



# 2020 Annual Groundwater Monitoring and Corrective Action Report

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

Erie, Michigan

January 2021

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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, 2020 to December 31, 2020. 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 2020 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 2020 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 2020 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 2020 semiannual monitoring events were completed in April and October 2020 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 2020 monitoring activities.

### **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 2020. No SSIs were recorded for the 2020 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**



# First Semiannual 2020 Groundwater Monitoring Report

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

Erie, Michigan

July 2020

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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 2020 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 2020. 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 approved by the EGLE on May 11, 2020.

### 1.2 Program Summary

Historically groundwater monitoring at JRW was performed under the HMP last revised on November 26, 1997 until the groundwater monitoring waiver was approved on September 2, 2009. It was then again performed pursuant to the CCR Rule only until implementation of the 2020 HMP. In the *2019 Annual Groundwater Monitoring Report for the JRW Pond 1&2 and Pond 6* (2019 Annual Report) (TRC, January 2020), the most recent report prepared in compliance with the CCR Rule, Consumers Energy reported that no potential statistically significant increases (SSIs) were noted in the 2019 semiannual detection monitoring events. Therefore, Consumers Energy continued detection monitoring in 2020 at Pond 1&2 and Pond 6 pursuant to

§257.94 of the CCR Rule, in addition to the recently approved HMP.

This 2020 First Semiannual Report presents the monitoring results and the statistical evaluation of the detection monitoring constituents (Section 11511a(3)(c) of Part 115) for the April 2020 semiannual groundwater monitoring event for Pond 1&2 and Pond 6 and marks the first report prepared for compliance with the HMP. 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.

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.

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## 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 (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.

### 2.2 April 2020 Groundwater Monitoring

Consumers Energy Laboratory Services personnel performed gauging and sampling of monitoring wells associated with Pond 1&2 and Pond 6 from April 7 through April 8, 2020. Groundwater monitoring was performed in accordance with the HMP. Groundwater samples collected during the April 2020 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 2020 groundwater sampling event. The QA/QC samples per CCR unit consisted of one field blank, one equipment blank, one field duplicate (JRW-MW-15002 at Pond 1&2 and JHC-MW-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 2020 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 2020), 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 2020 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**

The average groundwater gradient observed on April 7, 2020, using well pair JRW-MW-15006/JRW-MW-15002 and JRW-MW-15005/JRW-MW-15002, showed a very slight horizontal gradient of approximately 0.00014 ft/ft with minimal discernable overall flow direction across Pond 1&2 in the northern direction. 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 groundwater flow rate of approximately 0.028 feet/day (approximately 10 feet/year). Pond 1&2 groundwater elevations measured across the Site during the April 2020 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 2020 event, the average hydraulic gradient of 0.000040 ft/ft was calculated using well pairs JRW-MW-16004/JRW-MW 16001 and JRW-MW-16004/JRW-MW-16002 toward the north. Using the highest hydraulic conductivity measured at the Pond 6 CCR unit

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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 0.008 feet/day (approximately 2.9 feet/year). Groundwater elevations measured across the Site during the April 2020 sampling event are provided on Table 1 and are summarized in plan view on Figure 3.

The extremely low gradient and/or lack of 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 2020 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 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.

##### 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 First 2020 Semiannual Event (April 2020)

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

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

### **3.3 Data Comparison to Background Limits – Pond 6 First Semiannual Event (April 2020)**

The data comparisons of monitoring wells JRW-MW-16001 through JRW-MW-16006 for the April 2020 groundwater monitoring event are presented on Table 4. The statistical evaluation of the April 2020 constituents shows potential initial SSIs over background for:

- Fluoride at JRW-MW-16002.

The initial observation of a constituent concentration above the established background limits does not necessarily constitute an SSI. Per the HMP, if there is an exceedance of a prediction limit for one or more of the constituents, the well(s) of concern can be resampled within 30 days of the completion of the initial statistical analysis for verification purposes, further discussed below. There were no SSIs compared to background for the remaining constituents.

### **3.4 Verification Sampling for the Pond 6 First 2020 Semiannual Event**

Verification resampling is recommended per the HMP 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 HMP, if there is an exceedance of a prediction limit for one or more of the constituents, the well(s) of concern will be resampled within 30 days of the completion of the initial statistical analysis. Only constituents that initially exceed their statistical limit (i.e., have no previously recorded SSIs) will be analyzed for verification purposes.

As such, verification resampling for the April 2020 event was conducted on May 21, 2020 by Consumers Energy Laboratory Services personnel. Groundwater samples were collected for fluoride at JRW-MW-16002. A summary of the analytical results collected during the second semiannual verification resampling event is provided on Table 4. The associated data quality reviews are included in Appendix A.

The fluoride resample results are within the prediction limits; consequently, the initial potential SSI from the April 2020 event is not confirmed. Therefore, in accordance with the HMP and the Unified Guidance, the initial exceedances are not statistically significant, and no SSIs will be recorded for the April 2020 monitoring event.

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## 4.0 Conclusions and Recommendations

No SSIs over background limits were identified at either Pond 1&2 or Pond 6 during the April 2020 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 semiannual monitoring event for each of these units is scheduled for the fourth calendar quarter of 2020.

## 5.0 References

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## Tables

**Table 1**  
Groundwater Elevation Summary – April 2020  
JR Whiting Pond 1 & 2 and Pond 6  
Erie, Michigan

Well Location	Ground Surface Elevation (ft)	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Depth (ft BGS)		Screen Interval Elevation (ft)		April 7, 2020			
								Depth to Water (ft BTOC)	Groundwater Elevation (ft)		
<b>Static Water Level Monitoring Wells</b>											
JRW-MW-16007	579.47	582.31	Limestone	68.0	to	78.0	511.5	to	501.5	4.77	577.54
JRW-MW-16008	579.95	582.83	Limestone	68.0	to	73.0	512.0	to	507.0	5.29	577.54
JRW-MW-16009	579.90	582.60	Limestone	69.0	to	79.0	510.9	to	500.9	5.04	577.56
<b>Ponds 1 &amp; 2</b>											
JRW-MW-15001	NM	581.39	Limestone	NM	to	NM	NM	to	NM	3.75	577.64
JRW-MW-15002	NM	590.17	Limestone	NM	to	NM	NM	to	NM	12.57	577.60
JRW-MW-15003	NM	587.23	Limestone	NM	to	NM	NM	to	NM	9.58	577.65
JRW-MW-15004	NM	589.32	Limestone	NM	to	NM	NM	to	NM	11.90	577.42 <sup>(1)</sup>
JRW-MW-15005	NM	588.28	Limestone	NM	to	NM	NM	to	NM	10.54	577.74
JRW-MW-15006	NM	580.48	Limestone	NM	to	NM	NM	to	NM	2.75	577.73
<b>Pond 6</b>											
JRW-MW-16001	589.19	592.33	Limestone	71.0	to	81.0	518.2	to	508.2	14.80	577.53
JRW-MW-16002	585.78	588.69	Limestone	81.0	to	91.0	504.8	to	494.8	11.21	577.48
JRW-MW-16003	586.19	589.01	Limestone	73.0	to	83.0	513.2	to	503.2	11.43	577.58
JRW-MW-16004	586.48	589.34	Limestone	75.0	to	85.0	511.5	to	501.5	11.76	577.58
JRW-MW-16005	589.29	592.14	Limestone	78.0	to	88.0	511.3	to	501.3	14.57	577.57
JRW-MW-16006	588.26	591.04	Limestone	79.0	to	89.0	509.3	to	499.26	13.48	577.56

**Notes:**

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

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

TOC: Top of well casing.

ft BTOC: Feet below top of well casing.

ft BGS: Feet below ground surface.

NM = Not measured

NR = Not recorded

(1) Anomalous static water elevation, not used for gradient calculations.

**Table 2**  
 Summary of Groundwater Field Parameters – April 2020  
 JR Whiting Pond 1 & 2 and 6  
 Erie, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)
<b>Ponds 1 &amp; 2</b>							
JRW-MW-15001	4/8/2020	1.49	-75.9	7.5	1,103	13.5	5.22
JRW-MW-15002	4/7/2020	0.18	-84.6	7.6	1,151	11.5	2.75
JRW-MW-15003	4/7/2020	0.31	-102.2	7.7	1,017	11.8	7.63
JRW-MW-15004	4/7/2020	0.11	-113.0	7.7	966	12.2	5.91
JRW-MW-15005	4/8/2020	0.06	-95.1	7.7	904	13.4	1.97
JRW-MW-15006	4/8/2020	0.04	-157.4	7.7	982	12.3	14.88
<b>Pond 6</b>							
JRW-MW-16001	4/8/2020	0.10	-181.0	8.3	761	11.8	1.11
JRW-MW-16002	4/8/2020	0.05	-128.3	7.7	1,009	12.1	6.48
JRW-MW-16002 <sup>(1)</sup>	5/21/2020	0.04	-150.8	7.8	1,003	12.1	9.10
JRW-MW-16003	4/8/2020	0.05	-157.9	7.6	1,053	12.3	1.76
JRW-MW-16004	4/8/2020	0.02	-96.8	7.5	1,212	12.4	3.26
JRW-MW-16005	4/7/2020	0.09	-143.3	7.7	888	12.2	4.00
JRW-MW-16006	4/7/2020	0.15	-138.6	7.8	867	12.5	7.01

**Notes:**

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celcius.

NTU - Nephelometric Turbidity Unit.

(1) Results for verification sampling performed on 5/21/2020.

**Table 3**  
 Comparison of Groundwater Detection Monitoring Results to Background Limits – April 2020  
 JR Whiting Pond 1 & 2  
 Erie, Michigan

Sample Location:		JRW-MW-15001		JRW-MW-15002		JRW-MW-15003		JRW-MW-15004		JRW-MW-15005		JRW-MW-15006	
Sample Date:		4/8/2020	PL	4/7/2020	PL	4/7/2020	PL	4/7/2020	PL	4/8/2020	PL	4/8/2020	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
<b>Appendix III</b>													
Boron	ug/L	186	240	189	220	208	230	224	270	214	270	219	250
Calcium	mg/L	141	180	147	180	124	160	118	140	109	120	119	140
Chloride	mg/L	40.4	55	42.4	56	38.1	55	39.2	56.0	34.7	46.0	38.7	53
Fluoride	ug/L	1,150	1,600	1,630	1,900	1,670	1,800	1,590	1,800	1,570	1,700	1,420	1,700
Sulfate	mg/L	364	474	387	500	325	440	301	390	269	350	302	410
Total Dissolved Solids	mg/L	780	1,000	790	1,100	759	940	688	880	155	840	700	920
pH, Field	SU	7.5	6.8 - 8.4	7.6	7.2 - 7.9	7.7	7.3 - 8.3	7.7	7.2 - 8.0	7.7	7.3 - 8.6	7.7	7.0 - 9.0
<b>MI Part 115</b>													
Iron	mg/L	328	n < 8	320	n < 8	273	n < 8	367	n < 8	118	n < 8	725	n < 8

**Notes:**

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

All metals were analyzed as total unless otherwise specified.

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

n = The number of data points collected.

**Table 4**  
 Comparison of Groundwater Detection Monitoring Results to Background Limits – April 2020  
 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:		4/8/2020	PL	4/8/2020	5/21/2020 <sup>(1)</sup>	PL	4/8/2020	PL	4/7/2020	PL	4/7/2020	PL	4/7/2020	PL
Constituent	Unit	Data		Data			Data		Data		Data		Data	
<b>Appendix III</b>														
Boron	ug/L	170	203	173	--	209	199	257	201	262	182	244	170	226
Calcium	mg/L	89	111	125	--	149	134	156	160	181	105	182	102	117
Chloride	mg/L	17.1	23.6	18.7	--	25.4	26.1	32.4	33.5	43.7	21.0	29.4	20.6	38.6
Fluoride	ug/L	1,660	2,300	<b>1,480</b>	1,080	1,400	1,510	1,600	1,480	1,700	1,720	1,800	1,620	2,200
Sulfate	mg/L	229	278	369	--	426	386	470	449	507	284	498	290	399
Total Dissolved Solids	mg/L	500	770	733	--	832	767	1,040	885	1,110	644	1,030	627	904
pH, Field	SU	8.3	7.5 - 8.9	7.7	--	7.5 - 8.3	7.6	7.4 - 7.9	7.5	7.4 - 8.2	7.7	7.3 - 8.0	7.8	7.5 - 8.2
<b>MI Part 115</b>														
Iron	mg/L	79	n < 8	240	--	n < 8	364	n < 8	208	n < 8	303	n < 8	256	n < 8

**Notes:**

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

-- = not analyzed

n = The number of data points collected.

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 performed on 5/21/2020.

**Table 5**  
 Summary of Statistical Exceedances - April 2020  
 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. 2020 (bold >201)	4 Qtr. 2019 (bold >201)	2 Qtr. 2019 (bold >201)	4 Qtr. 2018 (bold >201)
<b>No Exceedances</b>								

## Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.




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

TRC - GIS



PROJECT:	<b>CONSUMERS ENERGY COMPANY JR WHITING POWER PLANT ERIE, MICHIGAN</b>
TITLE:	<b>SITE LOCATION MAP</b>

DRAWN BY:	S. MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	S. HOLMSTROM
DATE:	JULY 2020
PROJ. NO.:	367393
FILE:	367393-001-001slm.mxd
<b>FIGURE 1</b>	



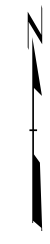


**LEGEND**

-  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.



1" = 500'  
1:6,000

PROJECT:		<b>CONSUMERS ENERGY COMPANY JR WHITING POWER PLANT ERIE, MICHIGAN</b>	
TITLE:		<b>SITE PLAN WITH CCR MONITORING WELL LOCATIONS</b>	
DRAWN BY:	S. MAJOR	PROJ NO.:	369393
CHECKED BY:	B. YELEN	<b>FIGURE 2</b>	
APPROVED BY:	S. HOLMSTROM		
DATE:	JULY 2020		
FILE NO.:		367393-001-004.mxd	



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**LEGEND**

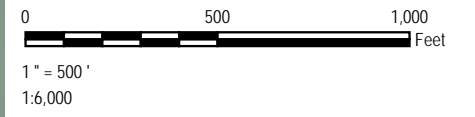
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- CCR UNIT MONITORING WELL

**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.
5. ANOMALOUS STATIC WATER ELEVATION. NOT USED FOR GRADIENT CALCULATION.



PROJECT:		<b>CONSUMERS ENERGY COMPANY JR WHITING POWER PLANT ERIE, MICHIGAN</b>	
TITLE:		<b>GROUNDWATER POTENTIOMETRIC ELEVATION SUMMARY APRIL 2020</b>	
DRAWN BY:	M. JAGOE	PROJ NO.:	367393
CHECKED BY:	M. HORN	<b>FIGURE 3</b>	
APPROVED BY:	S. HOLMSTROM		
DATE:	JULY 2020		



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# Appendix A

## Data Quality Reviews

## Pond 1 & 2



## Laboratory Data Quality Review Groundwater Sampling Event April 2020 Consumers Energy JR Whiting Ponds 1 & 2

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the April 2020 groundwater monitoring sampling event. Samples were analyzed for anions, total and/or dissolved metals, and total dissolved solids by CE Laboratory Services, located in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 20-0355.

During the April 2020 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 and/or Dissolved 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, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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 and dissolved 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 recoveries were within the acceptance limits, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-01/JRW-MW-15002. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

## Pond 6

# Laboratory Data Quality Review Groundwater Sampling Event April 2020 Consumers Energy JR Whiting Pond 6

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the April 2020 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 20-0356.

During the April 2020 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, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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 all 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.

# Laboratory Data Quality Review Verification Groundwater Sampling Event May 2020 Consumers Energy JR Whiting Pond 6

A groundwater sample was collected by Consumers Energy (CE) Laboratory Services for the May 2020 verification of the April 2020 groundwater monitoring sampling event. The sample was analyzed for fluoride by CE Laboratory Services, located in Jackson, Michigan. The laboratory analytical results were reported in laboratory project number 20-0589.

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

- JRW-MW-16002

The sample was analyzed for the following constituent:

Analyte Group	Method
Anions (Fluoride)	EPA 300.0

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

## Data Quality Review Procedure

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

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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. Target analytes were not detected in these blank samples.
- MS and MSD analyses were performed on sample JRW-MW-16002 for fluoride. 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 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-16002. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

# Appendix B

## Laboratory Reports

## **Pond 1 & 2**

To: MAMarion, P22-118

From: EBlaj, T-258

Date: April 21, 2020

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 1 AND 2 – 2020 Q2

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

---

**Chemistry Project: 20-0355**

CE Laboratory Services conducted groundwater monitoring at JR Whiting Pond 1 & 2 on 04/07/2020 and 04/08/2020, for the 1<sup>st</sup> 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 04/09/2020.

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 2009 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



*Testing performed in accordance with the A2LA scope of accreditation specified in the listed certificate. The information contained in this report is the sole property of Consumers Energy. It cannot be reproduced except in full, and with consent from Consumers Energy, or the customer for which this report was issued.*

## 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, 22<sup>nd</sup> 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:

<u>Acronym</u>	<u>Description</u>
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

<u>Qualifier</u>	<u>Description</u>
*	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



## Work Order Sample Summary

---

**Customer Name:** JR Whiting Complex  
**Work Order ID:** JRW RCRA GW Monitoring - Pond 1&2 - April 2020  
**Date Received:** 4/9/2020  
**Chemistry Project:** 20-0355

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
20-0355-01	JRW-MW-15001	Groundwater	04/08/2020 02:01 PM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-02	JRW-MW-15002	Groundwater	04/07/2020 11:14 AM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-03	JRW-MW-15003	Groundwater	04/07/2020 12:26 PM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-04	JRW-MW-15004	Groundwater	04/07/2020 01:12 PM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-05	JRW-MW-15005	Groundwater	04/08/2020 03:07 PM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-06	JRW-MW-15006	Groundwater	04/08/2020 04:15 PM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-07	DUP-01	Groundwater	04/07/2020 12:00 AM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-08	EB-01	Water	04/08/2020 07:24 AM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-09	FB-01	Water	04/07/2020 11:37 AM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-10	JRW-MW-15006 MS	Groundwater	04/08/2020 04:15 PM	JRW RCRA GW Monitoring - Pond 1&2
20-0355-11	JRW-MW-15006 MSD	Groundwater	04/08/2020 04:15 PM	JRW RCRA GW Monitoring - Pond 1&2

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15001**  
 Lab Sample ID: 20-0355-01  
 Matrix: Groundwater

Laboratory Project: **20-0355**  
 Collect Date: 04/08/2020  
 Collect Time: 02:01 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-01-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	186		ug/L	20	04/13/2020	AB20-0413-02
Calcium	141000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	328		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-01-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	40400		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1150		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	364000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0355-01-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	780		mg/L	20	04/09/2020	AB20-0409-06

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15002**  
 Lab Sample ID: 20-0355-02  
 Matrix: Groundwater

Laboratory Project: **20-0355**  
 Collect Date: 04/07/2020  
 Collect Time: 11:14 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-02-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	189		ug/L	20	04/13/2020	AB20-0413-02
Calcium	147000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	320		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-02-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	42400		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1630		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	387000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0355-02-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	790		mg/L	20	04/09/2020	AB20-0409-06

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15003**  
 Lab Sample ID: 20-0355-03  
 Matrix: Groundwater

Laboratory Project: **20-0355**  
 Collect Date: 04/07/2020  
 Collect Time: 12:26 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-03-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	208		ug/L	20	04/13/2020	AB20-0413-02
Calcium	124000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	273		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-03-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	38100		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1670		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	325000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0355-03-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	759		mg/L	20	04/09/2020	AB20-0409-06



# Analytical Report

Report Date: 04/21/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
Field Sample ID: **JRW-MW-15004**  
Lab Sample ID: 20-0355-04  
Matrix: Groundwater

Laboratory Project: **20-0355**  
Collect Date: 04/07/2020  
Collect Time: 01:12 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-04-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	224		ug/L	20	04/13/2020	AB20-0413-02
Calcium	118000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	367		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-04-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	39200		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1590		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	301000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0355-04-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	688		mg/L	20	04/09/2020	AB20-0409-06



# Analytical Report

Report Date: 04/21/20

## Laboratory Services A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
Field Sample ID: **JRW-MW-15005**  
Lab Sample ID: 20-0355-05  
Matrix: Groundwater

Laboratory Project: **20-0355**  
Collect Date: 04/08/2020  
Collect Time: 03:07 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-05-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	214		ug/L	20	04/13/2020	AB20-0413-02
Calcium	109000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	118		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-05-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	34700		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1570		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	269000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0355-05-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	155		mg/L	20	04/09/2020	AB20-0409-06

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15006**  
 Lab Sample ID: 20-0355-06  
 Matrix: Groundwater

Laboratory Project: **20-0355**  
 Collect Date: 04/08/2020  
 Collect Time: 04:15 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-06-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	219		ug/L	20	04/13/2020	AB20-0413-02
Calcium	119000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	725		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-06-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	38700		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1420		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	302000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0355-06-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	700		mg/L	20	04/09/2020	AB20-0409-06

