



# 2020 Annual Groundwater Monitoring and Corrective Action Report and Semi- Annual Remedy Selection and Design Progress Report

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for Compliance with the Coal Combustion  
Residuals (CCR) Rule

Former BC Cobb Power Plant

*Muskegon Environmental Redevelopment Group,  
LLC*

January 29, 2021

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## Table of Abbreviations and Acronyms

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Abbreviation	Definition
BTM	background threshold value
cm/s	centimeters per second
CCR	coal combustion residuals
COI	constituent of interest
EPA	Environmental Protection Agency
LCS	laboratory control samples
MDL	method detection limit
MS/MSD	matrix spike/duplicate
QC	quality control
RPD	relative percent difference
SOP	standard operating procedure
SSI	statistically significant increase
TDS	total dissolved solids
TSS	total suspended solids

**Summary of 40 CFR Section § 257.90(e)(6) Groundwater Monitoring System Requirements and Site-Specific Compliance – Former BC Cobb Power Plant**

<b>§ 257.90(e)(6)</b> A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:		<b>Ponds 0-8 and Bottom Ash Pond Status</b>
§257.90(e)(6)(i)	<i>At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95.</i>	Assessment Monitoring Program and Evaluation of Potential Remedies
§257.90(e)(6)(ii)	<i>At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95.</i>	Assessment Monitoring Program and Evaluation of Potential Remedies
§257.90(e)(6)(iii)	<i>If it was determined that there was a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to § 257.94(e):</i>	Yes
§257.90(e)(6)(iii)(A)	<i>Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase.</i>  These SSIs are from the original triggering event.	<ul style="list-style-type: none"> <li>• BCC-MW-15009 – boron, pH</li> <li>• BCC-MW-15010 - boron</li> <li>• BCC-MW-15011 – boron, pH</li> <li>• BCC-MW-15012 – fluoride, pH</li> <li>• BCC-MW-15014 – boron, pH</li> <li>• BCC-MW-15015 – pH</li> <li>• BCC-MW-15017 – pH</li> </ul>
§257.90(e)(6)(iii)(B)	<i>Provide the date when the assessment monitoring program was initiated for the CCR unit.</i>	April 25, 2018
§257.90(e)(6)(iv)	<i>If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in appendix IV to this part pursuant to § 257.95(g) include all of the following:</i>	Yes
§257.90(e)(6)(iv)(A)	<i>Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase.</i>  These SSLs are from the original triggering event.	<ul style="list-style-type: none"> <li>• MW-17001 – lithium</li> <li>• MW-17002 – lithium</li> </ul>
§257.90(e)(6)(iv)(B)	<i>Provide the date when the assessment of corrective measures was initiated for the CCR unit.</i>	April 15, 2019
§257.90(e)(6)(iv)(C)	<i>Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit.</i>	Will be held 30 days prior to remedy selection
§257.90(e)(6)(iv)(D)	<i>Provide the date when the assessment of corrective measures was completed for the CCR unit.</i>	September 11, 2019
§257.90(e)(6)(v)	<i>Whether a remedy was selected pursuant to § 257.97 during the current annual reporting period, and if so, the date of remedy selection.</i>	Evaluation of potential remedies ongoing
§257.90(e)(6)(vi)	<i>Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.</i>	Evaluation of potential remedies ongoing

## 1.0 Introduction

The U.S. Environmental Protection Agency's (EPA) final Coal Combustion Residuals (CCR) Rule 40 CFR §257 establishes a comprehensive set of requirements for the management and disposal of CCR (or coal ash) in surface impoundments by electric utilities. The former BC Cobb Power Plant (BCC or Site) is the site of a former coal-fired power generation facility located in Muskegon, Michigan (**Figure 1**). Consumers Energy Company (CEC) operated BCC between 1948 and 2016. During operations, coal combustion residuals (CCR) were deposited in Ponds 0-8 and the Bottom Ash Pond (**Figure 2**). This CCR unit is subject to the U.S. Environmental Protection Agency's (EPA) CCR Rule (40 CFR Part §257). In accordance with §257.91, CEC installed a groundwater monitoring system around the BCC Ponds as required by §257.91, and background groundwater monitoring was completed as required by §257.93.

As documented in the CEC January 14, 2019 *Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g)*, lithium was observed present at statistically significant levels above the site specific groundwater protection standard (GPS) developed for the CCR Rule compliance program in two downgradient monitoring wells at the BCC Ponds, thus necessitating CEC develop the September 2019 *Assessment of Corrective Measures*.

The Muskegon Environmental Redevelopment Group, LLC (MERG) acquired the BCC property in 2020 and has initiated the process of dewatering and removing CCR material from the ponds as part of pond remediation and closure efforts. MERG has continued implementation of the federal CCR Rule groundwater monitoring program, as required by §257.90-95, as a continuation of the CEC monitoring program. Surface impoundment closure is anticipated by August 2022.

## 2.0 Facility Description

The Site is in close proximity with several water bodies. The site is adjacent to the North Branch of the Muskegon River on the north and northwest perimeter berms, and the Veterans Memorial Pond is to the northeast. The Discharge Channel is along the southern border of the Site and discharges into the North Branch of the Muskegon River. The CCR unit, which includes Ponds 0-8 and the Bottom Ash Pond, were wet ash dewatering areas. From 1984 through plant closure in 2016, CCR was deposited in the ponds by utilizing sluicing methods. Bottom ash slurry was directed into the Bottom Ash Pond, with Bottom Ash Pond overflow directed into either Ponds 5 or 6. Fly ash from the power plant was directed into Ponds 7 and 8. The ponded CCR was routed through the remaining ponds in series. Each pond allowed a portion of CCR particles to settle out before the overflow was transferred to the next pond. The overflow from Pond 4 was discharged to a National Pollutant Discharge Elimination System (NPDES) outfall located on the Discharge Channel. CCR was periodically removed from the ponds and disposed offsite or beneficially reused. During operation of the CCR units, the pond surface water elevations were at 588 feet. Since plant closure in 2016, the pond water elevation has lowered and before dewatering efforts began, appeared to be approximately that of the adjacent Muskegon River.

MERG initiated clean closure of the ponds in 2020 by installing a slurry wall around the perimeter berm adjacent to the North Branch of the Muskegon River. Dewatering began in July 2020 to prepare for excavation and removal of waste CCR. Ash removal began in August 2020. Dewatering, excavation, and ash removal continued throughout 2020 with expected completion in 2022.

## 2.1 Hydrogeology

The Ponds 0-8 are primarily comprised of CCR and sand fill. According to historic U.S. Geologic Survey (USGS) topographic maps and aerial photographs dating back to 1929, the area currently occupied by the ash ponds was originally marsh land. The subsurface materials in the pond area generally consist of CCR ranging from 3 to 28 feet below ground surface (ft bgs) overlying 10 to 20 feet of poorly graded, fine-grained sand. Discontinuous layers of organic materials (i.e., humus and peat) are present within the fine-grained sand. Organic-rich silt was also encountered at depths ranging from 20 to 30 ft bgs, beneath the fine-grained sand, ranging in thickness from approximately 1 to 13 feet. The organic-rich silt deposits are thickest in the perimeter berms along the southernmost edge of the pond area (toward Muskegon Lake). Thinner deposits of the organic-rich silt were encountered toward the northernmost edge of the pond area. Silty clay and/or poorly graded, fine- to medium-grained sand is generally observed within 30 to 40 ft bgs, beneath the organic-rich silt. An underlying clay was encountered throughout the pond area at approximately 40 ft bgs, beneath the fine to medium-grained sand.

Geologic maps of Michigan and local well records indicate that 120 to 190 feet of glacio-lacustrine sand, gravel, moraine and lacustrine clay deposits are present throughout Muskegon County. These lacustrine deposits are situated on top of the sandstone bedrock that is part of the Marshall Formation, typically encountered at approximately 200 to 250 ft bgs throughout Muskegon County. Glacio-lacustrine sands dominate in the western and southern areas surrounding Muskegon Lake. The site is located in the central area of the County.

Ponds 0-8 are bound by surface water features (**Figure 2**): The North Branch Muskegon River and former plant-associated discharge channel adjoin the western and southernmost boundaries of the pond area, and Veterans Memorial Park is located north and northeast of the pond area. MERG understands that there is surface water pumping at the Veterans Memorial Park on an occasional basis to limit the flooding in some areas of the park. Pumping performed at the park has the potential to influence the groundwater flow conditions at BCC. Therefore, changes over time in groundwater flow conditions at the Site boundary will need to give consideration that potential for impact.

Groundwater flow within the uppermost aquifer has varied during plant operations and the post-shutdown period. While the ponds were actively receiving CCR and non-CCR wastewater, groundwater in the pond area was several feet higher than the surrounding surface water in Muskegon River and upgradient groundwater, creating a mound under the BCC Ponds, with groundwater flowing outward toward the surface water features. During shutdown there have been significant changes to the groundwater flow direction as a result of the lack of loading to the ponds that began in April 2016, and for a period in 2017 the Veterans Memorial Pond was

dewatered for maintenance activities. Since shutdown, groundwater is encountered at a similar elevation to the surrounding surface water, generally within the range of 579 to 583 feet above mean sea level (ft AMSL). Using the average hydraulic conductivity measured at the monitoring wells of 58 feet/day (ARCADIS, 2016), and an assumed effective porosity of 0.3, this results in groundwater flow rate of approximately 0.31 feet/day (approximately 113 feet/year).

**Appendix A** displays the potentiometric surface maps from the two 2020 monitoring events in May and October. In May, prior to dewatering for construction, the site had a groundwater flow direction generally northeast. In October, the groundwater flow direction was controlled by the dewatering. The groundwater flow direction was towards the center of the Site, as expected due to the dewatering wells spaced around the CCR unit.

## 2.2 Monitoring Well Network

The CCR Rule requires, at a minimum, one upgradient and three downgradient monitoring wells per CCR unit to be completed in the uppermost aquifer. Section §257.90 of the Rule states that the operator: "...may install a multiunit groundwater monitoring system instead of separate groundwater monitoring systems for each CCR unit." In addition, the Rule states that downgradient monitoring wells should be installed to: "accurately represent the quality of groundwater passing the waste boundary of the CCR unit. The downgradient monitoring system must be installed at the waste boundary that ensures detection of groundwater contamination in the uppermost aquifer."

The certified monitoring network at BC Cobb includes seven background wells on the southeast end of the Site to evaluate groundwater conditions unaffected by the CCR unit. Ponds 0-8 are separated by narrow embankments that are not recommended for well installation (**Figure 1**). To install downgradient wells at the waste boundary, wells would need to be installed on the embankments. Therefore, MERG will monitor Ponds 0-8 and the Bottom Ash Pond as a single multiunit groundwater monitoring system composed of 20 wells surrounding the CCR unit. The CCR unit boundary and the monitoring well locations are shown on (**Figure 2**).

Seven wells (MW-15002 through MW-15008) were installed in the southeast area of the Site to evaluate water quality unaffected by the CCR unit. **Appendix A** maps illustrate that these background wells are still upgradient or at a side gradient to the CCR unit and therefore even with groundwater flow changes at the site these wells remain appropriate background wells. MW-15001 was sampled during the background monitoring phase of the CCR Rule compliance program but now serves as a nature and extent well with only static water level measurement required.

Downgradient wells MW-15009 through MW-15023 were installed in 2015 to form the MERG multiunit network around the CCR unit (Ponds 0-8 and the Bottom Ash Pond). Shallow wells MW-17001 through MW-17006 were installed in 2017 and were paired with existing wells MW-15016 through MW-15021 to better characterize shallow groundwater quality and flow direction (**Figure 2**). MW-15016R through MW-15021 now provide data on deeper groundwater while MW-17001R through MW-17006 provide shallow groundwater data.

To accommodate pond closure construction in 2020, wells MW-15015, MW-15016, and MW-17001 have been relocated to within 10 feet of the original location. They are distinguished with an “R” following the well identifier (MW-15015R, MW-15016R and MW-17001R). In addition to the three well relocations, MW-15012 was removed on June 4, 2020 and MW-15014 was trimmed down to accommodate construction efforts and resurveyed.



Figure 1. Vicinity Map for the former BC Cobb Power Plant

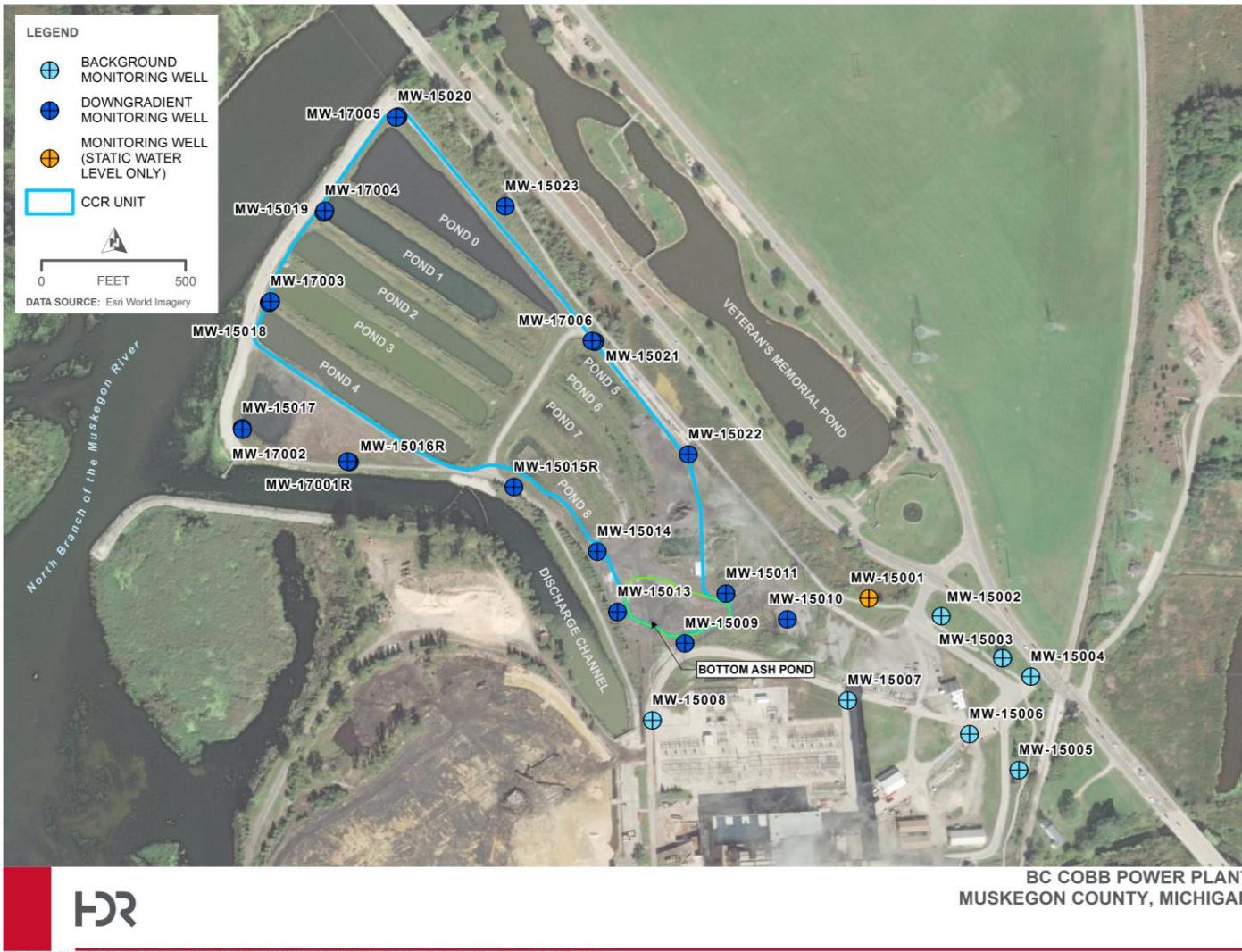


Figure 2. BC Cobb CCR Unit and Monitoring Wells

## 3.0 Monitoring

Two rounds of semi-annual groundwater sampling for assessment monitoring was conducted on the certified monitoring well network in 2020. **Table 1** provides the well identification number, well location, the dates the samples were collected, and whether the sample was required by the CCR Rule for the background sampling, detection monitoring or assessment monitoring programs. CEC initiated sample collection for background monitoring in December 2015 and completed the eighth round, as required by the CCR Rule, in July 2017. In accordance with CCR Rule §257.94(b), one round of detection monitoring was completed in September 2017. Three COIs were observed with statistically significant increases (SSIs) above background levels. The initial round of assessment monitoring was completed in April 2018 by CEC, and after an Alternative Source Demonstration was not successful, CEC initiated assessment monitoring. The first round of semi-annual assessment monitoring took place in June 2018.

The fifth and sixth rounds of assessment monitoring were completed in May and October of 2020. **Appendix B** summarizes the analyses required for each monitoring phase.

Wells MW-15015R, MW-15016R, and MW-17001R were installed within ten feet of the original well locations to accommodate construction. In order to establish if groundwater quality from the new locations was consistent with the old locations, the three new wells were sampled on May 21, 2020 and June 15, 2020. The wells were sampled again as a part of the site-wide October 2020 semi-annual assessment monitoring event.

**Table 1. Dates of groundwater samples collected for each well in 2020 and the required monitoring programs for the BC Cobb facility (§257.90(e)(3))**

Monitoring Well I.D.	Well Location	Dates Monitored	CCR Rule Monitoring Purpose
MW-15001	Water Level Only	May 4, 2020 October 26, 2020	Water Level Monitoring
MW-15002	Background/Upgradient	May 4, 2020 October 26, 2020	Assessment Monitoring
MW-15003	Background/Upgradient	May 4, 2020 October 26, 2020	Assessment Monitoring
MW-15004	Background/Upgradient	May 4, 2020 October 26, 2020	Assessment Monitoring
MW-15005	Background/Upgradient	May 4, 2020 October 27, 2020	Assessment Monitoring
MW-15006	Background/Upgradient	May 4, 2020 October 27, 2020	Assessment Monitoring
MW-15007	Background/Upgradient	May 4, 2020 October 27, 2020	Assessment Monitoring
MW-15008	Background/Upgradient	May 4, 2020 October 27, 2020	Assessment Monitoring
MW-15009	Downgradient	May 7, 2020 October 27, 2020	Assessment Monitoring
MW-15010	Downgradient	May 4, 2020 October 27, 2020	Assessment Monitoring
MW-15011	Downgradient	May 7, 2020 October 27, 2020	Assessment Monitoring
MW-15012 <sup>1</sup>	Downgradient	May 7, 2020	Assessment Monitoring
MW-15013	Downgradient	May 7, 2020 October 28, 2020	Assessment Monitoring
MW-15014	Downgradient	May 6, 2020 October 28, 2020	Assessment Monitoring
MW-15015	Downgradient	May 6, 2020	Assessment Monitoring
MW-15015R <sup>2</sup>	Downgradient	May 21, 2020 June 15, 2020	Well relocation testing
		October 30, 2020	Assessment Monitoring
MW-15016	Downgradient	May 6, 2020	Assessment Monitoring
MW-15016R <sup>2</sup>	Downgradient	May 21, 2020 June 15, 2020	Well relocation testing
		October 29, 2020	Assessment Monitoring
MW-15017	Downgradient	May 6, 2020 October 29, 2020	Assessment Monitoring
MW-15018	Downgradient	May 6, 2020 October 29, 2020	Assessment Monitoring
MW-15019	Downgradient	May 5, 2020 October 29, 2020	Assessment Monitoring
MW-15020	Downgradient	May 5, 2020 October 28, 2020	Assessment Monitoring
MW-15021	Downgradient	May 5, 2020 October 30, 2020	Assessment Monitoring
MW-15022	Downgradient	May 5, 2020 October 28, 2020	Assessment Monitoring
MW-15023	Downgradient	May 6, 2020 October 30, 2020	Assessment Monitoring
MW-17001	Downgradient	May 5, 2020	Assessment Monitoring
MW-17001R <sup>2</sup>	Downgradient	May 21, 2020 June 15, 2020	Well relocation testing
		October 29, 2020	Assessment Monitoring
MW-17002	Downgradient	May 6, 2020 October 29, 2020	Assessment Monitoring

MW-17003	Downgradient	May 6, 2020 October 29, 2020	Assessment Monitoring
MW-17004	Downgradient	May 5, 2020 October 29, 2020	Assessment Monitoring
MW-17005	Downgradient	May 5, 2020 October 28, 2020	Assessment Monitoring
MW-17006	Downgradient	May 5, 2020 October 30, 2020	Assessment Monitoring

Note: MW-15001 is measured for water level only. No samples are collected from MW-15001.

<sup>1</sup>MW-15012 was removed during construction on June 4, 2020.

<sup>2</sup>MW-15015, MW-15016, and MW-17001 were removed during construction and replaced with MW-15015R, MW-15016R, and MW-17001R, respectively on May 12, 2020.

## 3.2 Water Levels and Sample Collection

Water levels were collected in each well following the Groundwater Level Monitoring Standard Operating Procedure (SOP) (HDR, 2020). Water levels were measured before well purging began. Wells were purged until field parameters (pH, turbidity, conductivity, dissolved oxygen, temperature, and oxidation reduction potential) stabilized using a peristaltic pump and dedicated tubing. The results of field measurements were recorded on a field data form, which is maintained as part of the field records. After field parameters stabilized, samples were collected and tested for the parameters listed in **Table 2**. Two rounds of assessment monitoring samples were collected from each well in 2020. For quality control, one field duplicate sample was collected during each sample event. Water samples for the May and June 2020 events were delivered under Chain of Custody to Pace Analytical Laboratories in Grand Rapids, Michigan; samples for the October 2020 event were delivered to Trace Analytical Laboratories in Muskegon, Michigan.

## 3.3 Analytical Testing

Samples were taken for assessment monitoring in May and October 2020. Samples were analyzed for all Appendix III and Appendix IV parameters, plus TSS as listed in **Table 2**. Wells MW-15015R, MW-15016R, and MW-17001R were sampled May 21 and June 15, 2020 in order to establish if groundwater quality from the new locations was consistent with the old locations. These samples were analyzed for all Appendix III and Appendix IV parameters, plus TSS as listed in **Table 2**.

**Table 2. Constituents of Interest**

Appendix III Constituents	Appendix IV Constituents
Boron	Antimony
Calcium	Arsenic
Chloride	Barium
Fluoride	Beryllium
pH	Cadmium
Sulfate	Chromium
Total Dissolved Solids (TDS)	Cobalt
<b>Additional Parameters</b>	Fluoride
Total Suspended Solids (TSS)	Lead
	Lithium
	Mercury
	Molybdenum
	Selenium
	Thallium
	Radium 226 and 228 combined

### 3.4 Data Validation and Data Management

Data validation was conducted to eliminate data that did not meet validation criteria and designate a data qualifier for any data quality limitation discovered. All samples and quality control were reviewed and evaluated, and no samples were rejected. Most quality control analyses were within reportable limits; however, when quality control was outside limit controls, samples were reported as estimated. Relative percent difference (RPD) failures for field duplicate analyses were less than the 20 percent limit criteria. Laboratory Control Sample (LCS)/LCS duplicates and Matrix Spike/Duplicate (MS/MSD) duplicates %RPD recoveries all were within control limits. Data analyses required minimal qualifications, and all data were usable, even when qualified.

## 4.0 Monitoring Results

### 4.1 Water Levels and Groundwater Flow Direction

Water levels at the monitoring wells are provided in **Table 3**. Potentiometric surface maps were developed based on water levels measured in May and October 2020. The maps display the groundwater elevations at the wells and the groundwater contours and are provided in **Appendix A**. Groundwater beneath the area of the impoundments is between 578.11 and 582.39 ft ASML and groundwater flow direction was generally northeast before dewatering began in July 2020, after which flow direction is internal to the Site as a result of dewatering pumping wells between the ponds.

**Table 3. Groundwater elevations measured in 2020**

Well ID	TOC Elevation (ft amsl)	Groundwater Elevation (ft amsl) Week of May 4, 2020	Groundwater Elevation (ft amsl) Week of October 27, 2020
MW-15001	586.52	581.46	581.09
MW-15002	586.87	582.07	581.59
MW-15003	587.12	582.54	581.96
MW-15004	590.57	582.81	582.15
MW-15005	587.77	582.77	582.17
MW-15006	587.81	583.15	582.39
MW-15007	587.43	582.83	582.03
MW-15008	587.76	582.76	582.22
MW-15009	589.27	582.51	581.78
MW-15010	588.11	582.13	581.43
MW-15011	595.22	582.20	581.34
MW-15012 <sup>1</sup>	597.39	582.34	Note 1
MW-15013	598.50	582.51	589.78
MW-15014 <sup>3</sup>	589.51	582.50	580.53
MW-15015 <sup>2</sup>	596.75	582.56	Note 2
MW-15015R <sup>2</sup>	586.52	582.85 <sup>5</sup>	578.74
MW-15016 <sup>2</sup>	586.62	582.40	Note 2
MW-15016R <sup>2</sup>	586.62	582.58 <sup>5</sup>	580.13
MW-15017 <sup>4</sup>	586.33	582.43	580.88
MW-15018 <sup>4</sup>	586.33	582.43	580.73
MW-15019 <sup>4</sup>	586.32	582.49	580.46
MW-15020 <sup>4</sup>	586.26	582.43	580.79
MW-15021	593.73	582.15	578.70
MW-15022	595.82	581.62	579.86
MW-15023	588.08	581.81	579.33
MW-17001 <sup>2</sup>	589.29	582.54	Note 2
MW-17001R <sup>2</sup>	586.61	582.82 <sup>5</sup>	579.21
MW-17002 <sup>4</sup>	586.26	582.57	579.31
MW-17003 <sup>4</sup>	586.31	582.48	578.62
MW-17004 <sup>4</sup>	586.27	582.59	578.51
MW-17005 <sup>4</sup>	586.33	582.47	579.77
MW-17006	593.78	581.66	578.11

Note: MW-15001 is measured for water level only. No samples are collected from MW-15001.

<sup>1</sup>MW-15012 was removed during construction on June 4, 2020.

<sup>2</sup>MW-15015, MW-15016, and MW-17001 were removed during construction and replaced with MW-15015R, MW-15016R, and MW-17001R, respectively on May 12, 2020.

<sup>3</sup>MW-15014 was cut down between May 2020 and October 2020 sampling events for construction purposes. Most recent TOC elevation is shown.

<sup>4</sup>Wells were converted to flush-mount between May 2020 and October 2020 sampling events for construction purposes. Updated TOC survey elevations are shown.

<sup>5</sup>MW-15015R, MW-15016R, and MW-17001R water levels were measured on May 21, 2020 and June 15, 2020 to determine a baseline after installation. May 21, 2020 water levels are shown in the table. June 15, 2020 groundwater elevations for these wells are 582.32 ft amsl, 582.56 ft amsl, and 583.09 ft amsl, respectively.

## 4.2 Water Quality

As stipulated in the CCR Rule, eight rounds of background groundwater sampling were completed by CEC between December 2015 and July 2017. Samples were analyzed for Appendix III and IV parameters, plus TSS. The water quality collected from the monitoring wells located upgradient of the CCR units were compiled and statistically analyzed to develop background threshold values (BTVs) for each constituent of interest (COI). The first detection monitoring event was conducted in September 2017 and samples were analyzed for Appendix III constituents. After reporting SSIs for boron, fluoride, and pH in several wells, BC Cobb moved into assessment monitoring. The first assessment monitoring event was conducted in April 2018 and samples were analyzed for Appendix IV constituents. Lithium was found to be present at statistically significant levels (SSL) above the GPS in MW-17001 and MW-17002. This discovery prompted CCR removal and closure activities as detailed in the Assessment of Corrective Measures and Response Action Plan (TRC, 2020).

In May 2020, annual assessment monitoring samples were collected from the certified monitoring well network wells and all samples were analyzed for Appendix III and Appendix IV COIs. Water quality data tables are included in **Appendix C** and laboratory reports are provided in **Appendix D**. In accordance with CCR Rule §257.95(e), downgradient well concentrations from the May 2020 assessment monitoring event were compared against background values, and some concentrations were found to be above background values. In accordance with CCR Rule §257.95(f), detected Appendix IV COI concentrations in downgradient wells were compared against GPS and were found to exceed GPS. Therefore, in accordance with CCR Rule §257.95(g), downgradient well concentrations were statistically evaluated to determine "if one or more constituents in appendix IV to this part are detected at SSL above the groundwater protection standard." To determine if an exceedance of a GPS was statistically significant, the 95% lower confidence limit (95 LCL) was calculated for each of the downgradient wells for each of the Appendix IV COIs. The data set used to calculate the LCL included all Appendix IV results from samples collected at these wells since the establishment of the groundwater monitoring system. Therefore, most wells had between 8 and 15 sample events that were used to calculate the LCL. The LCL results that exceeded their respective GPS are provided in **Table 4**. Downgradient wells MW-17001 and MW-17002 had SSLs of lithium that exceed the GPS.

In October 2020, annual assessment monitoring samples were collected from the certified monitoring well network wells and all samples were analyzed for Appendix III and Appendix IV COIs. Water quality data tables are included in **Appendix C** and laboratory reports are provided in **Appendix D**. Downgradient well concentrations from the October 2020 assessment monitoring event were found to be above background values. In accordance with CCR Rule §257.95(f), concentrations in downgradient wells were found to exceed GPS. Therefore, in accordance with CCR Rule §257.95(g), downgradient well concentrations were statistically evaluated to determine if constituents are detected at SSL above the GPS. The October 2020 LCL results that exceeded their respective GPS are provided in **Table 4**. Downgradient wells MW-17001 and MW-17002 had SSLs of lithium that exceed the GPS.

**Table 4. LCLs for Appendix IV Constituents for Wells Exceeding GPS in May and October 2020**

Appendix IV Constituent		Lithium
Units		ug/l
GPS		40
May 2020 95% LCL	MW-17001	53.9*
	MW-17002	105*
October 2020 95% LCL	MW-17001	58*
	MW-17002	109*

\*95% Adjusted Gamma LCL

In 2021, MERG will continue to monitor groundwater at the Site in accordance with the assessment monitoring program and consistent with §257.93(e). In accordance with §257.97(a), MERG will also complete semi-annual progress reporting in 2021 to document work completed towards remedy selection and design.

## 5.0 Remedy Selection Progress Update

This section provides the semi-annual progress report describing the progress towards remedy selection for the ash impoundments in accordance with §257.97(a). Semiannual progress reports will be prepared and posted to the CCR website until a remedy is selected and documented in a final report.

### Source Control Measures Undertaken

A Closure Plan, prepared and certified by Golder Associates, Inc. was placed in CEC's Operating record and provided formal Notification of Intent to Initiate Closure on March 30, 2018, which confirmed that CEC planned to close the BCC Ponds under the CCR Rule's closure by removal provision in §257.102(c). A closure work plan was also submitted by CEC to the Michigan Department of Environment, Great Lakes, and Energy (EGLE), who approved it on October 16, 2018 and clarified the workplan on August 13, 2018 and September 20, 2019. MERG acquired the property on April 16, 2020 to complete the CCR ash removal. Upon acquisition, MERG immediately initiated closure commencement activities. Since the last semiannual selection of remedy update in July 2020, the following activities have been conducted by MERG:

- ✓ Stability analysis of the slurry wall and dewatering plan was completed;
- ✓ Excavation design was completed;
- ✓ State Solid Waste Permitting was completed and approved;
- ✓ Semiannual groundwater assessment monitoring was completed;
- ✓ Dewatering wells, pumps, and power installation was completed, and dewatering initiated in August and is ongoing; and
- ✓ CCR excavation and transport offsite is ongoing.

## Progress Towards Remedy Selection

An Assessment of Corrective Measures (ACM) was submitted to EGLE on September 11, 2019 by CEC. MERG intends to follow the CEC developed ACM for the Site, and follow the adaptive management strategy, which includes measures to remove source material, reduce infiltration, and minimize the potential future migration.

As described above, significant progress of source removal has begun at the Site in the last six months including dewatering and excavation of the vertical and lateral extent of CCR ash. The reduction of hydraulic loading and recharge of the aquifer are expected to change groundwater redox conditions and the physical removal of CCR is expected to further improve groundwater quality. During dewatering the conditions of groundwater flow are expected to change around the waste boundary. When excavation is complete and dewatering is ceased, groundwater conditions are anticipated to recover and equilibrate within weeks, at which time it is anticipated that groundwater quality conditions will improve.

It is anticipated that the remedy selection process for addressing affected groundwater will proceed following the CCR source removal. Additionally, MERG will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98, which includes semiannual assessment monitoring in accordance with §257.95 to monitor groundwater conditions and inform the remedy selection. The final remedy will be formally selected per §257.97 once the selected option is reviewed and commented on by EGLE and a public meeting is conducted at least 30-days prior to the final selection as required under §257.96(e).

## 6.0 Summary

The following observations are based on CCR Rule compliance groundwater monitoring program development during 2020:

- MERG initiated clean closure of the ponds by installing a slurry wall around the perimeter berm, dewatering of the CCR unit, and ash removal. Dewatering at the site began in July 2020 and ash removal began in August 2020.
- Well MW-15012 was removed, wells MW-15017 through MW-15020 and MW-17002 through MW-17005 were converted to flush mount, and MW-15014 was trimmed, all to accommodate construction activities associated with CCR removal.
- MW-15015, MW-15016, and MW-17001 were replaced with MW-15015R, MW-15016R, and MW-17001R, respectively, for construction activities associated with dewatering and CCR removal.
- Water levels were measured at all monitoring wells in May 2020 and October 2020. Potentiometric surface was contoured. The difference in groundwater flow direction between the May and October 2020 sample events is due to the dewatering groundwater pumping from wells around the ash ponds.
- All 28 wells of the certified well network were sampled in May 2020 for the assessment monitoring event. Assessment monitoring data was statistically evaluated, and SSLs above the GPS were observed at MW-17001 and MW-17002 for lithium.

- All 27 wells of the certified well network were sampled in October 2020 for the assessment monitoring event. Assessment monitoring data was statistically evaluated, and SSLs above the GPS were observed at MW-17001 and MW-17002 for lithium.
- Two additional rounds of sampling were completed on replacement wells MW-15015R, MW-15016R, and MW-17001R after installation to establish quality consistent with the original wells.
- The former BCC CCR status at the end of 2020 is assessment monitoring and evaluation of potential remedies. MERG is currently completing source removal; therefore evaluation of potential remedies includes: 1) whether clean closure criteria in groundwater have been met, 2) if the data trend indicates that MNA in addition to the source removal will be an effective remedy, or 3) if additional evaluation of enhanced MNA or other remedies is warranted.

It is anticipated that the remedy selection process for addressing affected groundwater will proceed following the CCR source removal. Additionally, MERG will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98, which includes semiannual assessment monitoring in accordance with §257.95 to monitor groundwater conditions and inform the remedy selection. The final remedy will be formally selected per §257.97 once the selected option is reviewed and commented on by EGLE and a public meeting is conducted at least 30-days prior to the final selection as required under §257.96(e).

The following activities are proposed to be completed or initiated in the next 6-month period:

- Continued dewatering of the CCR ash surface impoundments;
- Continued ash excavation and removal from the surface impoundments; and
- Continued semiannual groundwater assessment monitoring.

## 7.0 References

Arcadis, 2016. Summary of Monitoring Well Design, Installation, and Development. May 13, 2016.

CEC, 2019. Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g). January 14, 2019.

HDR, 2020. Groundwater Level Monitoring Standard Operating Procedure. July 8, 2020.

HDR, 2020a. Hydrogeologic Monitoring Plan. August 14, 2020.

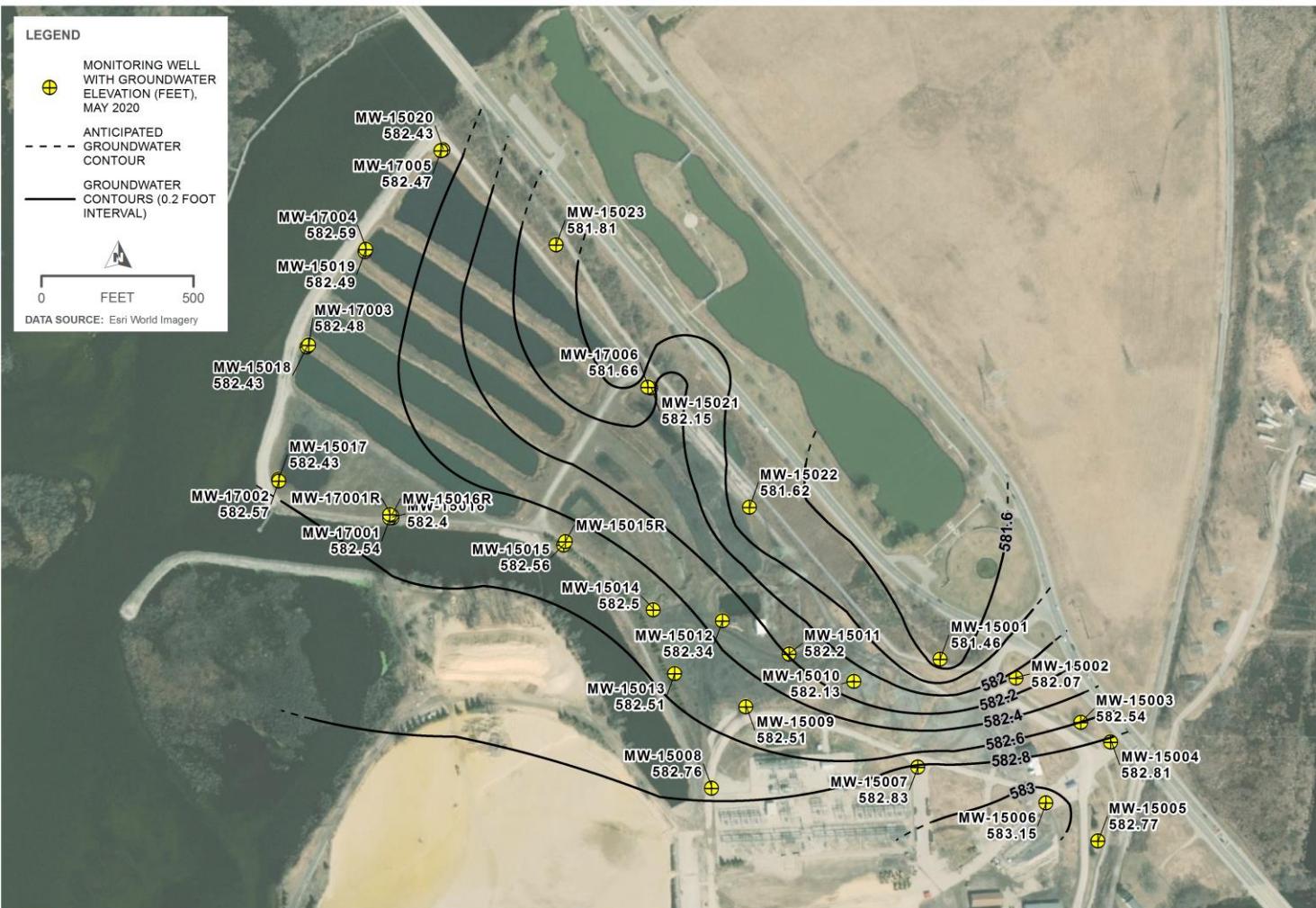
TRC, 2019. 2018 Annual Groundwater Monitoring Report. January 2019.

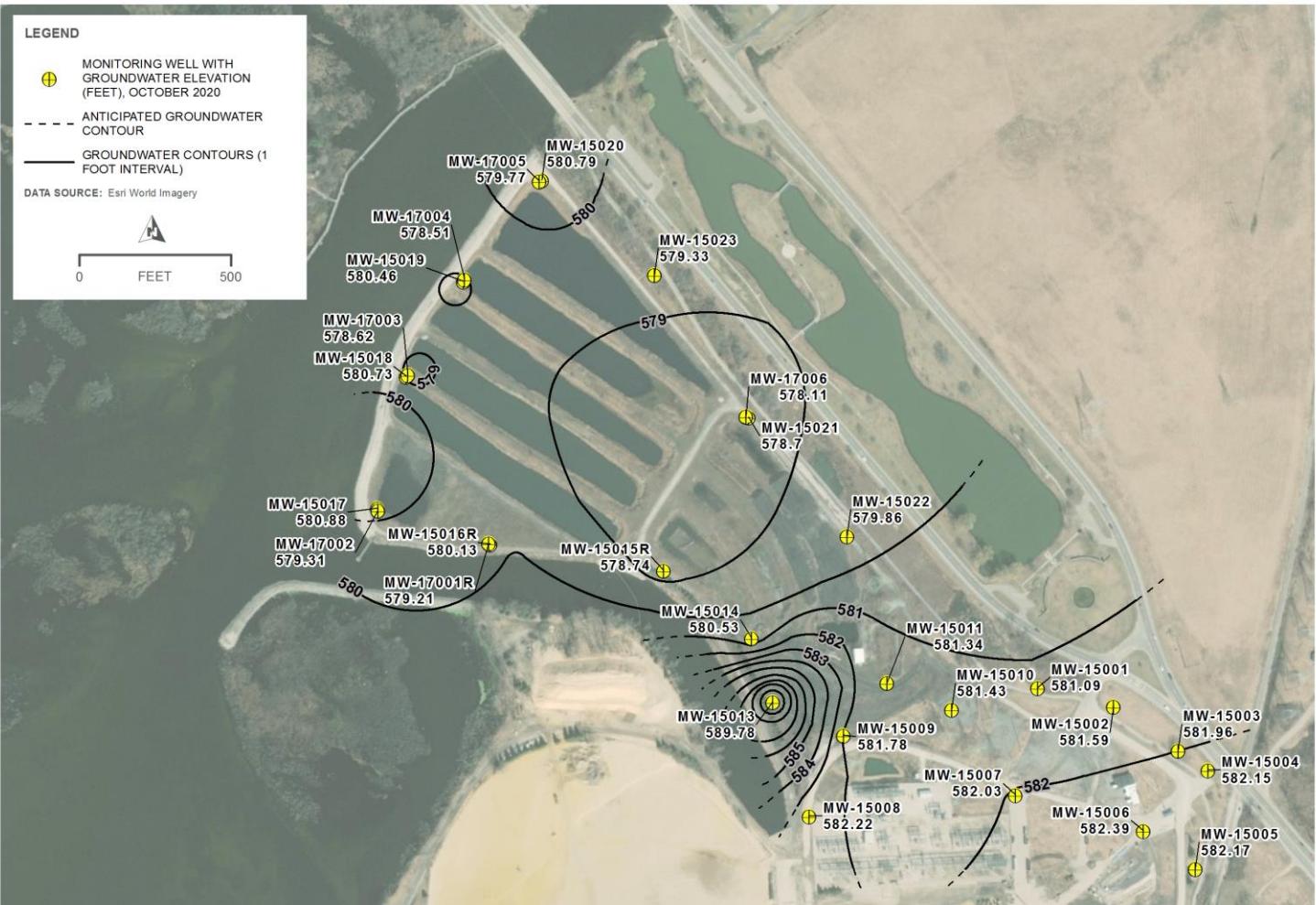
TRC, 2019a. Assessment of Corrective Measures Report. September 11, 2019.

TRC, 2020. 2019 Annual Groundwater Monitoring Report. January 2020.

## **Appendix A**

### **Potentiometric Surface Maps**





## **Appendix B**

### **Monitoring types to comply with specific CCR Rule requirements**

Monitoring types to comply with specific CCR Rule requirements			
Type of Monitoring	Description	CCR Rule Reference	Constituents Analyzed
Background Monitoring	Development of background water quality conditions for Appendix III and Appendix IV COIs	§257.94(b)	Appendix III and IV and TSS
Detection Monitoring	Semi-annual detection monitoring for Appendix III COIs	§257.94(c)	Appendix III
Assessment Monitoring	Detailed types below.	§257.95	Detailed types below.
➤ Initial Assessment	Determining detected Appendix IV COIs	§257.95(b)	Appendix IV
➤ Semi-Annual Assessment	Semi-annual assessment monitoring for Appendix III and detected Appendix IV COIs	§257.95(d)	Appendix III and detected Appendix IV plus TSS
➤ Annual Assessment	Determining detected Appendix IV COIs on an annual basis.	§257.95(b)	Appendix III and all Appendix IV plus TSS
➤ Release Characterization Assessment	Occurs after detection of SSL above the GPS for the purpose of characterizing the nature and extent of the release.	§257.95(g)(1)(iv)	Appendix III and detected Appendix IV plus TSS
Closure Confirmation Monitoring	Occurs after the facility has been closed (e.g. all CCR waste removed from the impoundment) in compliance with CCR Rule for certification of Clean Closure.	§257.102	Appendix IV

## **Appendix C**

### **Lab Results Summary Tables**

Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	Sample Location:	MW-15001							
							Compliance Phase:	Background Monitoring							
							Sample Dates:	11/30/2015	2/17/2016	4/12/2016	7/12/2016	9/27/2016	2/13/2017	4/4/2017	7/11/2017
Background															
<b>Field Parameters</b>															
pH	su	--	--	--	--	--		6.96	7.0	7.1	7.1	6.7	6.9	7.0	6.9
Conductivity	µS/cm	--	--	--	--	--		884	859	802	766	880	780	848	721
Turbidity	NTU	--	--	--	--	--		0.94	2.4	5.6	4.5	<1	5.5	<1	3.94
Dissolved Oxygen	mg/L	--	--	--	--	--		0.09	0.8	0.5	0.4	0.4	0.5	0.1	0.1
Temperature	°C	--	--	--	--	--		13.12	8.4	9.3	15.4	12.7	11.2	10.7	14.6
Oxidation Reduction Potential	mV	--	--	--	--	--		-139.3	-92.3	-66.1	-162.2	-83.1	-93.6	-94.8	-110.8
<b>Appendix III</b>															
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	5	<b>1,120</b>	<b>1,290</b>	<b>1,310</b>	<b>1,290</b>	<b>1,010</b>	<b>1,060</b>	<b>1,080</b>	<b>1,100</b>	
Calcium	mg/L	NC	NC	NC	500	1	118	129	105	113	130	105	107	91	
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	35.0	22.4	21.3	19.7	19.9	23.2	22.3	27.0	
Fluoride	ug/L	4,000	NC	NC	NC	1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	6.96	7.0	7.1	7.1	6.7	6.9	7.0	6.9	
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	67.0	46.2	33.8	33.5	35.6	41.9	37.0	44.8	
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	<b>580</b>	<b>520</b>	460	470	<b>520</b>	470	470	526	
<b>Appendix IV</b>															
Antimony	ug/L	6	6	6	130	1	<1	<1	<1	<1	<1	<1	<1	<1	
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1	<1	<1	<1	<1	<1	<1	<1	<1	
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	127	118	114	98	116	102	105	109	
Beryllium	ug/L	4	4	4	6.7	1.0	<1	<1	<1	<1	<1	<1	<1	<1	
Cadmium	ug/L	5	5	5	3.0	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	
Chromium	ug/L	100	100	100	11	1	<1	1	3	2	<1	1	1	<1	
Cobalt	ug/L	NC	40	100	100	15	<15	<15	<15	<15	<15	<15	<15	<15.0	
Fluoride	ug/L	4,000	NC	NC	NC	1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	
Lead	ug/L	NC	4	4	29	1	<1	<1	<1	<1	<1	<1	<1	<1	
Lithium	ug/L	NC	170	350	440	10	32.2	32.2	31	30	30	28	27	32	
Mercury	ug/L	2	2	2	0.20#	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	<5	<5	<5	<5	<5	<5	<5	<5	
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.366	0.387	0.312	0.255	0.311	0.297	<0.276	<0.948	
Radium-226/228	pCi/L	<b>5</b>	NC	NC	NC	N/A	1.54	0.963	1.23	1.39	<1.11	1.55	0.885	<1.80	
Radium-228	pCi/L	5	NC	NC	NC	N/A	1.17	<0.812	0.921	1.13	<1.11	1.25	0.610	<0.855	
Selenium	ug/L	50	50	50	<b>5</b>	1	<1	<1	<1	1	<1	<1	<1	<1	
Thallium	ug/L	2	2	2	3.7	2.5	<2	<2	<2	<2	<2	<2	<2	<2	

**Notes:**  
 ug/L - micrograms per liter. mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.  
 \* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.  
 \*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
 ^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using default hardness of 150 mg CaCO<sub>3</sub>/L per MDEQ RRD Op Memo 5, Sept. 30, 2004. Generic GSI criterion for calcium, chloride, and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium per footnote (H).  
 # - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.  
**BOLD** value indicates an exceedance of one or more of the listed criteria.  
**RED** value indicates an exceedance of the MCL.  
 -- not analyzed.  
 All metals were analyzed as total unless otherwise specified.

