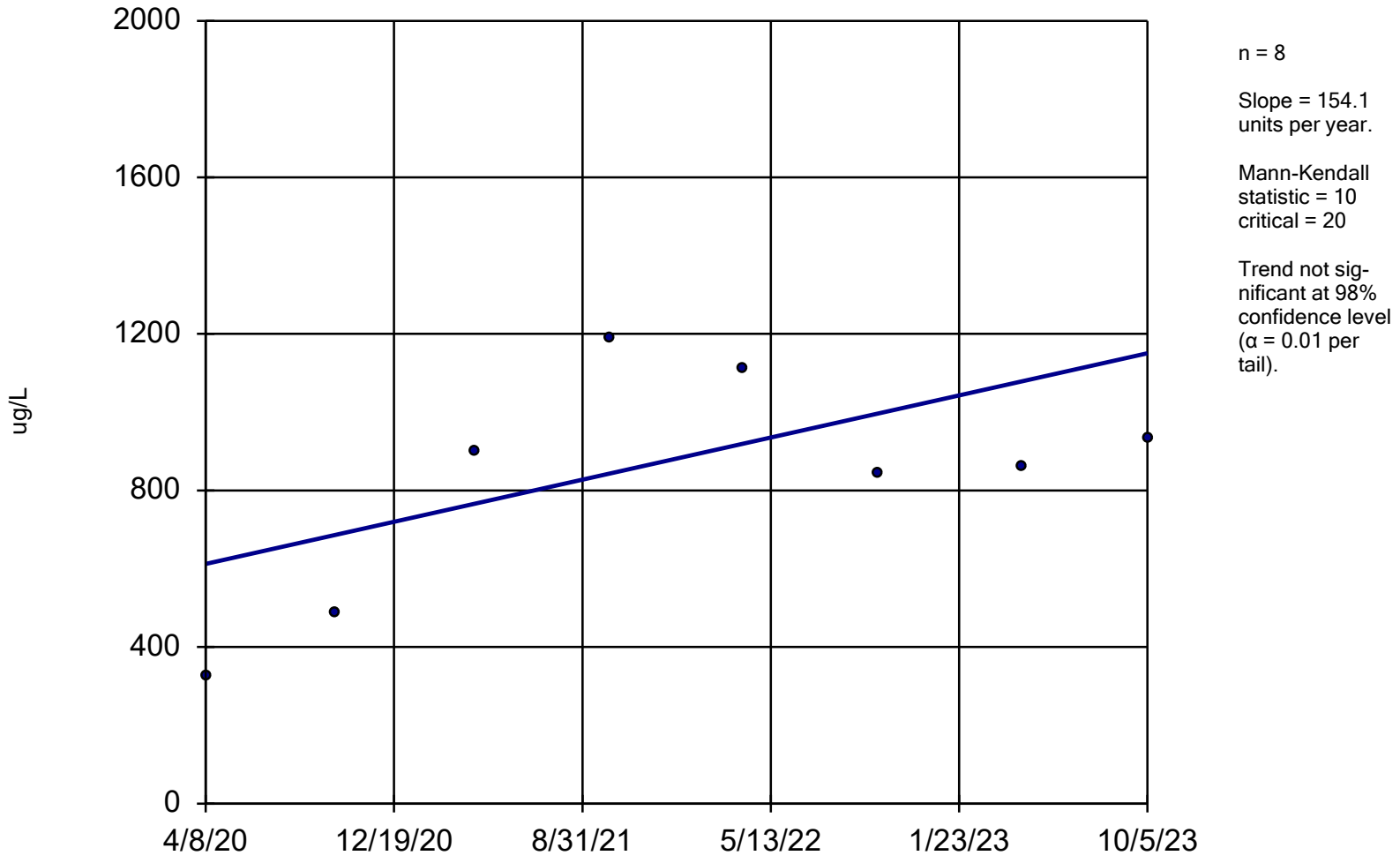


Time Series Analysis Run 12/26/2023 3:04 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

JRW-MW-15001



n = 8

Slope = 154.1 units per year.

Mann-Kendall statistic = 10
critical = 20

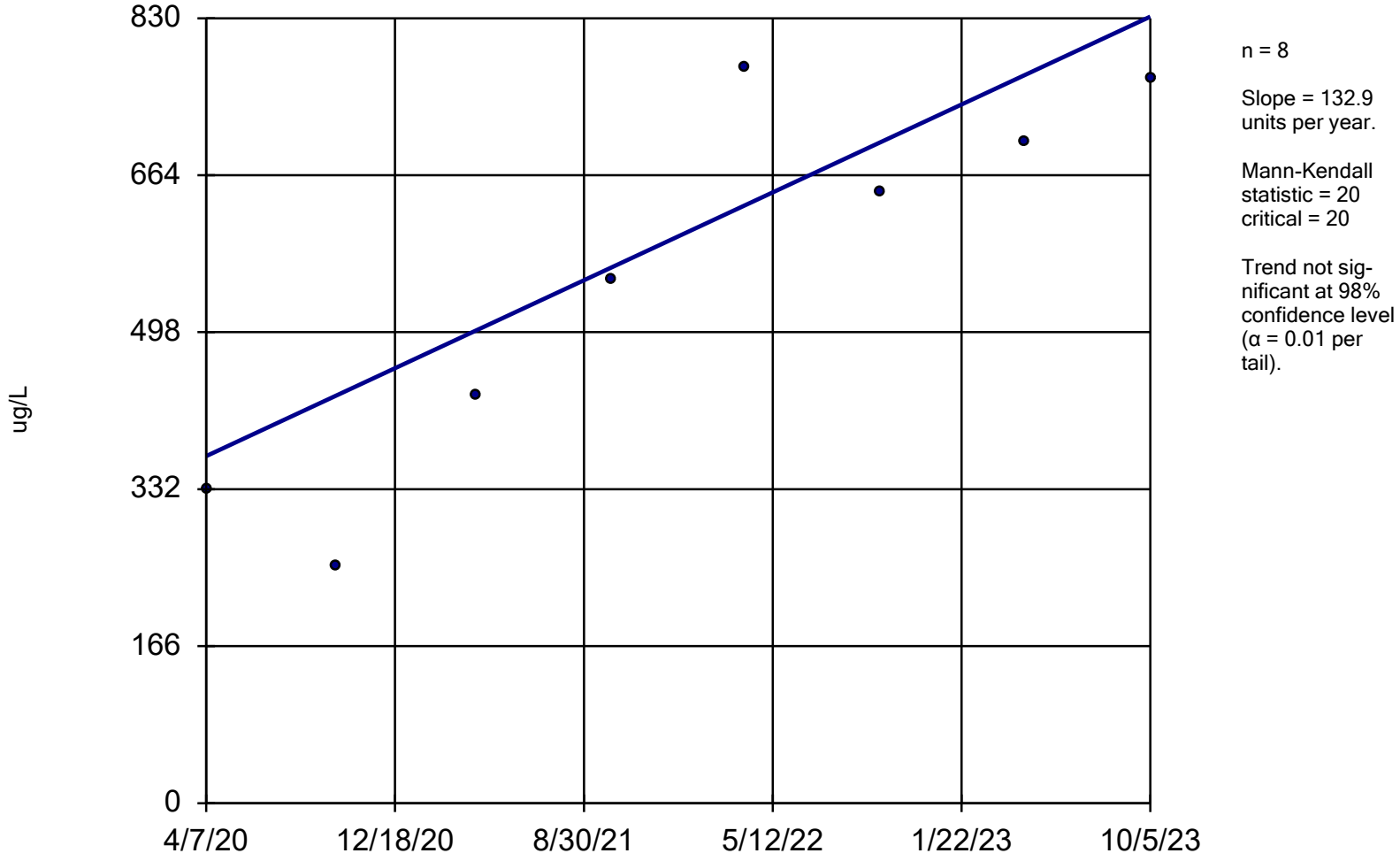
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/17/2024 2:14 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

JRW-MW-15002



n = 8

Slope = 132.9 units per year.

Mann-Kendall statistic = 20
critical = 20

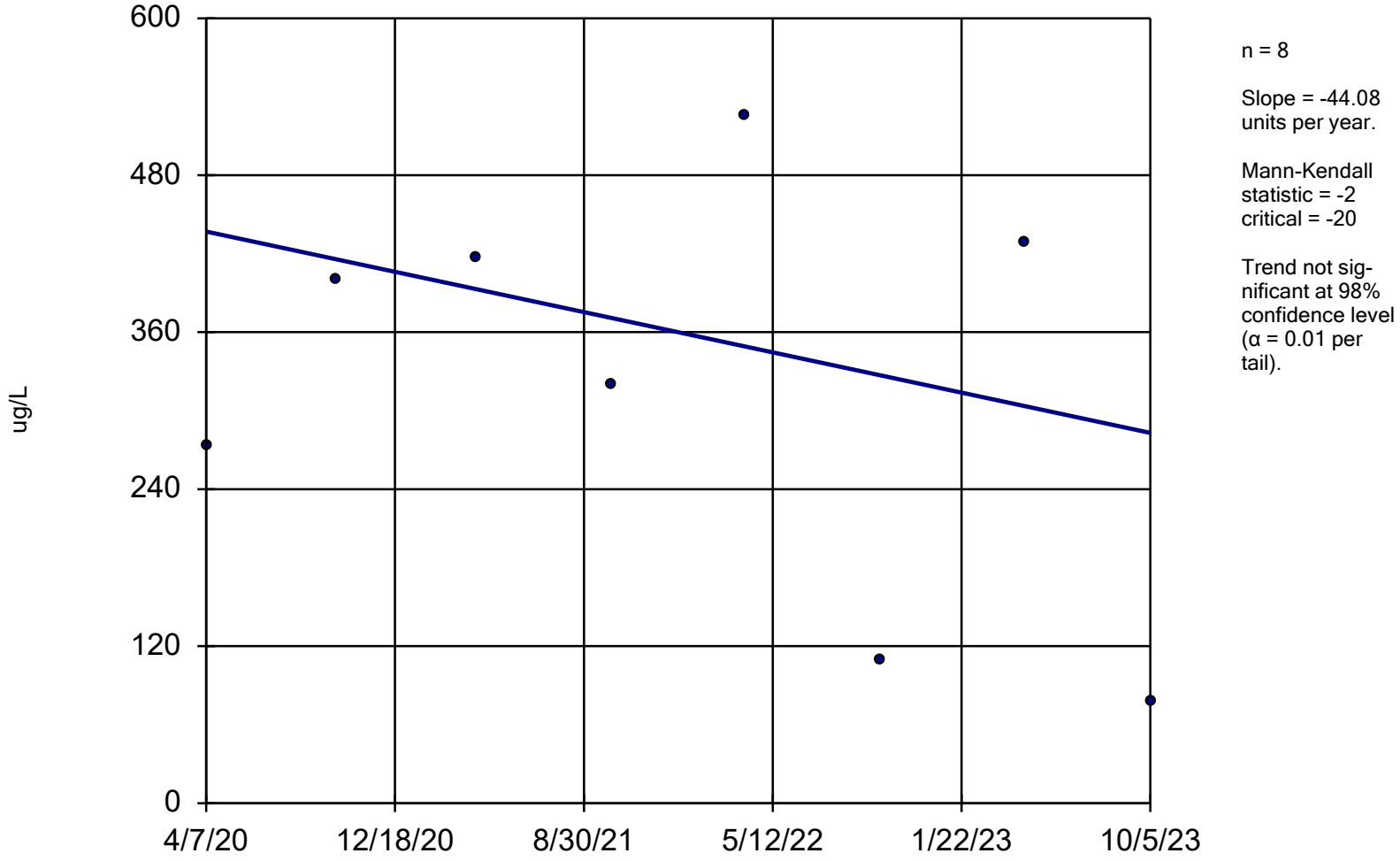
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/17/2024 2:14 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