**Metals by EPA 6020B: CCR Rule Analytes, Dissolved B, Ca, Fe** Aliquot: 20-0355-06-C05-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	203		ug/L	20	04/13/2020	AB20-0413-03
Calcium	114000		ug/L	1000	04/13/2020	AB20-0413-03
Iron	547		ug/L	20	04/13/2020	AB20-0413-03

**Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **DUP-01**  
 Lab Sample ID: 20-0355-07  
 Matrix: Groundwater

Laboratory Project: **20-0355**  
 Collect Date: 04/07/2020  
 Collect Time: 12:00 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-07-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	199		ug/L	20	04/13/2020	AB20-0413-02
Calcium	150000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	343		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-07-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	42400		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1780		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	393000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0355-07-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	828		mg/L	20	04/09/2020	AB20-0409-06



**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **EB-01**  
 Lab Sample ID: 20-0355-08  
 Matrix: Water

Laboratory Project: **20-0355**  
 Collect Date: 04/08/2020  
 Collect Time: 07:24 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-08-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	04/13/2020	AB20-0413-02
Calcium	ND		ug/L	1000	04/13/2020	AB20-0413-02
Iron	ND		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-08-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	ND		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	ND		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0355-08-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	20	04/09/2020	AB20-0409-06



# Analytical Report

Report Date: 04/21/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **FB-01**  
 Lab Sample ID: 20-0355-09  
 Matrix: Water

Laboratory Project: **20-0355**  
 Collect Date: 04/07/2020  
 Collect Time: 11:37 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-09-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	04/13/2020	AB20-0413-02
Calcium	ND		ug/L	1000	04/13/2020	AB20-0413-02
Iron	ND		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-09-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	ND		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	ND		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0355-09-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	20	04/09/2020	AB20-0409-06

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15006 MS**  
 Lab Sample ID: 20-0355-10  
 Matrix: Groundwater

Laboratory Project: **20-0355**  
 Collect Date: 04/08/2020  
 Collect Time: 04:15 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-10-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	105		%	20	04/13/2020	AB20-0413-02
Calcium	113		%	1000	04/13/2020	AB20-0413-02
Iron	111		%	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-10-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	114		%	1000	04/10/2020	AB20-0410-01
Fluoride	97		%	1000	04/10/2020	AB20-0410-01
Sulfate	100		%	2000	04/15/2020	AB20-0410-01

**Metals by EPA 6020B: CCR Rule Analytes, Dissolved B, Ca, Fe** Aliquot: 20-0355-10-C03-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	99		%	20	04/13/2020	AB20-0413-03
Calcium	105		%	1000	04/13/2020	AB20-0413-03
Iron	100		%	20	04/13/2020	AB20-0413-03

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15006 MSD**  
 Lab Sample ID: 20-0355-11  
 Matrix: Groundwater

Laboratory Project: **20-0355**  
 Collect Date: 04/08/2020  
 Collect Time: 04:15 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0355-11-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	110		%	20	04/13/2020	AB20-0413-02
Calcium	118		%	1000	04/13/2020	AB20-0413-02
Iron	111		%	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0355-11-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	117		%	1000	04/10/2020	AB20-0410-01
Fluoride	96		%	1000	04/10/2020	AB20-0410-01
Sulfate	102		%	2000	04/15/2020	AB20-0410-01

**Metals by EPA 6020B: CCR Rule Analytes, Dissolved B, Ca, Fe** Aliquot: 20-0355-11-C03-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	98		%	20	04/13/2020	AB20-0413-03
Calcium	105		%	1000	04/13/2020	AB20-0413-03
Iron	104		%	20	04/13/2020	AB20-0413-03



**Laboratory Services**  
A CENTURY OF EXCELLENCE

# Analytical Report

Report Date: 04/21/20

Data Qualifiers	Exception Summary
-----------------	-------------------

No exceptions occurred.

**TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM**

Project Log-In Number: 20-0355

Inspection Date: 04/09/2020 Inspection By: CVH

Sample Origin/Project Name: Ponds 1+2 JRW CCR

Shipment Delivered By: Enter the type of shipment carrier.

Pony \_\_\_\_\_ FedEx \_\_\_\_\_ UPS \_\_\_\_\_ USPS \_\_\_\_\_ Airborne \_\_\_\_\_

Other/Hand Carry (whom) CVH - 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 3.2-4.6°C Samples Received on Ice: Yes  No \_\_\_\_\_

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)	<u>14</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	<u>11</u>	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____

3 Nitrites & TDS sample containers were combined for analysis

# CHAIN OF CUSTODY

## CONSUMERS ENERGY COMPANY – LABORATORY SERVICES



135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SITE				PROJECT NUMBER			ANALYSIS REQUESTED							Page 1 of 1	
JRW RCRA – April 2020 Pond 1&2				20-0355			Total Metals	Anions	TDS	Dissolved Metals					SEND REPORT TO Michelle Manon
															TRC
SAMPLING TEAM				DATE SHIPPED		SITE SKETCHED ATTACHED? CIRCLE ONE								PHONE _____	
Casey Hansen						YES NO								REMARKS	
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION		DEPTH (ft)	# OF CONTAINERS								
20-0355-01	4.8.2020	1401	GW	JRW-MW-15001_040820			2	X	X	X					
-02	4-7-2020	1114	GW	JRW-MW-15002_040720			2	X	X	X					
-03	4-7-2020	1220	GW	JRW-MW-15003_040720			2	X	X	X					
-04	4-7-2020	1312	GW	JRW-MW-15004_040720			2	X	X	X					
-05	4.8.2020	1507	GW	JRW-MW-15005_040820			2	X	X	X					
-06	4.8.2020	1615	GW	JRW-MW-15006_040820			3	X	X	X	X				
-07	4-7-2020	—	GW	DUP-01_040720			2	X	X	X					
-08	4.8.2020	0724	GW	EB-01_040820			2	X	X	X				Peristaltic	
-09	4-7-2020	1137	GW	FB-01_040720			2	X	X	X					
-10	4.8.2020	1615	GW	JRW-MW-15006 MS_040820			3	X	X		X				
↓ -11	4.8.2020	1615	GW	JRW-MW-15006 MSD_040820			3	X	X		X				
RELINQUISHED BY (SIGNATURE)				DATE/TIME		RECEIVED BY (SIGNATURE)		COMMENTS							
Casey Hansen				4-9-2020 0645		[Signature]		3.2-4.6 <sup>00</sup> alice							
RELINQUISHED BY (SIGNATURE)				DATE/TIME		RECEIVED BY (SIGNATURE)									
						[Signature]									

ORIGINAL TO LAB    COPY TO CUSTOMER

## Pond 6



To: MAMarion, P22-118

From: EBlaj, T-258

Date: April 21, 2020

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 6 – 2020 Q2

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

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**Chemistry Project: 20-0355**

CE Laboratory Services conducted groundwater monitoring at JR Whiting Pond 6 on 04/07/2020 and 04/08/2020, for the 1<sup>st</sup> 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 04/09/2020.

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 2009 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



*Testing performed in accordance with the A2LA scope of accreditation specified in the listed certificate. The information contained in this report is the sole property of Consumers Energy. It cannot be reproduced except in full, and with consent from Consumers Energy, or the customer for which this report was issued.*

## 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, 22<sup>nd</sup> 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:

<u>Acronym</u>	<u>Description</u>
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

<u>Qualifier</u>	<u>Description</u>
*	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

**Customer Name:** JR Whiting Complex  
**Work Order ID:** JRW RCRA GW Monitoring - Pond 6 - April 2020  
**Date Received:** 4/9/2020  
**Chemistry Project:** 20-0356

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
20-0356-01	JRW-MW-16001	Groundwater	04/08/2020 09:05 AM	JRW RCRA GW Monitoring - Pond 6
20-0356-02	JRW-MW-16002	Groundwater	04/08/2020 10:30 AM	JRW RCRA GW Monitoring - Pond 6
20-0356-03	JRW-MW-16003	Groundwater	04/08/2020 11:14 AM	JRW RCRA GW Monitoring - Pond 6
20-0356-04	JRW-MW-16004	Groundwater	04/08/2020 12:16 PM	JRW RCRA GW Monitoring - Pond 6
20-0356-05	JRW-MW-16005	Groundwater	04/07/2020 02:36 PM	JRW RCRA GW Monitoring - Pond 6
20-0356-06	JRW-MW-16006	Groundwater	04/07/2020 03:27 PM	JRW RCRA GW Monitoring - Pond 6
20-0356-07	DUP-02	Groundwater	04/07/2020 03:27 PM	JRW RCRA GW Monitoring - Pond 6
20-0356-08	EB-02	Water	04/08/2020 07:34 AM	JRW RCRA GW Monitoring - Pond 6
20-0356-09	FB-02	Water	04/07/2020 02:01 AM	JRW RCRA GW Monitoring - Pond 6
20-0356-10	JRW-MW-16003 MS	Groundwater	04/08/2020 11:14 AM	JRW RCRA GW Monitoring - Pond 6
20-0356-11	JRW-MW-16003 MSD	Groundwater	04/08/2020 11:14 AM	JRW RCRA GW Monitoring - Pond 6



# Analytical Report

Report Date: 04/21/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **JRW-MW-16001**  
Lab Sample ID: 20-0356-01  
Matrix: Groundwater

Laboratory Project: **20-0356**  
Collect Date: 04/08/2020  
Collect Time: 09:05 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-01-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	170		ug/L	20	04/13/2020	AB20-0413-02
Calcium	89000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	79		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-01-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	17100		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1660		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	229000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0356-01-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	500		mg/L	20	04/09/2020	AB20-0409-06

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16002**  
 Lab Sample ID: 20-0356-02  
 Matrix: Groundwater

Laboratory Project: **20-0356**  
 Collect Date: 04/08/2020  
 Collect Time: 10:30 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-02-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	173		ug/L	20	04/13/2020	AB20-0413-02
Calcium	125000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	240		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-02-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	18700		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1480		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	369000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0356-02-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	733		mg/L	20	04/09/2020	AB20-0409-06

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16003**  
 Lab Sample ID: 20-0356-03  
 Matrix: Groundwater

Laboratory Project: **20-0356**  
 Collect Date: 04/08/2020  
 Collect Time: 11:14 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-03-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	199		ug/L	20	04/13/2020	AB20-0413-02
Calcium	134000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	364		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-03-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	26100		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1510		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	386000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0356-03-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	767		mg/L	20	04/09/2020	AB20-0409-06



# Analytical Report

Report Date: 04/21/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **JRW-MW-16004**  
Lab Sample ID: 20-0356-04  
Matrix: Groundwater

Laboratory Project: **20-0356**  
Collect Date: 04/08/2020  
Collect Time: 12:16 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-04-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	201		ug/L	20	04/13/2020	AB20-0413-02
Calcium	160000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	208		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-04-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	33500		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1480		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	449000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0356-04-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	885		mg/L	20	04/09/2020	AB20-0409-06



## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16005**  
 Lab Sample ID: 20-0356-05  
 Matrix: Groundwater

Laboratory Project: **20-0356**  
 Collect Date: 04/07/2020  
 Collect Time: 02:36 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-05-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	182		ug/L	20	04/13/2020	AB20-0413-02
Calcium	105000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	303		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-05-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	21000		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1720		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	284000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0356-05-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	644		mg/L	20	04/09/2020	AB20-0409-06

**Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16006**  
 Lab Sample ID: 20-0356-06  
 Matrix: Groundwater

Laboratory Project: **20-0356**  
 Collect Date: 04/07/2020  
 Collect Time: 03:27 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-06-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	170		ug/L	20	04/13/2020	AB20-0413-02
Calcium	102000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	256		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-06-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	20600		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1620		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	290000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0356-06-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	627		mg/L	20	04/09/2020	AB20-0409-06

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **DUP-02**  
 Lab Sample ID: 20-0356-07  
 Matrix: Groundwater

Laboratory Project: **20-0356**  
 Collect Date: 04/07/2020  
 Collect Time: 03:27 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-07-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	176		ug/L	20	04/13/2020	AB20-0413-02
Calcium	109000		ug/L	1000	04/13/2020	AB20-0413-02
Iron	262		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-07-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	21500		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	1720		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	290000		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0356-07-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	621		mg/L	20	04/09/2020	AB20-0409-06

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **EB-02**  
 Lab Sample ID: 20-0356-08  
 Matrix: Water

Laboratory Project: **20-0356**  
 Collect Date: 04/08/2020  
 Collect Time: 07:34 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-08-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	04/13/2020	AB20-0413-02
Calcium	ND		ug/L	1000	04/13/2020	AB20-0413-02
Iron	ND		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-08-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	ND		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	ND		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0356-08-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	20	04/09/2020	AB20-0409-06

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **FB-02**  
 Lab Sample ID: 20-0356-09  
 Matrix: Water

Laboratory Project: **20-0356**  
 Collect Date: 04/07/2020  
 Collect Time: 02:01 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-09-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	04/13/2020	AB20-0413-02
Calcium	ND		ug/L	1000	04/13/2020	AB20-0413-02
Iron	ND		ug/L	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-09-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	1000	04/10/2020	AB20-0410-01
Fluoride	ND		ug/L	1000	04/10/2020	AB20-0410-01
Sulfate	ND		ug/L	2000	04/15/2020	AB20-0410-01

**Total Dissolved Solids by SM 2540C** Aliquot: 20-0356-09-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	20	04/09/2020	AB20-0409-06



# Analytical Report

Report Date: 04/21/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **JRW-MW-16003 MS**  
Lab Sample ID: 20-0356-10  
Matrix: Groundwater

Laboratory Project: **20-0356**  
Collect Date: 04/08/2020  
Collect Time: 11:14 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-10-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	101		%	20	04/13/2020	AB20-0413-02
Calcium	113		%	1000	04/13/2020	AB20-0413-02
Iron	103		%	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-10-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	109		%	1000	04/10/2020	AB20-0410-01
Fluoride	87		%	1000	04/10/2020	AB20-0410-01
Sulfate	93		%	2000	04/15/2020	AB20-0410-01

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16003 MSD**  
 Lab Sample ID: 20-0356-11  
 Matrix: Groundwater

Laboratory Project: **20-0356**  
 Collect Date: 04/08/2020  
 Collect Time: 11:14 AM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-0356-11-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	104		%	20	04/13/2020	AB20-0413-02
Calcium	114		%	1000	04/13/2020	AB20-0413-02
Iron	110		%	20	04/13/2020	AB20-0413-02

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-0356-11-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	108		%	1000	04/10/2020	AB20-0410-01
Fluoride	87		%	1000	04/10/2020	AB20-0410-01
Sulfate	93		%	2000	04/15/2020	AB20-0410-01



# Analytical Report

Report Date: 04/21/20

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Data Qualifiers	Exception Summary
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No exceptions occurred.



**TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM**

Project Log-In Number: 20-0356

Inspection Date: 03/09/20 Inspection By: CUH

Sample Origin/Project Name: or 200110 Pind 6 JRW CUR

Shipment Delivered By: Enter the type of shipment carrier.

Pony \_\_\_\_\_ FedEx \_\_\_\_\_ UPS \_\_\_\_\_ USPS \_\_\_\_\_ Airborne \_\_\_\_\_  
Other/Hand Carry (whom) CUH - 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 3.2 - 4.6°C Samples Received on Ice: Yes  No \_\_\_\_\_

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)	<u>11</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	<u>11</u>	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____

anions + TDS containers  
were combined for analysis

# CHAIN OF CUSTODY

## CONSUMERS ENERGY COMPANY – LABORATORY SERVICES



135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SITE				PROJECT NUMBER			ANALYSIS REQUESTED							Page 1 of 1		
JRW RCRA – April 2020 Pond 6				20-0356			Total Metals	Anions	TDS							SEND REPORT TO Michelle Marion
SAMPLING TEAM				DATE SHIPPED		SITE SKETCHED ATTACHED? CIRCLE ONE										REMARKS
Casey Hansen						YES    NO									TRC _____	
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION		DEPTH (ft)	# OF CONTAINERS								PHONE _____	
20-0356-01	4.8.2020	0905	GW	JRW-MW-16001_040820			2	X	X	X						
-02	4.8.2020	1050	GW	JRW-MW-16002_040820			2	X	X	X						
-03	4.6.2020	1114	GW	JRW-MW-16003_040820			2	X	X	X						
-04	4.6.2020	1210	GW	JRW-MW-16004_040820			2	X	X	X						
-05	4.7.2020	1436	GW	JRW-MW-16005_040720			2	X	X	X						
-06	4.7.2020	1527	GW	JRW-MW-16006_040720			2	X	X	X						
-07	4.7.2020	1527	GW	DUP-02_040720			2	X	X	X						
-08	4.8.2020	0734	GW	EB-02_040820			2	X	X	X						Submersible
-09	4.7.2020	1401	GW	FB-02_040720			2	X	X	X						
-10	4.6.2020	1114	GW	JRW-MW-16003 MS_040820			2	X	X							
↓ -11	↓	1114	GW	JRW-MW-16003 MSD_040820			2	X	X							
RELINQUISHED BY (SIGNATURE)				DATE/TIME		RECEIVED BY (SIGNATURE)		COMMENTS								
Casey Hansen				4-9-2020    0045		[Signature]		3.2-4.6.06 ONIC								
RELINQUISHED BY (SIGNATURE)				DATE/TIME		RECEIVED BY (SIGNATURE)										
						[Signature]										

ORIGINAL TO LAB    COPY TO CUSTOMER

To: MAMarion, P22-118

From: EBlaj, T-258

Date: June 08, 2020

Subject: RCRA GROUNDWATER MONITORING – WHITING POND 6 VERIFICATION – 2020 Q2

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

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**Chemistry Project: 20-0589**

CE Laboratory Services conducted groundwater monitoring at JR Whiting Pond 6 on 05/21/2020, for the 1<sup>st</sup> Semiannual monitoring requirement, and as specified in the Sampling and Analysis Plan for the site. Only MW-16002 was sampled in order to verify Fluoride level. The samples were received by the Chemistry department of Laboratory Services for analysis on 05/22/2020.

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 2009 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



*Testing performed in accordance with the A2LA scope of accreditation specified in the listed certificate. The information contained in this report is the sole property of Consumers Energy. It cannot be reproduced except in full, and with consent from Consumers Energy, or the customer for which this report was issued.*

## 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, 22<sup>nd</sup> 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:

<u>Acronym</u>	<u>Description</u>
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

<u>Qualifier</u>	<u>Description</u>
*	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

**Customer Name:** JR Whiting Complex

**Work Order ID:** JRW Resampling MW-16002 and Site Water Level Survey

**Date Received:** 5/22/2020

**Chemistry Project:** 20-0589

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
20-0589-01	JRW-MW-16002	Groundwater	05/21/2020 05:23 PM	JRW RCRA GW Monitoring - Pond 6
20-0589-02	DUP-01	Groundwater	05/21/2020 05:23 PM	JRW RCRA GW Monitoring - Pond 6
20-0589-03	EB-01	Groundwater	05/21/2020 05:23 PM	JRW RCRA GW Monitoring - Pond 6
20-0589-04	FB-01	Groundwater	05/21/2020 05:23 PM	JRW RCRA GW Monitoring - Pond 6
20-0589-05	JRW-MW-16002 MS	Groundwater	05/21/2020 05:23 PM	JRW RCRA GW Monitoring - Pond 6
20-0589-06	JRW-MW-16002 MSD	Groundwater	05/21/2020 05:23 PM	JRW RCRA GW Monitoring - Pond 6



# Analytical Report

Report Date: 06/08/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **JRW-MW-16002**  
Lab Sample ID: 20-0589-01  
Matrix: Groundwater

Laboratory Project: **20-0589**  
Collect Date: 05/21/2020  
Collect Time: 05:23 PM

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

Aliquot: 20-0589-01-C01-A02

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Fluoride	1080		ug/L	1000	06/01/2020	AB20-0601-09



# Analytical Report

Report Date: 06/08/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **DUP-01**  
Lab Sample ID: 20-0589-02  
Matrix: Groundwater

Laboratory Project: **20-0589**  
Collect Date: 05/21/2020  
Collect Time: 05:23 PM

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

Aliquot: 20-0589-02-C01-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Fluoride	1030		ug/L	1000	06/01/2020	AB20-0601-09





# Analytical Report

Report Date: 06/08/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **EB-01**  
Lab Sample ID: 20-0589-03  
Matrix: Groundwater

Laboratory Project: **20-0589**  
Collect Date: 05/21/2020  
Collect Time: 05:23 PM

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

Aliquot: 20-0589-03-C01-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Fluoride	ND		ug/L	1000	06/01/2020	AB20-0601-09



# Analytical Report

Report Date: 06/08/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **FB-01**  
Lab Sample ID: 20-0589-04  
Matrix: Groundwater

Laboratory Project: **20-0589**  
Collect Date: 05/21/2020  
Collect Time: 05:23 PM

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

Aliquot: 20-0589-04-C01-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Fluoride	ND		ug/L	1000	06/01/2020	AB20-0601-09



# Analytical Report

Report Date: 06/08/20

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **JRW-MW-16002 MS**  
Lab Sample ID: 20-0589-05  
Matrix: Groundwater

Laboratory Project: **20-0589**  
Collect Date: 05/21/2020  
Collect Time: 05:23 PM

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

Aliquot: 20-0589-05-C01-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Fluoride	88		%	1000	06/01/2020	AB20-0601-09



# Analytical Report

Report Date: 06/08/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **JRW-MW-16002 MSD**  
Lab Sample ID: 20-0589-06  
Matrix: Groundwater

Laboratory Project: **20-0589**  
Collect Date: 05/21/2020  
Collect Time: 05:23 PM

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

Aliquot: 20-0589-06-C01-A01

Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Fluoride	90		%	1000	06/01/2020	AB20-0601-09

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Data Qualifiers	Exception Summary
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---

No exceptions occurred.

