2021 Annual Groundwater Monitoring and Corrective Action Report

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

Erie, Michigan

January 2022

Prepared For:

Consumers Energy

Prepared By:

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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, 2021 to December 31, 2021. 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 2021 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 2021 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 were identified for any of the Appendix III constituents during the 2021 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 2021 semiannual monitoring events were completed in April and October 2021 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 2021 monitoring activities.

No monitoring wells were installed or decommissioned in 2021. Key actions in 2021 included performing detection monitoring for Pond 1&2 and Pond 6 and conducting verification sampling on one well. No problems were encountered and thus no actions were needed to resolve problems. Key activities projected for 2022 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 2021. No SSIs were recorded for the 2021 monitoring period; 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 28, 2021

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 2021 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 Pan, 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. Engineer, Consumers Energy Environmental Services
Email: michelle.marion@cmsenergy.com Phone: (517) 937-9407

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

First Semiannual 2021 Groundwater Monitoring Report

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

Erie, Michigan

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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 (existing 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 2021 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 second calendar quarter of 2021. 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, dated July 5, 2013 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 performed pursuant to the CCR Rule until implementation of the 2020 HMP. In the *Second Semiannual 2020 Groundwater Monitoring Report* for the JRW Pond 1&2 and Pond 6 (Second Semiannual 2020 Report) (TRC, January 2021), Consumers Energy reported that no potential statistically significant increases (SSIs) were noted during the second 2020 semiannual detection monitoring event. Therefore, Consumers Energy continued detection monitoring in the first half of 2021 at Pond 1&2 and Pond 6 pursuant to §257.94 of the CCR

Rule, and the HMP.

This First Semiannual 2021 Report presents the monitoring results and the statistical evaluation of the detection monitoring constituents (Section 11511a(3)(c) of Part 115) for the April 2021 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 Ponds 1 and 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 confined and protected from CCR constituents by the overlying clay-rich aquitard and is typically encountered around 50 feet below ground surface (ft 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 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, which established the monitoring well locations for 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 2021 Groundwater Monitoring

Consumers Energy Laboratory Services personnel performed gauging and sampling of monitoring wells associated with Pond 1&2 and Pond 6 on April 8, 2021. Groundwater monitoring was performed in accordance with the HMP. Groundwater samples collected during the April 2021 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, 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 2021 groundwater sampling event. The QA/QC samples per CCR unit consisted of one field blank, one equipment blank, one field duplicate (JRW-MW-15004 at Pond 1&2 and JHC-MW-16006 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 2021 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 2021), 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) from Pond 1&2 and slightly to the south and west from Pond 6.

The most pronounced groundwater gradient between November 2016 and April 2021 at Pond 1&2 was observed in 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.

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 8, 2021 was calculated using well pair JRW-MW-15003/JRW-MW-15006. The maximum head difference across the Ponds 1&2 monitoring network showed a very slight horizontal gradient of approximately 0.00007 ft/ft with no clear discernable overall flow direction across Pond 1&2. 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 0.014 feet/day (approximately 5.2 feet/year). However, the actual gradient is much lower when considering the rest of the monitoring wells across Pond 1&2. The Pond 1&2 groundwater elevations measured across the Site during the April 2021 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.

Pond 6

During the April 2021event, the average hydraulic gradient of 0.000043 ft/ft was calculated using well pairs JRW-MW-16001/JRW-MW-16006 and JRW-MW-16002/JRW-MW-16004 with a minimal discernable overall flow direction across Pond 6 toward the southwest. This inferred flow direction is similar to that identified in October 2020, but opposite of the slight discernable flow direction observed to the north during the April 2020 event. 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, the result average groundwater flow rate is approximately 0.005 feet/day (approximately 1.9 feet/year). Groundwater elevations measured across the Site during the April 2021 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 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 2021 groundwater data in accordance with the detection monitoring program.

3.1 Establishing Background Limits

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.

Pond 6

Per the HMP, background limits were established for the detection monitoring constituents following the twelfth round of background monitoring 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 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 Second 2021 Semiannual Event (April 2021)

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 2021 detection monitoring parameters, a resample for the following parameter was collected in accordance with the 2020 HMP:

- Calcium at JRW-MW-15005

The data quality review had also indicated a potential high bias for calcium further indicating that a resample is appropriate.

3.3 Verification Resampling for the First 2021 Semiannual Event

Verification resampling is performed per Attachment C of 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 resampling was conducted on June 6, 2021, by Consumers Energy. A groundwater sample was collected for calcium analysis at monitoring well JRW-MW-15005 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 (Pond 1&2 analytical data compared to background). The associated data quality review is included in Appendix A.

The calcium resample result at JRW-MW-15005 was within the prediction limit; consequently, the initial potential SSI from the April 2021 event is not confirmed. Therefore, in accordance with the HMP and the Unified Guidance, the initial exceedance is not statistically significant, and there are no SSIs for the April 2021 monitoring event.

As no SSIs were found, detection monitoring will be continued at the Pond 1&2 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 2021 semiannual monitoring event.

3.4 Data Comparison to Background Limits – Pond 6 Second 2021 Semiannual Event (April 2021)

The data comparisons of monitoring wells JRW-MW-16001 through JRW-MW-16006 for the April 2021 groundwater monitoring event are presented on Table 4.

There were no SSIs compared to background for any of the constituents.

4.0 Conclusions and Recommendations

No SSIs over background limits were identified at either Pond 1&2 or Pond 6 during the April 2021 monitoring event. Therefore, Consumers Energy will continue with the detection monitoring program at the JRW Pond 1&2 and Pond 6 CCR units in conformance with the HMP.

No corrective actions were needed or performed for either Pond 1&2 or Pond 6. The second 2021 semiannual monitoring event for each of these units is scheduled for the fourth calendar quarter of 2021.

5.0 References

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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 2021

JR Whiting Ponds 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 8, 2021	
										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	6.42	575.89
JRW-MW-16008	579.95	582.83	Limestone	68.0	to	73.0	512.0	to	507.0	6.80	576.03
JRW-MW-16009	579.90	582.60	Limestone	69.0	to	79.0	510.9	to	500.9	6.68	575.92
Ponds 1 & 2											
JRW-MW-15001	NM	581.39	Limestone	NM	to	NM	NM	to	NM	5.23	576.16
JRW-MW-15002	NM	590.17	Limestone	NM	to	NM	NM	to	NM	14.02	576.15
JRW-MW-15003	NM	587.23	Limestone	NM	to	NM	NM	to	NM	11.06	576.17
JRW-MW-15004	NM	589.32	Limestone	NM	to	NM	NM	to	NM	13.19	576.13
JRW-MW-15005	NM	588.28	Limestone	NM	to	NM	NM	to	NM	12.16	576.12
JRW-MW-15006	NM	580.48	Limestone	NM	to	NM	NM	to	NM	4.37	576.11
Pond 6											
JRW-MW-16001	589.19	592.33	Limestone	71.0	to	81.0	518.2	to	508.2	16.25	576.08
JRW-MW-16002	585.78	588.69	Limestone	81.0	to	91.0	504.8	to	494.8	12.62	576.07
JRW-MW-16003	586.19	589.01	Limestone	73.0	to	83.0	513.2	to	503.2	12.98	576.03
JRW-MW-16004	586.48	589.34	Limestone	75.0	to	85.0	511.5	to	501.5	13.34	576.00
JRW-MW-16005	589.29	592.14	Limestone	78.0	to	88.0	511.3	to	501.3	16.10	576.04
JRW-MW-16006	588.26	591.04	Limestone	79.0	to	89.0	509.3	to	499.26	15.03	576.01

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.

NM = Not measured

Table 2
Summary of Field Parameter Results: April 2021
JR Whiting Ponds 1 & 2, and Pond 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	4/8/2021	0.26	-155	7.6	1,102	12.4	7.14
JRW-MW-15002	4/8/2021	0.21	-167.3	7.7	1,129	12.7	4.02
JRW-MW-15003	4/8/2021	0.37	46.03	7.6	994	12.4	3.99
JRW-MW-15004	4/8/2021	0.53	33.2	7.6	976	12.9	4.35
JRW-MW-15005	4/8/2021	2.07	34.3	7.7	887	13.6	4.95
	6/4/2021	1.16	61.4	7.6	891	14.9	5.89
JRW-MW-15006	4/8/2021	0.19	-82.6	7.5	999	12.3	5.36
Pond 6							
JRW-MW-16001	4/8/2021	0.32	-142.9	7.8	761	12.2	1.41
JRW-MW-16002	4/8/2021	0.35	-155.2	7.8	975	12.3	1.83
JRW-MW-16003	4/8/2021	0.43	-141.6	7.5	1,090	12.1	4.41
JRW-MW-16004	4/8/2021	0.31	-115.3	7.5	1,233	12.3	2.18
JRW-MW-16005	4/8/2021	0.39	-134.6	7.6	897	12.1	2.19
JRW-MW-16006	4/8/2021	0.33	-144.7	7.6	879	12.4	8.16

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

Table 3

Comparison of Groundwater Monitoring Parameter Results to Background Limits – April and June 2021

JR Whiting Ponds 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:		4/8/2021	PL	4/8/2021	PL	4/8/2021	PL	4/8/2021	PL	4/8/2021	6/4/2021[(1)]	PL	4/8/2021	PL
Constituent	Unit	Data		Data		Data		Data		Data			Data	
Appendix III														
Boron	ug/L	180	240	187	220	203	230	219	270	181	--	270	193	250
Calcium	mg/L	151	180	141	180	128	160	132	140	**123**	119	120	135	140
Chloride	mg/L	39.4	55	36.4	56	37.5	55	42.0	56.0	28.9	--	46.0	37.8	53
Fluoride	ug/L	1,160	1,600	1,280	1,900	1,250	1,800	1,190	1,800	1,120	--	1,700	1,130	1,700
Sulfate	mg/L	378	474	375	500	312	440	306	390	273	--	350	306	410
Total Dissolved Solids	mg/L	870	1,000	815	1,100	709	940	727	880	635	--	840	741	920
pH, Field	SU	7.6	6.8 - 8.4	7.7	7.2 - 7.9	7.6	7.3 - 8.3	7.6	7.2 - 8.0	7.7	7.6	7.3 - 8.6	7.5	7.0 - 9.0
MI Part 115														
Iron	ug/L	902	n < 8	432	n < 8	417	n < 8	134	n < 8	135	--	n < 8	165	n < 8

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not analyzed.

n = number of data points.

All metals were analyzed as total unless otherwise specified.

Bold font indicates an exceedance of the Prediction Limit (PL) using the number of significant figures in the PL.

(1) Results for verification sampling event performed on 6/4/2021.

Table 4

Comparison of Groundwater Monitoring Parameter Results to Background Limits – April 2021

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:		4/8/2021	PL	4/8/2021	PL	4/8/2021	PL	4/8/2021	PL	4/8/2021	PL	4/8/2021	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
Appendix III													
Boron	ug/L	160	203	167	209	185	257	197	262	185	244	180	226
Calcium	mg/L	97.7	111	140	149	153	156	175	181	118	182	116	117
Chloride	mg/L	16.8	23.6	18.3	25.4	25.6	32.4	33.3	43.7	21.3	29.4	20.3	38.6
Fluoride	ug/L	1,210	2,300	< 1,000	1,400	1,060	1,600	1,030	1,700	1,180	1,800	1,140	2,200
Sulfate	mg/L	222	278	362	426	379	470	446	507	280	498	289	399
Total Dissolved Solids	mg/L	533	770	725	832	814	1,040	905	1,110	650	1,030	619	904
pH, Field	SU	7.8	7.5 - 8.9	7.8	7.5 - 8.3	7.5	7.4 - 7.9	7.5	7.4 - 8.2	7.6	7.3 - 8.0	7.6	7.5 - 8.2
MI Part 115													
Iron	ug/L	121	n < 8	120	n < 8	229	n < 8	83	n < 8	292	n < 8	197	n < 8

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

n = number of data points.

All metals were analyzed as total unless otherwise specified.

Bold font indicates an exceedance of the Prediction Limit (PL) using the number of significant figures in the PL.

Table 5
Summary of Statistical Exceedances – April 2021
JR Whiting Pond 1 & 2 and Pond 6
Erie, Michigan

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

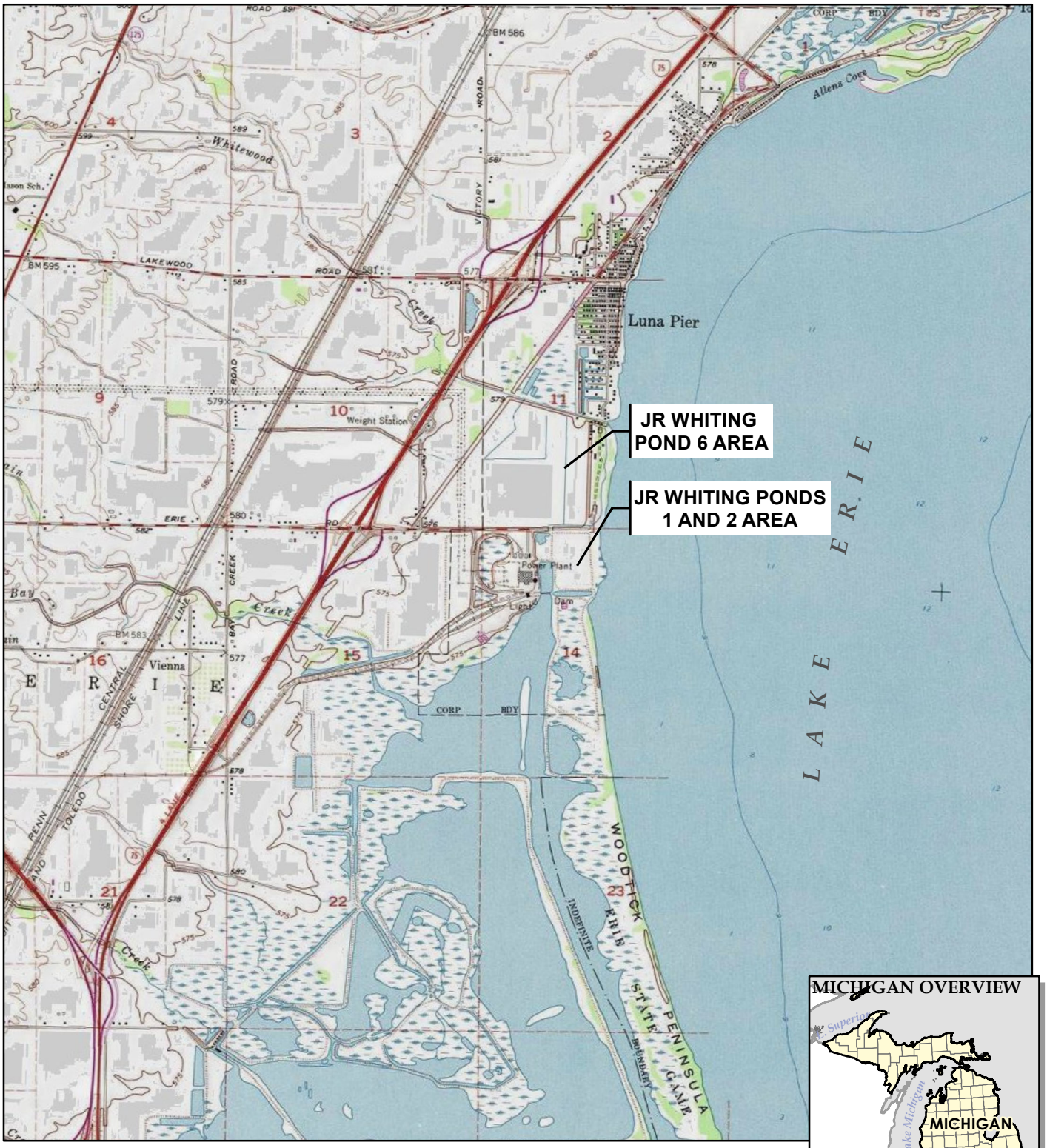
Data is in (X) ug/L or ( ) mg/L unless otherwise stated

Facility: JR Whiting – WDS# 397664

Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	2 Qtr. 2021 (**bold** >201)	4 Qtr. 2020 (**bold** >201)	2 Qtr. 2020 (**bold** >201)	4 Qtr. 2019 (**bold** >201)

No Exceedances

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

N

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
www.trccompanies.com
TRC - GIS

PROJECT:

CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

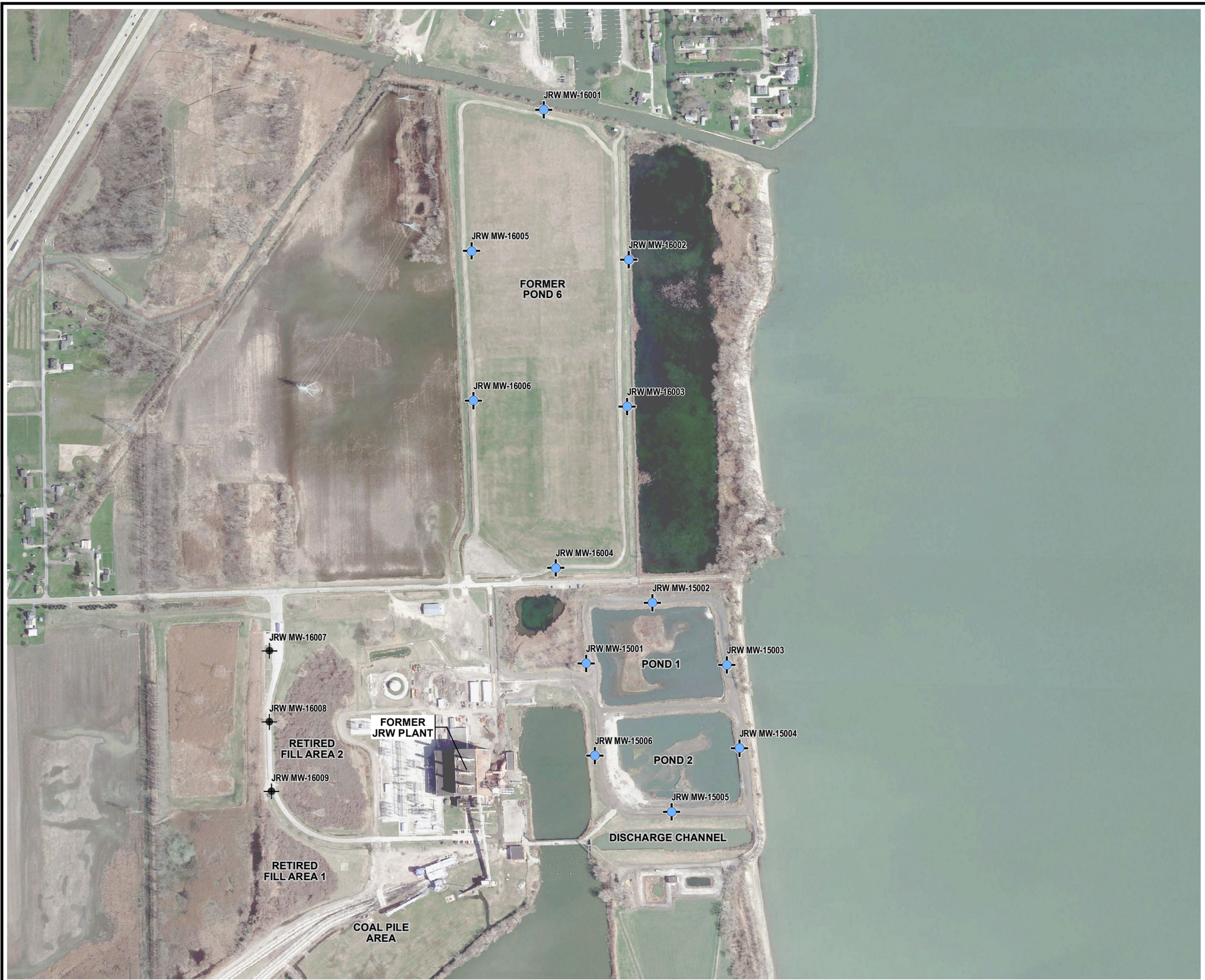
TITLE:

SITE LOCATION MAP

DRAWN BY:	R. BARBER
CHECKED BY:	B. YELEN
APPROVED BY:	S. HOLMSTROM
DATE:	JULY 2021
PROJ. NO.:	418421
FILE:	367393-001-001slm_20210630.mxd

FIGURE 1

S:\1-PROJECTS\Consumers_Energy_Company\Michigan\CCR_GW\2017_269767\367393-001-001slm_20210630.mxd -- Saved By: RBARBER on 7/26/2021, 10:30:03 AM



LEGEND

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

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO,2019.
2. STATIC WATER ONLY WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015.
3. PONDS 1 & 2 WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES CO. ON 11/27 /2019.

N

0 500 1,000 Feet

1 " = 500 '

1:6,000

PROJECT:

CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:

SITE PLAN
WITH CCR MONITORING WELL LOCATIONS

DRAWN BY:	R. BARBER	PROJ NO.:	418421
CHECKED BY:	B. YELEN		
APPROVED BY:	S. HOLMSTROM		**FIGURE 2**
DATE:	JULY 2021		

TRC

1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080
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FILE NO.: 367393-001-004_20210630.mxd

Plot Date: 7/20/2021, 07:21:58 AM by RBARBER -- LAYOUT: ANSI B(11"x17")
Path: S:\1-PROJECTS\Consumers_Energy_Company\Michigan\CCR_GW\2017_26976\367393-001-004_20210630.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

TRC - GIS

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, 4/28/2018.
2. WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015.
3. PONDS 1 & 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

0 500 1,000 Feet

1 " = 500 '

1:6,000

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

TITLE:
GROUNDWATER POTENTIOMETRIC ELEVATION SUMMARY APRIL 2021

DRAWN BY:	R. BARBER	PROJ NO.:	418421
CHECKED BY:	B. YELEN		
APPROVED BY:	S. HOLMSTROM		**FIGURE 3**
DATE:	JULY 2021		

TRC
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FILE NO.: 367393-001-005_20210630.mxd

TRC - GIS
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0
Plot Date: 7/20/2021, 07:56:57 AM by RBARBER -- LAYOUT: ANSI B (11"x17")
Path: S:\1-PROJECTS\Consumers_Energy_Company\Michigan\CCR_GW\2017_269767\367393-001-005_20210630.mxd

Appendix A
Data Quality Reviews

Pond 1 & 2

Laboratory Data Quality Review
Groundwater Sampling Event April 2021
Consumers Energy JR Whiting Ponds 1 & 2

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the April 2021 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 21-0433.

During the April 2021 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	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

- Preparation dates were not provided by the laboratory. Since the analyses were performed within the preparation holding times, where applicable, there is no impact on data usability due to this issue.
- 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 percent recoveries (%Rs) were within the acceptance limits with one exception. The %R for calcium (126%) in the MS was above the acceptance limits (75-125%). Potential high bias exists for the results for calcium in the groundwater samples in this data set as summarized in the attached table.
    - The relative percent difference (RPD) and MS/MSD concentrations for calcium only were provided by the laboratory upon request during this review in order to properly evaluate the high calcium %R in the MS; the RPD for calcium was within the acceptance limits.

- RPDs were not provided by the laboratory for anions, boron, and iron and therefore were not evaluated; further, MS/MSD concentrations were not provided by the laboratory. However, since all anion, boron, and iron 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-15004. All criteria were met.
- 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 Ponds 1 and 2

Erie, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
JRW-MW-15001	4/8/2021	Calcium	Matrix Spike recovery above acceptance limit (125%). Potential high bias.
JRW-MW-15002	4/8/2021		
JRW-MW-15003	4/8/2021		
JRW-MW-15004	4/8/2021		
JRW-MW-15005	4/8/2021		
JRW-MW-15006	4/8/2021		
DUP-01	4/8/2021		

Laboratory Data Quality Review
Groundwater Sampling Event June 2021
Consumers Energy JR Whiting Ponds 1 & 2 Verification Sample

A groundwater sample was collected by Consumers Energy (CE) Laboratory Services for the June 2021 groundwater monitoring verification 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 21-0692.

During the June 2021 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:

- Preparation dates were not provided by the laboratory. Since the analyses were performed within the preparation holding times, where applicable, there is no impact on data usability due to this issue.
- 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 recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were JRW-MW-15005 Dup/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 2021
Consumers Energy JR Whiting Pond 6

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the April 2021 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 21-0434.

During the April 2021 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 one or more of the following constituents:

Analyte Group	Method
Anions (Chloride, Fluoride, Sulfate)	EPA 300.0
Total Dissolved Solids	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:

- Preparation dates were not provided by the laboratory. Since the analyses were performed within the preparation holding times, where applicable, there is no impact on data usability due to this issue.
- 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 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-16006. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

Appendix B
Laboratory Reports

Pond 1 & 2

Consumers Energy
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135 W. Trail St.
Jackson, MI 49201

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

To: MAMarion, P22-118

From: EBlaj, T-258

Date: April 25, 2021

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 1 AND 2 – 2021 Q1

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

Chemistry Project: 21-0433

CE Laboratory Services conducted groundwater monitoring at JR Whiting, Pond 1 & 2 on 04/08/2021, for the 1st 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 04/09/2021.

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

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Work Order Sample Summary

Customer Name: JR Whiting Complex
Work Order ID: JRW RCRA GW Monitoring - Pond 1&2 - April 2021
Date Received: 4/9/2021
Chemistry Project: 21-0433

Sample #	Field Sample ID	Matrix	Sample Date	Site
21-0433-01	JRW-MW-15001	Groundwater	04/08/2021 10:09 AM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-02	JRW-MW-15002	Groundwater	04/08/2021 03:33 PM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-03	JRW-MW-15003	Groundwater	04/08/2021 02:41 PM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-04	JRW-MW-15004	Groundwater	04/08/2021 01:29 PM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-05	JRW-MW-15005	Groundwater	04/08/2021 12:15 PM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-06	JRW-MW-15006	Groundwater	04/08/2021 11:18 AM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-07	DUP-01	Groundwater	04/08/2021 12:00 AM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-08	EB-01	Water	04/08/2021 12:58 PM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-09	FB-01	Water	04/08/2021 12:58 PM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-10	JRW-MW-15006 MS	Groundwater	04/08/2021 11:18 AM	JRW RCRA GW Monitoring - Pond 1&2
21-0433-11	JRW-MW-15006 MSD	Groundwater	04/08/2021 11:18 AM	JRW RCRA GW Monitoring - Pond 1&2

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0433**
Field Sample ID:	**JRW-MW-15001**	Collect Date:	04/08/2021
Lab Sample ID:	21-0433-01	Collect Time:	10:09 AM
Matrix:	Groundwater		

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

Aliquot: 21-0433-01-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	180		ug/L	20	04/19/2021	AB21-0420-02
Calcium	151000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	902		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-01-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	39400		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1160		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	378000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0433-01-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	870		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0433**
Field Sample ID:	**JRW-MW-15002**	Collect Date:	04/08/2021
Lab Sample ID:	21-0433-02	Collect Time:	03:33 PM
Matrix:	Groundwater		

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

Aliquot: 21-0433-02-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	187		ug/L	20	04/19/2021	AB21-0420-02
Calcium	141000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	432		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-02-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	36400		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1280		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	375000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0433-02-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	815		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **JRW-MW-15003**
Lab Sample ID: 21-0433-03
Matrix: Groundwater

Laboratory Project: **21-0433**
Collect Date: 04/08/2021
Collect Time: 02:41 PM

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

Aliquot: 21-0433-03-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	203		ug/L	20	04/19/2021	AB21-0420-02
Calcium	128000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	417		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-03-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	37500		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1250		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	312000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0433-03-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	709		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0433**
Field Sample ID:	**JRW-MW-15004**	Collect Date:	04/08/2021
Lab Sample ID:	21-0433-04	Collect Time:	01:29 PM
Matrix:	Groundwater		

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

Aliquot: 21-0433-04-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	219		ug/L	20	04/19/2021	AB21-0420-02
Calcium	132000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	134		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-04-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	42000		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1190		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	306000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0433-04-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	727		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0433**
Field Sample ID:	**JRW-MW-15005**	Collect Date:	04/08/2021
Lab Sample ID:	21-0433-05	Collect Time:	12:15 PM
Matrix:	Groundwater		

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

Aliquot: 21-0433-05-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	181		ug/L	20	04/19/2021	AB21-0420-02
Calcium	123000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	135		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-05-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	28900		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1120		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	273000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0433-05-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	635		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0433**
Field Sample ID:	**JRW-MW-15006**	Collect Date:	04/08/2021
Lab Sample ID:	21-0433-06	Collect Time:	11:18 AM
Matrix:	Groundwater		

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

Aliquot: 21-0433-06-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	193		ug/L	20	04/19/2021	AB21-0420-02
Calcium	135000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	165		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-06-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	37800		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1130		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	306000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0433-06-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	741		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0433**
Field Sample ID:	**DUP-01**	Collect Date:	04/08/2021
Lab Sample ID:	21-0433-07	Collect Time:	12:00 AM
Matrix:	Groundwater		

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

Aliquot: 21-0433-07-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	215		ug/L	20	04/19/2021	AB21-0420-02
Calcium	127000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	111		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-07-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	41600		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1180		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	304000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0433-07-C03-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	703		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **EB-01**
Lab Sample ID: 21-0433-08
Matrix: Water

Laboratory Project: **21-0433**
Collect Date: 04/08/2021
Collect Time: 12:58 PM

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

Aliquot: 21-0433-08-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	04/19/2021	AB21-0420-02
Calcium	ND		ug/L	1000	04/19/2021	AB21-0420-02
Iron	ND		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-08-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	ND		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	ND		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0433-08-C03-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **FB-01**
Lab Sample ID: 21-0433-09
Matrix: Water

Laboratory Project: **21-0433**
Collect Date: 04/08/2021
Collect Time: 12:58 PM

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

Aliquot: 21-0433-09-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	04/19/2021	AB21-0420-02
Calcium	ND		ug/L	1000	04/19/2021	AB21-0420-02
Iron	ND		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-09-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	ND		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	ND		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0433-09-C03-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **JRW-MW-15006 MS**
Lab Sample ID: 21-0433-10
Matrix: Groundwater

Laboratory Project: **21-0433**
Collect Date: 04/08/2021
Collect Time: 11:18 AM

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

Aliquot: 21-0433-10-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	100		%	20	04/19/2021	AB21-0420-02
Calcium	126		%	1000	04/19/2021	AB21-0420-02
Iron	107		%	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-10-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	98		%	1000	04/20/2021	AB21-0419-01
Fluoride	92		%	1000	04/19/2021	AB21-0419-01
Sulfate	100		%	1000	04/20/2021	AB21-0419-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0433**
Field Sample ID:	**JRW-MW-15006 MSD**	Collect Date:	04/08/2021
Lab Sample ID:	21-0433-11	Collect Time:	11:18 AM
Matrix:	Groundwater		

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

Aliquot: 21-0433-11-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	99		%	20	04/19/2021	AB21-0420-02
Calcium	122		%	1000	04/19/2021	AB21-0420-02
Iron	111		%	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0433-11-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	98		%	1000	04/20/2021	AB21-0419-01
Fluoride	92		%	1000	04/19/2021	AB21-0419-01
Sulfate	100		%	1000	04/20/2021	AB21-0419-01

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Analytical Report

Report Date: 04/25/21

Data Qualifiers	Exception Summary
	No exceptions occured.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 21-0433

Inspection Date: 04-09-2021 **Inspection By:** MH

Sample Origin/Project Name: JRW Q2-2021 Pond H2

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) CET - Consumers

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

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

Cooler (1) 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 _____ Sealed ✓

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 1.3 - 4.0 °C Samples Received on Ice: Yes Y No____

M&TE # and Expiration 015402 6.4.21

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					

Pg. 292 not needed

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SAMPLING SITE	PROJECT NUMBER	ANALYSIS REQUESTED	Page 1 of 1
JRW RCRA – April 2021 Pond 1&2	21-0433 cnt 040921		SEND REPORT TO Michelle Marion
SAMPLING TEAM	DATE SHIPPED	SITE SKETCHED ATTACHED? CIRCLE ONE	TRC
Casey Hansen/Chase Tumey	Carry In 4-8-21	YES NO	PHONE

CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS	Total Metals	Anions	TDS					REMARKS
21-0433-01 cnt 040921	4-8-21	1009	GW	JRW-MW-15001	–	3	X	X	X					
-02		1533	GW	JRW-MW-15002	–	3	X	X	X					
-03		1491	GW	JRW-MW-15003	–	3	X	X	X					
-04		1329	GW	JRW-MW-15004	–	3	X	X	X					
-05		1215	GW	JRW-MW-15005	–	3	X	X	X					
-06		1118	GW	JRW-MW-15006	–	3	X	X	X					
-07		1529	GW	DUP-01	–	3	X	X	X					
-08		1258	GW	EB-01	–	3	X	X	X					
-09		1253	GW	FB-01	–	3	X	X	X					
-10		1118	GW	JRW-MW-15006 MS	–	2	X	X						
-11	–	1119	GW	JRW-MW-15006 MSD	–	2	X	X						

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	COMMENTS
	4-8-21 ~~1630~~ 1730	CAHansen	1.3-4.0°C on ice #015402
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	
			ORIGINAL TO LAB COPY TO CUSTOMER

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

To: MAMarion, P22-118

From: EBlaj, T-258

Date: July 01, 2021

Subject: RCRA GROUNDWATER MONITORING – JRW-MW-15005 VERIFICATION SAMPLE

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

Chemistry Project: 20-0589

CE Laboratory Services conducted groundwater monitoring at JR Whiting Pond 1&2 on 06/04/2021, for the 1st Semiannual monitoring requirement, and as specified in the Sampling and Analysis Plan for the site. Only JRW-MW-15005 was sampled in order to verify/confirm Calcium levels. The samples were received by the Chemistry department of Laboratory Services for analysis on 06/04/2021.