JRW-MW-15003



n = 8

Slope = -44.08 units per year.

Mann-Kendall statistic = -2
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

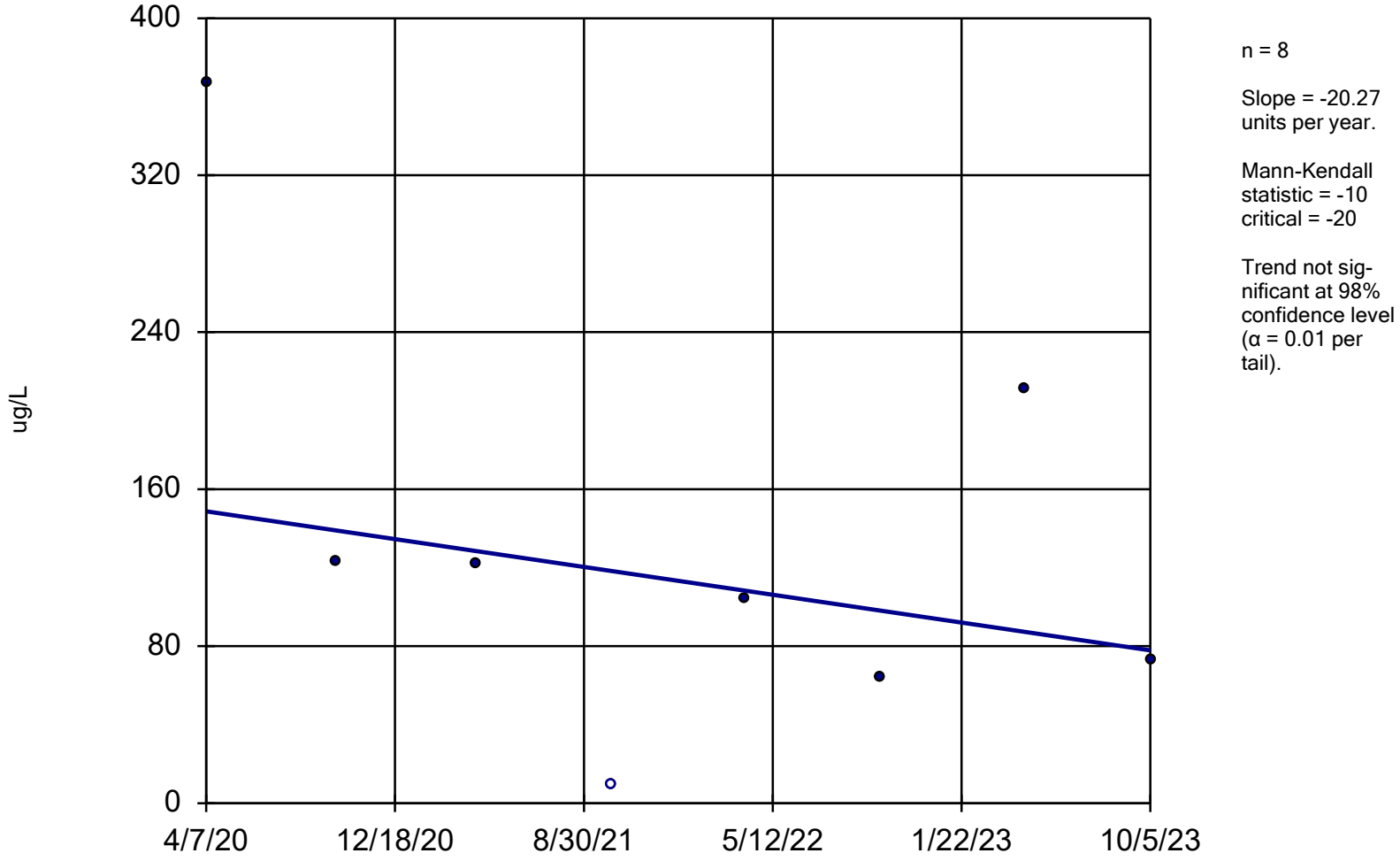
Sen's Slope Estimator Analysis Run 1/17/2024 2:14 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Hollow symbols indicate censored values.

Iron, Total

JRW-MW-15004



n = 8

Slope = -20.27 units per year.

Mann-Kendall statistic = -10
critical = -20

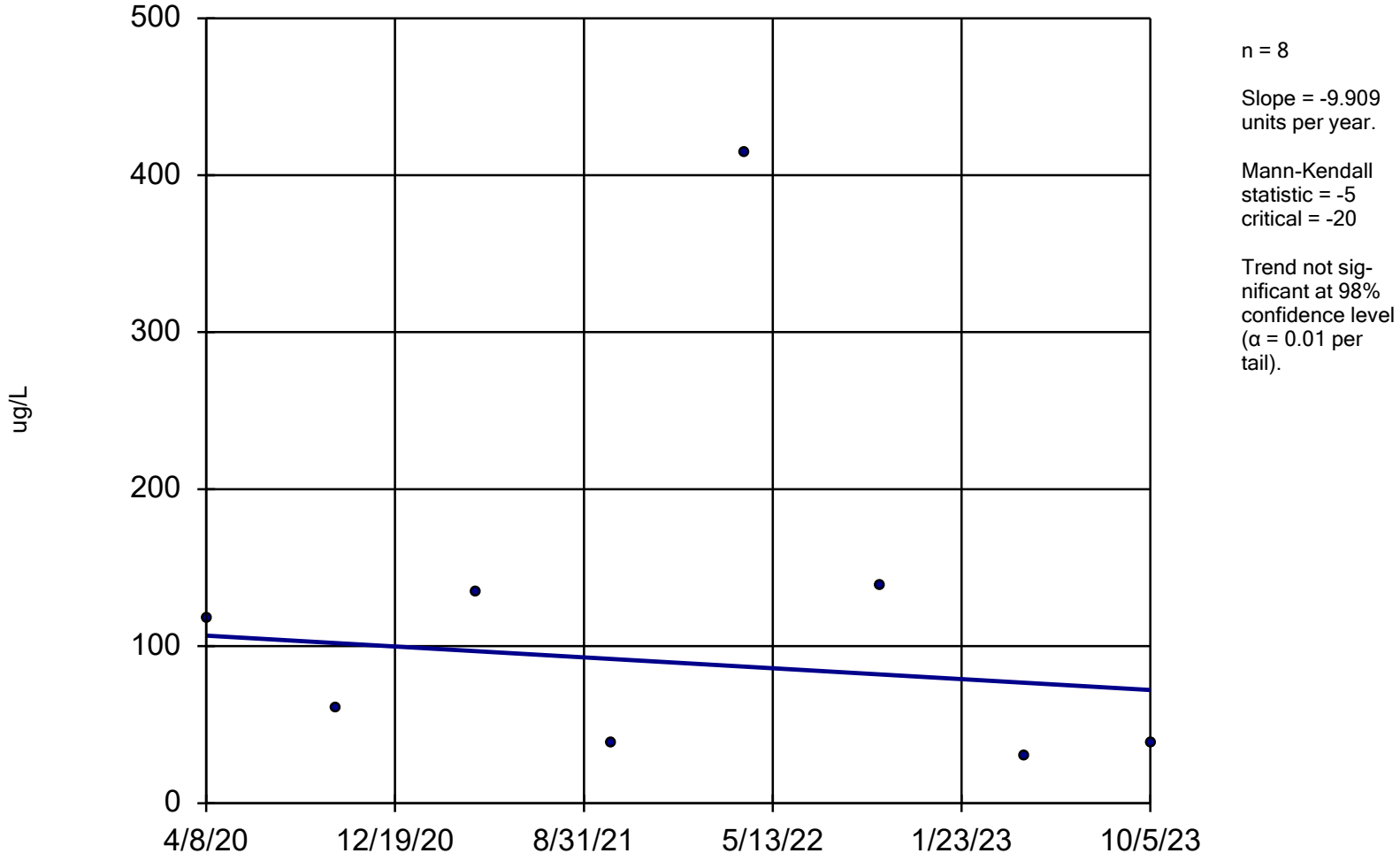
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/17/2024 2:14 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

JRW-MW-15005



n = 8

Slope = -9.909 units per year.