---

**TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM**

Project Log-In Number: 20-0589

Inspection Date: 05-22-2020 Inspection By: EB

Sample Origin/Project Name: JRW - Resampled HW 16002

Shipment Delivered By: Enter the type of shipment carrier.

Pony \_\_\_\_\_ FedEx \_\_\_\_\_ UPS \_\_\_\_\_ USPS \_\_\_\_\_ Airborne \_\_\_\_\_

Other/Hand Carry (whom) CET

Tracking Number: N/A 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 2.4°C Samples Received on Ice: Yes  No \_\_\_\_\_

2015402

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

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

# CHAIN OF CUSTODY

**CONSUMERS ENERGY COMPANY – LABORATORY SERVICES**



135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SITE <b>JRW RCRA – May 2020 Pond 6 Verification Sample</b>				PROJECT NUMBER <b>20-0589</b>			ANALYSIS REQUESTED						Page 1 of 1	
SAMPLING TEAM Chase Tumey				DATE SHIPPED <i>Carry in 5/21/20</i>		SITE SKETCHED ATTACHED? CIRCLE ONE YES    NO		Anions						SEND REPORT TO <u>Michelle Marion</u>
														TRC _____
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS							PHONE _____	
20-0589-01	<i>5-21-20</i>	<i>1723</i>	GW	JRW-MW-16002		1	X						REMARKS	
↓	↓	↓	GW	DUP-01		1	X							
↓	↓	↓	GW	EB-01		1	X							
↓	↓	↓	GW	FB-01		1	X							
↓	↓	↓	GW	JRW-MW-16002 MS		1	X							
↓	↓	↓	GW	JRW-MW-16002 MSD		1	X							
RELINQUISHED BY (SIGNATURE) 			DATE/TIME <i>5/21/20 2015</i>		RECEIVED BY (SIGNATURE) 			COMMENTS <i>2.4°C upon arrival/ Fluke 015484</i>						
RELINQUISHED BY (SIGNATURE)			DATE/TIME		RECEIVED BY (SIGNATURE)									

ORIGINAL TO LAB    COPY TO CUSTOMER

## **Appendix C Field Notes**





## Pond 1 & 2

# CHAIN OF CUSTODY

## CONSUMERS ENERGY COMPANY – LABORATORY SERVICES



135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SITE				PROJECT NUMBER			ANALYSIS REQUESTED							Page 1 of 1	
JRW RCRA – April 2020 Pond 1&2				20-0355			Total Metals	Anions	TDS	Dissolved Metals					SEND REPORT TO Michelle Manon
SAMPLING TEAM				DATE SHIPPED		SITE SKETCHED ATTACHED? CIRCLE ONE									REMARKS
Casey Hansen						YES NO		PHONE _____							
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION	DEPTH (ft)	# OF CONTAINERS									
20-0355-01	4.8.2020	1401	GW	JRW-MW-15001_040820		2	X	X	X						
-02	4.7.2020	1114	GW	JRW-MW-15002_040720		2	X	X	X						
-03	4.7.2020	1220	GW	JRW-MW-15003_040720		2	X	X	X						
-04	4.7.2020	1312	GW	JRW-MW-15004_040720		2	X	X	X						
-05	4.8.2020	1507	GW	JRW-MW-15005_040820		2	X	X	X						
-06	4.8.2020	1615	GW	JRW-MW-15006_040820		3	X	X	X	X					
-07	4.7.2020	—	GW	DUP-01_040720		2	X	X	X						
-08	4.8.2020	0724	GW	EB-01_040820		2	X	X	X					Peristaltic	
-09	4.7.2020	1137	GW	FB-01_040720		2	X	X	X						
-10	4.8.2020	1615	GW	JRW-MW-15006 MS_040820		3	X	X		X					
↓ -11	4.8.2020	1615	GW	JRW-MW-15006 MSD_040820		3	X	X		X					
RELINQUISHED BY (SIGNATURE)				DATE/TIME		RECEIVED BY (SIGNATURE)		COMMENTS							
Casey Hansen				4-9-2020 0645				3.2-4.6 <sup>00</sup> alice							
RELINQUISHED BY (SIGNATURE)				DATE/TIME		RECEIVED BY (SIGNATURE)									
															

ORIGINAL TO LAB COPY TO CUSTOMER







Laboratory Services  
A CENTURY OF EXCELLENCE

Sonde ID	19M
Start Date	04-06-2020
Project #	20-0355 : Ponds 1 & 2 20-0356 : Pond V
Site	JR Whiting CCR

Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 19M100493
Sonde Brand	YSI ProDSS S/N 19M100509
Flow Cell	EXO1 599080
DO Probe	YSI ProDSS S/N 19L103208
Turbidity Probe	YSI ProDSS S/N 19L103271
pH With ORP	YSI ProDSS S/N 19M101274
Conductivity & Temperature Probe	YSI ProDSS S/N 19L101251

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	19240146	4.7.21	4.01	3.97	4.06	4.00	4.02	4.08
7.0	GFS # 1639	19280105	7.6.21	6.98	7.05	7.08	7.04	7.05	7.08
10.0	GFS # 1645	19210104	5.9.21	10.00	9.95	10.02	10.05	10.06	10.09
Initials & Date:				CUH 4-6-20	CUH 04-06-20	CUH 4-7-20	CUH 4-8-20	CUH 4-8-20	CUH 4-8-20

- Is the same standard used for calibration and as-found?  Y or  N (if no, document on pg. 2)
- Are the calibration values within ±0.10 of the standard?  Y or  N (if no, recalibration is required)

ORP Standard (± 10mV)	Source	Source Lot #	Source Exp. Date	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification
229.0 (mV)	Ricca Chemical 9880	4910K41	07.2020	228.9	228.2	226.1	229.1	228.3	229.9
Initials & Date:				CUH 04-06-20	CUH 04-07-20	CUH 04-07-20	CUH 4-8-20	CUH 4-8-20	CUH 4-8-20

- Is the same standard used for calibration and as-found?  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	102.5	103.5	105.0	103.2	101.4	103.1
Initials & Date:				CUH 4-8-20	CUH 04-06-20	CUH 4-7-20	CUH 4-8-20	CUH 4-8-20	CUH 4-8-20

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

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
2241 uS/cm (2173-2308 uS/cm)	Ricca Chemical R2244230 -1A	4002L86	Feb. 2022	2216	2188	1409 =	1409 =	1409 =	1409 =
Initials & Date:				cut 4-16-20	cut 040620	cut 4-17-20 WH	cut 4-8-20	cut 4-8-20	cut 4-8-20

- Is the same standard used for calibration and as-found? 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	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	—	—	0.12	0.12	0.39	0.27	0.21	0.26
10.0 (± 1.0 NTUs)	Hach 2659949			N/A	10.23 <del>10.23</del> 04/09/2020	10.03	N/A	10.09	10.11
40.0 (± 4.0 NTUs)	Hach 2746356	A9158	06-2021	39.71	39.95	40.13	40.06	39.93	40.26
Initials & Date:				cut 4-16-20	cut 040620	cut 4-17-20	cut 4-8-20	cut 4-8-20	cut 4-8-20

- Is the same standard used for calibration and as-found? 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	19240146	6-7-21	pH 9.0 Check (8.98)	GFS Chemicals	18168806	10-25-21
pH 7.0	GFS Chemicals	19200073	5-11-21				
pH 10.0	GFS Chemicals	19400086	9-19-21				
Sp. (1409) Conductivity	GFS Chemicals	19410200	10-16-20				
40.0 Turbidity	GFS Chemicals	A0006	01-22				
10.0 Turbidity	GFS Chemicals	A0044	2-22				

Data Reviewed By: 

Date: 04-17-2020



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
2241 Range: 2173-2308 uS/cm	Ricca Chemical R2244230 -1A	4002L86	Feb. 2022	2290		Sonde not used			
Initials & Date:				CW 4-16-20					

- Is the same standard used for calibration and as-found? Y or N (if no, document on pg. 2)
- Are the calibration values within  $\pm 3\%$  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	-	-	0.13	0.09	0.16	0.08	0.16	0.21
10.0 ( $\pm 1.0$ NTUs)	Hach 2659949			NA	10.03	10.09	NA	10.03	10.16
40.0 ( $\pm 4.0$ NTUs)	Hach 2746356	A9158	08-2021	40.16	40.09	41.16	40.11	40.06	41.71
Initials & Date:				CW 4-16-20	CW 4-16-20	4-7-20 WA	CW 4-8-20	CW 4-8-20	CW 4-8-20

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

#### Additional Information for calibration standards

Standard	Source	Source Lot #	Source Exp. Date	Standard	Source	Source Lot #	Source Exp. Date
PH 4.0				PH 9	GFS		
PH 7.0							
PH 10.0							
Sp. Cond.							
40 NTU	Hach						
10 NTU	Hach						

Data Reviewed By: 

Date: 04-17-2020



Laboratory Services  
A CENTURY OF EXCELLENCE

<b>Sonde ID</b>	15H
<b>Start Date</b>	04.06.2020
<b>Project #</b>	20-0355 : Ponds 1&2 20-0356 : Ponds 6
<b>Site</b>	JR Whiting CCR

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	19240146	4.7.21	3.98		* Sonde not used →			
7.0	GFS # 1639	19280105	7.6.21	7.06		→			
10.0	GFS # 1645	19210104	5.9.21	10.00		→			
<b>Initials &amp; Date:</b>				CH 4.6.20		→			

- Is the same standard used for calibration and as-found? 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
229.0 (mV)	Ricca Chemical 9880	4910K67	07.2020	228.9		* Sonde not used →			
<b>Initials &amp; Date:</b>				CH 4.6.20		→			

- Is the same standard used for calibration and as-found? 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	96.9		* Sonde not used →			
<b>Initials &amp; Date:</b>				CH 4.6.20		→			

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



**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID JRW-MW-15001 Date 4-8-2020 Control Number 20-0355-01  
 Location JRW Whiting Depth-to-Screen Bottom (ft) 83.15 Casing ID (in) 2"  
 Depth-to-Midscreen (ft) \_\_\_\_\_ Screen Length (ft) \_\_\_\_\_ Protective Casing Mount (y/n) Y

(6.8-8.2) <sup>PH</sup> Field Measurements Sonde ID: 19M

Depth-to-water (ft) 3.76 HC Layer Detected (Y/N) N Completed by CUH

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%
1305							200	3.81	
1310	7.57	13.3	1100	45.2	4.58	+66.4	200	3.81	16.50
1313	7.54	13.3	1103	37.3	3.79	+67.7	200	3.81	*13.33
1316	7.55	13.5	1100	31.8	3.21	+61.0	200	3.81	*19.32
1319	7.54	13.5	1098	28.0	2.90	+55.8	200	3.81	*24.57
1321	7.53	13.4	1104	28.7	2.91	+40.4	200	3.81	*16.10
1324	7.53	13.7	1102	25.9	2.41	+33.4	200	3.81	*22.47
1327	7.53	13.6	1101	25.6	2.59	+32.7	200	3.81	*38.45
1330	7.53	13.4	1101	25.5	2.58	+32.3	200	3.81	*41.32
1333	7.51	13.7	1103	25.9	2.49	+14.7	200	3.81	*32.42
1336	7.51	13.5	1101	24.1	2.43	+14.0	200	3.81	*36.26
1339	7.51	13.5	1098	22.0	2.22	-1.9	200	3.81	*46.31
1342	7.49	13.6	1094	19.4	1.95	-38.5			

Sonde 15H  
↓  
16-36  
11.64  
8.42  
7.84  
6.13  
5.22  
4.80  
5.54  
5.05  
4.53  
4.92

Total Pump Time (min) \_\_\_\_\_ Total Purge Volume (gal) ~6.0 Reviewed by gf

Weather: 61°F, Sunny, slight wind, very muddy

Comments: Peristaltic / \* bubbles / - pH 9 = 9.02 Pg. 142

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

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

**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID JRW-MW-1500 Date 4-8-2020 Control Number 20-0355-01  
 Location JR Whiting Depth-to-Screen Bottom (ft) 83.15 Casing ID (in) 2"  
 Depth-to-Midscreen (ft) \_\_\_\_\_ Screen Length (ft) \_\_\_\_\_ Protective Casing Mount (y/n) Y

**Field Measurements**

Sonde ID: GM

Depth-to-water (ft) 3.76 HC Layer Detected (Y/N) N Completed by Utl

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%
1345	7.49	13.6	1094	18.6	1.87	-50.3	200	3.81	7.01
1348	7.48	13.6	1091	16.6	1.68	-64.9	200	3.81	6.81
1351	7.48	13.7	1101	14.1	1.62	-69.1	200	3.81	6.51
1354	7.49	13.7	1100	15.1	1.52	-73.0	200	3.81	6.30
1357	7.50	13.7	1103	15.0	1.50	-73.5	200	3.81	6.20
1400	7.50	13.5	1103	15.0	1.49	-75.9	200	3.81	6.09
1401	Collected Sample								

same  
is  
H  
↓  
63.21  
6.61  
5.96  
6.01  
5.81  
5.22

Total Pump Time (min) \_\_\_\_\_ Total Purge Volume (gal) 24.0 Reviewed by [Signature]

Weather: 61°F, sunny, slight wind, very muddy

Comments: Peristaltic / \* bubbles PG. 232

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	500mL	HDPE	A	N					

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

Consumers Energy Company  
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15002 Date 04-07-2020 Control Number 20-0335-02  
 Location JRW Whiting Depth-to-Screen Bottom (ft) 93.05 Casing ID (in) 2"  
 Depth-to-Midscreen (ft) \_\_\_\_\_ Screen Length (ft) \_\_\_\_\_ Protective Casing Mount (y/n) Y

(pH 7.2-7.9) **Field Measurements** Sonde ID: 19M  
 Depth-to-water (ft) 12.55 HC Layer Detected (Y/N) N Completed by CUH

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%
1029							280	12.55	
1040	7.53	11.4	1140	4.7	0.48	-130.2	280	12.55	48.21
1043	7.53	11.3	1150	2.7	0.29	-122.6	280	12.55	48.60
1046	7.52	11.4	1151	3.1	0.32	-96.9	280	12.56	37.83
1049	7.53	11.4	1150	2.4	0.25	-93.0	280	12.55	35.34
1052	7.53	11.4	1150	2.1	0.22	-91.8	280	12.55	34.36
1055	7.52	11.4	1153	2.2	0.24	-78.1	280	12.55	28.17
1058	7.54	11.4	1152	2.1	0.23	-79.1	280	12.55	13.37
1101	7.55	11.4	1152	1.9	0.20	-82.5	280	12.56	10.79
1104	7.55	11.5	1151	1.8	0.19	-83.5	280	12.55	8.68
1107	7.55	11.5	1150	1.7	0.18	-83.9	280	12.55	7.14
1110	7.55	11.5	1150	1.7	0.18	-84.1	280	12.55	6.00
1113	7.55	11.5	1151	1.7	0.18	-84.6	280	12.55	2.75

Total Pump Time (min) \_\_\_\_\_ Total Purge Volume (gal) 3.1 Reviewed by J

Weather: 47°F, cloudy, rain

Comments: pH check = 9.61, collect DUP - 01 collected sample @ 1114

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
125mL	1	HDPE	B	N					
500mL	1	HDPE	A	N					

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

Consumers Energy Company Monitoring Well Sampling Worksheet										
Well ID <u>JRW-MW-15003</u>		Date <u>4.7.2020</u>		Control Number <u>20-0355-03</u>						
Location <u>JR Whiting</u>			Depth-to-Screen Bottom (ft) <u>91.20</u>			Casing ID (in) <u>2" PVC</u>				
Depth-to-Midscreen (ft) _____		Screen Length (ft) _____		Protective Casing Mount (y/n) <u>Y</u>						
PH (7.3-8.3)							Field Measurements			Sonde ID: <u>9M</u>
Depth-to-water (ft) <u>9.60</u>		HC Layer Detected (Y/N) <u>N</u>			Completed by <u>CMH</u>					
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%	
1130							200	9.61		
1135	7.68	11.5	1027	13.2	1.40	-95.8	200	9.61	120.19	
1138	7.69	11.5	1025	12.0	1.27	-95.7	200	9.61	102.10	
1141	7.69	11.5	1019	10.6	1.13	-94.4	200	9.61	74.92	
1144	7.68	11.5	1016	9.4	1.02	-93.2	200	9.61	56.00	
1147	7.69	11.5	1012	4.4	0.70	-95.1	200	9.61	43.27	
1150	7.69	11.5	1012	6.3	0.67	-46.9	200	9.61	39.82	
1153	7.69	11.5	1011	6.1	0.65	-46.9	200	9.61	30.16	
1156	7.69	11.6	1010	5.2	0.55	-47.0	200	9.61	30.01	
1159	7.69	11.7	1010	4.0	0.42	-47.1	200	9.61	21.00	
1202	7.69	11.8	1010	3.8	0.40	-47.0	200	9.61	17.56	
1205	7.69	11.7	1011	3.8	0.39	-47.0	200	9.61	15.11	
1208	7.69	11.8	1015	3.7	0.38	-47.1	200	9.61	14.75	
Total Pump Time (min) _____		Total Purge Volume (gal) <u>7.9</u>			Reviewed by <u>g</u>					
Weather: <u>47°C, Cloudy, slight wind</u>										
Comments: <u>pH 9 check = 9.01</u>							<u>PE. 182</u>			
Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____					
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N	
1	125ML	HDPE	B	N						
1	500ML	HDPE	A	N						
* Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.										





Consumers Energy Company Monitoring Well Sampling Worksheet									
Well ID <u>JRW-MWR-15004</u>		Date <u>4.7.2020</u>		Control Number <u>20-0355-04</u>					
Location <u>JR Whiting</u>			Depth-to-Screen Bottom (ft) <u>97.80</u>			Casing ID (in) <u>2"</u>			
Depth-to-Midscreen (ft) _____		Screen Length (ft) _____		Protective Casing Mount (y/n) <u>Y</u>					
Field Measurements								Sonde ID: <u>19M</u>	
Depth-to-water (ft) <u>11.92</u>		HC Layer Detected (Y/N) <u>N</u>			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%
1230							200	12.05	
1250	7.68	12.3	974	2.4	0.25	-105.6	200	12.05	13.39
1253	7.68	12.1	974	1.5	0.15	-113.8	200	12.05	7.66
1256	7.68	12.1	974	1.3	0.14	-115.4	200	12.05	7.22
1259	7.68	12.2	970	1.3	0.14	-114.1	200	12.05	4.90
1302	7.67	12.2	969	1.2	0.12	-112.3	200	12.05	6.16
1305	7.67	12.2	967	1.1	0.12	-111.6	200	12.05	5.80
1308	7.67	12.2	966	1.1	0.11	-112.7	200	12.05	5.83
1311	7.67	12.2	966	1.0	0.11	-113.0	200	12.05	5.91
1312	collected sample								
Total Pump Time (min) _____		Total Purge Volume (gal) <u>3.5</u>			Reviewed by <u>[Signature]</u>				
Weather: <u>49°F, cloudy, slight wind</u>									
Comments: <u>pH 9 check = 9.02</u>									
Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
1	125ML	HDPE	B	N					
1	500ML	HDPE	A	N					
* Pump rate should be <500 mL/min for low-flow and <1 gal/min for high Volume.									