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

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Work Order Sample Summary

Customer Name: JR Whiting Complex
Work Order ID: JRW June 2021 - Pond 1&2 Verification Sample
Date Received: 6/4/2021
Chemistry Project: 21-0692

Sample #	Field Sample ID	Matrix	Sample Date	Site
21-0692-01	JRW-MW-15005	Groundwater	06/04/2021 11:01 AM	JRW RCRA GW Monitoring - Pond 1&2
21-0692-02	JRW-MW-15005 Dup	Groundwater	06/04/2021 11:01 AM	JRW RCRA GW Monitoring - Pond 1&2
21-0692-03	JRW-MW-15005 MS	Groundwater	06/04/2021 11:01 AM	JRW RCRA GW Monitoring - Pond 1&2
21-0692-04	JRW-MW-15005 MSD	Groundwater	06/04/2021 11:01 AM	JRW RCRA GW Monitoring - Pond 1&2
21-0692-05	FB-01	Groundwater	06/04/2021 11:05 AM	JRW RCRA GW Monitoring - Pond 1&2
21-0692-06	EB-01	Groundwater	06/04/2021 11:06 AM	JRW RCRA GW Monitoring - Pond 1&2

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Analytical Report

Report Date: 07/01/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0692**
Field Sample ID:	**JRW-MW-15005**	Collect Date:	06/04/2021
Lab Sample ID:	21-0692-01	Collect Time:	11:01 AM
Matrix:	Groundwater		

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

Aliquot: 21-0692-01-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	119000		ug/L	1000	06/17/2021	AB21-0617-15

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Analytical Report

Report Date: 07/01/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0692**
Field Sample ID:	**JRW-MW-15005 Dup**	Collect Date:	06/04/2021
Lab Sample ID:	21-0692-02	Collect Time:	11:01 AM
Matrix:	Groundwater		

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

Aliquot: 21-0692-02-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	119000		ug/L	1000	06/17/2021	AB21-0617-15

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Analytical Report

Report Date: 07/01/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0692**
Field Sample ID:	**JRW-MW-15005 MS**	Collect Date:	06/04/2021
Lab Sample ID:	21-0692-03	Collect Time:	11:01 AM
Matrix:	Groundwater		

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

Aliquot: 21-0692-03-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	105		%	1000	06/17/2021	AB21-0617-15

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Analytical Report

Report Date: 07/01/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0692**
Field Sample ID:	**JRW-MW-15005 MSD**	Collect Date:	06/04/2021
Lab Sample ID:	21-0692-04	Collect Time:	11:01 AM
Matrix:	Groundwater		

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

Aliquot: 21-0692-04-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	111		%	1000	06/17/2021	AB21-0617-15

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Analytical Report

Report Date: 07/01/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-0692**
Field Sample ID:	**FB-01**	Collect Date:	06/04/2021
Lab Sample ID:	21-0692-05	Collect Time:	11:05 AM
Matrix:	Water		

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

Aliquot: 21-0692-05-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	ND		ug/L	1000	06/17/2021	AB21-0617-15

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Analytical Report

Report Date: 07/01/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **EB-01**
Lab Sample ID: 21-0692-06
Matrix: Water

Laboratory Project: **21-0692**
Collect Date: 06/04/2021
Collect Time: 11:06 AM

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

Aliquot: 21-0692-06-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Calcium	ND		ug/L	1000	06/17/2021	AB21-0617-15

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Analytical Report

Report Date: 07/01/21

Data Qualifiers	Exception Summary
	No exceptions occured.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 21-0692

Inspection Date: 06-04-2021 **Inspection By:** RB

Sample Origin/Project Name: JRV Re-sample 15005

Shipment Delivered By: Enter the type of shipment carrier

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) CET

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 _____ Sealed ✓

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 1 EB 060421 3.2°C Samples Received on Ice. Yes ✓ No _____

M&TE # and Expiration IA-015402 / 6.03.2022

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)					
24 mL vial (glass)					
500 mL (plastic)					
Other _____					

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SAMPLING SITE	PROJECT NUMBER	ANALYSIS REQUESTED	Page 1 of 1
JRW RCRA – June 2021 Pond 1&2 Verification Sample	**21-0692**		SEND REPORT TO Michelle Marion
SAMPLING TEAM	DATE SHIPPED	SITE SKETCHED ATTACHED? CIRCLE ONE YES NO	TRC
Chase Tumey			PHONE

CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS	Metals								REMARKS
21-0692-01	6-4-21	1101	GW	JRW-MW-15005		1	X								
-02			GW	JRW-MW-15005 Dup		1	X								
-03			GW	JRW-MW-15005 MS		1	X								
-04			GW	JRW-MW-15005 MSD		1	X								
-05		1105	GW	FB-01		1	X								
-06		1106	GW	EB-01		1	X								

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	COMMENTS
	6-4-21 1347		1.2°C #01502
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	
			ORIGINAL TO LAB COPY TO CUSTOMER

Pond 6

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

To: MAMarion, P22-118

From: EBlaj, T-258

Date: April 25, 2021

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 6 – 2021 Q2

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

Chemistry Project: 21-0434

CE Laboratory Services conducted groundwater monitoring at the JR Whiting Pond 6 on 04/08/2021, 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 04/09/2021.

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.

NOTE: Field MS/MSD spike over-recovery was observed for Calcium due to high sample background; however, all other QA/QC elements, including spike recovery for the laboratory selected MS/MSD for Calcium were found within the acceptance criteria of the respective test methods.

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

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Work Order Sample Summary

Customer Name: JR Whiting Complex
Work Order ID: JRW RCRA GW Monitoring - Pond 6 - April 2021
Date Received: 4/9/2021
Chemistry Project: 21-0434

Sample #	Field Sample ID	Matrix	Sample Date	Site
21-0434-01	JRW-MW-16001	Groundwater	04/08/2021 12:41 PM	JRW RCRA GW Monitoring - Pond 6
21-0434-02	JRW-MW-16002	Groundwater	04/08/2021 01:56 PM	JRW RCRA GW Monitoring - Pond 6
21-0434-03	JRW-MW-16003	Groundwater	04/08/2021 02:36 PM	JRW RCRA GW Monitoring - Pond 6
21-0434-04	JRW-MW-16004	Groundwater	04/08/2021 03:16 PM	JRW RCRA GW Monitoring - Pond 6
21-0434-05	JRW-MW-16005	Groundwater	04/08/2021 12:01 PM	JRW RCRA GW Monitoring - Pond 6
21-0434-06	JRW-MW-16006	Groundwater	04/08/2021 11:21 AM	JRW RCRA GW Monitoring - Pond 6
21-0434-07	DUP-02	Groundwater	04/08/2021 12:00 AM	JRW RCRA GW Monitoring - Pond 6
21-0434-08	EB-02	Water	04/08/2021 02:23 PM	JRW RCRA GW Monitoring - Pond 6
21-0434-09	FB-02	Water	04/08/2021 02:31 PM	JRW RCRA GW Monitoring - Pond 6
21-0434-10	JRW-MW-16003 MS	Groundwater	04/08/2021 02:36 PM	JRW RCRA GW Monitoring - Pond 6
21-0434-11	JRW-MW-16003 MSD	Groundwater	04/08/2021 02:36 PM	JRW RCRA GW Monitoring - Pond 6

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-0434**
Field Sample ID:	**JRW-MW-16001**	Collect Date:	04/08/2021
Lab Sample ID:	21-0434-01	Collect Time:	12:41 PM
Matrix:	Groundwater		

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

Aliquot: 21-0434-01-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	160		ug/L	20	04/19/2021	AB21-0420-02
Calcium	97700		ug/L	1000	04/19/2021	AB21-0420-02
Iron	121		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-01-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	16800		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1210		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	222000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0434-01-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	533		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-0434**
Field Sample ID:	**JRW-MW-16002**	Collect Date:	04/08/2021
Lab Sample ID:	21-0434-02	Collect Time:	01:56 PM
Matrix:	Groundwater		

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

Aliquot: 21-0434-02-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	167		ug/L	20	04/19/2021	AB21-0420-02
Calcium	140000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	120		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-02-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	18300		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	ND		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	362000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0434-02-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	725		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-0434**
Field Sample ID:	**JRW-MW-16003**	Collect Date:	04/08/2021
Lab Sample ID:	21-0434-03	Collect Time:	02:36 PM
Matrix:	Groundwater		

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

Aliquot: 21-0434-03-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	185		ug/L	20	04/19/2021	AB21-0420-02
Calcium	153000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	229		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-03-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	25600		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1060		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	379000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0434-03-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	814		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-0434**
Field Sample ID:	**JRW-MW-16004**	Collect Date:	04/08/2021
Lab Sample ID:	21-0434-04	Collect Time:	03:16 PM
Matrix:	Groundwater		

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

Aliquot: 21-0434-04-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	197		ug/L	20	04/19/2021	AB21-0420-02
Calcium	175000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	83		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-04-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	33300		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1030		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	446000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0434-04-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	905		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-0434**
Field Sample ID:	**JRW-MW-16005**	Collect Date:	04/08/2021
Lab Sample ID:	21-0434-05	Collect Time:	12:01 PM
Matrix:	Groundwater		

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

Aliquot: 21-0434-05-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	185		ug/L	20	04/19/2021	AB21-0420-02
Calcium	118000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	292		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-05-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	21300		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1180		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	280000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0434-05-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	650		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **JRW-MW-16006**
Lab Sample ID: 21-0434-06
Matrix: Groundwater

Laboratory Project: **21-0434**
Collect Date: 04/08/2021
Collect Time: 11:21 AM

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

Aliquot: 21-0434-06-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	180		ug/L	20	04/19/2021	AB21-0420-02
Calcium	116000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	197		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-06-C03-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	20300		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1140		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	289000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0434-06-C04-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	619		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-0434**
Field Sample ID:	**DUP-02**	Collect Date:	04/08/2021
Lab Sample ID:	21-0434-07	Collect Time:	12:00 AM
Matrix:	Groundwater		

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

Aliquot: 21-0434-07-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	197		ug/L	20	04/19/2021	AB21-0420-02
Calcium	118000		ug/L	1000	04/19/2021	AB21-0420-02
Iron	189		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-07-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	20500		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	1160		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	290000		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0434-07-C03-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	639		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **EB-02**
Lab Sample ID: 21-0434-08
Matrix: Water

Laboratory Project: **21-0434**
Collect Date: 04/08/2021
Collect Time: 02:23 PM

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

Aliquot: 21-0434-08-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	04/19/2021	AB21-0420-02
Calcium	ND		ug/L	1000	04/19/2021	AB21-0420-02
Iron	ND		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-08-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	ND		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	ND		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0434-08-C03-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **FB-02**
Lab Sample ID: 21-0434-09
Matrix: Water

Laboratory Project: **21-0434**
Collect Date: 04/08/2021
Collect Time: 02:31 PM

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

Aliquot: 21-0434-09-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	04/19/2021	AB21-0420-02
Calcium	ND		ug/L	1000	04/19/2021	AB21-0420-02
Iron	ND		ug/L	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-09-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/20/2021	AB21-0419-01
Fluoride	ND		ug/L	1000	04/19/2021	AB21-0419-01
Sulfate	ND		ug/L	1000	04/20/2021	AB21-0419-01

Total Dissolved Solids by SM 2540C

Aliquot: 21-0434-09-C03-A01 **Analyst: CLH**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	04/10/2021	AB21-0410-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-0434**
Field Sample ID:	**JRW-MW-16003 MS**	Collect Date:	04/08/2021
Lab Sample ID:	21-0434-10	Collect Time:	02:36 PM
Matrix:	Groundwater		

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

Aliquot: 21-0434-10-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	78		%	20	04/19/2021	AB21-0420-02
Calcium	114		%	1000	04/19/2021	AB21-0420-02
Iron	112		%	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-10-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	89		%	1000	04/20/2021	AB21-0419-01
Fluoride	89		%	1000	04/19/2021	AB21-0419-01
Sulfate	96		%	1000	04/20/2021	AB21-0419-01

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Analytical Report

Report Date: 04/25/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-0434**
Field Sample ID:	**JRW-MW-16003 MSD**	Collect Date:	04/08/2021
Lab Sample ID:	21-0434-11	Collect Time:	02:36 PM
Matrix:	Groundwater		

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

Aliquot: 21-0434-11-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	101		%	20	04/19/2021	AB21-0420-02
Calcium	117		%	1000	04/19/2021	AB21-0420-02
Iron	113		%	20	04/19/2021	AB21-0420-02

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

Aliquot: 21-0434-11-C02-A01 **Analyst: DMW**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	89		%	1000	04/20/2021	AB21-0419-01
Fluoride	88		%	1000	04/19/2021	AB21-0419-01
Sulfate	96		%	1000	04/20/2021	AB21-0419-01

Data Qualifiers	Exception Summary
	No exceptions occured.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 21-0434

Inspection Date: 04-09-2021 **Inspection By:** CUH

Sample Origin/Project Name: JRW Q2-2021 RCRA Pond 6

Shipment Delivered By: Enter the type of shipment carrier.

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) CUH

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

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

Cooler (1) 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 _____ Sealed ✓

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 4.2-5.1°C Samples Received on Ice: Yes ✓ No____

M&TE # and Expiration 015402
4-4-21

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 _____					

PG. 2 & 2 not needed

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SAMPLING SITE	PROJECT NUMBER	ANALYSIS REQUESTED	Page 1 of 1
JRW RCRA – April 2021 Pond 6	21-0434 ent 040821	Total Metals; Anions; TDS	SEND REPORT TO Michelle Marion
SAMPLING TEAM	DATE SHIPPED	SITE SKETCHED ATTACHED? CIRCLE ONE YES NO	TRC
Casey Hansen/Chase Tumey			PHONE

CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS	Total Metals	Anions	TDS	REMARKS
21-0434-01 ent 040821	4-8-21	1241	GW	JRW-MW-16001	–	3	X	X	X	
-02	4-8-21	1356	GW	JRW-MW-16002	–	3	X	X	X	
-03	4-8-21	1436	GW	JRW-MW-16003	–	3	X	X	X	
-04	4-8-21	1516	GW	JRW-MW-16004	–	3	X	X	X	
-05	4-8-21	1201	GW	JRW-MW-16005	–	3	X	X	X	
-06	4-8-21	1121	GW	JRW-MW-16006	–	3	X	X	X	
-07	4-8-21	—	GW	DUP-02	–	3	X	X	X	
-08	4-8-21	1423	GW	EB-02	–	3	X	X	X	
-09	4-8-21	1431	GW	FB-02	–	3	X	X	X	
-10	4-8-21	1436	GW	JRW-MW-16003 MS	–	2	X	X		
-11	4-8-21	1436	GW	JRW-MW-16003 MSD	–	2	X	X		

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	COMMENTS
Casey Hansen	4-9-2021 0730		on ice 4.2-5.1 °C #015402
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	

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Appendix C
Field Notes

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JRW Pond 1 & 2

WATER LEVEL DATA

Site: JR Whiting
Project No: 30-04343 cf 4-8-21 Reviewed by: [signature]
Analyst: CEF Review Date: 04-15-21
Date: 4-8-21
Method: Electronic Tape
Tape ID: Solinst S/N: 1220045471

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001	0926	5.34	5.34	81.99	Recalculated DTW @1305 = 5.23
JRW MW-15002	1450	14.02	14.02	92.25	
JRW MW-15003	1347	11.06	11.06	90.10	
JRW MW-15004	~~23~~ 1231 4-7-21	13.19	13.19	96.41	
JRW MW-15005	1141	12.16	12.16	93.50	
JRW MW-15006	1026	4.37	4.37	82.90	
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					marked TOC
JRW MW-16008					marked TOC
JRW MW-16009					marked TOC

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

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Sonde ID	**20G**
Start Date	4-8-21
Project #	21-0433
Site	JR Whiting
Reviewed By & Date	04-15-21

Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 20G101513
Sonde Brand	YSI ProDSS S/N 20G101574
Flow Cell	EXO1 599080
DO Probe	YSI ProDSS S/N 20H100646
Turbidity Probe	YSI ProDSS S/N 20G104758
pH With ORP	YSI ProDSS S/N 20G105177
Conductivity & Temperature Probe	YSI ProDSS S/N 20G104783

- Is the same standard used for calibration and as-founds? Y 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	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
4.0	GFS # 1634	20080054	2-9-22	4.07	4.00				
7.0	GFS # 1639	20IV0138	4-22	7.07	7.08				
10.0	GFS # 1645	20060182	01-29-22	9.98	10.04				
			Initials & Date:	CR 4-8-21	CR 4-9-21				

- 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
229 (mV)	GFS	20270056	4-17-21	232.0	225.7				
			Initials & Date:	CR 4-8-21	CR 4-9-21				

- 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	96.7	94.9				
			Initials & Date:	CR 4-8-21	CR 4-9-21				

- 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	20G
Start Date	4-8-21
Reviewed By & Date:	04-15-21

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
1413	GFS	20390034	10-6-21	1403	1422				
			Initials & Date:	CS 4-7-21	CS 4-9-21				

- 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	--	--	1.05	0.04				
10.0 (± 1.0 NTUs)	Hach 2659949	—	—	N/A	—	—	N/A	—	—
40.0 (± 4.0 NTUs)	Hach 2746356	162494	10-2022	41.50	38.34				
			Initials & Date:	CS 4-8-21	CS 4-9-21				