Mann-Kendall statistic = -5
critical = -20

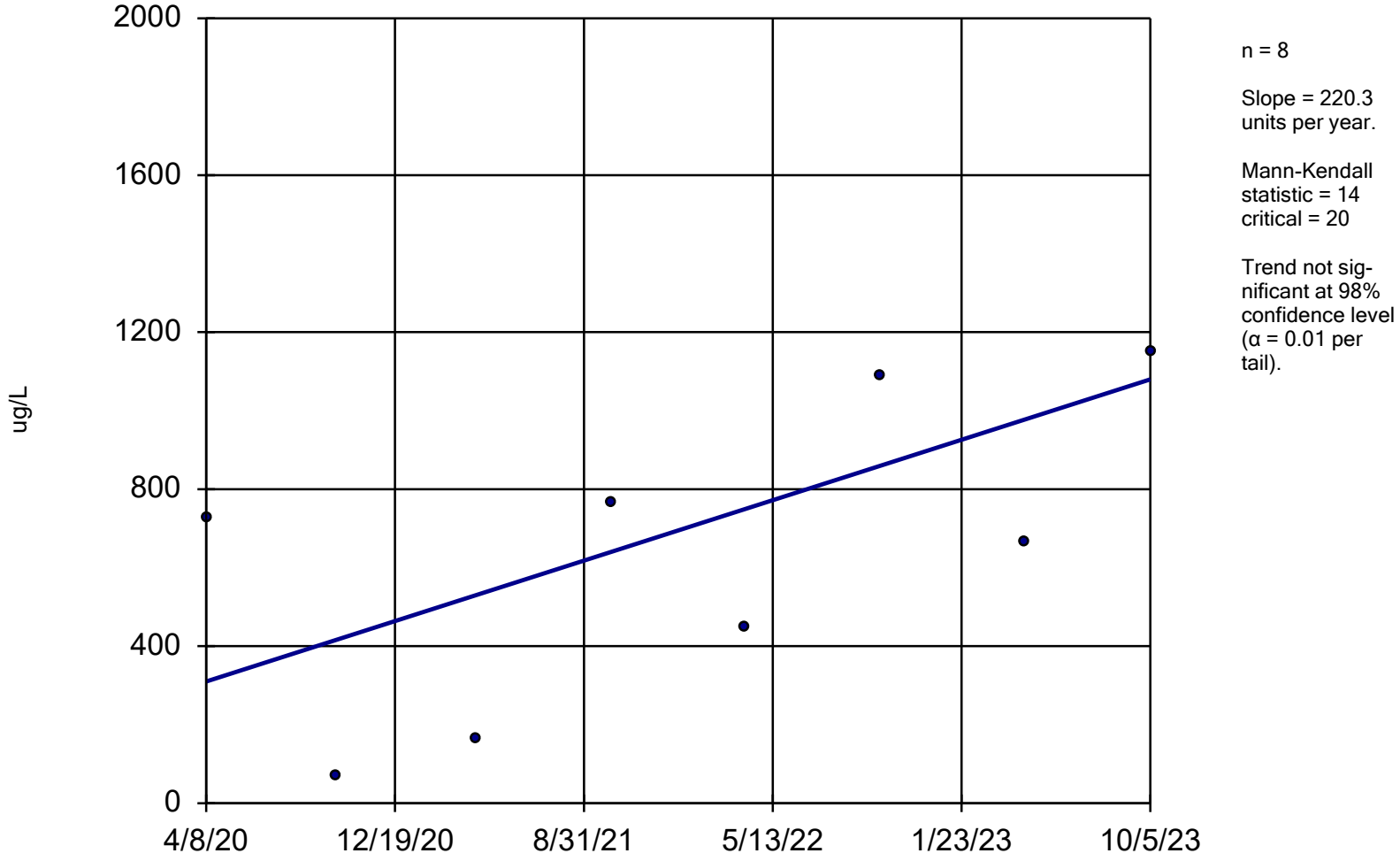
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/17/2024 2:14 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

JRW-MW-15006



n = 8

Slope = 220.3 units per year.

Mann-Kendall statistic = 14
critical = 20

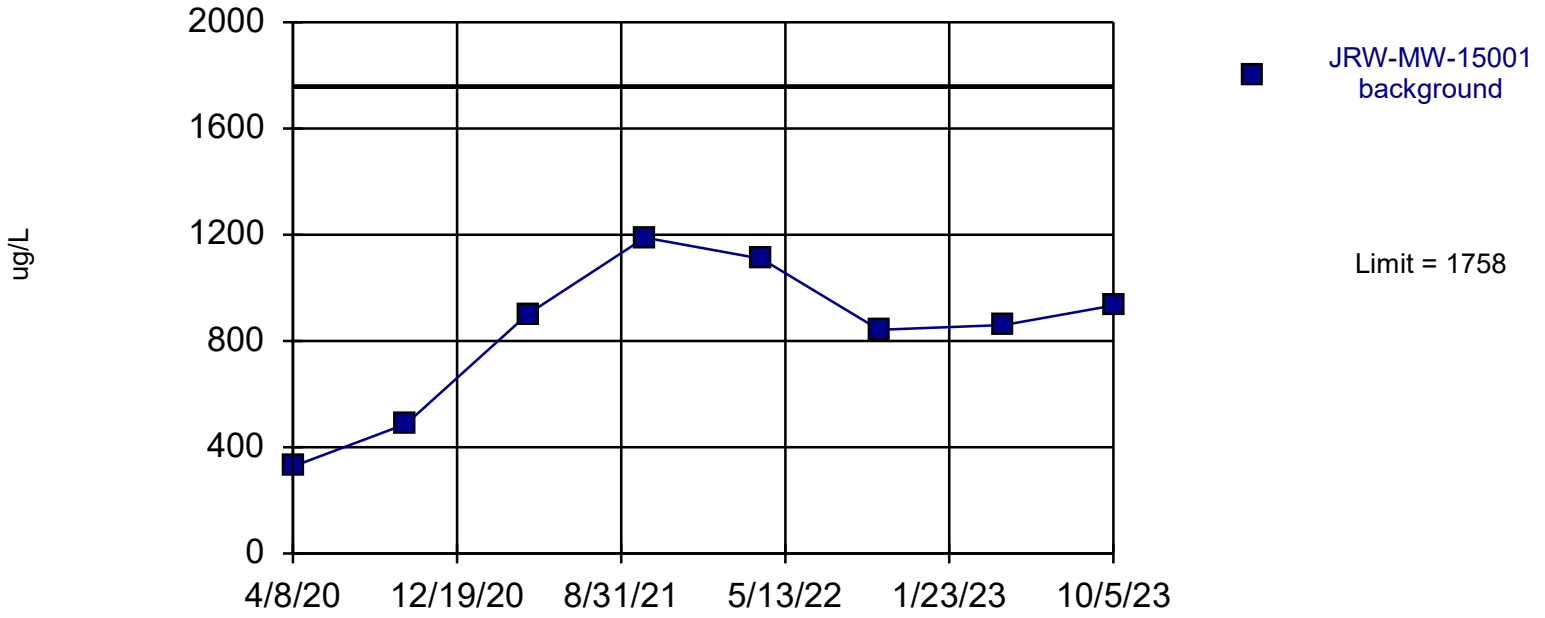
Trend not significant at 98% confidence level (α = 0.01 per tail).

Sen's Slope Estimator Analysis Run 1/17/2024 2:14 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-15001



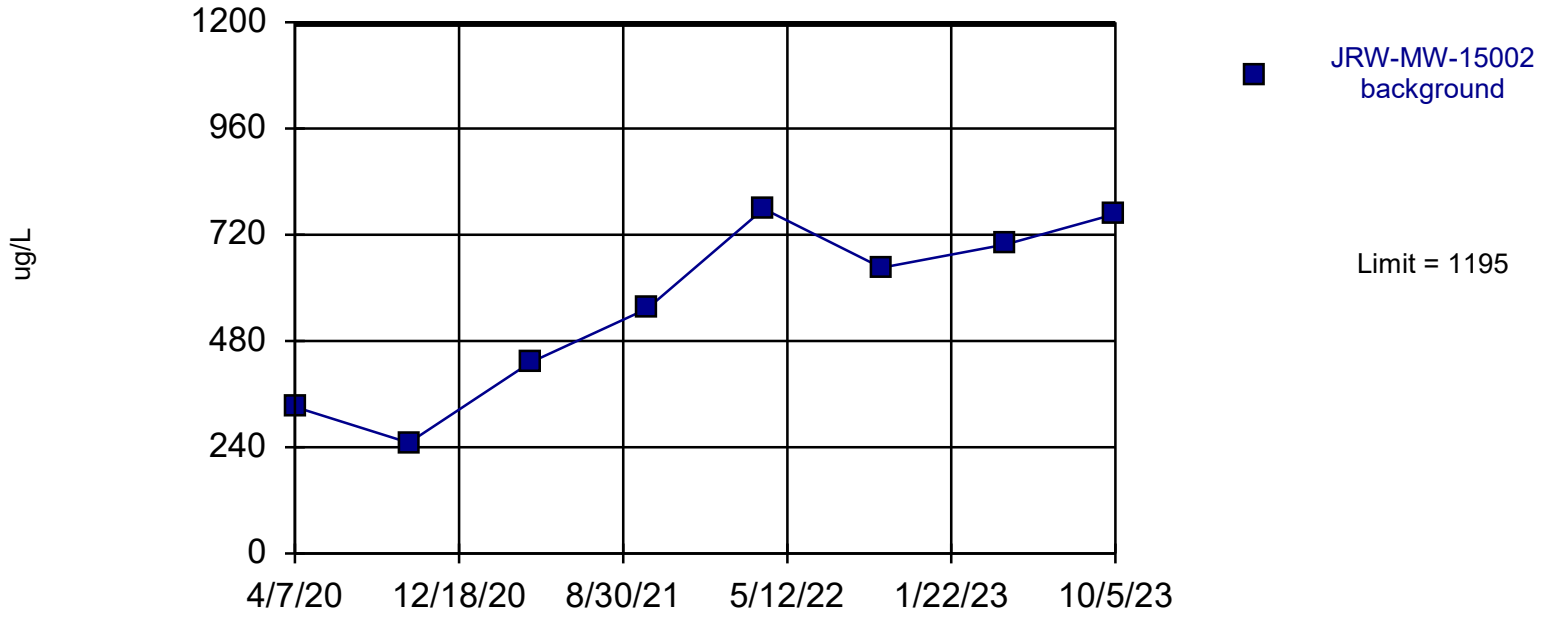
Background Data Summary: Mean=831.8, Std. Dev.=291.3, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9142, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 2:16 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-15002