**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID JRN-MW-15005 Date 4-8-2020 Control Number 20-0355-05  
 Location VR Whiting Depth-to-Screen Bottom (ft) 94.90 Casing ID (in) 2"  
 Depth-to-Midscreen (ft) \_\_\_\_\_ Screen Length (ft) \_\_\_\_\_ Protective Casing Mount (y/n) \_\_\_\_\_

(FH 7.3-8.6) Field Measurements Sonde ID: 19M

Depth-to-water (ft) 10.53 HC Layer Detected (Y/N) N Completed by CUH

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%
<u>1440</u>							<u>360</u>	<u>10.59</u>	
<u>1445</u>	<u>7.65</u>	<u>13.5</u>	<u>904</u>	<u>2.3</u>	<u>0.24</u>	<u>-81.3</u>	<u>360</u>	<u>10.59</u>	<u>11.76</u>
<u>1448</u>	<u>7.65</u>	<u>13.5</u>	<u>903</u>	<u>1.6</u>	<u>0.16</u>	<u>-82.8</u>	<u>360</u>	<u>10.59</u>	<u>10.99</u>
<u>1451</u>	<u>7.66</u>	<u>13.5</u>	<u>903</u>	<u>1.3</u>	<u>0.13</u>	<u>-83.9</u>	<u>360</u>	<u>10.59</u>	<u>*13.73</u>
<u>1454</u>	<u>7.65</u>	<u>13.5</u>	<u>903</u>	<u>1.1</u>	<u>0.12</u>	<u>-85.9</u>	<u>360</u>	<u>10.59</u>	<u>*14.52</u>
<u>1457</u>	<u>7.65</u>	<u>13.5</u>	<u>903</u>	<u>1.0</u>	<u>0.10</u>	<u>-88.7</u>	<u>360</u>	<u>10.59</u>	<u>*9.84</u>
<u>1500</u>	<u>7.65</u>	<u>13.5</u>	<u>904</u>	<u>0.8</u>	<u>0.08</u>	<u>-91.8</u>	<u>360</u>	<u>10.59</u>	<u>*3.82</u>
<u>1503</u>	<u>7.65</u>	<u>13.5</u>	<u>904</u>	<u>0.8</u>	<u>0.08</u>	<u>-93.9</u>	<u>360</u>	<u>10.59</u>	<u>2.81</u>
<u>1506</u>	<u>7.67</u>	<u>13.4</u>	<u>904</u>	<u>0.6</u>	<u>0.06</u>	<u>-95.1</u>	<u>360</u>	<u>10.59</u>	<u>*8.43</u>
<u>1507</u>	<u>collected sample</u>								

Sonde # 15  
FH  
4.23  
4.09  
2.70  
2.22  
2.56  
1.97

Total Pump Time (min) \_\_\_\_\_ Total Purge Volume (gal) 7.5 Reviewed by [Signature]

Weather: BSF, sunny, windy

Comments: Submersible / \* Bubbles / pH 9 = 9.01

Bottles Filled		Preservative Codes			A - NONE	B - HNO3	C - H2SO4	D - NaOH	E - HCl	F - _____
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N	
<u>1</u>	<u>125mL</u>	<u>HDPE</u>	<u>B</u>	<u>N</u>						
<u>1</u>	<u>500mL</u>	<u>HDPE</u>	<u>A</u>	<u>N</u>						

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

**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID JRW-MW-15000 Date 04-08-2020 Control Number 20-0355-40  
 Location JR Whitney Depth-to-Screen Bottom (ft) \_\_\_\_\_ Casing ID (in) 2"  
 Depth-to-Midscreen (ft) \_\_\_\_\_ Screen Length (ft) \_\_\_\_\_ Protective Casing Mount (y/n) \_\_\_\_\_

PH  
7.00-9.00

**Field Measurements**

Sonde ID: 19M

Depth-to-water (ft) 2.73 HC Layer Detected (Y/N) N Completed by cut

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%
<u>1540</u>								<u>2.75</u>	
<u>1547</u>	<u>7.69</u>	<u>12.4</u>	<u>984</u>	<u>0.5</u>	<u>0.06</u>	<u>-157.1</u>	<u>500</u>	<u>2.75</u>	<u>*150.6</u>
<u>1550</u>	<u>7.69</u>	<u>12.4</u>	<u>983</u>	<u>0.7</u>	<u>0.07</u>	<u>-157.6</u>	<u>500</u>	<u>2.75</u>	<u>*49.73</u>
<u>1553</u>	<u>7.69</u>	<u>12.4</u>	<u>984</u>	<u>0.6</u>	<u>0.06</u>	<u>-158.1</u>	<u>500</u>	<u>2.75</u>	<u>*32.68</u>
<u>1556</u>	<u>7.69</u>	<u>12.4</u>	<u>983</u>	<u>0.5</u>	<u>0.06</u>	<u>-156.3</u>	<u>500</u>	<u>2.75</u>	<u>*122.5</u>
<u>1559</u>	<u>7.67</u>	<u>12.3</u>	<u>984</u>	<u>0.5</u>	<u>0.05</u>	<u>-149.3</u>	<u>500</u>	<u>2.75</u>	<u>*22.38</u>
<u>1602</u>	<u>7.68</u>	<u>12.4</u>	<u>983</u>	<u>0.5</u>	<u>0.05</u>	<u>-152.1</u>	<u>500</u>	<u>2.75</u>	<u>*51.78</u>
<u>1605</u>	<u>7.68</u>	<u>12.4</u>	<u>982</u>	<u>0.5</u>	<u>0.05</u>	<u>-155.9</u>	<u>500</u>	<u>2.75</u>	<u>*46.11</u>
<u>1608</u>	<u>7.66</u>	<u>12.3</u>	<u>983</u>	<u>0.5</u>	<u>0.05</u>	<u>-154.2</u>	<u>500</u>	<u>2.75</u>	<u>13.97</u>
<u>1611</u>	<u>7.68</u>	<u>12.3</u>	<u>982</u>	<u>0.4</u>	<u>0.04</u>	<u>-154.7</u>	<u>500</u>	<u>2.75</u>	<u>13.99</u>
<u>1614</u>	<u>7.68</u>	<u>12.3</u>	<u>982</u>	<u>0.04</u>	<u>0.04</u>	<u>-157.4</u>	<u>500</u>	<u>2.75</u>	<u>14.01</u>
<u>1615</u>									

Sonde 15M

21.41  
19.63  
17.91  
18.93  
23.01  
16.31  
15.90  
14.85  
14.76  
14.88

Total Pump Time (min) \_\_\_\_\_ Total Purge Volume (gal) ~8 Reviewed by [Signature]

Weather: \_\_\_\_\_

Comments: Submersible / bubbles pH = 9.02

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
<u>3</u>	<u>125mL</u>	<u>HDPE</u>	<u>B</u>	<u>Y</u>					
<u>3</u>	<u>125mL</u>	<u>HDPE</u>	<u>B</u>	<u>N</u>					
<u>3</u>	<u>500mL</u>	<u>HDPE</u>	<u>A</u>	<u>N</u>					

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



## Pond 6

# CHAIN OF CUSTODY

## CONSUMERS ENERGY COMPANY – LABORATORY SERVICES



135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SITE				PROJECT NUMBER			ANALYSIS REQUESTED							Page 1 of 1	
JRW RCRA – April 2020 Pond 6				20-0356			Total Metals	Anions	TDS						SEND REPORT TO Michelle Marion
SAMPLING TEAM				DATE SHIPPED		SITE SKETCHED ATTACHED? CIRCLE ONE									REMARKS
Casey Hansen						YES NO		PHONE _____							
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION		DEPTH (ft)	# OF CONTAINERS								
20-0356-01	4.8.2020	0905	GW	JRW-MW-16001_040820			2	X	X	X					
-02	4.8.2020	1050	GW	JRW-MW-16002_040820			2	X	X	X					
-03	4.6.2020	1114	GW	JRW-MW-16003_040820			2	X	X	X					
-04	4.6.2020	1210	GW	JRW-MW-16004_040820			2	X	X	X					
-05	4.7.2020	1436	GW	JRW-MW-16005_040720			2	X	X	X					
-06	4.7.2020	1527	GW	JRW-MW-16006_040720			2	X	X	X					
-07	4.7.2020	1527	GW	DUP-02_040720			2	X	X	X					
-08	4.8.2020	0734	GW	EB-02_040820			2	X	X	X				Submersible	
-09	4.7.2020	1401	GW	FB-02_040720			2	X	X	X					
-10	4.6.2020	1114	GW	JRW-MW-16003 MS_040820			2	X	X						
↓ -11	↓	1114	GW	JRW-MW-16003 MSD_040820			2	X	X						
RELINQUISHED BY (SIGNATURE)				DATE/TIME		RECEIVED BY (SIGNATURE)		COMMENTS							
Casey Hansen				4.9.2020 0645		[Signature]		3.2-4.6.06 ORICE							
RELINQUISHED BY (SIGNATURE)				DATE/TIME		RECEIVED BY (SIGNATURE)									
						[Signature]									

ORIGINAL TO LAB COPY TO CUSTOMER



### WATER LEVEL DATA

<b>Site:</b>	JR Whiting	<b>Reviewed by:</b>	
<b>Project No:</b>	20-0355, 20-0356	<b>Review Date:</b>	04-17-20
<b>Analyst:</b>	CLH		
<b>Date:</b>	4/7/2020		
<b>Method:</b>	Electronic Tape		
<b>Tape ID:</b>	Geotech WLM	<b>S/N:</b>	1003

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001	1009 ✓	3.75 ✓	3.75	83.15	
JRW MW-15002	1015 ✓	12.57 ✓	12.57	93.05	
JRW MW-15003	1013 ✓	9.58 ✓	9.58	91.2	
JRW MW-15004	0956 ✓	11.9 ✓	11.9	97.8	
JRW MW-15005	0948 ✓	10.54 ✓	10.54	94.9	
JRW MW-15006	1000 ✓	2.75 ✓	2.75	73.8	
JRW MW-16001	0913 ✓	14.8 ✓	14.8	84.01	
JRW MW-16002	0906 ✓	11.21 ✓	11.21	95.5	
JRW MW-16003	0901 ✓	11.43 ✓	11.43	87.3	
JRW MW-16004	0855 ✓	11.76 ✓	11.76	90.01	
JRW MW-16005	0917 ✓	14.57 ✓	14.57	92.8	
JRW MW-16006	0851 ✓	13.48 ✓	13.48	93.27	
JRW MW-16007	0836 ✓	4.77 ✓	4.77	82.25	
JRW MW-16008	0829 ✓	5.29 ✓	5.29	77.55	
JRW MW-16009	0821 ✓	5.04 ✓	5.04	83.15	

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

## WATER LEVEL DATA

Site: JR Whiting  
 Project No: 20-0355, 20-0356  
 Analyst: CJH  
 Date: 4-7-2020  
 Method: Electronic Tape  
 Tape ID: Solinst Model 122 GeoTech WLM S/N: 1003  
 Reviewed by: *[Signature]*  
 Review Date: 04-17-20

Well ID	Time	DTW Trial 1 (ft)	DTW Trial 2 (ft)	DTB (ft)	Remarks
JRW MW-15001	1009	2.75	3.75	83.15	
JRW MW-15002	1015	12.57	12.57	93.05	
JRW MW-15003	1013	9.58	9.58	91.20	
JRW MW-15004	0956	11.90	11.90	97.80	
JRW MW-15005	0948	10.54	10.54	94.90	
JRW MW-15006	1000	2.75	2.75	73.80	
JRW MW-16001	0913	14.80	14.80	84.01	
JRW MW-16002	0910	11.21	11.21	95.50	
JRW MW-16003	0901	11.43	11.43	87.30	
JRW MW-16004	0855	11.70	11.70	90.01	
JRW MW-16005	0917	14.57	14.57	92.80	
JRW MW-16006	0851	13.48	13.48	93.27	
JRW MW-16007	0836	4.77	4.77	82.25	
JRW MW-16008	0829	5.29	5.29	77.55	
JRW MW-16009	0821	5.04	5.04	83.15	

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



Laboratory Services  
A CENTURY OF EXCELLENCE

Sonde ID	19M
Start Date	04-06-2020
Project #	20-0355 : Ponds 1 & 2 20-0356 : Pond V
Site	JR Whiting CCR

Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 19M100493
Sonde Brand	YSI ProDSS S/N 19M100509
Flow Cell	EXO1 599080
DO Probe	YSI ProDSS S/N 19L103208
Turbidity Probe	YSI ProDSS S/N 19L103271
pH With ORP	YSI ProDSS S/N 19M101274
Conductivity & Temperature Probe	YSI ProDSS S/N 19L101251

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	19240146	4.7.21	4.01	3.97	4.06	4.00	4.02	4.08
7.0	GFS # 1639	19280105	7.6.21	6.98	7.05	7.08	7.04	7.05	7.08
10.0	GFS # 1645	19210104	5.9.21	10.00	9.95	10.02	10.05	10.06	10.09
Initials & Date:				CUH 4.6.20	CUH 04-06-20	CUH 4.7.20	CUH 4.8.20	CUH 4.8.20	CUH 4.8.20

- Is the same standard used for calibration and as-found?  Y or  N (if no, document on pg. 2)
- Are the calibration values within ±0.10 of the standard?  Y or  N (if no, recalibration is required)

ORP Standard (± 10mV)	Source	Source Lot #	Source Exp. Date	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification
229.0 (mV)	Ricca Chemical 9880	4910K01	07.2020	228.9	228.2 <del>228.1</del>	226.1	229.1	228.3	229.9
Initials & Date:				CUH 04-06-20	CUH 04-07-20	CUH 04-07-20	CUH 4.8.20	CUH 4.8.20	CUH 4.8.20

- Is the same standard used for calibration and as-found?  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	102.5	103.5	105.0	103.2	101.4	103.1
Initials & Date:				CUH 4.4.20	CUH 04-06-20	CUH 4.7.20	CUH 4.8.20	CUH 4.8.20	CUH 4.8.20

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







Laboratory Services  
A CENTURY OF EXCELLENCE

<b>Sonde ID</b>	15H
<b>Start Date</b>	04-06-2020
<b>Project #</b>	20-0355 : Ponds 1 & 2 20-0356 : Ponds 6
<b>Site</b>	JR Whiting CCR

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	19240146	4.7.21	3.98		* Sonde not used →			
7.0	GFS # 1639	19280105	7.6.21	7.06		→			
10.0	GFS # 1645	19210104	5.9.21	10.00		→			
<b>Initials &amp; Date:</b>				CH					
				4-6-20		→			

- Is the same standard used for calibration and as-found? 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
229.0 (mV)	Ricca Chemical 9880	4910K67	07.2020	228.9		* Sonde not used →			
<b>Initials &amp; Date:</b>				CH					
				4-6-20		→			

- Is the same standard used for calibration and as-found? 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	96.9		* Sonde not used →			
<b>Initials &amp; Date:</b>				CH					
				4-6-20		→			

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

**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID: JEW-116001 Date: 4-8-2020 Control Number: 20-0356-01  
 Location: JR Whiting Depth-to-Screen Bottom (ft): 84.01 Casing ID (in): 2"  
 Depth-to-Midscreen (ft): \_\_\_\_\_ Screen Length (ft): \_\_\_\_\_ Protective Casing Mount (y/n): Y

(pH 7.5-8.9) **Field Measurements** Sonde ID: 19M

Depth-to-water (ft): 15.59 HC Layer Detected (Y/N): N Completed by: cut

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%
0758				6.8			340	15.60	
0803	8.15	11.7	763	0.79	0.71	-117.2	340	15.60	13.88
0806	8.62	11.9	762	4.16	0.48	-104.3	340	15.60	15.94
0809	8.65	11.7	759	3.9	0.41	-104.3	340	15.60	17.61
0811	8.63	11.6	758	3.6	0.38	-101.9	340	15.60	18.50
0814	8.15	11.6	769	3.2	0.34	-104.7	340	15.60	9.12
0817	7.85	11.6	776	2.6	0.27	-123.6	340	15.60	9.19
0820	7.78	11.6	780	2.1	0.22	-112.5	340	15.60	13.11
0823	7.82	11.6	779	1.8	0.19	-115.2	340	15.60	13.47
0826	7.88	11.6	777	1.6	0.17	-122.4	340	15.60	16.06
0829	7.96	11.6	796	1.6	0.17	-131.1	340	15.60	4.96
0831	8.02	11.6	773	1.6	0.17	-139.0	340	15.60	7.15
0834	8.80	11.8	754	2.8	0.29	-114.4	340	15.60	7.61

Sonde 15H  
3.09  
1.06  
2.00  
1.01  
1.02

Total Pump Time (min): \_\_\_\_\_ Total Purge Volume (gal): ~8 Reviewed by: Y

Weather: 53°F, partly cloudy, rain over-night, really muddy

Comments: Submersible Pg. 1 of 2

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	500mL	HDPE	A	N					

\* 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-16001 Date 4-8-2020 Control Number 20-0356-01  
 Location JR Whiting Depth-to-Screen Bottom (ft) 84.01 Casing ID (in) 2"  
 Depth-to-Midscreen (ft) \_\_\_\_\_ Screen Length (ft) \_\_\_\_\_ Protective Casing Mount (y/n) \_\_\_\_\_

**Field Measurements**

Sonde ID: 19M

Depth-to-water (ft) 15.59 HC Layer Detected (Y/N) N Completed by CUH

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%
0837	8.69	11.8	758	2.4	0.25	-217.8	340	15.60	5.38
0840	8.52	11.8	761	1.7	0.18	-210.3	340	15.60	4.93
0843	8.52	11.8	761	1.7	0.18	-207.1	340	15.60	5.03
0846	8.46	11.8	762	1.5	0.16	-202.4	340	15.60	5.08
0849	8.43	11.8	762	1.4	0.14	-198.3	340	15.60	5.41
0852	8.40	11.8	761	1.3	0.13	-196.5	340	15.60	4.96
0855	8.30	11.8	762	1.0	0.11	-185.3	340	15.60	4.67
0858	8.33	11.8	761	1.0	0.11	-188.0	340	15.60	4.80
0900	8.31	11.8	761	1.0	0.11	-183.4	340	15.60	5.13
0904	8.36	11.8	761	0.9	0.10	-186.0	340	15.60	4.74
0905	Collected sample								

Sonde  
16ft

2.01  
2.05  
1.93  
1.37  
1.01  
1.00  
2.01  
1.36  
1.09  
1.11

Total Pump Time (min) \_\_\_\_\_ Total Purge Volume (gal) 7.0 Reviewed by g

Weather: 53°F, partly cloudy, very muddy

Comments: \_\_\_\_\_ PG. 2 of 2

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
1	125ml	HDPE	B	N					
1	500ml	HDPE	A	N					

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

**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID: RV-MW-11002 Date: 4-8-2020 Control Number: 20-0356-02  
 Location: JR Whiting Depth-to-Screen Bottom (ft): 95.50 Casing ID (in): 2"  
 Depth-to-Midscreen (ft): \_\_\_\_\_ Screen Length (ft): \_\_\_\_\_ Protective Casing Mount (y/n): Y

**PH**  
(7.5-8.3) **Field Measurements** **Sonde ID:** 19M

Depth-to-water (ft): 11.27 HC Layer Detected (Y/N): N Completed by: CU1

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%
0936	Inserted submersible pump tubing clogged with sediment; pH = 8.44. Performing high-volume purge for pH and turbidity.								
0944	8.41	13.1	1010	12.0	1.25	-39.3	7500	11.36	736.14
0950	8.40	13.0	1030	13.7	1.43	-69.4	7500	11.36	344.67
0955	8.06	13.3	1042	12.8	1.33	-66.8	7500	11.36	29.50
1002	8.24	12.9	1021	19.5	2.05	-115.7	340	11.36	543.07
↳ lowered flow rate for low-flow, sediment load increased									
1005	8.20	12.5	1631	17.5	1.83	-112.3	340	11.36	785.16
1008	7.89	12.6	1033	21.4	2.21	-79.2	340	11.36	98.59
1011	7.85	12.3	1033	26.2	2.37	-75.5	340	11.36	25.00
1014	7.76	12.1	1010	0.8	0.08	-115.7	340	11.36	19.30
1017	7.68	12.1	1009	0.6	0.07	-123.8	340	11.36	16.11

Total Pump Time (min): \_\_\_\_\_ Total Purge Volume (gal): ~13 Reviewed by: [Signature]

Weather: 53°F, Sunny

Comments: Submersible; very turbid

PG. 2

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

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



**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID: JRW-MW-16003 Date: 04-08-2020 Control Number: 20-0356-03-10-1  
 Location: JR Whiting Depth-to-Screen Bottom (ft): 87.30 Casing ID (in): 2"  
 Depth-to-Midscreen (ft): \_\_\_\_\_ Screen Length (ft): \_\_\_\_\_ Protective Casing Mount (y/n): Y

(pH 7.4-7.9) **Field Measurements** Sonde ID: 19M

Depth-to-water (ft): 11.40 HC Layer Detected (Y/N): N Completed by: CJM

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%
1047							240	11.40	
1055	7.57	12.3	1038	<del>0.10</del> <sup>1.0</sup> 0.10	0.10	-165.3	240	11.40	*13.91 2.28
1058	7.54	12.2	1049	0.06	0.07	-167.4	240	11.40	*34.60 1.96
1101	7.55	12.2	1051	0.06	0.06	-163.0	240	11.40	*52.97 1.03
1104	7.54	12.3	1054	0.06	0.06	-158.7	240	11.40	*3.92 2.01
1107	7.54	12.3	1054	0.06	0.06	-158.6	240	11.40	*4.24 1.63
1110	7.54	12.3	1055	0.05	0.06	-158.5	240	11.40	*4.85 1.80
1113	7.55	12.3	1053	0.05	0.05	-157.9	240	11.40	7.94 1.76
1114	Collected Samples								

Total Pump Time (min): \_\_\_\_\_ Total Purge Volume (gal): 25 Reviewed by: [Signature]

Weather: 59°F, Sunny, muddy \* = Bubbles

Comments: collected MS/MSD, peristaltic pump, high sulfur odop.