- 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	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						

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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-1500i Date 4-8-21 Control Number 21-0434-01 (3)

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

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Solinst S/N: 1220045471

QC SAMPLE: ☐ MS/MSD ☐ DUP- **Sonde ID:** ☐ 11M ☐ 15H ☐ 19M ☑ 20G

Depth-to-water T/PVC (ft) 5.34 Depth-To-Bottom T/PVC (ft) 81.99 Completed by CFS

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
0930							120	5.41	
0933	7.48	11.9	1097	18.9	1.99	-99.3	120	5.41	9.35
0938	7.54	11.8	1100	7.0	0.75	-136.6	120	5.41	7.89
0943	7.59	11.8	1101	4.0	0.43	-147.7	120	5.41	12.14
0948	7.61	11.7	1101	3.0	0.33	-154.0	120	5.41	14.36
0953	7.61	11.7	1101	2.8	0.31	-155.9	120	5.41	31.46
0958	7.61	11.8	1100	2.7	0.29	-156.6	120	5.41	7.41
1003	7.62	12.0	1100	2.6	0.28	-156.7	120	5.41	7.62
1008	7.62	12.4	1102	2.5	0.26	-155.0	120	5.41	7.14
1009									
1014									

Total Pump Time (min): 44 Total Purge Volume (gal): ~1.5gal Reviewed by: 04-15-21

Weather:

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	↓	↓	A	↓					
1	500mL	↓	↓						

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

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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-1502 Date 4-8-21 Control Number 21-0433-02
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel
Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer
Depth to Water Tape: Solinst S/N: 1220041547-1
QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☐ 15H ☐ 19M ☑ 20G
Depth-to-water T/PVC (ft) 14.02 Depth-To-Bottom T/PVC (ft) 92.25 Completed by CET

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1451							120	14.04	
1453	7.60	12.9	1073	11.8	1.22	-97.2	120	14.04	2.33
1456	7.61	12.7	1110	4.9	0.52	-127.0	120	14.04	3.61
1503	7.64	12.7	1121	3.9	0.41	-138.0	120	14.04	7.65
1508	7.66	12.6	1130	2.6	0.27	-155.3	120	14.04	5.13
1513	7.66	12.6	1129	2.5	0.26	~~-157.3~~ -157.3	120	14.04	5.09
1518	7.66	12.5	1132	2.3	0.24	-161.1	120	14.04	5.20
1523	7.67	12.5	1133	2.0	0.22	-164.5	120	14.04	4.05
1528	7.66	12.6	1131	2.1	0.22	-165.6	120	14.04	4.24
1533	7.67	12.7	1129	2.0	0.21	-167.3	120	14.04	4.02
1534									

Total Pump Time (min): 42 Total Purge Volume (gal) : ≃ 1.4 gal Reviewed by: 04-15-21
Weather:
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	↓					
1	↓	↓	A	↓					
1	500mL	↓	↓	↓					

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

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Monitoring Well Sampling Worksheet

Well ID JRW-MW-15003 Date 4-8-21 Control Number 21-0433-03
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel
Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer
Depth to Water Tape: Solinst S/N: 1220094547-1
QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☐ 15H ☐ 19M ☑ 20G
Depth-to-water T/PVC (ft) 11.06 Depth-To-Bottom T/PVC (ft) ~~40.10~~ Completed by CES

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1353							120	11.10	
1355	7.71	12.8	997	45.7	4.86	80.4	120	11.10	22.16
1400	~~7.71~~ 7.64	~~12.8~~ 12.4	~~997~~ 996 cr 4-8-21	~~45.7~~ 14.8	~~4.86~~ 2.09	~~80.4~~ 73.1	120	11.10	13.72
1405	7.64	12.4	995	11.5	1.22	65.8	120	11.10	17.63
1410	7.63	12.4	994	7.1	0.76	57.9	120	11.10	9.49
1415	7.64	12.4	994	5.1	0.54	52.0	120	11.10	9.03
1420	7.64	12.4	996	4.2	6.44	35.5	120	11.10	8.77
1425	7.64	12.4	996	3.8	0.40	33.32	120	11.10	8.34
1430	7.65	12.4	995	3.7	0.39	44.65	120	11.10	4.85
1435	7.65	12.4	995	3.5	0.37	45.12	120	11.10	4.93
1440	7.64	12.4	994	3.5	0.37	46.03	120	11.10	3.99
1441									
1447									

Total Pump Time (min): 54 Total Purge Volume (gal) : ~2.0 gal Reviewed by: 04-15-21
Weather:
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	↓	↓	A	↓					
1	500mL	↓	↓	↓					

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

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Monitoring Well Sampling Worksheet

Well ID JRW-MW-15004 Date 4-8-21 Control Number 21-0433-04
Location JR Unit 1 Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel
Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer
Depth to Water Tape: Solinst S/N: 1220045471

QC SAMPLE: ☐ MS/MSD ☒ DUP- 01 **Sonde ID:** ☐ 11M ☐ 15H ☐ 19M ☑ 20G

Depth-to-water T/PVC (ft) 13.19 Depth-To-Bottom T/PVC (ft) 96.41 Completed by CES

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1241							120	13.19	
1243	7.67	12.6	940	23.1	2.41	76.2	120	13.19	5.84
1248	7.61	12.4	979	13.1	1.39	75.3	120	13.19	5.29
1253	7.60	12.3	979	10.1	1.08	65.5	120	13.19	5.09
1258	7.60	12.3	978	9.6	1.02	61.0	120	13.19	5.07
1303	7.60	12.3	977	7.3	0.78	54.3	120	13.19	6.01
1308	7.60	12.3	978	6.0	0.71	49.7	120	13.19	5.86
1313	7.60	12.7	977	6.1	0.65	44.4	120	13.19	5.25
1318	7.60	12.9	977	5.3	0.56	38.7	120	13.19	5.82
1323	7.60	13.0	977	5.0	0.53	35.4	120	13.19	4.55
1328	7.60	12.9	976	5.0	0.53	33.2	120	13.19	4.35
1329									
1341									

Total Pump Time (min): 60 Total Purge Volume (gal) : ≈2.5 gal Reviewed by: 04-15-21
Weather:
Comments: Field Blank + Equipment Blank @ 1238

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	↓	↓	A	↓					
2	500mL	↓	↓	↓					

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

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Monitoring Well Sampling Worksheet

Well ID JRW-MW-1500S Date 4-8-21 Control Number 21-0433-05
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Solinst S/N: 12200454T-1

QC SAMPLE: ☐ MS/MSD ☐ DUP- **Sonde ID:** ☐ 11M ☐ 15H ☐ 19M ☑ 20G

Depth-to-water T/PVC (ft) 12.16 Depth-To-Bottom T/PVC (ft) 93.50 Completed by CET

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
				Stablization parameters for the last three readings					
1147							120	12.21	
1149	7.67	13.4	889	21.8	2.27	50.6	120	12.21	4.58
1154	7.67	13.4	887	21.6	2.24	49.9	120	12.21	4.25
1159	7.67	13.4	887	21.1	2.13	40.6	120	12.21	5.03
1204	7.67	13.3	887	20.1	2.09	39.1	120	12.21	5.67
1209	7.67	13.6	888	19.9	2.06	35.7	120	12.21	4.54
1214	7.67	13.6	887	20.0	2.07	34.3	120	12.21	4.95
1215									
1221									

Total Pump Time (min): 34 Total Purge Volume (gal) : ≈ 1.0 gal Reviewed by: 04-15-21

Weather:

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	↓	↓	F	↓					
1	500mL	↓	↓	↓					

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

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Monitoring Well Sampling Worksheet

Well ID JRW-MW-15006 Date 4-8-21 Control Number 21-0433-06
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Solinst S/N: 1220041547-1

QC SAMPLE: ☒ MS/MSD ☐ DUP- **Sonde ID:** ☐ 11M ☐ 15H ☐ 19M ☑ 20G

Depth-to-water T/PVC (ft) 4.37 Depth-To-Bottom T/PVC (ft) 82.90 Completed by CET

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1030							120	4.41	
1032	7.59	12.4	1004	9.4	0.98	-6.1	120	4.41	1.92
1037	7.45	12.5	998	3.9	0.41	-21.4	120	4.41	1.98
~~1039~~	7.44	12.5	999	3.0	0.33	-27.6	120	4.41	2.04
~~1042~~	7.44	12.5	999	2.5	0.26	-32.5	120	4.41	2.80
1052	7.45	12.4	1000	2.2	0.24	-42.8	120	4.41	3.57
1057	7.45	12.5	997	2.1	0.22	-57.6	120	4.41	3.27
1102	7.46	12.1	999	2.0	0.21	-65.5	120	4.41	2.85
1107	7.47	12.1	998	1.9	0.20	-75.0	120	4.41	2.78
1112	7.47	12.2	998	1.8	0.20	-80.1	120	4.41	4.16
1117	7.47	12.3	999	1.8	0.19	-82.6	120	4.41	5.36
1118									
1126									

Total Pump Time (min): 56 Total Purge Volume (gal) : ≈ 2.0 gal Reviewed by: 04-15-21

Weather:

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		↓	A	↓					
3	15mL	↓	↓	↓					

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

JRW Pond 6

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WATER LEVEL DATA

Site: JR Whiting
Project No: 20 21-0433, 0434 Reviewed by:
Analyst: C. Hansen Review Date: 04-15-21
Date: 4·8·2021
Method: Electronic Tape
Tape ID: GeoTech S/N: 1003

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	0955	16.25	16.25	82.15	marked TOC
JRW MW-16002	0945	12.42	12.42	95.90	marked TOC
JRW MW-16003	0943	12.98	12.98	87.29	marked TOC
JRW MW-16004	0940	13.34	13.34	89.80	marked TOC
JRW MW-16005	0959	16.10	16.10	92.70	marked TOC
JRW MW-16006	1003	15.03	15.03	92.98	marked TOC
JRW MW-16007	1020	6.42	6.42	82.20	marked TOC
JRW MW-16008	1016	6.81	6.80	77.01	marked TOC
JRW MW-16009	1009	6.68	6.68	82.98	marked TOC

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

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Sonde ID	**15H**
Start Date	04.08.2021
Project #	21-0434
Site	JRwhiting
Reviewed By & Date:	04-15-21

Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 15F102974
Sonde Brand	YSI ProDSS S/N 15H101425 262909-1
Flow Cell	EXO1 599080
DO Probe	YSI ProDSS S/N 19G101726
Turbidity Probe	YSI ProDSS S/N 15G103731
pH With ORP	YSI ProDSS S/N 15H102089
Conductivity & Temperature Probe	YSI ProDSS S/N 15F104224

pH Standard (±0.1)	Source	Source Lot #	Source Exp. Date	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification
4.0	GFS # 1634	20680054	2.9.22	4.01	3.97				
7.0	GFS # 1639	20180138	4.26.22	7.00	6.93				
10.0	GFS # 1645	20060182	1.29.22	10.04	10.01				
			Initials & Date:	dmw 4.7.21	AH 4.9.21				

- 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 (±10 mV)	Source	Source Lot #	Source Exp. Date	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification
228 (mV)	GFS	20290056	4.17.21	231.2	233.1				
			Initials & Date:	dmw 4.7.21	AH 4.9.21				

- 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	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification
90-110% saturation	DI Water	N/A	N/A	96.4%	96.3%				
			Initials & Date:	dmw 4.7.21	AH 4.9.21				

- 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	15H
Start Date	4.8.2021
Reviewed By & Date:	04-15-21

Specific Conductance (uS/cm)	Source	Source Lot #	Source Exp. Date	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification
1423	GFS	2039037	10.6.21	1389	1388				
			Initials & Date:	dmw 4.7.21	CWH 4.9.21				

- Is the same standard used for calibration and as-founds? (Y) or N (if no, document on pg. 2)
- Are the calibration values within ±3% of the standard? (Y) or N (if no, recalibration is required)

Turbidity (NTUs)	Source	Source Lot #	Source Exp. Date	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification
0	DI Water	--	--	-0.07	-0.03				
10.0 (±1.0 NTUs)	Hach 2659949			NA	9.90		NA		
40.0 (±4.0 NTUs)	Hach 2746356	A0294	10/22	39.90	39.71				
			Initials & Date:	dmw 4.7.21	CWH 4.9.21				

- 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	GFS Chemicals			pH 9.0	GFS Chemicals		
pH 7.0	GFS Chemicals						
pH 10.0	GFS Chemicals						
Sp. Conductivity	GFS Chemicals						
10.0 Turbidity	GFS Chemicals						
40.0 Turbidity	GFS Chemicals						

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Monitoring Well Sampling Worksheet

Well ID JRW-MW 16001 Date 4.8.2021 Control Number 21-0434-01
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☐ Peristaltic ☑ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: GeoTech S/N: 1003

QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☑ 15H ☐ 19M ☐ 20G

Depth-to-water T/PVC (ft) 16.25 Depth-To-Bottom T/PVC (ft) 82.15 Completed by CWH

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1210							450	16.27	
1215	8.49	12.2	732	5.1	0.55	-194.4	450	16.37	2.98
1220	8.21	12.2	740	4.1	0.44	-176.8	450	16.37	1.78
1225	7.97	12.2	752	3.5	0.37	-155.8	450	16.37	1.56
1230	7.87	12.2	757	3.3	0.35	-149.3	450	16.37	1.44
1235	7.85	12.2	759	3.1	0.33	-145.2	450	16.37	1.43
1240	7.82	12.2	761	3.0	0.32	-142.9	450	16.37	1.41
1241	collected Sample								

Total Pump Time (min): 31 Total Purge Volume (gal) : 13.75 Reviewed by: 04-15-21

Weather: 40°F, Sunny, Wind

Comments: (pH = 7.5 → 8.9)

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	↓	↓	A	↓					
1	500mL	↓	A	↓					

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

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Monitoring Well Sampling Worksheet

Well ID JRW-MW-116002 Date 4-8-2021 Control Number 21-0434-02
Location JR Whiting Well Material: [✓] PVC [ ] SS [ ] Iron [ ] Galv. Steel

Purge Method: [✓] Peristaltic [ ] Submersible [ ] Fultz [ ] Bailer

Depth to Water Tape: Geotech S/N: 1003

QC SAMPLE: [ ] MS/MSD [ ] DUP- Sonde ID: [ ] 11M [✓] 15H [ ] 19M [ ] 20G

Depth-to-water T/PVC (ft) 12.42 Depth-To-Bottom T/PVC (ft) 95.90 Completed by CLH

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1255							250	12.77	
1300	8.62	12.1	909	4.5	0.48	-116.6	250	12.77	8.85
1305	8.57	12.2	908	3.8	0.40	-142.8	250	12.77	3.11
1310	8.56	12.2	910	3.6	0.39	-148.8	250	12.77	2.36
1315	8.54	12.3	907	3.5	0.37	-162.0	250	12.77	1.93
1320	8.49	12.4	918	3.4	0.37	-163.9	250	12.77	1.44
1325	8.45	12.4	919	3.4	0.36	-165.3	250	12.77	1.43
1330	8.39	12.4	919	3.4	0.36	-167.1	250	12.77	1.55
1335	8.29	12.4	929	3.3	0.36	-170.6	250	12.77	1.38
1340	8.27	12.4	930	3.3	0.36	-171.3	250	12.77	1.29
1345	7.85	12.3	977	3.3	0.35	-155.0	250	12.77	1.14
1350	7.78	12.3	977	3.3	0.35	-154.5	250	12.77	1.23
1355	7.83	12.3	975	3.3	0.35	-155.2	250	12.77	1.83
1356	Collected Sample								

Total Pump Time (min): 61 Total Purge Volume (gal) : 4.1 Reviewed by: 04-15-21

Weather: 65°F, Sunny, Wind

Comments: (PH = 7.5 - 8.3)

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	↓	↓	A	↓					
1	500mL	↓	A	↓					

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

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Monitoring Well Sampling Worksheet

MS MSD

Well ID JRW-MW-16003 Date 4-8-2021 Control Number 21-0434-03, -10, -11
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: GeoTech S/N: 1003

QC SAMPLE: ☑ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☑ 15H ☐ 19M ☐ 20G

Depth-to-water T/PVC (ft) 12.98 Depth-To-Bottom T/PVC (ft) 87.29 Completed by LH

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1410							240	12.89	
1415	7.50	12.2	1094	4.6	0.49	-132.2	240	~~12.89~~ am 040821 12.89	8.80
1420	7.50	12.2	1093	4.6	0.49	-132.6	240	12.89	5.14
1425	7.50	12.2	1091	4.1	0.44	-136.2	240	12.89	6.10
1430	7.49	12.2	1095	4.1	0.44	-136.4	240	12.89	5.36
1435	7.50	12.1	1090	4.0	0.43	-141.6	240	12.89	4.41
1436	collected samples								

Total Pump Time (min): 26 Total Purge Volume (gal) : ~1.5 Reviewed by: 04-15-21

Weather: 60°F, Sunny

Comments: (PH = 7.4 – 7.9)

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	↓		A						
1	500	↓	A	↓					

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

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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-160004 Date 4.8.21 Control Number 21-0434-04
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☐ Peristaltic ☑ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 1003

QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☑ 15H ☐ 19M ☐ 20G

Depth-to-water T/PVC (ft) 13.34 Depth-To-Bottom T/PVC (ft) 89.80 Completed by _____

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1455							500	13.90	
1500	7.52	12.3	1233	3.3	0.35	-119.3	500	13.90	19.85
1505	7.49	12.3	1233	3.1	0.33	-114.7	500	13.90	4.59
1510	7.47	12.3	1233	3.0	0.32	-115.7	500	13.90	2.96
1515	7.47	12.3	1233	2.9	0.31	-115.3	500	13.90	2.18
1516	collected Sample								

Total Pump Time (min): 21 Total Purge Volume (gal) : ~3.0 Reviewed by: 04-15-21

Weather: 55°F, cloudy, slight rain

Comments:

PH= 7.4-8.2

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	↓		A						
1	500mL	↓	A	↓					

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

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Monitoring Well Sampling Worksheet

Well ID JRW - MW-16005 Date 4.8.2021 Control Number 21-0434-05
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: GeoTech S/N: 1003

QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☑ 15H ☐ 19M ☐ 20G

Depth-to-water T/PVC (ft) 16.10 Depth-To-Bottom T/PVC (ft) 92.70 Completed by CWT

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1130							240	16.14	
1140	7.53	12.2	892	4.2	0.45	-121.8	240	7.41 ↔ 16.14	
1145	7.55	12.2	890	4.1	0.44	-126.2	240	16.14	6.63
1150	7.56	12.1	896	3.8	0.41	-130.0	240	16.14	5.86
1155	7.59	12.1	895	3.6	0.39	-134.1	240	16.14	3.31
1200	7.59	12.1	897	3.6	0.39	-134.6	240	16.14	2.19
1201	Collected Sample								

Total Pump Time (min): 31 Total Purge Volume (gal) : 2.0 Reviewed by: 04-15-21

Weather: 120°F, cloudy, windy

Comments: (pH = 7.3-8.0)

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	↓	↓	A						
1	500mL	↓	A	↓					

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

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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-160006 Date 4.8.2021 Control Number 21-0434-06, -07
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☐ Peristaltic ☑ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: GeoTech S/N: 1003

QC SAMPLE: ☐ MS/MSD ☐ DUP- 02 Sonde ID: ☐ 11M ☑ 15H ☐ 19M ☐ 20G

Depth-to-water T/PVC (ft) 15.03 Depth-To-Bottom T/PVC (ft) 92.98 Completed by CWH

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1030							400	15.10	
1040	7.47	12.9	885	5.9	0.62	-99.5	400	15.10	221.41
1045	7.56	13.2	884	5.0	0.52	-115.5	400	15.10	201.6
1050	7.60	13.2	883	4.5	0.47	-124.1	400	15.10	35.48
1055	7.60	13.5	882	3.8	0.39	-131.0	400	15.10	22.58
1100	7.60	12.7	884	3.4	0.36	-134.2	400	15.10	18.63
1105	7.60	12.4	883	3.3	0.35	-138.7	400	15.10	16.39
1110	7.63	12.4	880	3.2	0.34	-142.4	400	15.10	11.11
1115	7.64	12.4	880	3.2	0.34	-143.7	400	15.10	10.36
1120	7.64	12.4	879	3.1	0.33	-144.7	400	15.10	8.16
1121	Collected Samples								

Total Pump Time (min): 51 Total Purge Volume (gal) : ~5.4 Reviewed by: 04-15-21

Weather: 60°F, Sunny

Comments: Sulfur smell, Cloudy Water, Collected DUP-02

(pH = 7.5-8.2)

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	HDPE	B	N
1	↓	↓	A	↓	1	↓	↓	A	↓
1	500mL	↓	A	↓	1	500mL	↓	A	↓

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

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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JR-MW-1505 Date 6-4-21 Control Number 21-0692

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

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 1005

QC SAMPLE: ☑ MS/MSD ☑ DUP- Sonde ID: ☐ 11M ☐ 15H ☐ 19M ☑ 20G

Depth-to-water T/PVC (ft) 11.93 Depth-To-Bottom T/PVC (ft) 93.63 Completed by CET

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%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*
Stablization parameters for the last three readings									
1019							200	12.00	
1021	7.62	14.8	891	17.8	1.79	112.8	200	12.01	10.10
1026	7.54	14.8	891	14.9	1.50	104.5	200	12.01	21.10
1031	7.58	15.0	893	14.0	1.40	92.9	200	12.01	15.31
1036	7.60	15.0	891	13.6	1.36	80.5	200	12.01 (cr 6-4-21)	8.24
1041	7.61	15.1	891	13.2	1.33	71.4	200	12.01	7.91
1046	7.62	14.9	891	12.3	1.24	66.3	200	12.01	6.43
1051	7.62	15.0	892	11.6	1.17	63.3	200	12.01	6.73
1056	7.62	14.9	891	11.3	1.16	61.4	200	12.01	5.89
1057									
1101									

Total Pump Time (min): 38 Total Purge Volume (gal) : ~ 2.0 Reviewed by: 06-11-2021

Weather:

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	HDPE	B	N					

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

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Sonde ID	**20G**
Start Date	6-4-21
Project #	21-0692
Site	JR Whiting
Reviewed By & Date	06-11-2021

Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 20G101513
Sonde Brand	YSI ProDSS S/N 20G101574
Flow Cell	EXO1 599080
DO Probe	YSI ProDSS S/N 20H100646
Turbidity Probe	YSI ProDSS S/N 20G104758
pH With ORP	YSI ProDSS S/N 20G105177
Conductivity & Temperature Probe	YSI ProDSS S/N 20G104783

- Is the same standard used for calibration and as-founds? Y 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	2nd Daily Field Checks Completed	3rd Daily Field Checks Completed	4th Daily Filed Checks Completed	End Project Calibration Value
4.0	GFS # 1634	20040654	2.9.22	4.06					4.00
7.0	GFS # 1639	20186139	4.26.22	7.10					7.03
10.0	GFS # 1645	20060182	01.29.22	9.97					10.02
			Initials & Date:	CF 6-2-21					6-4-21 CF

- 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
224 (mV)	GFS	21180187	02.03-22	223.4					227.1
			Initials & Date:	CF 6-2-21					CF 6-4-21

- 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	98.9					99.0
			Initials & Date:	CF 6-2-21					CF 6-4-21

- 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	20G
Start Date	6-4-21
Reviewed By & Date:	06-11-2021

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
12/13	GFS	20390034	10.6.21	1428					1427
			Initials & Date:	CR 6.2.21					CR 6.4.21

- 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	--	--	.0,03					0.01
10.0 (± 1.0 NTUs)	Hach 2659949			N/A			N/A		
40.0 (± 4.0 NTUs)	Hach 2746356			39.61					40.21
			Initials & Date:	CR 6.2.21					CR 6.4.21

- 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	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 B
Second Semiannual Monitoring Report

January 27, 2022

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 Second Semiannual 2021 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. Engineer, Consumers Energy Environmental Services
Phone: (517) 937-9407
Email: michelle.marion@cmsenergy.com

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

Second Semiannual 2021 Groundwater Monitoring Report

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

Erie, Michigan

January 2022

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

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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 2021 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 2021. 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, dated July 5, 2013 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 performed pursuant to the CCR Rule until implementation of the 2020 HMP. In the *First Semiannual 2021 Groundwater Monitoring Report* for the JRW Pond 1&2 and Pond 6 (First Semiannual 2021 Report) (TRC, July 2021), Consumers Energy reported that no potential statistically significant increases (SSIs) were noted during the first 2021 semiannual detection monitoring event. Therefore, Consumers Energy continued detection monitoring in the second half of 2021 at Pond 1&2 and Pond 6 pursuant to §257.94 of the CCR Rule, and the

HMP.

This Second Semiannual 2021 Report presents the monitoring results and the statistical evaluation of the detection monitoring constituents (Section 11511a(3)(c) of Part 115) for the October 2021 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 Ponds 1 and 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 confined and protected from CCR constituents by the overlying clay-rich aquitard and is typically encountered around 50 feet below ground surface (ft 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 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, which established the monitoring well locations for 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 October 2021 Groundwater Monitoring

Consumers Energy Laboratory Services personnel performed gauging and sampling of monitoring wells associated with Pond 1&2 and Pond 6 on October 7 and 8, 2021. Groundwater monitoring was performed in accordance with the HMP. Groundwater samples collected during the October 2021 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, 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 2021 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-16006 at Pond 6), and one field matrix spike/matrix spike duplicate (MS/MSD) sample collected from JRW-MW-15002 at Pond 1&2, and JHC-MW-16005 at Pond 6.

Groundwater analytical results from the second semiannual 2021 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 October 2021), 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) from Pond 1&2 and slightly to the south and west from Pond 6.

The most pronounced groundwater gradient between November 2016 and October 2021 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.

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 7, 2021 was calculated using well pair JRW-MW-15005/JRW-MW-15003. The maximum head difference across the Ponds 1&2 monitoring network showed a very slight horizontal gradient of approximately 0.000024 ft/ft with no clear discernable overall flow direction across Pond 1&2. 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 0.005 feet/day (approximately 1.8 feet/year). However, the actual gradient is much lower when considering the rest of the monitoring wells across Pond 1&2. The Pond 1&2 groundwater elevations measured across the Site during the October 2021 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.

Pond 6

During the October 2021 event, the average hydraulic gradient of 0.000035 ft/ft was calculated using well pairs JRW-MW-16002/JRW-MW-16006 and JRW-MW-16002/JRW-MW-16004 with a minimal discernable overall flow direction across Pond 6 toward the northeast. This inferred flow direction is similar to that identified in April 2020, but opposite of the slight discernable flow direction observed to the southwest during the October 2020 and April 2021 events. 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, the result average groundwater flow rate is approximately 0.004 feet/day (approximately 1.5 feet/year). Groundwater elevations measured across the Site during the October 2021 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 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 second semiannual 2021 groundwater data in accordance with the detection monitoring program.

3.1 Establishing Background Limits

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.

Pond 6

Per the HMP, background limits were established for the detection monitoring constituents following the twelfth round of background monitoring 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 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 Second 2021 Semiannual Event (October 2021)

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 October 2021 detection monitoring parameters, 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 1&2 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 second 2021 semiannual monitoring event.

3.3 Data Comparison to Background Limits – Pond 6 Second 2021 Semiannual Event (October 2021)

The data comparisons of monitoring wells JRW-MW-16001 through JRW-MW-16006 for the October 2021 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 1&2 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 second 2021 semiannual monitoring event.

4.0 Conclusions and Recommendations

No SSIs over background limits were identified at either Pond 1&2 or Pond 6 during the October 2021 monitoring event. Therefore, Consumers Energy will continue with the detection monitoring program at the JRW Pond 1&2 and Pond 6 CCR units in conformance with the HMP.

No corrective actions were needed or performed for either Pond 1&2 or Pond 6. The first 2022 semiannual monitoring event for each of these units is scheduled for the second calendar quarter of 2022.

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 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. July 2021. First Semiannual 2021 Groundwater Monitoring Report – Former JR Whiting Power Plant, Pond 1&2 and Pond 6 CCR Unit, Erie, Michigan. Prepared for Consumers Energy Company.

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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 2021

JR Whiting Ponds 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 7, 2021	
										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	5.78	576.53
JRW-MW-16008	579.95	582.83	Limestone	68.0	to	73.0	512.0	to	507.0	6.30	576.53
JRW-MW-16009	579.90	582.60	Limestone	69.0	to	79.0	510.9	to	500.9	6.09	576.51
Ponds 1 & 2											
JRW-MW-15001	NM	581.39	Limestone	NM	to	NM	NM	to	NM	4.85	576.54
JRW-MW-15002	NM	590.17	Limestone	NM	to	NM	NM	to	NM	13.61	576.56
JRW-MW-15003	NM	587.23	Limestone	NM	to	NM	NM	to	NM	10.69	576.54
JRW-MW-15004	NM	589.32	Limestone	NM	to	NM	NM	to	NM	12.78	576.54
JRW-MW-15005	NM	588.28	Limestone	NM	to	NM	NM	to	NM	11.72	576.56
JRW-MW-15006	NM	580.48	Limestone	NM	to	NM	NM	to	NM	3.93	576.55
Pond 6											
JRW-MW-16001	589.19	592.33	Limestone	71.0	to	81.0	518.2	to	508.2	15.80	576.53
JRW-MW-16002	585.78	588.69	Limestone	81.0	to	91.0	504.8	to	494.8	12.19	576.50
JRW-MW-16003	586.19	589.01	Limestone	73.0	to	83.0	513.2	to	503.2	12.49	576.52
JRW-MW-16004	586.48	589.34	Limestone	75.0	to	85.0	511.5	to	501.5	12.80	576.54
JRW-MW-16005	589.29	592.14	Limestone	78.0	to	88.0	511.3	to	501.3	15.61	576.53
JRW-MW-16006	588.26	591.04	Limestone	79.0	to	89.0	509.3	to	499.26	14.49	576.55

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.

NM: Not measured.

Table 2
Summary of Field Parameter Results – October 2021
JR Whiting Ponds 1 & 2, and Pond 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	10/7/2021	0.55	-125.5	7.4	1,113	15.7	5.13
JRW-MW-15002	10/7/2021	0.30	-150.6	7.5	1,119	16.7	0.69
JRW-MW-15003	10/7/2021	0.24	-69.5	7.5	990	14.2	9.37
JRW-MW-15004	10/7/2021	0.26	39.1	7.3	986	15.8	4.44
JRW-MW-15005	10/7/2021	0.29	-106.7	7.6	905	16.8	3.55
JRW-MW-15006	10/7/2021	0.52	-143.6	7.4	1,002	15.7	2.46
Pond 6							
JRW-MW-16001	10/7/2021	0.18	-140.4	7.8	757	12.5	-0.39
JRW-MW-16002	10/8/2021	0.40	-119.6	7.8	965	14.6	3.54
JRW-MW-16003	10/8/2021	0.52	-113.5	7.5	1,055	14.3	4.93
JRW-MW-16004	10/8/2021	0.48	-108.6	7.5	1,210	13.8	5.40
JRW-MW-16005	10/7/2021	0.25	-156.4	7.6	880	15.1	2.76
JRW-MW-16006	10/7/2021	0.20	-150.6	7.7	837	13.1	1.31

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

Table 3

Comparison of Groundwater Monitoring Parameter Results to Background Limits – October 2021

JR Whiting Ponds 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:		10/7/2021	PL	10/7/2021	PL	10/7/2021	PL	10/7/2021	PL	10/7/2021	PL	10/7/2021	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
Appendix III													
Boron	ug/L	202	240	204	220	216	230	229	270	208	270	207	250
Calcium	mg/L	149	180	140	180	116	160	113	140	103	120	119	140
Chloride	mg/L	43	55	40.3	56	41.6	55	45.1	56.0	35	46.0	40.4	53
Fluoride	ug/L	1,390	1,600	1,260	1,900	1,190	1,800	1,140	1,800	1,120	1,700	1,080	1,700
Sulfate	mg/L	367	474	387	500	313	440	304	390	274	350	315	410
Total Dissolved Solids	mg/L	786	1,000	810	1,100	703	940	709	880	639	840	708	920
pH, Field	SU	7.4	6.8 - 8.4	7.5	7.2 - 7.9	7.5	7.3 - 8.3	7.3	7.2 - 8.0	7.6	7.3 - 8.6	7.4	7.0 - 9.0
MI Part 115													
Iron	ug/L	1,160	n < 8	553	n < 8	320	n < 8	< 20	n < 8	38	n < 8	768	n < 8

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

n = number of data points.

All metals were analyzed as total unless otherwise specified.

Bold font indicates an exceedance of the Prediction Limit (PL) using the number of significant figures in the PL.

Table 4

Comparison of Groundwater Monitoring Parameter Results to Background Limits – October 2021

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:		10/7/2021	PL	10/8/2021	PL	10/8/2021	PL	10/8/2021	PL	10/7/2021	PL	10/7/2021	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
Appendix III													
Boron	ug/L	176	203	187	209	200	257	203	262	191	244	173	226
Calcium	mg/L	86.7	111	108	149	134	156	149	181	104	182	101	117
Chloride	mg/L	17.8	23.6	19.8	25.4	27.3	32.4	35.2	43.7	22.6	29.4	22.6	38.6
Fluoride	ug/L	1,200	2,300	1,040	1,400	1,040	1,600	1,050	1,700	1,150	1,800	1,150	2,200
Sulfate	mg/L	232	278	373	426	376	470	443	507	289	498	285	399
Total Dissolved Solids	mg/L	537	770	715	832	750	1,040	878	1,110	595	1,030	590	904
pH, Field	SU	7.8	7.5 - 8.9	7.8	7.5 - 8.3	7.5	7.4 - 7.9	7.5	7.4 - 8.2	7.6	7.3 - 8.0	7.7	7.5 - 8.2
MI Part 115													
Iron	ug/L	90	n < 8	40	n < 8	412	n < 8	348	n < 8	705	n < 8	319	n < 8

Notes:

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

n = number of data points.