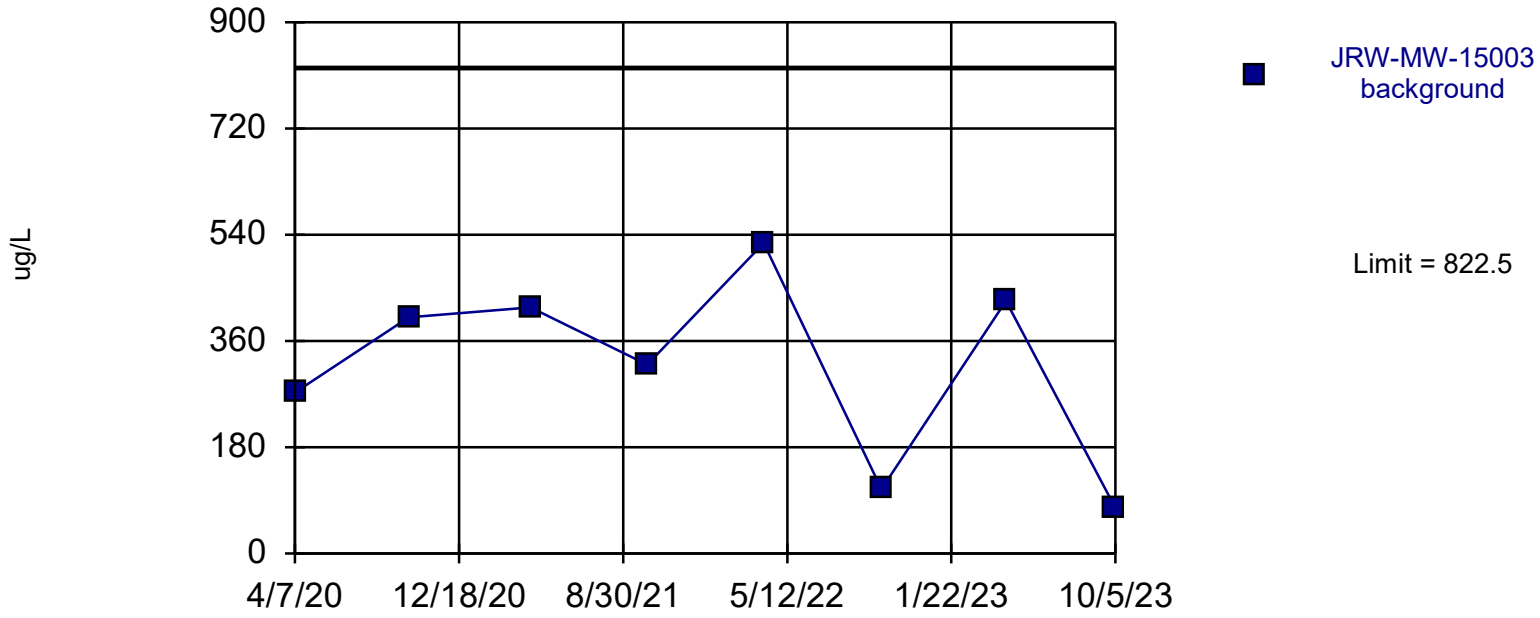
Background Data Summary: Mean=557.1, Std. Dev.=200.7, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9209, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 2:16 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-15003



Background Data Summary: Mean=318.8, Std. Dev.=158.4, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9211, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

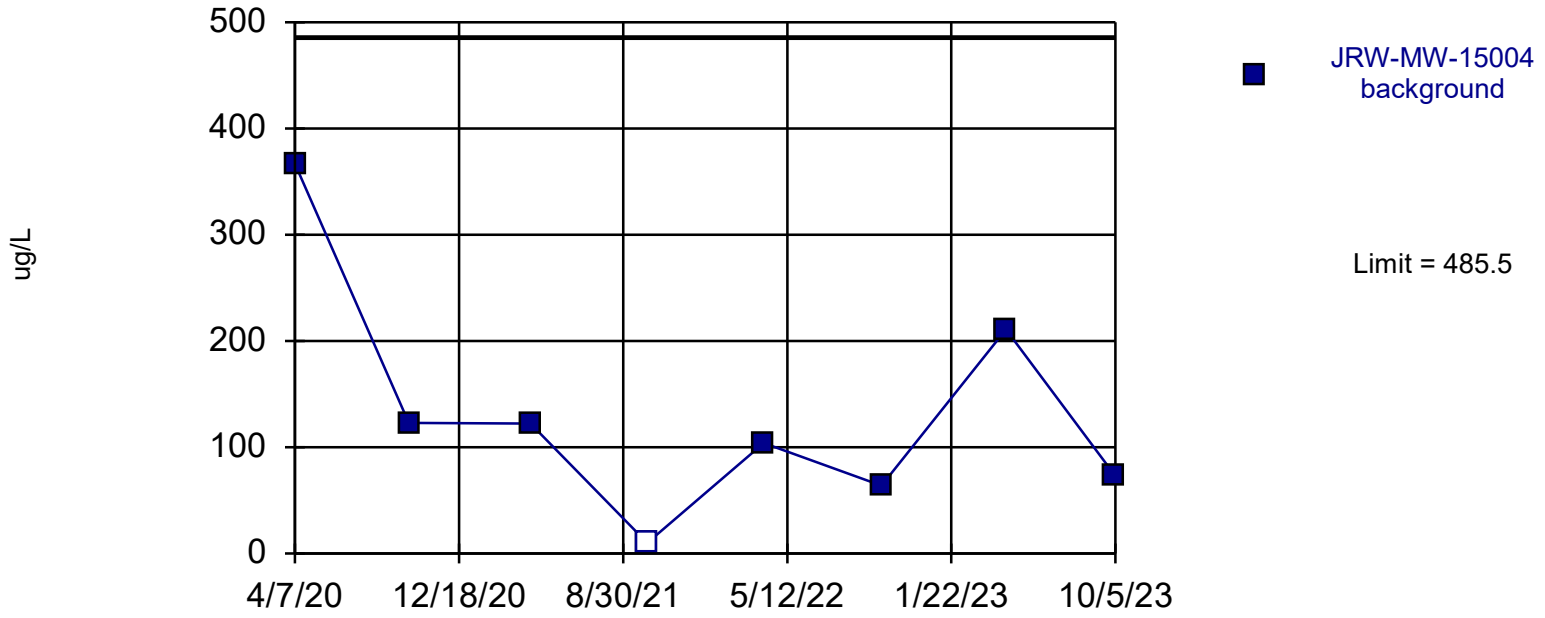
Prediction Limit Analysis Run 1/17/2024 2:16 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Hollow symbols indicate censored values.

Iron, Total

Intrawell Parametric, JRW-MW-15004



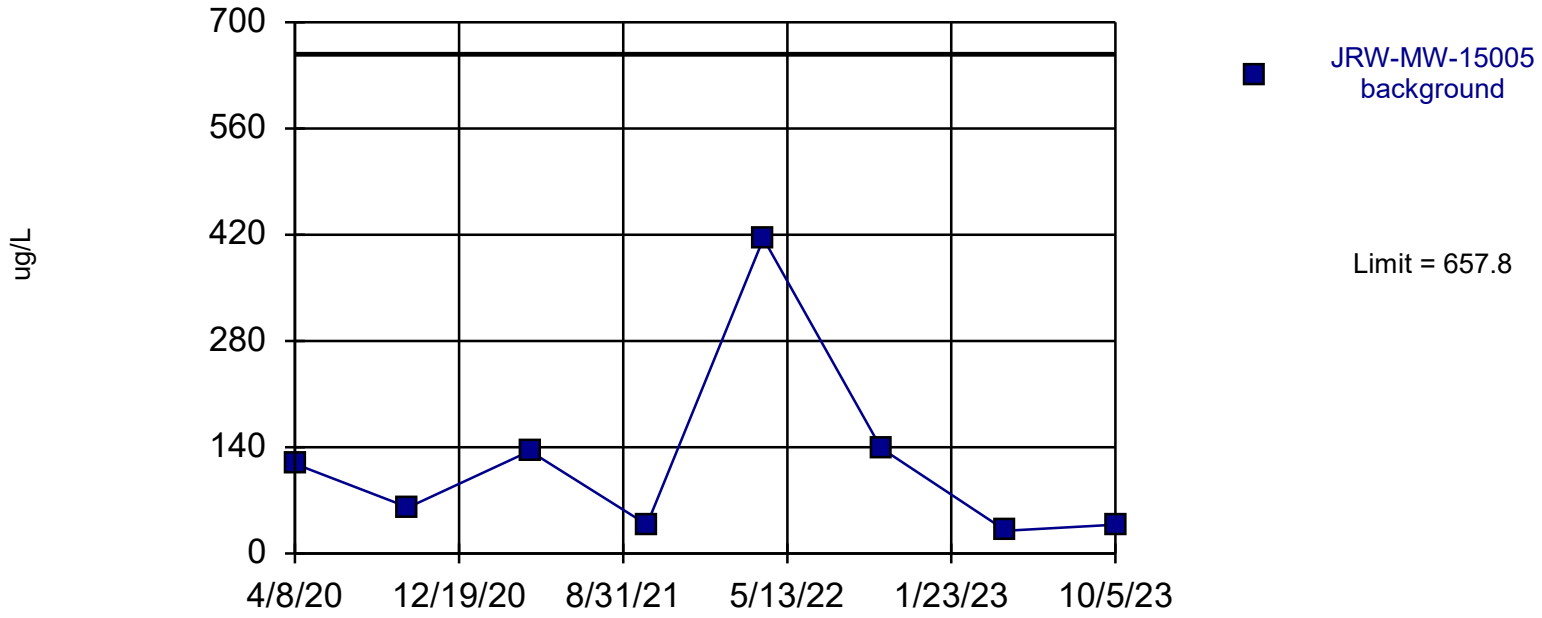
Background Data Summary: Mean=134.3, Std. Dev.=110.4, n=8, 12.5% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8687, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 2:16 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-15005