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
3	125mL	HDPE	B	N					
3	500mL	HDPE	A	N					

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



**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID JRW-mw-16004 Date 4-8-2020 Control Number 20-0356-04  
 Location JR Whiting Depth-to-Screen Bottom (ft) 90.01 Casing ID (in) 24  
 Depth-to-Midscreen (ft) \_\_\_\_\_ Screen Length (ft) \_\_\_\_\_ Protective Casing Mount (y/n) \_\_\_\_\_

(PH 7.4-8.2) Field Measurements Sonde ID: 19M

Depth-to-water (ft) 11.72 HC Layer Detected (Y/N) N Completed by CLL

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%	
1140	Hooked up submersible, very turbid, pH = 7.88								890.41	} 10 gallons
1145	Purging to clear up turbidity								561.88	
1200	7.51	12.3	1215	1.5	0.16	-74.0	420	11.80	38.86	
1203	7.45	12.3	1215	0.8	0.09	-80.2	420	11.80	6.42	
1206	7.46	12.3	1213	0.4	0.04	-90.8	420	11.80	4.05	
1209	7.46	12.2	1214	0.3	0.03	-92.4	420	11.80	3.92	
1212	7.46	12.2	1210	0.3	0.03	-94.8	420	11.80	3.86	
1215	7.47	12.4	1212	0.2	0.02	-96.8	420	11.80	3.26	
1216	collected sample									

} 10 gallons  
} 5 gallons

Total Pump Time (min) \_\_\_\_\_ Total Purge Volume (gal) 15 Reviewed by Jr

Weather: 59°F, Sunny, muddy, slight breeze

Comments: Submersible

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	500mL	HDPE	A	N					

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

**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID: JRW.MW-16005      Date: 4-7-2028      Control Number: 20-0356-05  
 Location: JR Whiting      Depth-to-Screen Bottom (ft): 92.40      Casing ID (in): 2"  
 Depth-to-Midscreen (ft): \_\_\_\_\_      Screen Length (ft): \_\_\_\_\_      Protective Casing Mount (y/n): y

**Field Measurements**      **Sonde ID: 19M**

Depth-to-water (ft): 14.75      HC Layer Detected (Y/N): N      Completed by: CAH

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%
1405							140	14.75	
1408	7.64	12.2	886	6.7	0.70	-109.5	140	14.75	14.91
1411	7.67	12.2	885	2.8	0.29	-127.0	140	14.75	38.27
1414	7.68	12.4	885	1.7	0.18	-134.2	140	14.75	34.03
1417	7.68	12.3	887	1.4	0.15	-136.8	140	14.75	27.82
1420	7.68	12.3	887	1.3	0.14	-138.4	140	14.75	28.69
1423	7.68	12.2	887	1.2	0.12	-141.1	140	14.75	24.68
1426	7.68	12.1	888	1.2	0.12	-142.3	140	14.75	9.94
1429	7.68	12.2	888	1.1	0.10	-143.0	140	14.75	4.43*
1432	7.68	12.2	888	1.1	0.10	-143.1	140	14.75	3.77*
1435	7.68	12.2	888	1.0	0.09	-143.3	140	14.75	4.00*
1436	collected	sample							(sonde 19m cup)

Low Flow  
31.47  
36.41  
39.52

Total Pump Time (min): \_\_\_\_\_      Total Purge Volume (gal): 2.0      Reviewed by: [Signature]

Weather: 52°F, Partly Sunny, Slight wind

Comments: pH check = 9.01, \* turbidity measured in calibration cup.

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	B	N					
1	500mL	HDPE	A	N					

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

**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID JRW-MW-16006 Date 4-7-2020 Control Number 20-0356-00  
 Location JRWhiting Depth-to-Screen Bottom (ft) 93.27 Casing ID (in) 2 1/2  
 Depth-to-Midscreen (ft) \_\_\_\_\_ Screen Length (ft) \_\_\_\_\_ Protective Casing Mount (y/n) \_\_\_\_\_

**Field Measurements** Sonde ID: 19M

Depth-to-water (ft) 13.50 HC Layer Detected (Y/N) N 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%
<u>1355</u>							<u>250</u>	<u>13.60</u>	
<u>1400</u>	<u>7.83</u>	<u>12.1</u>	<u>874</u>	<u>4.5</u>	<u>0.47</u>	<u>-138.9</u>	<u>250</u>	<u>13.60</u>	<u>61.39</u>
<u>1403</u>	<u>7.85</u>	<u>12.3</u>	<u>857</u>	<u>2.6</u>	<u>0.27</u>	<u>-136.7</u>	<u>250</u>	<u>13.60</u>	<u>30.91</u>
<u>1406</u>	<u>7.84</u>	<u>12.2</u>	<u>860</u>	<u>2.6</u>	<u>0.27</u>	<u>-136.8</u>	<u>250</u>	<u>13.60</u>	<u>32.25</u>
<u>1409</u>	<u>7.84</u>	<u>12.3</u>	<u>859</u>	<u>2.7</u>	<u>0.28</u>	<u>-135.9</u>	<u>250</u>	<u>13.60</u>	<u>29.27</u>
<u>1412</u>	<u>7.84</u>	<u>12.2</u>	<u>857</u>	<u>2.7</u>	<u>0.28</u>	<u>-135.7</u>	<u>250</u>	<u>13.60</u>	<u>28.54</u>
<u>1415</u>	<u>7.82</u>	<u>12.2</u>	<u>857</u>	<u>2.7</u>	<u>0.28</u>	<u>-129.4</u>	<u>250</u>	<u>13.60</u>	<u>101.41</u>
<u>1418</u>	<u>7.82</u>	<u>12.3</u>	<u>857</u>	<u>2.6</u>	<u>0.28</u>	<u>128.6</u>	<u>250</u>	<u>13.60</u>	<u>117.21</u>
<u>1421</u>	<u>7.82</u>	<u>12.3</u>	<u>857</u>	<u>2.7</u>	<u>0.28</u>	<u>129.0</u>	<u>250</u>	<u>13.60</u>	<u>2.02</u>
<u>1424</u>	<u>X</u>								
<u>1427</u>	<u>X</u>								

lots of degassing bubbles

Page 192  
switched to submersible

Total Pump Time (min) \_\_\_\_\_ Total Purge Volume (gal) 3.5 Reviewed by [Signature]

Weather: 49°F, slight wind, partly cloudy PG. 2-82

Comments: 1/4" tubing, peristaltic / collected dup-2 | FB-2 @ 1401

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
<u>1</u>	<u>125ml</u>	<u>HDPE</u>	<u>B</u>	<u>N</u>					
<u>1</u>	<u>500ml</u>	<u>HDPE</u>	<u>A</u>	<u>N</u>					

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

\* Switch to Sonde 191 For turbidity

**Consumers Energy Company  
Monitoring Well Sampling Worksheet**

Well ID JRW-MW-16006 Date 4.7.2020 Control Number 20-0356-06  
 Location JR Whiting Depth-to-Screen Bottom (ft) 93.27 Casing ID (in) 2"  
 Depth-to-Midscreen (ft) \_\_\_\_\_ Screen Length (ft) \_\_\_\_\_ Protective Casing Mount (y/n) \_\_\_\_\_

**Field Measurements** Sonde ID: PM

Depth-to-water (ft) 13.50 HC Layer Detected (Y/N) N Completed by UA

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	<u>J.3 ppm</u> ppm	mV	mL/min	Drawdown ft	<u>2.0</u> NTU
3-5 min	+/- 0.1	NA	+/- 3%	+/- 10%	+/- 10%	+/- 10mV	*	< 0.33	+/- 10%
1450									
1453	7.83	12.3	863	2.0	0.27	-140.0	340	13.61	57.77
1456	7.84	12.3	864	2.3	0.24	-140.9	340	13.61	52.55
1459	7.84	12.2	865	1.8	0.19	-142.1	340	13.61	53.30
1502	7.83	12.3	866	1.7	0.18	-140.7	340	13.61	50.02
1505	7.83	12.1	869	0.9	0.10	-142.9	500	13.61	43.00
1508	7.83	12.0	868	0.7	0.08	-144.9	500	13.61	54.27
1511	7.83	12.0	867	0.7	0.08	-145.0	500	13.61	54.68
1514	7.83	12.3	869	1.1	0.12	-145.2	120	13.61	40.60
1517	7.83	12.2	868	1.3	0.13	-144.9	120	13.61	37.36
1520	7.82	12.5	868	1.5	0.15	-140.3	120	13.61	7.84
1523	7.82	12.4	869	<u>1.5</u> <u>0.15</u>	0.15	-139.7	120	13.61	6.60
1526	7.82	12.5	867	1.4	0.15	-138.6	120	13.61	7.01

Bubbles

sonde laying down

Total Pump Time (min) 1527 collected sample Total Purge Volume (gal) ~6 Reviewed by [Signature]

Weather: 52°F, sunny, slightly windy

Comments: submersible pump; lots of dissolved gases (bubbles) pg. 1 of 2

Bottles Filled		Preservative Codes			A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____				
Number	Size	Type	Preservative Code	Filtered Y/N	Number	Size	Type	Preservative Code	Filtered Y/N
1+1=2	125 mL	HDPE	B	N					
1+1=2	125 mL	HDPE	A	N					

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





Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW MW-16002 Date 5 21 20 Control Number 20-0589-01  
 Location Whiting Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Geotech S/N: 1005

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 11.52 Depth-To-Bottom T/PVC (ft) \_\_\_\_\_ Completed by PST

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

Stablization parameters for the last three readings

1456							280	11.72	
1457	7.16	12.9	992	15.3	1.55	2.9	280	11.73	2668.85
1502	7.59	12.4	979	3.7	0.39	-114.5	280	11.75	1851.32
1507	7.77	12.3	977	2.6	0.28	-135.3	280	11.77	819.91
1512	7.85	12.1	980	1.8	0.19	-146.9	280	11.79	297.69
1517	7.84	12.1	984	1.5	0.16	-146.6	280	11.80	187.64
1522	7.81	12.1	987	1.4	0.15	-144.4	280	11.80	159.71
1527	7.79	12.2	992	1.3	0.13	-143.4	280	11.80	140.32
1532	7.77	12.2	995	1.1	0.12	-143.1	280	11.80	132.19
1537	7.77	12.1	999	1.1	0.12	-143.8	280	11.80	132.41
1542	7.76	12.1	1001	0.9	0.10	-145.0	280	11.80	117.30
1547	7.74	12.2	1006	0.9	0.10			11.80	96.21
1552	Adjusted pump depth to try and lower turbidity / stirred up sediment								
1557	7.74	12.2	998	1.0	0.10	-136.1	280	11.80	236.89
1602	7.74	12.4	1000	0.9	0.09	-139.8	280		167.73

Total Pump Time (min): 149 Total Purge Volume (gal): ≈ 11 gal Reviewed by: [Signature]

Weather: \_\_\_\_\_ Date: 05-28-20

Equipment & Field Blank

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
6	125ml	HDPE	A	N					

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

Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW MW-16002 Date 5-21-20 Control Number 20-0589-01  
 Location Whiting Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailer  
 Depth to Water Tape: Guttech S/N: 1005

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 11.52 Depth-To-Bottom T/PVC (ft) \_\_\_\_\_ 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%	+/- 0.3ppm	+/- 10mV	*	< 0.33	+/- 10%

Stabilization parameters for the last three readings

1607	7.75	12.3	1000	0.8	0.09	-141.1	280	11.80	148.31	
1612	7.75	12.5	1000	0.8	0.09	-143.2	280	11.80	110.86	110
1617	7.76	12.4	1000	0.7	0.08	-145.0	280	11.80	91.86	84.5
1622	7.77	12.5	1000	0.7	0.08	-146.6	280	11.80	80.46	72.9
1627	7.76	12.4	1003	0.7	0.08	-147.2	280	11.80	81.06	61.3
1632	7.77	12.3	1004	0.6	0.07	-149.0	280	11.80	76.04	55.7
1637	7.77	12.2	1004	0.6	0.06	-149.5	280	11.80	75.64	50.2
1642	7.78	12.2	1004	0.6	0.06	-150.3	280	11.80	64.92	48.7
1647	7.78	12.3	1004	0.5	0.05	-151.5	280	11.80	53.94	29.1
1652	7.78	12.2	1004	0.5	0.05	-151.8	280	11.80	47.63	28.0
1657	7.78	12.2	1004	0.5	0.05	-152.6	280	11.80	44.52	27.3
1702	7.79	12.2	1003	0.5	0.05	-153.7	280	11.80	42.13	25.4
1707	7.78	12.2	1005	0.5	0.05	-153.9	280	11.80	27.72	21.4
1712	7.78	12.2	1004	0.5	0.05	-153.8	280	11.80	23.66	15.8
1717	7.79	12.1	1004	0.4	0.04	-153.4	280	11.80	19.18	11.5

Total Pump Time (min): 149 Total Purge Volume (gal): 511 gal Reviewed by: [Signature]

Weather: \_\_\_\_\_ Date: 05-28-20

Comments:

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F - _____			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
6	125ml	HDPE	A	Y					

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





Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 19M100493
Sonde Brand	YSI ProDSS S/N 19M100509
Flow Cell	EXO1 599080
DO Probe	YSI ProDSS S/N 19L103208
Turbidity Probe	YSI ProDSS S/N 19L103271
pH With ORP	YSI ProDSS S/N 19M101274
Conductivity & Temperature Probe	YSI ProDSS S/N 19L101251

Sonde ID	19M
Start Date	21 2805282 5-27-20
Project #	20-0589
Site	JR Whitting Lonia MGP 2805282
Reviewed By & Date	<i>[Signature]</i> 05/28/20

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	19410212	10-5-21	3.98	4.00	4.07			
7.0	GFS # 1639	19410193	10-11-21	6.98	7.01	7.10			
10.0	GFS # 1645	19210104 05/01/20	05/09/21	10.05	9.98	10.04			
Initials & Date:				<i>CF</i> 5-18-20		<i>CF</i> 5-24-20			

- Is the same standard used for calibration and as-found?  or N (if no, document on pg. 2)
- Are the calibration values within ±0.10 of the standard?  or N (if no, recalibration is required)

ORP Standard (± 10mV)	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	20140051	01-30-2021	222.3	228.4	236.1			
Initials & Date:				<i>CF</i> 5-18-20		<i>CF</i> 5-28-20			

- Is the same standard used for calibration and as-found?  or N (if no, document on pg. 2)
- Are the calibration values within ±10% of the standard?  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	100.3	100.1	101.7			
Initials & Date:				<i>CF</i> 5-18-20		<i>CF</i> 5-24-20			

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

Sonde ID	19M
Start Date	21 05/28/20 5-27-20
Reviewed By & Date:	<i>[Signature]</i> 05/28/20

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
1421	GFS	20080116	2-11-21	1431	1422	1448			
Initials & Date:				CF 5-18-20		CF 5-28-20			

- Is the same standard used for calibration and as-found?  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	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	--	--	-2.14	0.03	-0.02			
10.0 (± 1.0 NTUs)	Hach 2659949			N/A	9.98	9.99	N/A		
40.0 (± 4.0 NTUs)	Hach 2746356			42.21	40.03	40.58			
Initials & Date:				CF 5-18-20		CF 5-28-20			

- Is the same standard used for calibration and as-found?  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						

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Equipment Details	Model & S/N
Monitor Brand	YSI 650MDS S/N 11M100447
Sonde Brand	YSI 6820V2 S/N 11M100468
Flow Cell	YSI 6160
DO Probe	YSI 6150 ROX S/N 178103930
Turbidity Probe	YSI 6136 S/N 18A104724
pH With ORP	YSI 6565 18K
Conductivity & Temperature Probe	YSI 6560 S/N 11L100408

Sonde ID	11M
Start Date	21 EB 052820 5-27-20
Project #	20-0589
Site	JRC Whitings Fonda MGP EB 05/28/20
Reviewed By & Date	[Signature] 05/28/20

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	19410212	10-5-21	3.96	4.01	3.99			
7.0	GFS # 1639	19410193	10-11-21	6.99	7.01	7.01			
10.0	GFS # 1645	20060182	01-29-22	10.06	9.98	9.93			
Initials & Date:				CF 5-18-20		CF 5-28-20			

- Is the same standard used for calibration and as-found?  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	20140051	01-30-21	234.7	231.9	230.3			
Initials & Date:				CF 5-18-20		CF 5-28-20			

- Is the same standard used for calibration and as-found?  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	110.0	100.9	100.0			
Initials & Date:				CF 5-18-20		CF 5-28-20			

- Is the same standard used for calibration and as-found?  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	11M
Start Date	05-21-20
Reviewed By & Date:	<i>J</i> 05/28/20

NOTE: Sonde 11M only used for Turbidity *EB* 05/28/20

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
1421	GFS	<del>20060116</del> 4002186	<del>2-11-2021</del> Feb. 2022	1440	1432	1414			
Initials & Date:				<i>CF</i> 5-18-20		<i>EB</i> 5-28-20			

- Is the same standard used for calibration and as-found?  Y or N (if no, document on pg. 2)
- Are the calibration values within  $\pm 3\%$  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	--	--	3.7	0.4	0.3	✓		
10.0 ( $\pm 1.0$ NTUs)	Hach 2659949	A0044	02-2022	9.9	9.8	10.1	✓		
40.0 ( $\pm 4.0$ NTUs)	Hach 2746356	A0037	02-2022	38.8	40.1	38.4	✓		
Initials & Date:				<i>CF</i> 5-18-20		<i>EB</i> 5-28-20			

- Is the same standard used for calibration and as-found?  Y or N (if no, document on pg. 2)
- Are the calibration values within  $\pm 10\%$  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 Turbidity	GFS Chemicals						
40 Turbidity	GFS Chemicals						



# **Appendix B**

## **Second Semiannual Monitoring Report**



# Second Semiannual 2020 Groundwater Monitoring Report

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

Erie, Michigan

January 2021

A handwritten signature in black ink, reading "Sarah B. Holmstrom".

---

Sarah B. Holmstrom, P.G.  
Project Manager

**Prepared For:**

Consumers Energy

**Prepared By:**

TRC  
1540 Eisenhower Place  
Ann Arbor, Michigan 48108

A handwritten signature in black ink, reading "Brian Yelen".

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Brian Yelen  
Project Geologist

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## APPENDICES

- Appendix A Data Quality Reviews
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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 Second Semiannual 2020 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 2020. 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 approved by the EGLE on May 11, 2020.

### 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 2020 Groundwater Monitoring Report for the JRW Pond 1&2 and Pond 6* (First Semiannual 2020 Report) (TRC, July 2020), the most recent report prepared in compliance with the CCR Rule and the 2020 HMP, Consumers Energy reported that no potential statistically significant increases (SSIs) were noted in the first 2020 semiannual detection monitoring event. Therefore, Consumers Energy continued detection monitoring in

the second half of 2020 at Pond 1&2 and Pond 6 pursuant to §257.94 of the CCR Rule, and the HMP.

This Second Semiannual 2020 Report presents the monitoring results and the statistical evaluation of the detection monitoring constituents (Section 11511a(3)(c) of Part 115) for the October 2020 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.

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## 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 (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.

### 2.2 October 2020 Groundwater Monitoring

Consumers Energy Laboratory Services personnel performed gauging and sampling of monitoring wells associated with Pond 1&2 and Pond 6 on October 1, 2020. Groundwater monitoring was performed in accordance with the HMP. Groundwater samples collected during the October 2020 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 2020 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-16004 at Pond 6), and one field matrix spike/matrix spike duplicate (MS/MSD) sample collected from JRW-MW-15006 at Pond 1&2, and JHC-MW-16003 at Pond 6.

Groundwater analytical results from the second semiannual 2020 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 2020), 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 2020 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 October 1, 2020 was calculated using well pair JRW-MW-15002/JRW-MW-15003. The maximum head difference across the Ponds 1&2 monitoring network showed a very slight horizontal gradient of approximately 0.00018 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 0.035 feet/day (approximately 12.8 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 2020 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.

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## Pond 6

During the October 2020 event, the average hydraulic gradient of 0.000076 ft/ft was calculated using well pairs JRW-MW-16001/JRW-MW-16004 and JRW-MW-16002/JRW-MW-16004 with a minimal discernable overall flow direction across Pond 6 toward the south. This inferred flow direction is 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 0.009 feet/day (approximately 3.3 feet/year). Groundwater elevations measured across the Site during the October 2020 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 2020 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 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.

##### 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 2020 Semiannual Event (October 2020)

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

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

### **3.3 Data Comparison to Background Limits – Pond 6 Second Semiannual Event (October 2020)**

The data comparisons of monitoring wells JRW-MW-16001 through JRW-MW-16006 for the October 2020 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 October 2020 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 2021 semiannual monitoring event for each of these units is scheduled for the second calendar quarter of 2021.