Sample Location: Compliance Phase: Sample Dates:										MW-15002																									
										Background Monitoring										Detection		Initial A.M.		Assessment Monitoring											
										11/30/2015	2/17/2016	4/12/2016	7/12/2016	9/27/2016	2/13/2017	4/4/2017	7/11/2017	9/14/2017	4/19/2018	6/14/2018	11/28/2018	4/8/2019	9/25/2019	5/4/2020	10/26/2020										
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>A</sup>	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Background																										
<b>Field Parameters</b>																																			
pH	su	--	--	--	--	--	--	--	6.74	7.1	7.0	7.0	7.0	7.2	7.2	7.11	7.2	7.5	7.4	7.2	7.1	7.3	7.2	7.5											
Conductivity	µS/cm	--	--	--	--	--	--	--	3,401	3,114	3,693	3,087	2,003	1,784	2,072	2,479	1,338	1,318	1,014	1,314	1,054	1,610	781	650											
Turbidity	NTU	--	--	--	--	--	--	--	1.72	<1	<1	<1	<1	<1	<1	<1	2.33	0.8	1.6	0.67	6.7	0.88	186.95	1.19											
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.14	0.2	0.3	0.4	0.4	0.5	0.6	0.10	0.21	0.25	0.3	0.42	0.2	0.43	0.17	0.08											
Temperature	°C	--	--	--	--	--	--	--	12.52	9.6	10.5	17.0	14.1	11.4	10.2	14.21	14.73	10.8	16.2	11.64	10.9	14.9	11.1	13.2											
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-129.4	-82.0	-82.9	-43.4	-50.5	-77.4	-59.8	-11.0	56.4	-7.1	18.4	61.4	-58.6	-96	131.4	-105.7											
<b>Appendix III</b>																																			
Boron	ug/L	NC	500	500	7,200	5	25.0	8.8	1,320	1,200	1,050	834	979	1,110	1,170	988	1,130	--	422	434	420	360	295	270											
Calcium	mg/L	NC	NC	500	1	1	0.3	214	259	197	169	165	184	167	185	132	--	95.6	103	130	120	115	85												
Chloride	mg/L	250**	250	250	500	5	2.5	0.1	720	519	681	577	328	226	354	472	152	--	115	161	170	300	55	34											
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	710			
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	0.10	--	6.74	7.1	7.0	7.0	7.2	7.2	7.1	7.2	7.5	7.4	7.2	7.1	7.3	7.8	7.5												
Sulfate	mg/L	250**	250	250	500	2	0.25	0.60	250	327	300	202	127	116	85.6	113	13.8	--	3.0	< 2.0	< 2.0	< 20	0.068	< 0.6											
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	10.0	1,900	1,900	1,900	1,800	1,100	1,200	1,500	772	--	738	644	790	870	442	510												
<b>Appendix IV</b>																																			
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.25			
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	10	4	2	2	1	1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.55					
Barium	ug/L	2,000	2,000	2,000	670	1	1.0	2.5	274	257	252	232	148	134	146	186	--	79.4	79.6	76.0	100	100	68.0	66											
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.27	<0.25						
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.25						
Chromium	ug/L	100	100	100	11	1	1.0	0.3	1	2	3	2	<1	2	2	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.37	0.32					
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	<15	--	<15.0	<15.0	<6.0	<6.0	--	0.2	<0.52										
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 20			
Lead	ug/L	NC	4	4</																															

Constituent	Unit	EPA MCL	Sample Location:		MW-15003																				
			Compliance Phase:		Background Monitoring							Detection Monitoring		Initial A.M.		Assessment Monitoring									
			Sample Dates:		11/30/2015	2/17/2016	4/12/2016	7/12/2016	9/27/2016	2/13/2017	4/4/2017	7/12/2017	9/14/2017	2/21/2018	4/19/2018	6/14/2018	11/28/2018	4/8/2019	9/25/2019	5/4/2020	10/26/2020				
Background																									
<b>Field Parameters</b>																									
pH	su	--	--	--	--	--	--	7.24	7.1	7.2	7.1	7.4	7.3	7.07	7.1	7.3	7.5	7.3	7.2	7.3	7.24	7.44			
Conductivity	µS/cm	--	--	--	--	--	--	2,957	3,291	2,991	2,796	2,749	2,438	2,349	1,803	2,151	--	3,911	3,522	3,225	1,549	2,760	3,125	2,230	
Turbidity	NTU	--	--	--	--	--	--	5.1	<1	<1	<1	2.1	1.6	5.79	<1	--	2.5	2.3	2.16	5.1	0.99	2.11	0.02		
Dissolved Oxygen	mg/L	--	--	--	--	--	--	2.32	0.3	0.3	0.3	0.4	0.4	0.0	0.15	0.21	--	0.23	0.28	0.28	0.04	0.3	0.22	0.08	
Temperature	°C	--	--	--	--	--	--	11.24	7.5	9.8	15.5	14.3	9.9	9.2	14.60	14.13	--	8.9	14.2	11.54	8.6	14.3	8.9	13.3	
Oxidation Reduction Potential	mV	--	--	--	--	--	--	34.1	-76.2	-51.2	-119.9	-67.8	-82.6	-107.0	-87.2	69.1	--	-28.9	14.5	60.3	-67.5	-110.5	90.9	-110.0	
<b>Appendix III</b>																									
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	5	25.0	8.8	<b>542</b>	<b>574</b>	<b>2,370</b>	<b>528</b>	494	<b>608</b>	<b>679</b>	<b>695</b>	361	--	--	290	313	390	230	259	310
Calcium	mg/L	NC	NC	500	1	1.0	0.3	216	233	180	177	179	163	167	154	145	--	--	148	129	100	150	149	140	
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	5	25.0	0.1	<b>700</b>	<b>682</b>	<b>640</b>	<b>581</b>	<b>512</b>	<b>456</b>	<b>363</b>	<b>293</b>	493	--	917	<b>737</b>	<b>360</b>	<b>670</b>	742	480	
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	360	380
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	0.10	--	7.24	7.1	7.2	7.1	7.4	7.3	7.1	7.1	7.3	7.5	7.3	7.2	7.2	7.3	7.7	7.44		
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	0.25	0.60	46.0	48.7	41.2	28.3	27.2	20.1	16.7	6.8	<2.0	--	--	<2.0	<2.0	<2.0	<20	4.5	<0.6
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	500	10	20.0	10.0	<b>1,900</b>	<b>1,900</b>	<b>1,700</b>	<b>1,600</b>	<b>1,500</b>	<b>1,400</b>	<b>1,200</b>	<b>1,110</b>	1,370	--	--	2,060	<b>1,550</b>	<b>1,100</b>	<b>1,400</b>	1,660	1400
<b>Appendix IV</b>																									
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<0.25		
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	10	1	1.0	0.6	2	<1	1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<0.55	
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	1.0	2.5	236	219	189	170	159	137	138	112	--	151	139	108	79	110	119	97	
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<0.25		
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<1.0	<0.20	<0.20	<0.25		
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	2	2	2	1	1	1	<1	--	<1.0	<1.0	<5.0	1.0	<1.0	0.51	0.52	
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	<15.0	<15.0	<30.0	<6.0	--	0.28	<0.52	
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	--	<1,000	<1,000	<1,000	<1,000	<1,000	360	380	
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<0.55		
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	<10	<10	<10	<10	<10	<10	<10	11	--	12	12	11	<10	<10	8.1	4.2	
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2		
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	1.2	<5	<5	<5	<5	<5	<5	<5	<5	--	<5.0	<5.0	<25.0	<5.0	<5.0	<0.13	<1.2	
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.204	1.0	0.667	0.633	0.522	0.387	0.284	0.350	0.442	--	--	0.707	0.573	<0.862	0.194	<0.267	0.269	0.47	
Radium-226/228	pCi/L	<b>5</b>	NC	NC	NC	N/A	0.974	1.0	2.40	1.30	1.39	1.66	1.53	1.58	1.25	<1.03	--	--	1.81	1.86	1.85	<0.696	1.58	0.269	1.03</

Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Sample Location: Compliance Phase: Sample Dates:		MW-15004																	
											Background Monitoring								Detection		Initial A.M.		Assessment Monitoring					
											11/30/2015	2/17/2016	4/12/2016	7/12/2016	9/27/2016	2/13/2017	4/4/2017	7/12/2017	9/14/2017	4/19/2018	6/12/2018	11/28/2018	4/9/2019	9/25/2019	5/4/2020	10/26/2020		
<b>Field Parameters</b>																												
pH	su	--	--	--	--	--	--	--	7.28	7.2	6.9	6.7	6.9	7.1	7.1	7.0	6.8	7.3	7	6.8	7.2	7.3	7.11	7.13				
Conductivity	µS/cm	--	--	--	--	--	--	--	655	556	616	741	688	570	615	648	1740	957	909	646	342	1321	920	920				
Turbidity	NTU	--	--	--	--	--	--	--	3.09	2.3	<1	<1	<1	<1	<1	3.08	1.76	2.5	3.6	0.84	7.9	0.93	10.17	2.16				
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	1.64	1.0	0.5	0.3	0.4	0.6	0.6	0.1	0.25	0.37	0.35	0.4	0.39	0.31	0.78	0.03				
Temperature	°C	--	--	--	--	--	--	--	11.07	7.0	7.6	15.9	16.9	9.0	8.7	15.0	15.57	8.8	17	11.48	7.3	16	9.0	14.7				
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-7.3	41.1	-14.0	-120.7	-69.5	-11.2	-67.3	-39.2	77.4	-29.7	-23.6	13.8	0.39	0.31	119.6	-89.5				
<b>Appendix III</b>																												
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	5	5.0	8.8	198	124	166	338	279	193	376	302	325	--	269	158	120	270	143	200				
Calcium	mg/L	NC	NC	NC	500	1	1.0	0.3	94.6	80.9	70.7	87.0	81.9	75.1	73.4	67.2	115	--	71.4	69.6	59	95	71	70				
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>500</b>	5	25.0	0.1	27.0	18.1	22.0	30.9	22.1	28.2	35.2	45.7	382	--	98.1	24.0	20	240	116	110					
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	560	690			
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	0.1	0.10	--	7.28	7.2	6.9	6.7	6.9	7.1	7.1	7.0	6.8	7.3	7.0	6.8	7.2	7.0	7.5	7.13					
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	0.25	0.60	33.0	17.8	13.6	<2	8.06	7.20	<2	2.9	5.8	--	< 2.0	9.1	7.4	< 20	4.3	< 0.6				
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	500	10	10.0	10.0	440	340	350	420	380	340	380	450	934	--	506	342	280	<b>730</b>	500	620				
<b>Appendix IV</b>																												
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	0.2	< 0.25				
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	10	1	1.0	0.6	2	1	1	2	7	2	2	3	--	1.5	1.1	2.7	2.2	4.7	7.1	4.6				
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	1.0	2.5	33	18	29	43	42	29	33	38	--	39.4	45.8	26.3	24	60	45	46				
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	--	0.027	< 0.25				
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.25				
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	1	2	2	1	1	3	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	1.0	0.9	0.49				
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	< 15.0	< 15.0	< 6.0	< 6.0	--	0.44	< 0.52				
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	560	690			
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.55				
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	<10	<10	<10	<10	<10	<10	<10	<10	--	< 10	< 10	< 10	< 10	< 10	< 10	2.9	1.7			
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.2			
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	1.2	<5	<5	7	<5	<5	<5	<5	<5	--</											

Sample Location: Compliance Phase: Sample Dates:									MW-15005																									
									Background Monitoring								Detection		Initial A.M.		Assessment Monitoring													
									12/1/2015	2/17/2016	4/12/2016	7/12/2016	9/27/2016	2/13/2017	4/4/2017	7/12/2017	9/14/2017	4/19/2018	6/14/2018	11/27/2018	4/9/2019	9/25/2019	5/4/2020	10/27/2020										
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Background																									
<b>Field Parameters</b>																																		
pH	su	--	--	--	--	--	--	--	7.18	7.2	7.3	7.2	7.1	7.3	7.6	7.3	7.3	7.7	7.4	7.4	7.4	7.4	7.4	7.40	7.56									
Conductivity	µS/cm	--	--	--	--	--	--	--	345	731	573	482	387	921	424	375	424	513	451	385	824	810	283	375										
Turbidity	NTU	--	--	--	--	--	--	--	1.23	<1	1.1	2.3	2.3	4.5	8.0	2.7	4.2	2.9	4.4	9.8	7.2	6	57.77	18.80										
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.67	0.3	0.7	0.3	0.5	0.9	3.2	0.2	0.19	4.22	0.31	0.71	0.52	0.27	0.95	0.07										
Temperature	°C	--	--	--	--	--	--	--	9.19	5.4	6.7	17.3	19.0	7.1	7.4	18.3	17.26	6.3	17.2	8.64	7.7	16	9.9	12.9										
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-100.7	-65.7	-37.1	-141.1	-79.1	-35.7	-66.6	-90.8	-117.9	-62.5	-14.7	35.1	-22.4	-149.9	207.0	-141.1										
<b>Appendix III</b>																																		
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	5	5.0	8.8	<20	51	35	46	43	39	25	31.3	36.8	--	27.8	38.5	56	< 50	13.1	22										
Calcium	mg/L	NC	NC	NC	500	1	1.0	0.3	57.2	93.3	60.6	75.4	67.3	99.2	43.9	60.2	64.2	--	51.1	55.0	76	58	37	58										
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	0.25	0.1	9.50	137	66.6	13.1	1.23	181	20.1	3.0	7.0	--	14.2	32.0	150	89	10	3.6										
Fluoride	ug/L	4,000	NC	NC	NC	1000	100.0	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 20				
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	0.10	--	7.18	7.2	7.3	7.2	7.1	7.3	7.6	7.3	7.3	7.7	7.4	7.4	7.4	7.4	8.0	7.56										
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	2	0.25	0.60	10.0	5.27	4.69	5.39	<2	5.57	7.88	4.4	2.9	--	4.9	2.8	5.4	3.8	7.5	5.5										
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	10.0	10.0	230	480	340	<b>590</b>	230	<b>570</b>	200	204	240	--	322	244	<b>640</b>	460	158	290										
<b>Appendix IV</b>																																		
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	0.57	< 0.25										
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1	1.0	0.6	1	1	<1	2	2	<1	1	--	1.3	< 1.0	< 1.0	< 1.0	< 1.0	3.0	1.3	2.4										
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	1.0	2.5	83	125	97	151	147	173	82	116	--	99.3	103	94.4	160	150	72	150										
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.25										
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.15	< 0.25										
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	<1	2	1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	1.1	1.3	0.51										
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	--	0.097	< 0.52									
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 20				
Lead	ug/L	NC	4	29	1	1.0	0.6	<1	<1	<1	1	<1	<1	<1	<1	<1	--	2.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1	1.6										
Lithium	ug/L	170	350	440	10	20.0	1.2	<10	<10	<10	<10	<10	<10	<10	<10	<10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 20.0	< 1.2									
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20	< 0.2								
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	1.2	<5	<5	<5	<5	<5	<5	<5	<5	--	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	1.7	1.7									
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.353	1.0	0.180	<0.336	<0.244	0.221	<0.332	<0.192	<0.279	<0.675	--	< 0.450	< 0.635	< 0.890	0.131	< 0.273	0.649	0.33										
Radium-226/228	pCi/L	<b>5</b>	NC	NC	N/A	1.28	1.0	0.882	<0.494	<0.378	0.662	0.545	1.02																					

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**Notes:**

ug/L - micrograms per liter. mg/L - milligrams per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.  
 MCL - Maximum Contaminant Level; EPA Drinking Water Standards

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criterion  
\* Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

<sup>\*</sup> - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

<sup>\*\*</sup> - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Standard  
<sup>^</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria, Hardness

<sup>a</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness per footnote {H}.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary.

**BOLD** value indicates an exceedance of one or more of the listed criteria.

**RED** value indicates an exceedance of the MCL.

All 7000 individuals in this sample were analyzed.

All metals were analyzed as total unless otherwise specified.

Sample Location: Compliance Phase: Sample Dates:												MW-15006																						
												Background Monitoring								Detection Monitoring			Initial A.M.		Assessment Monitoring									
												11/30/2015	2/17/2016	4/13/2016	7/12/2016	9/27/2016	2/13/2017	4/4/2017	7/12/2017	9/14/2017	2/21/2018	4/19/2018	6/14/2018	11/27/2018	4/9/2019	9/24/2019	5/4/2020	10/27/2020						
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Background																									
<b>Field Parameters</b>																																		
pH	su	--	--	--	--	--	--	--	7.03	7.3	7.2	6.9	6.9	7.3	7.4	7.2	7.2	6.9	7.5	7.3	7.2	7.4	7.4	7.17	7.53									
Conductivity	µS/cm	--	--	--	--	--	--	--	683	471	518	678	557	503	414	599	545	--	642	420	446	286	430	394	1270									
Turbidity	NTU	--	--	--	--	--	--	--	2.81	8.7	<1	<1	<1	<1	<1	<1	2.28	--	2.8	8.1	1.62	2.6	0.37	9.32	3.01									
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	2.71	2.7	2.6	1.4	1.2	2.0	3.5	1.5	0.39	--	4.34	1.16	2.48	2.05	0.34	1.85	0.03									
Temperature	°C	--	--	--	--	--	--	--	9.71	4.6	6.8	23.9	19.4	5.5	8.0	21.5	20.6	--	5.1	18.8	7.38	8.3	19	10.0	14.2									
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-55.1	73.4	60.5	-18.5	-5.5	-49.7	-10.0	33.2	-25	--	-6	-15.3	22.3	-20.7	-118.5	148.9	-123.9									
<b>Appendix III</b>																																		
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	5	5.0	8.8	48	39	33	43	55	32	35	42.3	45.1	--	--	42.1	42.5	< 50	50	30	51									
Calcium	mg/L	NC	NC	500	1	1.0	0.3	84.5	73.9	60.0	60.6	86.2	70.5	67.9	68.8	79.6	--	--	49.8	74.7	63	64	67	60										
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	0.25	0.1	50.0	12.8	32.5	63.1	19.6	48.0	23.5	69.8	16.1	--	--	16.7	24.4	2.0	10	5	200									
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	240	320	
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	0.10	--	7.03	7.3	7.2	6.9	6.9	7.3	7.4	7.2	7.2	6.9	7.5	7.3	7.2	7.4	7.4	7.9	7.53									
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	2	0.25	0.60	17.0	17.1	12.7	8.54	12.2	7.34	6.88	9.4	11.6	--	--	6.8	11.3	9.2	11	8	25									
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	10.0	10.0	380	290	300	380	320	330	260	346	322	--	--	340	298	240	310	234	760									
<b>Appendix IV</b>																																		
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	1	<1	<1	1	<1	<1	<1	<1	--	--	<1.0	1.4	<1.0	<1.0	--	0.56	0.65								
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1	1.0	0.6	1	1	<1	2	3	3	2	4	--	--	1.6	40.9	2.3	3.1	8.5	4.6	8.5									
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	1.0	2.5	26	16	17	20	26	17	17	28	--	--	20.5	52.1	19.1	16	25	14	34									
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<0.20	<0.25									
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--	<0.20	0.22	<0.20	<0.20	<0.20	<0.25										
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	1	2	1	<1	1	1	<1	--	--	<1.0	3.7	<1.0	1.1	<1.0	0.3	0.25									
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	--	<15.0	<15.0	<6.0	<6.0	<6.0	<0.41	0.54									
Fluoride	ug/L	4,000	NC	NC	NC	1000	0.10	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	240	320		
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	--	<1.0	1.1	<1.0	<1.0	<1.0	<0.55										

**Notes:**

**Notes:** ug/L - micrograms per liter, mg/L - milligrams per liter.

ug/L - micrograms per liter; mg/L - milligrams per liter.  
SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30,

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDW)

<sup>a</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated.

Michigan DEQ. Groundwater Surface Water Interface (DWI) Criteria: Variance-dependent criteria calculated using default variances of 100 mg/g excess per MDEQ DWI up memo 3, Sept. 30, 2004, per footnote (H).

# - If detected above 0.20 ug/L, further evaluation of low-level mercury

**BOLD** value indicates an exceedance of one.

**RED** value indicates an exceedance of the MCL.

-- - not analyzed.



Sample Location: Compliance Phase: Sample Dates:									MW-15009																		
									Background Monitoring										Detection	Initial A.M.	Assessment Monitoring						
									12/1/2015	2/17/2016	4/18/2016	7/12/2016	9/28/2016	2/14/2017	4/5/2017	7/11/2017	7/11/2017	9/13/2017	4/16/2018	6/13/2018	11/28/2018	4/9/2019	9/25/2019	5/7/2020	10/27/2020		
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Downgradient																		
<b>Field Parameters</b>																			Field Dup								
pH	su	--	--	--	--	--	--	--	10.62	10.8	10.3	10.0	10.0	10.2	10.1	9.6	9.6	10.2	9.8	9.8	9.8	9.4	8.7	8.05	8.32		
Conductivity	µS/cm	--	--	--	--	--	--	--	335	352	346	356	358	329	338	296	296	307	482	477	516	349	490	810	626		
Turbidity	NTU	--	--	--	--	--	--	--	1.93	<1	<1	<1	<1	1.2	2.5	7.0	7.0	2.88	2.4	0.5	0.94	2.8	0.29	96.65	1.35		
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.41	0.2	0.4	0.2	0.4	0.4	0.0	0.1	0.1	0.03	0.3	0.31	0.28	0.02	0.31	2.25	0.06		
Temperature	°C	--	--	--	--	--	--	--	13.50	12.7	17.7	19.7	16.8	13.6	13.5	17.0	17.0	16.14	10.9	18.1	12.73	13.2	15.6	13.7	13.9		
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-236.7	-280.2	-195.5	-367.1	-365.3	-361.2	-292.0	-319.6	-319.6	-363.9	-381.1	-107.9	-34.6	-254.3	-258.8	-157.3	-168.4		
<b>Appendix III</b>																											
Boron	ug/L	NC	500	500	7,200	125	125	8.8	2,380	2,520	2,170	2,070	2,190	2,110	2,190	2,210	1,690	2,120	--	1,670	1,690	1,600	1,500	1,560	1,100		
Calcium	mg/L	NC	NC	NC	500	1	1	0.3	42.7	44.1	40.1	44.1	46.7	37.7	38.2	37.6	36.5	34.9	--	42.4	27.9	33	51	97	74		
Chloride	mg/L	250**	250	250	500	5	5	0.1	24.0	24.0	27.1	26.9	24.3	22.8	24.9	26.3	26.3	26.0	--	95.7	51.1	32	41	134	55		
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	37	< 20	
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1	--	10.62	10.8	10.3	10	10	10.2	10.1	9.6	--	10.2	9.8	9.8	9.8	9.4	8.7	8.2	8.3		
Sulfate	mg/L	250**	250	250	500	2	0.25	0.60	63.0	39.3	49.5	55.2	49.1	31.6	39.8	43.0	47.2	41.7	--	< 2.0	19.2	49	30	17	12		
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	10.0	240	230	220	220	230	200	190	216	246	188	--	456	454	300	290	502	500		
<b>Appendix IV</b>																											
Antimony	ug/L	6	6	6	130	1	1.0	0.3	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0	< 0.25	
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	45	31	24	24	20	14	13	12	11	--	9.4	8.5	4.1	3.9	2.3	1.4	1.0		
Barium	ug/L	2,000	2,000	2,000	670	1	1.0	2.5	16	12	11	11	11	9	10	13	11	--	16.5	13.8	10.2	16	27	64	55		
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	--	< 0.20	< 0.25		
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20	< 0.25		
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	<1	1	2	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.19	< 0.25		
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	<15	--	< 15.0	< 15.0	< 6.0	< 6.0	--	0.16	< 0.52		
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	--	< 1000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	37	< 20	
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0	< 0.55		
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	15.6	14.6	15	14	14	13	14	19	--	24	21	20	21	32	64	46			
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20	< 0.2		
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	57	60	50	49	49	40	38	44	42	--	16.0	11.6	5.2	< 5.0	< 5.0	0.56	< 1.2		
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.204	1.0	<0.166	<0.157	<0.209	<0.158	<0.269	<0.159	<0.347	<0.756	<0.887	--	< 0.934	< 0.580	< 0.567	< 0.153	0.370	0.0720	0.0500		
Radium-226/228	pCi/L	5	NC	NC	NC	N/A	1.29	1.0	<0.451	<0.475	<0.467	<0.461	<0.628	0.747	<0.502	<2.72	< 3.85	--	< 1.89	< 3.85	< 1.47	< 0.583	0.807	0.0720	1.0300		
Radium-228	pCi/L	5	NC	NC	NC	N/A	1.09	1.0	<0.451	<0.475	<0.467	<0.461	<0.628	0.678	<0.502	<1.96	< 2.96	--	< 0.957	< 3.27	< 0.903	< 0.583	< 0.551	-0.960	0.980		
Selenium	ug/L	50	50	50	5																						

**Notes:**  $\mu\text{g/l}$  = micrograms per liter,  $\text{mg/l}$  = milligrams per liter

ug/L - micrograms per liter. mg/L - milligrams per liter.  
SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level; EPA Drinking Water Standards and Health Advisories, April, 2012, NC - no criteria

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2011

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

<sup>a</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using parameters (L<sub>1</sub>)

# - If detected above 0.20 µg/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEC policy and procedure 09-014 dated June 20, 2012.

**BOLD** value indicates an exceedance of one or more of the listed criteria.

**BOLD** value indicates  
**RED** value indicates a

**RED** value indicates an exceedance of the MCL.  
-- - not analyzed.

Sample Location: Compliance Phase: Sample Dates:										MW-15010																							
										Background Monitoring								Detection Monitoring			Initial A.M.		Assessment Monitoring										
										12/1/2015	2/17/2016	4/13/2016	7/13/2016	9/28/2016	2/14/2017	4/5/2017	7/11/2017	9/13/2017	9/13/2017	4/16/2018	6/14/2018	11/28/2018	4/9/2019	9/24/2019	5/4/2020	10/27/2020							
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Downgradient																								
<b>Field Parameters</b>																																	
pH	su	--	--	--	--	--	--	--	7.74	7.8	7.8	7.8	8.0	8.0	7.8	7.8	7.8	7.8	7.8	7.4	7.5	7.6	7.4	7.16	7.39								
Conductivity	µS/cm	--	--	--	--	--	--	--	587	402	344	449	547	390	556	345	875	941	991	1003	570	798	814	565									
Turbidity	NTU	--	--	--	--	--	--	--	2.51	2.8	<1	3.1	<1	<1	4.71	1.43	1.43	0.7	5.1	2.83	4.5	1	9.07	9.13									
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.01	0.1	0.2	0.3	0.4	0.5	0.5	0.1	0.11	0.26	0.34	0.38	0.02	0.29	0.23	0.05									
Temperature	°C	--	--	--	--	--	--	--	12.97	11.4	10.9	16.0	18.5	12.0	11.3	15.5	14.98	14.98	10.6	13.3	12.15	11.9	14.8	11.4	12.9								
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-246.0	-197.3	-182.6	-174.7	-104.8	-192.3	-52.9	-193.4	-126.9	-146.3	5.3	68.1	-140.2	-120.3	105.4	-105.7									
<b>Appendix III</b>																																	
Boron	ug/L	NC	500	500	7,200	125	50	8.8	1,970	1,510	1,340	1,270	1,570	1,440	1,760	1,340	1,770	--	2,100	1,850	1,700	1,100	638	510									
Calcium	mg/L	NC	NC	NC	500	1	1	0.3	71.2	51.9	37.4	58.2	66.4	49.8	80.5	40.7	129	133	--	133	115	110	130	127	78								
Chloride	mg/L	250**	250	250	500	5	2.5	0.1	23.0	22.5	21.5	22.7	25.1	22.3	24.2	25.5	24.5	24.4	--	29.3	39.6	22	42	43	35								
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	360	380							
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	0.10	--	7.74	7.8	7.8	7.8	8.0	7.8	7.8	7.8	--	7.8	7.4	7.5	7.6	7.4	7.6	7.4									
Sulfate	mg/L	250**	250	250	500	2	0.25	0.60	120	52.6	31.0	50.7	69.7	24.2	53.5	24.8	143	143	--	73.7	48.3	49	2.9	1	< 0.6								
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	10.0	410	270	220	260	320	360	288	570	618	--	636	590	490	450	471	520									
<b>Appendix IV</b>																																	
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.25							
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.55							
Barium	ug/L	2,000	2,000	2,000	2,000	670	1	1.0	2.5	49	34	28	42	45	31	51	29	--	--	63.4	64.8	68.1	78	61	55	39							
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.25							
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20								
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	<1	2	<1	<1	1	<1	<1	--	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.26	< 0.25							
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	--	< 15.0	< 15.0	< 6.0	< 6.0	--	0.19	< 0.52								
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	360	380						
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.55								
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	36.1	22.7	18	15	22	14	18	21	--	--	46	54	51	41	43	28									
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20								
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	33	29	27	15	20	9	7	16	--	--	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	1.1	1.6						

**Notes:**  $\text{mg/L}$  = milligrams per liter;  $\text{mg/L}$  = milligrams per liter.

ug/L - micrograms per liter. mg/L - milligrams per liter.  
SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level; EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2011

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2011.

<sup>a</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using equation (4).<sup>10</sup>

#. If detected above 0.20 µg/l, further evaluation of low-level mercury may be necessary to evaluate the CSI pathway per footnote (H).

# - If detected above 0.20 µg/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

**BOLD** value indicates an exceedance of one or more of the listed thresholds.  
**RED** value indicates an exceedance of the MCI.

**RED** value indicates an exceedance of the MCL.  
-- - not analyzed.

All metals were analyzed as total unless otherwise specified.

Sample Location: Compliance Phase: Sample Dates:										MW-15011																			
										Background Monitoring								Detection	Initial A.M.	Assessment Monitoring									
										12/1/2015	2/17/2016	4/13/2016	7/12/2016	9/28/2016	2/14/2017	4/5/2017	7/11/2017	9/13/2017	4/16/2018	6/13/2018	11/28/2018	4/10/2019	9/25/2019	9/25/2019	5/7/2020	10/27/2020	10/27/2020		
<b>Constituent</b> <b>Unit</b> <b>EPA MCL</b> <b>MI Residential*</b> <b>MI Non-Residential*</b> <b>MI GSI<sup>a</sup></b> <b>RDL (Most Common prior to 2020)</b> <b>RDL (Pace)</b> <b>RDL (Trace)</b> <b>Downgradient</b>																													
<b>Field Parameters</b>																													
pH	su	--	--	--	--	--	--	8.68	8.5	8.2	8.5	8.7	9.2	9.0	8.2	8.5	9.1	8.5	8.9	8.8	8.4	8.4	8.23	8.34	8.34				
Conductivity	µS/cm	--	--	--	--	--	--	391	346	323	371	390	389	427	346	247	272	251	332	300	655	655	708	820	820				
Turbidity	NTU	--	--	--	--	--	--	3.54	<1	<1	<1	<1	<1	<1	2.65	<1	3.5	1.2	0.71	2.5	1.25	1.25	46.18	0.14	0.14				
Dissolved Oxygen	mg/L	--	--	--	--	--	--	0.00	0.2	0.3	0.2	0.4	0.5	0.1	0.1	0.11	0.25	0.34	0.45	0.12	0.38	0.13	0.19	0.19					
Temperature	°C	--	--	--	--	--	--	13.76	10.4	14.1	19.2	15.2	12.2	13.0	16.0	15.07	12.5	18.3	12.22	13	14.9	14.9	13.8	13.1	13.1				
Oxidation Reduction Potential	mV	--	--	--	--	--	--	-322.4	-180.3	-145.7	-208.0	-100.0	-221.3	-198.5	-127.8	-215.1	-25.9	55.5	-204.2	-179.1	-248.7	-135.9	-135.9						
<b>Appendix III</b>																													
Boron	ug/L	NC	500	500	7,200	125	250	8.8	1,680	1,420	1,340	1,210	1,180	1,280	1,340	1,060	1,490	--	1,630	1,650	1,600	1,600	1,870	1,500	1,400				
Calcium	mg/L	NC	NC	500	1	1	0.3	53.0	47.6	36.9	47.3	48.0	47.9	52.0	42.2	23.9	--	22.6	29.5	41	63	63	90	120	120				
Chloride	mg/L	250**	250	250	500	5	5	0.1	22.0	20.7	22.1	24.8	21.0	19.5	22.2	22.9	24.0	--	23.2	26.3	38	37	37	31	42	43			
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	1,200	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	180	250	240		
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1	--	8.68	8.5	8.2	8.5	8.7	9.2	9.0	8.2	8.5	9.1	8.5	8.9	8.8	8.4	--	8.4	8.34	8.34			
Sulfate	mg/L	250**	250	250	500	2	5	0.60	50.0	30.8	35.8	43.8	38.5	37.2	42.8	29.1	6.4	--	12.3	21.9	38	97	99	109	81	83			
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	270	230	210	240	230	230	240	224	140	--	244	182	260	380	400	464	610	600				
<b>Appendix IV</b>																													
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	--	--	<1.0	<0.25	<0.25		
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	5	3	3	4	6	7	8	<1	--	6.4	1.5	7.3	9.3	<1.0	<1.0	0.84	<0.55	<0.55			
Barium	ug/L	2,000	2,000	2,000	670	1	1.0	2.5	36	29	25	30	31	31	32	31	--	15.2	16.6	18.5	31	39	39	55	74	72			
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	--	--	<0.20	<0.25	<0.25			
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<0.20	<0.20	--	--	<0.20	<0.25	<0.25			
Chromium	ug/L	100	100	100	11	1	1.0	0.3	1	<1	2	1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.18	<0.25	<0.25			
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	<15.0	<15.0	<6.0	<6.0	--	--	0.15	<0.52	<0.52			
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	1,200	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	180	250	240			
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	--	--	0.041	<0.55	<0.55			
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	17.2	16	14	15	16	17	17	20	--	21	11	18	18	13	13	20</					

Constituent		Unit	EPA MCL	MI Residential*		MI Non-Residential*		MI GSI <sup>^</sup>	RDL (Most Common prior to 2020)	RDL (Pace)	Sample Location: MW-15012																								
											Compliance Phase: Background Monitoring							Detection		Initial A.M.		Assessment Monitoring													
				Sample Dates: 12/1/2015		2/17/2016		4/13/2016		7/13/2016		9/29/2016		2/14/2017		4/5/2017		7/12/2017		9/13/2017		4/17/2018		6/13/2018		11/28/2018		4/10/2019		4/10/2019		9/25/2019		5/7/2020	
<b>Field Parameters</b>																												Downgradient							
pH	su	--	--	--	--	--	--	7.98	8.1	8.1	8.9	9.2	8.6	8.5	9.9	11.4	9.7	10.2	9.8	9.4	9.4	10.1	10.02								Field Dup				
Conductivity	µS/cm	--	--	--	--	--	--	374	569	570	406	354	318	340	265	441	774	884	556	420	420	1,123	1,573												
Turbidity	NTU	--	--	--	--	--	--	2.25	<1	1.8	<1	<1	<1	<1	4.41	<1	0.5	0.8	0.66	4.3	4.3	1.41	40.91												
Dissolved Oxygen	mg/L	--	--	--	--	--	--	0.49	0.2	0.2	0.4	0.5	0.6	0.4	0.1	0.12	0.24	0.34	0.34	0.65	0.65	0.37	0.13												
Temperature	°C	--	--	--	--	--	--	14.33	12.6	14.2	19.9	14.7	12.2	12.6	15.2	15.91	12.3	18.3	12.04	13.3	13.3	15.1	13.5												
Oxidation Reduction Potential	mV	--	--	--	--	--	--	0.8	-201.2	-217.3	-179.0	-174.9	-186.8	-208.8	-297.0	-172.3	-345.6	-98.6	6.5	-218.4	-218.4	-288.7	-241.5												
<b>Appendix III</b>																																			
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	125	125.0	<b>961</b>	<b>1,390</b>	<b>1,830</b>	<b>1,450</b>	<b>1,470</b>	<b>1,380</b>	<b>1,500</b>	<b>1,340</b>	<b>1,140</b>	--	<b>1,450</b>	<b>1,280</b>	<b>1,300</b>	1,300	<b>1,300</b>	1,470												
Calcium	mg/L	NC	NC	NC	500	1	5.0	49.5	82.1	65.5	44.5	43.5	32.0	34.9	24.6	48.7	--	95.1	55.7	61	60	140	250												
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	5.0	20.0	20.4	23.7	23.0	22.6	19.7	22.7	24.1	23.3	--	22.7	21.5	20	20	22	21												
Fluoride	ug/L	4,000	NC	NC	NC	1000	100.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000					
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	1.0	7.98	8.1	8.1	<b>8.9</b>	<b>9.2</b>	<b>8.6</b>	8.5	<b>9.89</b>	<b>11.4</b>	9.7	<b>10.2</b>	<b>9.8</b>	<b>9.4</b>	--	<b>10.1</b>	9.4												
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	25.0	69.0	111	106	65.6	50.9	55.7	57.2	21.8	59.6	--	<b>355</b>	137	190	180	<b>540</b>	768												
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	20.0	300	370	340	250	210	190	200	168	318	--	<b>902</b>	302	380	380	<b>850</b>	1260												
<b>Appendix IV</b>																																			
Antimony	ug/L	6	6	6	130	1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	0.18												
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1	1.0	<1	2	8	<b>12</b>	9	2	3	6	--	1.8	3.4	1.3	1.4	1.4	2.3	2.3												
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	2	40	63	68	34	22	25	28	14	--	109	105	51.7	79	79	190	234												
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<0.20												
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20												
Chromium	ug/L	100	100	100	11	1	1.0	<1	<1	1	1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0												
Cobalt	ug/L	NC	40	100	100	100	15	1.0	<15	<15	<15	<15	<15	<15	<15	<15	--	<15.0	<15.0	<6.0	<6.0	<6.0	0.26												
Fluoride	ug/L	4,000	NC	NC	NC	1000																													

Sample Location: Compliance Phase: Sample Dates:									MW-15013																							
									Background Monitoring								Detection	Initial A.M.		Assessment Monitoring												
									12/1/2015	2/18/2016	4/13/2016	7/13/2016	9/29/2016	2/14/2017	4/5/2017	7/12/2017	9/13/2017	4/17/2018	4/17/2018	6/13/2018	6/13/2018	11/29/2018	4/11/2019	9/25/2019	5/7/2020	10/28/2020						
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Downgradient																							
<b>Field Parameters</b>																																
pH	su	--	--	--	--	--	--	--	7.61	7.2	7.4	7.3	7.4	7.7	7.4	7.4	7.9	7.6	7.6	7.7	7.7	7	7.3	8	8.8	7.72						
Conductivity	µS/cm	--	--	--	--	--	--	--	528	436	400	392	449	444	435	417	320	423	423	400	400	321	304	400	695	432						
Turbidity	NTU	--	--	--	--	--	--	--	1.59	<1	<1	<1	<1	1.2	<1	3.97	<1	1.6	1.6	1.2	1.2	0.63	3.1	0.76	105.32	0.02						
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.07	0.4	0.3	0.4	0.5	0.4	0.1	0.1	0.12	0.28	0.28	0.41	0.41	0.89	0.08	0.35	0.15	0.15						
Temperature	°C	--	--	--	--	--	--	--	14.25	8.7	13.5	15.8	14.4	12.4	13.0	14.8	15.46	12.4	12.4	18.3	18.3	11.85	12	14.8	13.4	13.5						
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-262.9	-119.7	-130.3	-117.9	-118.8	-161.6	-137.0	-169.9	-122.3	-91.5	-91.5	-17.8	-17.8	70.6	-126.9	-209.3	-211.8	-136.1						
<b>Appendix III</b>																																
Boron	ug/L	NC	500	500	7,200	125	125	8.8	1,140	1,290	1,180	1,080	1,090	1,050	1,120	916	1,270	--	--	1,130	1,100	1,070	1,200	1,300	1,230	1,100						
Calcium	mg/L	NC	NC	500	1	1	0.3	65.2	58.3	47.5	48.4	59.7	52.5	50.9	43.9	34.4	--	--	47.3	48.9	50.8	50	45	66	52							
Chloride	mg/L	250**	250	500	5	5	0.1	21.0	20.9	21.5	21.0	22.9	19.8	19.9	23.4	21.2	--	--	21.5	21.6	21.3	21	24	21	24							
Fluoride	ug/L	4,000	NC	NC	1000	100	4,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	280	490					
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1	--	7.61	7.2	7.4	7.3	7.4	7.7	7.4	7.4	7.9	7.6	--	7.7	--	7.0	7.3	8.0	8.7	7.7							
Sulfate	mg/L	250**	250	250	500	2	5	0.60	89.0	44.3	34.3	27.5	31.3	23.1	15.1	8.7	59.9	--	--	8.7	7.9	5.9	4.8	53	226	6						
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	10.0	330	290	260	250	260	250	240	192	--	--	324	268	210	260	250	451	310							
<b>Appendix IV</b>																																
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.25						
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<0.55					
Barium	ug/L	2,000	2,000	2,000	670	1	1.0	2.5	71	58	49	47	51	52	48	42	--	43.3	44.7	43.9	41.1	39.5	45	31	40	48						
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.20	<0.25						
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.25					
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	<1	2	1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	0.1	<0.25				
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15.0	--	<15.0	<15.0	<15.0	<15.0	<6.0	<6.0	--	0.082	<0.52						
Fluoride	ug/L	4,000	NC	NC	1000	100	4,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	280	490				
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.55						
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	17.5	19.9	18	17	18	18	17	23	--	27	28	24	24	23	17	13	17	24						
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2					
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	17	20	21	12	11	10	9	8	--	<5.0	<5.0	<5.0	<5.0	5.0	5.7	9.9	77.2	3.7						
Radium-226	pCi/L	5	NC	NC	N/A	0.234	1.0	0.272	<0.299	0.173	<0.181	<0.215	<0.230	<0.215	0.731	--	<0.505	<0.506	<0.546	<0.585	<0.696	<0.232	<0.201									

Notes:  $\mu\text{g/l}$  - micrograms per liter,  $\text{mg/l}$  - milligrams per liter

SU - standard units; pH is a field parameter, pCi/l - picocuries per liter

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.  
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2011

<sup>a</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using the GSI method.

chromium

# - If detected at above 0.22 mg/L, further evaluation of low-level mercury may be necessary to evaluate the CSL pathway per Michigan Part 301 and MDEQ policy and procedure 00-014 dated June 29, 2012.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury  
**BOLD** value indicates an exceedance of one or more of the listed criteria

**BOLD** value indicates an exceedance of one or more thresholds.  
**RED** value indicates an exceedance of the MCI.

**RED** value indicates an exceedance of the MCL.  
--- not analyzed

Sample Location: Compliance Phase: Sample Dates:										MW-15014																						
										Background Monitoring								Detection		Initial A.M.		Assessment Monitoring										
										12/1/2015	2/18/2016	4/18/2016	7/13/2016	9/29/2016	2/14/2017	4/5/2017	7/12/2017	9/13/2017	4/17/2018	6/13/2018	11/29/2018	4/11/2019	4/11/2019	9/25/2019	5/6/2020	10/28/2020						
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Downgradient																							
<b>Field Parameters</b>																												Field Dup				
pH	su	--	--	--	--	--	--	--	11.53	11.6	11.2	11	11.1	11.5	11.3	11.5	12	11.6	11.4	11.5	11.3	11.3	11.3	11.3	11.07	11.11						
Conductivity	µS/cm	--	--	--	--	--	--	--	605	642	654	676	590	576	568	761	679	554	474	391	373	373	524	476	1650							
Turbidity	NTU	--	--	--	--	--	--	--	3.47	<1	1	1.6	<1	<1	4.76	1.65	2.9	2.2	2.39	3.6	3.6	0.25	144.5	22.7								
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.17	0.1	0.2	0.3	0.4	0.4	0.3	0.1	0.09	0.21	0.27	0.36	0.04	0.04	0.32	0.1	0.04							
Temperature	°C	--	--	--	--	--	--	--	15.87	10.8	13.6	14.8	12.4	10.9	10.5	14.0	15.11	11.6	17.9	10.14	11.8	11.8	14.6	13.4	12.9							
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-308.7	-215.0	-221.3	-205.9	-242.5	-226.2	-237.2	-315.6	-185.6	-155.1	-71.2	-33.7	-263.5	-286.5	-389.2	-274.6								
<b>Appendix III</b>																																
Boron	ug/L	NC	500	500	7,200	125	250	8.8	2,560	2,230	1,840	1,630	1,690	1,530	1,560	1,300	1,410	--	1,370	1,400	1,500	1,600	1,400	1,330	1,000							
Calcium	mg/L	NC	NC	NC	500	1	1	0.3	75.6	75.3	63.9	73.5	64.7	66.3	65.3	61.8	57.8	--	50.8	51.1	49	53	50	43	350							
Chloride	mg/L	250**	250	250	500	5	2.5	0.1	21.0	21.9	21.9	22.0	22.7	18.6	22.1	22.4	22.5	--	21.3	20.5	20	22	23	24	24							
Fluoride	ug/L	4,000	NC	NC	1000	100	4,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	330	330					
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1	--	11.53	11.6	11.2	11	11.1	11.5	11.3	11.5	12.0	11.6	11.4	11.5	11.3	--	11.3	11.1	11.1							
Sulfate	mg/L	250**	250	250	500	2	0.25	0.60	43.0	34.7	31.4	35.6	23.7	27.8	23.9	24.9	19.2	--	2.4	12.4	12	14	25	12	870							
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	10.0	350	310	270	290	250	280	270	292	282	--	338	224	260	290	250	212	1600							
<b>Appendix IV</b>																																
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	1.7	--	1.1	<1.0	<1.0	<1.0	<1.0	--	0.43	<0.25						
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	15	11	11	8	9	7	7	8	--	6.2	5.5	4.0	3.8	4.0	2.6	2.5	2.1							
Barium	ug/L	2,000	2,000	2,000	670	1	5	2.5	329	376	257	508	357	571	546	732	--	779	607	604	620	630	560	468	480							
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	--	<0.20	<0.25							
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<0.20	<0.20	<0.20	--	<0.20	<0.25							
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	2	1	1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	0.17	<0.25							
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	<15.0	<15.0	<6.0	<6.0	<6.0	--	0.081	<0.5							
Fluoride	ug/L	4,000	NC	NC	1000	100	4,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	330	330						
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	--	0.11	<0.55							
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	19	--	27	16	21	12	11	23	21	35				
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<0.20	<0.20	<0.20	--	<0.20	<0.2							
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	119	76	58	69	81	80	77	71	--	94.7	100	106	120	110	99	88	44							
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.237	1.0	<0.176	<0.175	<0.177	0.214	<0.218	<0.211	<0.289	<0.511	--	<1.11	<1.17	<1.52	<0.192	<0.182	<0.185	0.143	0.15							
Radium-226/228	pCi/L	5	NC	NC	NC																											

**Notes:**

$\mu\text{g/L}$  - micrograms per liter.  $\text{mg/L}$  - milligrams per liter.  
SU - standard units; pH is a field parameter.  $\text{nCi/L}$  - picocuries per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.  
MCL - Maximum Contaminant Level. EPA Drinking Water Standards and Health Advisories, April 2012. NC - no criteria.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories  
\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2011

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

<sup>a</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using Secondary Maximum Contaminant Level (SMCL), L-1 Secondary Drinking Water Regulations (SDWR), April 2012.

Wang, L., E.A. Gosselin, and J. M. Martel. 2003. A comparison of two methods for estimating the mean number of eggs per footlong (H). *Entomophaga* 48: 331-337.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury

**BOLD** value indicates an exceedance of one or more thresholds.

**RED** value indicates an exceedance of the MCL.  
--- not analyzed

Constituent		Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>A</sup>	RDL (Most Common prior to 2020)	RDL (Pace)	MW-15015																
									Background Monitoring								Detection Monitoring		Initial A.M.	Assessment Monitoring					
									12/1/2015	2/18/2016	4/13/2016	7/13/2016	9/29/2016	2/14/2017	4/5/2017	7/12/2017	7/12/2017	9/13/2017	9/13/2017	4/17/2018	6/13/2018	11/29/2018	4/11/2019	9/26/2019	5/6/2020
Downgradient																									
<b>Field Parameters</b>																	Field Dup	Field Dup	Field Dup	Field Dup					
pH	su	--	--	--	--	--	--	--	7.56	7.4	7.4	7.4	7.8	7.7	7.6	8.4	8.4	8.7	8.7	8.3	7.9	7.8	7.6	8.4	7.96
Conductivity	µS/cm	--	--	--	--	--	--	--	313	298	296	318	349	354	369	329	329	340	340	407	408	345	419	444	944
Turbidity	NTU	--	--	--	--	--	--	--	1.84	<1	<1	<1	<1	<1	1.2	1.8	1.8	<1	<1	1.2	1.5	0.81	7.5	0.77	3.8
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.02	0.2	0.2	0.3	0.4	0.4	0.1	0.1	0.1	0.07	0.07	0.24	0.33	0.29	0.05	0.4	0.2
Temperature	°C	--	--	--	--	--	--	--	14.51	9.4	12.5	15.8	13.6	10.8	11.1	14.1	14.1	15.06	15.06	11.2	16.4	10.91	10.2	13.5	12.8
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-299.8	-230.1	-222.5	-140.4	-222.8	-201.7	-170.2	-222.6	-222.6	-183.4	-183.4	-125.4	11.3	-0.4	-190	-239	-304.5
<b>Appendix III</b>																									
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	125	50	1,190	<b>1,170</b>	<b>963</b>	<b>614</b>	<b>656</b>	<b>662</b>	<b>599</b>	489	678	433	433	--	398	<b>505</b>	<b>630</b>	<b>510</b>	512	
Calcium	mg/L	NC	NC	NC	500	1	1	32.8	33.0	30.6	36.2	40.1	38.4	37.6	29.4	32.3	36.9	36.9	--	45.0	50.8	68	46	128	
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	5	21.0	22.0	21.6	20.4	19.5	19.2	22.7	20.1	20.0	20.3	--	19.5	17.8	20	17	19		
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	140	
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	1	7.56	7.4	7.4	7.4	7.8	7.7	7.6	8.4	8.4	<b>8.7</b>	8.7	8.3	7.9	7.8	7.6	8.4	8.1	
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	5	7.80	6.56	8.34	13.9	9.26	10.4	13.8	18.8	17.9	16.1	--	12.6	13.2	88	69	291		
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	10.0	220	200	190	180	180	200	190	166	190	192	--	316	238	360	250	646		
<b>Appendix IV</b>																									
Antimony	ug/L	6	6	6	130	1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.18	
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1	1.0	2	2	6	5	5	6	6	8	--	--	4.7	5.5	4.3	4.3	5.7	6.6		
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	1.0	23	22	21	25	28	30	28	30	34	--	39.9	37.9	41.0	63	44	135		
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20		
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20		
Chromium	ug/L	100	100	100	11	1	1.0	<1	<1	1	1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	0.16	
Cobalt	ug/L	NC	40	100	100	15	1.0	<15	<15	<15	<15	<15	<15	<15	<15	<15	--	< 15.0	< 15.0	< 6.0	< 6.0	--	0.16		
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	140	
Lead	ug/L	NC	4	29	1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.074		
Lithium	ug/L	NC	170	350	440	10	20.0	<10	<10	<10	<10	<10	<10	<10	<10	12	11	--	16	13	14	11	< 10	21.7	
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20		
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	17	14	17	11	10	9	11	12	13	--	9.4	7.0	7.2	11	< 10	9.6		
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.279	<0.193	<0.157	<0.242	<0.133	<0.378	<0.166	<0.340	<0.832	<0.698	--	--	< 0.467	< 0.475	< 0.677	< 0.224	< 0.165	0.932	
Radium-226/228	pCi/L	<b>5</b>	NC	NC	NC	N/A	1.2	<0.578	<0.577	<0.521	<0.467	0.850	<0.408	<0.420	<1.63	< 1.45	--	--	< 1.20	< 1.24	< 1.75	< 0.5			

Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Pace 5/21)	RDL (Pace 6/15)	RDL (Trace)	Sample Location: MW-15015R		
									Compliance Phase: Assessment Monitoring		
									Sample Dates:	5/21/2020	6/15/2020
<b>Downgradient</b>											
<b>Field Parameters</b>											
pH	su	--	--	--	--	--	--	--	7.67	6.84	7.89
Conductivity	µS/cm	--	--	--	--	--	--	--	1721	1010	1570
Turbidity	NTU	--	--	--	--	--	--	--	5.05	6.78	2.96
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.23	0.1	0.66
Temperature	°C	--	--	--	--	--	--	--	13.3	11.7	14.2
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-151.9	-321.1	-233.3
<b>Appendix III</b>											
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	50	50	8.8	718	675	870
Calcium	mg/L	NC	NC	NC	500	3	5	0.3	282	228	240
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	2.5	2.5	0.1	17	17	20
Fluoride	ug/L	4,000	NC	NC	NC	100	100	20.0	84	12	140
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	1	1	--	7.7	7.8	7.9
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	25	25	0.60	825	636	670
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	20	20	10.0	1460	1140	1200
<b>Appendix IV</b>											
Antimony	ug/L	6	6	6	130	1.0	1.0	0.3	< 1.0	< 1.0	< 0.25
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1.0	1.0	0.6	12.7	8.8	12.0
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1.0	1.0	2.5	107	108	140
Beryllium	ug/L	4	4	4	6.7	0.20	0.20	0.25	< 0.20	< 0.20	< 0.25
Cadmium	ug/L	5	5	5	3.0	0.20	0.20	0.25	< 0.20	< 0.20	< 0.25
Chromium	ug/L	100	100	100	11	1.0	1.0	0.3	0.22	< 1.0	< 0.25
Cobalt	ug/L	NC	40	100	100	1.0	1.0	0.5	0.42	0.31	< 0.5
Fluoride	ug/L	4,000	NC	NC	NC	100	100	20.0	84	0.12	140
Lead	ug/L	NC	4	4	29	1.0	1.0	0.6	< 1.0	< 1.0	< 0.55
Lithium	ug/L	NC	170	350	440	20.0	20.0	1.2	36	23.2	27
Mercury	ug/L	2	2	2	0.20#	0.20	0.20	0.2	< 0.20	< 0.20	< 0.2
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	1.0	1.0	1.2	27.7	23.1	18
Radium-226	pCi/L	5	NC	NC	NC	0.242	0.338	1.0	0.394	0.166	0.09
Radium-226/228	pCi/L	<b>5</b>	NC	NC	NC	1.08	1.26	1.0	0.918	2.12	0.58
Radium-228	pCi/L	5	NC	NC	NC	0.839	0.918	1.0	0.524	1.95	0.49
Selenium	ug/L	50	50	50	<b>5</b>	1.0	1.0	0.5	< 1.0	< 1.0	< 0.5
Thallium	ug/L	2	2	2	3.7	1.0	1.0	0.4	< 1.0	< 1.0	< 0.38
Total Suspended Solids	mg/L	--	--	--	--	2.5	2.5	4.0	4	< 2.5	< 4

**Notes:**

ug/L - micrograms per liter. mg/L - milligrams per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using default hardness of 150 mg CaCO<sub>3</sub>/L per MDEQ RRD Op Memo 5, Sept. 30, 2004. Generic GSI criterion for calcium, chloride, and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium per footnote {H}.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

**BOLD** value indicates an exceedance of one or more of the listed criteria.**RED** value indicates an exceedance of the MCL.

-- - not analyzed.

All metals were analyzed as total unless otherwise specified.

This well was installed on May 12, 2020 to replace MW-15015 for pond closure construction purposes.

Sample Location: Compliance Phase: Sample Dates:							MW-15016																					
							Background Monitoring								Detection		Initial A.M.		Assessment Monitoring									
							12/1/2015	2/18/2016	4/13/2016	7/13/2016	9/29/2016	2/14/2017	4/5/2017	7/12/2017	9/13/2017	4/17/2018	6/12/2018	11/29/2018	4/11/2019	9/26/2019	5/6/2020							
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	Downgradient																				
<b>Field Parameters</b>																												
pH	su	--	--	--	--	--	--	6.55	6.5	6.4	6.3	6.4	6.4	6.6	6.44	6.6	6.8	6.5	6.6	6.4	6.6	6.35						
Conductivity	µS/cm	--	--	--	--	--	--	1,902	2,061	2,170	2,171	2,161	2,061	1,929	2,005	2,018	2,121	2,038	1,607	1,552	2,143	2,084						
Turbidity	NTU	--	--	--	--	--	--	2.92	2.8	<1	5	<1	1.3	<1	3.58	3.11	2.2	3.2	2.41	5.6	4.45	119.37						
Dissolved Oxygen	mg/L	--	--	--	--	--	--	0.84	0.1	0.1	0.3	0.3	0.5	0.4	0.1	0.11	0.2	0.27	0.37	0.04	0.28	0.12						
Temperature	°C	--	--	--	--	--	--	10.85	11.0	12.1	16.7	15.0	11.4	10.6	14.2	15.55	9.9	17.8	11.5	11.2	15	12.8						
Oxidation Reduction Potential	mV	--	--	--	--	--	--	-109.7	-61.8	-92.2	-126.3	-90.1	-97.3	-96.3	-63.7	-87.9	-71.6	-88.4	-15.5	-100.6	-109.8	-184						
<b>Appendix III</b>																												
Boron	ug/L	NC	500	500	7,200	125	5.0	108	119	86	100	88	92	83	86	83.0	--	76.6	80.8	110	100	89						
Calcium	mg/L	NC	NC	500	1	1.0	172	184	164	172	181	176	172	170	182	--	168	169	170	160	176							
Chloride	mg/L	250**	250	250	500	5	5.0	200	204	203	165	204	196	200	10	226	--	197	201	190	230	239						
Fluoride	ug/L	4,000	NC	NC	1000	100.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<2.6					
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1.0	6.55	6.5	6.4	6.3	6.4	6.4	6.6	6.44	6.6	6.8	6.5	6.6	6.4	6.6	6.7						
Sulfate	mg/L	250**	250	250	500	2	0.25	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<0.041					
Total Dissolved Solids	mg/L	500**	500	500	500	10	20.0	980	1,000	980	920	930	990	1,000	1,050	995	--	986	968	1,000	980	944						
<b>Appendix IV</b>																												
Antimony	ug/L	6	6	6	130	1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
Arsenic	ug/L	10	10	10	10	1	1.0	2	2	3	3	2	2	2	2	--	1.5	1.3	1.3	1.6	1.4	1.6						
Barium	ug/L	2,000	2,000	2,000	670	1	5.0	656	647	614	619	621	666	613	596	--	649	652	548	700	630	678						
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20					
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20						
Chromium	ug/L	100	100	100	11	1	1.0	2	3	3	4	3	3	3	2	--	2.1	2.0	2.3	2.3	2.4	1.5						
Cobalt	ug/L	NC	40	100	100	15	1.0	<15	<15	<15	<15	<15	<15	<15	<15	--	< 15.0	< 15.0	< 6.0	< 6.0	< 6.0	< 1.6						
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<100					
Lead	ug/L	NC	4	4	29	1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.045						
Lithium	ug/L	NC	170	350	440	10	20.0	<10	<10	<10	<10	<10	<10	<10	<10	--	< 10	< 10	< 10	< 10	< 10	< 10						
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20						
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	<5	<5	<5	<5	<5	<5	<5	<5	--	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0						
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.242	<0.263	1.51	1.31	1.50	1.06	1.17	1.60	1.30	--	1.56	< 0.810	1.75	1.18	1.31	1.37						
Radium-226/228	pCi/L	5	NC	NC	NC	N/A	1.16	2.29	3.83	3.00	3.18	2.74	3.54	3.66	2.36	--	3.64	2.50	3.95	2.94	3.27	2.02						
Radium-228	pCi/L	5</td																										

									Sample Location:	MW-15016R		
									Compliance Phase:	Assessment Monitoring		
									Sample Dates:	5/21/2020	6/15/2020	10/29/2020
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Pace 5/21)	RDL (Pace 6/15)	RDL (Trace)	Downgradient			
<b>Field Parameters</b>												
pH	su	--	--	--	--	--	--	--	6.54	6.52	6.66	
Conductivity	µS/cm	--	--	--	--	--	--	--	1,553	2,210	2,240	
Turbidity	NTU	--	--	--	--	--	--	--	20.54	0.02	0.02	
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.13	0.13	0.06	
Temperature	°C	--	--	--	--	--	--	--	13.7	14.4	12.3	
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-134.4	-68.9	-243.7	
<b>Appendix III</b>												
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	10.0	10.0	8.8	112	109	150	
Calcium	mg/L	NC	NC	NC	500	1.0	1.0	0.3	192	195	200	
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	25.0	25.0	0.1	314	293	320	
Fluoride	ug/L	4,000	NC	NC	NC	100.0	100.0	20.0	81	140	< 20	
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	1.0	1.0	--	6.6	6.6	6.7	
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	0.25	0.25	0.60	2.8	5.8	< 0.6	
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	40.0	20.0	10.0	1190	1130	1200	
<b>Appendix IV</b>												
Antimony	ug/L	6	6	6	130	1.0	1.0	0.3	0.22	0.14	< 0.25	
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1.0	1.0	0.6	5.5	10.1	1.6	
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	5.0	5.0	2.5	806	789	890	
Beryllium	ug/L	4	4	4	6.7	0.20	0.20	0.25	< 0.20	< 0.20	< 0.25	
Cadmium	ug/L	5	5	5	3.0	0.20	0.20	0.25	< 0.20	< 0.20	< 0.25	
Chromium	ug/L	100	100	100	11	1.0	1.0	0.3	0.7	0.8	0.7	
Cobalt	ug/L	NC	40	100	100	1.0	1.0	0.5	1.9	1.6	1	
Fluoride	ug/L	4,000	NC	NC	NC	100	100	20.0	81	140	< 20	
Lead	ug/L	NC	4	4	29	1.0	1.0	0.6	0.059	< 1.0	< 0.55	
Lithium	ug/L	NC	170	350	440	20.0	20.0	1.2	10.9	3.7	5.0	
Mercury	ug/L	2	2	2	0.20#	0.20	0.20	0.2	< 0.20	< 0.20	< 0.2	
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	1.0	1.0	1.2	4.3	7.5	< 1.2	
Radium-226	pCi/L	5	NC	NC	NC	0.357	0.195	1.0	0.926	1.470	1.600	
Radium-226/228	pCi/L	<b>5</b>	NC	NC	NC	1.13	1.07	1.0	2.93	4.71	4.00	
Radium-228	pCi/L	5	NC	NC	NC	0.768	0.871	1.0	2.00	3.24	2.40	
Selenium	ug/L	50	50	50	<b>5</b>	1.0	1.0	0.5	< 1.0	< 1.0	< 0.5	
Thallium	ug/L	2	2	2	3.7	1.0	1.0	0.4	< 1.0	< 1.0	< 0.38	
Total Suspended Solids	mg/L	--	--	--	--	12.5	12.5	4.0	104	74	120	

**Notes:**

ug/L - micrograms per liter. mg/L - milligrams per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using default hardness of 150 mg CaCO<sub>3</sub>/L per MDEQ RRD Op Memo 5, Sept. 30, 2004. Generic GSI criterion for calcium, chloride, and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium per footnote {H}.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

BOLD value indicates an exceedance of one or more of the listed criteria.