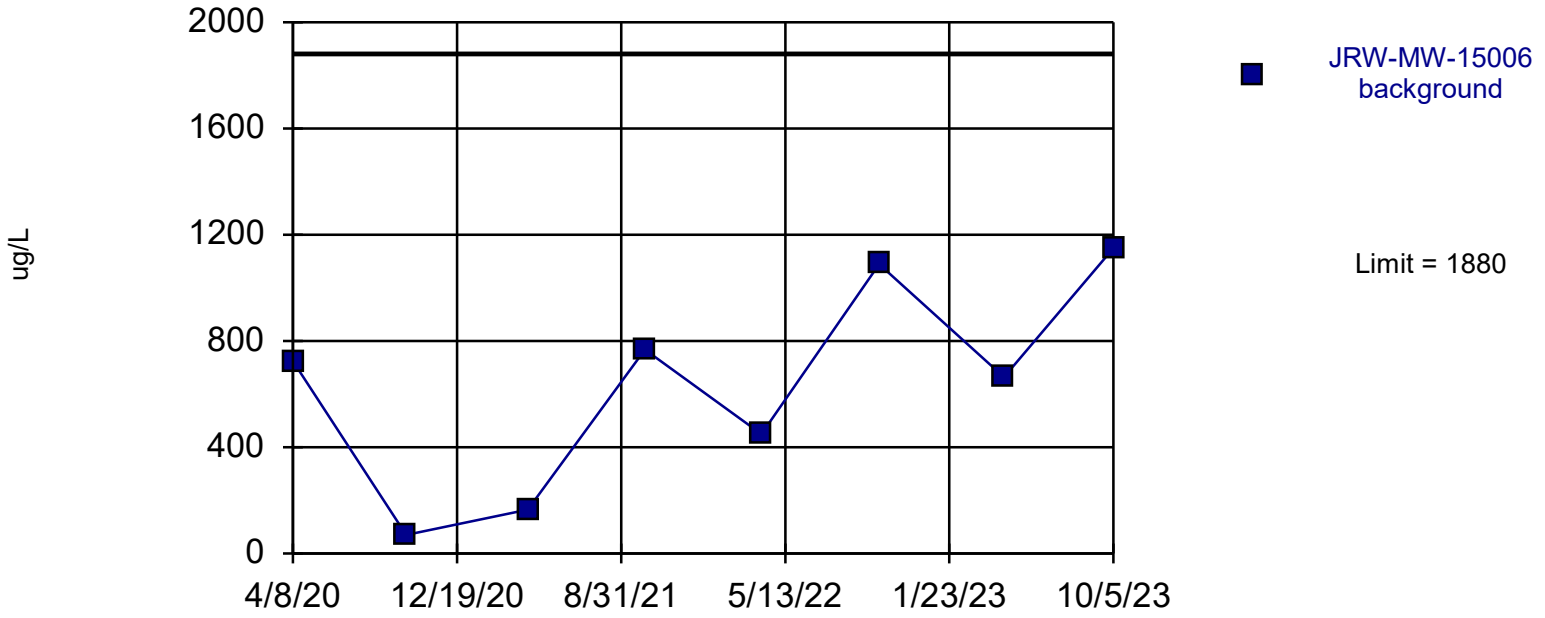
Background Data Summary (based on square root transformation): Mean=10.03, Std. Dev.=4.911, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8411, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 2:16 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-15006



Background Data Summary: Mean=635.3, Std. Dev.=391.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9414, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 2:16 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Pond 6

1540 Eisenhower Pl.
Ann Arbor, MI 48108

T 734.971.7080
TRCcompanies.com

Technical Memorandum

Date:	January 19, 2024
To:	Harold D. Register, Jr., Consumers Energy
From:	Sarah Holmstrom, TRC Kristin Lowery, TRC Rebecca Paalanen, TRC
Project No.:	514397.0000.0000 Phase 1, Task 2
Subject:	Iron Prediction Limit Calculation – Consumers Energy, JR Whiting Pond 6 CCR Unit

Starting in 2015, groundwater monitoring activities have been conducted at the JR Whiting ponds in accordance with the United States Environmental Protection Agency's (U.S. EPA's) Resource Conservation and Recovery Act (RCRA) Coal Combustion Residual rule ("CCR Rule") promulgated on April 17, 2015, as amended, which requires that the owner or operator of a CCR Unit must implement a detection monitoring program and evaluate statistically significant increases above background (40 CFR §257.94). Statistical background limits for Appendix III parameters[1] for the JR Whiting Power Plant Pond 6 were calculated as described in the June 24, 2019 *Background Statistical Evaluation (R1-R12)* technical memorandum, included in the *Annual Groundwater Monitoring Report*.[2]

On December 28, 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). PA 640 was developed to provide the State of Michigan oversight of CCR impoundments and landfills and to better align existing state solid waste management rules and statutes with the CCR Rule. On August 8, 2019 Consumers Energy submitted a revised *JR Whiting Hydrogeological Monitoring Plan, former JR Whiting Power Plant, Erie, Michigan* (2020 HMP) to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905, and the CCR Rule. The 2020 HMP was approved by the EGLE on May 11, 2020 and was implemented beginning in second calendar quarter of 2020.

Iron was incorporated into the detection monitoring program as part of the 2020 HMP in accordance with PA 640. Baseline data for iron was collected over eight semiannual monitoring events from April 2020 through October 2023. This memorandum presents the background iron statistical limits derived for Pond 6.

[1] Detection monitoring parameters defined in Appendix III of the CCR Rule include boron, calcium, chloride, fluoride, sulfate, total dissolved solids, and pH.
[2] TRC. July 2019. Annual Groundwater Monitoring Report – Former JR Whiting Power Plant, Pond 6, Erie, Michigan.

The Pond 6 CCR unit is located adjacent to Lake Erie. Groundwater present within the uppermost aquifer at the CCR unit is confined and protected from CCR constituents by the overlying clay-rich aquitard and is typically encountered around 50 feet below ground surface (bgs) in the limestone beneath the till. Potentiometric surface elevation data from groundwater within the CCR monitoring wells exhibit an extremely low hydraulic gradient across the site with no apparent flow direction. There are minor differences in hydraulic head across the monitoring wells (ranging from zero up to 0.24 feet across Pond 6 from event to event from November 2016 through March 2019), indicating that the potentiometric surface is flat the majority of the time. In the few instances since November 2016 where a slight gradient was observed and calculable, the direction of the flow potential was slightly to the south and west. Given that the hydraulic gradient is often so low, groundwater flow across Pond 6 is frequently incalculable and often stagnant. Based on potentiometric data, horizontal travel times within the aquifer are low, on the order of 5 ft/year or less, and it is likely that groundwater proximal to the monitoring wells is stagnant or slightly moving back and forth across the borehole, potentially extending the residence time of groundwater in the vicinity of each monitoring well and resulting in limited temporal variability in the dataset.

As a result of site-specific geologic and hydrogeologic conditions, downward migration of CCR leachate is not expected, and groundwater data continue to show no impacts from the CCR unit. This is supported by the information presented in the Annual Groundwater Monitoring Reports prepared from 2019 through 2023 (TRC, July 2019 through January 2024), which provide further details regarding site-specific hydrogeology and groundwater analytical results. Per the 2020 HMP, an intrawell statistical approach is being implemented for detection monitoring. This statistical method was selected based on the hydrogeology at the site, particularly the extremely low to non-existent gradient or lack of flow direction, in addition to the presence of 40 to 50 feet of laterally extensive clay-rich till that acts as a natural hydraulic barrier across the site and lack of observed impacts from the CCR unit.

The background data for the Pond 6 CCR unit were evaluated in accordance with the *Groundwater Statistical Evaluation Plan* (Stats Plan) (TRC, February 2020). The site groundwater data are maintained within a database accessible through Sanitas™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in U.S. EPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (Unified Guidance; UG). Within the Sanitas™ statistical program (and the UG), intrawell prediction limits were selected to perform the statistical calculation for background/baseline limits. Use of prediction limits is recommended by the UG to provide high statistical power and is an acceptable approach for intrawell detection monitoring under the CCR Rule and Part 115. Prediction limits (PLs) were calculated for iron based on a single future value. The following narrative describes the methods employed and the results obtained and the Sanitas™ output files are included as an attachment.

The set of downgradient monitoring wells utilized for compliance in the Pond 1 & 2 detection monitoring program includes JRW-MW-16001 through JRW-MW-16006. As described above, an intrawell statistical approach is being implemented for detection monitoring at Pond 6. 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/baseline dataset from that same well. The baseline evaluation included the following steps:

- Review of data quality reports for the baseline/background data sets for iron;
- Graphical representation of the baseline data as time versus concentration (T v. C) by well/constituent pair;
- Outlier testing of individual data points that appear from the graphical representations as potential outliers;
- Evaluation of percentage of non-detects for each baseline/background well-constituent (w/c) pair;
- Distribution of the data; and
- Calculation of the intrawell PL for each monitoring well for iron.

The results of these evaluations are presented and discussed below.

Data Quality

Data from each sampling round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The review was completed using the following quality control (QC) information which at a minimum included chain-of-custody forms, investigative sample results including blind field duplicates, and matrix spike and matrix spike duplicates (MS/MSDs) recoveries, and, as provided by the laboratory, method blanks, laboratory control spikes, and laboratory duplicates.

The data were found to be complete and usable for the purposes of the CCR monitoring program.

Time versus Concentration Graphs

The time versus concentration (T v. C) graphs (Sanitas™ Output Files) do not show potential or suspect outliers for iron.

While variations in results are present, the graphs show consistent baseline data and do not suggest that data sets, as a whole, likely have overall trending or seasonality. However, as discussed above, due to lack of groundwater flow potential there is limited temporal independence in the background dataset collected within the HMP implementation timeline. Accordingly, the data sets are of relatively short duration for making such observations regarding overall trending or seasonality. This will be addressed over time as more data become available and are incorporated into the background dataset.