All metals were analyzed as total unless otherwise specified.

Bold font indicates an exceedance of the Prediction Limit (PL) using the number of significant figures in the PL.

Table 5
Summary of Statistical Exceedances – October 2021
JR Whiting Pond 1 & 2 and Pond 6
Erie, Michigan

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

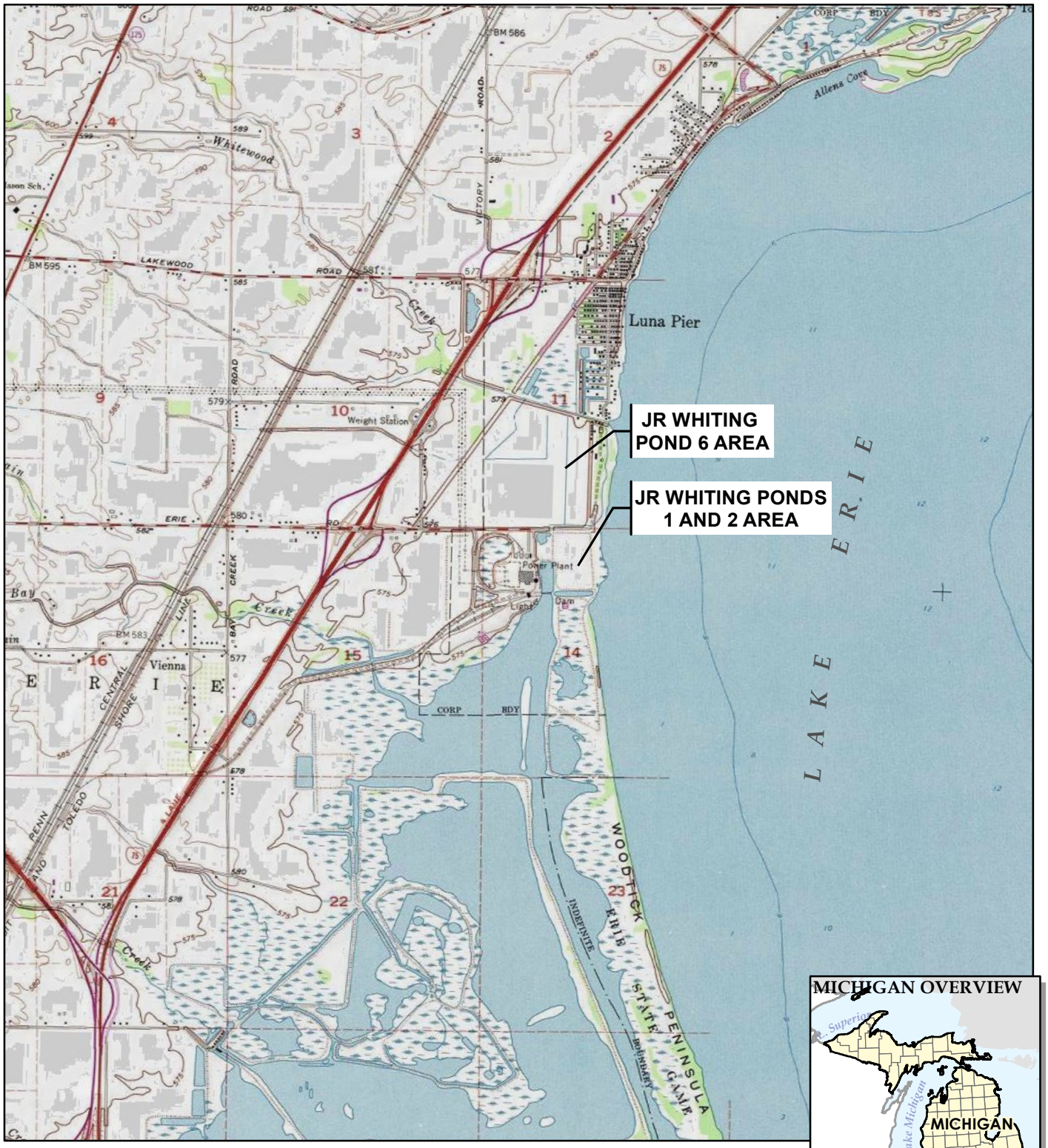
Data is in (X) ug/L or ( ) mg/L unless otherwise stated

Facility: JR Whiting – WDS# 397664

Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	4 Qtr. 2021 (**bold** >201)	2 Qtr. 2021 (**bold** >201)	4 Qtr. 2020 (**bold** >201)	2 Qtr. 2020 (**bold** >201)

No Exceedances

Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

N

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
www.trccompanies.com
TRC - GIS

PROJECT:

CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

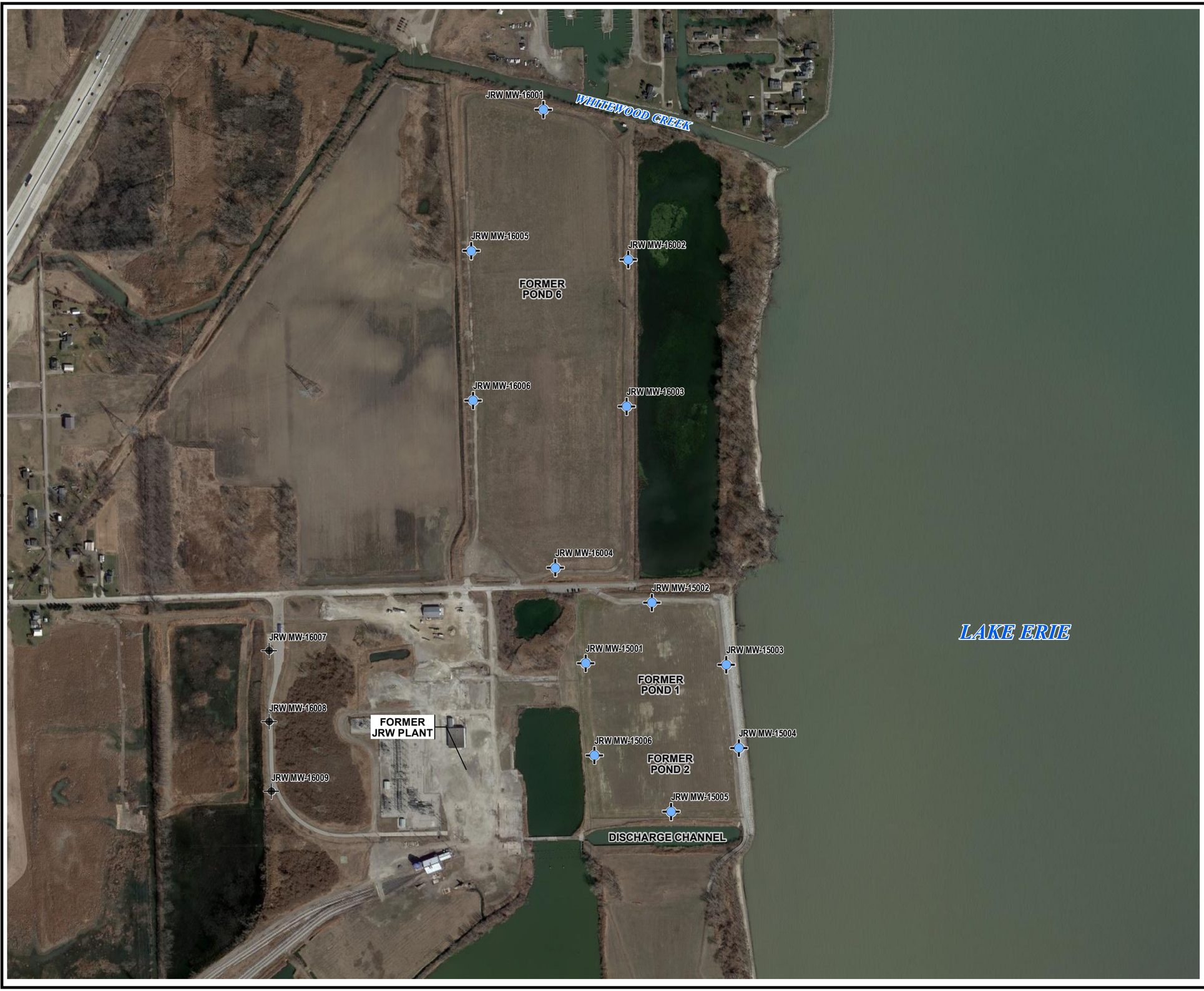
TITLE:

SITE LOCATION MAP

DRAWN BY:	R. BARBER
CHECKED BY:	B. YELEN
APPROVED BY:	S. HOLMSTROM
DATE:	JANUARY 2022
PROJ. NO.:	418421
FILE:	418421-001-001slm.mxd

FIGURE 1

S:\1-PROJECTS\Consumers_Energy_Company\Michigan\CCR_GW\2017_269767\418421-001-001slm.mxd -- Saved By: AFOJTIK on 12/9/2021, 21:55:10 PM



LEGEND

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

NOTES

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 03/2021.
2. STATIC WATER ONLY WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015.
3. PONDS 1 & 2 WELL LOCATIONS SURVEYED BY ROWE PROFESSIONAL SERVICES CO. ON 11/27 /2019.

0 500 1,000 Feet

1 " = 500 '

1:6,000

PROJECT:

CONSUMERS ENERGY COMPANY
JR WHITING POWER PLANT
ERIE, MICHIGAN

TITLE:

SITE PLAN
WITH CCR MONITORING WELL LOCATIONS

DRAWN BY:	R. BARBER	PROJ NO.:	418421
CHECKED BY:	B. YELEN		
APPROVED BY:	S. HOLMSTROM		**FIGURE 2**
DATE:	JANUARY 2022		

TRC

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

FILE NO.: 418421-001-002.mxd

TRC - GIS
Plot Date: 12/23/2021, 14:39:35 PM by AFOJTIK -- LAYOUT: ANSI B(11"x17")
Path: S:\11-PROJECTS\Consumers_Energy_Company\Michigan\CCR_GW\2017_269767\418421-001-002.mxd
Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0

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, 03/2021.
2. WELL LOCATIONS SURVEYED BY SHERIDAN SURVEYING CO. ON 11/19/2015.
3. PONDS 1 & 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

0 500 1,000 Feet

1 " = 500 '
1:6,000

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

TITLE:
GROUNDWATER POTENTIOMETRIC ELEVATION SUMMARY OCTOBER 2021

DRAWN BY:	R. BARBER	PROJ NO.:	418421
CHECKED BY:	B. YELEN		
APPROVED BY:	S. HOLMSTROM		
DATE:	JANUARY 2022		

FIGURE 3

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080
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FILE NO.: 418421-001-003.mxd

Plot Date: 12/23/2021, 14:42:12 PM by AFOJTIK -- LAYOUT: ANSI B (11"x17")
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Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)
Map Rotation: 0
TRC - GIS

Appendix A
Data Quality Reviews

Pond 1 & 2

Laboratory Data Quality Review
Groundwater Sampling Event October 2021
Consumers Energy JR Whiting Ponds 1 & 2

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the October 2021 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 21-1230.

During the October 2021 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-15002 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-15001. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- The nondetect reporting limit (RL) for TDS (10 mg/L) in samples EB-01 and FB-01 was above the RL specified in the Sampling and Analysis Plan (1.0 mg/L).

Pond 6

Laboratory Data Quality Review
Groundwater Sampling Event October 2021
Consumers Energy JR Whiting Pond 6

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the October 2021 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 21-1231.

During the October 2021 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 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-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-16005 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-16006. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.
- The nondetect reporting limit (RL) for TDS (10 mg/L) in samples EB-02 and FB-02 was above the RL specified in the Sampling and Analysis Plan (1.0 mg/L).

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: November 10, 2021

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 1 & 2 – 2021 Q4

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

Chemistry Project: 21-1230R

CE Laboratory Services conducted groundwater monitoring at JR Whiting, Pond 1 & 2 on 10/07/2021, 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 10/08/2021.

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.

NOTE: The original report has been revised for Fluoride and Chloride after correcting a preparation factor error identified for the two analytes, error which occurred during the original analysis; all other data remained unchanged.

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

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Work Order Sample Summary

Customer Name: JR Whiting Complex
Work Order ID: JRW RCRA GW Monitoring - Pond 1&2 - October 2021
Date Received: 10/8/2021
Chemistry Project: 21-1230

Sample #	Field Sample ID	Matrix	Sample Date	Site
21-1230-01	JRW-MW-15001	Groundwater	10/07/2021 11:33 AM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-02	JRW-MW-15002	Groundwater	10/07/2021 12:31 PM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-03	JRW-MW-15003	Groundwater	10/07/2021 01:45 PM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-04	JRW-MW-15004	Groundwater	10/07/2021 02:04 PM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-05	JRW-MW-15005	Groundwater	10/07/2021 01:14 PM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-06	JRW-MW-15006	Groundwater	10/07/2021 12:20 PM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-07	DUP-01	Groundwater	10/07/2021 12:00 AM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-08	EB-01	Water	10/07/2021 01:35 PM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-09	FB-01	Water	10/07/2021 01:40 PM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-10	JRW-MW-15002 Field MS	Groundwater	10/07/2021 12:31 PM	JRW RCRA GW Monitoring - Pond 1&2
21-1230-11	JRW-MW-15002 FIeld MSD	Groundwater	10/07/2021 12:31 PM	JRW RCRA GW Monitoring - Pond 1&2

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **JRW-MW-15001**
Lab Sample ID: 21-1230-01
Matrix: Groundwater

Laboratory Project: **21-1230**
Collect Date: 10/07/2021
Collect Time: 11:33 AM

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

Aliquot: 21-1230-01-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	202		ug/L	20	10/25/2021	AB21-1023-02
Calcium	149000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	1160		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-01-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	43000		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1390		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	367000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1230-01-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	786		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-1230**
Field Sample ID:	**JRW-MW-15002**	Collect Date:	10/07/2021
Lab Sample ID:	21-1230-02	Collect Time:	12:31 PM
Matrix:	Groundwater		

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

Aliquot: 21-1230-02-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	204		ug/L	20	10/25/2021	AB21-1023-02
Calcium	140000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	553		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-02-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	40300		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1260		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	387000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1230-02-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	810		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **JRW-MW-15003**
Lab Sample ID: 21-1230-03
Matrix: Groundwater

Laboratory Project: **21-1230**
Collect Date: 10/07/2021
Collect Time: 01:45 PM

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

Aliquot: 21-1230-03-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	216		ug/L	20	10/25/2021	AB21-1023-02
Calcium	116000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	320		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-03-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	41600		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1190		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	313000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1230-03-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	703		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **JRW-MW-15004**
Lab Sample ID: 21-1230-04
Matrix: Groundwater

Laboratory Project: **21-1230**
Collect Date: 10/07/2021
Collect Time: 02:04 PM

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

Aliquot: 21-1230-04-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	229		ug/L	20	10/25/2021	AB21-1023-02
Calcium	113000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	ND		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-04-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	45100		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1140		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	304000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1230-04-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	709		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **JRW-MW-15005**
Lab Sample ID: 21-1230-05
Matrix: Groundwater

Laboratory Project: **21-1230**
Collect Date: 10/07/2021
Collect Time: 01:14 PM

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

Aliquot: 21-1230-05-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	208		ug/L	20	10/25/2021	AB21-1023-02
Calcium	103000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	38		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-05-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	35000		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1120		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	274000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1230-05-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	639		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **JRW-MW-15006**
Lab Sample ID: 21-1230-06
Matrix: Groundwater

Laboratory Project: **21-1230**
Collect Date: 10/07/2021
Collect Time: 12:20 PM

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

Aliquot: 21-1230-06-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	207		ug/L	20	10/25/2021	AB21-1023-02
Calcium	119000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	768		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-06-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	40400		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1080		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	315000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1230-06-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	708		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-1230**
Field Sample ID:	**DUP-01**	Collect Date:	10/07/2021
Lab Sample ID:	21-1230-07	Collect Time:	12:00 AM
Matrix:	Groundwater		

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

Aliquot: 21-1230-07-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	199		ug/L	20	10/25/2021	AB21-1023-02
Calcium	144000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	1220		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-07-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	43400		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1130		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	361000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1230-07-C03-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	809		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **EB-01**
Lab Sample ID: 21-1230-08
Matrix: Water

Laboratory Project: **21-1230**
Collect Date: 10/07/2021
Collect Time: 01:35 PM

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

Aliquot: 21-1230-08-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/25/2021	AB21-1023-02
Calcium	ND		ug/L	1000	10/25/2021	AB21-1023-02
Iron	ND		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-08-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	ND		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	ND		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1230-08-C03-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**
Field Sample ID: **FB-01**
Lab Sample ID: 21-1230-09
Matrix: Water

Laboratory Project: **21-1230**
Collect Date: 10/07/2021
Collect Time: 01:40 PM

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

Aliquot: 21-1230-09-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/25/2021	AB21-1023-02
Calcium	ND		ug/L	1000	10/25/2021	AB21-1023-02
Iron	ND		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-09-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	ND		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	ND		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1230-09-C03-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-1230**
Field Sample ID:	**JRW-MW-15002 Field MS**	Collect Date:	10/07/2021
Lab Sample ID:	21-1230-10	Collect Time:	12:31 PM
Matrix:	Groundwater		