RED value indicates an exceedance of the MCL.

-- not analyzed.

All metals were analyzed as total unless otherwise specified.

This well was installed on May 12, 2020 to replace MW-15016 for pond closure construction purposes.

Sample Location: MW-15017																
Compliance Phase: Background Monitoring Detection Initial A.M. Assessment Monitoring																
Sample Dates: 12/1/2015 2/18/2016 4/18/2016 7/13/2016 9/29/2016 2/14/2017 4/5/2017 7/12/2017 9/13/2017 4/17/2018 6/12/2018 6/12/2018 11/29/2018 4/11/2019 9/26/2019 5/6/2020 10/29/2020																
Constituent Unit EPA MCL MI Residential* MI Non-Residential* MI GSI <sup>▲</sup> RDL (Most Common prior to 2020) RDL (Pace) RDL (Trace)																
<b>Field Parameters</b>																
pH	su	--	--	--	--	--	--	6.46	6.4	6.4	6.4	6.4	6.6	6.5	6.41	6.5
Conductivity	µS/cm	--	--	--	--	--	--	1,963	2,237	2,159	2,211	2,242	1,988	2,410	2,182	2,420
Turbidity	NTU	--	--	--	--	--	--	1.39	<1	<1	<1	3.2	5.4	3.5	3.5	2.68
Dissolved Oxygen	mg/L	--	--	--	--	--	--	0.04	0.2	0.3	0.2	0.5	0.5	0.0	0.1	0.17
Temperature	°C	--	--	--	--	--	--	11.22	10.1	14.8	16.1	13.9	11.1	10.0	13.8	14.49
Oxidation Reduction Potential	mV	--	--	--	--	--	--	-204.9	-132.6	-95.2	-101.2	-83.1	-86.8	-99.8	-79.5	-71.2
<b>Appendix III</b>																
Boron	ug/L	NC	500	500	7,200	125	5.0	8.8	59	90	66	76	78	76	75	82.8
Calcium	mg/L	NC	NC	500	1	5.0	0.3	225	247	220	232	252	232	232	203	245
Chloride	mg/L	250**	250	250	500	5	25.0	0.1	200	201	184	204	182	192	187	199
Fluoride	ug/L	4,000	NC	NC	1000	100.0	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1.0	--	6.46	6.4	6.4	6.4	6.4	6.6	6.5	--
Sulfate	mg/L	250**	250	250	500	2	0.25	0.60	<2	<2	<2	<2	<2	<2	<2.0	<2.0
Total Dissolved Solids	mg/L	500**	500	500	500	10	20.0	10.0	850	1,100	1,200	1,100	1,200	1,100	1,230	1,130
<b>Appendix IV</b>																
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	--
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	13	7	5	12	12	5	4	3
Barium	ug/L	2,000	2,000	2,000	670	1	10	2.5	1,030	981	924	985	955	968	876	772
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	--
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20
Chromium	ug/L	100	100	100	11	1	1.0	0.3	4	4	4	9	11	5	5	--
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15.0
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	--
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	<10	<10	<10	<10	<10	<10	<10	<10
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	<5	<5	<5	<5	<5	<5	<5	<5.0
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.312	1.0	1.61	2.38	2.18	1.91	1.94	1.82	1.56	1.97
Radium-226/228	pCi/L	5	NC	NC	NC	N/A	1.07	1.0	4.30	5.35	5.68	5.89	4.44	4.97	4.34	4.75
Radium-228	pCi/L	5	NC	NC	NC	N/A	0.758	1.0	2.69	2.97	3.50	3.98	2.50	3.15	2.78	2.78
Selenium	ug/L	50	50	50	5	1	1.0	0.5	3	4	3	8	2	2	3	--
Thallium	ug/L	2	2	2	3.7	2.0	1.0	0.4	<2	<2	<2	<2	<2	<2	<2	<2.0
Total Suspended Solids	mg/L	--	--	--	--	2.5	25	4.0	--	--	--	--	--	--	--	--

Notes:  
ug/L - micrograms per liter. mg/L - milligrams per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

▲ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using default hardness of 150 mg CaCO<sub>3</sub>/L per MDEQ RRD Op Memo 5, Sept. 30, 2004. Generic GSI criterion for calcium, chloride, and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium per footnote (H).

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

**BOLD** value indicates an exceedance of one or more of the listed criteria.

**RED** value indicates an exceedance of the MCL.

-- not analyzed.

All metals were analyzed as total unless otherwise specified.

Sample Location:		MW-15018																									
		Background & Detection Monitoring										Detection Monitoring		Initial A.M.		Assessment Monitoring											
Compliance Phase:		Sample Dates:		12/2/2015	2/18/2016	4/14/2016	7/14/2016	9/29/2016	2/14/2017	4/5/2017	7/11/2017	7/11/2017	9/13/2017	9/13/2017	4/18/2018	4/18/2018	6/12/2018	11/29/2018	4/11/2019	9/26/2019	5/6/2020	10/29/2020					
Constituent																											
<b>Field Parameters</b>																											
pH	su	--	--	--	--	--	--	--	7.0	6.9	6.8	6.5	6.5	6.7	6.8	6.8	6.8	6.9	6.8	6.9	6.61	6.86					
Conductivity	µS/cm	--	--	--	--	--	--	--	710	753	772	819	824	793	680	762	762	839	839	817	771	648	628	854	894	890	
Turbidity	NTU	--	--	--	--	--	--	--	5.46	<1	<1	<1	<1	<1	7	2	4.65	4.65	4.6	4.6	2.9	0.7	8.9	6.9	174.94	0.02	
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.20	0.2	0.3	0.4	0.5	0.5	0.5	0.1	0.19	0.19	0.27	0.27	0.32	0.55	0.05	0.34	0.16	0.36	
Temperature	°C	--	--	--	--	--	--	--	12.77	9.8	10.1	14.9	13.0	10.5	9.5	14.5	14.52	14.52	10	10	17.8	10.8	11.4	14.7	12.2	12.7	
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-138.5	-76.6	-80.8	-83.7	-53.5	-71.1	-36.7	-55.3	-55.3	-45	-45	-68.7	-6.3	-133.5	-100.7	4.8	-231.4		
<b>Appendix III</b>																											
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	125	50	8.8	487	<b>526</b>	478	399	438	479	493	<b>538</b>	446	492	502	--	--	<b>559</b>	488	<b>640</b>	<b>550</b>	541	640
Calcium	mg/L	NC	NC	500	1	1	0.3	88.6	100	87.9	86.8	98.5	100	92.1	84.8	81.1	90.7	89.1	--	--	87.6	101	96	94	106	110	
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	5	0.1	38.0	38.0	40.8	39.3	37.5	43.6	44.4	53.4	52.6	49.1	50.2	--	--	48.9	49.1	59	55	57	65
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	130	150	
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	1	--	7.0	6.9	6.8	6.5	6.5	6.7	6.8	6.8	6.8	--	6.9	--	6.8	6.9	6.8	7.0	6.9		
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	2	0.25	0.60	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	--	--	<2.0	<2.0	<2.0	<20	<0.25	<0.6
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	10.0	10.0	290	400	430	390	410	450	410	420	438	392	380	--	--	<b>598</b>	426	480	430	424	490
<b>Appendix IV</b>																											
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1	1.0	0.6	1	<1	<1	2	<1	<1	<1	<1	<1	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	0.46	<0.55	
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	1.0	2.5	155	149	139	133	143	171	149	153	143	--	--	139	141	156	127	150	140	154	240
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<0.20	<0.25	
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.25	
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	1	1	1	1	<1	1	<1	<1	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	0.35	0.29	
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	<15	--	--	<15.0	<15.0	<15.0	<6.0	<6.0	--	0.35	<0.52
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	130	150	
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.55	
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	21.4	23.1	24	12	14	21	21	26	26	--	--	29	27	26	22	24	20	24	33
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2	
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	1.2	<5	<5	<5	<5	<5	<5	<5	<5	<5	--	--	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<1.2	
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.234	1.0	0.227	0.394	0.430	0.234	0.522	0.363	<0.314	<0.479	<1.02	--	--	<0.843	0.290	<0.756	<0.842	0.316	0.511	0.707	0.730
Radium-226/228	pCi/L																										

Notes:

ug/L - micrograms per liter. mg/L - milligrams per liter.  
SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

SU - standard units; pH is a field parameter,  $\mu\text{Cl}/\text{L}$  - picocuries per liter.  
MCL - Maximum Contaminant Level; EPA Drinking Water Standards and Health Advisories, April 2012. NC - no criteria.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories  
\* Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2012

\*\* Secondary Maximum Contaminant Level (SMCL). EPA Secondary Drinking Water Regulations (SDWR), April 2013.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2011  
Michigan Part 2034 Groundwater Surface Water Interface (GSI) Criteria Hardness dependent criteria calculated using

<sup>^</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using per footnote (H).

#. If detected above 0.20 µg/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury  
BCD B value indicates an exceedance of one or more of the listed criteria.

**BOLD** value indicates an exceedance of one or more thresholds.

**RED** value indicates an exceedance of the MCL.  
--- not analyzed

All metals were analyzed as total unless otherwise specified.

Sample Location: Compliance Phase: Sample Dates:		MW-15019																									
		Background Monitoring								Detection		Initial A.M.		Assessment Monitoring													
		12/2/2015	2/18/2016	4/14/2016	7/13/2016	9/30/2016	2/15/2017	4/5/2017	7/11/2017	9/13/2017	4/18/2018	6/12/2018	11/30/2018	4/12/2019	9/26/2019	5/5/2020	5/5/2020	10/29/2020									
Downgradient																											
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>a</sup>	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)												Field Dup		Field Dup					
<b>Field Parameters</b>																											
pH	su	--	--	--	--	--	--	--	7	6.8	6.9	6.7	6.4	6.8	6.9	6.79	6.7	7	6.7	6.9	6.7	6.9	6.69	6.94			
Conductivity	µS/cm	--	--	--	--	--	--	--	646	727	707	733	762	692	821	843	1058	944	980	812	560	560	1031	1028	830		
Turbidity	NTU	--	--	--	--	--	--	--	8	<1	<1	<1	<1	<1	<1	1.56	2.94	2.6	3.4	2.48	8.2	8.2	4.75	145.62	145.62		
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	1.46	0.2	0.5	0.2	0.6	0.6	0.0	0.1	0.16	0.25	0.31	1.06	0.06	0.06	0.2	0.18	0.18		
Temperature	°C	--	--	--	--	--	--	--	12.09	6.6	9.5	17.5	13.0	9.7	9.0	14.5	13.81	11.1	18.4	11.65	10.9	10.9	14.2	12.2	12.2		
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-88.0	-122.7	-105.9	-106.7	-70.7	-119.2	-125.9	-78.9	-70.2	-89.9	-102.6	-10.4	-142.1	-142.1	-123.7	-16.9	-181		
<b>Appendix III</b>																											
Boron	ug/L	NC	500	500	7,200	125	100	8.8	1,530	1,590	1,440	1,320	1,260	1,370	1,410	1,430	1,010	--	1,170	1,540	1,600	1,500	1,000	837	814	730	
Calcium	mg/L	NC	NC	500	1	1	0.3	84.6	93.6	83.0	90.0	92.6	91.8	92.8	90.1	107	--	97.7	98.2	97	94	100	106	109	110		
Chloride	mg/L	250**	250	250	500	5	5	0.1	34.0	32.4	33.7	37.7	35.6	34.5	33.6	52.5	73.9	--	67.7	42.6	39	39	68	80	75	94	
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	51	52	<20		
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1	--	7.0	6.8	6.9	6.7	6.4	6.8	6.9	6.8	6.7	7.0	6.7	6.9	6.7	--	6.9	6.9	6.9		
Sulfate	mg/L	250**	250	250	500	2	0.25	0.60	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	--	<2.0	<2.0	<2.0	<2.0	0.13	<0.25	<0.6		
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	10.0	340	390	440	410	370	410	420	470	618	--	524	556	430	440	530	481	490	600	
<b>Appendix IV</b>																											
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.25		
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	0.4	0.48	<0.55	
Barium	ug/L	2,000	2,000	2,000	670	1	1.0	2.5	91	94	88	88	96	93	90	109	--	161	187	114	110	120	150	174	171	340	
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<0.20	<0.20	<0.25		
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.25		
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.64	0.63	0.53	
Cobalt	ug/L	NC	40	100	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	<15.0	<15.0	<6.0	<6.0	<6.0	--	0.76	0.75	0.64
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	51	52	<20	
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.55		
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	23.7	27.9	26	24	22	23	22	27	--	25	23	26	22	22	20	20	23	5	
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2		
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	<5	<5	<5	<5	<5	<5	<5	<5	--	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<1.0	<1.2		
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.261	1.0	0.333	0.279	0.465	0.282	0.315	0.329	&lt												

Sample Location:		MW-15020																										
		Background Monitoring										Detection	Initial A.M.	Assessment Monitoring														
		Sample Dates:		12/2/2015	2/18/2016	4/14/2016	7/14/2016	9/30/2016	2/15/2017	4/5/2017	7/11/2017	9/13/2017	4/18/2018	6/12/2018	6/12/2018	11/30/2018	11/30/2018	4/12/2019	9/26/2019	5/5/2020	10/28/2020							
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Downgradient																			
<b>Field Parameters</b>																												
pH	su	--	--	--	--	--	--	--	7.27	7.2	7.0	6.9	6.9	7.0	7.1	7.0	6.8	7	6.7	6.7	5.9	5.9	6.8	6.8	6.55	6.73		
Conductivity	µS/cm	--	--	--	--	--	--	--	475	526	555	549	560	540	507	604	985	853	968	968	710	710	487	1380	1397	1290		
Turbidity	NTU	--	--	--	--	--	--	--	2.1	<1	<1	<1	<1	<1	<1	3.42	4.62	4.2	2	2	0.54	0.54	3.7	1.65	217.26	0.02		
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.77	0.1	2.7	0.4	0.6	0.5	0.5	0.1	0.22	0.24	0.3	0.3	1.29	1.29	0.06	0.26	0.18	0.1		
Temperature	°C	--	--	--	--	--	--	--	12.61	9.8	11.3	15.7	13.7	9.8	10.0	15.6	14.4	11.2	18	18	12.1	12.1	14.3	12.6	13.4			
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-97.2	-112.5	-79.8	-95.3	-65.9	-96.7	-79.3	-76.7	-59.7	-89.9	-102.4	-102.4	3.9	3.9	-120.7	-115.4	25.7	-131.4		
<b>Appendix III</b>																												
Boron	ug/L	NC	500	500	7,200	125	100	8.8	630	738	638	603	608	621	667	618	745	--	708	699	721	930	700	830	815	900		
Calcium	mg/L	NC	NC	NC	500	1	1	0.3	61.0	67.6	59.1	60.7	66.5	67.0	66.6	68.1	107	--	96.3	91.6	81.5	81.7	76	110	127	110		
Chloride	mg/L	250**	250	250	500	5	5	0.1	39.0	35.4	34.3	69.6	33.5	33.3	33.9	45.7	87.8	--	92.1	92.0	49.6	49.6	45	130	162	140		
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	15	<20	
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1	--	7.27	7.2	7.0	6.9	6.9	7.0	7.1	7.0	6.8	7.0	6.7	--	6.9	--	6.8	6.8	6.8	6.7		
Sulfate	mg/L	250**	250	250	500	2	0.25	0.60	2.20	2.34	<2	<2	<2	<2	<2	<2	3.0	--	<2.0	<2.0	<2.0	<2.0	<2.0	2.9	<0.25	<0.6		
Total Dissolved Solids	mg/L	500**	500	500	500	10	20	10.0	320	310	320	310	330	320	388	608	--	622	508	428	382	400	660	634	680			
<b>Appendix IV</b>																												
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<0.25			
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.45	<0.55			
Barium	ug/L	2,000	2,000	2,000	670	1	5	2.5	48	52	51	47	54	53	52	60	--	148	197	196	119	115	120	330	393	360		
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	--	<0.20	<0.25			
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<0.20	<0.20	<0.20	--	<0.20	<0.25			
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	2	<1	1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	0.5	0.5		
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	<15.0	<15.0	<15.0	<6.0	<6.0	<6.0	--	0.63	<0.52		
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	15	<20		
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<0.55			
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	15.1	17.8	16	14	14	14	14	18	--	16	16	16	20	20	15	<10	9.5	5.3		
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	<0.20	<0.20	<0.20	<0.20	<0.20	--	<0.20	<0.2			
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	<5	<5	<5	<5	<5	<5	<5	<5	--	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<1.2			
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.286	1.0	<0.269	<0.240	<0.341	<0.190	<0.276	<0.294	<0.290	<0.761	--	0.744	<0.899	<0.774	1.14	<1.06	0.226	0.672	1.19	0.78		
Radium-226/228	pCi/L	5	NC	NC	NC	N/A	1.02	1.0	<0.467	0.847	0.730	<0.598	0.724	<0.591	0.652	<1.39	--	1.56	2.64	2.00	2.07	1.79	<0.558	1.94	4.68	2.45		
Radium-228	pCi/L	5	NC	NC	NC	N/A	0.73	1.0	<0.467	0.731	0.474	<0.598	0.682	<0.591	0.543	<0.627	--	0.813	1.75	1.47	0.925	1.30	<0.558	1.26	3.49	1.70		
Selenium	ug/L	50	50																									

Notes:  $\mu\text{g/l}$  = microgrammes per liter,  $\text{mg/l}$  = milligrammes per liter

ug/L - micrograms per liter. mg/L - milligrams per liter.  
SJI - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level; EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criterion.

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2011.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April,

<sup>a</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated

chromium  
fraction (II)

#. If detected above 0.20 µg/l, further evaluation of low level mercury may be necessary to evaluate the GSI pattern.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pattern.  
**BOLD** value indicates an exceedance of one or more of the listed criteria.

**BOLD** value indicates an exceedance of one or more of the listed criteria.  
**RED** value indicates an exceedance of the MCL.

**RED** value indicates an exceedance of the MCL.  
-- - not analyzed.

-- - not analyzed.

Sample Location: MW-15021																											
Compliance Phase: Background Monitoring																											
Sample Dates: 12/2/2015 2/18/2016 4/14/2016 7/13/2016 10/5/2016 2/15/2017 4/6/2017 7/12/2017 9/13/2017 4/18/2018 6/12/2018 11/30/2018 4/12/2019 9/26/2019 5/5/2020 10/30/2020																											
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Downgradient																		
<b>Field Parameters</b>																											
pH	su	--	--	--	--	--	--	--	6.83	6.8	6.8	6.7	6.8	6.9	6.9	6.8	7.1	6.8	6.7	6.7	6.9	6.9	6.7	6.9			
Conductivity	µS/cm	--	--	--	--	--	--	--	1,019	1,032	1,018	1,040	1,114	962	1,189	1,039	1,123	1131	1035	1076	762	1150	1150	1082	1220		
Turbidity	NTU	--	--	--	--	--	--	--	2.29	<1	<1	<1	1	<1	<1	1.05	2.32	8.3	0.7	1.2	3.4	7.95	7.95	179.52	7.66		
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.33	0.2	0.3	0.2	0.6	0.5	0.1	0.1	0.24	0.21	0.37	1.96	0.08	0.32	0.24	0.87			
Temperature	°C	--	--	--	--	--	--	--	13.17	9.1	12.6	17.3	14.8	10.9	7.3	13.8	13.87	12.2	17	12.06	11.3	13.2	13.2	12.4	12.6		
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-144.3	-111.7	-101.2	-97.6	-15.8	-108.6	-122.1	-83.0	-81.7	-97.3	-107.8	-16.8	-124.9	-125.9	-125.9	-12.9	-156.9		
<b>Appendix III</b>																	Field Dup										
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	125	125	8.8	362	489	400	425	491	465	<b>519</b>	<b>519</b>	<b>602</b>	--	<b>809</b>	<b>798</b>	<b>940</b>	<b>930</b>	960	1080	540		
Calcium	mg/L	NC	NC	500	1	1	0.3	86.4	98.5	89.6	97.4	96.9	97.9	96.3	86.8	91.3	--	89.4	96.6	93	92	95	101	92			
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>500</b>	5	5	0.1	88.0	82.7	87.2	98.3	98.9	94.6	93.9	97.0	108	--	112	120	110	110	110	125	150			
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	13	< 20	
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	0.1	1	--	6.83	6.8	6.8	6.7	6.8	6.9	6.9	6.8	6.8	7.1	6.8	6.7	6.7	6.9	--	7.1	6.94			
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	0.25	0.60	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<20	<20	<0.25	<0.6		
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	500	10	10.0	10.0	<b>610</b>	<b>540</b>	<b>570</b>	<b>590</b>	<b>620</b>	<b>570</b>	<b>560</b>	<b>548</b>	490	--	<b>576</b>	<b>534</b>	<b>590</b>	<b>570</b>	570	543	660		
<b>Appendix IV</b>																											
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 0.25	
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	10	1	1.0	0.6	3	1	1	2	2	2	1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.6	0.73		
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	2	2.5	274	244	236	233	252	240	228	211	--	236	238	224	250	240	230	236	280		
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.24	< 0.25		
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	--	--	< 0.20	< 0.25		
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	2	2	1	2	2	<1	--	< 1.0	1.1	< 1.0	1.2	1.2	1.1	0.7				
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	< 15.0	< 15.0	< 6.0	< 6.0	--	--	0.47	< 0.52		
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	13	< 20		
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 0.55		
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	<10	<10	<10	<10	<10	<10	<10	<10	--	< 10	< 10	< 8.0	< 8.0	< 10	< 10	< 4.1	2.1		
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	--	--	< 0.20	< 0.2		
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	1.2	<5	<5	<5	<5	<5	<5	<5	<5	--	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 1.2		
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.311	1.0	0.569	0.629	0.563	0.429	0.483	0.524	<0.215	<0.768	--	< 0.									

### **Notes:**

ug/L - micrograms per liter. mg/L - milligrams per liter.  
SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.  
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteri

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2011.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water

<sup>^</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using factors (L).

#, if detected above 0.30  $\mu\text{g/l}$ , further evaluation of low-level mercury may be necessary to evaluate the CSI pathway per Michigan Part 301 and MDEQ policy and procedure 09-014 dated June 29, 2009.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury  
**BOLD** value indicates an exceedance of one or more of the listed criteria.

**BOLD** value indicates an exceedance of one or more of the  
**RED** value indicates an exceedance of the MCI

**RED** value indicates  
-- not analyzed.

All metals were analyzed as total unless otherwise specified.

Sample Location: Compliance Phase: Sample Dates:									MW-15023																						
									Background Monitoring								Detection		Initial A.M.		Assessment Monitoring										
									12/2/2015	2/18/2016	4/14/2016	7/14/2016	10/5/2016	2/15/2017	4/5/2017	7/11/2017	9/13/2017	4/18/2018	6/11/2018	11/29/2018	4/12/2019	9/26/2019	5/6/2020	10/30/2020							
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Downgradient																						
<b>Field Parameters</b>																															
pH	su	--	--	--	--	--	--	--	7.43	7.5	7.5	7.5	7.4	7.6	7.6	7.6	7.6	7.4	7.5	7	7.5	7.51	7.51	7.68							
Conductivity	µS/cm	--	--	--	--	--	--	--	493	456	436	447	480	446	600	452	519	981	702	655	602	770	614	588							
Turbidity	NTU	--	--	--	--	--	--	--	0.89	<1	<1	<1	<1	<1	2	1	1.28	1.1	0.4	0.41	5.2	0.65	4.68	1.7							
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.27	0.2	0.3	0.5	0.5	0.6	0.1	0.1	0.22	0.29	0.35	0.81	0.41	0.35	0.29	0.59							
Temperature	°C	--	--	--	--	--	--	--	13.49	6.8	10.7	16.9	14.8	7.3	8.1	12.8	14.16	11.3	17.8	10.26	11.1	13	11.2	12.5							
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-139.1	-82.7	-79.0	-72.7	-75.0	-53.4	-83.6	-46.3	-33.4	-15.5	-68.7	30.9	-30.7	-128.7	144.1	-159.8							
<b>Appendix III</b>																															
Boron	ug/L	NC	500	500	7,200	125	50	8.8	414	284	267	308	526	484	1,590	701	504	--	1,650	1,350	2,600	1,000	717	610							
Calcium	mg/L	NC	NC	NC	500	1	1	0.3	59.7	59.4	53.3	54.1	64.0	59.9	74.5	50.8	60.9	--	98.9	116	120	100	85	73							
Chloride	mg/L	250**	250	250	500	5	5	0.1	30.0	26.9	24.6	28.7	24.8	23.8	24.6	26.8	25.5	--	19.4	17.0	16	16	15	12							
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1	--	7.43	7.5	7.5	7.5	7.4	7.6	7.63	7.6	7.6	7.4	7.5	7.0	7.5	7.8	7.7								
Sulfate	mg/L	250**	250	250	500	2	5	0.60	20.0	26.5	28.9	25.0	24.3	21.0	22.5	36.2	--	139	156	140	130	113	130								
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	10.0	240	270	270	290	290	280	290	408	--	474	530	600	490	384	340								
<b>Appendix IV</b>																															
Antimony	ug/L	6	6	6	130	1	1.0	0.3	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.25								
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	2	2	1	3	2	2	<1	2	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.59	< 0.55							
Barium	ug/L	2,000	2,000	2,000	670	1	1.0	2.5	57	48	43	40	47	42	46	38	--	97.1	87.8	90.4	100	92	78	70							
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.25							
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20							
Chromium	ug/L	100	100	100	11	1	1.0	0.3	<1	<1	2	1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.25							
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	<15	<15	<15	<15	<15	<15	<15	<15	--	< 15.0	< 15.0	< 6.0	< 6.0	--	0.11	< 0.52							
Fluoride	ug/L	4,000	NC	NC	NC	1000	0.10	20.0	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	
Lead	ug/L	NC	4	4	29	1	1.0	0.6	<1	<1	<1	<1	<1	<1	<1	<1	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.55								
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	12.1	10.6	<10	<10	<10	<10	11	<10	--	19	18	20	31	13	18	13							
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20							
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	8	6	<5	7	6	<5	6	<5	<5.0	7.1	6.6	< 5.0	5.1	6.2	5.9								
Radium-226	pCi/L	5	NC	NC	NC	N/A		1.0	0.232	<0.237	<0.242	0.226	<0.309	0.257	0.455	<0.889	--	< 0.572	< 0.958	< 0.537	0.181	0.209	0.178	0.150							
Radium-226/228	pCi/L	5	NC	NC	NC	N/A		1.0	<0.530	0.599	<0.456	<0.545	<0.355	0.426	1.42	<1.53	--	< 1.32	< 1.85	< 1.72	0.952	0.527	0.178	0.780							
Radium-228	pCi/L	5	NC	NC	NC	N/A		1.0	<0.530	0.426	<0																				

**Notes:** \_\_\_\_\_

ug/L - micrograms per liter. mg/L - milligrams per liter.  
SU - standard units; pH is a field parameter. nCi/L - picocuries per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.  
MCL - Maximum Contaminant Level. EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criterion.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories  
\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.  
\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (S)

<sup>\*\*</sup> - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

<sup>a</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria per footnote {H}.

# - If detected above 0.20 µg/L, further evaluation of

**BOLD** value indicates an exceedance of one or more of the

**RED** value indicates an exceedance of the MCL.

Constituent		Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	RDL (Most Common prior to 2020)	RDL (Pace)	Sample Location:		MW-17001																
											Background & Detection								Assessment Monitoring								
									Sample Dates:		12/7/2017	2/20/2018	6/15/2018	8/6/2018	11/29/2018	11/29/2018	4/11/2019	9/26/2019	5/6/2020								
Downgradient (Shallow 2017 Wells)																											
<b>Field Parameters</b>																											
pH	su	--	--	--	--	--	--	--	7.1	7.0	7.2	6.9	7.3	7.3	6.9	7	7.09										
Conductivity	µS/cm	--	--	--	--	--	--	--	920	943	903	894	731	731	661	862	1092										
Turbidity	NTU	--	--	--	--	--	--	--	3.4	3.1	3.6	3.7	0.87	0.87	4.1	0.55	48.22										
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.10	0.20	0.22	0.35	0.28	0.28	-0.01	0.28	0.43										
Temperature	°C	--	--	--	--	--	--	--	11.9	11.6	15.0	17.6	11.55	11.55	10.4	15.5	11.4										
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-253.7	-206.4	-328.2	69.7	-136.2	-136.2	-312.2	-149.8	-318.2										
<b>Appendix III</b>																											
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	125	125	<b>991</b>	<b>827</b>	<b>1,100</b>	<b>1,220</b>	<b>1,480</b>	1,550	<b>1,700</b>	<b>1,800</b>	1,780											
Calcium	mg/L	NC	NC	NC	500	1	1	118	118	124	117	135	134	130	120	167											
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	5	27.3	28.5	29.1	29.1	29.0	29.2	31	28	31											
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	97										
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	1	7.1	7.0	7.2	6.9	7.3	--	6.9	7.0	7.4											
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	5	156	135	90.8	18.7	148	140	64	17	138											
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	10.0	<b>558</b>	<b>552</b>	<b>566</b>	476	<b>568</b>	554	<b>570</b>	490	682											
<b>Appendix IV</b>																											
Antimony	ug/L	6	6	6	130	1	1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0								
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1	1.0	5.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.72								
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	1.0	85.6	71.3	65.8	73.8	74.4	70.6	82	81	92											
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--	< 0.20								
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20								
Chromium	ug/L	100	100	100	11	1	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.3	< 1.0	0.18										
Cobalt	ug/L	NC	40	100	100	15	1.0	< 15.0	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	--	0.21								
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	97								
Lead	ug/L	NC	4	4	29	1	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0								
Lithium	ug/L	NC	170	350	440	10	20.0	55	73	65	62	64	<b>63</b>	43	60	77											
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20								
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	0.76								
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.413	< 0.509	< 0.890	< 0.766	< 0.616	< 0.942	< 0.754	0.314	0.260	0.0779											
Radium-226/228	pCi/L	<b>5</b>	NC	NC	NC	N/A	1.15	< 1.34	< 1.79	< 1.71	< 1.44	< 1.69	< 1.45	0.721	1.08	0.0779											
Radium-228	pCi/L	5	NC	NC	NC	N/A	0.732	< 0.830	< 0.901	< 0.947	< 0.822	0.989	1.20	< 0.413	0.821	-0.413											
Selenium	ug/L	50	50	50	<b>5</b>	1	1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	0.31								
Thallium	ug/L	2	2	2	3.7	2.0	1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	--	< 1.0								
Total Suspended Solids	mg/L	--	--	--	--	2.5	2.5	--	--	--	--	--	--	--	--	--	--	< 2.5									

**Notes:**

ug/L - micrograms per liter. mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.  
 \* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.  
 \*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
 ^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using default hardness of 150 mg CaCO<sub>3</sub>/L per MDEQ RRD Op Memo 5, Sept. 30, 2004. Generic GSI criterion for calcium, chloride, and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium per footnote (H).  
 # - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.  
**BOLD** value indicates an exceedance of one or more of the listed criteria.  
**RED** value indicates an exceedance of the MCL.  
 -- - not analyzed.  
 All metals were analyzed as total unless otherwise specified.  
 This well was removed and replaced by MW-17001R on May 12, 2020 for pond closure construction purposes.

Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>A</sup>	RDL (Pace 5/21)	RDL (Pace 6/15)	RDL (Trace)	Sample Location:		
									MW-17001R		
									Compliance Phase: Assessment Monitoring		
Sample Dates: 5/21/2020 6/15/2020 10/29/2020											
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>A</sup>	RDL (Pace 5/21)	RDL (Pace 6/15)	RDL (Trace)	Downgradient (Shallow 2017 Wells)		
<b>Field Parameters</b>											
pH	su	--	--	--	--	--	--	--	7.32	7.68	6.98
Conductivity	µS/cm	--	--	--	--	--	--	--	1144	1460	1040
Turbidity	NTU	--	--	--	--	--	--	--	1.55	11.8	3.88
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.17	0.17	0.1
Temperature	°C	--	--	--	--	--	--	--	11	13.2	13.1
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-324	-103.1	-353.9
<b>Appendix III</b>											
Boron	ug/L	NC	500	500	7,200	125	125	8.8	2,060	1,940	2,100
Calcium	mg/L	NC	NC	NC	500	1	1	0.3	158	150	160
Chloride	mg/L	250**	250	250	500	2.5	2.5	0.1	30	28	21
Fluoride	ug/L	4,000	NC	NC	NC	100	100	20.0	160	180	120
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	1	1	--	7.5	7.1	7.0
Sulfate	mg/L	250**	250	250	500	2.5	2.5	0.60	220	122	4
Total Dissolved Solids	mg/L	500**	500	500	500	10.0	10.0	10.0	751	622	620
<b>Appendix IV</b>											
Antimony	ug/L	6	6	6	130	1.0	1.0	0.3	0.12	< 1.0	< 0.25
Arsenic	ug/L	10	10	10	10	1.0	1.0	0.6	7.3	2.0	0.71
Barium	ug/L	2,000	2,000	2,000	670	1.0	1.0	2.5	91	101	100
Beryllium	ug/L	4	4	4	6.7	0.20	0.20	0.25	< 0.20	< 0.20	< 0.25
Cadmium	ug/L	5	5	5	3.0	0.20	0.20	0.25	< 0.20	< 0.20	< 0.25
Chromium	ug/L	100	100	100	11	1.0	1.0	0.3	0.17	0.18	< 0.25
Cobalt	ug/L	NC	40	100	100	1.0	1.0	0.5	0.25	0.29	< 0.52
Fluoride	ug/L	4,000	NC	NC	NC	100	100	20.0	0.16	180	120
Lead	ug/L	NC	4	4	29	1.0	1.0	0.6	< 1.0	< 1.0	< 0.55
Lithium	ug/L	NC	170	350	440	20.0	20.0	1.2	97	75	93
Mercury	ug/L	2	2	2	0.20#	0.20	0.20	0.2	< 0.20	< 0.20	< 0.2
Molybdenum	ug/L	NC	73	210	3,200	1.0	1.0	1.2	2.5	0.37	< 1.2
Radium-226	pCi/L	5	NC	NC	NC	0.217	0.284	1.0	0.112	0.128	0.270
Radium-226/228	pCi/L	5	NC	NC	NC	1.08	1.250	1.0	0.31	0.806	0.930
Radium-228	pCi/L	5	NC	NC	NC	0.862	0.962	1.0	0.196	0.679	0.660
Selenium	ug/L	50	50	50	5	1.0	1.0	0.5	< 1.0	< 1.0	< 0.5
Thallium	ug/L	2	2	2	3.7	1.0	1.0	0.4	< 1.0	< 1.0	< 0.38
Total Suspended Solids	mg/L	--	--	--	--	2.5	2.5	4.0	< 2.5	< 2.5	< 4

**Notes:**

ug/L - micrograms per liter. mg/L - milligrams per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using default hardness of 150 mg CaCO<sub>3</sub>/L per MDEQ RRD Op Memo 5, Sept. 30, 2004. Generic GSI criterion for calcium, chloride, and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium per footnote {H}.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

BOLD value indicates an exceedance of one or more of the listed criteria.

RED value indicates an exceedance of the MCL.

-- not analyzed.

All metals were analyzed as total unless otherwise specified.

This well was installed on May 12, 2020 to replace MW-17001 for pond closure construction purposes.

Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Sample Location:	MW-17002									
									Compliance Phase:		Background & Detection		Assessment Monitoring						
									Sample Dates:		12/7/2017	2/20/2018	6/15/2018	8/6/2018	11/29/2018	4/11/2019	9/26/2019	5/6/2020	10/29/2020
Downgradient (Shallow 2017 Wells)																			
<b>Field Parameters</b>																			
pH	su	--	--	--	--	--	--	--	7.0	7.1	7.2	7.1	7	6.6	7.3	6.9	7.6		
Conductivity	µS/cm	--	--	--	--	--	--	--	1,069	1,252	1,227	1,090	871	946	1,206	1,361	1,160		
Turbidity	NTU	--	--	--	--	--	--	--	4.3	2.9	2.0	2.8	0.56	0.3	0.2	2.0	1.6		
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.10	0.21	0.26	0.35	0.43	0	0.35	0.23	0.22		
Temperature	°C	--	--	--	--	--	--	--	11.3	11.1	14.6	17.4	12.18	10.3	13.8	10.8	12.7		
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	-283.4	-262.1	-365.0	-294.3	-152.8	-339.3	-348.5	-184.6	-393.3		
<b>Appendix III</b>																			
Boron	ug/L	NC	500	500	7,200	125	1,000	8.8	8,280	12,800	13,300	9,440	9,030	9,200	13,000	10,800	16,000		
Calcium	mg/L	NC	NC	NC	500	1	1	0.3	178	201	224	194	197	220	200	254	220		
Chloride	mg/L	250**	250	250	500	5	0.250	0.1	15.3	14.2	13.2	15.4	16.8	15	12	8	4		
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	160	240		
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1	--	7.0	7.1	7.2	7.1	7.0	6.6	7.3	7.1	7.6		
Sulfate	mg/L	250**	250	250	500	2	25	0.60	330	325	332	226	402	690	540	483	280		
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	10.0	726	892	936	740	800	1,000	860	1060	860		
<b>Appendix IV</b>																			
Antimony	ug/L	6	6	6	130	1	1.0	0.3	1.5	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	--	< 1.0	< 0.25		
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	45.5	2.0	2.6	3.8	2.0	1.6	1.8	0.6	1.4		
Barium	ug/L	2,000	2,000	2,000	670	1	1.0	2.5	148	76.7	62.8	57.6	97.7	130	75	135	71		
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--	< 0.20	< 0.25		
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20	< 0.25		
Chromium	ug/L	100	100	100	11	1	1.0	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.15	0.4		
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	< 15.0	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	--	0.3	< 0.52		
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	160	240		
Lead	ug/L	NC	4	4	29	1	1.0	0.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0	< 0.55		
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	75	160	150	130	120	100	140	141	140		
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20	< 0.2		
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	30.1	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	2.7	3.5		
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.217	1.0	< 1.03	< 1.07	< 0.757	0.306	< 0.968	0.233	0.501	0.592	0.390		
Radium-226/228	pCi/L	5	NC	NC	NC	N/A	1.07	1.0	< 2.03	< 4.84	< 3.11	1.56	2.29	0.688	0.702	0.742	0.940		
Radium-228	pCi/L	5	NC	NC	NC	N/A	0.854	1.0	< 0.996	< 3.77	< 2.35	1.25	2.01	< 0.598	< 0.527	0.150	0.550		
Selenium	ug/L	50	50	50	5	1	1.0	0.5	1.1	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5		
Thallium	ug/L	2	2	2	3.7	2.0	1.0	0.4	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	--	< 1.0	< 0.38		
Total Suspended Solids	mg/L	--	--	--	--	2.5	2.5	4.0	--	--	--	--	--	--	--	< 2.5	< 4		

**Notes:**

ug/L - micrograms per liter. mg/L - milligrams per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using default hardness of 150 mg CaCO<sub>3</sub>/L per MDEQ RRD Op Memo 5, Sept. 30, 2004. Generic GSI criterion for calcium, chloride, and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium per footnote (H).

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

BOLD value indicates an exceedance of one or more of the listed criteria.

RED value indicates an exceedance of the MCL.

-- - not analyzed.

All metals were analyzed as total unless otherwise specified.

Sample Location: Compliance Phase: Sample Dates:									MW-17003																		
									Background & Detection		Assessment Monitoring																
									12/7/2017	2/20/2018	6/15/2018	8/7/2018	8/7/2018	11/29/2018	4/12/2019	9/26/2019	5/6/2020	10/29/2020									
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Downgradient (Shallow 2017 Wells)																		
<b>Field Parameters</b>															Field Dup												
pH	su	--	--	--	--	--	--	--	7.0	7.2	7.4	7.3	7.3	7.3	7.1	7.5	7.2	7.44									
Conductivity	µS/cm	--	--	--	--	--	--	--	580	510	517	553	553	516	410	701	682	660									
Turbidity	NTU	--	--	--	--	--	--	--	4.1	1.9	1.2	1.8	1.8	0.7	5	0.23	46.47	0.02									
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.19	0.28	0.38	0.33	0.33	0.62	0.06	0.24	0.19	0.42									
Temperature	°C	--	--	--	--	--	--	--	11.7	11.2	14.9	16.8	16.8	11.17	10.5	13.7	10.9	13									
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	81.3	-115.5	5.10	-84.3	-84.3	0.3	-227	-219.3	-72.8	-325.9									
<b>Appendix III</b>																											
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	125	25.0	8.8	413	394	369	383	377	410	380	350	403	480									
Calcium	mg/L	NC	NC	500	500	1	1	0.3	74.3	55.7	63.2	74.6	76.9	88.7	78	82	94	86									
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	5	0.1	18.3	21.5	22.7	21.9	21.8	19.1	17	23	17	11									
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	81	< 20					
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	1	--	7.0	7.2	7.4	7.3	--	7.3	7.1	7.5	7.6	7.4										
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	5	0.60	48.4	< 2.0	< 2.0	17.7	25.9	49.6	12	37	24	52									
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	10.0	10.0	324	330	412	326	324	362	380	373	400										
<b>Appendix IV</b>																											
Antimony	ug/L	6	6	6	130	1	1.0	0.3	1.1	< 1.0	< 1.0	< 2.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.25									
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1	1.0	0.6	<b>26.0</b>	< 1.0	< 1.0	1.0	1.1	< 1.0	3.8	9.4	21.1	7.9									
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	1.0	2.5	128	78.1	66.5	77.9	83.3	92.7	83	93	109	120									
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.25											
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.25									
Chromium	ug/L	100	100	100	11	1	1.0	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.25									
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	--	0.12	< 0.52									
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	81	< 20							
Lead	ug/L	NC	4	4	29	1	1.0	0.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.55									
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	19	17	13	18	18	19	15	14	19	20									
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20									
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	1.2	48.8	6.3	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	11.2	7.6							
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.361	1.0	< 0.889	< 0.755	< 0.594	< 0.687	0.353	< 0.685	0.205	0.347	0.351	0.460									
Radium-226/228	pCi/L	<b>5</b>	NC	NC	NC	N/A	1.26	1.0	< 1.55	< 1.46	< 1.42	< 1.49	< 1.03	< 1.38	0.539	0.676	0.351	1.380									
Radium-228	pCi/L	5	NC	NC	NC	N/A	0.902	1.0	< 0.663	< 0.707	< 0.828	0.932	< 0.871	< 0.695	< 0.483	< 0.521	< 0.162	0.92									
Selenium	ug/L	50	50	50	<b>5</b>	1	1.0	0.5	< 1.0	2.2	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 0.5									
Thallium	ug/L	2	2	2	3.7	2.0	1.0	0.4	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 0.38									
Total Suspended Solids	mg/L	--	--	--	--	2.5																					

Sample Location: Compliance Phase: Sample Dates:									MW-17004									
									Background & Detection		Assessment Monitoring							
									12/6/2017	2/20/2018	6/15/2018	8/7/2018	11/30/2018	4/12/2019	4/12/2019	9/26/2019	5/5/2020	10/29/2020
<b>Constituent</b>																		
<b>Field Parameters</b>																		
pH	su	--	--	--	--	--	--	--	7.2	7.3	7.4	7.3	7.3	7.5	7.5	7.6	7.53	6.92
Conductivity	µS/cm	--	--	--	--	--	--	--	452	450	569	550	783	387	387	519	858	970
Turbidity	NTU	--	--	--	--	--	--	--	3.4	<1.0	<1.0	1.4	0.41	6.9	6.9	0.75	7.04	0.02
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.25	0.26	0.36	0.37	1.22	0.05	0.05	0.35	0.26	0.38
Temperature	°C	--	--	--	--	--	--	--	14.0	13.6	15.4	18.5	12.19	10.7	10.7	14.4	11.2	12.9
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	28.7	-72.0	7.90	-51.2	41.5	-191.8	-191.8	-148.9	34.5	-130.8
<b>Appendix III</b>																		
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	125	50	8.8	367	429	<b>525</b>	425	<b>601</b>	440	450	<b>570</b>	542	830
Calcium	mg/L	NC	NC	500	1	1	0.3	53.7	48.1	73.1	68.9	116	67	71	66	126	150	
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	5	0.1	21.3	21.3	21.4	21.2	18.7	19	20	16	17	5
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	89	120
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	1	--	7.2	7.3	7.4	7.3	7.3	7.5	--	7.6	7.7	6.9	
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	5	0.60	< 2.0	< 2.0	8.3	< 2.0	166	7.8	7.5	3.1	104.0	220.0
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	10.0	10.0	228	238	410	320	500	330	340	300	490	620
<b>Appendix IV</b>																		
Antimony	ug/L	6	6	130	1	1.0	0.3	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	--	< 1.0	< 0.25	
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	1	1.0	0.6	2.5	1.8	1.1	< 1.0	2.1	1.7	1.7	< 1.0	5.3	0.65	
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	2	2.5	145	116	175	148	252	150	150	140	253	370
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--	< 0.2	< 0.25
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20	< 0.25
Chromium	ug/L	100	100	100	11	1	1.0	0.3	< 1.0	< 1.0	1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.17	< 0.25
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	< 15.0	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	< 6.0	--	0.16	< 0.5
Fluoride	ug/L	4,000	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	89	120
Lead	ug/L	NC	4	4	29	1	1.0	0.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0	< 0.55
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	< 10	< 10	< 10	< 10	14	< 8.0	8.0	< 10	15.2	13
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20	< 0.2
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	1.2	9.9	5.9	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	0.8	< 1.2
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.18	1.0	< 0.945	< 0.723	< 0.441	< 0.519	< 0.766	0.182	< 0.203	0.271	0.191	0.280
Radium-226/228	pCi/L	<b>5</b>	NC	NC	NC	N/A	1.24	1.0	< 1.75	< 1.44	< 1.25	< 1.46	< 1.56	0.721	0.638	< 0.546	0.191	1.040
Radium-228	pCi/L	5	NC	NC	NC	N/A	1.06	1.0	< 0.804	< 0.719	< 0.810	1.03	< 0.790	0.539	< 0.623	< 0.546	-0.620	0.760
Selenium	ug/L	50	50	50	<b>5</b>	1	1.0	0.5	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	
Thallium	ug/L	2	2	2	3.7	2.0	1.0	0.4	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	--	< 1.0	< 0.38
Total Suspended Solids	mg/L	--	--	--	--	2.5	2.5	4.0	--	--	--	--	--	--	--	--	< 2.5	< 4

**Notes:**

ug/L - micrograms per liter, mg/L - milligrams per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using default hardness of 150 mg CaCO<sub>3</sub>/L per MDEQ RRD Op Memo 5, Sept. 30, 2004. Generic GSI criterion for calcium, chloride, and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium per footnote (H).

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

**BOLD** value indicates an exceedance of one or more of the listed criteria.**RED** value indicates an exceedance of the MCL.

-- - not analyzed.

All metals were analyzed as total unless otherwise specified.

Sample Location: Compliance Phase: Sample Dates:									MW-17005																
									Background & Detection Monitoring								Assessment Monitoring								
									12/6/2017	12/6/2017	2/20/2018	2/20/2018	6/15/2018	6/15/2018	8/7/2018	11/30/2018	4/12/2019	9/26/2019	9/26/2019	5/5/2020	10/28/2022				
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Downgradient (Shallow 2017 Wells)																
<b>Field Parameters</b>										Field Dup		Field Dup		Field Dup							Field Dup				
pH	su	--	--	--	--	--	--	--	7.3	7.3	7.3	7.3	7.4	7.4	7.3	7.6	7.5	7.3	7.3	6.79	7.44				
Conductivity	µS/cm	--	--	--	--	--	--	--	426	426	483	483	568	568	512	496	378	900	900	1911	599				
Turbidity	NTU	--	--	--	--	--	--	--	3.8	3.8	2.5	2.5	3.6	3.6	<1.0	1.69	6.4	0.99	0.99	1.8	7.59				
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--	0.22	0.22	0.23	0.23	0.38	0.38	0.35	1.23	0.07	0.31	0.31	0.26	0.13				
Temperature	°C	--	--	--	--	--	--	--	14.9	14.9	13.9	13.9	16.7	16.7	20.8	12.22	10.8	14.4	14.4	11.9	14.6				
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--	28.9	28.9	-80.8	-80.8	9.2	9.2	-104.3	45.8	-116.6	-126	-126	57.2	-128.6				
<b>Appendix III</b>																									
Boron	ug/L	NC	500	500	7,200	125	125	8.8	191	208	238	228	377	353	342	350	400	490	520	1450	430				
Calcium	mg/L	NC	NC	NC	500	1	5	0.3	51.9	54.0	54.2	53.1	71.2	71.1	68.1	68.1	69	120	120	343	76				
Chloride	mg/L	250**	250	250	500	5	5	0.1	19.4	19.4	21.6	21.3	20.5	20.5	19.6	18.5	15	17	17	20	22				
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	22	120	
pH, Field	SU	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	0.1	1	--	7.3	--	7.3	--	7.4	--	7.3	7.6	7.5	7.3	--	7.1	7.44				
Sulfate	mg/L	250**	250	250	500	2	25	0.60	11.5	11.00	< 2.0	< 2.0	9.6	9.0	4.3	42.1	120	65	64	589	6				
Total Dissolved Solids	mg/L	500**	500	500	500	10	10.0	10.0	262	220	310	266	358	416	318	318	380	550	520	1390	340				
<b>Appendix IV</b>																									
Antimony	ug/L	6	6	6	130	1	1.0	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.25		
Arsenic	ug/L	10	10	10	10	1	1.0	0.6	2.9	2.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.31	< 0.55	
Barium	ug/L	2,000	2,000	2,000	670	1	5	2.5	168	167	123	128	161	149	179	131	84	340	350	456	170				
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.25		
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.25		
Chromium	ug/L	100	100	100	11	1	1.0	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1	3.8	0.3	0.4
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	< 6.0	< 6.0	< 1.0	< 1.0	< 1.0	< 0.52		
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	22	120	
Lead	ug/L	NC	4	4	29	1	1.0	0.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.55		
Lithium	ug/L	NC	170	350	440	10	20.0	1.2	10	12	11	11	< 10	< 10	13	11	< 8.0	14	14	48	13				
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.2		
Molybdenum	ug/L	NC	73	210	3,200	5	1.0	1.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 1.2		
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.269	1.0	< 0.863	1.56	< 0.804	0.910	< 0.692	< 0.610	0.440	< 0.592	0.270	0.497	0.481	0.285	0.150				
Radium-226/228	pCi/L	5	NC	NC	NC	N/A	0.995	1.0	< 1.59	< 1.61	< 1.71	< 1.80	< 1.49	< 1.46	< 1.15	< 1.25	0.700	0.739	1.08	0.541	0.960				
Radium-228	pCi/L	5	NC	NC	NC	N/A	0.726	1.0	< 0.722	< 0.649	< 0.904	< 0.945	< 0.796	< 0.853	< 0.741	< 0.656	< 0.479	< 0.564	0.596	0.256	0.810				
Selenium	ug/L	50	50	50	5	1	1.0	0.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5		
Thallium	ug/L	2	2	2	3.7	2.0	1.0	0.4	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 1.0	< 0.38		
Total Suspended Solids	mg/L	--	--	--	--	2.5	12.5	4.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	49	< 4	

Notes:

Notes: µg/L - micrograms per liter; mg/L - milligrams per liter

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2011

<sup>a</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR), April, 2011.

and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium

per footnote {H}.

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate health risk.