Outlier Testing

The baseline T v. C graphs (Sanitas™ Output Files) and probability plots did not show potential outliers; therefore, outlier testing was not performed for the baseline data sets. Had candidate values been present, the Dixon's Outlier Test in Sanitas™ would have been used to evaluate potential outlier removal.

Percentage of Non-detects

Background concentrations that are reported as non-detects were evaluated differently depending upon the percentage of non-detects (e.g., less than 15%, 15 to 50%, and greater than 50%) for the reported concentrations for a given parameter at a given monitoring well. Non-detect data were handled in accordance with the procedures in the Stats Plan.

Distribution of the Data Sets

The distribution of each data set is determined by the Sanitas™ software during calculation of the upper PL. The Shapiro-Wilk test is used to test normality of data sets for sample sizes fewer than 50. If the data appear to be non-normal, mathematical transformations of the data may be utilized such that the transformed data follow a normal distribution (e.g., lognormal distributions). Alternatively, non-parametric tests may be utilized when data cannot be normalized. Table 1 summarizes the distributions determined by the Sanitas™ software.

Upper Prediction Limits

Table 1 presents the calculated PLs (with one future event) for the baseline data sets. The PL is calculated based on the distribution listed on the table. For non-normal background datasets, a non-parametric prediction limit is utilized, resulting in the highest value from the background dataset as the PL. The achieved confidence and/or coverage rates depend entirely on the number of background data points, and coverage rates for various confidence levels are shown in the Sanitas™ outputs for non-parametric prediction limits. Verification resampling (1 of 2) is recommended per the Stats Plan and UG to achieve the performance standards specified in the CCR Rule and the 2020 HMP.

Table 1
Summary of Iron Baseline Data Distributions and Intrawell Prediction Limits

Well	Distribution	Prediction Limit
JRW-MW-16001	Normal	230
JRW-MW-16002	Normal	510
JRW-MW-16003	Normal	630
JRW-MW-16004	Normal	750
JRW-MW-16005	Normal	940
JRW-MW-16006	Normal	400

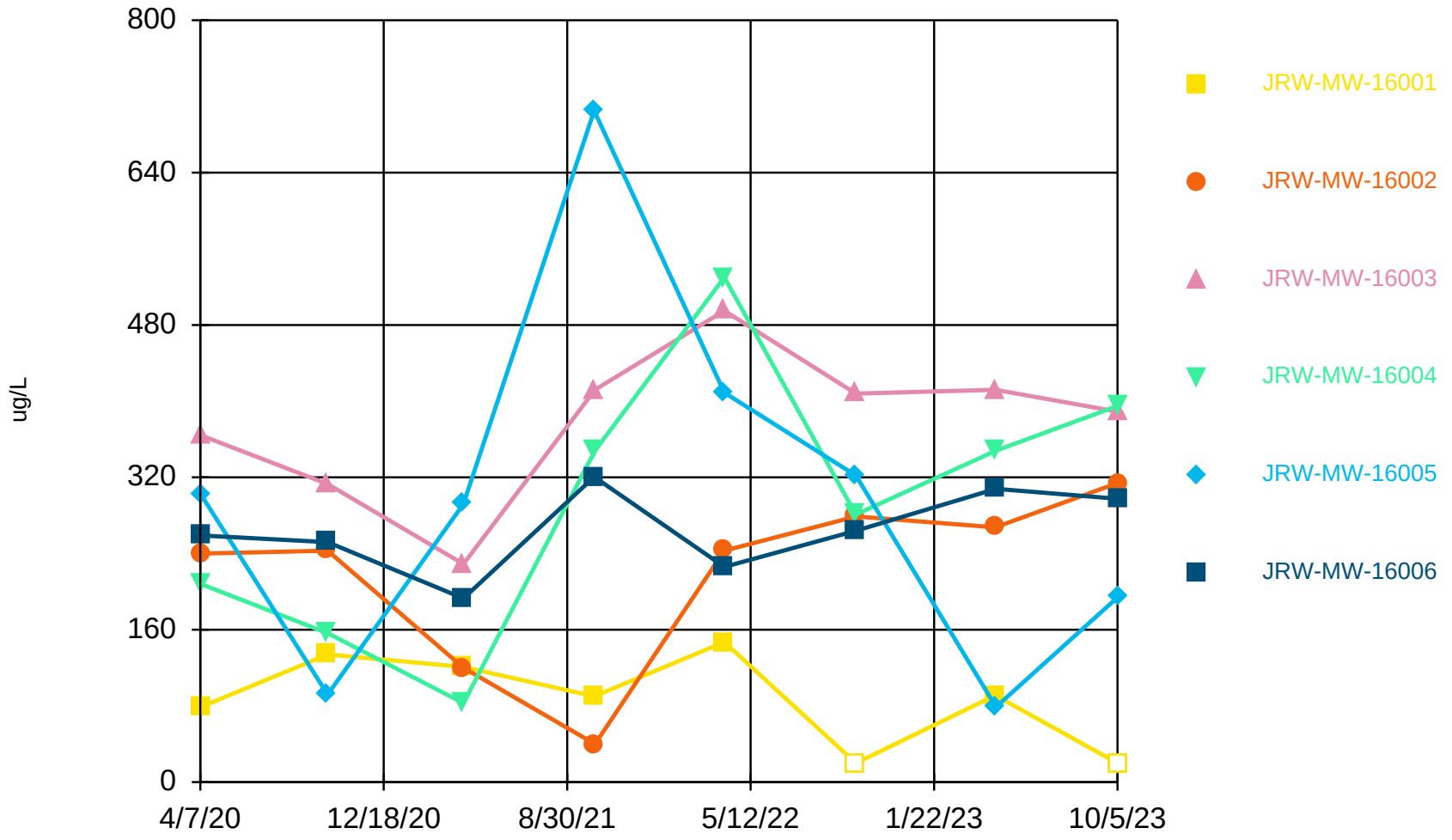
Attachments:

Attachment 1 Sanitas™ Output

Attachment 1
Sanitas™ Output

Hollow symbols indicate censored values.

Iron, Total

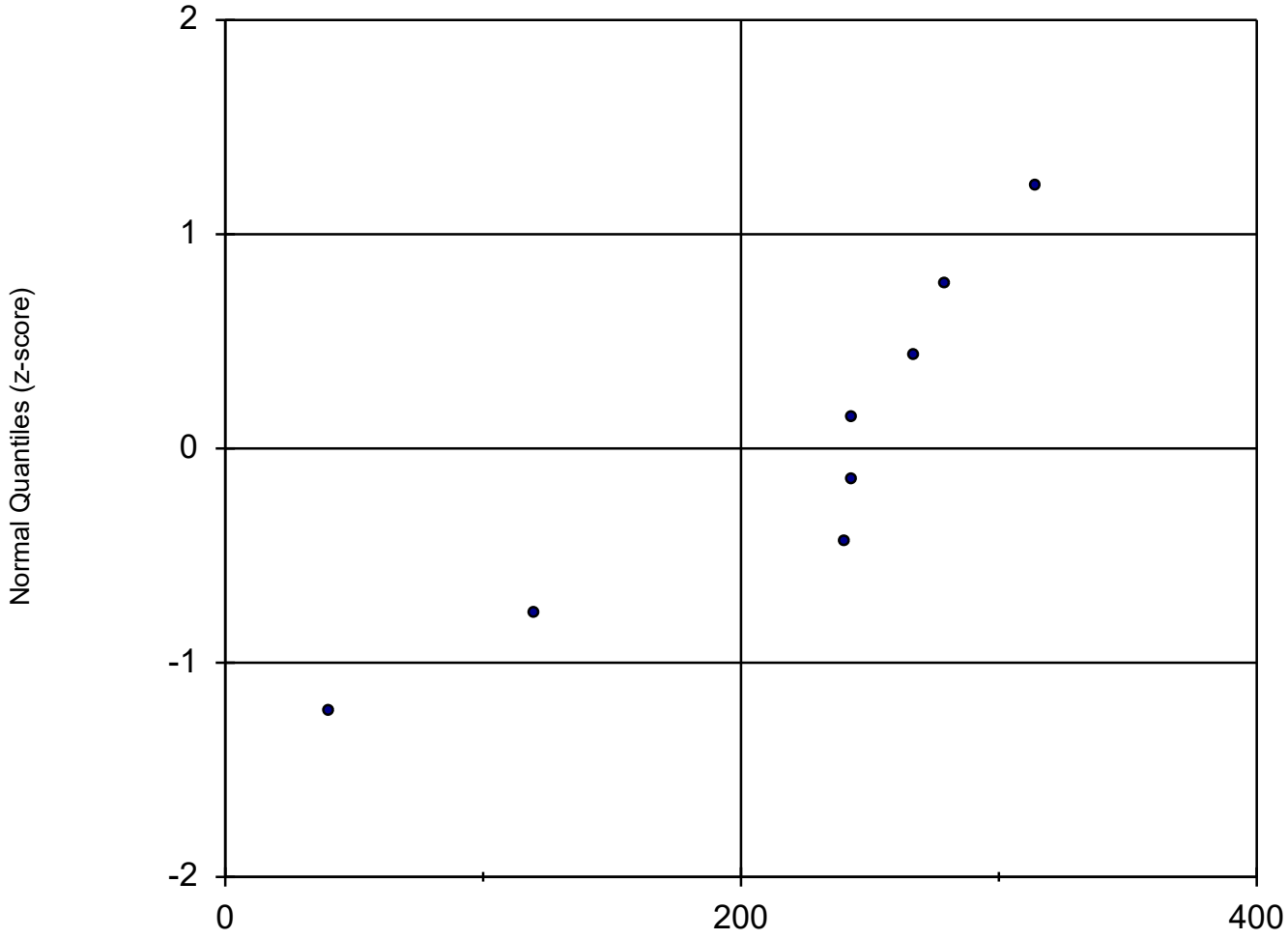


Time Series Analysis Run 12/26/2023 3:09 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