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

Aliquot: 21-1230-10-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	95		%	20	10/25/2021	AB21-1023-02
Calcium	102		%	1000	10/25/2021	AB21-1023-02
Iron	121		%	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-10-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	102		%	1000	10/22/2021	AB21-1022-07
Fluoride	88		%	1000	10/22/2021	AB21-1022-07
Sulfate	95		%	1000	10/25/2021	AB21-1022-07

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Analytical Report

Report Date: 11/10/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 1&2**	Laboratory Project:	**21-1230**
Field Sample ID:	**JRW-MW-15002 FIeld MSD**	Collect Date:	10/07/2021
Lab Sample ID:	21-1230-11	Collect Time:	12:31 PM
Matrix:	Groundwater		

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

Aliquot: 21-1230-11-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	91		%	20	10/25/2021	AB21-1023-02
Calcium	98		%	1000	10/25/2021	AB21-1023-02
Iron	111		%	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1230-11-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	97		%	1000	10/22/2021	AB21-1022-07
Fluoride	87		%	1000	10/22/2021	AB21-1022-07
Sulfate	93		%	1000	10/25/2021	AB21-1022-07

Data Qualifiers	Exception Summary
	No exceptions occured.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 21-1230

Inspection Date: 10/8/21 **Inspection By:** LH

Sample Origin/Project Name: PONDS 1+2 JRW

Shipment Delivered By: Enter the type of shipment carrier

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/Hand Carry (whom) CH | CET - CONSUMERS

Tracking Number _____ Shipping Form Attached Yes _____ No _____

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

Cooler (1) 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 _____ Sealed ✓

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 3.6 - 4.9°C Samples Received on Ice Yes X No _____

M&TE # and Expiration 015402 | 4.3.22

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 _____					

PG. 2 of 2 not needed

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SAMPLING SITE	PROJECT NUMBER	ANALYSIS REQUESTED	Page 1 of 1
JRW RCRA – October 2021 Pond 1&2	21-1230		SEND REPORT TO Michelle Marion
SAMPLING TEAM: Casey Hansen/Chase Tumey	DATE SHIPPED	SITE SKETCHED ATTACHED? CIRCLE ONE YES NO	TRC PHONE

CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS	Total Metals	Anions	TDS					REMARKS
21-1230-01	10.7.21	1133	GW	JRW-MW-15001		3	X	X	X					
-02		1231	GW	JRW-MW-15002		3	X	X	X					
-03		1345	GW	JRW-MW-15003		3	X	X	X					
-04		1404	GW	JRW-MW-15004		3	X	X	X					
-05		1314	GW	JRW-MW-15005		3	X	X	X					
-06		1220	GW	JRW-MW-15006		3	X	X	X					
-07		—	GW	DUP-01		3	X	X	X					
-08		1335	GW	EB-01		3	X	X	X					
-09		1340	GW	FB-01		3	X	X	X					
-10		1231	GW	JRW-MW-15002 Field MS		2	X	X						
-11		1231	GW	JRW-MW-15002 Field MSD		2	X	X						

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	COMMENTS
Casey Hansen	10-8-21 1400		on ice 3.6-4.9°C #015402
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	

ORIGINAL TO LAB COPY TO CUSTOMER

Pond 6

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

To: MAMarion, P22-118

From: EBlaj, T-258

Date: November 10, 2021

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 6 – 2021 Q4

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

Chemistry Project: 21-1231R

CE Laboratory Services conducted groundwater monitoring at the JR Whiting Pond 6 on 10/07/2021 and 10/08/2021, 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 10/08/2021.

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.

NOTE: The original report has been revised for Fluoride and Chloride after correcting a preparation factor error identified for the two analytes, error which occurred during the original analysis; all other data remained unchanged.

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

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Work Order Sample Summary

Customer Name: JR Whiting Complex
Work Order ID: JRW RCRA GW Monitoring - Pond 6 - October 2021
Date Received: 10/8/2021
Chemistry Project: 21-1231

Sample #	Field Sample ID	Matrix	Sample Date	Site
21-1231-01	JRW-MW-16001	Groundwater	10/07/2021 05:31 PM	JRW RCRA GW Monitoring - Pond 6
21-1231-02	JRW-MW-16002	Groundwater	10/08/2021 11:25 AM	JRW RCRA GW Monitoring - Pond 6
21-1231-03	JRW-MW-16003	Groundwater	10/08/2021 10:35 AM	JRW RCRA GW Monitoring - Pond 6
21-1231-04	JRW-MW-16004	Groundwater	10/08/2021 09:46 AM	JRW RCRA GW Monitoring - Pond 6
21-1231-05	JRW-MW-16005	Groundwater	10/07/2021 04:22 PM	JRW RCRA GW Monitoring - Pond 6
21-1231-06	JRW-MW-16006	Groundwater	10/07/2021 03:26 PM	JRW RCRA GW Monitoring - Pond 6
21-1231-07	DUP-02	Groundwater	10/07/2021 12:00 AM	JRW RCRA GW Monitoring - Pond 6
21-1231-08	EB-02	Water	10/07/2021 04:45 PM	JRW RCRA GW Monitoring - Pond 6
21-1231-09	FB-02	Water	10/07/2021 04:50 PM	JRW RCRA GW Monitoring - Pond 6
21-1231-10	JRW-MW-16005 Field MS	Groundwater	10/07/2021 04:22 PM	JRW RCRA GW Monitoring - Pond 6
21-1231-11	JRW-MW-16005 FIeld MSD	Groundwater	10/07/2021 04:22 PM	JRW RCRA GW Monitoring - Pond 6

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **JRW-MW-16001**
Lab Sample ID: 21-1231-01
Matrix: Groundwater

Laboratory Project: **21-1231**
Collect Date: 10/07/2021
Collect Time: 04:31 PM

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

Aliquot: 21-1231-01-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	176		ug/L	20	10/25/2021	AB21-1023-02
Calcium	86700		ug/L	1000	10/25/2021	AB21-1023-02
Iron	90		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-01-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	17800		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1200		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	232000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1231-01-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	537		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **JRW-MW-16002**
Lab Sample ID: 21-1231-02
Matrix: Groundwater

Laboratory Project: **21-1231**
Collect Date: 10/08/2021
Collect Time: 10:25 AM

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

Aliquot: 21-1231-02-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	187		ug/L	20	10/25/2021	AB21-1023-02
Calcium	108000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	40		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-02-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	19800		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1040		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	373000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1231-02-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	715		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **JRW-MW-16003**
Lab Sample ID: 21-1231-03
Matrix: Groundwater

Laboratory Project: **21-1231**
Collect Date: 10/08/2021
Collect Time: 09:35 AM

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

Aliquot: 21-1231-03-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	200		ug/L	20	10/25/2021	AB21-1023-02
Calcium	134000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	412		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-03-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	27300		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1040		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	376000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1231-03-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	750		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **JRW-MW-16004**
Lab Sample ID: 21-1231-04
Matrix: Groundwater

Laboratory Project: **21-1231**
Collect Date: 10/08/2021
Collect Time: 08:46 AM

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

Aliquot: 21-1231-04-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	203		ug/L	20	10/25/2021	AB21-1023-02
Calcium	149000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	348		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-04-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	35200		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1050		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	443000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1231-04-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	878		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **JRW-MW-16005**
Lab Sample ID: 21-1231-05
Matrix: Groundwater

Laboratory Project: **21-1231**
Collect Date: 10/07/2021
Collect Time: 03:22 PM

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

Aliquot: 21-1231-05-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	191		ug/L	20	10/25/2021	AB21-1023-02
Calcium	104000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	705		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-05-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	22600		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1150		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	289000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1231-05-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	595		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **JRW-MW-16006**
Lab Sample ID: 21-1231-06
Matrix: Groundwater

Laboratory Project: **21-1231**
Collect Date: 10/07/2021
Collect Time: 02:26 PM

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

Aliquot: 21-1231-06-C02-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	173		ug/L	20	10/25/2021	AB21-1023-02
Calcium	101000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	319		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-06-C03-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	22600		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1150		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	285000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1231-06-C04-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	590		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **DUP-02**
Lab Sample ID: 21-1231-07
Matrix: Groundwater

Laboratory Project: **21-1231**
Collect Date: 10/06/2021
Collect Time: 11:00 PM

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

Aliquot: 21-1231-07-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	176		ug/L	20	10/25/2021	AB21-1023-02
Calcium	102000		ug/L	1000	10/25/2021	AB21-1023-02
Iron	322		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-07-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	20300		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	1080		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	285000		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1231-07-C03-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	613		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **EB-02**
Lab Sample ID: 21-1231-08
Matrix: Water

Laboratory Project: **21-1231**
Collect Date: 10/07/2021
Collect Time: 03:45 PM

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

Aliquot: 21-1231-08-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/25/2021	AB21-1023-02
Calcium	ND		ug/L	1000	10/25/2021	AB21-1023-02
Iron	ND		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-08-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	ND		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	ND		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1231-08-C03-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site: **JRW RCRA GW Monitoring - Pond 6**
Field Sample ID: **FB-02**
Lab Sample ID: 21-1231-09
Matrix: Water

Laboratory Project: **21-1231**
Collect Date: 10/07/2021
Collect Time: 03:50 PM

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

Aliquot: 21-1231-09-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/25/2021	AB21-1023-02
Calcium	ND		ug/L	1000	10/25/2021	AB21-1023-02
Iron	ND		ug/L	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-09-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	10/22/2021	AB21-1022-07
Fluoride	ND		ug/L	1000	10/22/2021	AB21-1022-07
Sulfate	ND		ug/L	1000	10/25/2021	AB21-1022-07

Total Dissolved Solids by SM 2540C

Aliquot: 21-1231-09-C03-A01 **Analyst: CET**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/13/2021	AB21-1013-01

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Analytical Report

Report Date: 11/10/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-1231**
Field Sample ID:	**JRW-MW-16005 Field MS**	Collect Date:	10/07/2021
Lab Sample ID:	21-1231-10	Collect Time:	03:22 PM
Matrix:	Groundwater		

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

Aliquot: 21-1231-10-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	91		%	20	10/25/2021	AB21-1023-02
Calcium	103		%	1000	10/25/2021	AB21-1023-02
Iron	115		%	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-10-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	92		%	1000	10/25/2021	AB21-1022-07
Fluoride	81		%	1000	10/22/2021	AB21-1022-07
Sulfate	95		%	1000	10/25/2021	AB21-1022-07

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Analytical Report

Report Date: 11/10/21

Sample Site:	**JRW RCRA GW Monitoring - Pond 6**	Laboratory Project:	**21-1231**
Field Sample ID:	**JRW-MW-16005 FIeld MSD**	Collect Date:	10/07/2021
Lab Sample ID:	21-1231-11	Collect Time:	03:22 PM
Matrix:	Groundwater		

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

Aliquot: 21-1231-11-C01-A01 **Analyst: EB**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	93		%	20	10/25/2021	AB21-1023-02
Calcium	107		%	1000	10/25/2021	AB21-1023-02
Iron	95		%	20	10/25/2021	AB21-1023-02

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

Aliquot: 21-1231-11-C02-A01 **Analyst: TMR**

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	93		%	1000	10/25/2021	AB21-1022-07
Fluoride	81		%	1000	10/22/2021	AB21-1022-07
Sulfate	95		%	1000	10/25/2021	AB21-1022-07

Data Qualifiers	Exception Summary
	No exceptions occured.

General Standard Operating Procedure

TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM

Project Log-In Number: 21-1231

Inspection Date: 10-08-21 **Inspection By:** CLH

Sample Origin/Project Name: JRW POND 6

Shipment Delivered By: Enter the type of shipment carrier

Pony _____ FedEx _____ UPS _____ USPS _____ Airborne _____

Other/~~Hand Carry~~ (whom) CLH + CET

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 _____ Sealed ✓

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 2.9-4.1°C Samples Received on Ice. Yes ✓ No____

M&TE # and Expiration 015402 | 10.~~06~~ 100821
06.3.22

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)					
24 mL vial (glass)	22				
250 ~~500~~ mL (plastic)	9				
Other _____					

PG. 2 of 2 not needed

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SAMPLING SITE: **JRW RCRA – October 2021 Pond 6**

PROJECT NUMBER: **21-1231**

SAMPLING TEAM: Casey Hansen/Chase Tumey

DATE SHIPPED:

SITE SKETCHED ATTACHED? CIRCLE ONE: YES NO

SEND REPORT TO: Michelle Marion

TRC

PHONE

CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS	ANALYSIS REQUESTED: Total Metals	Anions	TDS						REMARKS
21-1231-01	10.7.21	1731	GW	JRW-MW-16001		3	X	X	X						
-02	10.8.21	1125	GW	JRW-MW-16002		3	X	X	X						
-03	10.8.21	1035	GW	JRW-MW-16003		3	X	X	X						
-04	10.8.21	0946	GW	JRW-MW-16004		3	X	X	X						
-05	10.7.21	1622	GW	JRW-MW-16005		3	X	X	X						
-06	10.7.21	1526	GW	JRW-MW-16006		3	X	X	X						
-07	10.7.21	—	GW	DUP-02		3	X	X	X						
-08	10.7.21	1645	GW	EB-02		3	X	X	X						
-09	10.7.21	1650	GW	FB-02		3	X	X	X						
-10	10.7.21	1622	GW	JRW-MW-16005 Field MS		2	X	X							
-11	10.7.21	1622	GW	JRW-MW-16005 Field MSD		2	X	X							

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
Casey Hansen	10.8.21 1400	
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

COMMENTS: nice 2.9-4.1°C 015402

ORIGINAL TO LAB COPY TO CUSTOMER

Appendix C
Field Notes

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WATER LEVEL DATA

Site: JR Whiting

Project No: 21-1230 **Reviewed by:** JA

Analyst: CET **Review Date:** 11-03-21

Date: 10-7-21

Method: Electronic Tape

Tape ID: ~~Solinst, Model 122~~ @ 10-7-21 Geotech **S/N:** 1035

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001	1039	4.85	4.85	81.94	
JRW MW-15002	1015	13.61	13.61	92.24	
JRW MW-15003	1020	10.69	10.69	90.28	
JRW MW-15004	1025	12.78	12.78	96.27	
JRW MW-15005	~~1230~~ @ 10-7-21 1030	11.72	11.72	93.45	
JRW MW-15006	1035	3.93	3.93	82.95	
JRW MW-16001					
JRW MW-16002					
JRW MW-16003					
JRW MW-16004					
JRW MW-16005					
JRW MW-16007					
JRW MW-16008					
JRW MW-16009					

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 10-7-21 Control Number 21-1230-01
Location Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 1005

QC SAMPLE: ☐ MS/MSD ☑ DUP-01 Sonde ID: ☐ 11M ☐ 15H ☑ 19M ☐ 20G ☐ 21G

Depth-to-water T/PVC (ft) 4.85 Depth-To-Bottom T/PVC (ft) 81.94 Completed by CEY

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	+/- 0.1	NA	+/- 3%	+/- 10%	+/- 10%	+/- 10mV	*	< 0.33	+/- 10%	
Stablization parameters for the last three readings										
1045							160	4.95	~~5.36~~	
1047	7.64	16.1	1108	30.0	2.87	141.8	160	4.95	5.36	
1052	7.46	15.6	1109	~~+7.7~~ 18.0	1.77	135.0	160	4.95	5.02	
1057	7.41	15.5	1110	12.8	1.26	80.0	160	4.95	5.69	
1102	7.40	15.5	1110	10.6	1.04	6.9	160	4.95	6.72	
1107	7.41	15.5	1112	8.2	0.80	-69.1	160	4.95	5.34	
1112	7.41	15.6	1111	7.0	0.69	-88.2	160	4.95	5.96	
1117	7.40	15.8	1112	6.1	0.59	-105.6	160	4.95	4.71	
1122	7.41	15.9	1116	6.0	0.59	-116.8	160	4.95	4.69	
1127	7.41	15.8	1115	5.8	0.58	-120.1	160	4.95	5.00	
1132	7.43	15.7	1113	5.6	0.55	-125.5	160	4.95	5.13	
1133	Collected Sample									
1140										

Total Pump Time (min): 55 Total Purge Volume (gal): ≈ 2.5 gal Reviewed by: 11-03-21

Weather:

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	✓						
2	1	1	A	1						
2	250 ml	1	1	1						

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

Laboratory Services
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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15002 Date 10-7-21 Control Number 21-1230-02, -10, -11
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel
Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer
Depth to Water Tape: Solonist S/N: 379851

QC SAMPLE: ☑ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☐ 15H ☐ 19M ☑ 20G ☐ 21G