**BOLD** value indicates an exceedance of one or

**RED** value indicates an exceedance of the MCL.

Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>A</sup>	RDL (Most Common prior to 2020)	RDL (Pace)	RDL (Trace)	Sample Location:	MW-17006								
									Compliance Phase:	Background & Detection		Assessment Monitoring						
									Sample Dates:	12/6/2017	2/20/2018	6/15/2018	8/7/2018	11/30/2018	4/12/2019	9/26/2019	5/5/2020	10/30/2020
Downgradient (Shallow 2017 Wells)																		
<b>Field Parameters</b>																		
pH	su	--	--	--	--	--	--	--		7.7	7.3	7.5	7.5	7.7	7.5	7.8	7.03	7.02
Conductivity	µS/cm	--	--	--	--	--	--	--		794	11	717	693	686	732	975	1029	1320
Turbidity	NTU	--	--	--	--	--	--	--		3.0	1.3	1.3	<1.0	0.43	1.7	0.95	2.47	0.02
Dissolved Oxygen	mg/L	--	--	--	--	--	--	--		0.22	2.09	0.42	0.37	1.35	0.11	0.39	0.27	0.9
Temperature	°C	--	--	--	--	--	--	--		11.1	13.5	15.8	19.6	11.93	12	13.2	12.1	12.1
Oxidation Reduction Potential	mV	--	--	--	--	--	--	--		60.7	10.8	16.4	-60.7	20.2	-156.7	-209	30.3	-79.1
<b>Appendix III</b>																		
Boron	ug/L	NC	<b>500</b>	<b>500</b>	7,200	125	100	8.8		<b>669</b>	<b>594</b>	<b>653</b>	<b>765</b>	<b>630</b>	<b>650</b>	<b>600</b>	745	980
Calcium	mg/L	NC	NC	NC	500	1	1	0.3		106	95.0	97.5	90.4	99.8	150	130	153	220
Chloride	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	<b>500</b>	5	5	0.1		19.0	20.3	20.9	21.5	20.4	19	18	25	19
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0		< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	22	130
pH, Field	SU	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 8.5</b>	<b>6.5 - 9.0</b>	0.1	1	--		7.7	7.3	7.5	7.5	7.7	7.5	7.8	7.4	7.0
Sulfate	mg/L	<b>250**</b>	<b>250</b>	<b>250</b>	500	2	5	0.60		129	93.1	69.8	46.2	102	<b>290</b>	220	182	340
Total Dissolved Solids	mg/L	<b>500**</b>	<b>500</b>	<b>500</b>	<b>500</b>	10	10.0	10.0		474	472	478	438	432	<b>800</b>	<b>680</b>	631	940
<b>Appendix IV</b>																		
Antimony	ug/L	6	6	6	130	1	1.0	0.3		< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	--	< 1.0	< 0.25
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	1	1.0	0.6		4.9	2.4	4.6	< 1.0	6.6	5.9	4.3	5.7	0.7
Barium	ug/L	2,000	2,000	2,000	<b>670</b>	1	1.0	2.5		83.3	79.0	70.3	73.0	68.6	120	98	129	190
Beryllium	ug/L	4	4	4	6.7	1.0	0.20	0.25		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--	< 0.20	< 0.25
Cadmium	ug/L	5	5	5	3.0	0.2	0.20	0.25		< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20	< 0.25
Chromium	ug/L	100	100	100	11	1	1.0	0.3		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.2	0.2	< 0.25
Cobalt	ug/L	NC	40	100	100	15	1.0	0.5		< 15.0	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	--	0.17	< 0.52
Fluoride	ug/L	4,000	NC	NC	NC	1000	100	20.0		< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	0.022	130
Lead	ug/L	NC	4	4	29	1	1.0	0.6		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0	< 0.55
Lithium	ug/L	NC	170	350	440	10	20.0	1.2		38	37	31	36	32	35	28	38	57
Mercury	ug/L	2	2	2	0.20#	0.2	0.20	0.2		< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20	< 0.2
Molybdenum	ug/L	NC	<b>73</b>	210	3,200	5	1.0	1.2		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	1.6	< 1.2
Radium-226	pCi/L	5	NC	NC	NC	N/A	0.332	1.0		< 0.930	< 0.766	< 0.862	< 0.582	1.13	< 0.225	0.497	0.754	0.440
Radium-226/228	pCi/L	<b>5</b>	NC	NC	NC	N/A	1.21	1.0		< 0.833	< 0.716	< 0.888	< 0.757	1.06	< 0.556	< 0.437	0.955	1.180
Radium-228	pCi/L	5	NC	NC	NC	N/A	0.873	1.0		< 1.76	< 1.48	< 1.75	< 1.34	2.19	< 0.556	0.819	0.201	0.740
Selenium	ug/L	50	50	50	<b>5</b>	1	1.0	0.5		< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 0.5	
Thallium	ug/L	2	2	2	3.7	2.0	1.0	0.4		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	--	< 1.0	< 0.38
Total Suspended Solids	mg/L	--	--	--	--	2.5	2.5	4.0		--	--	--	--	--	--	--	< 2.5	< 4

**Notes:**

ug/L - micrograms per liter, mg/L - milligrams per liter.

SU - standard units; pH is a field parameter. pCi/L - picocuries per liter.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012. NC - no criteria.

\* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.

\*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.

^ - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using default hardness of 150 mg CaCO<sub>3</sub>/L per MDEQ RRD Op Memo 5, Sept. 30, 2004. Generic GSI criterion for calcium, chloride, and sulfate is the total dissolved solids criterion. Chromium GSI criterion based on hexavalent chromium per footnote (H).

# - If detected above 0.20 ug/L, further evaluation of low-level mercury may be necessary to evaluate the GSI pathway per Michigan Part 201 and MDEQ policy and procedure 09-014 dated June 20, 2012.

BOLD value indicates an exceedance of one or more of the listed criteria.

RED value indicates an exceedance of the MCL.

-- not analyzed.

All metals were analyzed as total unless otherwise specified.

## **Appendix D**

### **Lab Reports**

August 06, 2020

Molly Reeves  
HDR, Inc.  
3321 Bronson Blvd  
Kalamazoo, MI 49008

RE: Project: Muskegon Site Rad  
Pace Project No.: 50256084

Dear Molly Reeves:

Enclosed are the analytical results for sample(s) received by the laboratory on May 05, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

Revised Report: This report replaces the original dated, 051920. Revised to add Rad 226/228 combined per client request./080620msb

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melanie Booms  
melanie.booms@pacelabs.com  
(616)975-4500  
Project Manager

Enclosures

cc: Lara Syrocki, HDR, Inc.  
Aryka Thomson, HDR, Inc.



## REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.

## SAMPLE SUMMARY

Project: Muskegon Site Rad  
 Pace Project No.: 50256084

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50256084001	MW-15002	Water	05/04/20 11:10	05/05/20 08:33
50256084002	MW-15003	Water	05/04/20 12:00	05/05/20 08:33
50256084003	MW-15004	Water	05/04/20 12:40	05/05/20 08:33
50256084004	MW-15005	Water	05/04/20 13:40	05/05/20 08:33
50256084005	MW-15006	Water	05/04/20 14:40	05/05/20 08:33
50256084006	MW-15007	Water	05/04/20 15:25	05/05/20 08:33
50256084007	MW-15008	Water	05/04/20 16:10	05/05/20 08:33
50256084008	MW-15010	Water	05/04/20 16:55	05/05/20 08:33

## REPORT OF LABORATORY ANALYSIS

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# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.  
**WO# : 50256084**

<b>Section A</b> Required Client Information:		<b>Section B</b> Required Project Information:		<b>Section C</b> Invoice Information:																																																																																																																																																																																																																																																																																																							
Company: HDR, Inc.	Report To: Molly Reeves	Address: 3321 Benson Blvd	Copy To:	Company Name:	Attention:																																																																																																																																																																																																																																																																																																						
Kalamazoo, MI 49008		Email: molly.reeves@idinc.com		Address:																																																																																																																																																																																																																																																																																																							
Phone: 734-751-1790	Fax:	Purchase Order #:		Pace Quote:																																																																																																																																																																																																																																																																																																							
Requested Due Date:	Project Name: Muskegon Site	Project #: 50256084	Pace Project Manager: melanie.booms	State / Location: MI	Residual Chlorine (Y/N)																																																																																																																																																																																																																																																																																																						
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## Sample Conditions Upon Receipt Form (SCUR)

WO# : 50256084

Date/Time: 5.5.20	Evaluated by: WDC	PM: MSB	Due Date: 05/27/20
Client: HDR		CLIENT: GR-HDR	
Project Manager: MSB	Profile ID:		
Rush TAT Requested: YES NO	Due Date:		
Lab Notified of Rush or Short Holds: YES NO	Non Conformance Form Required: YES NO		
Samples Received Via: FedEx UPS Client	Pace Courier	Other: _____	Comments: _____
Custody Seals Present and Intact:		YES	NO
Received Sample Information Form(s): Drinking Waters Only		YES	NO
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)		YES	NO
Short Holds Present (< 72 Hours):		YES	NO
Samples Received in Hold:		YES	NO
Custody Signatures Present:		YES	NO
Collector Signature Present:		YES	NO
Packing Material Used:		YES	NO
Samples Collected Today and On Ice:		YES	NO
IR Gun #: 280 281	Digital Thermometer #: 282 283		
Ice Type: WET Bagged / WET Loose BLUE NONE		1. Cooler Temp Upon Receipt: 0.3   1.0 °C	
Ice Location: TOP BOTTOM MIDDLE DISPERSED		Temp should be 0-6°C (Initial/Corrected)	
Temp Blank Received:		YES	NO
Containers Intact:		YES	NO
Correct Containers:		YES	NO
Sufficient Volume:		YES	NO
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are VOA, coliform, LLHg, O&G, or any container with a septum cap or preserved with HCl		YES	NO
Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)		YES	NO
VOA Headspace Acceptable (<6mm):		YES	NO
Trip Blank Received: HCl MeOH TSP OTHER		YES	NO
Comments:		2. Cooler Temp Upon Receipt: 1.6   2.4 °C	
		3. Cooler Temp Upon Receipt: 2.0   2.8 °C	
		4. Cooler Temp Upon Receipt: _____ °C	

# ANALYTICAL REPORT

August 06, 2020

Revised Report

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

## Pace Analytical - Grand Rapids, MI

Sample Delivery Group: L1215480  
Samples Received: 05/06/2020  
Project Number: 50256084  
Description: Muskegon Site Rad  
Site: 001  
Report To: Melanie Booms  
5560 Corporate Exchange Ct SE  
Grand Rapids, MI 49512

Entire Report Reviewed By:



Donna Eidson  
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



<b>Cp: Cover Page</b>	<b>1</b>	<b>1 Cp</b>
<b>Tc: Table of Contents</b>	<b>2</b>	<b>2 Tc</b>
<b>Ss: Sample Summary</b>	<b>3</b>	<b>3 Ss</b>
<b>Cn: Case Narrative</b>	<b>5</b>	<b>4 Cn</b>
<b>Sr: Sample Results</b>	<b>6</b>	<b>5 Sr</b>
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MW-15005 L1215480-04	9	9 SC
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MW-15008 L1215480-07	12	
MW-15010 L1215480-08	13	
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<b>Radiochemistry by Method SM7500Ra B M</b>	<b>15</b>	
<b>GI: Glossary of Terms</b>	<b>16</b>	
<b>AL: Accreditations &amp; Locations</b>	<b>17</b>	
<b>Sc: Sample Chain of Custody</b>	<b>18</b>	

## SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



			Collected by	Collected date/time	Received date/time	
				05/04/20 11:10	05/06/20 08:45	
MW-15002 L1215480-01 Non-Potable Water	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1472316	1	05/08/20 09:00	05/12/20 10:25	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN

MW-15003 L1215480-02 Non-Potable Water	Collected by	Collected date/time	Received date/time
		05/04/20 12:00	05/06/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1472316	1	05/08/20 09:00	05/12/20 10:25	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN

MW-15004 L1215480-03 Non-Potable Water	Collected by	Collected date/time	Received date/time
		05/04/20 12:40	05/06/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1472316	1	05/08/20 09:00	05/12/20 10:25	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN

MW-15005 L1215480-04 Non-Potable Water	Collected by	Collected date/time	Received date/time
		05/04/20 13:40	05/06/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1472316	1	05/08/20 09:00	05/12/20 10:25	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN

MW-15006 L1215480-05 Non-Potable Water	Collected by	Collected date/time	Received date/time
		05/04/20 14:40	05/06/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1472316	1	05/08/20 09:00	05/12/20 10:25	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN

MW-15007 L1215480-06 Non-Potable Water	Collected by	Collected date/time	Received date/time
		05/04/20 15:25	05/06/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1472316	1	05/08/20 09:00	05/12/20 10:25	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



## MW-15008 L1215480-07 Non-Potable Water

Collected by  
05/04/20 16:10

Collected date/time  
Received date/time  
05/06/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1472316	1	05/08/20 09:00	05/12/20 10:25	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN

## MW-15010 L1215480-08 Non-Potable Water

Collected by  
05/04/20 16:55

Collected date/time  
Received date/time  
05/06/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1472316	1	05/08/20 09:00	05/12/20 10:25	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1475276	1	05/13/20 15:12	05/15/20 10:42	RGT	Mt. Juliet, TN

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson  
Project Manager

- <sup>1</sup> Cp
- <sup>2</sup> Tc
- <sup>3</sup> Ss
- <sup>4</sup> Cn
- <sup>5</sup> Sr
- <sup>6</sup> Qc
- <sup>7</sup> GI
- <sup>8</sup> AI
- <sup>9</sup> SC

### Report Revision History

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Level II Report - Version 1: 05/19/20 14:28

### Project Narrative

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U Qualifiers were added upon customer request and indicate reslts + uncertainty are < MDA.



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.555	MDA 0.804	Analysis Date date / time 05/12/2020 10:25	<u>Batch</u> <a href="#">WG1472316</a>	<sup>1</sup> Cp
RADIUM-228	1.14			62.0-143	05/12/2020 10:25	<a href="#">WG1472316</a>	<sup>2</sup> Tc
( <i>T</i> ) Barium	113						<sup>3</sup> Ss
( <i>T</i> ) Yttrium	103			79.0-136	05/12/2020 10:25	<a href="#">WG1472316</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.757	MDA 1.11	Analysis Date date / time 05/15/2020 10:42	<u>Batch</u> <a href="#">WG1475276</a>	<sup>5</sup> Sr
Combined Radium	1.27						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.202	MDA 0.304	Analysis Date date / time 05/15/2020 10:42	<u>Batch</u> <a href="#">WG1475276</a>	<sup>7</sup> Gl
RADIUM-226	0.138			30.0-143	05/15/2020 10:42	<a href="#">WG1475276</a>	<sup>8</sup> Al
( <i>T</i> ) Barium-133	71.4						<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.191	U	0.518	0.77	05/12/2020 10:25	WG1472316
(T) Barium	112			62.0-143	05/12/2020 10:25	WG1472316
(T) Yttrium	105			79.0-136	05/12/2020 10:25	WG1472316

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.269		0.719	0.974	05/15/2020 10:42	WG1475276

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.269		0.201	0.204	05/15/2020 10:42	WG1475276
(T) Barium-133	102			30.0-143	05/15/2020 10:42	WG1475276

<sup>10</sup> Sc



## Radiochemistry by Method 904

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.274	<u>U</u>	0.615	0.954	05/12/2020 10:25	WG1472316
(T) Barium	115			62.0-143	05/12/2020 10:25	WG1472316
(T) Yttrium	94.2			79.0-136	05/12/2020 10:25	WG1472316

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## Radiochemistry by Method Calculation

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.433		0.799	1.2	05/15/2020 10:42	WG1475276

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.159		0.184	0.25	05/15/2020 10:42	WG1475276
(T) Barium-133	101			30.0-143	05/15/2020 10:42	WG1475276

<sup>10</sup> Sc



## Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.476	U	0.546	0.923	05/12/2020 10:25	WG1472316
(T) Barium	107			62.0-143	05/12/2020 10:25	WG1472316
(T) Yttrium	99.0			79.0-136	05/12/2020 10:25	WG1472316

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.649		0.905	1.28	05/15/2020 10:42	WG1475276

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.649		0.359	0.353	05/15/2020 10:42	WG1475276
(T) Barium-133	102			30.0-143	05/15/2020 10:42	WG1475276

<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.295	<u>U</u>	0.580	1.01	05/12/2020 10:25	<u>WG1472316</u>
(T) Barium	108			62.0-143	05/12/2020 10:25	<u>WG1472316</u>
(T) Yttrium	96.9			79.0-136	05/12/2020 10:25	<u>WG1472316</u>

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## Radiochemistry by Method Calculation

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.000		0.649	1.26	05/15/2020 10:42	<u>WG1475276</u>

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	-0.0315	<u>U</u>	0.0690	0.245	05/15/2020 10:42	<u>WG1475276</u>
(T) Barium-133	99.4			30.0-143	05/15/2020 10:42	<u>WG1475276</u>

<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.715		0.594	0.938	05/12/2020 10:25	WG1472316
(T) Barium	106			62.0-143	05/12/2020 10:25	WG1472316
(T) Yttrium	93.3			79.0-136	05/12/2020 10:25	WG1472316

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## Radiochemistry by Method Calculation

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.800		0.742	1.18	05/15/2020 10:42	WG1475276

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.0852	U	0.148	0.241	05/15/2020 10:42	WG1475276
(T) Barium-133	106			30.0-143	05/15/2020 10:42	WG1475276



## Radiochemistry by Method 904

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	
RADIUM-228	0.491		0.578	0.9	05/12/2020 10:25	WG1472316	<sup>1</sup> Cp
( <i>T</i> ) Barium	98.8			62.0-143	05/12/2020 10:25	WG1472316	<sup>2</sup> Tc
( <i>T</i> ) Yttrium	95.1			79.0-136	05/12/2020 10:25	WG1472316	<sup>3</sup> Ss

## Radiochemistry by Method Calculation

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	
Combined Radium	0.892		0.828	1.1	05/15/2020 10:42	WG1475276	<sup>4</sup> Cn

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	
RADIUM-226	0.401		0.250	0.199	05/15/2020 10:42	WG1475276	<sup>5</sup> Sr
( <i>T</i> ) Barium-133	92.7			30.0-143	05/15/2020 10:42	WG1475276	<sup>6</sup> Qc

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.622	MDA 1	Analysis Date date / time 05/12/2020 10:25	<u>Batch</u> <a href="#">WG1472316</a>
RADIUM-228	0.634					
(T) Barium	109			62.0-143	05/12/2020 10:25	<a href="#">WG1472316</a>
(T) Yttrium	94.8			79.0-136	05/12/2020 10:25	<a href="#">WG1472316</a>

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.805	MDA 1.24	Analysis Date date / time 05/15/2020 10:42	<u>Batch</u> <a href="#">WG1475276</a>
Combined Radium	0.780					

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.183	MDA 0.241	Analysis Date date / time 05/15/2020 10:42	<u>Batch</u> <a href="#">WG1475276</a>
RADIUM-226	0.146					
(T) Barium-133	78.7			30.0-143	05/15/2020 10:42	<a href="#">WG1475276</a>

<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc



## Method Blank (MB)

(MB) R3527812-1 05/11/20 14:00

Analyte	MB Result pCi/l	<u>MB Qualifier</u>	MB MDA pCi/l
Radium-228	-0.187	<u>U</u>	0.503
(T) Barium	87.7		
(T) Yttrium	106		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1215480-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1215480-07 05/12/20 10:25 • (DUP) R3527812-5 05/11/20 14:00

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD	DUP RER	<u>DUP Qualifier</u>	DUP RPD Limits	DUP RER Limit
Radium-228	0.491	0.0185	1	185	0.594	<u>U</u>	20	3
(T) Barium	98.8	109						
(T) Yttrium	95.1	111						

## Laboratory Control Sample (LCS)

(LCS) R3527812-2 05/11/20 14:00

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Radium-228	5.00	4.84	96.8	80.0-120	
(T) Barium			108		
(T) Yttrium			104		

<sup>9</sup>Sc

## L1215480-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1215480-08 05/12/20 10:25 • (MS) R3527812-3 05/11/20 14:00 • (MSD) R3527812-4 05/11/20 14:00

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	MS RER	RPD Limits %
Radium-228	10.0	0.634	11.4	12.4	107	118	1	70.0-130		8.66		20
(T) Barium		109		111	104							
(T) Yttrium		94.8		109	109							



L1215480-01,02,03,04,05,06,07,08

## Method Blank (MB)

(MB) R3529113-1 05/15/20 10:42

Analyte	MB Result pCi/l	<u>MB Qualifier</u>	MB MDA pCi/l
Radium-226	0.00602	<u>U</u>	0.0530
(T) Barium-133	72.6		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1215480-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1215480-07 05/15/20 10:42 • (DUP) R3529113-4 05/15/20 10:42

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	<u>DUP Qualifier</u>	DUP RPD Limits %	DUP RER Limit
Radium-226	0.401	0.190	1	71.2	0.607		20	3
(T) Barium-133	92.7	93.2						

## Laboratory Control Sample (LCS)

(LCS) R3529113-2 05/15/20 10:42

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Radium-226	5.02	5.14	102	80.0-120	
(T) Barium-133			84.5		

<sup>9</sup>Sc

## L1217558-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1217558-01 05/15/20 10:42 • (MS) R3529113-3 05/15/20 10:42

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Radium-226	20.1	0.287	20.1	98.3	1	75.0-125	
(T) Barium-133		101		102			



## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

**Results Disclaimer -** Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

### Abbreviations and Definitions

MDA	Minimum Detectable Activity.	<sup>1</sup> Cp
Rec.	Recovery.	<sup>2</sup> Tc
RER	Replicate Error Ratio.	<sup>3</sup> Ss
RPD	Relative Percent Difference.	<sup>4</sup> Cn
SDG	Sample Delivery Group.	<sup>5</sup> Sr
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.	<sup>6</sup> Qc
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.	<sup>7</sup> Gl
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.	<sup>8</sup> Al
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.	<sup>9</sup> Sc
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.	
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.	
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.	
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.	
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.	
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.	
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.	
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.	
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.	

Qualifier	Description
U	Below Detectable Limits: Indicates that the analyte was not detected.



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

- \* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
- \* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

Alabama	40660
Alaska	17-026
Arizona	AZ0612
Arkansas	88-0469
California	2932
Colorado	TN00003
Connecticut	PH-0197
Florida	E87487
Georgia	NELAP
Georgia <sup>1</sup>	923
Idaho	TN00003
Illinois	200008
Indiana	C-TN-01
Iowa	364
Kansas	E-10277
Kentucky <sup>1,6</sup>	90010
Kentucky <sup>2</sup>	16
Louisiana	AI30792
Louisiana <sup>1</sup>	LA180010
Maine	TN0002
Maryland	324
Massachusetts	M-TN003
Michigan	9958
Minnesota	047-999-395
Mississippi	TN00003
Missouri	340
Montana	CERT0086

Nebraska	NE-OS-15-05
Nevada	TN-03-2002-34
New Hampshire	2975
New Jersey-NELAP	TN002
New Mexico <sup>1</sup>	n/a
New York	11742
North Carolina	Env375
North Carolina <sup>1</sup>	DW21704
North Carolina <sup>3</sup>	41
North Dakota	R-140
Ohio-VAP	CL0069
Oklahoma	9915
Oregon	TN200002
Pennsylvania	68-02979
Rhode Island	LA000356
South Carolina	84004
South Dakota	n/a
Tennessee <sup>1,4</sup>	2006
Texas	T104704245-18-15
Texas <sup>5</sup>	LAB0152
Utah	TN00003
Vermont	VT2006
Virginia	460132
Washington	C847
West Virginia	233
Wisconsin	9980939910
Wyoming	A2LA

## Third Party Federal Accreditations

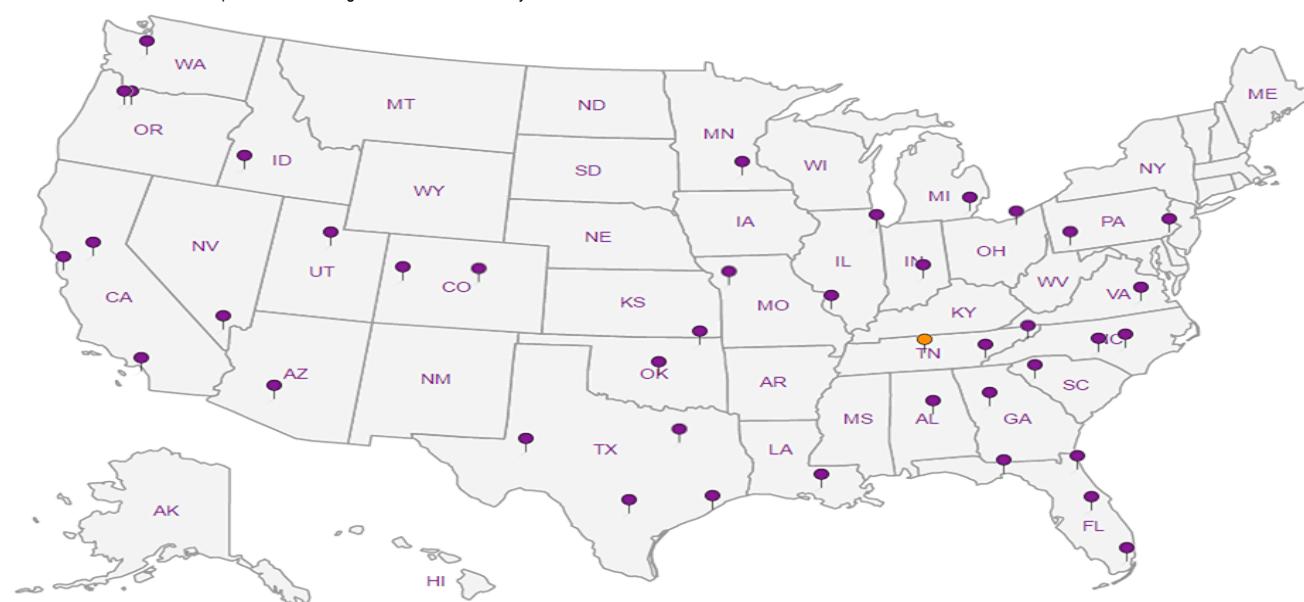
A2LA – ISO 17025	1461.01
A2LA – ISO 17025 <sup>5</sup>	1461.02
Canada	1461.01
EPA-Crypto	TN00003

AIHA-LAP,LLC EMLAP	100789
DOD	1461.01
USDA	P330-15-00234

<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>6</sup> Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



- <sup>1</sup> Cp
- <sup>2</sup> Tc
- <sup>3</sup> Ss
- <sup>4</sup> Cn
- <sup>5</sup> Sr
- <sup>6</sup> Qc
- <sup>7</sup> Gl
- <sup>8</sup> Al
- <sup>9</sup> Sc

# Chain of Custody

G231

tical  
pacelabs.com

Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: MI

Cert. Needed:  Yes  No

Owner Received Date: 5/5/2020 Results Requested By: 5/27/2020

Workorder: 50256084

Workorder Name: Muskegon Site Rad

Report To

Subcontract To

Melanie Booms  
Pace Analytical Grand Rapids  
5560 Corporate Exchange Ct. SE  
Grand Rapids, MI 49512  
Phone (616)975-4500

Pace National

Requested Analysis

Item	Sample ID	Sample Type	Collect Date/Time		Lab ID	Matrix	HNO3	Preserved Containers								Comments	
			Day	Month				1	2	3	4	5	6	7	8		
1	MW-15002	PS	5/4	2020	11:10	50256084001	Water	2				X	X				-01
2	MW-15003	PS	5/4	2020	12:00	50256084002	Water	2				X	X				02
3	MW-15004	PS	5/4	2020	12:40	50256084003	Water	2				X	X				03
4	MW-15005	PS	5/4	2020	13:40	50256084004	Water	2				X	X				04
5	MW-15006	PS	5/4	2020	14:40	50256084005	Water	2				X	X				05
6	MW-15007	PS	5/4	2020	15:25	50256084006	Water	2				X	X				06
7	MW-15008	PS	5/4	2020	16:10	50256084007	Water	2				X	X				07
8	MW-15010	PS	5/4	2020	16:55	50256084008	Water	2				X	X				08

1215480

LAB USE ONLY

Transfers	Released By	Date/Time	Received By	Date/Time	Comments
1	S. D. Bradin	5/5/20 19:00	Lauri Kemp	5/6/20 8:45	J flag down to the MDL Settings J, 3, F EDD 1149
2					
3					

Cooler Temperature on Receipt 4.4 °C

Custody Seal Y or N

Received on Ice Y or N

Samples Intact Y or N

\*\*\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

4.3 + 1 = 4.4 NM  
AM

RAD SCREEN: <0.5 mR/hr

**Sample Conditions Upon Receipt Form (SCUR)**
**WO# : 50256084**

Date/Time:	5/5/20	Evaluated by: UUDC		PM: MSB	Due Date:	05/27/20
Client:	HDR			CLIENT:		GR-HDR
Project Manager:	MSB	Profile ID:				
Rush TAT Requested:	YES	No	Due Date:			
Lab Notified of Rush or Short Holds:	YES	NO		Non Conformance Form Required:	YES	NO
Samples Received Via:	FedEx	UPS	Client	Pace Courier	Other:	Comments:
<b>Custody Seals Present and Intact:</b>						
Received Sample Information Form(s):	Drinking Waters Only					
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)	YES	NO	N/A	N/A	N/A	
Short Holds Present (< 72 Hours):	YES	NO				
Samples Received in Hold:	YES	NO				
Custody Signatures Present:	YES	NO				
Collector Signature Present:	YES	NO				
Packing Material Used:	YES	NO				
Samples Collected Today and On Ice:	YES	NO	N/A	N/A	N/A	
IR Gun #:	280	281		Digital Thermometer #:	282	283
Ice Type:	WET Bagged / WET Loose	BLUE	NONE	1. Cooler Temp Upon Receipt:	0.3	1.0 °C
Ice Location:	TOP	BOTTOM	MIDDLE	DISPERSED	Temp should be 0-6°C (Initial/Corrected)	
Temp Blank Received:	YES	NO				
Containers Intact:	YES	NO				
Correct Containers:	YES	NO				
Sufficient Volume:	YES	NO				
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are POA, coliform, LLHg, O&G, or any container with a septum cap or preserved with HCl						
Residual Chlorine Absent:	YES	NO	N/A	N/A	N/A	
SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)	YES	NO	N/A	N/A	N/A	
/OA Headspace Acceptable (<6mm):	YES	NO				
trip Blank Received:	HCl	MeOH	TSP	OTHER	YES	NO
Comments:						
2. Cooler Temp Upon Receipt:	1.0	2.1	°C			
3. Cooler Temp Upon Receipt:	2.0	2.8	°C			
4. Cooler Temp Upon Receipt:			°C			
Pg. <u>1</u> of <u>1</u>						

Pace Analytical National Center for Testing & Innovation  
Cooler Receipt Form

Client:	PACEGRME		
Cooler Received/Opened On:	5/16/20	Temperature:	4.4
Received By:	Carol Kemp		
Signature:			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	/		
COC Signed / Accurate?	/		
Bottles arrive intact?	/		
Correct bottles used?	/		
Sufficient volume sent?	/		
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?	/		

May 14, 2020

Molly Reeves  
HDR, Inc.  
3321 Bronson Blvd  
Kalamazoo, MI 49008

RE: Project: Muskegon Site  
Pace Project No.: 50256085

Dear Molly Reeves:

Enclosed are the analytical results for sample(s) received by the laboratory on May 05, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Indianapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melanie Booms  
melanie.booms@pacelabs.com  
(616)975-4500  
Project Manager

Enclosures

cc: Aryka Thomson, HDR, Inc.



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: Muskegon Site  
Pace Project No.: 50256085

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**Pace Analytical Services Indianapolis**

7726 Moller Road, Indianapolis, IN 46268  
Illinois Accreditation #: 200074  
Indiana Drinking Water Laboratory #: C-49-06  
Kansas/TNI Certification #: E-10177  
Kentucky UST Agency Interest #: 80226  
Kentucky WW Laboratory ID #: 98019  
Michigan Drinking Water Laboratory #9050

Ohio VAP Certified Laboratory #: CL0065  
Oklahoma Laboratory #: 9204  
Texas Certification #: T104704355  
West Virginia Certification #: 330  
Wisconsin Laboratory #: 999788130  
USDA Soil Permit #: P330-19-00257

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: Muskegon Site  
 Pace Project No.: 50256085

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50256085001	<b>MW-15002</b>	Water	05/04/20 11:10	05/05/20 08:33
50256085002	<b>MW-15003</b>	Water	05/04/20 12:00	05/05/20 08:33
50256085003	<b>MW-15004</b>	Water	05/04/20 12:40	05/05/20 08:33
50256085004	<b>MW-15005</b>	Water	05/04/20 13:40	05/05/20 08:33
50256085005	<b>MW-15006</b>	Water	05/04/20 14:40	05/05/20 08:33
50256085006	<b>MW-15007</b>	Water	05/04/20 15:25	05/05/20 08:33
50256085007	<b>MW-15008</b>	Water	05/04/20 16:10	05/05/20 08:33
50256085008	<b>MW-15010</b>	Water	05/04/20 16:55	05/05/20 08:33

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: Muskegon Site  
Pace Project No.: 50256085

Lab ID	Sample ID	Method	Analysts	Analytics Reported
50256085001	MW-15002	EPA 9056	RSF	3
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		SM 4500-H+B	TPD	1
50256085002	MW-15003	EPA 9056	RSF	3
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		SM 4500-H+B	TPD	1
50256085003	MW-15004	EPA 9056	RSF	3
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		SM 4500-H+B	TPD	1
50256085004	MW-15005	EPA 9056	RSF	3
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		SM 4500-H+B	TPD	1
50256085005	MW-15006	EPA 9056	RSF	3
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		SM 4500-H+B	TPD	1
50256085006	MW-15007	EPA 9056	RSF	3
		EPA 6010	KJE	2

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: Muskegon Site  
Pace Project No.: 50256085

Lab ID	Sample ID	Method	Analysts	Analytes Reported
50256085007	<b>MW-15008</b>	EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		SM 4500-H+B	TPD	1
		EPA 9056	RSF	3
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
50256085008	<b>MW-15010</b>	SM 2540D	MMS	1
		SM 4500-H+B	TPD	1
		EPA 9056	RSF	3
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		SM 4500-H+B	TPD	1

PASI-I = Pace Analytical Services - Indianapolis

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256085

Sample: MW-15002	Lab ID: 50256085001	Collected: 05/04/20 11:10	Received: 05/05/20 08:33	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	54.5	mg/L	2.5	0.40	10			05/07/20 16:01	16887-00-6
Fluoride	0.67	mg/L	0.10	0.0068	1			05/07/20 15:41	16984-48-8
Sulfate	0.068J	mg/L	0.25	0.043	1			05/07/20 15:41	14808-79-8
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	115000	ug/L	1000	72.9	1	05/08/20 06:30	05/11/20 14:16	7440-70-2	
Lithium	5.6J	ug/L	20.0	2.4	1	05/08/20 06:30	05/11/20 14:16	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/08/20 08:26	05/11/20 14:07	7440-36-0	
Arsenic	<0.22	ug/L	1.0	0.22	1	05/08/20 08:26	05/11/20 14:07	7440-38-2	
Barium	68.0	ug/L	1.0	0.20	1	05/08/20 08:26	05/11/20 14:07	7440-39-3	
Beryllium	0.027J	ug/L	0.20	0.020	1	05/08/20 08:26	05/11/20 14:07	7440-41-7	
Boron	295	ug/L	25.0	8.3	5	05/08/20 08:26	05/12/20 01:30	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/08/20 08:26	05/11/20 14:07	7440-43-9	
Chromium	0.37J	ug/L	1.0	0.10	1	05/08/20 08:26	05/11/20 14:07	7440-47-3	
Cobalt	0.20J	ug/L	1.0	0.037	1	05/08/20 08:26	05/11/20 14:07	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/08/20 08:26	05/11/20 14:07	7439-92-1	
Molybdenum	<0.13	ug/L	1.0	0.13	1	05/08/20 08:26	05/11/20 14:07	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/08/20 08:26	05/11/20 14:07	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/08/20 08:26	05/11/20 14:07	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/12/20 10:19	05/13/20 09:56	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	442	mg/L	10.0	10.0	1			05/07/20 11:52	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/07/20 10:46	PP
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	7.8	Std. Units	0.10	0.10	1			05/07/20 08:34	H3

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256085

Sample: MW-15003	Lab ID: 50256085002	Collected: 05/04/20 12:00	Received: 05/05/20 08:33	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	742	mg/L	25.0	4.0	100			05/08/20 11:19	16887-00-6
Fluoride	0.36	mg/L	0.10	0.0068	1			05/07/20 16:59	16984-48-8
Sulfate	4.5	mg/L	0.25	0.043	1			05/07/20 16:59	14808-79-8
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	149000	ug/L	1000	72.9	1	05/08/20 06:30	05/11/20 14:22	7440-70-2	
Lithium	8.1J	ug/L	20.0	2.4	1	05/08/20 06:30	05/11/20 14:22	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/08/20 08:26	05/11/20 14:12	7440-36-0	
Arsenic	<0.22	ug/L	1.0	0.22	1	05/08/20 08:26	05/11/20 14:12	7440-38-2	
Barium	119	ug/L	1.0	0.20	1	05/08/20 08:26	05/11/20 14:12	7440-39-3	
Beryllium	0.025J	ug/L	0.20	0.020	1	05/08/20 08:26	05/11/20 14:12	7440-41-7	
Boron	259	ug/L	25.0	8.3	5	05/08/20 08:26	05/12/20 01:35	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/08/20 08:26	05/11/20 14:12	7440-43-9	
Chromium	0.51J	ug/L	1.0	0.10	1	05/08/20 08:26	05/11/20 14:12	7440-47-3	
Cobalt	0.28J	ug/L	1.0	0.037	1	05/08/20 08:26	05/11/20 14:12	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/08/20 08:26	05/11/20 14:12	7439-92-1	
Molybdenum	<0.13	ug/L	1.0	0.13	1	05/08/20 08:26	05/11/20 14:12	7439-98-7	
Selenium	0.33J	ug/L	1.0	0.31	1	05/08/20 08:26	05/11/20 14:12	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/08/20 08:26	05/11/20 14:12	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/12/20 10:19	05/13/20 09:58	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	1660	mg/L	20.0	20.0	1			05/07/20 11:53	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/07/20 10:46	PP
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	7.7	Std. Units	0.10	0.10	1			05/07/20 08:41	H3

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256085

Sample: MW-15004	Lab ID: 50256085003	Collected: 05/04/20 12:40	Received: 05/05/20 08:33	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	116	mg/L	25.0	4.0	100			05/08/20 11:38	16887-00-6
Fluoride	0.56	mg/L	0.10	0.0068	1			05/07/20 17:37	16984-48-8
Sulfate	4.3	mg/L	0.25	0.043	1			05/07/20 17:37	14808-79-8
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	70700	ug/L	1000	72.9	1	05/08/20 06:30	05/11/20 14:24	7440-70-2	
Lithium	2.9J	ug/L	20.0	2.4	1	05/08/20 06:30	05/11/20 14:24	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	0.20J	ug/L	1.0	0.12	1	05/08/20 08:26	05/11/20 14:16	7440-36-0	
Arsenic	7.1	ug/L	1.0	0.22	1	05/08/20 08:26	05/11/20 14:16	7440-38-2	
Barium	45.3	ug/L	1.0	0.20	1	05/08/20 08:26	05/11/20 14:16	7440-39-3	
Beryllium	0.027J	ug/L	0.20	0.020	1	05/08/20 08:26	05/11/20 14:16	7440-41-7	
Boron	143	ug/L	5.0	1.7	1	05/08/20 08:26	05/11/20 14:16	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/08/20 08:26	05/11/20 14:16	7440-43-9	
Chromium	0.89J	ug/L	1.0	0.10	1	05/08/20 08:26	05/11/20 14:16	7440-47-3	
Cobalt	0.44J	ug/L	1.0	0.037	1	05/08/20 08:26	05/11/20 14:16	7440-48-4	
Lead	0.16J	ug/L	1.0	0.029	1	05/08/20 08:26	05/11/20 14:16	7439-92-1	
Molybdenum	1.5	ug/L	1.0	0.13	1	05/08/20 08:26	05/11/20 14:16	7439-98-7	
Selenium	0.53J	ug/L	1.0	0.31	1	05/08/20 08:26	05/11/20 14:16	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/08/20 08:26	05/11/20 14:16	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/12/20 10:19	05/13/20 10:01	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	500	mg/L	10.0	10.0	1			05/07/20 11:53	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	10	mg/L	5.0	5.0	1			05/07/20 10:46	
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	7.5	Std. Units	0.10	0.10	1			05/07/20 08:44	H3

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256085

Sample: MW-15005	Lab ID: 50256085004	Collected: 05/04/20 13:40	Received: 05/05/20 08:33	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	9.6	mg/L	0.25	0.040	1			05/07/20 18:16	16887-00-6
Fluoride	0.11	mg/L	0.10	0.0068	1			05/07/20 18:16	16984-48-8
Sulfate	7.5	mg/L	0.25	0.043	1			05/07/20 18:16	14808-79-8
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	37300	ug/L	1000	72.9	1	05/08/20 06:30	05/11/20 14:27	7440-70-2	
Lithium	<2.4	ug/L	20.0	2.4	1	05/08/20 06:30	05/11/20 14:27	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	0.57J	ug/L	1.0	0.12	1	05/08/20 08:26	05/11/20 14:21	7440-36-0	
Arsenic	1.3	ug/L	1.0	0.22	1	05/08/20 08:26	05/11/20 14:21	7440-38-2	
Barium	71.7	ug/L	1.0	0.20	1	05/08/20 08:26	05/11/20 14:21	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/08/20 08:26	05/11/20 14:21	7440-41-7	
Boron	13.1	ug/L	5.0	1.7	1	05/08/20 08:26	05/11/20 14:21	7440-42-8	N2
Cadmium	0.15J	ug/L	0.20	0.022	1	05/08/20 08:26	05/11/20 14:21	7440-43-9	
Chromium	0.46J	ug/L	1.0	0.10	1	05/08/20 08:26	05/11/20 14:21	7440-47-3	
Cobalt	0.097J	ug/L	1.0	0.037	1	05/08/20 08:26	05/11/20 14:21	7440-48-4	
Lead	1.1	ug/L	1.0	0.029	1	05/08/20 08:26	05/11/20 14:21	7439-92-1	
Molybdenum	1.7	ug/L	1.0	0.13	1	05/08/20 08:26	05/11/20 14:21	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/08/20 08:26	05/11/20 14:21	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/08/20 08:26	05/11/20 14:21	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/12/20 10:19	05/13/20 10:03	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	158	mg/L	10.0	10.0	1			05/07/20 11:53	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	9	mg/L	5.0	5.0	1			05/07/20 10:46	
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	8.0	Std. Units	0.10	0.10	1			05/07/20 08:50	H3

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256085

Sample: MW-15006	Lab ID: 50256085005	Collected: 05/04/20 14:40	Received: 05/05/20 08:33	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	<b>5.4</b>	mg/L	0.25	0.040	1			05/07/20 18:55	16887-00-6
Fluoride	<b>0.24</b>	mg/L	0.10	0.0068	1			05/07/20 18:55	16984-48-8
Sulfate	<b>8.1</b>	mg/L	0.25	0.043	1			05/07/20 18:55	14808-79-8
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	<b>67000</b>	ug/L	1000	72.9	1	05/08/20 06:30	05/11/20 14:29	7440-70-2	
Lithium	<b>&lt;2.4</b>	ug/L	20.0	2.4	1	05/08/20 06:30	05/11/20 14:29	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<b>0.56J</b>	ug/L	1.0	0.12	1	05/08/20 08:26	05/11/20 14:35	7440-36-0	
Arsenic	<b>4.6</b>	ug/L	1.0	0.22	1	05/08/20 08:26	05/11/20 14:35	7440-38-2	
Barium	<b>14.4</b>	ug/L	1.0	0.20	1	05/08/20 08:26	05/11/20 14:35	7440-39-3	
Beryllium	<b>&lt;0.020</b>	ug/L	0.20	0.020	1	05/08/20 08:26	05/11/20 14:35	7440-41-7	
Boron	<b>29.6</b>	ug/L	5.0	1.7	1	05/08/20 08:26	05/12/20 01:39	7440-42-8	N2
Cadmium	<b>&lt;0.022</b>	ug/L	0.20	0.022	1	05/08/20 08:26	05/11/20 14:35	7440-43-9	
Chromium	<b>0.30J</b>	ug/L	1.0	0.10	1	05/08/20 08:26	05/11/20 14:35	7440-47-3	
Cobalt	<b>0.41J</b>	ug/L	1.0	0.037	1	05/08/20 08:26	05/11/20 14:35	7440-48-4	
Lead	<b>&lt;0.029</b>	ug/L	1.0	0.029	1	05/08/20 08:26	05/11/20 14:35	7439-92-1	
Molybdenum	<b>3.7</b>	ug/L	1.0	0.13	1	05/08/20 08:26	05/11/20 14:35	7439-98-7	
Selenium	<b>0.93J</b>	ug/L	1.0	0.31	1	05/08/20 08:26	05/11/20 14:35	7782-49-2	
Thallium	<b>&lt;0.040</b>	ug/L	1.0	0.040	1	05/08/20 08:26	05/11/20 14:35	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<b>&lt;0.080</b>	ug/L	0.20	0.080	1	05/12/20 10:19	05/13/20 10:06	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	<b>234</b>	mg/L	10.0	10.0	1			05/07/20 11:53	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<b>&lt;2.5</b>	mg/L	2.5	2.5	1			05/07/20 10:46	PP
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	<b>7.9</b>	Std. Units	0.10	0.10	1			05/07/20 08:53	H3

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256085

Sample: MW-15007	Lab ID: 50256085006	Collected: 05/04/20 15:25	Received: 05/05/20 08:33	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	513	mg/L	25.0	4.0	100			05/08/20 11:58	16887-00-6
Fluoride	0.32	mg/L	0.10	0.0068	1			05/07/20 19:33	16984-48-8
Sulfate	3.6	mg/L	0.25	0.043	1			05/07/20 19:33	14808-79-8
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	91100	ug/L	1000	72.9	1	05/08/20 06:30	05/11/20 14:31	7440-70-2	
Lithium	2.6J	ug/L	20.0	2.4	1	05/08/20 06:30	05/11/20 14:31	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/08/20 08:26	05/11/20 14:39	7440-36-0	
Arsenic	2.0	ug/L	1.0	0.22	1	05/08/20 08:26	05/11/20 14:39	7440-38-2	
Barium	57.9	ug/L	1.0	0.20	1	05/08/20 08:26	05/11/20 14:39	7440-39-3	
Beryllium	0.024J	ug/L	0.20	0.020	1	05/08/20 08:26	05/11/20 14:39	7440-41-7	
Boron	76.7	ug/L	5.0	1.7	1	05/08/20 08:26	05/12/20 01:44	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/08/20 08:26	05/11/20 14:39	7440-43-9	
Chromium	0.55J	ug/L	1.0	0.10	1	05/08/20 08:26	05/11/20 14:39	7440-47-3	
Cobalt	0.39J	ug/L	1.0	0.037	1	05/08/20 08:26	05/11/20 14:39	7440-48-4	
Lead	0.092J	ug/L	1.0	0.029	1	05/08/20 08:26	05/11/20 14:39	7439-92-1	
Molybdenum	2.7	ug/L	1.0	0.13	1	05/08/20 08:26	05/11/20 14:39	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/08/20 08:26	05/11/20 14:39	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/08/20 08:26	05/11/20 14:39	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/12/20 10:19	05/13/20 10:15	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	1180	mg/L	20.0	20.0	1			05/07/20 11:54	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	2	mg/L	2.5	2.5	1			05/07/20 10:47	
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	7.3	Std. Units	0.10	0.10	1			05/07/20 08:57	H3

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256085

Sample: MW-15008	Lab ID: 50256085007	Collected: 05/04/20 16:10	Received: 05/05/20 08:33	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	162	mg/L	25.0	4.0	100			05/08/20 12:17	16887-00-6
Fluoride	0.24	mg/L	0.10	0.0068	1			05/07/20 20:50	16984-48-8
Sulfate	1.1	mg/L	0.25	0.043	1			05/07/20 20:50	14808-79-8
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	103000	ug/L	1000	72.9	1	05/08/20 06:30	05/11/20 14:33	7440-70-2	
Lithium	16.3J	ug/L	20.0	2.4	1	05/08/20 06:30	05/11/20 14:33	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/08/20 08:26	05/11/20 14:44	7440-36-0	
Arsenic	1.3	ug/L	1.0	0.22	1	05/08/20 08:26	05/11/20 14:44	7440-38-2	
Barium	120	ug/L	1.0	0.20	1	05/08/20 08:26	05/11/20 14:44	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/08/20 08:26	05/11/20 14:44	7440-41-7	
Boron	294	ug/L	25.0	8.3	5	05/08/20 08:26	05/12/20 01:49	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/08/20 08:26	05/11/20 14:44	7440-43-9	
Chromium	0.20J	ug/L	1.0	0.10	1	05/08/20 08:26	05/11/20 14:44	7440-47-3	
Cobalt	0.16J	ug/L	1.0	0.037	1	05/08/20 08:26	05/11/20 14:44	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/08/20 08:26	05/11/20 14:44	7439-92-1	
Molybdenum	0.37J	ug/L	1.0	0.13	1	05/08/20 08:26	05/11/20 14:44	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/08/20 08:26	05/11/20 14:44	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/08/20 08:26	05/11/20 14:44	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/12/20 10:19	05/13/20 10:18	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	656	mg/L	10.0	10.0	1			05/07/20 11:54	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/07/20 10:47	PP
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	7.9	Std. Units	0.10	0.10	1			05/07/20 09:00	H3

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256085

Sample: MW-15010	Lab ID: 50256085008	Collected: 05/04/20 16:55	Received: 05/05/20 08:33	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	43.2	mg/L	2.5	0.40	10			05/07/20 21:48	16887-00-6
Fluoride	0.36	mg/L	0.10	0.0068	1			05/07/20 21:29	16984-48-8
Sulfate	1.2	mg/L	0.25	0.043	1			05/07/20 21:29	14808-79-8
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	127000	ug/L	1000	72.9	1	05/08/20 06:30	05/11/20 14:36	7440-70-2	
Lithium	40.5	ug/L	20.0	2.4	1	05/08/20 06:30	05/11/20 14:36	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/08/20 08:26	05/11/20 14:48	7440-36-0	
Arsenic	<0.22	ug/L	1.0	0.22	1	05/08/20 08:26	05/11/20 14:48	7440-38-2	
Barium	55.3	ug/L	1.0	0.20	1	05/08/20 08:26	05/11/20 14:48	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/08/20 08:26	05/11/20 14:48	7440-41-7	
Boron	638	ug/L	50.0	16.6	10	05/08/20 08:26	05/12/20 01:53	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/08/20 08:26	05/11/20 14:48	7440-43-9	
Chromium	0.26J	ug/L	1.0	0.10	1	05/08/20 08:26	05/11/20 14:48	7440-47-3	
Cobalt	0.19J	ug/L	1.0	0.037	1	05/08/20 08:26	05/11/20 14:48	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/08/20 08:26	05/11/20 14:48	7439-92-1	
Molybdenum	1.1	ug/L	1.0	0.13	1	05/08/20 08:26	05/11/20 14:48	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/08/20 08:26	05/11/20 14:48	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/08/20 08:26	05/11/20 14:48	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/12/20 10:19	05/13/20 10:20	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	471	mg/L	10.0	10.0	1			05/07/20 11:54	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/07/20 10:47	PP
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Indianapolis								
pH at 25 Degrees C	7.6	Std. Units	0.10	0.10	1			05/07/20 09:03	H3

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256085

QC Batch:	560791	Analysis Method:	EPA 9056
QC Batch Method:	EPA 9056	Analysis Description:	9056 IC Anions
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008		

METHOD BLANK: 2585929 Matrix: Water

Associated Lab Samples: 50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008

Parameter	Units	Blank	Reporting		Analyzed	Qualifiers
		Result	Limit	MDL		
Chloride	mg/L	<0.040	0.25	0.040	05/07/20 15:03	
Fluoride	mg/L	<0.0068	0.10	0.0068	05/07/20 15:03	
Sulfate	mg/L	<0.043	0.25	0.043	05/07/20 15:03	

LABORATORY CONTROL SAMPLE: 2585930

Parameter	Units	Spike	LCS	LCS	% Rec	Qualifiers
		Conc.	Result	% Rec	Limits	
Chloride	mg/L	1.2	1.2	97	80-120	
Fluoride	mg/L	0.5	0.50	99	80-120	
Sulfate	mg/L	2.5	2.5	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2585931 2585932

Parameter	Units	MS		MSD		MS	MSD	% Rec	Limits	RPD	Max
		50256364003	Spike	Spike	MS						
Chloride	mg/L	409	125	125	542	538	106	103	80-120	1	15
Fluoride	mg/L	ND	0.5	0.5	0.57	0.57	102	103	80-120	1	15
Sulfate	mg/L	1520	250	250	1800	1790	109	106	80-120	0	15

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256085

QC Batch:	560768	Analysis Method:	EPA 7470
QC Batch Method:	EPA 7470	Analysis Description:	7470 Mercury
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008		

METHOD BLANK: 2585720 Matrix: Water

Associated Lab Samples: 50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.080	0.20	0.080	05/13/20 09:14	

LABORATORY CONTROL SAMPLE: 2585721

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.0	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2585722 2585723

Parameter	Units	50255919002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	5.0	5.0	101	101	75-125	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256085

QC Batch:	560471	Analysis Method:	EPA 6010
QC Batch Method:	EPA 3010	Analysis Description:	6010 MET
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008		

METHOD BLANK: 2584205 Matrix: Water

Associated Lab Samples: 50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	<72.9	1000	72.9	05/11/20 13:32	
Lithium	ug/L	<2.4	20.0	2.4	05/11/20 13:32	

LABORATORY CONTROL SAMPLE: 2584206

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10200	102	80-120	
Lithium	ug/L	1000	1030	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2584207 2584208

Parameter	Units	MS	MSD	MS	MSD	MS	MSD	% Rec	% Rec	RPD	RPD	Max
		50256079003	Spike Conc.									
Calcium	ug/L	37600	10000	10000	48300	47800	107	102	75-125	1	20	
Lithium	ug/L	<20.0	1000	1000	1040	1040	104	104	75-125	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256085

QC Batch:	560743	Analysis Method:	EPA 6020
QC Batch Method:	EPA 200.2	Analysis Description:	6020 MET
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008		

METHOD BLANK: 2585606 Matrix: Water

Associated Lab Samples: 50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008

Parameter	Units	Blank	Reporting		Analyzed	Qualifiers
		Result	Limit	MDL		
Antimony	ug/L	<0.12	1.0	0.12	05/11/20 13:58	
Arsenic	ug/L	<0.22	1.0	0.22	05/11/20 13:58	
Barium	ug/L	<0.20	1.0	0.20	05/11/20 13:58	
Beryllium	ug/L	<0.020	0.20	0.020	05/11/20 13:58	
Boron	ug/L	<1.7	5.0	1.7	05/11/20 13:58	N2
Cadmium	ug/L	<0.022	0.20	0.022	05/11/20 13:58	
Chromium	ug/L	<0.10	1.0	0.10	05/11/20 13:58	
Cobalt	ug/L	<0.037	1.0	0.037	05/11/20 13:58	
Lead	ug/L	<0.029	1.0	0.029	05/11/20 13:58	
Molybdenum	ug/L	<0.13	1.0	0.13	05/11/20 13:58	
Selenium	ug/L	<0.31	1.0	0.31	05/11/20 13:58	
Thallium	ug/L	<0.040	1.0	0.040	05/11/20 13:58	

LABORATORY CONTROL SAMPLE: 2585607

Parameter	Units	Spike	LCS		% Rec	Qualifiers
		Conc.	Result	% Rec	Limits	
Antimony	ug/L	40	41.3	103	80-120	
Arsenic	ug/L	40	39.0	97	80-120	
Barium	ug/L	40	38.1	95	80-120	
Beryllium	ug/L	40	37.3	93	80-120	
Boron	ug/L	40	40.9	102	80-120	N2
Cadmium	ug/L	40	38.3	96	80-120	
Chromium	ug/L	40	39.9	100	80-120	
Cobalt	ug/L	40	40.2	101	80-120	
Lead	ug/L	40	39.2	98	80-120	
Molybdenum	ug/L	40	37.2	93	80-120	
Selenium	ug/L	40	39.7	99	80-120	
Thallium	ug/L	40	40.9	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2585608 2585609

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		50256079003 Result	Spike Conc.	Spike Conc.	MS Result						
Antimony	ug/L	<1.0	40	40	40.8	38.6	102	96	75-125	6	20
Arsenic	ug/L	<1.0	40	40	39.2	38.6	97	96	75-125	2	20
Barium	ug/L	5.7	40	40	43.4	43.3	94	94	75-125	0	20

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## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256085

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:		2585608		2585609									
Parameter	Units	MS		MSD		MS Result	MS % Rec	MSD Result	MSD % Rec	% Rec Limits	Max		Qual
		50256079003	Spike Conc.	Spike Conc.	MS Result						RPD	RPD	
Beryllium	ug/L	<0.20	40	40	37.2	37.0	93	92	75-125	1	20		
Boron	ug/L	23.9	40	40	62.7	62.9	97	98	75-125	0	20	CH,N2	
Cadmium	ug/L	<0.20	40	40	38.2	37.8	95	94	75-125	1	20		
Chromium	ug/L	<2.0	40	40	40.1	39.8	99	98	75-125	1	20		
Cobalt	ug/L	<1.0	40	40	38.7	38.9	97	97	75-125	1	20		
Lead	ug/L	<1.0	40	40	39.2	39.0	98	97	75-125	0	20		
Molybdenum	ug/L	<1.0	40	40	37.7	37.9	94	94	75-125	0	20		
Selenium	ug/L	<1.0	40	40	39.8	39.2	99	98	75-125	2	20		
Thallium	ug/L	<1.0	40	40	40.8	40.7	102	102	75-125	0	20		

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256085

QC Batch:	560763	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008		

METHOD BLANK: 2585700 Matrix: Water

Associated Lab Samples: 50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<10.0	10.0	10.0	05/07/20 11:52	

LABORATORY CONTROL SAMPLE: 2585701

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	282	94	80-120	

SAMPLE DUPLICATE: 2585702

Parameter	Units	50256085001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	442	448	1	10	

SAMPLE DUPLICATE: 2585703

Parameter	Units	50256307005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	304	305	0	10	

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256085

QC Batch:	560729	Analysis Method:	SM 2540D
QC Batch Method:	SM 2540D	Analysis Description:	2540D Total Suspended Solids
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008		

METHOD BLANK: 2585529 Matrix: Water

Associated Lab Samples: 50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<2.5	2.5	2.5	05/07/20 10:46	

LABORATORY CONTROL SAMPLE: 2585530

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	92	92	80-120	

SAMPLE DUPLICATE: 2585800

Parameter	Units	50256085003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	10	12	18	10	R1

SAMPLE DUPLICATE: 2585801

Parameter	Units	50256257001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	250	260	4	10	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256085

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QC Batch:	560708	Analysis Method:	SM 4500-H+B
QC Batch Method:	SM 4500-H+B	Analysis Description:	4500H+B pH
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256085001, 50256085002, 50256085003, 50256085004, 50256085005, 50256085006, 50256085007, 50256085008		

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SAMPLE DUPLICATE: 2585474

Parameter	Units	50256085001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.8	7.8	0	2	H3

---

SAMPLE DUPLICATE: 2585475

Parameter	Units	50256287001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.7	7.6	1	2	H3

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## REPORT OF LABORATORY ANALYSIS

## QUALIFIERS

Project: Muskegon Site  
Pace Project No.: 50256085

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### ANALYTE QUALIFIERS

- |    |   |
|----|---|
| CH | The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.   |
| H3 | Sample was received or analysis requested beyond the recognized method holding time.  |
| N2 | The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request. |
| PP | The mass of dried residue obtained did not meet the test method requirements based on volume used.  |
| R1 | RPD value was outside control limits.   |

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Muskegon Site  
Pace Project No.: 50256085

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50256085001	MW-15002	EPA 9056	560791		
50256085002	MW-15003	EPA 9056	560791		
50256085003	MW-15004	EPA 9056	560791		
50256085004	MW-15005	EPA 9056	560791		
50256085005	MW-15006	EPA 9056	560791		
50256085006	MW-15007	EPA 9056	560791		
50256085007	MW-15008	EPA 9056	560791		
50256085008	MW-15010	EPA 9056	560791		
50256085001	MW-15002	EPA 3010	560471	EPA 6010	561274
50256085002	MW-15003	EPA 3010	560471	EPA 6010	561274
50256085003	MW-15004	EPA 3010	560471	EPA 6010	561274
50256085004	MW-15005	EPA 3010	560471	EPA 6010	561274
50256085005	MW-15006	EPA 3010	560471	EPA 6010	561274
50256085006	MW-15007	EPA 3010	560471	EPA 6010	561274
50256085007	MW-15008	EPA 3010	560471	EPA 6010	561274
50256085008	MW-15010	EPA 3010	560471	EPA 6010	561274
50256085001	MW-15002	EPA 200.2	560743	EPA 6020	561160
50256085002	MW-15003	EPA 200.2	560743	EPA 6020	561160
50256085003	MW-15004	EPA 200.2	560743	EPA 6020	561160
50256085004	MW-15005	EPA 200.2	560743	EPA 6020	561160
50256085005	MW-15006	EPA 200.2	560743	EPA 6020	561160
50256085006	MW-15007	EPA 200.2	560743	EPA 6020	561160
50256085007	MW-15008	EPA 200.2	560743	EPA 6020	561160
50256085008	MW-15010	EPA 200.2	560743	EPA 6020	561160
50256085001	MW-15002	EPA 7470	560768	EPA 7470	561636
50256085002	MW-15003	EPA 7470	560768	EPA 7470	561636
50256085003	MW-15004	EPA 7470	560768	EPA 7470	561636
50256085004	MW-15005	EPA 7470	560768	EPA 7470	561636
50256085005	MW-15006	EPA 7470	560768	EPA 7470	561636
50256085006	MW-15007	EPA 7470	560768	EPA 7470	561636
50256085007	MW-15008	EPA 7470	560768	EPA 7470	561636
50256085008	MW-15010	EPA 7470	560768	EPA 7470	561636
50256085001	MW-15002	SM 2540C	560763		
50256085002	MW-15003	SM 2540C	560763		
50256085003	MW-15004	SM 2540C	560763		
50256085004	MW-15005	SM 2540C	560763		
50256085005	MW-15006	SM 2540C	560763		
50256085006	MW-15007	SM 2540C	560763		
50256085007	MW-15008	SM 2540C	560763		
50256085008	MW-15010	SM 2540C	560763		
50256085001	MW-15002	SM 2540D	560729		
50256085002	MW-15003	SM 2540D	560729		
50256085003	MW-15004	SM 2540D	560729		
50256085004	MW-15005	SM 2540D	560729		
50256085005	MW-15006	SM 2540D	560729		
50256085006	MW-15007	SM 2540D	560729		

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Muskegon Site  
Pace Project No.: 50256085

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50256085007	MW-15008	SM 2540D	560729		
50256085008	MW-15010	SM 2540D	560729		
50256085001	MW-15002	SM 4500-H+B	560708		
50256085002	MW-15003	SM 4500-H+B	560708		
50256085003	MW-15004	SM 4500-H+B	560708		
50256085004	MW-15005	SM 4500-H+B	560708		
50256085005	MW-15006	SM 4500-H+B	560708		
50256085006	MW-15007	SM 4500-H+B	560708		
50256085007	MW-15008	SM 4500-H+B	560708		
50256085008	MW-15010	SM 4500-H+B	560708		

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**CHAIN-OF-CUSTODY / Analytical Request** | WO# : 50256085  
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed.