JRW-MW-16002



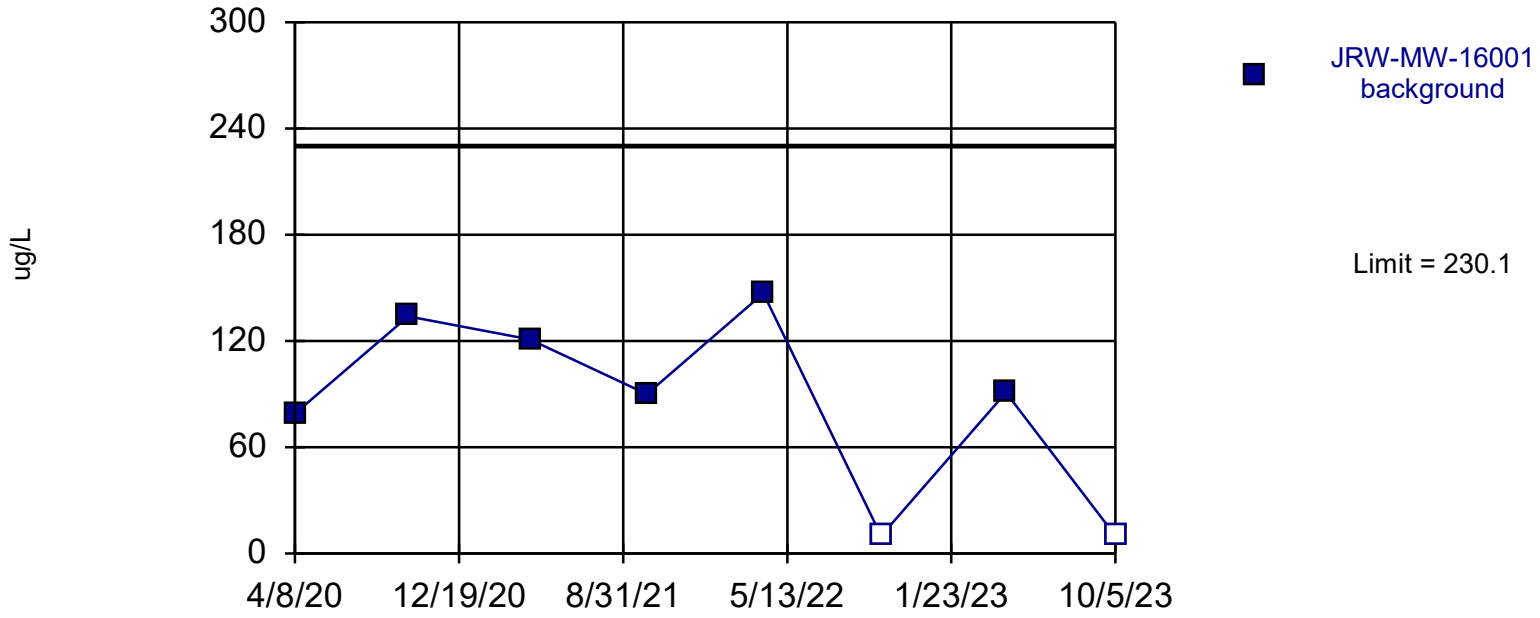
Probability Plot Analysis Run 1/17/2024 4:21 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Hollow symbols indicate censored values.

Iron, Total

Intrawell Parametric, JRW-MW-16001



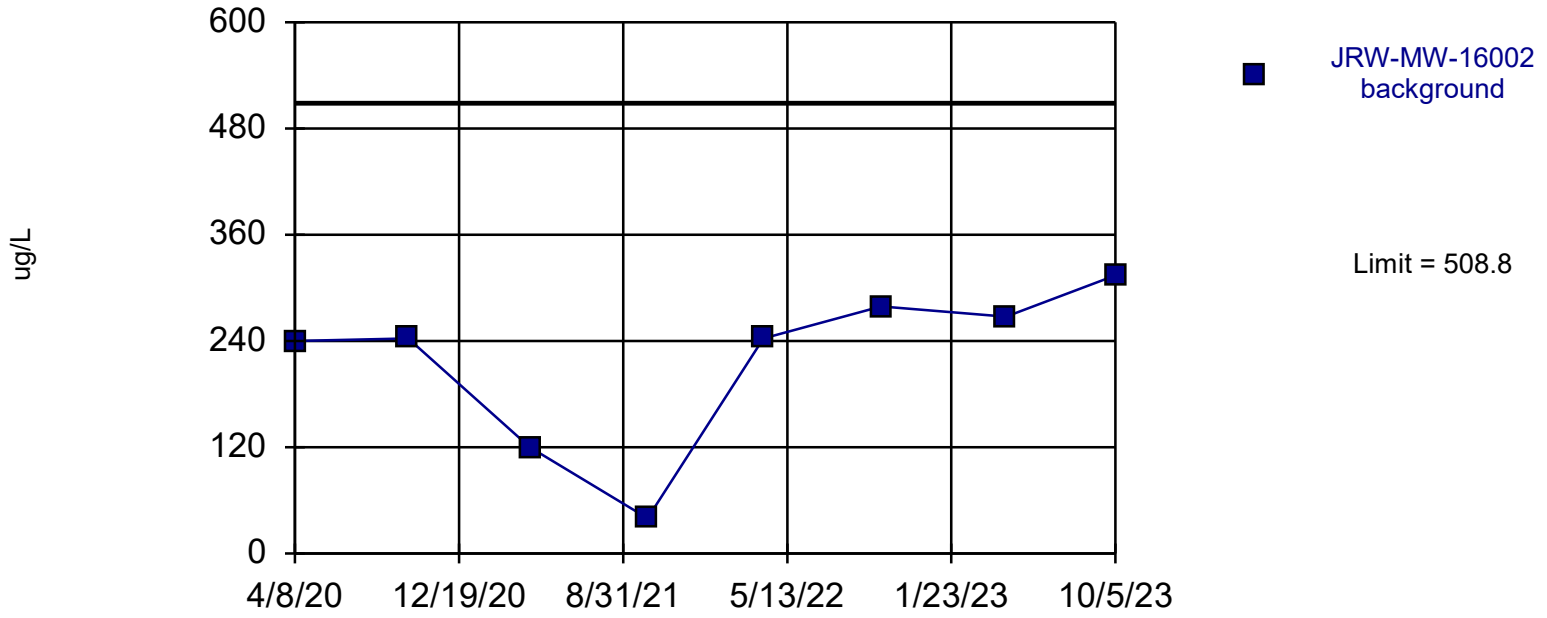
Background Data Summary (after Kaplan-Meier Adjustment): Mean=87.75, Std. Dev.=44.76, n=8, 25% NDs. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8882, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 4:22 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-16002



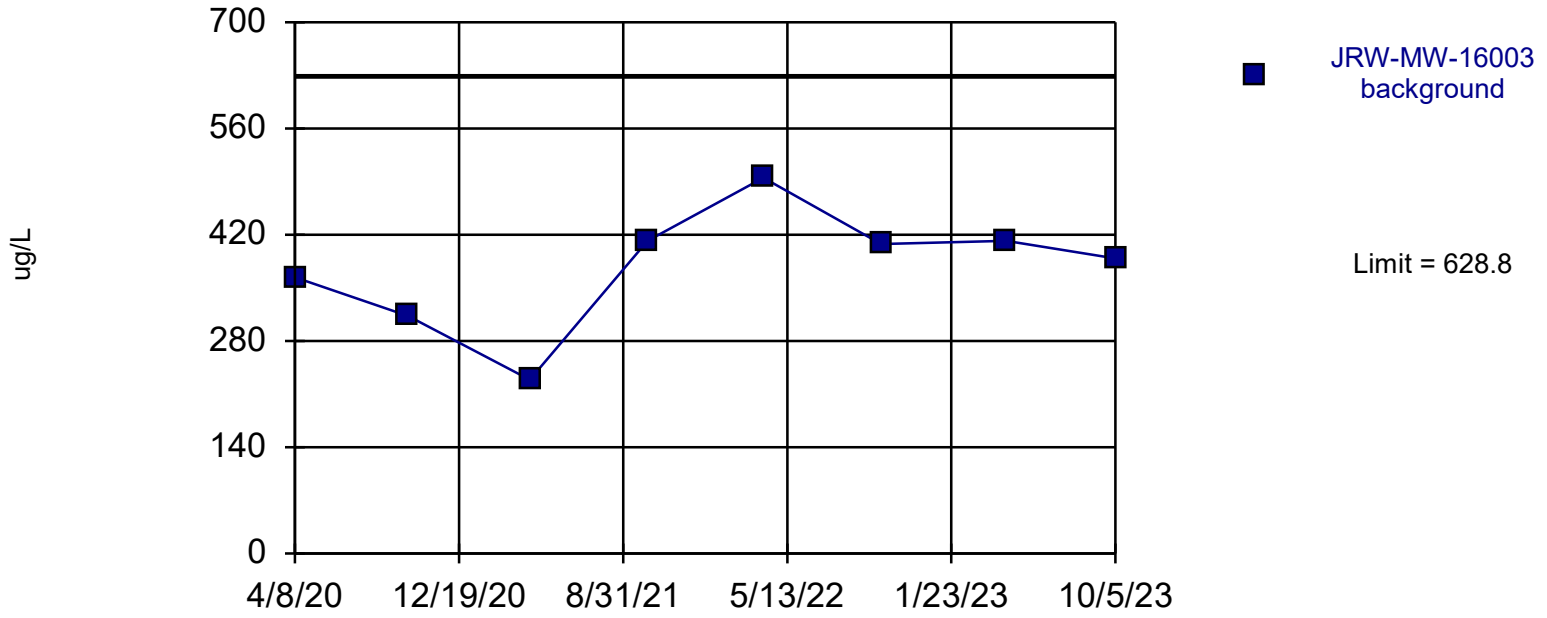
Background Data Summary: Mean=218.3, Std. Dev.=91.35, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8356, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 4:22 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-16003