Depth-to-water T/PVC (ft) 13.61 Depth-To-Bottom T/PVC (ft) 92.24 Completed by CLH/MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	+/- 0.1	NA	+/- 3%	+/- 10%	+/- 10%	+/- 10mV	*	< 0.33	+/- 10%	
Stablization parameters for the last three readings										
1144							136	13.63		
1155	7.28	16.5	894	12.6	1.21	-66.9	136	13.63	1.10	
1200	7.33	16.6	1029	6.8	0.65	-94.0	136	13.63	1.79	
1205	7.40	16.6	1074	4.7	0.46	-117.7	136	13.63	~~14.79~~	-0.45 MLR
1210	7.46	16.6	1107	3.9	0.38	-133.6	136	13.63	-0.65	
1215	7.47	16.6	1114	3.5	0.34	-141.4	136	13.63	-0.44	
1220	7.49	16.6	1118	3.3	0.32	-145.8	136	13.63	0.50	
1225	7.50	16.6	1117	3.2	0.31	-148.2	136	13.63	-0.21	
1230	7.50	16.7	1119	3.1	0.30	-150.6	136	13.63	0.69	
1231	Collect Sample									

Total Pump Time (min): 40 Total Purge Volume (gal): 2.0 Reviewed by: 11-03-21
Weather: 65°F, Partly cloudy
Comments: Collected MS/MSD

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	125 mL	plastic	B	N						
3	125mL	↓	A	↓						
1	250mL		A							

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

Consumers Energy
Laboratory Services
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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15003 Date 10-7-21 Control Number 21-1230-03
Location JR Whiting Well Material: [✓] PVC [ ] SS [ ] Iron [ ] Galv. Steel

Purge Method: [✓] Peristaltic [ ] Submersible [ ] Fultz [ ] Bailer

Depth to Water Tape: Solonist S/N: 379851

QC SAMPLE: [ ] MS/MSD [ ] DUP- Sonde ID: [ ] 11M [ ] 15H [ ] 19M [✓] 20G [ ] 21G

Depth-to-water T/PVC (ft) 10.70 Depth-To-Bottom T/PVC (ft) _____ Completed by MLR/CLH

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*	
Stablization parameters for the last three readings										
1255							180	10.72		
1300	7.51	14.6	990	3.5	0.36	-45.8	180	10.72	11.33	
1305	7.50	14.5	990	2.9	0.30	-45.5	180	10.72	11.30	
1310	7.50	14.4	990	2.9	0.29	-45.9	180	10.72	11.07	
1315	7.50	14.5	989	2.8	0.28	-47.5	180	10.72	11.38	
1320	7.50	14.5	990	2.6	0.27	-47.6	180	10.72	11.32	
1325	7.51	14.1	990	2.8	0.29	-57.9	180	10.72	8.79	
1330	7.50	14.2	990	2.4	0.25	-65.5	180	10.72	9.56	
1335	7.50	14.1	990	2.3	0.24	-68.7	180	10.72	9.45	
1340	7.51	14.2	990	2.3	0.24	-69.5	180	10.72	9.37	
1345	Collected Sample									

Total Pump Time (min): 50 Total Purge Volume (gal): 3.25 Reviewed by: 11-03-21

Weather: 60°F, Slight rain

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.*

Consumers Energy Laboratory Services

Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRV - MW - 15004 Date 10-7-21 Control Number 21-1230-04

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

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 1005

QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☐ 15H ☑ 19M ☐ 20G ☐ 21G

Depth-to-water T/PVC (ft) 12.78 Depth-To-Bottom T/PVC (ft) 96.27 Completed by CG

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*	
Stablization parameters for the last three readings										
1336							160	12.83		
1338	7.52	16.1	988	5.1	0.49	52.4	160	~~12.83~~ 12.84	3.47	
1343	7.39	16.0	987	3.7	0.36	47.8	160	12.83	3.93	
1348	7.38	16.0	987	3.1	0.31	45.7	160	12.83	4.02	
1353	7.36	15.9	987	2.9	0.27	43.6	160	12.83	3.81	
1358	7.35	15.9	987	2.8	0.27	41.0	160	12.83	4.52	
1403	7.34	15.8	986	2.8	0.26	39.1	160	12.83	4.44	
1404							~~160~~			
1408										

Total Pump Time (min): 52 Total Purge Volume (gal) : ≈ 1.3 gal Reviewed by: 11-03-21

Weather:

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	✓					
1	1	1	A	1					
1	250mL	1	1	1					

** 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 JRV-MW-1500S Date 10-7-21 Control Number 21-1230-05
Location Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 1005

QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☐ 15H ☑ 19M ☐ 20G ☐ 21G

Depth-to-water T/PVC (ft) 11.72 Depth-To-Bottom T/PVC (ft) 93.45 Completed by CEJ

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*	
Stablization parameters for the last three readings										
1245							220	11.83		
1244	7.75	16.9	901	9.4	0.88	-71.0	220	11.83	3.44	
1249	7.60	16.9	900	5.4	0.52	-89.7	220	11.83	3.86	
1254	7.58	17.2	900	4.2	0.40	-105.4	220	11.83	4.64	
1259	7.61	17.1	900	3.6	0.34	-106.6	220	11.83	4.99	
1304	7.61	16.9	904	3.2	0.31	-107.0	220	11.83	3.04	
1309	7.61	16.8	904	3.1	0.30	-106.7	220	11.83	3.42	
1314	7.61	16.8	905	3.1	0.29	-106.7	220	11.83	3.55	
1314										
1317										

Total Pump Time (min): 34 Total Purge Volume (gal): ~~1gal~~ 2gal Reviewed by: 11-03-21

Weather:

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	1L	〃	A	〃						
1	250mL	〃	〃	〃						

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

Laboratory Services
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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID SRW-MW-15006 Date 10-7-21 Control Number 21-1230-06
Location Whiting Well Material: ✓ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ✓ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 1005

QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☐ 15H ✓ 19M ☐ 20G ☐ 21G

Depth-to-water T/PVC (ft) 3.93 Depth-To-Bottom T/PVC (ft) 82.95 Completed by CGF

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	+/- 0.1	NA	+/- 3%	+/- 10%	+/- 10%	+/- 10mV	*	< 0.33	+/- 10%	
1202										*Stablization parameters for the last three readings*
~~1159~~ 1210							160	3.99		
1204	7.60	15.8	1005	5.6	0.55	-118.9	160	3.99	1.79	
1209	7.48	15.7	1003	5.6	0.55	-134.9	160	3.99	2.78	
1214	7.46	15.7	1003	5.5	0.54	-139.0	160	3.99	2.16	
1219	7.44	15.7	1002	5.3	0.52	-143.1	160	3.99	2.46	
1220										
1224										

Total Pump Time (min): 22 Total Purge Volume (gal) : ≈ 1 gal Reviewed by: 11-22-21

Weather:

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	↓					
1	250mL	↓	A	↓					

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

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WATER LEVEL DATA

Site: JR Whiting

Project No: ~~12-~~ 21-1230, 21-1231 (mit 100721) **Reviewed by:** [signature]

Analyst: WH, MLR **Review Date:** 11-03-21

Date: 10.07.21

Method: Electronic Tape

Tape ID: Solinst, Model ~~122~~ 101 (WH 100721) **S/N:** 379851

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 ✓	1645	15.80	15.80	83.65	GOOD
JRW MW-16002	1745	12.19	12.19	94.10	GOOD
JRW MW-16003	1750	12.49	12.49	86.70	GOOD
JRW MW-16004	1751	12.80	12.80	88.50	GOOD
JRW MW-16005 ✓	1545	15.61	15.61	91.05	GOOD
JRW-MW-16006 ✓	1520	14.70	14.70	91.35	GOOD
JRW MW-16007	9:57	5.78	5.78	80.65	good
JRW MW-16008	9:53	6.30	6.30	76.00	good
JRW MW-16009	9:45	6.09	6.09	81.61	good
Recheck → JRW-MW-16006	1803	14.49 ~~14~~ MLR 100721	14.49 ✓	91.35	good

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

Laboratory Services
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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16001 Date 10-7-21 Control Number 21-1231-01
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel
Purge Method: ☐ Peristaltic ☑ Submersible ☐ Fultz ☐ Bailer
Depth to Water Tape: Solonist S/N: 379851

QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☐ 15H ☐ 19M ☑ 20G ☐ 21G

Depth-to-water T/PVC (ft) 15.80 Depth-To-Bottom T/PVC (ft) 83.65 Completed by CLH/MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	+/- 0.1	NA	+/- 3%	+/- 10%	+/- 10%	+/- 10mV	*	< 0.33	+/- 10%	
	MLR 10-7-21									
(1645) 1645							450	16.10		
(1650) 1650	10.82	12.7	662	27.0	2.86	-155.0	450	16.10	3.88	
1655	10.78	12.6	657	25.8	2.74	-136.7	450	16.10	1.57	
1700	10.25	12.6	636	22.8	2.41	-111.8	450	16.10	1.03	
1701	High volume purge to Lower PH (Purged 7 gallons)									
1715	8.01	12.5	753	2.0	0.21	-144.1	450	16.10	-0.89	
1720	7.86	12.5	758	1.8	0.19	-140.5	450	16.10	-0.23	
1725	7.83	12.5	751	1.7	0.18	-140.3	450	16.10	-0.28	
1730	7.82	12.5	757	1.7	0.18	-140.4	450	16.10	-0.39	
1731	Collected Sample									

Total Pump Time (min): 45 Total Purge Volume (gal) : ~ 10.5 Reviewed by: 11-03-21
Weather: Slight rain 68°
Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - ___							
Quantity (10-7-21 MLR)	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
3	125mL	Plastic	B	N					
1	125mL	Plastic	A	N					
1	250mL	Plastic	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-16002 Date 10-8-21 Control Number 21-1231-02
Location JR Whiting Well Material: [✓] PVC [ ] SS [ ] Iron [ ] Galv. Steel

Purge Method: [✓] Peristaltic [ ] Submersible [ ] Fultz [ ] Bailer

Depth to Water Tape: Geotech S/N: 1005

QC SAMPLE: [ ] **MS/MSD** [ ] **DUP-** **Sonde ID:** [ ] 11M [ ] 15H [✓] 19M [ ] 20G [ ] 21G

Depth-to-water T/PVC (ft) 12.13 Depth-To-Bottom T/PVC (ft) 94.10 Completed by CET

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*	
Stablization parameters for the last three readings										
1047							220	12.22		
1049	7.51	14.8	729	6.4	0.64	-10.9	220	~~12.66~~ 12.22 CET 10-8-21	2.66	
1054	8.25	14.4	773	4.9	0.49	-46.7	220	12.22	5.44	
1059	8.10	14.3	826	4.3	0.44	-67.3	220	~~12.25~~ 12.25 CET 10-8-21	4.86	
1104	8.38	14.4	904	4.1	0.41	-77.0	220	12.29	3.89	
1109	7.95	14.2	963	4.1	0.41	-94.2	220	12.29	8.29	
1114	7.89	14.5	962	4.2	0.42	-115.9	220	12.29	4.52	
1119	7.87	14.6	965	4.2	0.42	-116.9	220	12.29	3.97	
1124	7.85	14.6	965	4.0	0.40	-119.6	220	12.29	3.54	
1125										

Total Pump Time (min): 38 Total Purge Volume (gal): ~2.2 Reviewed by: [signature] 11-03-21

Weather:

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	L		A						
1	250mL	L	L	L					

** 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 10-8-21 Control Number 21-1231-03
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 1005

QC SAMPLE: ☐ MS/MSD ☐ DUP- **Sonde ID:** ☐ 11M ☐ 15H ☑ 19M ☐ 20G ☐ 21G

Depth-to-water T/PVC (ft) 12.33 Depth-To-Bottom T/PVC (ft) 86.70 Completed by CES

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*	
Stablization parameters for the last three readings										
1007							220	12.40		
1009	7.81	14.6	1058	13.9	1.34	-66.5	220	12.40	5.09	
1014	7.57	14.7	1060	6.6	0.66	-98.1	220	12.40	5.94	
1019	7.53	14.6	1053	7.4	0.74	-109.1	220	12.40	3.45	
1024	7.52	14.5	1053	5.2	0.52	-110.3	220	12.40	5.40	
1029	7.52	14.2	1053	4.7	0.47	-113.6	220	12.40	4.74	
1034	7.50	14.3	1055	5.1	0.52	-113.5	220	12.40	4.93	
1035										
1038										

Total Pump Time (min): ~~40~~ 31 Total Purge Volume (gal) : 52 gal Reviewed by: 11-03-21

Weather:

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	1	1	A	1					
1	250ml	1	I	1					

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

Consumers Energy
Laboratory Services
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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16004 Date 10-8-21 Control Number 21-1231-04

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

Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer

Depth to Water Tape: Geotech S/N: 1005

QC SAMPLE: ☐ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☐ 15H ☑ 19M ☐ 20G ☐ 21G

Depth-to-water T/PVC (ft) 12.67 Depth-To-Bottom T/PVC (ft) 88.50 Completed by CEF

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	+/- 0.1	NA	+/- 3%	+/- 10%	+/- 10%	+/- 10mV	*	< 0.33	+/- 10%	
Stablization parameters for the last three readings										
0918							220	12.73		
0920	8.34	14.6	1109	11.0	1.08	6.1	220	12.73	5.87	
0925	7.76	14.4	1194	4.8	0.48	-97.6	220	12.73	7.75	
0930	7.60	14.1	1209	4.2	0.42	-102.0	220	12.73	6.43	
0935	7.55	14.0	1211	4.9	0.49	-105.5	220	12.73	6.76	
0940	7.53	14.1	1211	4.8	0.47	-107.5	220	12.73	6.28	
0945	7.54	13.9	1210	4.7	0.48	-108.6	220	12.73	5.40	
0946										
0948										

Total Pump Time (min): 30 Total Purge Volume (gal): ~1.75gal Reviewed by: 11-03-21

Weather:

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	1	1	A	1						
1	250mL	1	1	1						

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

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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID MW-1600S Date 10-7-21 Control Number 21-1231-05, -10, -11
Location JR Whiting Well Material: ☑ PVC ☐ SS ☐ Iron ☐ Galv. Steel
Purge Method: ☑ Peristaltic ☐ Submersible ☐ Fultz ☐ Bailer
Depth to Water Tape: Solonist S/N: 379851
QC SAMPLE: ☑ MS/MSD ☐ DUP- Sonde ID: ☐ 11M ☐ 15H ☐ 19M ☑ 20G ☐ 21G
Depth-to-water T/PVC (ft) 15.61 Depth-To-Bottom T/PVC (ft) 91.05 Completed by CLH/MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*	
Stablization parameters for the last three readings										
1545							250	15.65		
1550	7.25	15.2	871	4.2	0.42	-81.8	250	15.65	2.00	
1555	7.38	15.2	875	3.4	0.34	-109.2	250	15.65	2.35	
1600	7.45	14.9	877	3.1	0.31	-129.0	250	15.65	3.41	
1605	7.54	14.9	878	2.7	0.28	-146.7	250	15.65	7.56	
1610	7.57	15.1	880	2.6	0.26	-150.3	250	15.65	2.55	
1615	7.59	15.1	881	2.5	0.25	-155.5	250	15.65	2.85	
1620	7.59	15.1	880	2.5	0.25	-156.4	250	15.65	2.76	
1622	Collected Sample									

Total Pump Time (min): 37 Total Purge Volume (gal): ~~5~~ 2.5 MLR 10-7-21 Reviewed by: 11-03-21
Weather: 68° rain
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	12mL	Plastic	A	N						
1	250mL	Plastic	A	N						

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

Laboratory Services
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Consumers Energy Company
Monitoring Well Sampling Worksheet

Well ID JRW-MW-160006 Date 10.7.21 Control Number 21-1231-06, -07
Location JR Whiting Well Material: ☐ PVC ☐ SS ☐ Iron ☐ Galv. Steel
Purge Method: ☐ Peristaltic ☑ Submersible ☐ Fultz ☐ Bailer
Depth to Water Tape: Solinst S/N: 379851

QC SAMPLE: ☐ MS/MSD ☑ DUP-02 Sonde ID: ☐ 11M ☐ 15H ☐ 19M ☑ 20G ☐ 21G

Depth-to-water T/PVC (ft) 14.70 Depth-To-Bottom T/PVC (ft) 91.35 Completed by CLH | MLR

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level Drawdown	Turbidity	Notes
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	ft	NTU	
3-5 min	*+/- 0.1*	*NA*	*+/- 3%*	*+/- 10%*	*+/- 10%*	*+/- 10mV*	*	*< 0.33*	*+/- 10%*	
Stablization parameters for the last three readings										
1445							460	14.73		
1450	7.74	13.0	829	3.0	0.32	-137.4	460	14.73	77.80	
1455	7.74	13.1	830	2.5	0.26	-141.8	460	14.73	21.0	
1500	7.73	13.0	830	2.3	0.25	-144.2	460	14.73	13.31	
1505	7.74	13.0	832	2.2	0.23	-146.4	460	14.73	8.05	
1510	7.73	13.0	833	2.1	0.22	-148.3	460	14.73	3.33	
1515	7.74	13.0	835	2.0	0.21	-149.6	460	14.73	2.15	
1520	7.74	13.1	836	2.0	0.20	-150.2	460	14.73	2.00	
1525	7.74	13.1	837	1.9	0.20	-150.6	460	14.73	1.31	
1526	Collect Sample									

Total Pump Time (min): 41 min Total Purge Volume (gal) : 5 Reviewed by: 11-05-21
Weather: 60°F, rain
Comments:
Collected Field Dup-02

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	125mL	↓	A	N						
2	250mL	↓	A	N						

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