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed.

## Sample Conditions Upon Receipt Form (SCUR)

Date/Time: 5.5.20	Evaluated by: WDC	WO# : 50256085		
Client: HDR	PM: MSB Due Date: 05/14/20			CLIENT: GR-HDR
Project Manager: MSB	Profile ID:			
Rush TAT Requested: YES NO	Due Date:			
Lab Notified of Rush or Short Holds: YES NO	Non Conformance Form Required: YES NO			
Samples Received Via: FedEx UPS Client	Pace Courier	Other:	Comments:	
Custody Seals Present and Intact:		YES	NO	NA
Received Sample Information Form(s): Drinking Waters Only		YES	NO	NA
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)		YES	NO	N/A
Short Holds Present (< 72 Hours):		YES	NO	
Samples Received in Hold:		YES	NO	
Custody Signatures Present:		YES	NO	
Collector Signature Present:		YES	NO	
Packing Material Used:		YES	NO	
Samples Collected Today and On Ice:		YES	NO	N/A
IR Gun #:	280 281	Digital Thermometer #: 282 283		
Ice Type: WET Bagged / WET Loose BLUE NONE		1. Cooler Temp Upon Receipt: 0.3/1.0 °C		
Ice Location: TOP BOTTOM MIDDLE DISPERSED		Temp should be 0-6°C (Initial/Corrected)		
Temp Blank Received:		YES	NO	
Containers Intact:		YES	NO	
Correct Containers:		YES	NO	
Sufficient Volume:		YES	NO	
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are VOA, coliform, LLHg, O&G, or any container with a septum cap or preserved with HCl		YES	NO	N/A
Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)		YES	NO	N/A
VOA Headspace Acceptable (<6mm):		YES	NO	N/A
Trip Blank Received: HCl MeOH TSP OTHER		YES	NO	
Comments:		2. Cooler Temp Upon Receipt: 1.6/2.4 °C		
		3. Cooler Temp Upon Receipt: 2.0/2.8 °C		
		4. Cooler Temp Upon Receipt: _____ °C		

May 18, 2020

Molly Reeves  
HDR, Inc.  
3321 Bronson Blvd  
Kalamazoo, MI 49008

RE: Project: Muskegon Site  
Pace Project No.: 50256557

Dear Molly Reeves:

Enclosed are the analytical results for sample(s) received by the laboratory on May 07, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Grand Rapids
- Pace Analytical Services - Indianapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melanie Booms  
melanie.booms@pacelabs.com  
(616)975-4500  
Project Manager

Enclosures

cc: Aryka Thomson, HDR, Inc.



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: Muskegon Site  
Pace Project No.: 50256557

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### **Pace Analytical Services Indianapolis**

7726 Moller Road, Indianapolis, IN 46268  
Illinois Accreditation #: 200074  
Indiana Drinking Water Laboratory #: C-49-06  
Kansas/TNI Certification #: E-10177  
Kentucky UST Agency Interest #: 80226  
Kentucky WW Laboratory ID #: 98019  
Michigan Drinking Water Laboratory #9050

Ohio VAP Certified Laboratory #: CL0065  
Oklahoma Laboratory #: 9204  
Texas Certification #: T104704355  
West Virginia Certification #: 330  
Wisconsin Laboratory #: 999788130  
USDA Soil Permit #: P330-19-00257

### **Pace Analytical Services Grand Rapids**

5560 Corporate Exchange Ct SE, Grand Rapids, MI 49512  
Minnesota/TNI Laboratory #026-999-161

Michigan Drinking Water Laboratory #0034

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: Muskegon Site  
Pace Project No.: 50256557

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50256557001	<b>MW-15022</b>	Water	05/05/20 10:50	05/07/20 16:10
50256557002	<b>MW-15021</b>	Water	05/05/20 11:25	05/07/20 16:10
50256557003	<b>MW-17006</b>	Water	05/05/20 12:00	05/07/20 16:10
50256557004	<b>MW-15020</b>	Water	05/05/20 14:05	05/07/20 16:10
50256557005	<b>MW-15019</b>	Water	05/05/20 16:10	05/07/20 16:10
50256557006	<b>MW-17005</b>	Water	05/05/20 14:50	05/07/20 16:10
50256557007	<b>MW-17004</b>	Water	05/05/20 15:30	05/07/20 16:10
50256557008	<b>MW-15019D</b>	Water	05/05/20 16:30	05/07/20 16:10
50256557009	<b>MW-15013</b>	Water	05/07/20 08:50	05/07/20 16:10
50256557010	<b>MW-15012</b>	Water	05/07/20 10:15	05/07/20 16:10
50256557011	<b>MW-15011</b>	Water	05/07/20 11:40	05/07/20 16:10
50256557012	<b>MW-15009</b>	Water	05/07/20 12:50	05/07/20 16:10
50256557013	<b>MW-15023</b>	Water	05/06/20 08:35	05/07/20 16:10
50256557014	<b>MW-17003</b>	Water	05/06/20 10:00	05/07/20 16:10
50256557015	<b>MW-15018</b>	Water	05/06/20 11:00	05/07/20 16:10
50256557016	<b>MW-15017</b>	Water	05/06/20 12:00	05/07/20 16:10
50256557017	<b>MW-17002</b>	Water	05/06/20 13:00	05/07/20 16:10
50256557018	<b>MW-17001</b>	Water	05/06/20 14:10	05/07/20 16:10
50256557019	<b>MW-15016</b>	Water	05/06/20 14:55	05/07/20 16:10
50256557020	<b>MW-15015</b>	Water	05/06/20 16:00	05/07/20 16:10
50256557021	<b>MW-15014</b>	Water	05/06/20 16:50	05/07/20 16:10

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: Muskegon Site  
Pace Project No.: 50256557

Lab ID	Sample ID	Method	Analysts	Analytes Reported
50256557001	MW-15022	EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	MMS	1
50256557002	MW-15021	EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	MMS	1
50256557003	MW-17006	EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	MMS	1
50256557004	MW-15020	EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	MMS	1
50256557005	MW-15019	EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	MMS	1
50256557006	MW-17005	EPA 9056	NPW	3
		SM 4500-H+B	NRC	1

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: Muskegon Site  
Pace Project No.: 50256557

Lab ID	Sample ID	Method	Analysts	Analytics Reported
50256557007	MW-17004	EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
50256557008	MW-15019D	SM 2540C	MMS	1
		SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	MMS	1
		EPA 9056	NPW	3
50256557009	MW-15013	SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
50256557010	MW-15012	EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
50256557011	MW-15011	EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12

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## SAMPLE ANALYTE COUNT

Project: Muskegon Site  
Pace Project No.: 50256557

Lab ID	Sample ID	Method	Analysts	Analytes Reported
50256557012	MW-15009	EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
50256557013	MW-15023	EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
50256557014	MW-17003	EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
50256557015	MW-15018	SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
50256557016	MW-15017	EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1

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## SAMPLE ANALYTE COUNT

Project: Muskegon Site  
Pace Project No.: 50256557

Lab ID	Sample ID	Method	Analysts	Analytes Reported
50256557017	MW-17002	SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
50256557018	MW-17001	SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
50256557019	MW-15016	SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
50256557020	MW-15015	SM 2540D	MMS	1
		EPA 9056	NPW	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
50256557021	MW-15014	SM 2540D	MMS	1
		EPA 9056	RSF	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	SKK	1
		SM 2540D	MMS	1

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## SAMPLE ANALYTE COUNT

Project: Muskegon Site  
Pace Project No.: 50256557

Lab ID	Sample ID	Method	Analysts	Analytics Reported
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PASI-GR = Pace Analytical Services - Grand Rapids  
PASI-I = Pace Analytical Services - Indianapolis

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15022	Lab ID: 50256557001	Collected: 05/05/20 10:50	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	36.7	mg/L	5.0	0.31	20			05/11/20 11:51	16887-00-6
Fluoride	0.38	mg/L	0.10	0.0026	1			05/11/20 11:05	16984-48-8
Sulfate	587	mg/L	25.0	4.1	100			05/12/20 09:33	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.7	Std. Units	1.0	1.0	1			05/08/20 10:56	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	172000	ug/L	1000	130	1	05/11/20 06:15	05/14/20 02:58	7440-70-2	
Lithium	22.6	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 02:58	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 05:38	7440-36-0	
Arsenic	0.60J	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 05:38	7440-38-2	
Barium	135	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 05:38	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 05:38	7440-41-7	
Boron	8310	ug/L	1000	332	200	05/11/20 11:18	05/13/20 00:34	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 05:38	7440-43-9	
Chromium	0.26J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 05:38	7440-47-3	
Cobalt	0.19J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 05:38	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 05:38	7439-92-1	
Molybdenum	3.6	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 05:38	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 05:38	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 05:38	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:06	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	1140	mg/L	20.0	20.0	1			05/11/20 12:11	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/11/20 10:20	PP

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15021	Lab ID: 50256557002	Collected: 05/05/20 11:25	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	125	mg/L	5.0	0.31	20			05/11/20 12:52	16887-00-6
Fluoride	0.013J	mg/L	0.10	0.0026	1			05/11/20 12:37	16984-48-8
Sulfate	<0.041	mg/L	0.25	0.041	1			05/11/20 12:37	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.1	Std. Units	1.0	1.0	1			05/08/20 11:01	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	101000	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:00	7440-70-2	
Lithium	<4.1	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:00	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:00	7440-36-0	
Arsenic	0.60J	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:00	7440-38-2	
Barium	236	ug/L	2.0	0.39	2	05/11/20 11:18	05/13/20 03:01	7440-39-3	
Beryllium	0.024J	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:00	7440-41-7	
Boron	1080	ug/L	125	41.5	25	05/11/20 11:18	05/13/20 00:57	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:00	7440-43-9	
Chromium	0.71J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:00	7440-47-3	
Cobalt	0.47J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:00	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:00	7439-92-1	
Molybdenum	<0.13	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:00	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:00	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:00	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:08	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	543	mg/L	10.0	10.0	1			05/11/20 12:12	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/11/20 10:20	PP

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-17006	Lab ID: 50256557003	Collected: 05/05/20 12:00	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	<b>25.4</b>	mg/L	5.0	0.31	20			05/11/20 13:53	16887-00-6
Fluoride	<b>0.022J</b>	mg/L	0.10	0.0026	1			05/11/20 13:38	16984-48-8
Sulfate	<b>182</b>	mg/L	5.0	0.82	20			05/11/20 13:53	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	<b>7.4</b>	Std. Units	1.0	1.0	1			05/08/20 11:04	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	<b>153000</b>	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:02	7440-70-2	
Lithium	<b>37.9</b>	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:02	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<b>&lt;0.12</b>	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:05	7440-36-0	
Arsenic	<b>5.7</b>	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:05	7440-38-2	
Barium	<b>129</b>	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 06:05	7440-39-3	
Beryllium	<b>&lt;0.020</b>	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:05	7440-41-7	
Boron	<b>745</b>	ug/L	100	33.2	20	05/11/20 11:18	05/13/20 01:01	7440-42-8	N2
Cadmium	<b>&lt;0.022</b>	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:05	7440-43-9	
Chromium	<b>0.21J</b>	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:05	7440-47-3	
Cobalt	<b>0.17J</b>	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:05	7440-48-4	
Lead	<b>&lt;0.029</b>	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:05	7439-92-1	
Molybdenum	<b>1.6</b>	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:05	7439-98-7	
Selenium	<b>&lt;0.31</b>	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:05	7782-49-2	
Thallium	<b>&lt;0.040</b>	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:05	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<b>&lt;0.080</b>	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:15	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	<b>631</b>	mg/L	10.0	10.0	1			05/11/20 12:16	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<b>&lt;2.5</b>	mg/L	2.5	2.5	1			05/11/20 10:21	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15020	Lab ID: 50256557004	Collected: 05/05/20 14:05	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	162	mg/L	5.0	0.31	20			05/11/20 14:23	16887-00-6
Fluoride	0.015J	mg/L	0.10	0.0026	1			05/11/20 14:08	16984-48-8
Sulfate	<0.041	mg/L	0.25	0.041	1			05/11/20 14:08	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	6.8	Std. Units	1.0	1.0	1			05/08/20 11:08	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	127000	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:16	7440-70-2	
Lithium	9.5J	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:16	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:09	7440-36-0	
Arsenic	0.45J	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:09	7440-38-2	
Barium	393	ug/L	5.0	0.98	5	05/11/20 11:18	05/13/20 03:05	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:09	7440-41-7	
Boron	815	ug/L	100	33.2	20	05/11/20 11:18	05/13/20 01:06	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:09	7440-43-9	
Chromium	0.54J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:09	7440-47-3	
Cobalt	0.63J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:09	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:09	7439-92-1	
Molybdenum	<0.13	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:09	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:09	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:09	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:18	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	634	mg/L	20.0	20.0	1			05/11/20 12:16	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	69	mg/L	16.7	16.7	1			05/11/20 10:21	

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15019	Lab ID: 50256557005	Collected: 05/05/20 16:10	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	<b>79.6</b>	mg/L	5.0	0.31	20			05/11/20 14:54	16887-00-6
Fluoride	<b>0.051J</b>	mg/L	0.10	0.0026	1			05/11/20 14:39	16984-48-8
Sulfate	<b>0.13J</b>	mg/L	0.25	0.041	1			05/11/20 14:39	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	<b>6.9</b>	Std. Units	1.0	1.0	1			05/08/20 11:12	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	<b>106000</b>	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:19	7440-70-2	
Lithium	<b>20.0</b>	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:19	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<b>&lt;0.12</b>	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:14	7440-36-0	
Arsenic	<b>0.40J</b>	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:14	7440-38-2	
Barium	<b>174</b>	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 06:14	7440-39-3	
Beryllium	<b>&lt;0.020</b>	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:14	7440-41-7	
Boron	<b>837</b>	ug/L	100	33.2	20	05/11/20 11:18	05/13/20 01:10	7440-42-8	N2
Cadmium	<b>&lt;0.022</b>	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:14	7440-43-9	
Chromium	<b>0.64J</b>	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:14	7440-47-3	
Cobalt	<b>0.76J</b>	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:14	7440-48-4	
Lead	<b>&lt;0.029</b>	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:14	7439-92-1	
Molybdenum	<b>&lt;0.13</b>	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:14	7439-98-7	
Selenium	<b>0.36J</b>	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:14	7782-49-2	
Thallium	<b>&lt;0.040</b>	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:14	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<b>&lt;0.080</b>	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:20	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	<b>481</b>	mg/L	10.0	10.0	1			05/11/20 12:17	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<b>46</b>	mg/L	12.5	12.5	1			05/11/20 10:21	

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-17005	Lab ID: 50256557006	Collected: 05/05/20 14:50	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	<b>20.4</b>	mg/L	5.0	0.31	20			05/11/20 15:23	16887-00-6
Fluoride	<b>0.022J</b>	mg/L	0.10	0.0026	1			05/11/20 15:08	16984-48-8
Sulfate	<b>589</b>	mg/L	25.0	4.1	100			05/12/20 10:18	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	<b>7.1</b>	Std. Units	1.0	1.0	1			05/08/20 11:16	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	<b>343000</b>	ug/L	5000	650	5	05/11/20 06:15	05/14/20 03:57	7440-70-2	
Lithium	<b>47.5</b>	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:21	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<b>&lt;0.12</b>	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:18	7440-36-0	
Arsenic	<b>0.31J</b>	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:18	7440-38-2	
Barium	<b>456</b>	ug/L	5.0	0.98	5	05/11/20 11:18	05/13/20 03:10	7440-39-3	
Beryllium	<b>&lt;0.020</b>	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:18	7440-41-7	
Boron	<b>1450</b>	ug/L	125	41.5	25	05/11/20 11:18	05/13/20 01:15	7440-42-8	N2
Cadmium	<b>&lt;0.022</b>	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:18	7440-43-9	
Chromium	<b>0.32J</b>	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:18	7440-47-3	
Cobalt	<b>0.36J</b>	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:18	7440-48-4	
Lead	<b>&lt;0.029</b>	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:18	7439-92-1	
Molybdenum	<b>0.29J</b>	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:18	7439-98-7	
Selenium	<b>&lt;0.31</b>	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:18	7782-49-2	
Thallium	<b>&lt;0.040</b>	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:18	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<b>&lt;0.080</b>	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:23	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	<b>1390</b>	mg/L	20.0	20.0	1			05/11/20 12:17	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<b>49</b>	mg/L	12.5	12.5	1			05/11/20 10:21	

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-17004	Lab ID: 50256557007	Collected: 05/05/20 15:30	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	16.7	mg/L	5.0	0.31	20			05/11/20 15:54	16887-00-6
Fluoride	0.089J	mg/L	0.10	0.0026	1			05/11/20 15:39	16984-48-8
Sulfate	104	mg/L	5.0	0.82	20			05/11/20 15:54	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.7	Std. Units	1.0	1.0	1			05/08/20 11:19	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	126000	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:23	7440-70-2	
Lithium	15.2J	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:23	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:32	7440-36-0	
Arsenic	5.3	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:32	7440-38-2	
Barium	253	ug/L	2.0	0.39	2	05/11/20 11:18	05/13/20 03:14	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:32	7440-41-7	
Boron	542	ug/L	50.0	16.6	10	05/11/20 11:18	05/13/20 01:29	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:32	7440-43-9	
Chromium	0.17J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:32	7440-47-3	
Cobalt	0.16J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:32	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:32	7439-92-1	
Molybdenum	0.80J	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:32	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:32	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:32	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:30	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	490	mg/L	10.0	10.0	1			05/11/20 12:18	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/11/20 10:21	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15019D	Lab ID: 50256557008	Collected: 05/05/20 16:30	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	74.5	mg/L	5.0	0.31	20			05/11/20 16:55	16887-00-6
Fluoride	0.052J	mg/L	0.10	0.0026	1			05/11/20 16:40	16984-48-8
Sulfate	<0.041	mg/L	0.25	0.041	1			05/11/20 16:40	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	6.9	Std. Units	1.0	1.0	1			05/08/20 11:25	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	109000	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:25	7440-70-2	
Lithium	23.4	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:25	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:37	7440-36-0	
Arsenic	0.48J	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:37	7440-38-2	
Barium	171	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 06:37	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:37	7440-41-7	
Boron	814	ug/L	100	33.2	20	05/11/20 11:18	05/13/20 01:33	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:37	7440-43-9	
Chromium	0.63J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:37	7440-47-3	
Cobalt	0.75J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:37	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:37	7439-92-1	
Molybdenum	<0.13	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:37	7439-98-7	
Selenium	0.34J	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:37	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:37	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:32	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	490	mg/L	10.0	10.0	1			05/11/20 12:19	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	59	mg/L	25.0	25.0	1			05/12/20 16:00	

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15013	Lab ID: 50256557009	Collected: 05/07/20 08:50	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	<b>21.2</b>	mg/L	5.0	0.31	20			05/11/20 17:25	16887-00-6
Fluoride	<b>0.28</b>	mg/L	0.10	0.0026	1			05/11/20 17:10	16984-48-8
Sulfate	<b>226</b>	mg/L	5.0	0.82	20			05/11/20 17:25	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	<b>8.7</b>	Std. Units	1.0	1.0	1			05/08/20 11:29	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	<b>66400</b>	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:27	7440-70-2	
Lithium	<b>17.3J</b>	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:27	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<b>&lt;0.12</b>	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:41	7440-36-0	
Arsenic	<b>1.3</b>	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:41	7440-38-2	
Barium	<b>39.6</b>	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 06:41	7440-39-3	
Beryllium	<b>&lt;0.020</b>	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:41	7440-41-7	
Boron	<b>1230</b>	ug/L	125	41.5	25	05/11/20 11:18	05/13/20 01:38	7440-42-8	N2
Cadmium	<b>&lt;0.022</b>	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:41	7440-43-9	
Chromium	<b>0.14J</b>	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:41	7440-47-3	
Cobalt	<b>0.082J</b>	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:41	7440-48-4	
Lead	<b>&lt;0.029</b>	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:41	7439-92-1	
Molybdenum	<b>77.2</b>	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:41	7439-98-7	
Selenium	<b>0.90J</b>	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:41	7782-49-2	
Thallium	<b>&lt;0.040</b>	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:41	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<b>&lt;0.080</b>	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:35	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	<b>451</b>	mg/L	10.0	10.0	1			05/13/20 15:03	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<b>&lt;2.5</b>	mg/L	2.5	2.5	1			05/13/20 15:10	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15012	Lab ID: 50256557010	Collected: 05/07/20 10:15	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	<b>20.5</b>	mg/L	5.0	0.31	20			05/11/20 17:56	16887-00-6
Fluoride	<b>0.12</b>	mg/L	0.10	0.0026	1			05/11/20 17:41	16984-48-8
Sulfate	<b>768</b>	mg/L	25.0	4.1	100			05/12/20 10:33	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	<b>9.4</b>	Std. Units	1.0	1.0	1			05/08/20 13:25	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	<b>250000</b>	ug/L	5000	650	5	05/11/20 06:15	05/14/20 03:59	7440-70-2	
Lithium	<b>26.6</b>	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:29	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<b>0.18J</b>	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:46	7440-36-0	
Arsenic	<b>2.3</b>	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:46	7440-38-2	
Barium	<b>234</b>	ug/L	2.0	0.39	2	05/11/20 11:18	05/13/20 03:19	7440-39-3	
Beryllium	<b>&lt;0.020</b>	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:46	7440-41-7	
Boron	<b>1470</b>	ug/L	125	41.5	25	05/11/20 11:18	05/13/20 01:42	7440-42-8	N2
Cadmium	<b>0.029J</b>	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:46	7440-43-9	
Chromium	<b>&lt;0.10</b>	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:46	7440-47-3	
Cobalt	<b>0.26J</b>	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:46	7440-48-4	
Lead	<b>&lt;0.029</b>	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:46	7439-92-1	
Molybdenum	<b>245</b>	ug/L	2.0	0.26	2	05/11/20 11:18	05/13/20 03:19	7439-98-7	
Selenium	<b>1.4</b>	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:46	7782-49-2	
Thallium	<b>&lt;0.040</b>	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:46	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<b>&lt;0.080</b>	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:37	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	<b>1260</b>	mg/L	20.0	20.0	1			05/13/20 15:03	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<b>&lt;2.5</b>	mg/L	2.5	2.5	1			05/13/20 15:10	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15011	Lab ID: 50256557011	Collected: 05/07/20 11:40	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	<b>30.5</b>	mg/L	5.0	0.31	20			05/11/20 18:26	16887-00-6
Fluoride	<b>0.18</b>	mg/L	0.10	0.0026	1			05/11/20 18:11	16984-48-8
Sulfate	<b>109</b>	mg/L	5.0	0.82	20			05/11/20 18:26	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	<b>8.4</b>	Std. Units	1.0	1.0	1			05/08/20 13:32	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	<b>90100</b>	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:31	7440-70-2	
Lithium	<b>20.2</b>	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:31	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<b>&lt;0.12</b>	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:50	7440-36-0	
Arsenic	<b>0.84J</b>	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:50	7440-38-2	
Barium	<b>55.2</b>	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 06:50	7440-39-3	
Beryllium	<b>&lt;0.020</b>	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:50	7440-41-7	
Boron	<b>1870</b>	ug/L	250	83.0	50	05/11/20 11:18	05/13/20 01:47	7440-42-8	N2
Cadmium	<b>&lt;0.022</b>	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:50	7440-43-9	
Chromium	<b>0.18J</b>	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:50	7440-47-3	
Cobalt	<b>0.15J</b>	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:50	7440-48-4	
Lead	<b>0.041J</b>	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:50	7439-92-1	
Molybdenum	<b>1.3</b>	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:50	7439-98-7	
Selenium	<b>0.34J</b>	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:50	7782-49-2	
Thallium	<b>&lt;0.040</b>	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:50	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<b>&lt;0.080</b>	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:40	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	<b>464</b>	mg/L	10.0	10.0	1			05/13/20 15:03	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<b>&lt;2.5</b>	mg/L	2.5	2.5	1			05/13/20 15:11	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15009	Lab ID: 50256557012	Collected: 05/07/20 12:50	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	134	mg/L	5.0	0.31	20			05/11/20 18:56	16887-00-6
Fluoride	0.037J	mg/L	0.10	0.0026	1			05/11/20 18:42	16984-48-8
Sulfate	17.0	mg/L	0.25	0.041	1			05/11/20 18:42	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	8.2	Std. Units	1.0	1.0	1			05/08/20 13:37	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	96900	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:34	7440-70-2	
Lithium	63.9	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:34	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 06:55	7440-36-0	
Arsenic	1.4	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 06:55	7440-38-2	
Barium	63.6	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 06:55	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 06:55	7440-41-7	
Boron	1560	ug/L	125	41.5	25	05/11/20 11:18	05/13/20 01:52	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 06:55	7440-43-9	
Chromium	0.19J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 06:55	7440-47-3	
Cobalt	0.16J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 06:55	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 06:55	7439-92-1	
Molybdenum	0.56J	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 06:55	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 06:55	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 06:55	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:42	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	502	mg/L	10.0	10.0	1			05/13/20 15:03	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/13/20 15:12	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15023	Lab ID: 50256557013	Collected: 05/06/20 08:35	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	15.0	mg/L	5.0	0.31	20			05/11/20 19:57	16887-00-6
Fluoride	0.12	mg/L	0.10	0.0026	1			05/11/20 19:42	16984-48-8
Sulfate	113	mg/L	5.0	0.82	20			05/11/20 19:57	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.8	Std. Units	1.0	1.0	1			05/08/20 13:42	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	85100	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:36	7440-70-2	
Lithium	17.8J	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:36	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 07:00	7440-36-0	
Arsenic	0.59J	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 07:00	7440-38-2	
Barium	78.3	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 07:00	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 07:00	7440-41-7	
Boron	717	ug/L	50.0	16.6	10	05/11/20 11:18	05/13/20 01:56	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 07:00	7440-43-9	
Chromium	0.26J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 07:00	7440-47-3	
Cobalt	0.11J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 07:00	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 07:00	7439-92-1	
Molybdenum	6.2	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 07:00	7439-98-7	
Selenium	0.32J	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 07:00	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 07:00	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:45	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	384	mg/L	10.0	10.0	1			05/12/20 16:45	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/12/20 16:01	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-17003	Lab ID: 50256557014	Collected: 05/06/20 10:00	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	17.1	mg/L	5.0	0.31	20			05/11/20 20:27	16887-00-6
Fluoride	0.081J	mg/L	0.10	0.0026	1			05/11/20 20:12	16984-48-8
Sulfate	24.1	mg/L	5.0	0.82	20			05/11/20 20:27	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.6	Std. Units	1.0	1.0	1			05/08/20 13:48	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	93900	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:42	7440-70-2	
Lithium	19.3J	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:42	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 07:04	7440-36-0	
Arsenic	21.1	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 07:04	7440-38-2	
Barium	109	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 07:04	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 07:04	7440-41-7	
Boron	403	ug/L	25.0	8.3	5	05/11/20 11:18	05/13/20 02:01	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 07:04	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 07:04	7440-47-3	
Cobalt	0.12J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 07:04	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 07:04	7439-92-1	
Molybdenum	11.2	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 07:04	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 07:04	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 07:04	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:47	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	373	mg/L	10.0	10.0	1			05/12/20 17:30	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/12/20 16:01	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15018	Lab ID: 50256557015	Collected: 05/06/20 11:00	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	57.0	mg/L	5.0	0.31	20			05/11/20 20:58	16887-00-6
Fluoride	0.13	mg/L	0.10	0.0026	1			05/11/20 20:43	16984-48-8
Sulfate	<0.041	mg/L	0.25	0.041	1			05/11/20 20:43	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.0	Std. Units	1.0	1.0	1			05/08/20 13:52	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	106000	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:44	7440-70-2	
Lithium	23.9	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:44	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 07:09	7440-36-0	
Arsenic	0.46J	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 07:09	7440-38-2	
Barium	154	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 07:09	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 07:09	7440-41-7	
Boron	541	ug/L	50.0	16.6	10	05/11/20 11:18	05/13/20 02:05	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 07:09	7440-43-9	
Chromium	0.35J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 07:09	7440-47-3	
Cobalt	0.35J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 07:09	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 07:09	7439-92-1	
Molybdenum	<0.13	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 07:09	7439-98-7	
Selenium	0.44J	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 07:09	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 07:09	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:49	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	424	mg/L	10.0	10.0	1			05/12/20 17:31	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	43	mg/L	16.7	16.7	1			05/12/20 16:01	

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15017	Lab ID: 50256557016	Collected: 05/06/20 12:00	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	229	mg/L	25.0	1.6	100			05/12/20 10:48	16887-00-6
Fluoride	<0.0026	mg/L	0.10	0.0026	1			05/11/20 21:13	16984-48-8
Sulfate	<0.041	mg/L	0.25	0.041	1			05/11/20 21:13	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	6.7	Std. Units	1.0	1.0	1			05/08/20 13:59	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	249000	ug/L	5000	650	5	05/11/20 06:15	05/14/20 04:01	7440-70-2	
Lithium	11.2J	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:46	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 07:13	7440-36-0	
Arsenic	2.1	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 07:13	7440-38-2	
Barium	1010	ug/L	10.0	2.0	10	05/11/20 11:18	05/13/20 02:10	7440-39-3	
Beryllium	0.020J	ug/L	0.20	0.020	1	05/11/20 11:18	05/12/20 07:13	7440-41-7	
Boron	87.6	ug/L	5.0	1.7	1	05/11/20 11:18	05/13/20 02:24	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 07:13	7440-43-9	
Chromium	2.9	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 07:13	7440-47-3	
Cobalt	1.3	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 07:13	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 07:13	7439-92-1	
Molybdenum	0.20J	ug/L	1.0	0.13	1	05/11/20 11:18	05/12/20 07:13	7439-98-7	
Selenium	0.56J	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 07:13	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 07:13	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 11:52	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	1120	mg/L	20.0	20.0	1			05/12/20 17:31	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	137	mg/L	25.0	25.0	1			05/12/20 16:01	

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-17002	Lab ID: 50256557017	Collected: 05/06/20 13:00	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	7.5	mg/L	0.25	0.016	1			05/11/20 21:44	16887-00-6
Fluoride	0.16	mg/L	0.10	0.0026	1			05/11/20 21:44	16984-48-8
Sulfate	483	mg/L	25.0	4.1	100			05/12/20 11:03	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.1	Std. Units	1.0	1.0	1			05/08/20 14:05	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	254000	ug/L	5000	650	5	05/11/20 06:15	05/14/20 04:07	7440-70-2	
Lithium	141	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:48	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 07:27	7440-36-0	
Arsenic	0.59J	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 07:27	7440-38-2	
Barium	135	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 07:27	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/13/20 03:23	7440-41-7	
Boron	10800	ug/L	1000	332	200	05/11/20 11:18	05/13/20 02:28	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 07:27	7440-43-9	
Chromium	0.15J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 07:27	7440-47-3	
Cobalt	0.30J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 07:27	7440-48-4	
Lead	<0.029	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 07:27	7439-92-1	
Molybdenum	2.7	ug/L	1.0	0.13	1	05/11/20 11:18	05/13/20 03:23	7439-98-7	
Selenium	<0.31	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 07:27	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 07:27	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 12:02	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	1060	mg/L	10.0	10.0	1			05/12/20 17:31	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/12/20 16:01	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-17001	Lab ID: 50256557018	Collected: 05/06/20 14:10	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	<b>30.6</b>	mg/L	5.0	0.31	20			05/11/20 22:59	16887-00-6
Fluoride	<b>0.097J</b>	mg/L	0.10	0.0026	1			05/11/20 22:44	16984-48-8
Sulfate	<b>138</b>	mg/L	5.0	0.82	20			05/11/20 22:59	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	<b>7.4</b>	Std. Units	1.0	1.0	1			05/08/20 14:11	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	<b>167000</b>	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:50	7440-70-2	
Lithium	<b>76.8</b>	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:50	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<b>&lt;0.12</b>	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 07:32	7440-36-0	
Arsenic	<b>0.72J</b>	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 07:32	7440-38-2	
Barium	<b>92.1</b>	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 07:32	7440-39-3	
Beryllium	<b>&lt;0.020</b>	ug/L	0.20	0.020	1	05/11/20 11:18	05/13/20 03:28	7440-41-7	
Boron	<b>1780</b>	ug/L	125	41.5	25	05/11/20 11:18	05/13/20 02:33	7440-42-8	N2
Cadmium	<b>&lt;0.022</b>	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 07:32	7440-43-9	
Chromium	<b>0.18J</b>	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 07:32	7440-47-3	
Cobalt	<b>0.21J</b>	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 07:32	7440-48-4	
Lead	<b>&lt;0.029</b>	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 07:32	7439-92-1	
Molybdenum	<b>0.76J</b>	ug/L	1.0	0.13	1	05/11/20 11:18	05/13/20 03:28	7439-98-7	
Selenium	<b>0.31J</b>	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 07:32	7782-49-2	
Thallium	<b>&lt;0.040</b>	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 07:32	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<b>&lt;0.080</b>	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 12:04	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	<b>682</b>	mg/L	10.0	10.0	1			05/12/20 17:31	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<b>&lt;2.5</b>	mg/L	2.5	2.5	1			05/12/20 16:01	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15016	Lab ID: 50256557019	Collected: 05/06/20 14:55	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	239	mg/L	5.0	0.31	20			05/11/20 23:29	16887-00-6
Fluoride	<0.0026	mg/L	0.10	0.0026	1			05/11/20 23:14	16984-48-8
Sulfate	<0.041	mg/L	0.25	0.041	1			05/11/20 23:14	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	6.7	Std. Units	1.0	1.0	1			05/08/20 14:21	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	176000	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:52	7440-70-2	
Lithium	8.7J	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:52	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.12	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 07:36	7440-36-0	
Arsenic	1.6	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 07:36	7440-38-2	
Barium	678	ug/L	5.0	0.98	5	05/11/20 11:18	05/13/20 02:38	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/13/20 02:42	7440-41-7	
Boron	89.4	ug/L	5.0	1.7	1	05/11/20 11:18	05/13/20 02:42	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 07:36	7440-43-9	
Chromium	1.5	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 07:36	7440-47-3	
Cobalt	1.6	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 07:36	7440-48-4	
Lead	0.045J	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 07:36	7439-92-1	
Molybdenum	<0.13	ug/L	1.0	0.13	1	05/11/20 11:18	05/13/20 02:42	7439-98-7	
Selenium	0.47J	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 07:36	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 07:36	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 12:07	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	944	mg/L	20.0	20.0	1			05/12/20 17:31	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	111	mg/L	25.0	25.0	1			05/12/20 16:01	

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15015	Lab ID: 50256557020	Collected: 05/06/20 16:00	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	18.6	mg/L	5.0	0.31	20			05/12/20 00:00	16887-00-6
Fluoride	0.14	mg/L	0.10	0.0026	1			05/11/20 23:45	16984-48-8
Sulfate	291	mg/L	5.0	0.82	20			05/12/20 00:00	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	8.1	Std. Units	1.0	1.0	1			05/08/20 14:35	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	128000	ug/L	1000	130	1	05/11/20 06:15	05/14/20 03:55	7440-70-2	
Lithium	21.7	ug/L	20.0	4.1	1	05/11/20 06:15	05/14/20 03:55	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	0.18J	ug/L	1.0	0.12	1	05/11/20 11:18	05/12/20 07:41	7440-36-0	
Arsenic	6.6	ug/L	1.0	0.22	1	05/11/20 11:18	05/12/20 07:41	7440-38-2	
Barium	135	ug/L	1.0	0.20	1	05/11/20 11:18	05/12/20 07:41	7440-39-3	
Beryllium	<0.020	ug/L	0.20	0.020	1	05/11/20 11:18	05/13/20 03:33	7440-41-7	
Boron	512	ug/L	50.0	16.6	10	05/11/20 11:18	05/13/20 02:47	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/11/20 11:18	05/12/20 07:41	7440-43-9	
Chromium	0.16J	ug/L	1.0	0.10	1	05/11/20 11:18	05/12/20 07:41	7440-47-3	
Cobalt	0.16J	ug/L	1.0	0.037	1	05/11/20 11:18	05/12/20 07:41	7440-48-4	
Lead	0.074J	ug/L	1.0	0.029	1	05/11/20 11:18	05/12/20 07:41	7439-92-1	
Molybdenum	9.6	ug/L	1.0	0.13	1	05/11/20 11:18	05/13/20 03:33	7439-98-7	
Selenium	0.39J	ug/L	1.0	0.31	1	05/11/20 11:18	05/12/20 07:41	7782-49-2	
Thallium	<0.040	ug/L	1.0	0.040	1	05/11/20 11:18	05/12/20 07:41	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	05/15/20 09:31	05/16/20 12:09	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	646	mg/L	10.0	10.0	1			05/12/20 17:32	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/12/20 16:01	PP

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50256557

Sample: MW-15014	Lab ID: 50256557021	Collected: 05/06/20 16:50	Received: 05/07/20 16:10	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	<b>23.9</b>	mg/L	2.5	0.40	10			05/11/20 12:50	16887-00-6
Fluoride	<b>0.33</b>	mg/L	0.10	0.0068	1			05/11/20 12:30	16984-48-8
Sulfate	<b>12.3</b>	mg/L	0.25	0.043	1			05/11/20 12:30	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	<b>11.1</b>	Std. Units	1.0	1.0	1			05/08/20 14:40	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	<b>42800</b>	ug/L	1000	130	1	05/11/20 13:21	05/15/20 22:08	7440-70-2	
Lithium	<b>21.1</b>	ug/L	20.0	4.1	1	05/11/20 13:21	05/15/20 22:08	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<b>0.43J</b>	ug/L	1.0	0.12	1	05/11/20 10:22	05/12/20 04:33	7440-36-0	
Arsenic	<b>2.5</b>	ug/L	1.0	0.22	1	05/11/20 10:22	05/12/20 04:33	7440-38-2	
Barium	<b>468</b>	ug/L	5.0	0.98	5	05/11/20 10:22	05/12/20 07:45	7440-39-3	
Beryllium	<b>&lt;0.020</b>	ug/L	0.20	0.020	1	05/11/20 10:22	05/12/20 04:33	7440-41-7	
Boron	<b>1330</b>	ug/L	250	83.0	50	05/11/20 10:22	05/12/20 05:15	7440-42-8	N2
Cadmium	<b>&lt;0.022</b>	ug/L	0.20	0.022	1	05/11/20 10:22	05/12/20 04:33	7440-43-9	
Chromium	<b>0.17J</b>	ug/L	1.0	0.10	1	05/11/20 10:22	05/12/20 04:33	7440-47-3	
Cobalt	<b>0.081J</b>	ug/L	1.0	0.037	1	05/11/20 10:22	05/12/20 04:33	7440-48-4	
Lead	<b>0.11J</b>	ug/L	1.0	0.029	1	05/11/20 10:22	05/12/20 04:33	7439-92-1	
Molybdenum	<b>88.2</b>	ug/L	1.0	0.13	1	05/11/20 10:22	05/12/20 04:33	7439-98-7	
Selenium	<b>3.9</b>	ug/L	1.0	0.31	1	05/11/20 10:22	05/12/20 04:33	7782-49-2	
Thallium	<b>&lt;0.040</b>	ug/L	1.0	0.040	1	05/11/20 10:22	05/12/20 04:33	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<b>&lt;0.080</b>	ug/L	0.20	0.080	1	05/12/20 10:22	05/13/20 11:31	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	<b>212</b>	mg/L	10.0	10.0	1			05/12/20 17:32	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<b>&lt;2.5</b>	mg/L	2.5	2.5	1			05/13/20 15:10	PP

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561188	Analysis Method:	EPA 9056
QC Batch Method:	EPA 9056	Analysis Description:	9056 IC Anions
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007, 50256557008, 50256557009, 50256557010, 50256557011, 50256557012, 50256557013, 50256557014, 50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020		

METHOD BLANK: 2588573 Matrix: Water

Associated Lab Samples: 50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007,  
50256557008, 50256557009, 50256557010, 50256557011, 50256557012, 50256557013, 50256557014,  
50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020

Parameter	Units	Blank	Reporting	MDL	Analyzed	Qualifiers
		Result	Limit			
Chloride	mg/L	<0.016	0.25	0.016	05/11/20 10:36	
Fluoride	mg/L	<0.0026	0.10	0.0026	05/11/20 10:36	
Sulfate	mg/L	<0.041	0.25	0.041	05/11/20 10:36	

LABORATORY CONTROL SAMPLE: 2588574

Parameter	Units	Spike	LCS	LCS	% Rec	Qualifiers
		Conc.	Result	% Rec	Limits	
Chloride	mg/L	1.2	1.2	93	80-120	
Fluoride	mg/L	0.5	0.48	95	80-120	
Sulfate	mg/L	2.5	2.4	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2588575 2588576

Parameter	Units	MS	MSD	MS	MSD	MS	MSD	% Rec	Limits	Max	
		50256557001	Spike		Spike	Result	% Rec			RPD	
Chloride	mg/L	36.7	25	25	57.4	58.9	83	89	80-120	2	15
Fluoride	mg/L	0.38	0.5	0.5	0.77	0.77	78	78	80-120	0	15 M0
Sulfate	mg/L	587	250	250	881	880	117	117	80-120	0	15

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561238	Analysis Method:	EPA 9056
QC Batch Method:	EPA 9056	Analysis Description:	9056 IC Anions
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples: 50256557021			

METHOD BLANK: 2588737 Matrix: Water

Associated Lab Samples: 50256557021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.040	0.25	0.040	05/11/20 11:52	
Fluoride	mg/L	<0.0068	0.10	0.0068	05/11/20 11:52	
Sulfate	mg/L	<0.043	0.25	0.043	05/11/20 11:52	

LABORATORY CONTROL SAMPLE: 2588738

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	1.2	1.2	92	80-120	
Fluoride	mg/L	0.5	0.45	91	80-120	
Sulfate	mg/L	2.5	2.4	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2588739 2588740

Parameter	Units	MS		MSD		MS		MSD		% Rec		Max	
		50256464009	Result	Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	RPD	Qual
Chloride	mg/L	ND	1.2	1.2	1.2	1.2	1.2	92	92	80-120	0	15	
Fluoride	mg/L	ND	0.5	0.5	0.45	0.46	0.46	91	91	80-120	0	15	
Sulfate	mg/L	ND	2.5	2.5	2.4	2.4	2.4	97	95	80-120	1	15	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

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QC Batch:	560975	Analysis Method:	SM 4500-H+B
QC Batch Method:	SM 4500-H+B	Analysis Description:	4500H+BGR pH
		Laboratory:	Pace Analytical Services - Grand Rapids
Associated Lab Samples:	50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007, 50256557008, 50256557013, 50256557014, 50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020, 50256557021		

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LABORATORY CONTROL SAMPLE: 2587139

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	6	6.0	100	99-101	

---

SAMPLE DUPLICATE: 2587140

Parameter	Units	50256356001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	9.0	9.0	0	2	H3

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

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QC Batch:	560976	Analysis Method:	SM 4500-H+B
QC Batch Method:	SM 4500-H+B	Analysis Description:	4500H+BGR pH
		Laboratory:	Pace Analytical Services - Grand Rapids

Associated Lab Samples: 50256557009, 50256557010, 50256557011, 50256557012

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LABORATORY CONTROL SAMPLE: 2587141

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	6	6.0	101	99-101	

---

SAMPLE DUPLICATE: 2587142

Parameter	Units	50256560001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	8.1	8.2	1	2	H3

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561016	Analysis Method:	EPA 7470
QC Batch Method:	EPA 7470	Analysis Description:	7470 Mercury
		Laboratory:	Pace Analytical Services - Indianapolis

Associated Lab Samples: 50256557021

METHOD BLANK: 2587422 Matrix: Water

Associated Lab Samples: 50256557021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.080	0.20	0.080	05/13/20 10:23	

LABORATORY CONTROL SAMPLE: 2587423

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2587424 2587425

Parameter	Units	MS Result	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	50256064002	<0.080	5	5	4.9	4.8	98	96	75-125	2 20

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

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QC Batch:	561017	Analysis Method:	EPA 7470
QC Batch Method:	EPA 7470	Analysis Description:	7470 Mercury
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007, 50256557008, 50256557009, 50256557010, 50256557011, 50256557012, 50256557013, 50256557014, 50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020		

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METHOD BLANK: 2587426                          Matrix: Water

Associated Lab Samples: 50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007,  
50256557008, 50256557009, 50256557010, 50256557011, 50256557012, 50256557013, 50256557014,  
50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.080	0.20	0.080	05/16/20 11:01	

LABORATORY CONTROL SAMPLE: 2587427

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.5	90	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2587428                          2587429

Parameter	Units	MS Result	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Max RPD	Qual
Mercury	ug/L	<0.080	5	5	4.6	4.7	92	94	75-125	2	20

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	560916	Analysis Method:	EPA 6010
QC Batch Method:	EPA 3010	Analysis Description:	6010 MET
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007, 50256557008, 50256557009, 50256557010, 50256557011, 50256557012, 50256557013, 50256557014, 50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020		

METHOD BLANK: 2586985 Matrix: Water

Associated Lab Samples: 50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007,  
50256557008, 50256557009, 50256557010, 50256557011, 50256557012, 50256557013, 50256557014,  
50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020

Parameter	Units	Blank	Reporting	MDL	Analyzed	Qualifiers
		Result	Limit			
Calcium	ug/L	<130	1000	130	05/14/20 02:56	
Lithium	ug/L	<4.1	20.0	4.1	05/14/20 02:56	

LABORATORY CONTROL SAMPLE: 2586986

Parameter	Units	Spike	LCS	LCS	% Rec	Qualifiers
		Conc.	Result	% Rec	Limits	
Calcium	ug/L	10000	10200	102	80-120	
Lithium	ug/L	1000	1050	105	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2586987 2586988

Parameter	Units	50256557003	MS	MSD	MS	MSD	% Rec	MSD % Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.									
Calcium	ug/L	153000	10000	10000	168000	172000	152	191	75-125	2	20	P6	
Lithium	ug/L	37.9	1000	1000	1090	1100	105	106	75-125	1	20		

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	560920	Analysis Method:	EPA 6010
QC Batch Method:	EPA 3010	Analysis Description:	6010 MET
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256557021		

METHOD BLANK: 2586993 Matrix: Water

Associated Lab Samples: 50256557021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	<130	1000	130	05/15/20 21:53	
Lithium	ug/L	<4.1	20.0	4.1	05/15/20 21:53	

LABORATORY CONTROL SAMPLE: 2586994

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10100	101	80-120	
Lithium	ug/L	1000	1040	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2586995 2586996

Parameter	Units	50256705003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	199000	10000	10000	198000	204000	-11	48	75-125	3	20	E,P6
Lithium	ug/L	54.3	1000	1000	1080	1130	102	107	75-125	4	20	

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site

Pace Project No.: 50256557

QC Batch: 561202

Analysis Method: EPA 6020

QC Batch Method: EPA 200.2

Analysis Description: 6020 MET

Laboratory:

Pace Analytical Services - Indianapolis

Associated Lab Samples: 50256557021

METHOD BLANK: 2588618

Matrix: Water

Associated Lab Samples: 50256557021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.12	1.0	0.12	05/12/20 04:15	
Arsenic	ug/L	<0.22	1.0	0.22	05/12/20 04:15	
Barium	ug/L	<0.20	1.0	0.20	05/12/20 04:15	
Beryllium	ug/L	<0.020	0.20	0.020	05/12/20 04:15	
Boron	ug/L	<1.7	5.0	1.7	05/12/20 04:15	N2
Cadmium	ug/L	<0.022	0.20	0.022	05/12/20 04:15	
Chromium	ug/L	<0.10	1.0	0.10	05/12/20 04:15	
Cobalt	ug/L	<0.037	1.0	0.037	05/12/20 04:15	
Lead	ug/L	<0.029	1.0	0.029	05/12/20 04:15	
Molybdenum	ug/L	<0.13	1.0	0.13	05/12/20 04:15	
Selenium	ug/L	<0.31	1.0	0.31	05/12/20 04:15	
Thallium	ug/L	<0.040	1.0	0.040	05/12/20 04:15	

LABORATORY CONTROL SAMPLE: 2588619

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	42.0	105	80-120	
Arsenic	ug/L	40	37.8	94	80-120	
Barium	ug/L	40	38.9	97	80-120	
Beryllium	ug/L	40	38.8	97	80-120	
Boron	ug/L	40	42.1	105	80-120 N2	
Cadmium	ug/L	40	39.7	99	80-120	
Chromium	ug/L	40	40.7	102	80-120	
Cobalt	ug/L	40	39.7	99	80-120	
Lead	ug/L	40	39.5	99	80-120	
Molybdenum	ug/L	40	37.9	95	80-120	
Selenium	ug/L	40	38.4	96	80-120	
Thallium	ug/L	40	40.3	101	80-120	