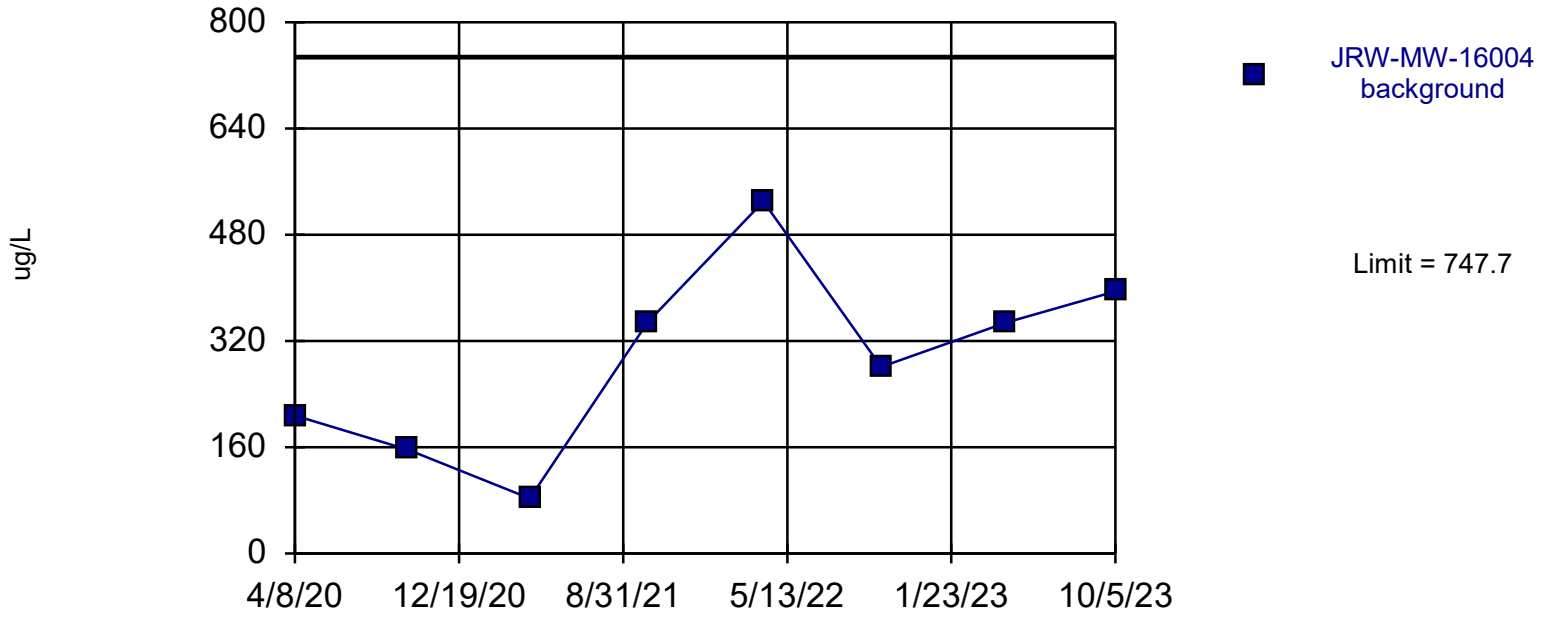
Background Data Summary: Mean=377.8, Std. Dev.=78.96, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9325, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 4:22 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-16004



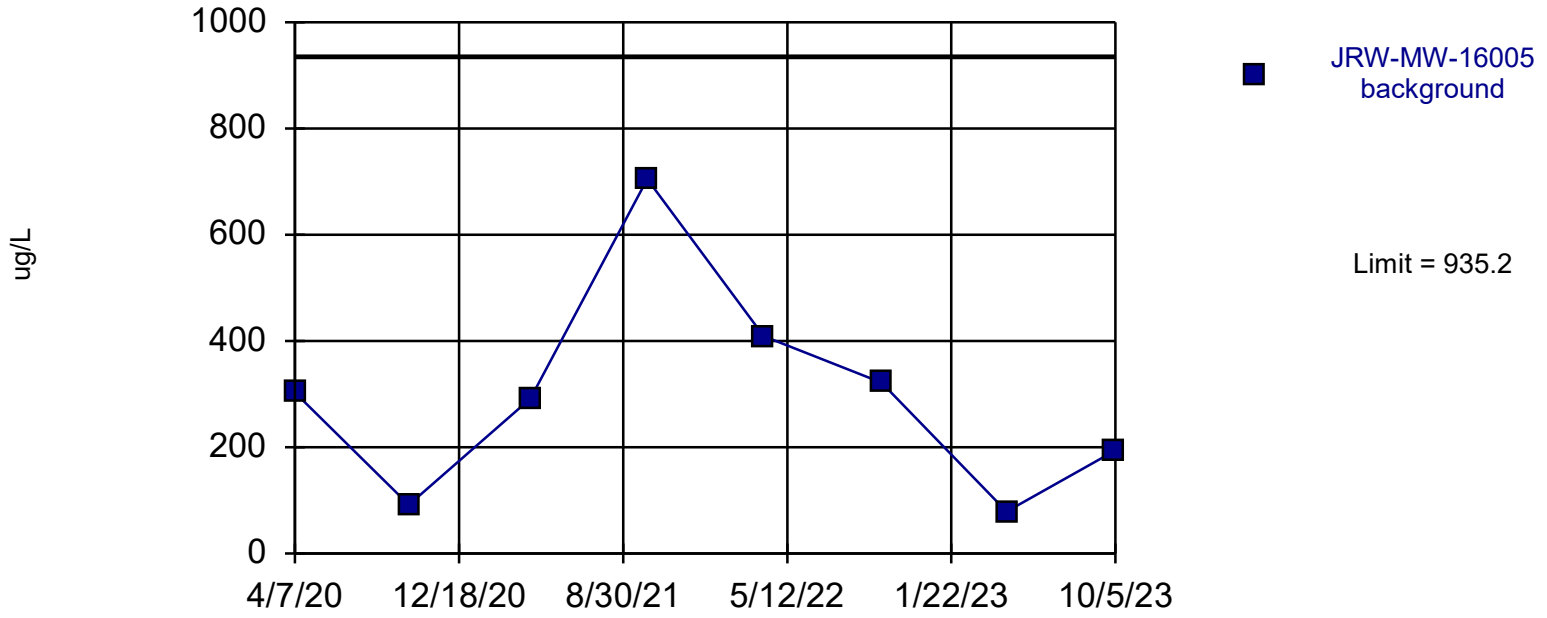
Background Data Summary: Mean=293.7, Std. Dev.=142.8, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9808, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 4:22 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-16005



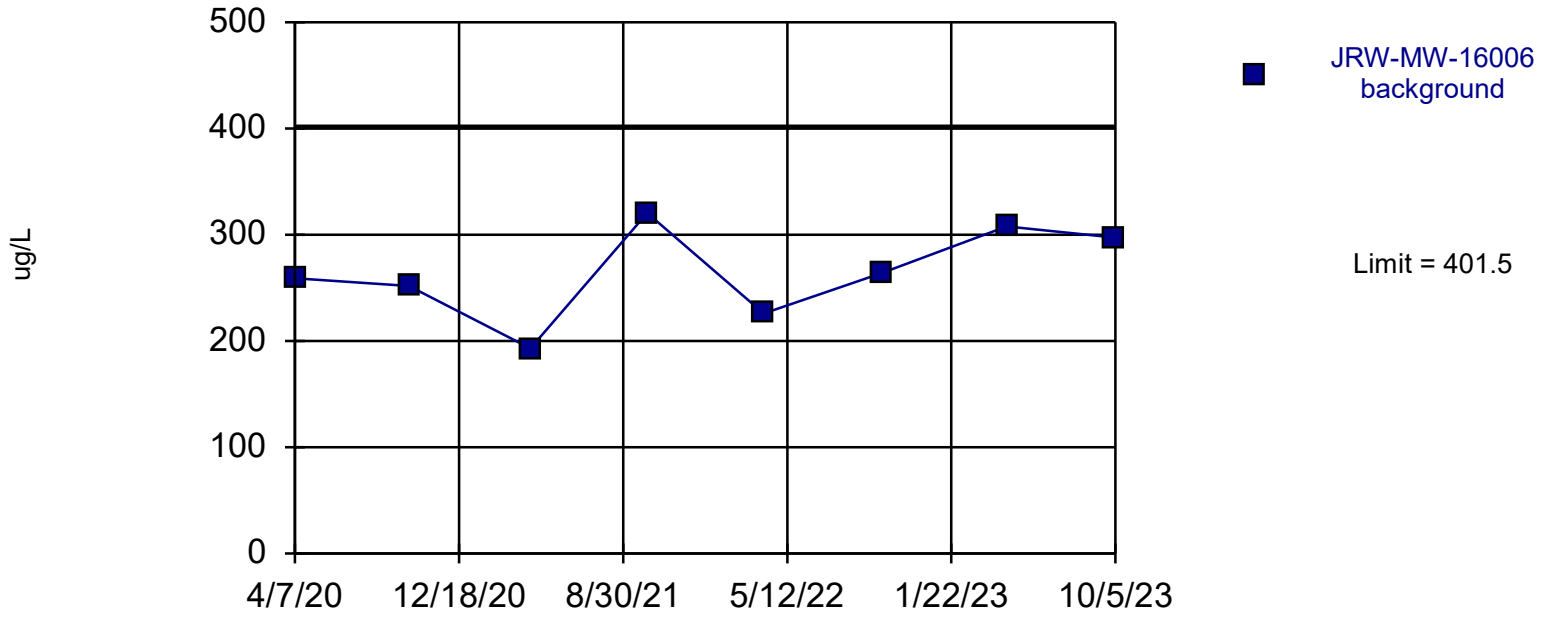
Background Data Summary: Mean=299.5, Std. Dev.=199.9, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9009, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 4:22 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe

Iron, Total

Intrawell Parametric, JRW-MW-16006



Background Data Summary: Mean=265, Std. Dev.=42.92, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9609, critical = 0.749. Report alpha = 0.01. Assumes 1 future value.

Prediction Limit Analysis Run 1/17/2024 4:22 PM

Client: Consumers Energy Data: JRW_All_App III_w_Fe