## 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.
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- 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.
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- USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA facilities, Unified Guidance. Office of Conservation and Recovery. EPA 530/R-09-007.
- USEPA. April 2015. 40 CFR Parts 257 and 261. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. 80 Federal Register 74 (April 17, 2015), pp. 21301-21501 (80 FR 21301).
- USEPA. 2016. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Extension of Compliance Deadlines for Certain Inactive Surface Impoundments; Response to Partial Vacatur. Office of Conservation and Recovery. EPA 81-FR-51082.
- USEPA. July 2018. 40 CFR Part 257. Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One); Final Rule. 83 Federal Register 146 (July 30, 2018), pp. 36435-36456 (83 FR 36435).



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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 2020  
JR Whiting Pond 1 & 2 and Pond 6  
Erie, Michigan

Well Location	Ground Surface Elevation (ft)	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Depth (ft BGS)		Screen Interval Elevation (ft)		October 1, 2020			
								Depth to Water (ft BTOC)	Groundwater Elevation (ft)		
<b>Static Water Level Monitoring Wells</b>											
JRW-MW-16007	579.47	582.31	Limestone	68.0	to	78.0	511.5	to	501.5	7.51	574.80
JRW-MW-16008	579.95	582.83	Limestone	68.0	to	73.0	512.0	to	507.0	8.00	574.83
JRW-MW-16009	579.90	582.60	Limestone	69.0	to	79.0	510.9	to	500.9	7.76	574.84
<b>Ponds 1 &amp; 2</b>											
JRW-MW-15001	NM	581.39	Limestone	NM	to	NM	NM	to	NM	6.46	574.93
JRW-MW-15002	NM	590.17	Limestone	NM	to	NM	NM	to	NM	15.22	574.95
JRW-MW-15003	NM	587.23	Limestone	NM	to	NM	NM	to	NM	12.37	574.86
JRW-MW-15004	NM	589.32	Limestone	NM	to	NM	NM	to	NM	14.45	574.87
JRW-MW-15005	NM	588.28	Limestone	NM	to	NM	NM	to	NM	13.36	574.92
JRW-MW-15006	NM	580.48	Limestone	NM	to	NM	NM	to	NM	5.59	574.89
<b>Pond 6</b>											
JRW-MW-16001	589.19	592.33	Limestone	71.0	to	81.0	518.2	to	508.2	17.30	575.03
JRW-MW-16002	585.78	588.69	Limestone	81.0	to	91.0	504.8	to	494.8	13.66	575.03
JRW-MW-16003	586.19	589.01	Limestone	73.0	to	83.0	513.2	to	503.2	14.06	574.95
JRW-MW-16004	586.48	589.34	Limestone	75.0	to	85.0	511.5	to	501.5	14.46	574.88
JRW-MW-16005	589.29	592.14	Limestone	78.0	to	88.0	511.3	to	501.3	17.16	574.98
JRW-MW-16006	588.26	591.04	Limestone	79.0	to	89.0	509.3	to	499.26	16.06	574.98

**Notes:**

Top of casing elevation survey was conducted by Rowe Professional Services Company on 7/14/2020.

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

TOC: Top of well casing.

ft BTOC: Feet below top of well casing.

ft BGS: Feet below ground surface.

NM = Not measured

**Table 2**  
 Summary of Groundwater Field Parameters – October 2020  
 JR Whiting Pond 1 & 2 and 6  
 Erie, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)
<b>Ponds 1 &amp; 2</b>							
JRW-MW-15001	10/1/2020	0.30	-41.5	7.5	1,105	13.8	8.13
JRW-MW-15002	10/1/2020	0.35	-144.7	7.5	1,149	13.3	4.54
JRW-MW-15003	10/1/2020	0.31	-214	7.7	1,005	12.9	7.61
JRW-MW-15004	10/1/2020	0.31	-215.6	7.6	988	13.1	6.27
JRW-MW-15005	10/1/2020	0.29	-245	7.7	890	13.5	4.89
JRW-MW-15006	10/1/2020	0.27	-330.9	7.6	992	12.9	5.01
<b>Pond 6</b>							
JRW-MW-16001	10/1/2020	0.54	-142.3	7.9	777	12.2	2.10
JRW-MW-16002	10/1/2020	0.13	-188.8	7.8	1,002	12.0	5.14
JRW-MW-16003	10/1/2020	0.18	-184.2	7.6	1,053	13.5	0.90
JRW-MW-16004	10/1/2020	0.20	-108.4	7.4	1,235	13.6	1.10
JRW-MW-16005	10/1/2020	0.18	-98.2	7.6	971	12.1	1.30
JRW-MW-16006	10/1/2020	0.59	-150.1	7.8	851	11.8	1.36

**Notes:**

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard units.

umhos/cm - Micromhos per centimeter.

°C - Degrees Celcius.

NTU - Nephelometric Turbidity Unit.

**Table 3**  
 Comparison of Groundwater Detection Monitoring Results to Background Limits – October 2020  
 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:		10/1/2020	PL	10/1/2020	PL	10/1/2020	PL	10/1/2020	PL	10/1/2020	PL	10/1/2020	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
<b>Appendix III</b>													
Boron	ug/L	196	240	174	220	191	230	216	270	182	270	203	250
Calcium	mg/L	154	180	142	180	121	160	120	140	113	120	122	140
Chloride	mg/L	44.2	55	43.5	56	41.6	55	46.6	56	31.5	46	42.6	53
Fluoride	ug/L	1,590	1,600	1,610	1,900	1,510	1,800	1,520	1,800	1,490	1,700	1,550	1,700
Sulfate	mg/L	388	474	415	500	334	440	319	390	288	350	284	410
Total Dissolved Solids	mg/L	813	1,000	846	1,100	704	940	681	880	644	840	694	920
pH, Field	SU	7.5	6.8 - 8.4	7.5	7.2 - 7.9	7.7	7.3 - 8.3	7.6	7.2 - 8.0	7.7	7.3 - 8.6	7.6	7.0 - 9.0
<b>MI Part 115</b>													
Iron	mg/L	484	n < 8	250	n < 8	400	n < 8	123	n < 8	61	n < 8	70	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 Detection Monitoring Results to Background Limits – October 2020  
 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:		10/1/2020	PL	10/1/2020	PL	10/1/2020	PL	10/1/2020	PL	10/1/2020	PL	10/1/2020	PL
Constituent	Unit	Data		Data		Data		Data		Data		Data	
<b>Appendix III</b>													
Boron	ug/L	169	203	154	209	178	257	192	262	180	244	171	226
Calcium	mg/L	89.2	111	130	149	127	156	151	181	117	182	101	117
Chloride	mg/L	18.6	23.6	19.8	25.4	27.5	32.4	36.4	43.7	24.1	29.4	22.4	38.6
Fluoride	ug/L	1,580	2,300	1,240	1,400	1,370	1,600	1,440	1,700	1,460	1,800	1,520	2,200
Sulfate	mg/L	244	278	379	426	393	470	472	507	344	498	290	399
Total Dissolved Solids	mg/L	517	770	759	832	771	1,040	970	1,110	720	1,030	617	904
pH, Field	SU	7.9	7.5 - 8.9	7.8	7.5 - 8.3	7.6	7.4 - 7.9	7.4	7.4 - 8.2	7.6	7.3 - 8.0	7.8	7.5 - 8.2
<b>MI Part 115</b>													
Iron	mg/L	134	n < 8	243	n < 8	313	n < 8	158	n < 8	92	n < 8	252	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 2020  
 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. 2020 <b>(bold &gt;201)</b>	2 Qtr. 2020 <b>(bold &gt;201)</b>	4 Qtr. 2019 <b>(bold &gt;201)</b>	2 Qtr. 2019 <b>(bold &gt;201)</b>
<b>No Exceedances</b>								



## Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.



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

TRC - GIS

PROJECT:	<b>CONSUMERS ENERGY COMPANY JR WHITING POWER PLANT ERIE, MICHIGAN</b>
TITLE:	<b>SITE LOCATION MAP</b>



DRAWN BY:	S. MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	S. HOLMSTROM
DATE:	JANUARY 2021
PROJ. NO.:	367393
FILE:	367393-001-001slm.mxd

**FIGURE 1**

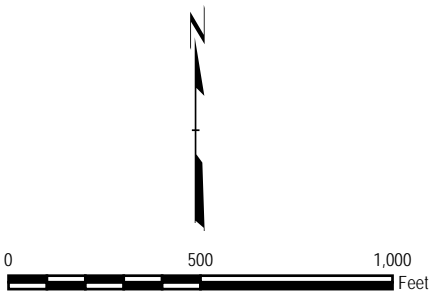





**LEGEND**

-  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.



1" = 500'  
 1:6,000

<b>PROJECT:</b>		<b>CONSUMERS ENERGY COMPANY JR WHITING POWER PLANT ERIE, MICHIGAN</b>	
<b>TITLE:</b>		<b>SITE PLAN WITH CCR MONITORING WELL LOCATIONS</b>	
DRAWN BY:	S. MAJOR	PROJ NO.:	369393
CHECKED BY:	B. YELEN	<b>FIGURE 2</b>	
APPROVED BY:	S. HOLMSTROM		
DATE:	JANUARY 2021		
		1540 Eisenhower Place Ann Arbor, MI 48108-3284 Phone: 734.971.7080 www.trccompanies.com	
FILE NO.:		367393-001-004.mxd	



Plot Date: 1/5/2021, 09:54:52 AM by SMAJOR -- LAYOUT: ANSIB(11"x17")  
 Path: S:\1-PROJECTS\Consumers\_Energy\_Company\Michigan\CCR\_GW\2017\_2697676367393-001-005.mxd  
 Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl (Foot)  
 Map Rotation: 0  
 TRC - GIS



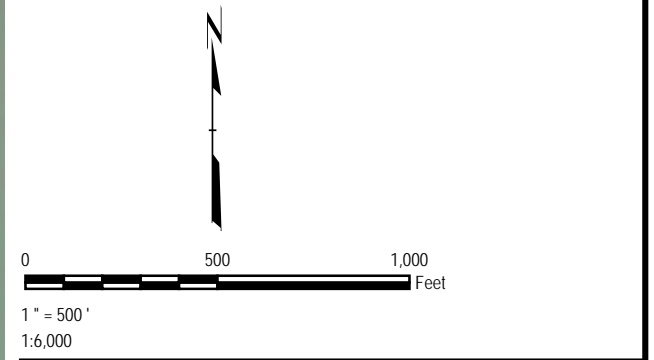
**LEGEND**

- 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.
  5. ANOMALOUS STATIC WATER ELEVATION. NOT USED FOR GRADIENT CALCULATION.



PROJECT:		<b>CONSUMERS ENERGY COMPANY JR WHITING POWER PLANT ERIE, MICHIGAN</b>	
TITLE:		<b>GROUNDWATER POTENTIOMETRIC ELEVATION SUMMARY OCTOBER 2020</b>	
DRAWN BY:	S. MAJOR	PROJ NO.:	367393
CHECKED BY:	B. YELEN	<b>FIGURE 3</b>	
APPROVED BY:	S. HOLMSTROM		
DATE:	JANUARY 2021		

**TRC**

1540 Eisenhower Place  
Ann Arbor, MI 48108-3284  
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FILE NO.: 367393-001-005.mxd



# Appendix A

## Data Quality Reviews

## **Pond 1 & 2**

## Laboratory Data Quality Review Groundwater Sampling Event October 2020 Consumers Energy JR Whiting Ponds 1 & 2

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the October 2020 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 20-1090.

During the October 2020 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, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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 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 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.



## Pond 6

# Laboratory Data Quality Review Groundwater Sampling Event October 2020 Consumers Energy JR Whiting Pond 6

Groundwater samples were collected by Consumers Energy (CE) Laboratory Services for the October 2020 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 20-1095.

During the October 2020 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, 2017). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for 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 with the exception of calcium which exhibited high recoveries, likely due to the elevated concentration of calcium in the unspiked sample; this issue does not have an adverse effect on the data. 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 or deemed not to have an adverse effect on the data, there is no impact on data usability due to this issue.
- The field duplicate pair samples were DUP-02/JRW-MW-16004. All criteria were met.
- Laboratory duplicate analyses were not performed on a sample from this data set.

# Appendix B

## Laboratory Reports

## Pond 1 & 2

To: MAMarion, P22-118

From: EBlaj, T-258

Date: October 11, 2020

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 1 AND 2 – 2020 Q4

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

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**Chemistry Project: 20-1090**

CE Laboratory Services conducted groundwater monitoring at JR Whiting Pond 1 & 2 on 10/01/2020 for the 2<sup>nd</sup> 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 10/02/2020.

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 2009 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



*Testing performed in accordance with the A2LA scope of accreditation specified in the listed certificate. The information contained in this report is the sole property of Consumers Energy. It cannot be reproduced except in full, and with consent from Consumers Energy, or the customer for which this report was issued.*

## 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, 22<sup>nd</sup> 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:

<u>Acronym</u>	<u>Description</u>
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



<u>Qualifier</u>	<u>Description</u>
*	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

**Customer Name:** JR Whiting Complex

**Work Order ID:** JRW RCRA GW Monitoring - Pond 1&2 - October 2020

**Date Received:** 10/2/2020

**Chemistry Project:** 20-1090

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
20-1090-01	JRW-MW-15001	Groundwater	10/01/2020 02:44 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-02	JRW-MW-15002	Groundwater	10/01/2020 01:45 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-03	JRW-MW-15003	Groundwater	10/01/2020 06:11 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-04	JRW-MW-15004	Groundwater	10/01/2020 05:14 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-05	JRW-MW-15005	Groundwater	10/01/2020 04:27 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-06	JRW-MW-15006	Groundwater	10/01/2020 03:43 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-07	DUP-01	Groundwater	10/01/2020 02:44 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-08	EB-01	Water	10/01/2020 05:17 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-09	FB-01	Water	10/01/2020 05:18 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-10	JRW-MW-15006 MS	Groundwater	10/01/2020 03:43 PM	JRW RCRA GW Monitoring - Pond 1&2
20-1090-11	JRW-MW-15006 MSD	Groundwater	10/01/2020 03:43 PM	JRW RCRA GW Monitoring - Pond 1&2



# Analytical Report

Report Date: 10/11/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
Field Sample ID: **JRW-MW-15001**  
Lab Sample ID: 20-1090-01  
Matrix: Groundwater

Laboratory Project: **20-1090**  
Collect Date: 10/01/2020  
Collect Time: 02:44 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-01-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	196		ug/L	20	10/07/2020	AB20-1007-01
Calcium	154000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	484		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-01-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	44200		ug/L	2000	10/06/2020	AB20-1006-03
Fluoride	1590		ug/L	1000	10/06/2020	AB20-1006-03
Sulfate	388000		ug/L	1000	10/07/2020	AB20-1006-03

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1090-01-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	813		mg/L	10	10/07/2020	AB20-1005-06

**Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15002**  
 Lab Sample ID: 20-1090-02  
 Matrix: Groundwater

Laboratory Project: **20-1090**  
 Collect Date: 10/01/2020  
 Collect Time: 01:45 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-02-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	174		ug/L	20	10/07/2020	AB20-1007-01
Calcium	142000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	250		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-02-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	43500		ug/L	2000	10/06/2020	AB20-1006-03
Fluoride	1610		ug/L	1000	10/06/2020	AB20-1006-03
Sulfate	415000		ug/L	1000	10/07/2020	AB20-1006-03

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1090-02-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	846		mg/L	10	10/07/2020	AB20-1005-06

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15003**  
 Lab Sample ID: 20-1090-03  
 Matrix: Groundwater

Laboratory Project: **20-1090**  
 Collect Date: 10/01/2020  
 Collect Time: 06:11 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-03-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	191		ug/L	20	10/07/2020	AB20-1007-01
Calcium	121000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	400		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-03-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	41600		ug/L	2000	10/06/2020	AB20-1006-03
Fluoride	1510		ug/L	1000	10/06/2020	AB20-1006-03
Sulfate	334000		ug/L	1000	10/07/2020	AB20-1006-03

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1090-03-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	704		mg/L	10	10/07/2020	AB20-1005-06

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15004**  
 Lab Sample ID: 20-1090-04  
 Matrix: Groundwater

Laboratory Project: **20-1090**  
 Collect Date: 10/01/2020  
 Collect Time: 05:14 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-04-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	216		ug/L	20	10/07/2020	AB20-1007-01
Calcium	120000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	123		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-04-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	46600		ug/L	2000	10/06/2020	AB20-1006-03
Fluoride	1520		ug/L	1000	10/06/2020	AB20-1006-03
Sulfate	319000		ug/L	1000	10/07/2020	AB20-1006-03

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1090-04-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	681		mg/L	10	10/07/2020	AB20-1005-06

**Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15005**  
 Lab Sample ID: 20-1090-05  
 Matrix: Groundwater

Laboratory Project: **20-1090**  
 Collect Date: 10/01/2020  
 Collect Time: 04:27 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-05-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	182		ug/L	20	10/07/2020	AB20-1007-01
Calcium	113000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	61		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-05-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	31500		ug/L	2000	10/06/2020	AB20-1006-03
Fluoride	1490		ug/L	1000	10/06/2020	AB20-1006-03
Sulfate	288000		ug/L	1000	10/07/2020	AB20-1006-03

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1090-05-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	644		mg/L	10	10/07/2020	AB20-1005-06



## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **JRW-MW-15006**  
 Lab Sample ID: 20-1090-06  
 Matrix: Groundwater

Laboratory Project: **20-1090**  
 Collect Date: 10/01/2020  
 Collect Time: 03:43 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-06-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	203		ug/L	20	10/07/2020	AB20-1007-01
Calcium	122000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	70		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-06-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	42600		ug/L	2000	10/06/2020	AB20-1006-03
Fluoride	1550		ug/L	1000	10/06/2020	AB20-1006-03
Sulfate	284000		ug/L	1000	10/07/2020	AB20-1006-03

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1090-06-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	694		mg/L	10	10/07/2020	AB20-1005-06

**Laboratory Services**

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
 Field Sample ID: **DUP-01**  
 Lab Sample ID: 20-1090-07  
 Matrix: Groundwater

Laboratory Project: **20-1090**  
 Collect Date: 10/01/2020  
 Collect Time: 02:44 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-07-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	190		ug/L	20	10/07/2020	AB20-1007-01
Calcium	142000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	492		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-07-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	43400		ug/L	2000	10/06/2020	AB20-1006-03
Fluoride	1470		ug/L	1000	10/06/2020	AB20-1006-03
Sulfate	391000		ug/L	1000	10/07/2020	AB20-1006-03

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1090-07-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	796		mg/L	10	10/07/2020	AB20-1005-06



# Analytical Report

Report Date: 10/11/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
Field Sample ID: **EB-01**  
Lab Sample ID: 20-1090-08  
Matrix: Water

Laboratory Project: **20-1090**  
Collect Date: 10/01/2020  
Collect Time: 05:17 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-08-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/07/2020	AB20-1007-01
Calcium	ND		ug/L	1000	10/07/2020	AB20-1007-01
Iron	ND		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-08-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	2000	10/06/2020	AB20-1006-03
Fluoride	ND		ug/L	1000	10/06/2020	AB20-1006-03
Sulfate	ND		ug/L	1000	10/07/2020	AB20-1006-03

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1090-08-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/07/2020	AB20-1005-06



# Analytical Report

Report Date: 10/11/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
Field Sample ID: **FB-01**  
Lab Sample ID: 20-1090-09  
Matrix: Water

Laboratory Project: **20-1090**  
Collect Date: 10/01/2020  
Collect Time: 05:18 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-09-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/07/2020	AB20-1007-01
Calcium	ND		ug/L	1000	10/07/2020	AB20-1007-01
Iron	ND		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-09-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	2000	10/06/2020	AB20-1006-03
Fluoride	ND		ug/L	1000	10/06/2020	AB20-1006-03
Sulfate	ND		ug/L	1000	10/07/2020	AB20-1006-03

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1090-09-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/07/2020	AB20-1005-06



# Analytical Report

Report Date: 10/11/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
Field Sample ID: **JRW-MW-15006 MS**  
Lab Sample ID: 20-1090-10  
Matrix: Groundwater

Laboratory Project: **20-1090**  
Collect Date: 10/01/2020  
Collect Time: 03:43 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-10-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	104		%	20	10/07/2020	AB20-1007-01
Calcium	121		%	1000	10/07/2020	AB20-1007-01
Iron	109		%	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-10-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	112		%	2000	10/06/2020	AB20-1006-03
Fluoride	104		%	1000	10/06/2020	AB20-1006-03
Sulfate	106		%	1000	10/07/2020	AB20-1006-03



# Analytical Report

Report Date: 10/11/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 1&2**  
Field Sample ID: **JRW-MW-15006 MSD**  
Lab Sample ID: 20-1090-11  
Matrix: Groundwater

Laboratory Project: **20-1090**  
Collect Date: 10/01/2020  
Collect Time: 03:43 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1090-11-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	104		%	20	10/07/2020	AB20-1007-01
Calcium	113		%	1000	10/07/2020	AB20-1007-01
Iron	110		%	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1090-11-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	114		%	2000	10/06/2020	AB20-1006-03
Fluoride	107		%	1000	10/06/2020	AB20-1006-03
Sulfate	107		%	1000	10/07/2020	AB20-1006-03



**Laboratory Services**  
A CENTURY OF EXCELLENCE

# Analytical Report

Report Date: 10/11/20

Data Qualifiers	Exception Summary
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No exceptions occurred.



**TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM**

Project Log-In Number: 20-1090

Inspection Date: 10-09-2020 Inspection By: UHT

Sample Origin/Project Name: JRW

Shipment Delivered By: Enter the type of shipment carrier.

Pony \_\_\_\_\_ FedEx \_\_\_\_\_ UPS \_\_\_\_\_ USPS \_\_\_\_\_ Airborne \_\_\_\_\_

Other/Hand Carry (whom) CT-Consumers

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 1.2 - 3.0°C Samples Received on Ice: Yes  No \_\_\_\_\_

M&TE # and Expiration #016402 / 11-4-21

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)	<u>9</u>	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>22</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	_____	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____

# CHAIN OF CUSTODY

## CONSUMERS ENERGY COMPANY – LABORATORY SERVICES



135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SITE: <b>JRW RCRA – April 2020 Pond 1&amp;2</b>				PROJECT NUMBER: <b>20-1090</b>			ANALYSIS REQUESTED							Page 1 of 1	
SAMPLING TEAM: Casey Hansen & Chase Tumey				DATE SHIPPED:		SITE SKETCHED ATTACHED? CIRCLE ONE: YES    NO		Total Metals	Anions	TDS					SEND REPORT TO: Michelle Marion
															TRC
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION		DEPTH (ft)	# OF CONTAINERS								REMARKS
20-1090-01	10-01-20	1444	GW	JRW-MW-15001			3	X	X	X					
-02		1345	GW	JRW-MW-15002			3	X	X	X					
-03		1811	GW	JRW-MW-15003			3	X	X	X					
-04		1774	GW	JRW-MW-15004			3	X	X	X					
-05		1627	GW	JRW-MW-15005			3	X	X	X					
-06		1543	GW	JRW-MW-15006			3	X	X	X					
-07		1444	GW	DUP-01			3	X	X	X					
-08		1717	GW	EB-01			3	X	X	X					
-09		1718	GW	FB-01			3	X	X	X					
-10		1543	GW	JRW-MW-15006 MS			2	X	X						
✓ -11	✓	1543	GW	JRW-MW-15006 MSD			2	X	X						
RELINQUISHED BY: (SIGNATURE) 				DATE/TIME 10-02-20 0730		RECEIVED BY: (SIGNATURE) Casey Hansen				COMMENTS  1.2-3.0g # 015402					
RELINQUISHED BY: (SIGNATURE)				DATE/TIME:		RECEIVED BY: (SIGNATURE)									

ORIGINAL TO LAB    COPY TO CUSTOMER

## Pond 6

To: MAMarion, P22-118

From: EBlaj, T-258

Date: October 11, 2020

Subject: RCRA GROUNDWATER MONITORING – JR WHITING POND 6 – 2020 Q4

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

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**Chemistry Project: 20-1095**

CE Laboratory Services conducted groundwater monitoring at JR Whiting Pond 6 on 10/01/2020, for the 2<sup>nd</sup> 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 10/02/2020.

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 2009 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



*Testing performed in accordance with the A2LA scope of accreditation specified in the listed certificate. The information contained in this report is the sole property of Consumers Energy. It cannot be reproduced except in full, and with consent from Consumers Energy, or the customer for which this report was issued.*

## 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, 22<sup>nd</sup> 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:

<u>Acronym</u>	<u>Description</u>
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

<u>Qualifier</u>	<u>Description</u>
*	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

## Work Order Sample Summary

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**Customer Name:** JR Whiting Complex  
**Work Order ID:** JRW RCRA GW Monitoring - Pond 6 - October 2020  
**Date Received:** 10/2/2020  
**Chemistry Project:** 20-1095

<u>Sample #</u>	<u>Field Sample ID</u>	<u>Matrix</u>	<u>Sample Date</u>	<u>Site</u>
20-1095-01	JRW-MW-16001	Groundwater	10/01/2020 04:51 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-02	JRW-MW-16002	Groundwater	10/01/2020 04:11 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-03	JRW-MW-16003	Groundwater	10/01/2020 02:31 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-04	JRW-MW-16004	Groundwater	10/01/2020 01:21 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-05	JRW-MW-16005	Groundwater	10/01/2020 06:06 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-06	JRW-MW-16006	Groundwater	10/01/2020 07:01 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-07	DUP-02	Groundwater	10/01/2020 01:21 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-08	EB-02	Water	10/01/2020 07:11 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-09	FB-02	Water	10/01/2020 01:08 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-10	JRW-MW-16003 MS	Groundwater	10/01/2020 02:31 PM	JRW RCRA GW Monitoring - Pond 6
20-1095-11	JRW-MW-16003 MSD	Groundwater	10/01/2020 02:31 PM	JRW RCRA GW Monitoring - Pond 6





# Analytical Report

Report Date: 10/11/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16001**  
 Lab Sample ID: 20-1095-01  
 Matrix: Groundwater

Laboratory Project: **20-1095**  
 Collect Date: 10/01/2020  
 Collect Time: 04:51 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-01-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	169		ug/L	20	10/07/2020	AB20-1007-01
Calcium	89200		ug/L	1000	10/07/2020	AB20-1007-01
Iron	134		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-01-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	18600		ug/L	2000	10/06/2020	AB20-1006-04
Fluoride	1580		ug/L	1000	10/06/2020	AB20-1006-04
Sulfate	244000		ug/L	1000	10/07/2020	AB20-1006-04

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1095-01-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	517		mg/L	10	10/06/2020	AB20-1005-07

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16002**  
 Lab Sample ID: 20-1095-02  
 Matrix: Groundwater

Laboratory Project: **20-1095**  
 Collect Date: 10/01/2020  
 Collect Time: 04:11 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-02-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	154		ug/L	20	10/07/2020	AB20-1007-01
Calcium	130000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	243		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-02-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	19800		ug/L	2000	10/06/2020	AB20-1006-04
Fluoride	1240		ug/L	1000	10/06/2020	AB20-1006-04
Sulfate	379000		ug/L	1000	10/07/2020	AB20-1006-04

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1095-02-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	759		mg/L	10	10/06/2020	AB20-1005-07

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16003**  
 Lab Sample ID: 20-1095-03  
 Matrix: Groundwater

Laboratory Project: **20-1095**  
 Collect Date: 10/01/2020  
 Collect Time: 02:31 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-03-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	178		ug/L	20	10/07/2020	AB20-1007-01
Calcium	127000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	313		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-03-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	27500		ug/L	2000	10/06/2020	AB20-1006-04
Fluoride	1370		ug/L	1000	10/06/2020	AB20-1006-04
Sulfate	393000		ug/L	1000	10/07/2020	AB20-1006-04

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1095-03-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	771		mg/L	10	10/06/2020	AB20-1005-07

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16004**  
 Lab Sample ID: 20-1095-04  
 Matrix: Groundwater

Laboratory Project: **20-1095**  
 Collect Date: 10/01/2020  
 Collect Time: 01:21 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-04-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	192		ug/L	20	10/07/2020	AB20-1007-01
Calcium	151000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	158		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-04-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	36400		ug/L	2000	10/06/2020	AB20-1006-04
Fluoride	1440		ug/L	1000	10/06/2020	AB20-1006-04
Sulfate	472000		ug/L	1000	10/07/2020	AB20-1006-04

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1095-04-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	970		mg/L	10	10/06/2020	AB20-1005-07



# Analytical Report

Report Date: 10/11/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **JRW-MW-16005**  
Lab Sample ID: 20-1095-05  
Matrix: Groundwater

Laboratory Project: **20-1095**  
Collect Date: 10/01/2020  
Collect Time: 06:06 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-05-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	180		ug/L	20	10/07/2020	AB20-1007-01
Calcium	117000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	92		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-05-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	24100		ug/L	2000	10/06/2020	AB20-1006-04
Fluoride	1460		ug/L	1000	10/06/2020	AB20-1006-04
Sulfate	344000		ug/L	1000	10/07/2020	AB20-1006-04

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1095-05-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	720		mg/L	10	10/06/2020	AB20-1005-07

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **JRW-MW-16006**  
 Lab Sample ID: 20-1095-06  
 Matrix: Groundwater

Laboratory Project: **20-1095**  
 Collect Date: 10/01/2020  
 Collect Time: 07:01 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-06-C02-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	171		ug/L	20	10/07/2020	AB20-1007-01
Calcium	101000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	252		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-06-C03-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	22400		ug/L	2000	10/06/2020	AB20-1006-04
Fluoride	1520		ug/L	1000	10/06/2020	AB20-1006-04
Sulfate	290000		ug/L	1000	10/07/2020	AB20-1006-04

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1095-06-C04-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	617		mg/L	10	10/06/2020	AB20-1005-07

**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **DUP-02**  
 Lab Sample ID: 20-1095-07  
 Matrix: Groundwater

Laboratory Project: **20-1095**  
 Collect Date: 10/01/2020  
 Collect Time: 01:21 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-07-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	194		ug/L	20	10/07/2020	AB20-1007-01
Calcium	161000		ug/L	1000	10/07/2020	AB20-1007-01
Iron	155		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-07-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	36700		ug/L	2000	10/06/2020	AB20-1006-04
Fluoride	1490		ug/L	1000	10/06/2020	AB20-1006-04
Sulfate	474000		ug/L	1000	10/07/2020	AB20-1006-04

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1095-07-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	978		mg/L	10	10/06/2020	AB20-1005-07



**Laboratory Services**  
A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
 Field Sample ID: **EB-02**  
 Lab Sample ID: 20-1095-08  
 Matrix: Water

Laboratory Project: **20-1095**  
 Collect Date: 10/01/2020  
 Collect Time: 07:11 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-08-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/07/2020	AB20-1007-01
Calcium	ND		ug/L	1000	10/07/2020	AB20-1007-01
Iron	ND		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-08-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	2000	10/06/2020	AB20-1006-04
Fluoride	ND		ug/L	1000	10/06/2020	AB20-1006-04
Sulfate	ND		ug/L	1000	10/07/2020	AB20-1006-04

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1095-08-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/06/2020	AB20-1005-07



# Analytical Report

Report Date: 10/11/20

## Laboratory Services A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **FB-02**  
Lab Sample ID: 20-1095-09  
Matrix: Water

Laboratory Project: **20-1095**  
Collect Date: 10/01/2020  
Collect Time: 01:08 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-09-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	ND		ug/L	20	10/07/2020	AB20-1007-01
Calcium	ND		ug/L	1000	10/07/2020	AB20-1007-01
Iron	ND		ug/L	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-09-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	ND		ug/L	2000	10/06/2020	AB20-1006-04
Fluoride	ND		ug/L	1000	10/06/2020	AB20-1006-04
Sulfate	ND		ug/L	1000	10/07/2020	AB20-1006-04

**Total Dissolved Solids by SM 2540C** Aliquot: 20-1095-09-C03-A01 Analyst: CLH

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Total Dissolved Solids	ND		mg/L	10	10/06/2020	AB20-1005-07



# Analytical Report

Report Date: 10/11/20

## Laboratory Services A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **JRW-MW-16003 MS**  
Lab Sample ID: 20-1095-10  
Matrix: Groundwater

Laboratory Project: **20-1095**  
Collect Date: 10/01/2020  
Collect Time: 02:31 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-10-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	107		%	20	10/07/2020	AB20-1007-01
Calcium	133	*	%	1000	10/07/2020	AB20-1007-01
Iron	108		%	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-10-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	105		%	2000	10/06/2020	AB20-1006-04
Fluoride	101		%	1000	10/06/2020	AB20-1006-04
Sulfate	106		%	1000	10/07/2020	AB20-1006-04



# Analytical Report

Report Date: 10/11/20

## Laboratory Services

A CENTURY OF EXCELLENCE

Sample Site: **JRW RCRA GW Monitoring - Pond 6**  
Field Sample ID: **JRW-MW-16003 MSD**  
Lab Sample ID: 20-1095-11  
Matrix: Groundwater

Laboratory Project: **20-1095**  
Collect Date: 10/01/2020  
Collect Time: 02:31 PM

**Metals by EPA 6020B: CCR Rule Appendix III and Fe Total Metals** Aliquot: 20-1095-11-C01-A01 Analyst: SLK

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Boron	110		%	20	10/07/2020	AB20-1007-01
Calcium	131	*	%	1000	10/07/2020	AB20-1007-01
Iron	112		%	20	10/07/2020	AB20-1007-01

**Anions by EPA 300.0 CCR Rule Analyte List, Cl, F, SO4, Aqueous** Aliquot: 20-1095-11-C02-A01 Analyst: DMW

Parameter(s)	Result	Flag	Units	RL	Analysis Date	Tracking #
Chloride	106		%	2000	10/06/2020	AB20-1006-04
Fluoride	105		%	1000	10/06/2020	AB20-1006-04
Sulfate	102		%	1000	10/07/2020	AB20-1006-04

Data Qualifiers	Exception Summary
-----------------	-------------------

\* = Field MS/MSD spike over-recovery was observed for Calcium due to high sample background. No other exceptions occurred.

**TITLE: SAMPLE LOG-IN – SHIPMENT INSPECTION FORM**

Project Log-In Number: 20.1095

Inspection Date: 10-09-2020

Inspection By: LUT

Sample Origin/Project Name: JRW

Shipment Delivered By: Enter the type of shipment carrier.

Pony \_\_\_\_\_ FedEx \_\_\_\_\_ UPS \_\_\_\_\_ USPS \_\_\_\_\_ Airborne \_\_\_\_\_  
Other/Hand Carry (whom) LUT - 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 0.8-2.2°C Samples Received on Ice: Yes  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)	<u>9</u>	_____	_____	_____	_____
9-oz (amber glass jar)	_____	_____	_____	_____	_____
2-oz (amber glass)	_____	_____	_____	_____	_____
125 mL (plastic)	<u>22</u>	_____	_____	_____	_____
24 mL vial (glass)	_____	_____	_____	_____	_____
500 mL (plastic)	_____	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____



# CHAIN OF CUSTODY

## CONSUMERS ENERGY COMPANY – LABORATORY SERVICES



135 WEST TRAIL ST., JACKSON, MI 49201 • (517) 788-1251 • FAX (517) 788-2533

SAMPLING SITE: <b>JRW RCRA – April 2020 Pond 6</b>				PROJECT NUMBER: <b>20-1095</b>			ANALYSIS REQUESTED							Page 1 of 1	
SAMPLING TEAM: Casey Hansen & Chase Tumey				DATE SHIPPED:		SITE SKETCHED ATTACHED? CIRCLE ONE: YES      NO		Total Metals	Anions	TDS					SEND REPORT TO: Michelle Marion
															TRC
CE CONTROL #	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	SAMPLE DESCRIPTION / LOCATION		DEPTH (ft)	# OF CONTAINERS								REMARKS
20-1095-01	10.1.20	1151	GW	JRW-MW-16001			3	X	X	X					cut
-02	10.1.20	1111	GW	JRW-MW-16002			3	X	X	X					cut
-03	10.1.20	1431	GW	JRW-MW-16003			3	X	X	X					cut
-04	10.1.20	1321	GW	JRW-MW-16004			3	X	X	X					cut
-05	10.1.20	1800	GW	JRW-MW-16005			3	X	X	X					cut
-06	10.1.20	1901	GW	JRW-MW-16006			3	X	X	X					cut
-07	10.1.20	1321	GW	DUP-02			3	X	X	X					cut
-08	10.1.20	1911	GW	EB-02			3	X	X	X					cut
-09	10.1.20	1308	GW	FB-02			3	X	X	X					cut
-10	10.1.20	1431	GW	JRW-MW-16003 MS			2	X	X						cut
↓ -11	10.1.20	1431	GW	JRW-MW-16003 MSD			2	X	X						cut
RELINQUISHED BY: (SIGNATURE) <i>Casey Hansen</i>				DATE/TIME 10-02-2020 DBE		RECEIVED BY: (SIGNATURE) <i>[Signature]</i>				COMMENTS 0.87.2°C # 015402					
RELINQUISHED BY: (SIGNATURE)				DATE/TIME:		RECEIVED BY: (SIGNATURE)				ORIGINAL TO LAB      COPY TO CUSTOMER					

## **Appendix C Field Notes**



**WATER LEVEL DATA**

Site: JR Whiting

Project No: 20-1090, 20-1095

Reviewed by: *[Signature]*  
Review Date: 10/09/20

Analyst: ch/cet

Date: 10/1/2020

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	1129	6.46	6.46	81.94	
JRW MW-15002	1149	15.22	15.22	92.28	
JRW MW-15003*	1145	12.37	12.37	90.09	12.15 @ 1733
JRW MW-15004*	1141	14.45	14.45	96.45	14.23 @ 1642
JRW MW-15005	1135	13.36	13.36	93.47	
JRW MW-15006	1131	5.59	5.59	82.74	
JRW MW-16001	1135	17.30	17.30	81.20	marked TOC
JRW MW-16002	1143	13.64	13.64	94.45	↓ 14.10 @ 1345 14.55 @ 1217
JRW MW-16003*	1148	14.06	14.06	86.80	
JRW MW-16004*	1153	14.46	14.46	89.00	
JRW MW-16005	1130	17.14	17.14	91.64	
JRW MW-16006	1127	16.06	16.06	91.80	
JRW MW-16007	1117	7.51	7.51	80.98	
JRW MW-16008	1114	8.00	8.00	76.30	
JRW MW-16009	1110	7.74	7.74	81.94	

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

Sonde ID	15H
Start Date	10-01-20
Project #	20-1090, 20-1095
Site	JR Whiting
Reviewed By & Date:	<i>[Signature]</i> 10/09/20

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	19410212	10-5-2021	4.14	4.01	3.96			4.02
7.0	GFS # 1639	2018 0138	4-26-2022	7.12	7.02	7.05			7.10
10.0	GFS # 1645	20060142	01-29-2022	10.05	9.94	10.04			10.07
Initials & Date:				<i>CS</i> 7-30-20	<i>CS</i> 10-8-20	<i>CS</i> 10-5-20			<i>LET</i> 10-12-20

- Is the same standard used for calibration and as-found?  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	20190217	02-13-21	205.4	227.6	241.1			240.1
Initials & Date:				<i>CS</i> 9-30-20	<i>CS</i> 10-1-20	<i>CS</i> 10-5-20			<i>LET</i> 10-10-20

- Is the same standard used for calibration and as-found?  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	92.7	99.7	100.3			103.9
Initials & Date:				<i>CS</i> 9/30/20	<i>CS</i> 10-1-20	<i>CS</i> 10-5-20			<i>LET</i> 10-12-20

- Is the same standard used for calibration and as-found?  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	10-01-20
Reviewed By & Date:	<i>f</i> 10/09/20

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
1421	GFS	2006016	2-11-21	1427	1419	1444			1452
Initials & Date:				<i>CS</i> 9-30-20	<i>CS</i> 10-1-20	<i>CS</i> 10-3-20			<i>CS</i> 10-16-20

- Is the same standard used for calibration and as-found?  Y or N (if no, document on pg. 2)
- Are the calibration values within  $\pm 3\%$  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	--	--	0.11	0.04	0.16			
10.0 ( $\pm 1.0$ NTUs)	Hach 2659949	→		NA	→		NA	→	
40.0 ( $\pm 4.0$ NTUs)	Hach 2746356	40037	02-2022	38.43	40.03	42.24			
Initials & Date:				<i>CS</i> 9-30-20	<i>CS</i> 10-1-20	<i>CS</i> 10-5-20			

- Is the same standard used for calibration and as-found?  Y or N (if no, document on pg. 2)
- Are the calibration values within  $\pm 10\%$  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						



Laboratory Services  
A CENTURY OF EXCELLENCE

Sonde ID	19M
Start Date	10-01-20
Project #	20-1090, 20-1095
Site	JR Whiting
Reviewed By & Date	J 10/09/20

Equipment Details	Model & S/N
Monitor Brand	YSI ProDSS S/N 19M100493
Sonde Brand	YSI ProDSS S/N 19M100509
Flow Cell	EXO1 599080
DO Probe	YSI ProDSS S/N 19L103208
Turbidity Probe	YSI ProDSS S/N 19L103271
pH With ORP	YSI ProDSS S/N 19M101274
Conductivity & Temperature Probe	YSI ProDSS S/N 19L101251

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	19410212 <del>20180138</del> 197020	10-5-2021 <del>4-26-22</del>	3.92	4.03	4.03			3.96
7.0	GFS # 1639	20180138	4-26-22	7.01	7.00	7.10			7.05
10.0	GFS # 1645	20060182	01-29-2022	9.94	9.96	10.07			10.04
Initials & Date:				CF 9-30-20	CF 10-1-20	CF 10-5-20			CF 10-6-20

- Is the same standard used for calibration and as-found?  Y or N (if no, document on pg. 2)
- Are the calibration values within ±0.10 of the standard?  Y or N (if no, recalibration is required)