MATRIX SPIKE &amp; MATRIX SPIKE DUPLICATE: 2588620                    2588621

Parameter	Units	MS		MSD		MS		MSD		% Rec		Max RPD	RPD Qual
		50256241001	Spike Result	Spike Conc.	Conc.	MS Result	MSD Result	% Rec	MS % Rec	MSD % Rec	Limits	RPD	
Antimony	ug/L	<1.0	40	40	42.4	42.2	106	105	75-125	0	20		
Arsenic	ug/L	<1.0	40	40	36.9	36.8	92	91	75-125	0	20		
Barium	ug/L	90.0	40	40	132	130	105	99	75-125	2	20		
Beryllium	ug/L	<0.20	40	40	35.6	35.7	89	89	75-125	0	20 CL		

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

		MATRIX SPIKE & MATRIX SPIKE DUPLICATE:		2588620		2588621						
Parameter	Units	MS		MSD				% Rec		Max		
		50256241001	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	Limits	RPD	RPD	Qual
Boron	ug/L	45.3	40	40	79.5	78.0	85	82	75-125	2	20	CH,N2
Cadmium	ug/L	<0.20	40	40	38.0	37.3	95	93	75-125	2	20	
Chromium	ug/L	<2.0	40	40	38.2	37.8	95	94	75-125	1	20	
Cobalt	ug/L	<1.0	40	40	36.5	36.5	91	91	75-125	0	20	
Lead	ug/L	<1.0	40	40	39.3	38.8	98	97	75-125	1	20	
Molybdenum	ug/L	<1.0	40	40	37.4	36.6	93	91	75-125	2	20	CL
Selenium	ug/L	<1.0	40	40	39.0	39.1	96	96	75-125	0	20	
Thallium	ug/L	<1.0	40	40	40.6	40.1	101	100	75-125	1	20	

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site

Pace Project No.: 50256557

QC Batch: 561207 Analysis Method: EPA 6020

QC Batch Method: EPA 200.2 Analysis Description: 6020 MET

Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007,  
50256557008, 50256557009, 50256557010, 50256557011, 50256557012, 50256557013, 50256557014,  
50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020

METHOD BLANK: 2588634

Matrix: Water

Associated Lab Samples: 50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007,  
50256557008, 50256557009, 50256557010, 50256557011, 50256557012, 50256557013, 50256557014,  
50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.12	1.0	0.12	05/12/20 05:19	
Arsenic	ug/L	<0.22	1.0	0.22	05/12/20 05:19	
Barium	ug/L	<0.20	1.0	0.20	05/12/20 05:19	
Beryllium	ug/L	<0.020	0.20	0.020	05/12/20 05:19	
Boron	ug/L	<1.7	5.0	1.7	05/12/20 05:19	N2
Cadmium	ug/L	<0.022	0.20	0.022	05/12/20 05:19	
Chromium	ug/L	<0.10	1.0	0.10	05/12/20 05:19	
Cobalt	ug/L	<0.037	1.0	0.037	05/12/20 05:19	
Lead	ug/L	<0.029	1.0	0.029	05/12/20 05:19	
Molybdenum	ug/L	<0.13	1.0	0.13	05/12/20 05:19	
Selenium	ug/L	<0.31	1.0	0.31	05/12/20 05:19	
Thallium	ug/L	<0.040	1.0	0.040	05/12/20 05:19	

LABORATORY CONTROL SAMPLE: 2588635

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	42.3	106	80-120	
Arsenic	ug/L	40	38.2	96	80-120	
Barium	ug/L	40	39.2	98	80-120	
Beryllium	ug/L	40	39.0	97	80-120	
Boron	ug/L	40	42.6	107	80-120 N2	
Cadmium	ug/L	40	39.9	100	80-120	
Chromium	ug/L	40	40.3	101	80-120	
Cobalt	ug/L	40	39.6	99	80-120	
Lead	ug/L	40	39.7	99	80-120	
Molybdenum	ug/L	40	37.6	94	80-120	
Selenium	ug/L	40	37.9	95	80-120	
Thallium	ug/L	40	40.4	101	80-120	

MATRIX SPIKE &amp; MATRIX SPIKE DUPLICATE: 2588636      2588637

Parameter	Units	50256557001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Max RPD	Max Qual
Antimony	ug/L	<0.12	40	40	42.7	41.7	107	104	75-125	2	20	

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

		MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2588636				2588637						
Parameter	Units	MS		MSD		MS Result	% Rec	MSD % Rec	% Rec	Max		
		50256557001	Spike Conc.	Spike Conc.	MS Result					RPD	RPD	
Arsenic	ug/L	0.60J	40	40	38.6	38.3	95	94	75-125	1	20	
Barium	ug/L	135	40	40	173	174	96	98	75-125	0	20	
Beryllium	ug/L	<0.020	40	40	39.6	38.8	99	97	75-125	2	20	
Boron	ug/L	8310	40	40	8300	8390	-18	197	75-125	1	20	N2,P6
Cadmium	ug/L	<0.022	40	40	39.0	38.1	97	95	75-125	2	20	
Chromium	ug/L	0.26J	40	40	39.3	39.2	98	97	75-125	0	20	
Cobalt	ug/L	0.19J	40	40	37.6	37.0	94	92	75-125	2	20	
Lead	ug/L	<0.029	40	40	40.0	39.4	100	99	75-125	1	20	
Molybdenum	ug/L	3.6	40	40	41.6	40.9	95	93	75-125	2	20	
Selenium	ug/L	<0.31	40	40	17.0	15.7	42	39	75-125	8	20	M3
Thallium	ug/L	<0.040	40	40	41.6	40.9	104	102	75-125	1	20	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561195	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
Associated Lab Samples:	Laboratory: Pace Analytical Services - Indianapolis		
Associated Lab Samples: 50256557001, 50256557002			

METHOD BLANK: 2588591 Matrix: Water

Associated Lab Samples: 50256557001, 50256557002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<10.0	10.0	10.0	05/11/20 12:04	

LABORATORY CONTROL SAMPLE: 2588592

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	266	89	80-120	

SAMPLE DUPLICATE: 2588593

Parameter	Units	50256546003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1080	1100	2	10	

SAMPLE DUPLICATE: 2588594

Parameter	Units	50256557001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1140	1150	2	10	

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561198	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
		Laboratory:	Pace Analytical Services - Indianapolis

Associated Lab Samples: 50256557003, 50256557004, 50256557005, 50256557006, 50256557007, 50256557008

METHOD BLANK: 2588603 Matrix: Water

Associated Lab Samples: 50256557003, 50256557004, 50256557005, 50256557006, 50256557007, 50256557008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<10.0	10.0	10.0	05/11/20 12:16	

LABORATORY CONTROL SAMPLE: 2588604

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	263	88	80-120	

SAMPLE DUPLICATE: 2588605

Parameter	Units	50256643001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	527	517	2	10	

SAMPLE DUPLICATE: 2588606

Parameter	Units	50256685006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	942	910	3	10	

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## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch: 561453	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Indianapolis
Associated Lab Samples: 50256557013	

METHOD BLANK: 2589441 Matrix: Water

Associated Lab Samples: 50256557013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<10.0	10.0	10.0	05/12/20 16:38	

LABORATORY CONTROL SAMPLE: 2589442

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	272	91	80-120	

SAMPLE DUPLICATE: 2589443

Parameter	Units	50256465007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	440	476	8	10	

SAMPLE DUPLICATE: 2589444

Parameter	Units	50256546023 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1770	1720	3	10	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561455	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256557014, 50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020, 50256557021		

METHOD BLANK: 2589447 Matrix: Water

Associated Lab Samples: 50256557014, 50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020, 50256557021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<10.0	10.0	10.0	05/12/20 17:30	

LABORATORY CONTROL SAMPLE: 2589448

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	284	95	80-120	

SAMPLE DUPLICATE: 2589449

Parameter	Units	50256557014 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	373	383	3	10	

SAMPLE DUPLICATE: 2589450

Parameter	Units	50256673001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	579	586	1	10	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561686	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
		Laboratory:	Pace Analytical Services - Indianapolis

Associated Lab Samples: 50256557009, 50256557010, 50256557011, 50256557012

METHOD BLANK: 2590525 Matrix: Water

Associated Lab Samples: 50256557009, 50256557010, 50256557011, 50256557012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<10.0	10.0	10.0	05/13/20 15:02	

LABORATORY CONTROL SAMPLE: 2590526

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	298	99	80-120	

SAMPLE DUPLICATE: 2590527

Parameter	Units	50256557009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	451	442	2	10	

SAMPLE DUPLICATE: 2590528

Parameter	Units	50256563017 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1990000 ug/L	1980	1	10	

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561194	Analysis Method:	SM 2540D
QC Batch Method:	SM 2540D	Analysis Description:	2540D Total Suspended Solids
		Laboratory:	Pace Analytical Services - Indianapolis

Associated Lab Samples: 50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007

METHOD BLANK: 2588587 Matrix: Water

Associated Lab Samples: 50256557001, 50256557002, 50256557003, 50256557004, 50256557005, 50256557006, 50256557007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<2.5	2.5	2.5	05/11/20 10:19	

LABORATORY CONTROL SAMPLE: 2588588

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	95	95	80-120	

SAMPLE DUPLICATE: 2588589

Parameter	Units	50256620002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	76	76	1	10	

SAMPLE DUPLICATE: 2588590

Parameter	Units	50256557004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	69	69	0	10	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561400	Analysis Method:	SM 2540D
QC Batch Method:	SM 2540D	Analysis Description:	2540D Total Suspended Solids
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50256557008, 50256557013, 50256557014, 50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020		

METHOD BLANK: 2589234 Matrix: Water

Associated Lab Samples: 50256557008, 50256557013, 50256557014, 50256557015, 50256557016, 50256557017, 50256557018, 50256557019, 50256557020

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<2.5	2.5	2.5	05/12/20 15:59	

LABORATORY CONTROL SAMPLE: 2589235

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	94	94	80-120	

SAMPLE DUPLICATE: 2589872

Parameter	Units	50256557015 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	43	44	2	10	

SAMPLE DUPLICATE: 2589873

Parameter	Units	50256557019 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	111	108	3	10	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50256557

QC Batch:	561625	Analysis Method:	SM 2540D
QC Batch Method:	SM 2540D	Analysis Description:	2540D Total Suspended Solids
		Laboratory:	Pace Analytical Services - Indianapolis

Associated Lab Samples: 50256557009, 50256557010, 50256557011, 50256557012, 50256557021

METHOD BLANK: 2590355 Matrix: Water

Associated Lab Samples: 50256557009, 50256557010, 50256557011, 50256557012, 50256557021

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<2.5	2.5	2.5	05/13/20 15:10	

LABORATORY CONTROL SAMPLE: 2590356

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	94	94	80-120	

SAMPLE DUPLICATE: 2590357

Parameter	Units	50256561001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	28	28	0	10	

SAMPLE DUPLICATE: 2590358

Parameter	Units	50256566001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	42	41	2	10	

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## QUALIFIERS

Project: Muskegon Site  
Pace Project No.: 50256557

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### ANALYTE QUALIFIERS

- |    |   |
|----|---|
| CH | The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.   |
| CL | The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.  |
| E  | Analyte concentration exceeded the calibration range. The reported result is estimated.   |
| H3 | Sample was received or analysis requested beyond the recognized method holding time.  |
| M0 | Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.   |
| M3 | Matrix spike recovery was outside laboratory control limits due to matrix interferences.  |
| N2 | The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request. |
| P6 | Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.   |
| PP | The mass of dried residue obtained did not meet the test method requirements based on volume used.  |

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Muskegon Site  
Pace Project No.: 50256557

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50256557001	MW-15022	EPA 9056	561188		
50256557002	MW-15021	EPA 9056	561188		
50256557003	MW-17006	EPA 9056	561188		
50256557004	MW-15020	EPA 9056	561188		
50256557005	MW-15019	EPA 9056	561188		
50256557006	MW-17005	EPA 9056	561188		
50256557007	MW-17004	EPA 9056	561188		
50256557008	MW-15019D	EPA 9056	561188		
50256557009	MW-15013	EPA 9056	561188		
50256557010	MW-15012	EPA 9056	561188		
50256557011	MW-15011	EPA 9056	561188		
50256557012	MW-15009	EPA 9056	561188		
50256557013	MW-15023	EPA 9056	561188		
50256557014	MW-17003	EPA 9056	561188		
50256557015	MW-15018	EPA 9056	561188		
50256557016	MW-15017	EPA 9056	561188		
50256557017	MW-17002	EPA 9056	561188		
50256557018	MW-17001	EPA 9056	561188		
50256557019	MW-15016	EPA 9056	561188		
50256557020	MW-15015	EPA 9056	561188		
50256557021	MW-15014	EPA 9056	561238		
50256557001	MW-15022	SM 4500-H+B	560975		
50256557002	MW-15021	SM 4500-H+B	560975		
50256557003	MW-17006	SM 4500-H+B	560975		
50256557004	MW-15020	SM 4500-H+B	560975		
50256557005	MW-15019	SM 4500-H+B	560975		
50256557006	MW-17005	SM 4500-H+B	560975		
50256557007	MW-17004	SM 4500-H+B	560975		
50256557008	MW-15019D	SM 4500-H+B	560975		
50256557009	MW-15013	SM 4500-H+B	560976		
50256557010	MW-15012	SM 4500-H+B	560976		
50256557011	MW-15011	SM 4500-H+B	560976		
50256557012	MW-15009	SM 4500-H+B	560976		
50256557013	MW-15023	SM 4500-H+B	560975		
50256557014	MW-17003	SM 4500-H+B	560975		
50256557015	MW-15018	SM 4500-H+B	560975		
50256557016	MW-15017	SM 4500-H+B	560975		
50256557017	MW-17002	SM 4500-H+B	560975		
50256557018	MW-17001	SM 4500-H+B	560975		
50256557019	MW-15016	SM 4500-H+B	560975		
50256557020	MW-15015	SM 4500-H+B	560975		
50256557021	MW-15014	SM 4500-H+B	560975		
50256557001	MW-15022	EPA 3010	560916	EPA 6010	561838
50256557002	MW-15021	EPA 3010	560916	EPA 6010	561838
50256557003	MW-17006	EPA 3010	560916	EPA 6010	561838
50256557004	MW-15020	EPA 3010	560916	EPA 6010	561838

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**QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: Muskegon Site  
Pace Project No.: 50256557

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50256557005	MW-15019	EPA 3010	560916	EPA 6010	561838
50256557006	MW-17005	EPA 3010	560916	EPA 6010	561838
50256557007	MW-17004	EPA 3010	560916	EPA 6010	561838
50256557008	MW-15019D	EPA 3010	560916	EPA 6010	561838
50256557009	MW-15013	EPA 3010	560916	EPA 6010	561838
50256557010	MW-15012	EPA 3010	560916	EPA 6010	561838
50256557011	MW-15011	EPA 3010	560916	EPA 6010	561838
50256557012	MW-15009	EPA 3010	560916	EPA 6010	561838
50256557013	MW-15023	EPA 3010	560916	EPA 6010	561838
50256557014	MW-17003	EPA 3010	560916	EPA 6010	561838
50256557015	MW-15018	EPA 3010	560916	EPA 6010	561838
50256557016	MW-15017	EPA 3010	560916	EPA 6010	561838
50256557017	MW-17002	EPA 3010	560916	EPA 6010	561838
50256557018	MW-17001	EPA 3010	560916	EPA 6010	561838
50256557019	MW-15016	EPA 3010	560916	EPA 6010	561838
50256557020	MW-15015	EPA 3010	560916	EPA 6010	561838
50256557021	MW-15014	EPA 3010	560920	EPA 6010	562230
50256557001	MW-15022	EPA 200.2	561207	EPA 6020	561358
50256557002	MW-15021	EPA 200.2	561207	EPA 6020	561358
50256557003	MW-17006	EPA 200.2	561207	EPA 6020	561358
50256557004	MW-15020	EPA 200.2	561207	EPA 6020	561358
50256557005	MW-15019	EPA 200.2	561207	EPA 6020	561358
50256557006	MW-17005	EPA 200.2	561207	EPA 6020	561358
50256557007	MW-17004	EPA 200.2	561207	EPA 6020	561358
50256557008	MW-15019D	EPA 200.2	561207	EPA 6020	561358
50256557009	MW-15013	EPA 200.2	561207	EPA 6020	561358
50256557010	MW-15012	EPA 200.2	561207	EPA 6020	561358
50256557011	MW-15011	EPA 200.2	561207	EPA 6020	561358
50256557012	MW-15009	EPA 200.2	561207	EPA 6020	561358
50256557013	MW-15023	EPA 200.2	561207	EPA 6020	561358
50256557014	MW-17003	EPA 200.2	561207	EPA 6020	561358
50256557015	MW-15018	EPA 200.2	561207	EPA 6020	561358
50256557016	MW-15017	EPA 200.2	561207	EPA 6020	561358
50256557017	MW-17002	EPA 200.2	561207	EPA 6020	561358
50256557018	MW-17001	EPA 200.2	561207	EPA 6020	561358
50256557019	MW-15016	EPA 200.2	561207	EPA 6020	561358
50256557020	MW-15015	EPA 200.2	561207	EPA 6020	561358
50256557021	MW-15014	EPA 200.2	561202	EPA 6020	561356
50256557001	MW-15022	EPA 7470	561017	EPA 7470	562255
50256557002	MW-15021	EPA 7470	561017	EPA 7470	562255
50256557003	MW-17006	EPA 7470	561017	EPA 7470	562255
50256557004	MW-15020	EPA 7470	561017	EPA 7470	562255
50256557005	MW-15019	EPA 7470	561017	EPA 7470	562255
50256557006	MW-17005	EPA 7470	561017	EPA 7470	562255
50256557007	MW-17004	EPA 7470	561017	EPA 7470	562255
50256557008	MW-15019D	EPA 7470	561017	EPA 7470	562255
50256557009	MW-15013	EPA 7470	561017	EPA 7470	562255

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Muskegon Site  
Pace Project No.: 50256557

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50256557010	MW-15012	EPA 7470	561017	EPA 7470	562255
50256557011	MW-15011	EPA 7470	561017	EPA 7470	562255
50256557012	MW-15009	EPA 7470	561017	EPA 7470	562255
50256557013	MW-15023	EPA 7470	561017	EPA 7470	562255
50256557014	MW-17003	EPA 7470	561017	EPA 7470	562255
50256557015	MW-15018	EPA 7470	561017	EPA 7470	562255
50256557016	MW-15017	EPA 7470	561017	EPA 7470	562255
50256557017	MW-17002	EPA 7470	561017	EPA 7470	562255
50256557018	MW-17001	EPA 7470	561017	EPA 7470	562255
50256557019	MW-15016	EPA 7470	561017	EPA 7470	562255
50256557020	MW-15015	EPA 7470	561017	EPA 7470	562255
50256557021	MW-15014	EPA 7470	561016	EPA 7470	561638
50256557001	MW-15022	SM 2540C	561195		
50256557002	MW-15021	SM 2540C	561195		
50256557003	MW-17006	SM 2540C	561198		
50256557004	MW-15020	SM 2540C	561198		
50256557005	MW-15019	SM 2540C	561198		
50256557006	MW-17005	SM 2540C	561198		
50256557007	MW-17004	SM 2540C	561198		
50256557008	MW-15019D	SM 2540C	561198		
50256557009	MW-15013	SM 2540C	561686		
50256557010	MW-15012	SM 2540C	561686		
50256557011	MW-15011	SM 2540C	561686		
50256557012	MW-15009	SM 2540C	561686		
50256557013	MW-15023	SM 2540C	561453		
50256557014	MW-17003	SM 2540C	561455		
50256557015	MW-15018	SM 2540C	561455		
50256557016	MW-15017	SM 2540C	561455		
50256557017	MW-17002	SM 2540C	561455		
50256557018	MW-17001	SM 2540C	561455		
50256557019	MW-15016	SM 2540C	561455		
50256557020	MW-15015	SM 2540C	561455		
50256557021	MW-15014	SM 2540C	561455		
50256557001	MW-15022	SM 2540D	561194		
50256557002	MW-15021	SM 2540D	561194		
50256557003	MW-17006	SM 2540D	561194		
50256557004	MW-15020	SM 2540D	561194		
50256557005	MW-15019	SM 2540D	561194		
50256557006	MW-17005	SM 2540D	561194		
50256557007	MW-17004	SM 2540D	561194		
50256557008	MW-15019D	SM 2540D	561400		
50256557009	MW-15013	SM 2540D	561625		
50256557010	MW-15012	SM 2540D	561625		
50256557011	MW-15011	SM 2540D	561625		

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Muskegon Site  
 Pace Project No.: 50256557

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50256557012	MW-15009	SM 2540D	561625		
50256557013	MW-15023	SM 2540D	561400		
50256557014	MW-17003	SM 2540D	561400		
50256557015	MW-15018	SM 2540D	561400		
50256557016	MW-15017	SM 2540D	561400		
50256557017	MW-17002	SM 2540D	561400		
50256557018	MW-17001	SM 2540D	561400		
50256557019	MW-15016	SM 2540D	561400		
50256557020	MW-15015	SM 2540D	561400		
50256557021	MW-15014	SM 2540D	561625		

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
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Section A

Section B

Section C

A standard linear barcode is located on the right side of the page. It consists of vertical black bars of varying widths on a white background.



# Sample Conditions Upon Receipt Form (SCUR)

Date/Time: <u>5.7.20</u>	Evaluated by: <u>WDC</u>	<b>WO# : 50256557</b>		
Client: <u>HDR</u>		PM: MSB	Due Date: 05/18/20	
Project Manager: <u>MSB</u>	Profile ID:	CLIENT: GR-HDR		
Rush TAT Requested: YES NO		Due Date:		
Lab Notified of Rush or Short Holds: YES <u>NO</u>		Non Conformance Form Required: YES <u>NO</u>		
Samples Received Via: FedEx    UPS    Client    Pace Courier    Other: _____ <span style="float: right;">Comments:</span>				
Custody Seals Present and Intact:		YES	NO	<u>N/A</u>
Received Sample Information Form(s): Drinking Waters Only		YES	NO	<u>N/A</u>
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)		YES	NO	<u>N/A</u>
Short Holds Present (< 72 Hours):		YES	NO	
Samples Received in Hold:		<u>YES</u>	NO	
Custody Signatures Present:		<u>YES</u>	NO	
Collector Signature Present:		<u>YES</u>	NO	
Packing Material Used:		<u>YES</u>	NO	
Samples Collected Today and On Ice:		YES	NO	<u>N/A</u>
IR Gun #: 280 281		Digital Thermometer #: 282 283		
Ice Type: WET Bagged / WET Loose    BLUE    NONE		1. Cooler Temp Upon Receipt: <u>0.1109</u> °C		
Ice Location: TOP    BOTTOM    MIDDLE    DISPERSED		Temp should be 0-6°C (Initial/Corrected)		
Temp Blank Received:		YES	NO	
Containers Intact:		<u>YES</u>	NO	
Correct Containers:		<u>YES</u>	NO	
Sufficient Volume:		<u>YES</u>	NO	
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are VOA, coliform, LLHG, O&G, or any container with a septum cap or preserved with HCl		<u>YES</u>	NO	<u>N/A</u>
Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)		YES	NO	<u>N/A</u>
VOA Headspace Acceptable (<6mm):		YES	NO	<u>N/A</u>
Trip Blank Received: HCl    MeOH    TSP    OTHER		YES	NO	
Comments: <u>5. 0.211.0</u> <u>Cooler Temps:</u> <u>6. 0.611.4</u> °C <u>7. 1.011.8</u> °C		2. Cooler Temp Upon Receipt: <u>15.23</u> °C		
			3. Cooler Temp Upon Receipt: <u>17.25</u> °C	
			4. Cooler Temp Upon Receipt: <u>35.43</u> °C	

August 06, 2020

Molly Reeves  
HDR, Inc.  
3321 Bronson Blvd  
Kalamazoo, MI 49008

RE: Project: Muskegon Site Rad  
Pace Project No.: 50256558

Dear Molly Reeves:

Enclosed are the analytical results for sample(s) received by the laboratory on May 07, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

Revised Report: This report replaces the original dated, 061020. Revised to add Rad 226/228 combined per client request./080620msb

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melanie Booms  
melanie.booms@pacelabs.com  
(616)975-4500  
Project Manager

Enclosures

cc: Lara Syrocki, HDR, Inc.  
Aryka Thomson, HDR, Inc.



## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: Muskegon Site Rad  
Pace Project No.: 50256558

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50256558001	<b>MW-15022</b>	Water	05/05/20 10:50	05/07/20 16:10
50256558002	<b>MW-15021</b>	Water	05/05/20 11:25	05/07/20 16:10
50256558003	<b>MW-17006</b>	Water	05/05/20 12:00	05/07/20 16:10
50256558004	<b>MW-15020</b>	Water	05/05/20 14:05	05/07/20 16:10
50256558005	<b>MW-15019</b>	Water	05/05/20 16:10	05/07/20 16:10
50256558006	<b>MW-17005</b>	Water	05/05/20 14:50	05/07/20 16:10
50256558007	<b>MW-17004</b>	Water	05/05/20 15:30	05/07/20 16:10
50256558008	<b>MW-15019D</b>	Water	05/05/20 16:30	05/07/20 16:10
50256558009	<b>MW-15013</b>	Water	05/07/20 08:50	05/07/20 16:10
50256558010	<b>MW-15012</b>	Water	05/07/20 10:15	05/07/20 16:10
50256558011	<b>MW-15011</b>	Water	05/07/20 11:40	05/07/20 16:10
50256558012	<b>MW-15009</b>	Water	05/07/20 12:50	05/07/20 16:10
50256558013	<b>MW-15023</b>	Water	05/06/20 08:35	05/07/20 16:10
50256558014	<b>MW-17003</b>	Water	05/06/20 10:00	05/07/20 16:10
50256558015	<b>MW-15018</b>	Water	05/06/20 11:00	05/07/20 16:10
50256558016	<b>MW-15017</b>	Water	05/06/20 12:00	05/07/20 16:10
50256558017	<b>MW-17002</b>	Water	05/06/20 13:00	05/07/20 16:10
50256558018	<b>MW-17001</b>	Water	05/06/20 14:10	05/07/20 16:10
50256558019	<b>MW-15016</b>	Water	05/06/20 14:55	05/07/20 16:10
50256558020	<b>MW-15015</b>	Water	05/06/20 16:00	05/07/20 16:10
50256558021	<b>MW-15014</b>	Water	05/06/20 16:50	05/07/20 16:10

## REPORT OF LABORATORY ANALYSIS

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Section A

### **Required Client Information:**

**Company:** HDR, Inc.  
**Address:** 3321 Branson Blv  
Kalamazoo, MI 49008  
**Email:** molly.reeves@hdrinc.com  
**Phone:** 734-751-1790  
**Requested Due Date:**

Section B

## Required Project Information:

Report To: Molly Reeves  
Copy To:  
  
Purchase Order #:  
Project Name: Muskegon St.  
Project #: 1234567890

Section C

**Invoice Information:**

Attention: \_\_\_\_\_  
Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
  
Pace Quote: \_\_\_\_\_  
Pace Project Manager: \_\_\_\_\_  
Pace Profile #: 921

100

III  
Site / Location

2.



Pace Analytical<sup>®</sup>  
www.pacelabs.com

# CHAIN-OF-CUSTODY / Analytical Request Doc# : M0# : 50256558

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be filled out.

<b>Section A</b>		<b>Section B</b>		<b>Section C</b>																																																																																																																																																																																																																																																							
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Company: HDR, Inc.	Report To: Molly Reeves	Attention:																																																																																																																																																																																																																																																									
Address: 3321 Bronson Blvd Kalamazoo, MI 49008	Copy To:	Company Name:																																																																																																																																																																																																																																																									
Email: molly.reeves@hdrinc.com	Purchase Order #:	Address:																																																																																																																																																																																																																																																									
Phone: 734-751-1790	Project Name: Muskegon Site	Pace Quote:	Pace Project Manager: melanie.booms@pacelabs.com,																																																																																																																																																																																																																																																								
Requested Due Date:	Project #:	Pace Profile #:	9219																																																																																																																																																																																																																																																								
<table border="1"> <thead> <tr> <th rowspan="2">ITEM #</th> <th rowspan="2">SAMPLE ID One Character per box. (A-Z, 0-9, -, -) Sample IDs must be unique</th> <th rowspan="2">COLLECTED MATRIX CODE Drinking Water Water Waste Water Product Soil/Solid Oil Wipe Air Other Tissue</th> <th rowspan="2">START DATE TIME</th> <th rowspan="2">END DATE TIME</th> <th rowspan="2">TIME</th> <th colspan="12">SAMPLE TEMP AT COLLECTION</th> </tr> <tr> <th colspan="12"># OF CONTAINERS Upreserved</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>MNN-15023</td> <td>WT</td> <td>05/19/12</td> <td>8:35</td> <td></td> <td colspan="12">6</td> </tr> <tr> <td>2</td> <td>MNN-17003</td> <td>WT</td> <td></td> <td>10:00</td> <td></td> <td colspan="12">6</td> </tr> <tr> <td>3</td> <td>MNN-15018</td> <td>WT</td> <td></td> <td>11:00</td> <td></td> <td colspan="12">6</td> </tr> <tr> <td>4</td> <td>MNN-15017</td> <td>WT</td> <td></td> <td>12:00</td> <td></td> <td colspan="12">6</td> </tr> <tr> <td>5</td> <td>MNN-17002</td> <td>WT</td> <td></td> <td>1:00</td> <td></td> <td colspan="12">6</td> </tr> <tr> <td>6</td> <td>MNN-17001</td> <td>WT</td> <td></td> <td>2:10</td> <td></td> <td colspan="12">6</td> </tr> <tr> <td>7</td> <td>MNN-15016</td> <td>WT</td> <td></td> <td>2:55</td> <td></td> <td colspan="12">6</td> </tr> <tr> <td>8</td> <td>MNN-15015</td> <td>WT</td> <td></td> <td>3:00</td> <td></td> <td colspan="12">6</td> </tr> <tr> <td>9</td> <td>MNN-15014</td> <td>WT</td> <td></td> <td>4:50</td> <td></td> <td colspan="12">6</td> </tr> <tr> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="12"></td> </tr> <tr> <td>11</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="12"></td> </tr> <tr> <td>12</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="12"></td> </tr> </tbody> </table>						ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9, -, -) Sample IDs must be unique	COLLECTED MATRIX CODE Drinking Water Water Waste Water Product Soil/Solid Oil Wipe Air Other Tissue	START DATE TIME	END DATE TIME	TIME	SAMPLE TEMP AT COLLECTION												# OF CONTAINERS Upreserved												1	MNN-15023	WT	05/19/12	8:35		6												2	MNN-17003	WT		10:00		6												3	MNN-15018	WT		11:00		6												4	MNN-15017	WT		12:00		6												5	MNN-17002	WT		1:00		6												6	MNN-17001	WT		2:10		6												7	MNN-15016	WT		2:55		6												8	MNN-15015	WT		3:00		6												9	MNN-15014	WT		4:50		6												10																		11																		12																	
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PRINT Name of SAMPLER:		ACCEPTED BY / AFFILIATION		DATE	TIME																																																																																																																																																																																																																																																						
SIGNATURE of SAMPLER:				DATE Signed:																																																																																																																																																																																																																																																							
Section C		Requested / Analyze Filtered (Y/N)		State / Location		TEMP in C																																																																																																																																																																																																																																																					
		Residual Chlorine (Y/N)		MI		Samples Sealed (Y/N)																																																																																																																																																																																																																																																					
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# Sample Conditions Upon Receipt Form (SCUR)

Date/Time: <u>5.7.20</u>	Evaluated by: <u>WDC</u>	<b>WO# : 50256558</b> <b>PM: MSB</b> <b>Due Date: 05/29/20</b> <b>CLIENT: GR-HDR</b>			
Client: <u>HDR</u>	Project Manager: <u>MSB</u>				Profile ID:
Rush TAT Requested: YES	NO	Due Date:			
Lab Notified of Rush or Short Holds: YES		NO	Non Conformance Form Required: YES		NO
Samples Received Via: FedEx    UPS    Client    Pace Courier    Other: _____					Comments: _____
Custody Seals Present and Intact:			YES	NO	N/A
Received Sample Information Form(s): Drinking Waters Only			YES	NO	N/A
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)			YES	NO	N/A
Short Holds Present (< 72 Hours):			YES	NO	
Samples Received in Hold:			YES	NO	
Custody Signatures Present:			YES	NO	
Collector Signature Present:			YES	NO	
Packing Material Used:			YES	NO	
Samples Collected Today and On Ice:			YES	NO	N/A
IR Gun #: 280	281	Digital Thermometer #:	282	283	
Ice Type: WET Bagged / WET Loose    BLUE    NONE			1. Cooler Temp Upon Receipt: <u>0.1   0.9</u> °C		
Ice Location: TOP    BOTTOM    MIDDLE    DISPERSED			Temp should be 0-6°C (Initial/Corrected)		
Temp Blank Received:			YES	NO	
Containers Intact:			YES	NO	
Correct Containers:			YES	NO	
Sufficient Volume:			YES	NO	
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are VOA, coliform, LLHg, O&G, or any container with a septum cap or preserved with HCl			YES	NO	N/A
Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)			YES	NO	N/A
VOA Headspace Acceptable (<6mm):			YES	NO	N/A
Trip Blank Received: HCl    MeOH    TSP    OTHER			YES	NO	
Comments: <i>Cooler Temps:</i>			2. Cooler Temp Upon Receipt: <u>1.5   2.3</u> °C		
			3. Cooler Temp Upon Receipt: <u>1.7   2.5</u> °C		
			4. Cooler Temp Upon Receipt: <u>3.5   4.3</u> °C		

# ANALYTICAL REPORT

August 06, 2020

Revised Report

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

## Pace Analytical - Grand Rapids, MI

Sample Delivery Group: L1217169  
Samples Received: 05/11/2020  
Project Number: 50256558  
Description: Muskegon Site Rad  
Site: 001  
Report To: Melanie Booms  
5560 Corporate Exchange Ct SE  
Grand Rapids, MI 49512

Entire Report Reviewed By:



Donna Eidson  
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

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ONE LAB. NATIONWIDE.



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<b>Cn: Case Narrative</b>	<b>7</b>	
<b>Sr: Sample Results</b>	<b>8</b>	
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<b>Radiochemistry by Method SM7500Ra B M</b>	<b>31</b>	
<b>Gl: Glossary of Terms</b>	<b>33</b>	
<b>Al: Accreditations &amp; Locations</b>	<b>34</b>	
<b>Sc: Sample Chain of Custody</b>	<b>35</b>	

## SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



			Collected by	Collected date/time	Received date/time
				05/05/20 10:50	05/11/20 09:15

## MW-15022 L1217169-01 Non-Potable Water

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/05/20 09:40	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1477856	1	05/20/20 14:52	06/05/20 09:40	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## MW-15021 L1217169-02 Non-Potable Water

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/05/20 09:40	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1477856	1	05/20/20 14:52	06/05/20 09:40	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT	Mt. Juliet, TN

Collected by  
05/05/20 11:25

## MW-17006 L1217169-03 Non-Potable Water

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/05/20 09:40	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1477856	1	05/20/20 14:52	06/05/20 09:40	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT	Mt. Juliet, TN

Collected by  
05/05/20 12:00

## MW-15020 L1217169-04 Non-Potable Water

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/05/20 09:40	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1477856	1	05/20/20 14:52	06/05/20 09:40	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT	Mt. Juliet, TN

Collected by  
05/05/20 14:05

## MW-15019 L1217169-05 Non-Potable Water

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT	Mt. Juliet, TN

Collected by  
05/05/20 16:10

## MW-17005 L1217169-06 Non-Potable Water

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT	Mt. Juliet, TN

Collected by  
05/05/20 14:50

## SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



				Collected by	Collected date/time	Received date/time
					05/05/20 15:30	05/11/20 09:15
MW-17004 L1217169-07 Non-Potable Water	Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
						Location
Radiochemistry by Method 904		WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR
Radiochemistry by Method Calculation		WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT
Radiochemistry by Method SM7500Ra B M		WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT
MW-15019D L1217169-08 Non-Potable Water	Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
						Location
Radiochemistry by Method 904		WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR
Radiochemistry by Method Calculation		WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT
Radiochemistry by Method SM7500Ra B M		WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT
MW-15013 L1217169-09 Non-Potable Water	Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
						Location
Radiochemistry by Method 904		WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR
Radiochemistry by Method Calculation		WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT
Radiochemistry by Method SM7500Ra B M		WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT
MW-15012 L1217169-10 Non-Potable Water	Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
						Location
Radiochemistry by Method 904		WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR
Radiochemistry by Method Calculation		WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT
Radiochemistry by Method SM7500Ra B M		WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT
MW-15011 L1217169-11 Non-Potable Water	Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
						Location
Radiochemistry by Method 904		WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR
Radiochemistry by Method Calculation		WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT
Radiochemistry by Method SM7500Ra B M		WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT
MW-15009 L1217169-12 Non-Potable Water	Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
						Location
Radiochemistry by Method 904		WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR
Radiochemistry by Method Calculation		WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT
Radiochemistry by Method SM7500Ra B M		WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT

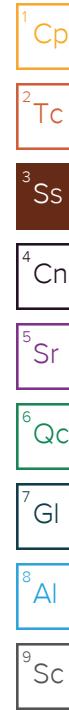
- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

## SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



				Collected by	Collected date/time	Received date/time
					05/06/20 08:35	05/11/20 09:15
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT	Mt. Juliet, TN
				Collected by	Collected date/time	Received date/time
					05/06/20 10:00	05/11/20 09:15
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1477856	1	05/20/20 14:52	06/09/20 09:20	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1477856	1	05/20/20 14:52	05/21/20 15:50	RGT	Mt. Juliet, TN
				Collected by	Collected date/time	Received date/time
					05/06/20 11:00	05/11/20 09:15
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1483326	1	05/28/20 11:33	06/09/20 09:20	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1483326	1	05/28/20 11:33	06/03/20 14:24	RGT	Mt. Juliet, TN
				Collected by	Collected date/time	Received date/time
					05/06/20 12:00	05/11/20 09:15
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1483326	1	05/28/20 11:33	06/09/20 09:20	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1483326	1	05/28/20 11:33	06/03/20 14:24	RGT	Mt. Juliet, TN
				Collected by	Collected date/time	Received date/time
					05/06/20 13:00	05/11/20 09:15
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1474476	1	05/12/20 13:04	06/09/20 09:20	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1483326	1	05/28/20 11:33	06/09/20 09:20	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1483326	1	05/28/20 11:33	06/03/20 14:24	RGT	Mt. Juliet, TN
				Collected by	Collected date/time	Received date/time
					05/06/20 14:10	05/11/20 09:15
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1475267	1	05/18/20 12:10	05/28/20 10:30	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1483326	1	05/28/20 11:33	05/29/20 15:43	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1483326	1	05/28/20 11:33	05/29/20 15:43	RGT	Mt. Juliet, TN



## SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



## MW-15016 L1217169-19 Non-Potable Water

Collected by      Collected date/time      Received date/time  
 05/06/20 14:55      05/11/20 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1475267	1	05/18/20 12:10	05/28/20 10:30	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1483326	1	05/28/20 11:33	05/29/20 15:44	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1483326	1	05/28/20 11:33	05/29/20 15:44	RGT	Mt. Juliet, TN

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## MW-15015 L1217169-20 Non-Potable Water

Collected by      Collected date/time      Received date/time  
 05/06/20 16:00      05/11/20 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1475267	1	05/18/20 12:10	05/28/20 10:30	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1483326	1	05/28/20 11:33	05/29/20 15:45	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1483326	1	05/28/20 11:33	05/29/20 15:45	RGT	Mt. Juliet, TN

## MW-15014 L1217169-21 Non-Potable Water

Collected by      Collected date/time      Received date/time  
 05/06/20 16:50      05/11/20 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1475267	1	05/18/20 12:10	05/28/20 10:30	SNR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1483326	1	05/28/20 11:33	06/04/20 13:38	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1483326	1	05/28/20 11:33	06/04/20 13:38	RGT	Mt. Juliet, TN



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson  
Project Manager

- <sup>1</sup> Cp
- <sup>2</sup> Tc
- <sup>3</sup> Ss
- <sup>4</sup> Cn
- <sup>5</sup> Sr
- <sup>6</sup> Qc
- <sup>7</sup> GI
- <sup>8</sup> AI
- <sup>9</sup> SC

#### Report Revision History

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Level II Report - Version 1: 06/10/20 11:04

MW-15022

Collected date/time: 05/05/20 10:50

## SAMPLE RESULTS - 01

L1217169

ONE LAB. NATIONWIDE.



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.634	MDA 0.994	Analysis Date date / time 06/05/2020 09:40	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	3.22						<sup>2</sup> Tc
( <i>T</i> ) Barium	112			62.0-143	06/05/2020 09:40	<a href="#">WG1474476</a>	
( <i>T</i> ) Yttrium	108			79.0-136	06/05/2020 09:40	<a href="#">WG1474476</a>	<sup>3</sup> Ss

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.841	MDA 1.19	Analysis Date date / time 06/05/2020 09:40	<u>Batch</u> <a href="#">WG1477856</a>	<sup>4</sup> Cn
Combined Radium	3.50						<sup>5</sup> Sr

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.207	MDA 0.197	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>6</sup> Qc
RADIUM-226	0.286						<sup>7</sup> Gl
( <i>T</i> ) Barium-133	92.4			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	<sup>8</sup> Al



## Radiochemistry by Method 904

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	
	pCi/l		+ / -	pCi/l	date / time		<sup>1</sup> Cp
RADIUM-228	0.162		0.582	0.868	06/05/2020 09:40	<u>WG1474476</u>	<sup>2</sup> Tc
( <i>T</i> ) Barium	108			62.0-143	06/05/2020 09:40	<u>WG1474476</u>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	110			79.0-136	06/05/2020 09:40	<u>WG1474476</u>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	
	pCi/l		+ / -	pCi/l	date / time		<sup>5</sup> Sr
Combined Radium	0.490		0.847	1.18	06/05/2020 09:40	<u>WG1477856</u>	<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	
	pCi/l		+ / -	pCi/l	date / time		<sup>7</sup> Gl
RADIUM-226	0.328		0.265	0.311	05/21/2020 15:50	<u>WG1477856</u>	<sup>8</sup> Al
( <i>T</i> ) Barium-133	98.0			30.0-143	05/21/2020 15:50	<u>WG1477856</u>	<sup>9</sup> Sc

MW-17006

Collected date/time: 05/05/20 12:00

## SAMPLE RESULTS - 03

L1217169

ONE LAB. NATIONWIDE.



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.580	MDA 0.873	Analysis Date date / time 06/05/2020 09:40	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	0.201						<sup>2</sup> Tc
( <i>T</i> ) Barium	98.2			62.0-143	06/05/2020 09:40	<a href="#">WG1474476</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	108			79.0-136	06/05/2020 09:40	<a href="#">WG1474476</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.979	MDA 1.21	Analysis Date date / time 06/05/2020 09:40	<u>Batch</u> <a href="#">WG1477856</a>	<sup>5</sup> Sr
Combined Radium	0.955						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.399	MDA 0.332	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>7</sup> Gl
RADIUM-226	0.754						<sup>8</sup> Al
( <i>T</i> ) Barium-133	77.2			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.561	MDA 0.73	Analysis Date date / time 06/05/2020 09:40	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	3.49						<a href="#">WG1474476</a>
(T) Barium	111			62.0-143	06/05/2020 09:40		
(T) Yttrium	109			79.0-136	06/05/2020 09:40	<a href="#">WG1474476</a>	

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 1.01	MDA 1.02	Analysis Date date / time 06/05/2020 09:40	<u>Batch</u> <a href="#">WG1477856</a>	<sup>2</sup> Tc
Combined Radium	4.68						

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.451	MDA 0.286	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>3</sup> Ss
RADIUM-226	1.19						
(T) Barium-133	78.6			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.618	MDA 0.956	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	-0.0196						<sup>2</sup> Tc
( <i>T</i> ) Barium	111			62.0-143	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	93.5			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.865	MDA 1.22	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>5</sup> Sr
Combined Radium	0.331						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.247	MDA 0.261	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>7</sup> Gl
RADIUM-226	0.331						<sup>8</sup> Al
( <i>T</i> ) Barium-133	80.5			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.507	MDA 0.726	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	0.256						<sup>2</sup> Tc
( <i>T</i> ) Barium	109			62.0-143	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	101			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.747	MDA 0.995	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>5</sup> Sr
Combined Radium	0.541						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.240	MDA 0.269	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>7</sup> Gl
RADIUM-226	0.285						<sup>8</sup> Al
( <i>T</i> ) Barium-133	87.9			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.626	MDA 1.06	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	-0.620						<sup>2</sup> Tc
( <i>T</i> ) Barium	105			62.0-143	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	96.2			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.795	MDA 1.24	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>5</sup> Sr
Combined Radium	0.191						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.169	MDA 0.18	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>7</sup> Gl
RADIUM-226	0.191						<sup>8</sup> Al
( <i>T</i> ) Barium-133	85.3			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.695	MDA 1.12	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	0.338						<a href="#">WG1474476</a>
( <i>T</i> ) Barium	112			62.0-143	06/09/2020 09:20		
( <i>T</i> ) Yttrium	97.5			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.988	MDA 1.46	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>2</sup> Tc
Combined Radium	0.781						

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.293	MDA 0.339	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>3</sup> Ss
RADIUM-226	0.443						
( <i>T</i> ) Barium-133	100			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.706	MDA 1.29	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	-1.76						<a href="#">WG1474476</a>
( <i>T</i> ) Barium	106			62.0-143	06/09/2020 09:20		
( <i>T</i> ) Yttrium	94.3			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.983	MDA 1.52	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>2</sup> Tc
Combined Radium	0.495						

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.277	MDA 0.234	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>3</sup> Ss
RADIUM-226	0.495						
( <i>T</i> ) Barium-133	114			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.615	MDA 0.947	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	-0.219						<sup>2</sup> Tc
( <i>T</i> ) Barium	124			62.0-143	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	106			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.827	MDA 1.26	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>5</sup> Sr
Combined Radium	0.125						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.212	MDA 0.312	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>7</sup> Gl
RADIUM-226	0.125						<sup>8</sup> Al
( <i>T</i> ) Barium-133	107			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.615	MDA 0.999	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	-0.278						<sup>2</sup> Tc
( <i>T</i> ) Barium	113			62.0-143	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	96.8			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.808	MDA 1.23	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>5</sup> Sr
Combined Radium	0.209						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.193	MDA 0.23	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>7</sup> Gl
RADIUM-226	0.209						<sup>8</sup> Al
( <i>T</i> ) Barium-133	94.3			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.651	MDA 1.09	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	-0.960						<a href="#">WG1474476</a>
( <i>T</i> ) Barium	116			62.0-143	06/09/2020 09:20		
( <i>T</i> ) Yttrium	102			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.776	MDA 1.29	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>2</sup> Tc
Combined Radium	0.0720						

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.125	MDA 0.204	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>3</sup> Ss
RADIUM-226	0.0720						
( <i>T</i> ) Barium-133	104			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.575	MDA 1.03	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	-1.24						<sup>2</sup> Tc
( <i>T</i> ) Barium	109			62.0-143	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	95.7			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.781	MDA 1.31	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>5</sup> Sr
Combined Radium	0.178						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.206	MDA 0.28	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>7</sup> Gl
RADIUM-226	0.178						<sup>8</sup> Al
( <i>T</i> ) Barium-133	89.3			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.596	MDA 0.902	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	-0.162						<sup>2</sup> Tc
( <i>T</i> ) Barium	124			62.0-143	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	103			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.892	MDA 1.26	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1477856</a>	<sup>5</sup> Sr
Combined Radium	0.351						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.296	MDA 0.361	Analysis Date date / time 05/21/2020 15:50	<u>Batch</u> <a href="#">WG1477856</a>	<sup>7</sup> Gl
RADIUM-226	0.351						<sup>8</sup> Al
( <i>T</i> ) Barium-133	97.9			30.0-143	05/21/2020 15:50	<a href="#">WG1477856</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.578	MDA 0.871	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	-0.267						<sup>2</sup> Tc
( <i>T</i> ) Barium	120			62.0-143	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	108			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.903	MDA 1.11	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1483326</a>	<sup>5</sup> Sr
Combined Radium	0.707						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.325	MDA 0.234	Analysis Date date / time 06/03/2020 14:24	<u>Batch</u> <a href="#">WG1483326</a>	<sup>7</sup> Gl
RADIUM-226	0.707						<sup>8</sup> Al
( <i>T</i> ) Barium-133	115			30.0-143	06/03/2020 14:24	<a href="#">WG1483326</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	1 Cp
RADIUM-228	3.05		0.568	0.758	06/09/2020 09:20	WG1474476	2 Tc
(T) Barium	120			62.0-143	06/09/2020 09:20	WG1474476	3 Ss
(T) Yttrium	106			79.0-136	06/09/2020 09:20	WG1474476	4 Cn

## Radiochemistry by Method Calculation

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	5 Sr
Combined Radium	4.66		1.01	1.07	06/09/2020 09:20	WG1483326	6 Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	7 Gl
RADIUM-226	1.61		0.440	0.312	06/03/2020 14:24	WG1483326	8 Al
(T) Barium-133	108			30.0-143	06/03/2020 14:24	WG1483326	9 Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.547	MDA 0.854	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1474476</a>	<sup>1</sup> Cp
RADIUM-228	0.150						<sup>2</sup> Tc
( <i>T</i> ) Barium	107			62.0-143	06/09/2020 09:20	<a href="#">WG1474476</a>	
( <i>T</i> ) Yttrium	104			79.0-136	06/09/2020 09:20	<a href="#">WG1474476</a>	<sup>3</sup> Ss

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.835	MDA 1.07	Analysis Date date / time 06/09/2020 09:20	<u>Batch</u> <a href="#">WG1483326</a>	<sup>4</sup> Cn
Combined Radium	0.742						<sup>5</sup> Sr

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.288	MDA 0.217	Analysis Date date / time 06/03/2020 14:24	<u>Batch</u> <a href="#">WG1483326</a>	<sup>6</sup> Qc
RADIUM-226	0.592						<sup>7</sup> Gl
( <i>T</i> ) Barium-133	113			30.0-143	06/03/2020 14:24	<a href="#">WG1483326</a>	<sup>8</sup> Al

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.444	MDA 0.732	Analysis Date date / time 05/28/2020 10:30	<u>Batch</u> <a href="#">WG1475267</a>	<sup>1</sup> Cp
RADIUM-228	-0.413						<sup>2</sup> Tc
( <i>T</i> ) Barium	94.3			62.0-143	05/28/2020 10:30	<a href="#">WG1475267</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	121			79.0-136	05/28/2020 10:30	<a href="#">WG1475267</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.702	MDA 1.15	Analysis Date date / time 05/29/2020 15:43	<u>Batch</u> <a href="#">WG1483326</a>	<sup>5</sup> Sr
Combined Radium	0.0779						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.258	MDA 0.413	Analysis Date date / time 05/29/2020 15:43	<u>Batch</u> <a href="#">WG1483326</a>	<sup>7</sup> Gl
RADIUM-226	0.0779						<sup>8</sup> Al
( <i>T</i> ) Barium-133	103			30.0-143	05/29/2020 15:43	<a href="#">WG1483326</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.590	MDA 0.922	Analysis Date date / time 05/28/2020 10:30	<u>Batch</u> <a href="#">WG1475267</a>	<sup>1</sup> Cp
RADIUM-228	0.647						<sup>2</sup> Tc
( <i>T</i> ) Barium	101			62.0-143	05/28/2020 10:30	<a href="#">WG1475267</a>	
( <i>T</i> ) Yttrium	120			79.0-136	05/28/2020 10:30	<a href="#">WG1475267</a>	<sup>3</sup> Ss

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 1.05	MDA 1.16	Analysis Date date / time 05/29/2020 15:44	<u>Batch</u> <a href="#">WG1483326</a>	<sup>4</sup> Cn
Combined Radium	2.02						<sup>5</sup> Sr

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.462	MDA 0.242	Analysis Date date / time 05/29/2020 15:44	<u>Batch</u> <a href="#">WG1483326</a>	<sup>6</sup> Qc
RADIUM-226	1.37						<sup>7</sup> Gl
( <i>T</i> ) Barium-133	101			30.0-143	05/29/2020 15:44	<a href="#">WG1483326</a>	<sup>8</sup> Al

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc



## Radiochemistry by Method 904

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	
RADIUM-228	-1.49		0.576	0.917	05/28/2020 10:30	<a href="#">WG1475267</a>	<sup>1</sup> Cp
( <i>T</i> ) Barium	101			62.0-143	05/28/2020 10:30	<a href="#">WG1475267</a>	<sup>2</sup> Tc
( <i>T</i> ) Yttrium	112			79.0-136	05/28/2020 10:30	<a href="#">WG1475267</a>	<sup>3</sup> Ss

## Radiochemistry by Method Calculation

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	
Combined Radium	0.932		0.952	1.2	05/29/2020 15:45	<a href="#">WG1483326</a>	<sup>4</sup> Cn

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	
RADIUM-226	0.932		0.376	0.279	05/29/2020 15:45	<a href="#">WG1483326</a>	<sup>5</sup> Sr
( <i>T</i> ) Barium-133	106			30.0-143	05/29/2020 15:45	<a href="#">WG1483326</a>	<sup>6</sup> Qc

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.491	MDA 0.752	Analysis Date date / time 05/28/2020 10:30	<u>Batch</u> <a href="#">WG1475267</a>	<sup>1</sup> Cp
RADIUM-228	0.225						<sup>2</sup> Tc
( <i>T</i> ) Barium	101			62.0-143	05/28/2020 10:30	<a href="#">WG1475267</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	112			79.0-136	05/28/2020 10:30	<a href="#">WG1475267</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.663	MDA 0.989	Analysis Date date / time 06/04/2020 13:38	<u>Batch</u> <a href="#">WG1483326</a>	<sup>5</sup> Sr
Combined Radium	0.369						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.172	MDA 0.237	Analysis Date date / time 06/04/2020 13:38	<u>Batch</u> <a href="#">WG1483326</a>	<sup>7</sup> Gl
RADIUM-226	0.143						<sup>8</sup> Al
( <i>T</i> ) Barium-133	114			30.0-143	06/04/2020 13:38	<a href="#">WG1483326</a>	<sup>9</sup> Sc



## Method Blank (MB)

(MB) R3536636-1 06/05/20 09:40

Analyte	MB Result pCi/l	<u>MB Qualifier</u>	MB MDA pCi/l
Radium-228	-0.470		0.480
(T) Barium	102		
(T) Yttrium	109		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1216908-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1216908-01 06/05/20 09:40 • (DUP) R3536636-5 06/05/20 09:40

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD	DUP RER	<u>DUP Qualifier</u>	DUP RPD Limits	DUP RER Limit
Radium-228	-0.472	0.826	1	200	1.62		20	3
(T) Barium	105	108						
(T) Yttrium	101	108						

## Laboratory Control Sample (LCS)

(LCS) R3536636-2 06/05/20 09:40

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Radium-228	5.00	4.22	84.3	80.0-120	
(T) Barium			103		
(T) Yttrium			107		

<sup>9</sup>Sc

## L1216934-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1216934-01 06/05/20 09:40 • (MS) R3536636-3 06/05/20 09:40 • (MSD) R3536636-4 06/05/20 09:40

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	MS RER	RPD Limits %
Radium-228	10.0	1.72	12.6	11.4	108	97.0	1	70.0-130		9.43		20
(T) Barium		97.8			104	111						
(T) Yttrium		108			97.8	109						

[L1217169-18,19,20,21](#)

## Method Blank (MB)

(MB) R3530968-1 05/22/20 10:30

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-228	0.194		0.455
(T) Barium	90.0		
(T) Yttrium	108		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1217574-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1217574-01 05/22/20 10:30 • (DUP) R3530968-4 05/22/20 10:30

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.580	0.645	1	10.7	0.0923		20	3
(T) Barium	87.5	85.3						
(T) Yttrium	105	106						

## Laboratory Control Sample (LCS)

(LCS) R3530968-2 05/22/20 10:30

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.86	97.2	80.0-120	
(T) Barium			82.1		
(T) Yttrium			106		

<sup>9</sup>Sc

## L1217240-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1217240-01 05/22/20 10:30 • (MS) R3530968-3 05/22/20 10:30

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Radium-228	10.0	0.411	10.8	104	1	70.0-130	
(T) Barium		88.4		85.6			
(T) Yttrium		109		107			



## Method Blank (MB)

(MB) R3530800-1 05/21/20 15:50

Analyte	MB Result pCi/l	<u>MB Qualifier</u>	MB MDA pCi/l
Radium-226	-0.00843		0.0656
(T) Barium-133	84.1		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1218991-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1218991-01 05/21/20 19:37 • (DUP) R3530800-5 05/21/20 15:50

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD	DUP RER	<u>DUP Qualifier</u>	DUP RPD Limits	DUP RER Limit
Radium-226	0.200	0.172	1	15.3	0.0900		20	3
(T) Barium-133	95.4	84.5						

## Laboratory Control Sample (LCS)

(LCS) R3530800-2 05/21/20 15:50

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Radium-226	5.02	4.83	96.3	80.0-120	
(T) Barium-133			88.3		

<sup>10</sup>Sc

## L1218557-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1218557-04 05/21/20 15:50 • (MS) R3530800-3 05/21/20 15:50 • (MSD) R3530800-4 05/21/20 15:50

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	MS RER	RPD Limits %
Radium-226	20.1	0.0812	20.2	19.6	100	97.1	1	75.0-125			3.12		20
(T) Barium-133		91.0			83.6	92.9							

[L1217169-15,16,17,18,19,20,21](#)

## Method Blank (MB)

(MB) R3535339-1 06/03/20 14:24

Analyte	MB Result pCi/l	<u>MB Qualifier</u>	MB MDA pCi/l
Radium-226	0.000		0.0602
(T) Barium-133	98.2		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1222318-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1222318-01 05/29/20 15:59 • (DUP) R3535339-5 06/03/20 14:24

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution %	DUP RPD %	DUP RER	<u>DUP Qualifier</u>	DUP RPD Limits %	DUP RER Limit
Radium-226	0.196	0.0602	1	106	0.495		20	3
(T) Barium-133	104	103						

## Laboratory Control Sample (LCS)

(LCS) R3535339-2 06/03/20 14:24

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Radium-226	5.02	5.19	103	80.0-120	
(T) Barium-133		102			

<sup>9</sup>Sc

## L1219043-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1219043-01 05/29/20 15:55 • (MS) R3535339-3 06/03/20 14:24 • (MSD) R3535339-4 06/03/20 14:24

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution %	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	MS RER	RPD Limits %
Radium-226	20.1	0.862	23.6	21.9	113	105	1	75.0-125			7.51		20
(T) Barium-133		110		110	112								



## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

**Results Disclaimer -** Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

### Abbreviations and Definitions

MDA	Minimum Detectable Activity.	<sup>1</sup> Cp
Rec.	Recovery.	<sup>2</sup> Tc
RER	Replicate Error Ratio.	<sup>3</sup> Ss
RPD	Relative Percent Difference.	<sup>4</sup> Cn
SDG	Sample Delivery Group.	<sup>5</sup> Sr
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.	<sup>6</sup> Qc
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.	<sup>7</sup> Gl
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.	<sup>8</sup> Al
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.	<sup>9</sup> Sc
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.	
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.	
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.	
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.	
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.	
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.	
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.	
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.	
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.	

Qualifier	Description
	The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

- \* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
- \* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

Alabama	40660
Alaska	17-026
Arizona	AZ0612
Arkansas	88-0469
California	2932
Colorado	TN00003
Connecticut	PH-0197
Florida	E87487
Georgia	NELAP
Georgia <sup>1</sup>	923
Idaho	TN00003
Illinois	200008
Indiana	C-TN-01
Iowa	364
Kansas	E-10277
Kentucky <sup>1,6</sup>	90010
Kentucky <sup>2</sup>	16
Louisiana	AI30792
Louisiana <sup>1</sup>	LA180010
Maine	TN0002
Maryland	324
Massachusetts	M-TN003
Michigan	9958
Minnesota	047-999-395
Mississippi	TN00003
Missouri	340
Montana	CERT0086

Nebraska	NE-OS-15-05
Nevada	TN-03-2002-34
New Hampshire	2975
New Jersey-NELAP	TN002
New Mexico <sup>1</sup>	n/a
New York	11742
North Carolina	Env375
North Carolina <sup>1</sup>	DW21704
North Carolina <sup>3</sup>	41
North Dakota	R-140
Ohio-VAP	CL0069
Oklahoma	9915
Oregon	TN200002
Pennsylvania	68-02979
Rhode Island	LA000356
South Carolina	84004
South Dakota	n/a
Tennessee <sup>1,4</sup>	2006
Texas	T104704245-18-15
Texas <sup>5</sup>	LAB0152
Utah	TN00003
Vermont	VT2006
Virginia	460132
Washington	C847
West Virginia	233
Wisconsin	9980939910
Wyoming	A2LA

## Third Party Federal Accreditations

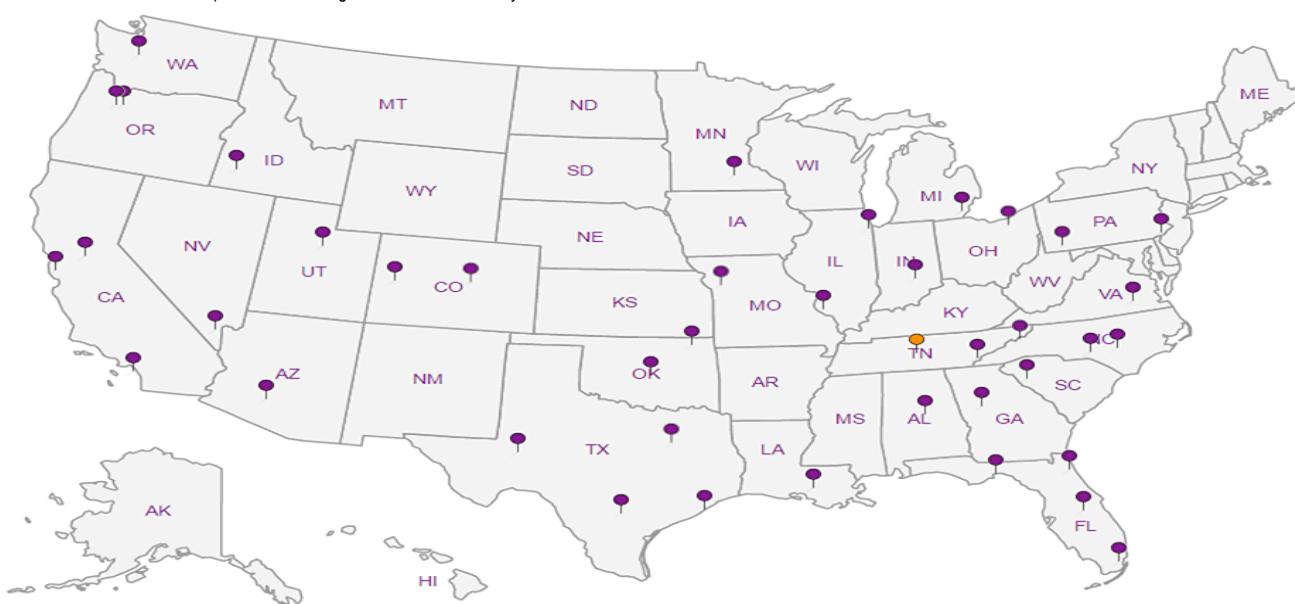
A2LA – ISO 17025	1461.01
A2LA – ISO 17025 <sup>5</sup>	1461.02
Canada	1461.01
EPA-Crypto	TN00003

AIHA-LAP,LLC EMLAP	100789
DOD	1461.01
USDA	P330-15-00234

<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>6</sup> Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



- <sup>1</sup> Cp
- <sup>2</sup> Tc
- <sup>3</sup> Ss
- <sup>4</sup> Cn
- <sup>5</sup> Sr
- <sup>6</sup> Qc
- <sup>7</sup> Gl
- <sup>8</sup> Al
- <sup>9</sup> Sc

## **Chain of Custody**

Samples were sent directly to the Subcontracting Laboratory.

**State Of Origin: MI**

**Cert. Needed:**  Yes

No

Owner Received Date:

5/7/2020

Workorder: 50256558

**Workorder Name:** Muskegon Site Rad

5/7/2020 Results Requested By: 5/29/2020

Report To		Subcontract To					Requested Analysis											
Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers					Rad 226 + SM7500 Ra B	Rad 228 EPA 904 GPC						
						HNO3												
1	MW-15022	PS	5/5/2020 10:50	50256558001	Water	2					X	X						
2	MW-15021	PS	5/5/2020 11:25	50256558002	Water	2					X	X						
3	MW-17006	PS	5/5/2020 12:00	50256558003	Water	2					X	X						
4	MW-15020	PS	5/5/2020 14:05	50256558004	Water	2					X	X						
5	MW-15019	PS	5/5/2020 16:10	50256558005	Water	2					X	X						
6	MW-17005	PS	5/5/2020 14:50	50256558006	Water	2					X	X						
7	MW-17004	PS	5/5/2020 15:30	50256558007	Water	2					X	X						
8	MW-15019D	PS	5/5/2020 16:30	50256558008	Water	2					X	X						
9	MW-15013	PS	5/7/2020 08:50	50256558009	Water	2					X	X						
10	MW-15012	PS	5/7/2020 10:15	50256558010	Water	2					X	X						
11	MW-15011	PS	5/7/2020 11:40	50256558011	Water	2					X	X						
12	MW-15009	PS	5/7/2020 12:50	50256558012	Water	2					X	X						
13	MW-15023	PS	5/6/2020 08:35	50256558013	Water	2					X	X						
14	MW-17003	PS	5/6/2020 10:00	50256558014	Water	2					X	X						
15	MW-15018	PS	5/6/2020 11:00	50256558015	Water	2					X	X						
16	MW-15017	PS	5/6/2020 12:00	50256558016	Water	2					X	X						
17	MW-17002	PS	5/6/2020 13:00	50256558017	Water	2					X	X						
18	MW-17001	PS	5/6/2020 14:10	50256558018	Water	2					X	X						
19	MW-15016	PS	5/6/2020 14:55	50256558019	Water	2					X	X						

# Chain of Custody

Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: MI

Cert. Needed:  Yes

No

Owner Received Date: 5/7/2020 Results Requested By: 5/29/2020



Workorder: 50256558 Workorder Name: Muskegon Site Rad

Report To

Subcontract To

Melanie Booms  
Pace Analytical Grand Rapids  
5560 Corporate Exchange Ct. SE  
Grand Rapids, MI 49512  
Phone (616)975-4500

						Requested Analysis											
Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers		Rad 226 - SM7500 Ra B		Rad 228 EPA 904 GPC							
						HNO3											
20	MW-15015	PS	5/6/2020 16:00	50256558020	Water	2				X	X						
21	MW-15014	PS	5/6/2020 16:50	50256558021	Water	2				X	X						
22																	
23																	
24																	
						Comments											
Transfers	Released By		Date/Time	Received By				Date/Time									
1	<i>[Signature]</i>		5/6/20 16:00	<i>[Signature]</i>				5/11/20 9:15									
2																	
3																	
Cooler Temperature on Receipt			Amb°C	Custody Seal <input checked="" type="checkbox"/> or <input type="checkbox"/>		Received on Ice		Y	or	N	Samples Intact		Y	or	N		

\*\*\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

Amb



## CHAIN-OF-CUSTODY / Analytical Request Do

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed.

WO# : 50256558

1217169

## Section A

## Required Client Information:

Company: HDR, Inc.  
 Address: 3321 Bronson Blvd  
 Calumet, MI 49008  
 Email: molly.reeves@hdrinc.com

Phone: 734-751-1790 | Fax:  
 Requested Due Date:

Purchase Order #: Project Name: Muskegon Site  
 Project #: Project #: 9219



1217169  
2

# CHAIN-OF-CUSTODY / Analytical Request Docu

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be

**WO# : 50256558**

<b>Section A</b> <b>Required Client Information:</b> Company: HDR, Inc. Address: 3321 Branson Blvd Kalamazoo, MI 49008 Email: molly.reeves@hdriinc.com Phone: 734-751-1790 Fax Requested Due Date:		<b>Section B</b> <b>Required Project Information:</b> Report To: Molly Reeves Copy To: Purchase Order #: Project Name: Muskegon Site Project #:		<b>Section C</b> <b>Invoice Information:</b> Attention: Company Name: Address: Pace Quote: Pace Project Manager: melanie.booms@pacelabs.com, Pace Profile #: 9219	
				<b>PM: MSB</b> <b>Due Date: 05/29/20</b> <b>CLIENT: GR-HDR</b>	
				<b>State / Location:</b> MI	

ITEM #	SAMPLE ID <small>One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique</small>	MATRIX Drinking Water Water Waste Water Product Soil/Solid Oil Wipe Air Other Tissue	CODE DW WT WW P SL OL WP AR OT TS	MATRIX CODE (see valid codes to left) SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives						Analyses Test (Y/N)	Requested Analysis Filtered (Y/N)						Residual Chlorine (Y/N)	
					START		END				H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	IN Metals, Total	IN pH	IN TDS/Cl, SO4/	IN TSS	IN Red-226	IN Rad-228		
					DATE	TIME	DATE	TIME																	
1	MW-15023			WT G	5/16/20	8:35				6	Unpreserved							X							
2	MW-17003						10:00			6								X							
3	MW-15018						11:00			6								X							
4	MW-15017						12:00			6								X							
5	MW-17002						1:00			6								X							
6	MW-17001						2:10			6								X							
7	MW-15016						2:55			6								X							
8	MW-15015						4:00			6								X							
9	MW-15014						4:50			6								X							
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED-BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
---------------------	-------------------------------	------	------	---------------------------	------	------	-------------------

Aug 17/20 / HDR 5/17/20 4:10 pm 5/17/20 1610

#### SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER:

DATE Signed:

TEMP in C	Received on Ice (Y/N)	Custody Sealed (Y/N)	Cooler (Y/N)	Sample In tact (Y/N)
-----------	-----------------------	----------------------	--------------	----------------------

12/17/69

Date/Time:	5.7.20	Evaluated by:	WDC	W#:	50256555	
Client:	HDR	PM:	MSB	Due Date:	05/29/20	
Project Manager:	MSB	Profile ID:		CLIENT:	GR-HDR	
Rush TAT Requested:	YES	No Due Date:				
Lab Notified of Rush or Short Holds:	YES	No	Non Conformance Form Required:		NO	
Samples Received Via:	FedEx	UPS	Client	Pace Courier	Other:	
Custody Seals Present and Intact:						
Received Sample Information Form(s):	Drinking Waters Only					
USDA Regulated Soils:	(AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)					
Short Holds Present (< 72 Hours):	YES NO					
Samples Received in Hold:	YES NO					
Custody Signatures Present:	YES NO					
Collector Signature Present:	YES NO					
Packing Material Used:	YES NO					
Samples Collected Today and On Ice:	YES NO					
IR Gun #:	280	281	Digital Thermometer #:			
Ice Type:	WET Bagged / WET Loose	BLUE	NONE	282 283		
Ice Location:	TOP	BOTTOM	MIDDLE	1. Cooler Temp Upon Receipt: 0.1 0.9 °C		
Temp Blank Received:	DISPERSED Temp should be 0-6°C (Initial/Corrected)					
Containers Intact:	YES NO					
Correct Containers:	YES NO					
Sufficient Volume:	YES NO					
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are VOA, coliform, LHLg, O&G, or any container with a septum cap or preserved with HCl						
Residual Chlorine Absent:	YES NO					
(SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)						
VOA Headspace Acceptable (<6mm):	YES NO					
Trip Blank Received:	HC1	MeOH	TSP	OTHER	YES NO	
Comments:	5. 0.2 1.0 °C					2. Cooler Temp Upon Receipt: 1.5 2.3 °C
Colder Temps: 4. 0.0 1.4 °C						3. Cooler Temp Upon Receipt: 1.7 2.5 °C
7. 1.0 1.8 °C						4. Cooler Temp Upon Receipt: 3.5 4.3 °C
						Pg. 1 of 1

Pace Analytical National Center for Testing & Innovation  
 Cooler Receipt Form

Client:	PACEGRMS	1217169	
Cooler Received/Opened On:	5/11/20	Temperature:	Amb
Received By:	Carol Kemp		
Signature:	<i>Carol Kemp</i>		
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?			
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?		✓	

June 01, 2020

Molly Reeves  
HDR, Inc.  
3321 Bronson Blvd  
Kalamazoo, MI 49008

RE: Project: Muskegon Site  
Pace Project No.: 50257867

Dear Molly Reeves:

Enclosed are the analytical results for sample(s) received by the laboratory on May 21, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Grand Rapids
- Pace Analytical Services - Indianapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melanie Booms  
melanie.booms@pacelabs.com  
(616)975-4500  
Project Manager

Enclosures

cc: Aryka Thomson, HDR, Inc.



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## CERTIFICATIONS

Project: Muskegon Site  
Pace Project No.: 50257867

---

### **Pace Analytical Services Indianapolis**

7726 Moller Road, Indianapolis, IN 46268  
Illinois Accreditation #: 200074  
Indiana Drinking Water Laboratory #: C-49-06  
Kansas/TNI Certification #: E-10177  
Kentucky UST Agency Interest #: 80226  
Kentucky WW Laboratory ID #: 98019  
Michigan Drinking Water Laboratory #9050

Ohio VAP Certified Laboratory #: CL0065  
Oklahoma Laboratory #: 9204  
Texas Certification #: T104704355  
West Virginia Certification #: 330  
Wisconsin Laboratory #: 999788130  
USDA Soil Permit #: P330-19-00257

### **Pace Analytical Services Grand Rapids**

5560 Corporate Exchange Ct SE, Grand Rapids, MI 49512  
Minnesota/TNI Laboratory #026-999-161

Michigan Drinking Water Laboratory #0034

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: Muskegon Site  
Pace Project No.: 50257867

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50257867001	MW-17001R	Water	05/21/20 13:20	05/21/20 17:30
50257867002	MW-15016R	Water	05/21/20 14:00	05/21/20 17:30
50257867003	MW-15015R	Water	05/21/20 15:45	05/21/20 17:30

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: Muskegon Site  
Pace Project No.: 50257867

Lab ID	Sample ID	Method	Analysts	Analytes Reported
50257867001	MW-17001R	EPA 9056	RSF	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	LBT	1
		SM 2540C	MMS	1
		SM 2540D	SKK	1
50257867002	MW-15016R	EPA 9056	RSF	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	LBT	1
		SM 2540C	MMS	1
		SM 2540D	SKK	1
50257867003	MW-15015R	EPA 9056	RSF	3
		SM 4500-H+B	NRC	1
		EPA 6010	JPK	2
		EPA 6020	DMT	12
		EPA 7470	LBT	1
		SM 2540C	MMS	1
		SM 2540D	SKK	1

PASI-GR = Pace Analytical Services - Grand Rapids

PASI-I = Pace Analytical Services - Indianapolis

## REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50257867

Sample: MW-17001R	Lab ID: 50257867001	Collected: 05/21/20 13:20	Received: 05/21/20 17:30	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	29.5	mg/L	2.5	0.40	10			05/29/20 18:59	16887-00-6
Fluoride	0.16	mg/L	0.10	0.0068	1			05/29/20 18:39	16984-48-8
Sulfate	220	mg/L	2.5	0.43	10			05/29/20 18:59	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.5	Std. Units	1.0	1.0	1			05/22/20 10:03	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	158000	ug/L	1000	130	1	05/24/20 13:39	05/26/20 22:08	7440-70-2	
Lithium	96.6	ug/L	20.0	4.1	1	05/24/20 13:39	05/26/20 22:08	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	0.12J	ug/L	1.0	0.10	1	05/28/20 09:09	05/29/20 15:51	7440-36-0	
Arsenic	7.3	ug/L	1.0	0.20	1	05/28/20 09:09	05/29/20 15:51	7440-38-2	
Barium	90.6	ug/L	1.0	0.15	1	05/28/20 09:09	05/29/20 15:51	7440-39-3	
Beryllium	<0.022	ug/L	0.20	0.022	1	05/28/20 09:09	05/29/20 15:51	7440-41-7	
Boron	2060	ug/L	125	41.5	25	05/28/20 09:09	05/29/20 03:06	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/28/20 09:09	05/29/20 15:51	7440-43-9	
Chromium	0.17J	ug/L	1.0	0.11	1	05/28/20 09:09	05/29/20 15:51	7440-47-3	
Cobalt	0.25J	ug/L	1.0	0.032	1	05/28/20 09:09	05/29/20 15:51	7440-48-4	
Lead	<0.034	ug/L	1.0	0.034	1	05/28/20 09:09	05/29/20 15:51	7439-92-1	
Molybdenum	2.5	ug/L	1.0	0.10	1	05/28/20 09:09	05/29/20 15:51	7439-98-7	
Selenium	<0.41	ug/L	1.0	0.41	1	05/28/20 09:09	05/29/20 15:51	7782-49-2	
Thallium	<0.031	ug/L	1.0	0.031	1	05/28/20 09:09	05/29/20 15:51	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.12	ug/L	0.20	0.12	1	05/29/20 11:27	05/31/20 11:41	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	751	mg/L	10.0	10.0	1			05/27/20 15:17	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			05/27/20 10:54	PP

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50257867

Sample: MW-15016R	Lab ID: 50257867002	Collected: 05/21/20 14:00	Received: 05/21/20 17:30	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	314	mg/L	25.0	4.0	100			05/29/20 20:16	16887-00-6
Fluoride	0.081J	mg/L	0.10	0.0068	1			05/29/20 19:37	16984-48-8
Sulfate	2.8	mg/L	0.25	0.043	1			05/29/20 19:37	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	6.6	Std. Units	1.0	1.0	1			05/22/20 10:04	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	192000	ug/L	1000	130	1	05/24/20 13:39	05/26/20 22:10	7440-70-2	
Lithium	10.9J	ug/L	20.0	4.1	1	05/24/20 13:39	05/26/20 22:10	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	0.22J	ug/L	1.0	0.10	1	05/28/20 09:09	05/29/20 15:55	7440-36-0	
Arsenic	5.5	ug/L	1.0	0.20	1	05/28/20 09:09	05/29/20 15:55	7440-38-2	
Barium	806	ug/L	5.0	0.76	5	05/28/20 09:09	05/29/20 15:46	7440-39-3	
Beryllium	<0.022	ug/L	0.20	0.022	1	05/28/20 09:09	05/29/20 15:55	7440-41-7	
Boron	112	ug/L	10.0	3.3	2	05/28/20 09:09	05/29/20 03:11	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/28/20 09:09	05/29/20 15:55	7440-43-9	
Chromium	0.69J	ug/L	1.0	0.11	1	05/28/20 09:09	05/29/20 15:55	7440-47-3	
Cobalt	1.9	ug/L	1.0	0.032	1	05/28/20 09:09	05/29/20 15:55	7440-48-4	
Lead	0.059J	ug/L	1.0	0.034	1	05/28/20 09:09	05/29/20 15:55	7439-92-1	
Molybdenum	4.3	ug/L	1.0	0.10	1	05/28/20 09:09	05/29/20 15:55	7439-98-7	
Selenium	<0.41	ug/L	1.0	0.41	1	05/28/20 09:09	05/29/20 15:55	7782-49-2	
Thallium	<0.031	ug/L	1.0	0.031	1	05/28/20 09:09	05/29/20 15:55	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.12	ug/L	0.20	0.12	1	05/29/20 11:27	05/31/20 11:43	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	1190	mg/L	40.0	40.0	1			05/27/20 15:17	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	104	mg/L	12.5	12.5	1			05/27/20 10:54	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50257867

Sample: MW-15015R	Lab ID: 50257867003	Collected: 05/21/20 15:45	Received: 05/21/20 17:30	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	17.2	mg/L	2.5	0.40	10			05/29/20 21:33	16887-00-6
Fluoride	0.084J	mg/L	0.10	0.0068	1			05/29/20 21:14	16984-48-8
Sulfate	825	mg/L	25.0	4.3	100			05/29/20 21:53	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.7	Std. Units	1.0	1.0	1			05/22/20 10:06	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	282000	ug/L	3000	390	3	05/24/20 13:39	05/26/20 22:34	7440-70-2	
Lithium	36.0	ug/L	20.0	4.1	1	05/24/20 13:39	05/26/20 22:17	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.10	ug/L	1.0	0.10	1	05/28/20 09:09	05/29/20 16:00	7440-36-0	
Arsenic	12.7	ug/L	1.0	0.20	1	05/28/20 09:09	05/29/20 16:00	7440-38-2	
Barium	107	ug/L	1.0	0.15	1	05/28/20 09:09	05/29/20 16:00	7440-39-3	
Beryllium	<0.022	ug/L	0.20	0.022	1	05/28/20 09:09	05/29/20 16:00	7440-41-7	
Boron	718	ug/L	50.0	16.6	10	05/28/20 09:09	05/29/20 03:16	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	05/28/20 09:09	05/29/20 16:00	7440-43-9	
Chromium	0.22J	ug/L	1.0	0.11	1	05/28/20 09:09	05/29/20 16:00	7440-47-3	
Cobalt	0.42J	ug/L	1.0	0.032	1	05/28/20 09:09	05/29/20 16:00	7440-48-4	
Lead	<0.034	ug/L	1.0	0.034	1	05/28/20 09:09	05/29/20 16:00	7439-92-1	
Molybdenum	27.7	ug/L	1.0	0.10	1	05/28/20 09:09	05/29/20 16:00	7439-98-7	
Selenium	<0.41	ug/L	1.0	0.41	1	05/28/20 09:09	05/29/20 16:00	7782-49-2	
Thallium	<0.031	ug/L	1.0	0.031	1	05/28/20 09:09	05/29/20 16:00	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.12	ug/L	0.20	0.12	1	05/29/20 11:27	05/31/20 11:45	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	1460	mg/L	20.0	20.0	1			05/27/20 15:18	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	4	mg/L	2.5	2.5	1			05/27/20 10:54	

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50257867

QC Batch:	564357	Analysis Method:	EPA 9056
QC Batch Method:	EPA 9056	Analysis Description:	9056 IC Anions
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50257867001, 50257867002, 50257867003		

METHOD BLANK: 2603551 Matrix: Water

Associated Lab Samples: 50257867001, 50257867002, 50257867003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.040	0.25	0.040	05/29/20 13:50	
Fluoride	mg/L	<0.0068	0.10	0.0068	05/29/20 13:50	
Sulfate	mg/L	<0.043	0.25	0.043	05/29/20 13:50	

LABORATORY CONTROL SAMPLE: 2603552

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	1.2	1.2	93	80-120	
Fluoride	mg/L	0.5	0.50	100	80-120	
Sulfate	mg/L	2.5	2.4	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2603553 2603554

Parameter	Units	MS		MSD		MS		MSD		% Rec		Max	
		50257554001	Spike Conc.	Spike Conc.	MS Result	MSD Result	% Rec	MSD % Rec	Limits	RPD	RPD	Qual	
Chloride	mg/L	35.0	12.5	12.5	46.6	46.5	93	93	80-120	0	15		
Fluoride	mg/L	0.59	0.5	0.5	1.1	1.1	100	100	80-120	0	15		
Sulfate	mg/L	27.7	25	25	51.7	51.5	96	95	80-120	0	15		

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50257867

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QC Batch:	563300	Analysis Method:	SM 4500-H+B
QC Batch Method:	SM 4500-H+B	Analysis Description:	4500H+BGR pH
		Laboratory:	Pace Analytical Services - Grand Rapids
Associated Lab Samples: 50257867001, 50257867002, 50257867003			

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LABORATORY CONTROL SAMPLE: 2598511

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	6	6.0	100	99-101	

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SAMPLE DUPLICATE: 2598512

Parameter	Units	50257866001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.9	7.8	0	2	H3

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50257867

QC Batch:	563959	Analysis Method:	EPA 7470
QC Batch Method:	EPA 7470	Analysis Description:	7470 Mercury
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50257867001, 50257867002, 50257867003		

METHOD BLANK: 2601817 Matrix: Water

Associated Lab Samples: 50257867001, 50257867002, 50257867003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.12	0.20	0.12	05/31/20 10:46	

LABORATORY CONTROL SAMPLE: 2601818

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.9	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2601819 2601820

Parameter	Units	50257661004 MS Result	50257661004 Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	5.0	4.9	100	98	75-125	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2601821 2601822

Parameter	Units	50257670007 MS Result	50257670007 Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	4.7	4.9	95	97	75-125	3	20	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50257867

QC Batch:	563267	Analysis Method:	EPA 6010
QC Batch Method:	EPA 3010	Analysis Description:	6010 MET
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50257867001, 50257867002, 50257867003		

METHOD BLANK: 2598333 Matrix: Water

Associated Lab Samples: 50257867001, 50257867002, 50257867003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	<130	1000	130	05/26/20 21:26	
Lithium	ug/L	<4.1	20.0	4.1	05/26/20 21:26	

LABORATORY CONTROL SAMPLE: 2598334

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9060	91	80-120	
Lithium	ug/L	1000	935	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2598335 2598336

Parameter	Units	50257440003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	11.0 mg/L	10000	10000	19400	19000	85	80	75-125	2	20	
Lithium	ug/L	<10.0	1000	1000	922	900	92	90	75-125	2	20	

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## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site

Pace Project No.: 50257867

QC Batch: 563743 Analysis Method: EPA 6020

QC Batch Method: EPA 200.2 Analysis Description: 6020 MET

Laboratory: Pace Analytical Services - Indianapolis

Associated Lab Samples: 50257867001, 50257867002, 50257867003

METHOD BLANK: 2600673 Matrix: Water

Associated Lab Samples: 50257867001, 50257867002, 50257867003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.10	1.0	0.10	05/29/20 01:17	
Arsenic	ug/L	<0.20	1.0	0.20	05/29/20 01:17	
Barium	ug/L	<0.15	1.0	0.15	05/29/20 01:17	
Beryllium	ug/L	<0.022	0.20	0.022	05/29/20 01:17	
Boron	ug/L	<1.7	5.0	1.7	05/29/20 02:57	N2
Cadmium	ug/L	<0.022	0.20	0.022	05/29/20 01:17	
Chromium	ug/L	<0.11	1.0	0.11	05/29/20 01:17	
Cobalt	ug/L	<0.032	1.0	0.032	05/29/20 01:17	
Lead	ug/L	<0.034	1.0	0.034	05/29/20 01:17	
Molybdenum	ug/L	<0.10	1.0	0.10	05/29/20 01:17	
Selenium	ug/L	<0.41	1.0	0.41	05/29/20 01:17	
Thallium	ug/L	<0.031	1.0	0.031	05/29/20 01:17	

LABORATORY CONTROL SAMPLE: 2600674

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	40.5	101	80-120	
Arsenic	ug/L	40	38.2	95	80-120	
Barium	ug/L	40	40.1	100	80-120	
Beryllium	ug/L	40	39.3	98	80-120	
Boron	ug/L	40	40.5	101	80-120	N2
Cadmium	ug/L	40	40.5	101	80-120	
Chromium	ug/L	40	39.6	99	80-120	
Cobalt	ug/L	40	39.9	100	80-120	
Lead	ug/L	40	40.3	101	80-120	
Molybdenum	ug/L	40	39.2	98	80-120	
Selenium	ug/L	40	38.2	95	80-120	
Thallium	ug/L	40	40.6	102	80-120	

MATRIX SPIKE &amp; MATRIX SPIKE DUPLICATE: 2600675 2600676

Parameter	Units	MS		MSD		MS		MSD		% Rec		Max RPD	RPD Qual
		50257286003	Spike Result	Spike Conc.	Conc.	MS Result	MSD Result	% Rec	MSD % Rec	% Rec Limits	RPD		
Antimony	ug/L	ND	40	40	41.7	42.2	104	105	75-125	1	20		
Arsenic	ug/L	0.34J	40	40	38.5	38.6	95	96	75-125	0	20		
Barium	ug/L	69.3	40	40	110	110	102	101	75-125	0	20		
Beryllium	ug/L	ND	40	40	36.8	37.5	92	94	75-125	2	20		

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50257867

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:			2600675		2600676							
Parameter	Units	50257286003 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.								
Boron	ug/L	472	40	40	507	513	89	104	75-125	1	20	CC,E, N2
Cadmium	ug/L	ND	40	40	38.9	38.9	97	97	75-125	0	20	
Chromium	ug/L	0.20J	40	40	39.2	39.4	97	98	75-125	0	20	
Cobalt	ug/L	0.34J	40	40	37.8	37.9	94	94	75-125	0	20	
Lead	ug/L	0.039J	40	40	40.5	40.8	101	102	75-125	1	20	
Molybdenum	ug/L	0.93	40	40	40.2	40.1	98	98	75-125	0	20	
Selenium	ug/L	ND	40	40	38.6	39.4	96	98	75-125	2	20	
Thallium	ug/L	ND	40	40	41.4	42.1	104	105	75-125	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:			2600677		2600678							
Parameter	Units	50257332005 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.								
Antimony	ug/L	ND	40	40	40.2	40.2	101	100	75-125	0	20	
Arsenic	ug/L	ND	40	40	32.8	32.5	82	81	75-125	1	20	
Barium	ug/L	35.0	40	40	73.4	73.1	96	95	75-125	0	20	
Beryllium	ug/L	ND	40	40	37.8	37.3	95	93	75-125	2	20	
Boron	ug/L	4660	40	40	4650	4610	-44	-143	75-125	1	20	CC,E, IC,N2, P6
Cadmium	ug/L	1.1	40	40	39.6	39.7	96	96	75-125	0	20	
Chromium	ug/L	ND	40	40	39.7	38.9	96	94	75-125	2	20	
Cobalt	ug/L	70.7	40	40	106	106	87	87	75-125	0	20	
Lead	ug/L	9.0	40	40	49.1	48.1	100	98	75-125	2	20	
Molybdenum	ug/L	293	40	40	321	324	72	78	75-125	1	20	P6
Selenium	ug/L	ND	40	40	32.8	33.8	82	85	75-125	3	20	
Thallium	ug/L	ND	40	40	41.6	40.8	104	102	75-125	2	20	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50257867

QC Batch:	563737	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples: 50257867001, 50257867002, 50257867003			

METHOD BLANK: 2600653 Matrix: Water

Associated Lab Samples: 50257867001, 50257867002, 50257867003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<10.0	10.0	10.0	05/27/20 15:12	

LABORATORY CONTROL SAMPLE: 2600654

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	272	91	80-120	

SAMPLE DUPLICATE: 2600655

Parameter	Units	50257867002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1190	1170	2	10	

SAMPLE DUPLICATE: 2600656

Parameter	Units	50257872001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	674	664	1	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50257867

QC Batch:	563775	Analysis Method:	SM 2540D
QC Batch Method:	SM 2540D	Analysis Description:	2540D Total Suspended Solids
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples: 50257867001, 50257867002, 50257867003			

METHOD BLANK: 2600817                                  Matrix: Water

Associated Lab Samples: 50257867001, 50257867002, 50257867003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<2.5	2.5	2.5	05/27/20 10:54	

LABORATORY CONTROL SAMPLE: 2600818

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	94	94	80-120	

SAMPLE DUPLICATE: 2600819

Parameter	Units	50257753011 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	122	124	2	10	

SAMPLE DUPLICATE: 2600820

Parameter	Units	50257848004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	249	250	0	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: Muskegon Site  
Pace Project No.: 50257867

---

### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### ANALYTE QUALIFIERS

- CC      The continuing calibration for this compound is outside of method control limits. The result is estimated.
- E       Analyte concentration exceeded the calibration range. The reported result is estimated.
- H3      Sample was received or analysis requested beyond the recognized method holding time.
- IC      The initial calibration for this compound was outside of method control limits. The result is estimated.
- N2      The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
- P6      Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
- PP      The mass of dried residue obtained did not meet the test method requirements based on volume used.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Muskegon Site  
Pace Project No.: 50257867

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50257867001	MW-17001R	EPA 9056	564357		
50257867002	MW-15016R	EPA 9056	564357		
50257867003	MW-15015R	EPA 9056	564357		
50257867001	MW-17001R	SM 4500-H+B	563300		
50257867002	MW-15016R	SM 4500-H+B	563300		
50257867003	MW-15015R	SM 4500-H+B	563300		
50257867001	MW-17001R	EPA 3010	563267	EPA 6010	563684
50257867002	MW-15016R	EPA 3010	563267	EPA 6010	563684
50257867003	MW-15015R	EPA 3010	563267	EPA 6010	563684
50257867001	MW-17001R	EPA 200.2	563743	EPA 6020	564208
50257867002	MW-15016R	EPA 200.2	563743	EPA 6020	564208
50257867003	MW-15015R	EPA 200.2	563743	EPA 6020	564208
50257867001	MW-17001R	EPA 7470	563959	EPA 7470	564571
50257867002	MW-15016R	EPA 7470	563959	EPA 7470	564571
50257867003	MW-15015R	EPA 7470	563959	EPA 7470	564571
50257867001	MW-17001R	SM 2540C	563737		
50257867002	MW-15016R	SM 2540C	563737		
50257867003	MW-15015R	SM 2540C	563737		
50257867001	MW-17001R	SM 2540D	563775		
50257867002	MW-15016R	SM 2540D	563775		
50257867003	MW-15015R	SM 2540D	563775		

### REPORT OF LABORATORY ANALYSIS

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**Section A**  
Required Client Information:

Company: HDR, Inc.	Report To: Molly Reeves	Alt. Name:
Address: 3221 Bronson Blvd	Copy To: Anya Thomson	Company Name:
Kalamazoo, MI 49008		Address:
Email To: Molly.reeves@hdrinc.com	Purchase Order No:	Pace Quote:
Phone: 734-243-7138 Fax:	Project Name: Muskegon Site	Reference:
Requested Due Date/TAT:	Project Number:	Pace Project Manager:

Page: 1 of 3

**2224313**

REGULATORY AGENCY
<input type="checkbox"/> NPDES <input checked="" type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER
<input type="checkbox"/> Pace Quote <input checked="" type="checkbox"/> RCRA <input type="checkbox"/> OTHER
Site Location: MI
STATE: MI

ITEM #	SAMPLE ID (A-Z 0-9 / -) Sample IDs MUST BE UNIQUE	COLLECTED		Preservatives		# OF CONTAINERS		SAMPLE TEMP AT COLLECTION		Analysis Test ↑		Requested Analysis Filtered (Y/N)		Residual Chlorine (Y/N)							
		MATRIX CODES	MATRIX / CODE	COMPOSITE START	COMPOSITE END/GRAB	MATRIX CODE (G=GRAB C=COMP) (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	HCl	HNO3	H2SO4	NaOH	ZnSO4	Na2S2O3	Methanol	Other	NH3	Ph	TSS	TDS/E+Cl, SO4	Rod-228	Rod-226
1	MVN-17001R	WT	G	5/21/20	1:20										X	X	X	X	X	X	
2	MVN-15010R	WT	1	1	2:00										X	X	X	X	X	X	
3	MVN-15015R	WT	1	1	3:45										X	X	X	X	X	X	
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION		DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME	SAMPLE CONDITIONS											
		Molly Thomson / HDR		5/21/20	5:30	J. N. Jackson		5/21/20	1730												
SAMPLE NAME AND SIGNATURE		PRINT Name of SAMPLER:		SIGNATURE of SAMPLER:		DATE Signed (MM/DD/YY):															
<b>ORIGINAL</b>																					

## Sample Conditions Upon Receipt Form (SCUR)

Date/Time: <i>5/21/20</i>	Evaluated by: <i>JW</i>	WO# : 50257867		
Client: <i>HDR INC.</i>		PM: MSB	Due Date: 06/03/20	
Project Manager: <i>NJSB</i>	Profile ID: <i>9219</i>	CLIENT: GR-HDR		
Rush TAT Requested: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Due Date:			
Lab Notified of Rush or Short Holds: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Non Conformance Form Required: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>			
Samples Received Via: FedEx <input type="checkbox"/> UPS <input checked="" type="checkbox"/> Client <input type="checkbox"/> Pace Courier <input type="checkbox"/> Other: _____	Comments: _____			
Custody Seals Present and Intact: <i>5/21/20</i>				
Received Sample Information Form(s): Drinking Waters Only		YES	NO	NA
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)		YES	NO	NA
Short Holds Present (< 72 Hours):		YES	NO	
Samples Received in Hold:		YES	NO	
Custody Signatures Present:		YES	NO	
Collector Signature Present:		YES	NO	
Packing Material Used:		YES	NO	
Samples Collected Today and On Ice:		YES	NO	N/A
IR Gun #: <i>✓ 280 281</i>	Digital Thermometer #: 282 283			
Ice Type: WET Bagged / WET Loose <input checked="" type="checkbox"/> BLUE <input type="checkbox"/> NONE <input type="checkbox"/>	1. Cooler Temp Upon Receipt: <i>3.5 / 3.9</i> °C			
Ice Location: TOP <input type="checkbox"/> BOTTOM <input type="checkbox"/> MIDDLE <input checked="" type="checkbox"/> DISPersed <input type="checkbox"/>	Temp should be 0-6°C (Initial/Corrected)			
Temp Blank Received:	YES	NO		
Containers Intact:	YES	NO		
Correct Containers:	YES	NO		
Sufficient Volume:	YES	NO		
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are VOA, coliform, LLHG, O&G, or any container with a septum cap or preserved with HCl	YES	NO	N/A	<i>✓ 2909011</i>
Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)	YES	NO	N/A	
VOA Headspace Acceptable (<6mm):	YES	NO	N/A	
Trip Blank Received: HCl <input type="checkbox"/> MeOH <input type="checkbox"/> TSP <input type="checkbox"/> OTHER <input type="checkbox"/>	YES	NO		
Comments:	2. Cooler Temp Upon Receipt: _____ °C			
	3. Cooler Temp Upon Receipt: _____ °C			
	4. Cooler Temp Upon Receipt: _____ °C			

August 06, 2020

Molly Reeves  
HDR, Inc.  
3321 Bronson Blvd  
Kalamazoo, MI 49008

RE: Project: Muskegon Site Rad  
Pace Project No.: 50257868

Dear Molly Reeves:

Enclosed are the analytical results for sample(s) received by the laboratory on May 21, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

Revised Report: This report replaces the original dated, 061620. Revised to add Rad 226/228 combined per client request./080620msb

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melanie Booms  
melanie.booms@pacelabs.com  
(616)975-4500  
Project Manager

Enclosures

cc: Lara Syrocki, HDR, Inc.  
Aryka Thomson, HDR, Inc.



## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: Muskegon Site Rad  
Pace Project No.: 50257868

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50257868001	MW-17001R	Water	05/21/20 13:20	05/21/20 17:30
50257868002	MW-15016R	Water	05/21/20 14:00	05/21/20 17:30
50257868003	MW-15015R	Water	05/21/20 15:45	05/21/20 17:30

## REPORT OF LABORATORY ANALYSIS

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**CHAIN-OF-CUSTODY / Annex**  
The Chain-of-Custody is a LEGAL DOCUMENT

**CHAIN-OF-CUSTODY / AR WÖH# : 50257868**  
The Chain-of-Custody is a LEGAL DOCUMENT

The Chain-of-Custody is a LEGAL DOCUMENT

**Important Note:** By signing this form you are accepting Faces' NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

# Sample Conditions Upon Receipt Form (SCUR)

Date/Time:	5/21/20	Evaluated by:	JN
Client:	HDR, INC		
Project Manager:	MSB	Profile ID:	9219
Rush TAT Requested:	YES	NO	Due Date:

WO# : 50257868

PM: MSB Due Date: 06/15/20  
CLIENT: GR-HDR

Lab Notified of Rush or Short Holds: YES ✓NO Non Conformance Form Required: YES ✓NO

Samples Received Via: FedEx UPS ✓Client Pace Courier Other: \_\_\_\_\_ Comments: \_\_\_\_\_

Custody Seals Present and Intact: YES NO ✓NA

Received Sample Information Form(s): Drinking Waters Only YES NO ✓NA

USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico) YES NO ✓N/A

Short Holds Present (< 72 Hours): YES ✓NO

Samples Received in Hold: ✓YES NO

Custody Signatures Present: ✓YES NO

Collector Signature Present: ✓YES NO

Packing Material Used: ✓YES NO

Samples Collected Today and On Ice: ✓YES NO N/A

IR Gun #: 280 281 Digital Thermometer #: 282 283

Ice Type: WET Bagged / WET Loose BLUE NONE 1. Cooler Temp Upon Receipt: 3.5/3.9 °C

Ice Location: TOP BOTTOM MIDDLE ✓DISPERSED Temp should be 0-6°C (Initial/Corrected)

Temp Blank Received: ✓YES NO

Containers Intact: ✓YES NO

Correct Containers: ✓YES NO

Sufficient Volume: ✓YES NO

Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation  
Exceptions are VOA, coliform, LLHG, O&G, or any container with a septum cap or preserved with HCl YES NO ✓N/A

Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide) YES NO ✓N/A

VOA Headspace Acceptable (<6mm): YES NO ✓N/A

Trip Blank Received: HCl MeOH TSP OTHER YES ✓NO

Comments: 2. Cooler Temp Upon Receipt: \_\_\_\_\_ °C

3. Cooler Temp Upon Receipt: \_\_\_\_\_ °C

4. Cooler Temp Upon Receipt: \_\_\_\_\_ °C

# ANALYTICAL REPORT

August 06, 2020

Revised Report

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

## Pace Analytical - Grand Rapids, MI

Sample Delivery Group: L1222324  
Samples Received: 05/27/2020  
Project Number: 50257868  
Description: Muskegon Site  
Site: 001  
Report To: Melanie Booms  
5560 Corporate Exchange Ct SE  
Grand Rapids, MI 49512

Entire Report Reviewed By:



Donna Eidson  
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

# TABLE OF CONTENTS

ONE LAB. NATIONWIDE.



Cp: Cover Page	1	<sup>1</sup> Cp
Tc: Table of Contents	2	<sup>2</sup> Tc
Ss: Sample Summary	3	<sup>3</sup> Ss
Cn: Case Narrative	4	<sup>4</sup> Cn
Sr: Sample Results	5	<sup>5</sup> Sr
MW-17001R L1222324-01	5	<sup>6</sup> Qc
MW-15016R L1222324-02	6	<sup>7</sup> Gl
MW-15015R L1222324-03	7	<sup>8</sup> Al
Qc: Quality Control Summary	8	<sup>9</sup> Sc
Radiochemistry by Method 904	8	
Radiochemistry by Method SM7500Ra B M	9	
Gl: Glossary of Terms	10	
Al: Accreditations & Locations	11	
Sc: Sample Chain of Custody	12	

## SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



			Collected by	Collected date/time	Received date/time
				05/21/20 13:20	05/27/20 08:45
MW-17001R L1222324-01 Non-Potable Water	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst Location

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1482900	1	05/28/20 14:52	06/03/20 13:40	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1488872	1	06/08/20 15:36	06/09/20 15:19	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1488872	1	06/08/20 15:36	06/09/20 15:19	RGT	Mt. Juliet, TN

MW-15016R L1222324-02 Non-Potable Water	Collected by	Collected date/time	Received date/time
		05/21/20 14:00	05/27/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1482900	1	05/28/20 14:52	06/03/20 13:40	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1488872	1	06/08/20 15:36	06/09/20 15:19	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1488872	1	06/08/20 15:36	06/09/20 15:19	RGT	Mt. Juliet, TN

MW-15015R L1222324-03 Non-Potable Water	Collected by	Collected date/time	Received date/time
		05/21/20 15:45	05/27/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1482900	1	05/28/20 14:52	06/03/20 13:40	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1488872	1	06/08/20 15:36	06/09/20 15:19	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1488872	1	06/08/20 15:36	06/09/20 15:19	RGT	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson  
Project Manager

- <sup>1</sup> Cp
- <sup>2</sup> Tc
- <sup>3</sup> Ss
- <sup>4</sup> Cn
- <sup>5</sup> Sr
- <sup>6</sup> Qc
- <sup>7</sup> GI
- <sup>8</sup> AI
- <sup>9</sup> SC

#### Report Revision History

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Level II Report - Version 1: 06/16/20 10:15



## Radiochemistry by Method 904

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	1 Cp
RADIUM-228	0.196		0.585	0.862	06/03/2020 13:40	WG1482900	2 Tc
(T) Barium	108			62.0-143	06/03/2020 13:40	WG1482900	3 Ss
(T) Yttrium	102			79.0-136	06/03/2020 13:40	WG1482900	4 Cn

## Radiochemistry by Method Calculation

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	5 Sr
Combined Radium	0.308		0.735	1.08	06/09/2020 15:19	WG1488872	6 Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	7 Gl
RADIUM-226	0.112		0.150	0.217	06/09/2020 15:19	WG1488872	8 Al
(T) Barium-133	99.5			30.0-143	06/09/2020 15:19	WG1488872	9 Sc



## Radiochemistry by Method 904

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	1 Cp
RADIUM-228	2.00		0.558	0.768	06/03/2020 13:40	WG1482900	2 Tc
(T) Barium	114			62.0-143	06/03/2020 13:40	WG1482900	3 Ss
(T) Yttrium	101			79.0-136	06/03/2020 13:40	WG1482900	4 Cn

## Radiochemistry by Method Calculation

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	5 Sr
Combined Radium	2.93		0.972	1.13	06/09/2020 15:19	WG1488872	6 Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result	<u>Qualifier</u>	Uncertainty	MDA	Analysis Date	<u>Batch</u>	7 Gl
RADIUM-226	0.926		0.414	0.357	06/09/2020 15:19	WG1488872	8 Al
(T) Barium-133	101			30.0-143	06/09/2020 15:19	WG1488872	9 Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.549	MDA 0.839	Analysis Date date / time 06/03/2020 13:40	<u>Batch</u> <a href="#">WG1482900</a>	<sup>1</sup> Cp
RADIUM-228	0.524						<sup>2</sup> Tc
( <i>T</i> ) Barium	113		62.0-143		06/03/2020 13:40	<a href="#">WG1482900</a>	
( <i>T</i> ) Yttrium	102			79.0-136	06/03/2020 13:40	<a href="#">WG1482900</a>	<sup>3</sup> Ss

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.816	MDA 1.08	Analysis Date date / time 06/09/2020 15:19	<u>Batch</u> <a href="#">WG1488872</a>	<sup>4</sup> Cn
Combined Radium	0.918						<sup>5</sup> Sr

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.267	MDA 0.242	Analysis Date date / time 06/09/2020 15:19	<u>Batch</u> <a href="#">WG1488872</a>	<sup>6</sup> Qc
RADIUM-226	0.394						<sup>7</sup> Gl
( <i>T</i> ) Barium-133	93.3		30.0-143		06/09/2020 15:19	<a href="#">WG1488872</a>	<sup>8</sup> Al

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc



## Method Blank (MB)

(MB) R3535421-1 06/03/20 09:35

Analyte	MB Result pCi/l	<u>MB Qualifier</u>	MB MDA pCi/l
Radium-228	-0.0276		0.501
(T) Barium	106		
(T) Yttrium	105		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1222318-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1222318-01 06/03/20 13:40 • (DUP) R3535421-5 06/03/20 09:35

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD	DUP RER	<u>DUP Qualifier</u>	DUP RPD Limits	DUP RER Limit
Radium-228	1.35	1.54	1	13.4	0.220		20	3
(T) Barium	107	100						
(T) Yttrium	101	108						

## Laboratory Control Sample (LCS)

(LCS) R3535421-2 06/03/20 09:35

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Radium-228	5.00	4.81	96.1	80.0-120	
(T) Barium			98.1		
(T) Yttrium			104		

<sup>9</sup>Sc

## L1221007-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1221007-13 06/03/20 13:40 • (MS) R3535421-3 06/03/20 09:35 • (MSD) R3535421-4 06/03/20 09:35

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	MS RER	RPD Limits %
Radium-228	10.0	3.32	11.8	14.2	84.7	108	1	70.0-130			18.3		20
(T) Barium		106		105	105								
(T) Yttrium		111		109	109								



L1222324-01,02,03

## Method Blank (MB)

(MB) R3538773-1 06/09/20 15:19

Analyte	MB Result pCi/l	<u>MB Qualifier</u>	MB MDA pCi/l
Radium-226	-0.0212		0.0760
(T) Barium-133	103		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1221007-17 Original Sample (OS) • Duplicate (DUP)

(OS) L1221007-17 06/09/20 15:19 • (DUP) R3538773-5 06/09/20 15:19

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution %	DUP RPD %	DUP RER	<u>DUP Qualifier</u>	DUP RPD Limits %	DUP RER Limit
Radium-226	0.123	0.154	1	22.3	0.114		20	3
(T) Barium-133	95.4	99.3						

## Laboratory Control Sample (LCS)

(LCS) R3538773-2 06/09/20 15:19

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Radium-226	5.02	5.55	110	80.0-120	
(T) Barium-133		103			

<sup>9</sup>Sc

## L1221007-20 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1221007-20 06/09/20 15:19 • (MS) R3538773-3 06/09/20 15:19 • (MSD) R3538773-4 06/09/20 15:19

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution %	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	MS RER	RPD Limits %
Radium-226	20.1	0.344	18.6	21.0	91.0	103	1	75.0-125			11.9		20
(T) Barium-133		98.7		102	104								



## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

**Results Disclaimer -** Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

### Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
	The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

- \* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
- \* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

Alabama	40660
Alaska	17-026
Arizona	AZ0612
Arkansas	88-0469
California	2932
Colorado	TN00003
Connecticut	PH-0197
Florida	E87487
Georgia	NELAP
Georgia <sup>1</sup>	923
Idaho	TN00003
Illinois	200008
Indiana	C-TN-01
Iowa	364
Kansas	E-10277
Kentucky <sup>1,6</sup>	90010
Kentucky <sup>2</sup>	16
Louisiana	AI30792
Louisiana <sup>1</sup>	LA180010
Maine	TN0002
Maryland	324
Massachusetts	M-TN003
Michigan	9958
Minnesota	047-999-395
Mississippi	TN00003
Missouri	340
Montana	CERT0086

Nebraska	NE-OS-15-05
Nevada	TN-03-2002-34
New Hampshire	2975
New Jersey-NELAP	TN002
New Mexico <sup>1</sup>	n/a
New York	11742
North Carolina	Env375
North Carolina <sup>1</sup>	DW21704
North Carolina <sup>3</sup>	41
North Dakota	R-140
Ohio-VAP	CL0069
Oklahoma	9915
Oregon	TN200002
Pennsylvania	68-02979
Rhode Island	LA000356
South Carolina	84004
South Dakota	n/a
Tennessee <sup>1,4</sup>	2006
Texas	T104704245-18-15
Texas <sup>5</sup>	LAB0152
Utah	TN00003
Vermont	VT2006
Virginia	460132
Washington	C847
West Virginia	233
Wisconsin	9980939910
Wyoming	A2LA

## Third Party Federal Accreditations

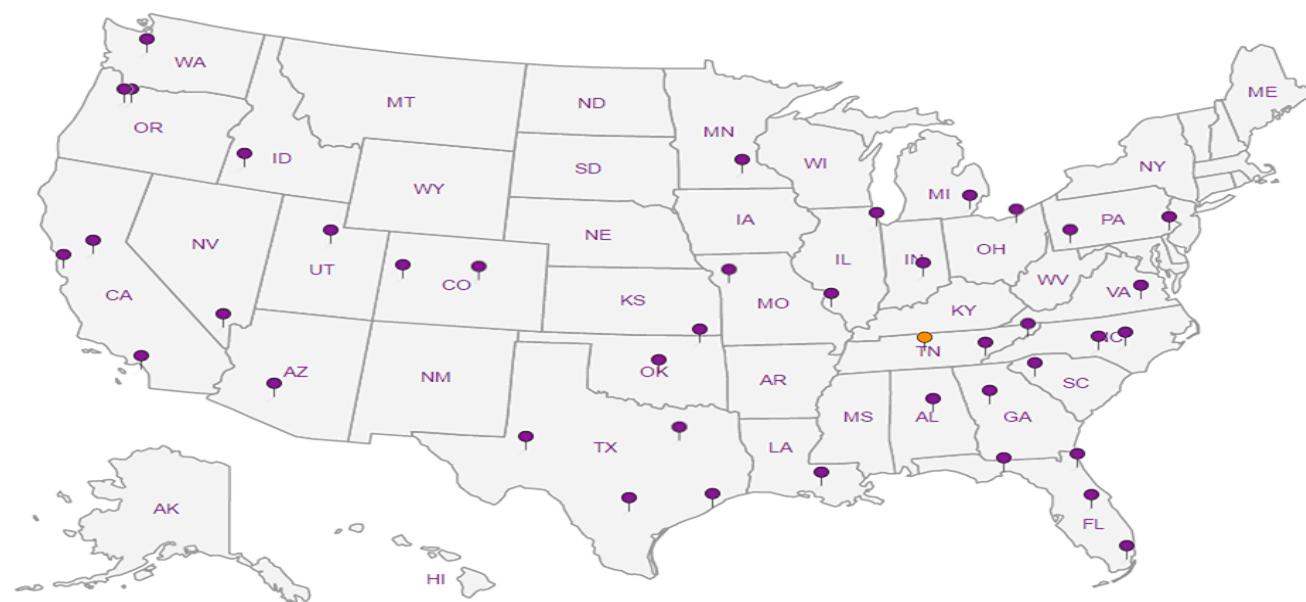
A2LA – ISO 17025	1461.01
A2LA – ISO 17025 <sup>5</sup>	1461.02
Canada	1461.01
EPA-Crypto	TN00003

AIHA-LAP,LLC EMLAP	100789
DOD	1461.01
USDA	P330-15-00234

<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>6</sup> Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



- <sup>1</sup> Cp
- <sup>2</sup> Tc
- <sup>3</sup> Ss
- <sup>4</sup> Cn
- <sup>5</sup> Sr
- <sup>6</sup> Qc
- <sup>7</sup> Gl
- <sup>8</sup> Al
- <sup>9</sup> Sc

## Chain of Custody

Samples were sent directly to the Subcontracting Laboratory.