ORP Standard (± 10mV)	Source	Source Lot #	Source Exp. Date	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification	Calibration Value	Pre-Field Calibration Check	End of Day Calibration Verification
224 (mV)	GFS	20190217	02-13-21	210.0	229.1	240.1			241.1
Initials & Date:				CF 9-30-20	CF 10-5-20	CF 10-05-20			CF 10-10-20

- Is the same standard used for calibration and as-found?  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	99.9	103.9			100.3
Initials & Date:				CF 9/30/20	CF 10-5-20	10-5-20			CF 10-10-20

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





Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-MW-15001 Date 10-01-20 Control Number 20-1090-01  
 Location JR Whiting Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Geotech S/N: 1003  
 QC SAMPLE:  MS/MSD  DUP-01 Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 6.46 Depth-To-Bottom T/PVC (ft) 81.90 Completed by CEI

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

Stabilization parameters for the last three readings

1357							300	6.60	
1358	7.65	14.4	1115	28.8	258	-60.5	300	6.60	12.12
1403	7.54	13.9	1107	4.5	0.46	-42.6	300	6.62	7.59
1408	7.53	13.9	1107	3.8	0.39	-42.1	300	6.62	13.37
1413	7.53	13.8	1109	5.4	0.35	-41.8	300	6.62	11.27
1418	7.53	12.9	1106	3.3	0.33	-41.9	300	6.62	16.67
1423	7.53	14.1	1107	3.2	0.32	-42.2	300	6.62	10.71
1428	7.52	13.8	1106	3.1	0.32	-41.6	300	6.62	11.36
<del>1433</del>	7.52	13.7	1104	3.0	0.31	-41.7	300	6.62	9.41
1438	7.52	13.9	1105	3.0	0.31	-41.5	300	6.62	7.18
1443	7.52	13.8	1105	2.9	0.30	-41.5	300	6.62	8.13
1444									
1452									

Total Pump Time (min): 47 Total Purge Volume (gal): ≈ 4 gal Reviewed by: [Signature] 10/09/20

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	A						
2	↓	↓	B						
2	500ml	↓	A						

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



Consumers Energy Company  
Monitoring Well Sampling Worksheet

Well ID JRW-MW-15002 Date 10-01-20 Control Number 20-1090-02  
 Location JR Whiting Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Geotech S/N: 1003

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 15.22 Depth-To-Bottom T/PVC (ft) 92.28 Completed by CEI

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

Stabilization parameters for the last three readings

1206							300	15.25	
1209	6.96	13.3	499.4	61.5	6.42	101.8	300	15.28	33.85
1214	6.89	13.1	508	37.7	3.93	88.8	300	15.28	5.76
1219	6.91	13.2	517	24.9	2.59	90.9	300	15.28	8.36
1224	7.18	13.3	544	13.7	1.43	46.6	300	15.28	6.71
1229	7.82	13.4	574	8.7	0.90	-59.5	300	15.28	9.68
1234	8.29	13.4	591	7.3	0.76	-85.2	300	15.28	9.54
1239	8.71	13.2	620	6.4	0.66	-111.9	300	15.28	5.27
1244	9.12	13.3	643	5.7	0.59	-129.8	300	15.28	5.57
1249	9.35	13.0	678	4.9	0.52	-141.9	300	15.28	5.67
1254	9.46	13.1	723	4.9	0.45	-148.2	300	15.28	7.13
1259	9.42	13.3	750	4.3	0.45	-145.3	300	15.28	5.15
1304	9.34	13.6	783	4.0	0.42	-141.5	300	15.28	6.99
1309	9.12	13.6	823	3.8	0.39	-128.8	300	15.28	7.81
1314	8.83	13.6	875	3.6	0.38	-153.8	300	15.28	4.99

Total Pump Time (min): 102 Total Purge Volume (gal): 58 gal Reviewed by: [Signature] 10/09/20

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	A	↕					
1	↓	↓	B	↕					
1	500ml	↓	A	↕					

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



Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW - mud - 15002 (cont) Date 10-01-20 Control Number 20-1090-02  
 Location JR Whiting Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Geotech S/N: 1003

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 15.22 Depth-To-Bottom T/PVC (ft) 92.24 Completed by CE

Time	pH	Temp	Sp Cond	DO	DO	ORP	Pump Rate	Water level	Turbidity
min	units	°C	uS/cm	% sat.	ppm	mV	mL/min	Drawdown ft	NTU
3-5 min	+/- 0.1	NA	+/- 3%	+/- 10%	+/- 0.3ppm	+/- 10mV	*	< 0.33	+/- 10%
<i>Stablization parameters for the last three readings</i>									
1319	8.40	13.6	930	3.5	0.37	-190.3	300	15.28	5.53
1324	8.02	13.8	998	3.5	0.36	-187.4	300	15.28	5.84
1329	7.74	13.7	1103	3.4	0.35	-165.9	300	15.28	4.33
1334	7.61	13.8	1127	3.3	0.34	-154.0	300	15.28	5.42
1339	7.53	13.5	1143	3.3	0.34	-146.1	300	15.28	5.02
1344	7.52	13.3	1149	3.3	0.35	-144.7	300	15.	4.54
1345									
1348									

Total Pump Time (min): 102 Total Purge Volume (gal): ≈ 8 gal Reviewed by: [Signature]

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	HOPE	A	✓					
1	↓	↓	B	↓					
1	500ml	↓	A	↓					

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



Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-MW-15003 Date 10-01-20 Control Number 20-1090-03  
 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:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 12.15 Depth-To-Bottom T/PVC (ft) 90.09 Completed by CEY

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

Stabilization parameters for the last three readings

1733							300	12.15	
1735	7.77	13.1	1007	8.5	0.88	-184.0	300	12.15	5.26
1740	7.71	13.1	1006	4.5	0.47	-199.1	300	12.15	7.24
1745	7.70	12.9	1066	3.7	0.39	-205.1	300	12.15	5.34
1750	7.69	12.9	1005	2.3	0.35	-210.0	300	12.15	8.94
1755	7.64	13.0	1004	3.2	0.33	-211.3	300	12.15	8.66
1800	7.69	13.0	1006	3.1	0.32	-213.0	300	12.15	7.93
1805	7.69	13.0	1005	3.0	0.32	-213.6	300	12.15	8.04
1810	7.69	12.9	1005	3.0	0.31	-214.0	300	12.15	7.61
1811									
1814									

Total Pump Time (min): 41 Total Purge Volume (gal): ≈ 3.5 gal Reviewed by: [Signature] 10/01/20

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	A	↗					
1	↓	↓	B	↓					
1	500ml	↓	A	↓					

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

Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-mw-15004 Date 10-01-20 Control Number 20-1090-04  
 Location JRW Whiting Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Ceoted S/N: 1003

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 14.27 Depth-To-Bottom T/PVC (ft) 96.45 Completed by CEY

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

Stablization parameters for the last three readings

1642							300	14.23	
1643	7.86	13.3	990	17.7	1.78	-196.2	300	14.23	4.48
1648	7.51	13.1	988	4.1	0.43	-205.6	300	14.23	5.26
1653	7.57	13.0	987	3.5	0.36	-205.7	300	14.23	5.11
1658	7.56	13.1	987	3.3	0.34	-210.6	300	14.23	4.20
1703	7.56	13.2	987	3.1	0.33	-211.8	300	14.23	6.03
1708	7.56	13.1	987	3.0	0.32	-214.7	300	14.23	4.74
1713	7.56	13.1	988	3.0	0.31	-215.6	300	14.23	6.27
1714									
1717									

Total Pump Time (min): 35 Total Purge Volume (gal): 3 gal Reviewed by: [Signature] 10/09/20

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	A	✓					
1		↓	B	↓					
1	500ml	↓	A	↓					

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



Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-MW-15005 Date 10-01-20 Control Number 20-1090-05  
 Location JR Writing Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Geotech S/N: 1003

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 13.19 Depth-To-Bottom T/PVC (ft) 93.47 Completed by CE

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

Stablization parameters for the last three readings

1600							300	13.32	
1601	8.10	13.6	899	17.0	1.60	-223.1	300	13.33	8.51
1606	7.86	13.2	890	3.9	0.41	-233.9	300	13.34	7.06
1611	7.73	13.2	890	3.1	0.33	-236.7	300	13.34	5.09
1616	7.72	13.3	890	2.9	0.31	-242.6	300	13.34	4.87
1621	7.71	13.5	889	2.8	0.30	-243.9	300	13.34	4.96
1626	7.70	13.5	890	2.8	0.29	-245.0	300	13.34	4.89
1627									
1630									

Total Pump Time (min): 30 Total Purge Volume (gal): 2.5 gal Reviewed by: J 10/09/20

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	125 ml	HDP	A	N					
1	↓	↓	B	↓					
1	500 ml	↓	A	↓					

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



Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-MW-15006 Date 10-01-20 Control Number 20-1090-06  
 Location JRW 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:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 5.42 Depth-To-Bottom T/PVC (ft) 82.76 Completed by CEJ

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

Stabilization parameters for the last three readings

1501							300	5.48	
1502	7.62	13.7	1009	11.4	1.14	-231.5	300	5.44	4.54
1507	7.57	13.3	993	3.5	0.37	-282.1	300	5.48	6.60
1512	7.55	13.2	994	3.0	0.31	-296.4	300	5.48	4.37
1517	7.55	13.2	993	2.8	0.29	-306.8	300	5.48	5.91
1522	7.55	13.2	993	2.7	0.29	-311.1	300	5.48	4.64
1527	7.55	13.1	994	2.7	0.28	-317.4	300	5.48	5.08
1532	7.55	12.9	993	2.6	0.28	-324.3	300	5.48	4.58
1537	7.55	12.9	993	2.6	0.27	-328.2	300	5.48	4.23
1542	7.56	12.9	992	2.5	0.27	-330.9	300	5.48	5.01
1543									
1549									

Total Pump Time (min): 48 Total Purge Volume (gal): ~ 4 gal Reviewed by: [Signature] 10/09/20

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	125 mL	HDPE	A	~					
3		↓	B	↓					
3	500 mL	↓	A	↓					

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



Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-16001 Date 10-01-2020 Control Number 20-1095-01  
 Location JRW Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: SOLINIST S/N: 122-004547-1

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 17.30 Depth-To-Bottom T/PVC (ft) 81.20 Completed by act

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

Stabilization parameters for the last three readings Bubbles

1420							500	17.39		meter
1630	8.34	12.3	771	5.6	0.62	-159.8	500	17.39	22.10	17.4
1635	8.21	12.4	772	5.6	0.59	-157.3	500	17.39	20.88	8.4
1640	8.00	12.1	770	5.2	0.55	-149.4	500	17.39	26.09	3.3
1645	7.93	12.3	777	5.2	0.54	-142.2	500	17.39	8.52	3.0
1650	7.93	12.2	777	5.2	0.54	-142.3	500	17.39	5.80	2.1
1650	collected sample									

Total Pump Time (min): 31 Total Purge Volume (gal): 4 Reviewed by: [Signature] 10/01/20

Weather: 65°F, Partly Cloudy @ 1640: Dumped out sonde

Comments: used Handheld Turbidity Meter

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	A	N					
1	125mL	↓	B	N					
1	500mL	↓	A	N					

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



Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-MW-16002 Date 10-1-2020 Control Number 20-1095-02  
 Location JRW Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Solmist S/N: 122-004547-1 pH = 7.5-8.3

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 13.66 Depth-To-Bottom T/PVC (ft) 94.45 Completed by CUH

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

Stabilization parameters for the last three readings

1455	10.85	12.4	853	2.5	0.26	-115.7	500	13.66	16.02
1500	10.85	12.3	857	2.0	0.21	-139.6	500	13.66	11.03
1505	10.86	12.0	859	1.7	0.18	-154.8	500	13.66	10.91
1510	10.84	12.1	859	1.7	0.18	-156.1	500	13.66	10.50
1515	10.85	12.1	856	1.7	0.18	-159.1	500	13.66	10.93
1520	10.84	12.0	854	1.6	0.17	-159.8	500	13.66	9.83
1525	10.81	11.8	851	1.6	0.17	-159.7	500	13.66	9.89
1528	10.79	11.7	851	1.6	0.17	-159.3	500	13.66	9.91
1530	10.54	11.7	830	1.4	0.15	-153.6	500	13.66	10.01
1535	9.30	11.8	904	1.4	0.15	-193.8	500	13.66	13.61
1540	8.31	12.1	990	1.2	0.14	-215.4	500	13.26	11.87
1545	8.15	12.3	995	1.3	0.13	-208.1	500	13.26	10.33
1550	8.00	11.9	998	1.3	0.13	-198.4	500	13.26	9.76
1555	7.92	11.9	999	1.3	0.13	-193.7	500	13.31	8.52
1557	1400	11.9	999	1.3	0.13	-192.1	500	13.33	7.66

Total Pump Time (min): 65 Total Purge Volume (gal): 8 Reviewed by: g 10/09/20

Weather: 63°F, sporadic rain showers

Comments: used portable turbidity meter / High Flow rate due to pH

Bottles Filled		Preservative Codes: A - NONE B - HNO3 C - H2SO4 D - NaOH E - HCl F -							
Quantity	Size	Type	Preservative Code	Filtered Y/N	Quantity	Size	Type	Preservative Code	Filtered Y/N
1	125mL	HDPE	A	N					
1	125mL	↓	B	N					
1	500mL	↓	A	N					

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



Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-MW-16002 Date 10.1.20 Control Number 20-1095-02  
 Location JRW Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Solinist S/N: 122-004547-1

QC SAMPLE:  MS/MSD  DUP-  Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 13.66 Depth-To-Bottom T/PVC (ft) 94.45 Completed by GH

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

Stabilization parameters for the last three readings

1605	7.87	12.1	1001	1.2	0.13	-190.5	500	13.35	6.61
1610	7.84	12.0	1002	1.2	0.13	-188.8	500	13.39	5.14
1611	collected samples								

Total Pump Time (min): \_\_\_\_\_ Total Purge Volume (gal): 10 Reviewed by: GH 10/09/20

Weather: \_\_\_\_\_

Comments: See Page 1 of 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
<u>See Page 1 of 2</u>									

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



Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-MW-16 003 Date 10-01-2020 Control Number 20-1095-03-10-11  
 Location JRW Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: holinist S/N: 122-004547-1  
 QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 14.06 Depth-To-Bottom T/PVC (ft) 86.08 Completed by UW

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

Stabilization parameters for the last three readings Bubbles

1345							200	14.10	↓	none
1355	7.96	12.6	1042	2.7	0.20	-186.9	200	14.08	68.02	2.3
1400	7.97	13.3	1044	2.2	0.23	-190.0	200	14.08	35.11	1.6
1405	7.94	12.7	1046	2.2	0.22	-179.3	200	14.08	30.59	1.2
1410	7.96	12.7	1046	1.9	0.19	-185.7	200	14.08	42.51	1.1
1415	7.94	12.7	1049	1.7	0.18	-186.4	200	14.08	1.6 *	3.6
1420	7.96	13.3	1047	2.1	0.22	-177.5	200	14.08	1.6 *	1.6
1425	7.97	13.4	1051	1.7	0.18	-185.5	200	14.08	1.6	0.9
1430	7.97	13.5	1053	1.8	0.18	-184.2	200	14.08	1.5	0.9
collected samples @ 1431										
										used 19M + handheld meter for readings. (UW)

Total Pump Time (min): 45 Total Purge Volume (gal): 5.0 Reviewed by: [Signature]

Weather: 63°F, cloudy, light rain  
 Comments: \* Attempted to change to 11M sonde for turbidity readings; but probe not working. lots of dissolved gases, sticking to probes

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	A	N						
3	125mL	↓	B	N						
3	500 mL	↓	A	N						

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



Consumers Energy Company  
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16004 Date 10-1-2020 Control Number 20-1095-04  
 Location JRWWhiting Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Solinist 122 S/N: 122-004947-1  
 QC SAMPLE:  MS/MSD  DUP- 02 Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 14.46 Depth-To-Bottom T/PVC (ft) 89.00 Completed by CVH

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

Stabilization parameters for the last three readings

1217	<sup># 10/1/20</sup> 4.8							14.55		<u>metr</u>
1225	4.8	13.8	1237	10.0	1.02	-54.3	250	14.58	134.77	<u>632</u>
1230	7.03	13.3	1235	4.5	0.46	-66.6	250	14.58	114.29	<u>21.4</u>
1235	7.04	13.2	1230	3.4	0.35	-73.1	250	14.58	86.06	<u>20.6</u>
1240	7.10	13.1	1229	3.0	0.31	-77.6	250	14.58	79.21	<u>17.0</u>
1245	7.21	13.1	1231	2.7	0.27	-89.7	250	14.58	80.13	<u>16.0</u>
1250	7.18	12.9	1234	2.4	0.25	-88.8	250	14.58	28.71	<u>15.0</u>
1255	7.19	12.9	1232	2.2	0.23	-90.3	250	14.58	54.28	<u>12.0</u>
1300	7.22	13.2	1237	2.2	0.23	-94.1	250	14.58	13.87	<u>11.0</u>
1305	7.30	13.2	1237	2.2	0.22	-102.0	250	14.58	12.04	<u>4.5</u>
1310	7.33	13.3	1236	2.2	0.22	-104.0	250	14.58	9.34	<u>3.2</u>
1315	7.40	13.4	1232	2.1	0.21	-110.4	250	14.58	9.37	<u>1.5</u>
1320	7.37	13.4	1235	1.9	0.20	-108.4	250	14.58	5.50	<u>1.1</u>
1321	collected samples									
1324										

Total Pump Time (min): 58 Total Purge Volume (gal): 4.0 Reviewed by: [Signature] 10/09/20

Weather: 66°F, Windy, Partly Cloudy Bubbles in sonde

Comments: Success live sonde data w/ program -> export csv to K: Drive

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+1	125mL	HDPE	A B	N					
1+1	125mL	HDPE	A	N					
1+1	500mL	HDPE	A	N					

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



Consumers Energy Company  
Monitoring Well Sampling Worksheet

Well ID JRW-MW-16005 Date 10-01-2020 Control Number 20-1095-05  
 Location JRW Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Solinist S/N: 122-004547-1

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 17.16 Depth-To-Bottom T/PVC (ft) 91.69 Completed by CUH

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

Stabilization parameters for the last three readings Bubbles → met

1705							500	17.19	
1715	7.49	12.2	871	8.9	0.93	+17.1	500	17.19	72.93
1720	7.46	12.2	871	8.5	0.89	+23.7	500	17.19	4.44
1725	7.45	12.2	870	8.1	0.85	+29.7	500	17.19	4.93
1730	7.44	12.1	868	7.7	0.81	+34.7	500	17.19	5.94
1735	7.44	12.1	867	7.0	0.73	+37.8	500	17.19	6.03
1740	7.43	12.1	875	6.5	0.68	+25.3	500	17.19	8.02
1745	7.43	12.1	875	6.5	0.64	+19.6	500	17.19	10.14
1750	7.48	12.1	875	3.7	0.39	-40.2	500	17.19	12.77
1755	7.56	12.1	964	2.1	0.22	-82.6	500	17.19	4.63
1800	7.59	12.1	970	1.8	0.19	-95.4	500	17.19	5.91
1805	7.59	12.1	971	1.7	0.18	-98.2	500	17.19	7.74
1806	collected sample (1 hr limit)								

Total Pump Time (min): 50 Total Purge Volume (gal): 4.5 Reviewed by: J 10/01/20

Weather: 65°F, Partly sunny

Comments: Bubbles on probes

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	A	N					
1	125ml	↓	B	N					
1	500ml	↓	A	N					

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



Consumers Energy Company  
 Monitoring Well Sampling Worksheet

Well ID JRW-MW-16006 Date 10.1.2020 Control Number 20-1095-06  
 Location JRW Well Material:  PVC  SS  Iron  Galv. Steel  
 Purge Method:  Peristaltic  Submersible  Fultz  Bailor  
 Depth to Water Tape: Solinist S/N: 122-004547-1

QC SAMPLE:  MS/MSD  DUP- Sonde ID:  08C  11M  15H  19M

Depth-to-water T/PVC (ft) 16.06 Depth-To-Bottom T/PVC (ft) 91.80 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%	+/- 0.3ppm	+/- 10mV	*	< 0.33	+/- 10%

Stabilization parameters for the last three readings METER

1823							500	16.09	
1830	7.76	12.2	906	39.1	3.91	-162.4	500	16.09	13.0
1835	7.82	12.0	867	7.5	-0.79	-158.4	500	16.09	9.61
1840	7.82	12.0	855	6.8	0.72	-154.1	500	16.09	8.11
1845	7.81	11.9	851	6.6	0.70	-152.5	500	16.09	7.11
1850	7.80	11.8	851	5.9	0.62	-150.4	500	16.09	3.53
1855	7.80	11.8	851	6.0	0.60	-150.0	500	16.09	3.33
1900	7.80	11.8	851	5.9	0.59	-150.1	500	16.09	1.36
1901	collected samples								

Total Pump Time (min): 37 Total Purge Volume (gal): 7.0 Reviewed by: [Signature]

Weather: 63°F, Sunny

Comments: \*used portable meter for Turbidity Readings

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	A	N					
1	125ml	↓	B	N					
1	900ml	↓	A	N					

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