Workorder: 50257868 Workorder Name: Muskegon Site

**State Of Origin: MI**

Cert. Needed:  Yes

Owner Received Date: 5/21/2020

**Owner Received Date:** 5/21/2020 **Results Requested By:** 6/15/2020

**\*\*\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.**

*This chain of custody is considered complete as is since this information is available in the owner laboratory.*

$$1.6 - .3 = 1.3 \text{ NM}$$

RAD SCREEN: <0.5 mR/hr



1222324

## Sample Conditions Upon Receipt Form (SCUR)

Date/Time:	5/21/20	Evaluated by:	<i>JW</i>
Client:	<i>DDR INC</i>		
Project Manager:	753	Profile ID:	0550

WO# : 50257868										
Date/Time:	5/21/20	Evaluated by:								
Client:	HDR TNC									
Project Manager:	NSB	Profile ID:								
Rush/TAT Requested:	YES	NO	Due Date:							
Lab Notified of Rush or Short Holds:			YES	NO	Non Conformance Form Required:		YES	NO		
Samples Received Via:	FedEx	UPS	Client	Pace Courier	Other:					
Comments:										
Custody Seals Present and Intact:										
Received Sample Information Form(s): Drinking Waters Only										
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NO, OK, OR, SC, TN, TX, WA or Puerto Rico)										
Short Holds Present (< 72 Hours):										
Samples Received in Hold:										
Custody Signatures Present:										
Collector Signature Present:										
Packing Material Used:										
Samples Collected Today and On Ice:										
IR Gun #:	✓80	281	Digital Thermometer #:	282	283					
Ice Type:	WET Bagged / WET Loose	BLUE	NONE	1. Cooler Temp Upon Receipt: <u>3.5/3.9</u> °C						
Ice Location:	TOP	BOTTOM	MIDDLE	DISPERSED	Temp should be 0-6°C (Initial/Corrected)					
Temp Blank Received:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO									
Containers Intact:										
Correct Containers:										
Sufficient Volume:										
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation. Exceptions are VOA, coliform, LHLg, O&G, or any container with a septum/cap or preserved with HCl.										
Residual Chlorine Absent:										
SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)										
VOA Headspace Acceptable (<6mm):										
Trip Blank Received:	HCl	MeOH	TSP	OTHER	YES	NO	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> N/A	<input type="checkbox"/> N/A	
Comments:										
2. Cooler Temp Upon Receipt _____ °C										
3. Cooler Temp Upon Receipt _____ °C										
4. Cooler Temp Upon Receipt _____ °C										

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19

Pace Analytical National Center for Testing & Innovation  
 Cooler Receipt Form

Client:	PACEGRMI		
Cooler Received/Opened On:	5/27/20	Temperature:	1.3
Received By:	Kelsey Stephenson		
Signature:			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?		<input checked="" type="checkbox"/>	
COC Signed / Accurate?		<input checked="" type="checkbox"/>	
Bottles arrive intact?		<input checked="" type="checkbox"/>	
Correct bottles used?		<input checked="" type="checkbox"/>	
Sufficient volume sent?		<input checked="" type="checkbox"/>	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			

June 25, 2020

Molly Reeves  
HDR, Inc.  
3321 Bronson Blvd  
Kalamazoo, MI 49008

RE: Project: Muskegon Site  
Pace Project No.: 50259884

Dear Molly Reeves:

Enclosed are the analytical results for sample(s) received by the laboratory on June 15, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Grand Rapids
- Pace Analytical Services - Indianapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melanie Booms  
melanie.booms@pacelabs.com  
(616)975-4500  
Project Manager

Enclosures

cc: Lara Syrocki, HDR, Inc.  
Aryka Thomson, HDR, Inc.



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## CERTIFICATIONS

Project: Muskegon Site  
Pace Project No.: 50259884

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### **Pace Analytical Services Indianapolis**

7726 Moller Road, Indianapolis, IN 46268  
Illinois Accreditation #: 200074  
Indiana Drinking Water Laboratory #: C-49-06  
Kansas/TNI Certification #: E-10177  
Kentucky UST Agency Interest #: 80226  
Kentucky WW Laboratory ID #: 98019  
Michigan Drinking Water Laboratory #9050

Ohio VAP Certified Laboratory #: CL0065  
Oklahoma Laboratory #: 9204  
Texas Certification #: T104704355  
West Virginia Certification #: 330  
Wisconsin Laboratory #: 999788130  
USDA Soil Permit #: P330-19-00257

### **Pace Analytical Services Grand Rapids**

5560 Corporate Exchange Ct SE, Grand Rapids, MI 49512  
Minnesota/TNI Laboratory #026-999-161

Michigan Drinking Water Laboratory #0034

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: Muskegon Site  
Pace Project No.: 50259884

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50259884001	MW-17001R	Water	06/15/20 12:25	06/15/20 17:58
50259884002	MW-15016R	Water	06/15/20 14:15	06/15/20 17:58
50259884003	MW-15015R	Water	06/15/20 16:15	06/15/20 17:58

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: Muskegon Site  
Pace Project No.: 50259884

Lab ID	Sample ID	Method	Analysts	Analytes Reported
50259884001	<b>MW-17001R</b>	EPA 9056	RSF	3
		SM 4500-H+B	NRC	1
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	SKK	1
50259884002	<b>MW-15016R</b>	EPA 9056	RSF	3
		SM 4500-H+B	NRC	1
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	SKK	1
50259884003	<b>MW-15015R</b>	EPA 9056	RSF	3
		SM 4500-H+B	NRC	1
		EPA 6010	KJE	2
		EPA 6020	DMT	12
		EPA 7470	ILP	1
		SM 2540C	MMS	1
		SM 2540D	SKK	1

PASI-GR = Pace Analytical Services - Grand Rapids

PASI-I = Pace Analytical Services - Indianapolis

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50259884

Sample: MW-17001R	Lab ID: 50259884001	Collected: 06/15/20 12:25	Received: 06/15/20 17:58	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	28.3	mg/L	2.5	0.44	10			06/24/20 01:38	16887-00-6
Fluoride	0.18	mg/L	0.10	0.0014	1			06/24/20 01:19	16984-48-8
Sulfate	122	mg/L	2.5	1.1	10			06/24/20 01:38	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.1	Std. Units	1.0	1.0	1			06/16/20 10:40	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	150000	ug/L	1000	134	1	06/18/20 06:20	06/24/20 12:13	7440-70-2	
Lithium	75.0	ug/L	20.0	3.0	1	06/18/20 06:20	06/24/20 12:13	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.10	ug/L	1.0	0.10	1	06/19/20 08:20	06/22/20 09:29	7440-36-0	
Arsenic	2.0	ug/L	1.0	0.20	1	06/19/20 08:20	06/22/20 09:29	7440-38-2	
Barium	101	ug/L	1.0	0.15	1	06/19/20 08:20	06/22/20 09:29	7440-39-3	
Beryllium	<0.022	ug/L	0.20	0.022	1	06/19/20 08:20	06/22/20 09:29	7440-41-7	
Boron	1940	ug/L	125	41.5	25	06/19/20 08:20	06/22/20 06:36	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	06/19/20 08:20	06/22/20 09:29	7440-43-9	
Chromium	0.18J	ug/L	1.0	0.11	1	06/19/20 08:20	06/22/20 09:29	7440-47-3	
Cobalt	0.29J	ug/L	1.0	0.032	1	06/19/20 08:20	06/22/20 09:29	7440-48-4	
Lead	<0.034	ug/L	1.0	0.034	1	06/19/20 08:20	06/22/20 09:29	7439-92-1	
Molybdenum	0.37J	ug/L	1.0	0.10	1	06/19/20 08:20	06/22/20 09:29	7439-98-7	
Selenium	<0.41	ug/L	1.0	0.41	1	06/19/20 08:20	06/22/20 09:29	7782-49-2	
Thallium	<0.031	ug/L	1.0	0.031	1	06/19/20 08:20	06/22/20 09:29	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	06/17/20 21:26	06/18/20 09:35	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	622	mg/L	10.0	10.0	1			06/17/20 10:05	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			06/16/20 15:57	PP

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50259884

Sample: MW-15016R	Lab ID: 50259884002	Collected: 06/15/20 14:15	Received: 06/15/20 17:58	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	293	mg/L	25.0	4.4	100			06/24/20 02:17	16887-00-6
Fluoride	0.14	mg/L	0.10	0.0014	1			06/24/20 01:57	16984-48-8
Sulfate	5.8	mg/L	0.25	0.11	1			06/24/20 01:57	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	6.6	Std. Units	1.0	1.0	1			06/16/20 10:45	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	195000	ug/L	1000	134	1	06/18/20 06:20	06/24/20 12:15	7440-70-2	
Lithium	3.7J	ug/L	20.0	3.0	1	06/18/20 06:20	06/24/20 12:15	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	0.14J	ug/L	1.0	0.10	1	06/19/20 08:20	06/22/20 09:43	7440-36-0	
Arsenic	10.1	ug/L	1.0	0.20	1	06/19/20 08:20	06/22/20 09:43	7440-38-2	
Barium	789	ug/L	5.0	0.76	5	06/19/20 08:20	06/23/20 04:07	7440-39-3	
Beryllium	<0.022	ug/L	0.20	0.022	1	06/19/20 08:20	06/22/20 09:43	7440-41-7	
Boron	109	ug/L	10.0	3.3	2	06/19/20 08:20	06/22/20 06:40	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	06/19/20 08:20	06/22/20 09:43	7440-43-9	
Chromium	0.79J	ug/L	1.0	0.11	1	06/19/20 08:20	06/22/20 09:43	7440-47-3	
Cobalt	1.6	ug/L	1.0	0.032	1	06/19/20 08:20	06/22/20 09:43	7440-48-4	
Lead	<0.034	ug/L	1.0	0.034	1	06/19/20 08:20	06/22/20 09:43	7439-92-1	
Molybdenum	7.5	ug/L	1.0	0.10	1	06/19/20 08:20	06/22/20 09:43	7439-98-7	
Selenium	<0.41	ug/L	1.0	0.41	1	06/19/20 08:20	06/22/20 09:43	7782-49-2	
Thallium	<0.031	ug/L	1.0	0.031	1	06/19/20 08:20	06/22/20 09:43	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	06/17/20 21:26	06/18/20 09:43	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	1130	mg/L	20.0	20.0	1			06/17/20 10:05	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	74	mg/L	12.5	12.5	1			06/16/20 15:57	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Muskegon Site  
Pace Project No.: 50259884

Sample: MW-15015R	Lab ID: 50259884003	Collected: 06/15/20 16:15	Received: 06/15/20 17:58	Matrix: Water					
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9056 IC Anions</b>	Analytical Method: EPA 9056 Pace Analytical Services - Indianapolis								
Chloride	17.4	mg/L	2.5	0.44	10			06/24/20 02:55	16887-00-6
Fluoride	0.12	mg/L	0.10	0.0014	1			06/24/20 02:36	16984-48-8
Sulfate	636	mg/L	25.0	10.7	100			06/24/20 03:14	14808-79-8
<b>4500H+ pH, Electrometric</b>	Analytical Method: SM 4500-H+B Pace Analytical Services - Grand Rapids								
pH at 25 Degrees C	7.8	Std. Units	1.0	1.0	1			06/16/20 10:47	H3
<b>6010 MET ICP</b>	Analytical Method: EPA 6010 Preparation Method: EPA 3010 Pace Analytical Services - Indianapolis								
Calcium	228000	ug/L	5000	670	5	06/18/20 06:20	06/24/20 12:53	7440-70-2	
Lithium	23.2	ug/L	20.0	3.0	1	06/18/20 06:20	06/24/20 12:24	7439-93-2	
<b>6020 MET ICPMS</b>	Analytical Method: EPA 6020 Preparation Method: EPA 200.2 Pace Analytical Services - Indianapolis								
Antimony	<0.10	ug/L	1.0	0.10	1	06/19/20 08:20	06/22/20 09:47	7440-36-0	
Arsenic	8.8	ug/L	1.0	0.20	1	06/19/20 08:20	06/22/20 09:47	7440-38-2	
Barium	108	ug/L	1.0	0.15	1	06/19/20 08:20	06/22/20 09:47	7440-39-3	
Beryllium	<0.022	ug/L	0.20	0.022	1	06/19/20 08:20	06/22/20 09:47	7440-41-7	
Boron	675	ug/L	50.0	16.6	10	06/19/20 08:20	06/22/20 06:45	7440-42-8	N2
Cadmium	<0.022	ug/L	0.20	0.022	1	06/19/20 08:20	06/22/20 09:47	7440-43-9	
Chromium	<0.11	ug/L	1.0	0.11	1	06/19/20 08:20	06/22/20 09:47	7440-47-3	
Cobalt	0.31J	ug/L	1.0	0.032	1	06/19/20 08:20	06/22/20 09:47	7440-48-4	
Lead	<0.034	ug/L	1.0	0.034	1	06/19/20 08:20	06/22/20 09:47	7439-92-1	
Molybdenum	23.1	ug/L	1.0	0.10	1	06/19/20 08:20	06/22/20 09:47	7439-98-7	
Selenium	<0.41	ug/L	1.0	0.41	1	06/19/20 08:20	06/22/20 09:47	7782-49-2	
Thallium	<0.031	ug/L	1.0	0.031	1	06/19/20 08:20	06/22/20 09:47	7440-28-0	
<b>7470 Mercury</b>	Analytical Method: EPA 7470 Preparation Method: EPA 7470 Pace Analytical Services - Indianapolis								
Mercury	<0.080	ug/L	0.20	0.080	1	06/17/20 21:26	06/18/20 09:45	7439-97-6	
<b>2540C Total Dissolved Solids</b>	Analytical Method: SM 2540C Pace Analytical Services - Indianapolis								
Total Dissolved Solids	1140	mg/L	20.0	20.0	1			06/17/20 10:06	
<b>2540D Total Suspended Solids</b>	Analytical Method: SM 2540D Pace Analytical Services - Indianapolis								
Total Suspended Solids	<2.5	mg/L	2.5	2.5	1			06/16/20 15:57	PP

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50259884

QC Batch:	568571	Analysis Method:	EPA 9056
QC Batch Method:	EPA 9056	Analysis Description:	9056 IC Anions
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50259884001, 50259884002, 50259884003		

METHOD BLANK: 2623120 Matrix: Water

Associated Lab Samples: 50259884001, 50259884002, 50259884003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.044	0.25	0.044	06/23/20 09:52	
Fluoride	mg/L	<0.0014	0.10	0.0014	06/23/20 09:52	
Sulfate	mg/L	<0.11	0.25	0.11	06/23/20 09:52	

LABORATORY CONTROL SAMPLE: 2623121

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	1.2	1.2	96	80-120	
Fluoride	mg/L	0.5	0.51	102	80-120	
Sulfate	mg/L	2.5	2.5	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2623122 2623123

Parameter	Units	MS		MSD		MS		MSD		% Rec		Max	
		50259592003	Result	Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	% Rec	MSD % Rec	RPD	RPD	Qual	
Chloride	mg/L	48.7	12.5	12.5	60.0	60.0	91	90	80-120	0	15		
Fluoride	mg/L	0.10	0.5	0.5	0.59	0.59	96	97	80-120	1	15		
Sulfate	mg/L	156	25	25	176	176	81	81	80-120	0	15		

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50259884

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QC Batch:	567361	Analysis Method:	SM 4500-H+B
QC Batch Method:	SM 4500-H+B	Analysis Description:	4500H+BGR pH
		Laboratory:	Pace Analytical Services - Grand Rapids
Associated Lab Samples: 50259884001, 50259884002, 50259884003			

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LABORATORY CONTROL SAMPLE: 2617011

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	6	6.0	100	99-101	

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SAMPLE DUPLICATE: 2617012

Parameter	Units	50259884001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.1	7.1	0	2	H3

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50259884

QC Batch:	567632	Analysis Method:	EPA 7470
QC Batch Method:	EPA 7470	Analysis Description:	7470 Mercury
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50259884001, 50259884002, 50259884003		

METHOD BLANK: 2618293 Matrix: Water

Associated Lab Samples: 50259884001, 50259884002, 50259884003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	0.11J	0.20	0.080	06/18/20 08:44	

LABORATORY CONTROL SAMPLE: 2618294

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.9	118	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2618295 2618296

Parameter	Units	MS Result	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	5.4	5.2	108	105	75-125	3	20

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## REPORT OF LABORATORY ANALYSIS



## **QUALITY CONTROL DATA**

Project: Muskegon Site  
Pace Project No.: 50259884

QC Batch: 567543 Analysis Method: EPA 6010  
QC Batch Method: EPA 3010 Analysis Description: 6010 MET  
Laboratory: Pace Analytical Services - Indianapolis  
Associated Lab Samples: 50259884001, 50259884002, 50259884003

METHOD BLANK: 2617961 Matrix: Water

Associated Lab Samples: 50259884001, 50259884002, 50259884003

Parameter	Units	Blank	Reporting		MDL	Analyzed	Qualifiers
		Result	Limit				
Calcium	ug/L	<134	1000		134	06/24/20 11:45	
Lithium	ug/L	<3.0	20.0		3.0	06/24/20 11:45	

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LABORATORY CONTROL SAMPLE: 2617962

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9750	97	80-120	
Lithium	ug/L	1000	959	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2617963 2617964

Parameter	Units	50258874003	MS		MSD		MS		MSD		% Rec		Max RPD
			Spike Conc.	Spike Conc.	MS Result	MSD Result	% Rec	% Rec	Limits	RPD	Qual		
Calcium	ug/L	127 mg/L	10000	10000	140000	137000	127	100	75-125	2	20	P6	
Lithium	ug/L	ND	1000	1000	972	970	97	97	75-125	0	20		

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50259884

QC Batch:	567824	Analysis Method:	EPA 6020
QC Batch Method:	EPA 200.2	Analysis Description:	6020 MET
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50259884001, 50259884002, 50259884003		

METHOD BLANK: 2619239 Matrix: Water

Associated Lab Samples: 50259884001, 50259884002, 50259884003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.10	1.0	0.10	06/22/20 06:27	
Arsenic	ug/L	<0.20	1.0	0.20	06/22/20 06:27	
Barium	ug/L	<0.15	1.0	0.15	06/22/20 06:27	
Beryllium	ug/L	<0.022	0.20	0.022	06/22/20 06:27	
Boron	ug/L	<1.7	5.0	1.7	06/22/20 06:27	N2
Cadmium	ug/L	<0.022	0.20	0.022	06/22/20 06:27	
Chromium	ug/L	<0.11	1.0	0.11	06/22/20 06:27	
Cobalt	ug/L	<0.032	1.0	0.032	06/22/20 06:27	
Lead	ug/L	<0.034	1.0	0.034	06/22/20 06:27	
Molybdenum	ug/L	<0.10	1.0	0.10	06/22/20 06:27	
Selenium	ug/L	<0.41	1.0	0.41	06/22/20 06:27	
Thallium	ug/L	<0.031	1.0	0.031	06/22/20 06:27	

LABORATORY CONTROL SAMPLE: 2619240

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	43.8	109	80-120	
Arsenic	ug/L	40	38.8	97	80-120	
Barium	ug/L	40	39.8	99	80-120	
Beryllium	ug/L	40	39.2	98	80-120	
Boron	ug/L	40	41.6	104	80-120	N2
Cadmium	ug/L	40	40.9	102	80-120	
Chromium	ug/L	40	40.8	102	80-120	
Cobalt	ug/L	40	42.4	106	80-120	
Lead	ug/L	40	41.0	102	80-120	
Molybdenum	ug/L	40	39.5	99	80-120	
Selenium	ug/L	40	39.8	100	80-120	
Thallium	ug/L	40	42.0	105	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2619241 2619242

Parameter	Units	50259065001 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.	MS Result	MSD Result						
Antimony	ug/L	ND	40	40	43.0	44.0	107	110	75-125	2	20	
Arsenic	ug/L	0.0025 mg/L	40	40	41.2	40.8	97	96	75-125	1	20	
Barium	ug/L	0.15 mg/L	40	40	187	191	88	98	75-125	2	20	

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50259884

		MATRIX SPIKE & MATRIX SPIKE DUPLICATE:		2619241		2619242					
Parameter	Units	MS		MSD							
		50259065001	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD
Beryllium	ug/L	ND	40	40	38.3	39.1	96	98	75-125	2	20
Boron	ug/L	0.061 mg/L	40	40	102	104	102	106	75-125	2	20 N2
Cadmium	ug/L	ND	40	40	38.7	39.8	97	99	75-125	3	20
Chromium	ug/L	ND	40	40	40.8	39.9	102	100	75-125	2	20
Cobalt	ug/L	ND	40	40	39.5	40.3	98	100	75-125	2	20
Lead	ug/L	ND	40	40	40.7	41.5	102	104	75-125	2	20
Molybdenum	ug/L	0.0040 mg/L	40	40	42.8	43.9	97	100	75-125	3	20
Selenium	ug/L	ND	40	40	39.5	39.3	98	97	75-125	1	20
Thallium	ug/L	ND	40	40	42.2	42.9	105	107	75-125	2	20

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## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50259884

QC Batch:	567578	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples: 50259884001, 50259884002, 50259884003			

METHOD BLANK: 2618052 Matrix: Water

Associated Lab Samples: 50259884001, 50259884002, 50259884003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<10.0	10.0	10.0	06/17/20 10:03	

LABORATORY CONTROL SAMPLE: 2618053

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	275	92	80-120	

SAMPLE DUPLICATE: 2618054

Parameter	Units	50259875001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	440	448	2	10	

SAMPLE DUPLICATE: 2618055

Parameter	Units	50259884002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1130	1130	0	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

## QUALITY CONTROL DATA

Project: Muskegon Site  
Pace Project No.: 50259884

QC Batch:	567436	Analysis Method:	SM 2540D
QC Batch Method:	SM 2540D	Analysis Description:	2540D Total Suspended Solids
		Laboratory:	Pace Analytical Services - Indianapolis
Associated Lab Samples:	50259884001, 50259884002, 50259884003		

METHOD BLANK: 2617458 Matrix: Water

Associated Lab Samples: 50259884001, 50259884002, 50259884003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	<2.5	2.5	2.5	06/16/20 15:56	

LABORATORY CONTROL SAMPLE: 2617459

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	97	97	80-120	

SAMPLE DUPLICATE: 2617460

Parameter	Units	50259875001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	47	50	6	10	

SAMPLE DUPLICATE: 2617461

Parameter	Units	50259951001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	77	75	2	10	

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## QUALIFIERS

Project: Muskegon Site  
Pace Project No.: 50259884

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### ANALYTE QUALIFIERS

H3      Sample was received or analysis requested beyond the recognized method holding time.

N2      The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

P6      Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

PP      The mass of dried residue obtained did not meet the test method requirements based on volume used.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Muskegon Site  
Pace Project No.: 50259884

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
50259884001	MW-17001R	EPA 9056	568571		
50259884002	MW-15016R	EPA 9056	568571		
50259884003	MW-15015R	EPA 9056	568571		
50259884001	MW-17001R	SM 4500-H+B	567361		
50259884002	MW-15016R	SM 4500-H+B	567361		
50259884003	MW-15015R	SM 4500-H+B	567361		
50259884001	MW-17001R	EPA 3010	567543	EPA 6010	568920
50259884002	MW-15016R	EPA 3010	567543	EPA 6010	568920
50259884003	MW-15015R	EPA 3010	567543	EPA 6010	568920
50259884001	MW-17001R	EPA 200.2	567824	EPA 6020	568330
50259884002	MW-15016R	EPA 200.2	567824	EPA 6020	568330
50259884003	MW-15015R	EPA 200.2	567824	EPA 6020	568330
50259884001	MW-17001R	EPA 7470	567632	EPA 7470	567802
50259884002	MW-15016R	EPA 7470	567632	EPA 7470	567802
50259884003	MW-15015R	EPA 7470	567632	EPA 7470	567802
50259884001	MW-17001R	SM 2540C	567578		
50259884002	MW-15016R	SM 2540C	567578		
50259884003	MW-15015R	SM 2540C	567578		
50259884001	MW-17001R	SM 2540D	567436		
50259884002	MW-15016R	SM 2540D	567436		
50259884003	MW-15015R	SM 2540D	567436		

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**CHAIN-OF-CUSTODY / Analytical Request**

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant

<b>Section A</b> Required Client Information:		<b>Section B</b> Required Project Information:		<b>Section C</b> Invoice Information:																																																																																																																																																																																																										
Company: HDR, Inc.	Report To: Ayika Thomson	Attention:	Company Name:	Regulatory Agency:																																																																																																																																																																																																										
Address: 5405 Data Ct	Copy To: Mobility Reeves		Address:																																																																																																																																																																																																											
Ann Arbor, MI 48108	Purchase Order #:		Pacs Quote:																																																																																																																																																																																																											
Email: ayika.thomson@idirinc.com	Project Name: Muskegon Site		Pacs Project Manager: melanie.booms@pacelabs.com,																																																																																																																																																																																																											
Phone: 734-751-0762	Project #: 50259884		Pacs Profile #: 9219																																																																																																																																																																																																											
Requested Due Date:																																																																																																																																																																																																														
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# Sample Conditions Upon Receipt Form (SCUR)

Date/Time: <i>6-15-20</i>	Evaluated by: <i>JW</i>	<b>WO# : 50259884</b>		
Client: <i>HDR INC.</i>				PM: MSB      Due Date: 06/25/20
Project Manager: <i>MSB</i>	Profile ID: <i>9219</i>	CLIENT: GR-HDR		
Rush TAT Requested: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Due Date:			
Lab Notified of Rush or Short Holds: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Non Conformance Form Required: YES <input checked="" type="checkbox"/> NO		
Samples Received Via: FedEx <input type="checkbox"/> UPS <input checked="" type="checkbox"/> Client <input type="checkbox"/> Pace Courier <input type="checkbox"/> Other: _____				Comments: _____
Custody Seals Present and Intact:		YES	NO	<input checked="" type="checkbox"/> NA
Received Sample Information Form(s): Drinking Waters Only		YES	NO	<input checked="" type="checkbox"/> NA
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)		YES	NO	<input checked="" type="checkbox"/> N/A
Short Holds Present (< 72 Hours):		<input checked="" type="checkbox"/> YES	NO	
Samples Received in Hold:		<input checked="" type="checkbox"/> YES	NO	
Custody Signatures Present:		<input checked="" type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	
Collector Signature Present:		YES	<input checked="" type="checkbox"/> NO	
Packing Material Used:		<input checked="" type="checkbox"/> YES	NO	
Samples Collected Today and On Ice:		<input checked="" type="checkbox"/> YES	NO	N/A
IR Gun #: <i>✓ 280 281</i>		Digital Thermometer #: 282 283		
Ice Type: <input checked="" type="checkbox"/> WET Bagged / <input checked="" type="checkbox"/> WET Loose <input type="checkbox"/> BLUE <input type="checkbox"/> NONE		1. Cooler Temp Upon Receipt: <i>5.9/4.3</i> °C		
Ice Location: TOP BOTTOM MIDDLE <input checked="" type="checkbox"/> DISPERSED		Temp should be 0-6°C (Initial/Corrected)		
Temp Blank Received:		<input checked="" type="checkbox"/> YES	NO	
Containers Intact:		<input checked="" type="checkbox"/> YES	NO	
Correct Containers:		<input checked="" type="checkbox"/> YES	NO	
Sufficient Volume:		<input checked="" type="checkbox"/> YES	NO	
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are VOA, coliform, LLHG, O&G, or any container with a septum cap or preserved with HCl		<input checked="" type="checkbox"/> YES	NO	N/A
Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)		YES	NO	<input checked="" type="checkbox"/> N/A
VOA Headspace Acceptable (<6mm):		YES	NO	<input checked="" type="checkbox"/> N/A
Trip Blank Received: HCl MeOH TSP OTHER		YES	<input checked="" type="checkbox"/> NO	
Comments:		2. Cooler Temp Upon Receipt: _____ °C		
		3. Cooler Temp Upon Receipt: _____ °C		
		4. Cooler Temp Upon Receipt: _____ °C		

August 06, 2020

Molly Reeves  
HDR, Inc.  
3321 Bronson Blvd  
Kalamazoo, MI 49008

RE: Project: Muskegon Site Rad  
Pace Project No.: 50259885

Dear Molly Reeves:

Enclosed are the analytical results for sample(s) received by the laboratory on June 15, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

Revised Report: This report replaces the original dated, 071420. Revised to add Rad 226/228 combined per client request./080620msb

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melanie Booms  
melanie.booms@pacelabs.com  
(616)975-4500  
Project Manager

Enclosures

cc: Lara Syrocki, HDR, Inc.  
Aryka Thomson, HDR, Inc.



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## SAMPLE SUMMARY

Project: Muskegon Site Rad  
Pace Project No.: 50259885

Lab ID	Sample ID	Matrix	Date Collected	Date Received
50259885001	MW-17001R	Water	06/15/20 12:25	06/15/20 17:58
50259885002	MW-15016R	Water	06/15/20 14:15	06/15/20 17:58
50259885003	MW-15015R	Water	06/15/20 16:15	06/15/20 17:58

## REPORT OF LABORATORY ANALYSIS

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WO# : 50259885



50259885

- 2 -

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**CHAIN-OF-CUSTODY / Analytical Request Document**

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must

Section C

Section B

BELLINI A

BELLINI A

# Sample Conditions Upon Receipt Form (SCUR)

Date/Time:	6-15-20	Evaluated by:	DN
Client:	KDR INC.		
Project Manager:	KSB	Profile ID:	9219
Rush TAT Requested:	YES	NO	Due Date:
Lab Notified of Rush or Short Holds:	✓ YES	NO	

**WO# : 5025985**

PM: MSB Due Date: 07/08/20  
CLIENT: GR-HDR

Non Conformance Form Required: YES ✓ NO			
Comments:			
Samples Received Via:	FedEx	UPS	✓ Client
Custody Seals Present and Intact:	YES	NO	✓ N/A
Received Sample Information Form(s): Drinking Waters Only	YES	NO	✓ N/A
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)	YES	NO	✓ N/A
Short Holds Present (< 72 Hours):	✓ YES	NO	
Samples Received in Hold:	✓ YES	NO	
Custody Signatures Present:	✓ YES	✗ NO	
Collector Signature Present:	YES	✓ NO	
Packing Material Used:	✓ YES	NO	
Samples Collected Today and On Ice:	✓ YES	NO	N/A
IR Gun #:	✓ 280	281	Digital Thermometer #: 282 283
Ice Type:	WET Bagged / WET Loose	BLUE	NONE
Ice Location:	TOP	BOTTOM	MIDDLE ✓ DISPERSED
Temp should be 0-6°C (Initial/Corrected)			
Temp Blank Received:	✓ YES	NO	
Containers Intact:	✓ YES	NO	
Correct Containers:	✓ YES	NO	
Sufficient Volume:	✓ YES	NO	
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are VOA, coliform, LLHg, O&G, or any container with a septum cap or preserved with HCl	✓ YES	NO	N/A
Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)	YES	NO	✓ N/A
VOA Headspace Acceptable (<6mm):	YES	NO	✓ N/A
Trip Blank Received:	HCl	MeOH	TSP OTHER
Comments:	2. Cooler Temp Upon Receipt: _____ °C 3. Cooler Temp Upon Receipt: _____ °C 4. Cooler Temp Upon Receipt: _____ °C		

# ANALYTICAL REPORT

August 06, 2020

Revised Report

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

## Pace Analytical - Grand Rapids, MI

Sample Delivery Group: L1230038  
Samples Received: 06/17/2020  
Project Number: 50259885  
Description: Muskegon Site  
Site: 001  
Report To: Melanie Booms  
5560 Corporate Exchange Ct SE  
Grand Rapids, MI 49512

Entire Report Reviewed By:



Donna Eidson  
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

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ONE LAB. NATIONWIDE.



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Cn: Case Narrative	4	<sup>4</sup> Cn
Sr: Sample Results	5	<sup>5</sup> Sr
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MW-15016R L1230038-02	6	<sup>7</sup> Gl
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Al: Accreditations & Locations	11	
Sc: Sample Chain of Custody	12	

## SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



## MW-17001R L1230038-01 Non-Potable Water

Collected by      Collected date/time      Received date/time  
 06/15/20 12:25      06/17/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1494352	1	06/18/20 14:01	07/02/20 09:45	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1504370	1	07/06/20 15:33	07/07/20 17:10	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1504370	1	07/06/20 15:33	07/07/20 17:10	RRE	Mt. Juliet, TN

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## MW-15016R L1230038-02 Non-Potable Water

Collected by      Collected date/time      Received date/time  
 06/15/20 14:15      06/17/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1494352	1	06/18/20 14:01	07/02/20 09:45	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1504370	1	07/06/20 15:33	07/07/20 17:10	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1504370	1	07/06/20 15:33	07/07/20 17:10	RRE	Mt. Juliet, TN

## MW-15015R L1230038-03 Non-Potable Water

Collected by      Collected date/time      Received date/time  
 06/15/20 16:15      06/17/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1494352	1	06/18/20 14:01	07/02/20 09:45	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1504370	1	07/06/20 15:33	07/07/20 17:10	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1504370	1	07/06/20 15:33	07/07/20 17:10	RRE	Mt. Juliet, TN



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson  
Project Manager

- <sup>1</sup> Cp
- <sup>2</sup> Tc
- <sup>3</sup> Ss
- <sup>4</sup> Cn
- <sup>5</sup> Sr
- <sup>6</sup> Qc
- <sup>7</sup> GI
- <sup>8</sup> AI
- <sup>9</sup> SC

#### Report Revision History

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Level II Report - Version 1: 07/13/20 17:16



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.595	MDA 0.962	Analysis Date date / time 07/02/2020 09:45	<u>Batch</u> <a href="#">WG1494352</a>	<sup>1</sup> Cp
RADIUM-228	0.679						<sup>2</sup> Tc
( <i>T</i> ) Barium	88.9			62.0-143	07/02/2020 09:45	<a href="#">WG1494352</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	112			79.0-136	07/02/2020 09:45	<a href="#">WG1494352</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.784	MDA 1.25	Analysis Date date / time 07/07/2020 17:10	<u>Batch</u> <a href="#">WG1504370</a>	<sup>5</sup> Sr
Combined Radium	0.806						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.189	MDA 0.284	Analysis Date date / time 07/07/2020 17:10	<u>Batch</u> <a href="#">WG1504370</a>	<sup>7</sup> Gl
RADIUM-226	0.128						<sup>8</sup> Al
( <i>T</i> ) Barium-133	92.4			30.0-143	07/07/2020 17:10	<a href="#">WG1504370</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.594	MDA 0.871	Analysis Date date / time 07/02/2020 09:45	<u>Batch</u> <a href="#">WG1494352</a>	<sup>1</sup> Cp
RADIUM-228	3.24						<sup>2</sup> Tc
( <i>T</i> ) Barium	90.6			62.0-143	07/02/2020 09:45	<a href="#">WG1494352</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	115			79.0-136	07/02/2020 09:45	<a href="#">WG1494352</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 1.01	MDA 1.07	Analysis Date date / time 07/07/2020 17:10	<u>Batch</u> <a href="#">WG1504370</a>	<sup>5</sup> Sr
Combined Radium	4.71						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.416	MDA 0.195	Analysis Date date / time 07/07/2020 17:10	<u>Batch</u> <a href="#">WG1504370</a>	<sup>7</sup> Gl
RADIUM-226	1.47						<sup>8</sup> Al
( <i>T</i> ) Barium-133	94.9			30.0-143	07/07/2020 17:10	<a href="#">WG1504370</a>	<sup>9</sup> Sc



## Radiochemistry by Method 904

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.555	MDA 0.918	Analysis Date date / time 07/02/2020 09:45	<u>Batch</u> <a href="#">WG1494352</a>	<sup>1</sup> Cp
RADIUM-228	1.95						<sup>2</sup> Tc
( <i>T</i> ) Barium	94.9			62.0-143	07/02/2020 09:45	<a href="#">WG1494352</a>	<sup>3</sup> Ss
( <i>T</i> ) Yttrium	113			79.0-136	07/02/2020 09:45	<a href="#">WG1494352</a>	<sup>4</sup> Cn

## Radiochemistry by Method Calculation

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.791	MDA 1.26	Analysis Date date / time 07/07/2020 17:10	<u>Batch</u> <a href="#">WG1504370</a>	<sup>5</sup> Sr
Combined Radium	2.12						<sup>6</sup> Qc

## Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	<u>Qualifier</u> + / -	Uncertainty 0.236	MDA 0.338	Analysis Date date / time 07/07/2020 17:10	<u>Batch</u> <a href="#">WG1504370</a>	<sup>7</sup> Gl
RADIUM-226	0.166						<sup>8</sup> Al
( <i>T</i> ) Barium-133	87.8			30.0-143	07/07/2020 17:10	<a href="#">WG1504370</a>	<sup>9</sup> Sc



## Method Blank (MB)

(MB) R3547202-1 07/01/20 09:50

Analyte	MB Result pCi/l	<u>MB Qualifier</u>	MB MDA pCi/l
Radium-228	-0.119		0.523
(T) Barium	106		
(T) Yttrium	82.6		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1230038-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1230038-01 07/02/20 09:45 • (DUP) R3547202-5 07/01/20 09:50

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD	DUP RER	<u>DUP Qualifier</u>	DUP RPD Limits	DUP RER Limit
Radium-228	0.679	-0.503	1	200	1.26		20	3
(T) Barium	88.9	94.1						
(T) Yttrium	112	85.5						

## Laboratory Control Sample (LCS)

(LCS) R3547202-2 07/01/20 09:50

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Radium-228	5.00	5.41	108	80.0-120	
(T) Barium			108		
(T) Yttrium			87.2		

<sup>9</sup>Sc

## L1228581-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1228581-01 07/02/20 09:45 • (MS) R3547202-3 07/01/20 09:50 • (MSD) R3547202-4 07/01/20 09:50

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	MS RER	RPD Limits %
Radium-228	10.0	0.669	10.2	11.4	95.0	107	1	70.0-130			11.4		20
(T) Barium		88.9		102	105								
(T) Yttrium		120		84.9	80.0								



## Method Blank (MB)

(MB) R3548920-1 07/07/20 17:10

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-226	0.00368		0.0696
(T) Barium-133	94.1		

<sup>1</sup>Cp<sup>2</sup>Tc<sup>3</sup>Ss<sup>4</sup>Cn<sup>5</sup>Sr<sup>6</sup>Qc<sup>7</sup>Gl<sup>8</sup>Al<sup>9</sup>Sc

## L1230038-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1230038-01 07/07/20 17:10 • (DUP) R3548920-5 07/07/20 17:10

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.128	0.120	1	6.39	0.0245		20	3
(T) Barium-133	92.4	86.6						

## Laboratory Control Sample (LCS)

(LCS) R3548920-2 07/07/20 17:10

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.02	4.82	96.0	80.0-120	
(T) Barium-133			95.2		

<sup>9</sup>Sc

## L1230038-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1230038-03 07/07/20 17:10 • (MS) R3548920-3 07/07/20 17:10 • (MSD) R3548920-4 07/07/20 17:10

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.1	0.166	17.6	15.6	86.6	76.8	1	75.0-125			11.9		20
(T) Barium-133		87.8			90.4	94.3							



## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

**Results Disclaimer -** Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

### Abbreviations and Definitions

MDA	Minimum Detectable Activity.	<sup>1</sup> Cp
Rec.	Recovery.	<sup>2</sup> Tc
RER	Replicate Error Ratio.	<sup>3</sup> Ss
RPD	Relative Percent Difference.	<sup>4</sup> Cn
SDG	Sample Delivery Group.	<sup>5</sup> Sr
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.	<sup>6</sup> Qc
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.	<sup>7</sup> Gl
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.	<sup>8</sup> Al
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.	<sup>9</sup> Sc
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.	
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.	
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.	
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.	
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.	
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.	
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.	
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.	
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.	

Qualifier	Description
	The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

- \* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
- \* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

Alabama	40660
Alaska	17-026
Arizona	AZ0612
Arkansas	88-0469
California	2932
Colorado	TN00003
Connecticut	PH-0197
Florida	E87487
Georgia	NELAP
Georgia <sup>1</sup>	923
Idaho	TN00003
Illinois	200008
Indiana	C-TN-01
Iowa	364
Kansas	E-10277
Kentucky <sup>1,6</sup>	90010
Kentucky <sup>2</sup>	16
Louisiana	AI30792
Louisiana <sup>1</sup>	LA180010
Maine	TN0002
Maryland	324
Massachusetts	M-TN003
Michigan	9958
Minnesota	047-999-395
Mississippi	TN00003
Missouri	340
Montana	CERT0086

Nebraska	NE-OS-15-05
Nevada	TN-03-2002-34
New Hampshire	2975
New Jersey-NELAP	TN002
New Mexico <sup>1</sup>	n/a
New York	11742
North Carolina	Env375
North Carolina <sup>1</sup>	DW21704
North Carolina <sup>3</sup>	41
North Dakota	R-140
Ohio-VAP	CL0069
Oklahoma	9915
Oregon	TN200002
Pennsylvania	68-02979
Rhode Island	LA000356
South Carolina	84004
South Dakota	n/a
Tennessee <sup>1,4</sup>	2006
Texas	T104704245-18-15
Texas <sup>5</sup>	LAB0152
Utah	TN00003
Vermont	VT2006
Virginia	460132
Washington	C847
West Virginia	233
Wisconsin	9980939910
Wyoming	A2LA

## Third Party Federal Accreditations

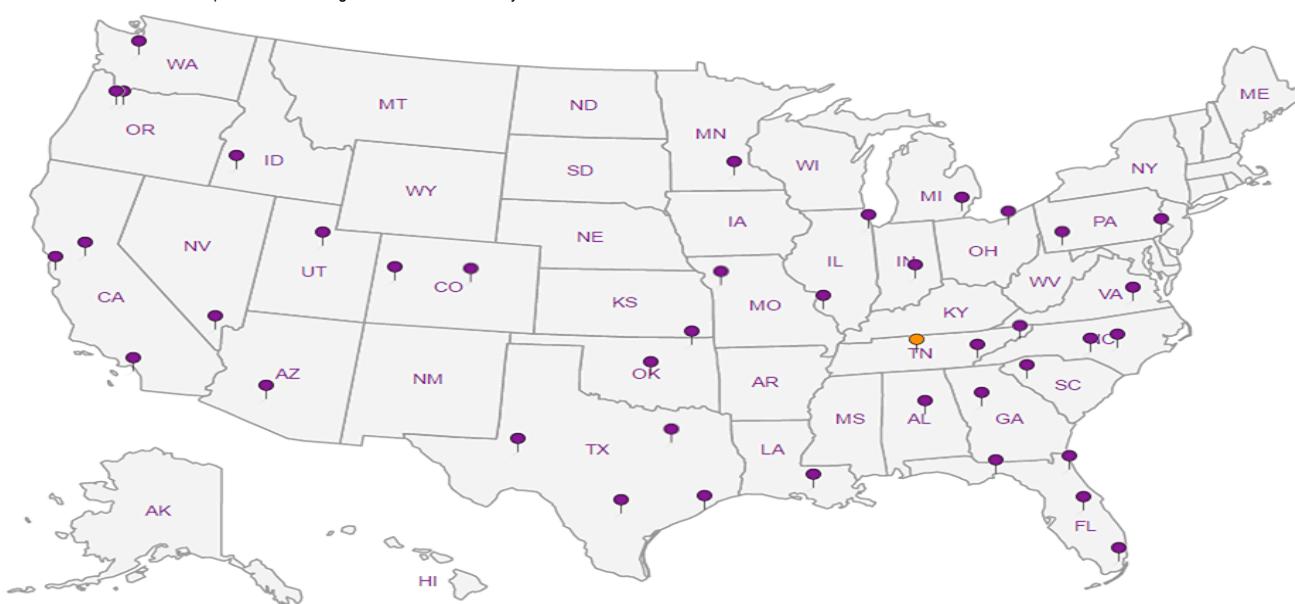
A2LA – ISO 17025	1461.01
A2LA – ISO 17025 <sup>5</sup>	1461.02
Canada	1461.01
EPA-Crypto	TN00003

AIHA-LAP,LLC EMLAP	100789
DOD	1461.01
USDA	P330-15-00234

<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>6</sup> Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



- <sup>1</sup> Cp
- <sup>2</sup> Tc
- <sup>3</sup> Ss
- <sup>4</sup> Cn
- <sup>5</sup> Sr
- <sup>6</sup> Qc
- <sup>7</sup> Gl
- <sup>8</sup> Al
- <sup>9</sup> Sc

# Chain of Custody

G022

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www.pacelabs.com

Samples were sent directly to the Subcontracting Laboratory.

Workorder: 50259885 Workorder Name: Muskegon Site

State Of Origin: MI

Cert. Needed:  Yes

No

Owner Received Date: 6/15/2020 Results Requested By: 7/8/2020

Report To		Subcontract To		Requested Analysis																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Melanie Booms Pace Analytical Grand Rapids 5560 Corporate Exchange Ct. SE Grand Rapids, MI 49512 Phone (616)975-4500																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	HNO3	CK	10	11	12	13	14	15					16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996



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www.pacealabs.com

**Ship To:**

Sending Region IR50-Indianapolis  
Receiving Region IR850-Pace National  
State of Sample Origin MI

All questions should be addressed to sending project manager.

Requested Reportable Units \_\_\_\_\_

Report Wet or Dry Weight?  Dry Weight  Cert. Needed

WORK REQUESTED			
Method Description	Container Type	Quantity of containers	Preservative
Rad 226 - SIM7500 Ra B	BP1N		HNO3
Rad 228 EPA 904 GPC	BP1N		HNO3
	<b>TOTAL</b>		<b>TOTAL</b>

Special Requirements:

Receiving Region Department	Acctg. Code	Totals from above	Receiving Region (80%)	Revenue Allocation
Radiochemistry	38	\$300.00	\$240.00	Client Services Dept. \$360.00
* Custom Revenue Allocation	<b>TOTAL</b>	<b>\$300.00</b>	<b>\$240.00</b>	<b>\$360.00</b>

**FOR ANALYTICAL WORK COMPLETED THIS SECTION ALSO**

Chain of Custody included:  Yes  No  
 Matrix:  Drinking Water  Soil  Water  Air  Other (Identify) \_\_\_\_\_

**CONFIRMATION OF WORK COMPLETED**

Date Completed: \_\_\_\_\_ Receiving Project Manager: \_\_\_\_\_

**DISPOSITION of FORM**

Original sent to the receiving lab - Copy kept at the sending lab.

When work completed: Original sent to the ABM at the receiving laboratory. Copies are made to corporate as needed.

**INTER-LABORATORY WORK ORDER # 50259885**

(To be completed by sending lab)

Sending Project No	50259885
Receiving Project No:	
Check Box for Consolidated invoice:	<input type="checkbox"/>
Date Prepared:	06/16/20
<b>REQUESTED COMPLETION DATE: 7/8/2020</b>	





## Sample Conditions Upon Receipt Form (SCUR)

Pace Analytical Inc.  
www.paceanalytical.com

<b>WO# : 50259885</b>					
Date/Time:	2015-20	Evaluated by:	SM	PM:	MSB
Client:	<u>GR-HDR</u>			Due Date:	07/08/20
Project Manager:	<u>BSB</u>	Profile ID:	<u>9219</u>	CLIENT:	GR-HDR
Rush TAT Requested:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	Due Date:		
Lab Notified of Rush or Short Holds:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	Non Conformance Form Required:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
Samples Received Via:	FedEx	UPS	<input checked="" type="checkbox"/> Client	Pace Courier	Other: _____
Comments:					
Custody Seals Present and Intact:					
Received Sample Information Form(s): Drinking Waters Only					
USDA Regulated Soils: (AL, AR, CA, FL, GA, ID, LA, MS, NM, NY, NC, OK, OR, SC, TN, TX, WA or Puerto Rico)					
Short Holds Present (< 72 Hours):					
Samples Received in Hold:					
Custody Signatures Present:					
Collector Signature Present:					
Packing Material Used:					
Samples Collected Today and On Ice:					
IR Gun #:	<u>280</u>	<u>281</u>	Digital Thermometer #:		
Ice Type:	<u>WET</u>	<u>Bagged / WET Loose</u>	BLUE	NONE	282      283
Ice Location:	<u>TOP</u>	<u>BOTTOM</u>	<u>MIDDLE</u>	<u>DISPERSED</u>	1. Cooler Temp Upon Receipt: <u>5.9</u> / <u>5.3</u> °C
Temp should be 0-6°C (Initial/Corrected)					
Temp Blank Received:	<input checked="" type="checkbox"/> YES      NO				
Containers Intact:	<input checked="" type="checkbox"/> YES      NO				
Correct Containers:	<input checked="" type="checkbox"/> YES      NO				
Sufficient Volume:	<input checked="" type="checkbox"/> YES      NO				
Sample pH Acceptable: All containers needing preservation are found to be in compliance with EPA recommendation Exceptions are VOA, coliform, LLHg, O&G, or any container with a septum cap or preserved with HCl					
Residual Chlorine Absent: (SVOC/Pest 625, PCB 608, Total/Amenable/Available Cyanide)					
VOA Headspace Acceptable (<6mm):					
Trip Blank Received:	HCl	MeOH	TSP	OTHER	<input checked="" type="checkbox"/> YES      NO
Comments:					
2. Cooler Temp Upon Receipt: _____ °C					
3. Cooler Temp Upon Receipt: _____ °C					
4. Cooler Temp Upon Receipt: _____ °C					

Pace Analytical National Center for Testing & Innovation  
 Cooler Receipt Form

Client:	PAC EGRM5	1230038	
Cooler Received/Opened On:	6/17/20	Temperature:	14.7
Received By:	Carol Kemp		
Signature:	Carol Kemp		
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?		/	
COC Signed / Accurate?		/	
Bottles arrive intact?		/	
Correct bottles used?		/	
Sufficient volume sent?		/	
If Applicable			
VOA Zero headspace?		/	
Preservation Correct / Checked?			

Trace Analytical Laboratories, Inc.  
2241 Black Creek Road  
Muskegon, MI 49444-2673



231-773-5998 Phone  
888-979-4469 Fax  
[www.trace-labs.com](http://www.trace-labs.com)

November 10, 2020

Ms. Molly Reeves  
HDR Michigan Inc.  
5405 Data Court  
Ann Arbor, MI 48108

Phone: (734) 263-7138

RE: Trace Project 20J0991  
Client Project BC Cobb

Dear Ms. Reeves:

Enclosed are your analytical results. The results of this report relate only to the samples listed in the body of this report.

All reports were examined through Trace's validation process to ensure that requirements for quality and completeness were satisfied. All reported analytical results were obtained in accordance with the methods referenced on the reports. Every practical effort was made to meet the reporting limit specifications for this work, however, some results may have raised reporting limits to correct for percent solids.

For clients that require NELAP Accreditation, Trace certifies that these test results meet all requirements of the NELAP Standard, except for those analytes with a "N" notation. These analytes have not been evaluated by NELAP at Trace's discretion and will not be reported unless requested by client.

If you have questions concerning this report, please contact me at 231.773.5998 or by email at [jmink@trace-labs.com](mailto:jmink@trace-labs.com).

Sincerely,

A handwritten signature in black ink that reads "Jon Mink".

Jon Mink  
Senior Project Manager  
Enclosures



NJDEP Accreditation No. MI008

This report shall not be reproduced, except in full, without the written consent of Trace Analytical Laboratories, Inc.

Trace Analytical Laboratories, Inc.  
2241 Black Creek Road  
Muskegon, MI 49444-2673



231-773-5998 Phone  
888-979-4469 Fax  
[www.trace-labs.com](http://www.trace-labs.com)

### SAMPLE SUMMARY

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID	Sample ID	Matrix	Collected By	Date Collected	Date Received
20J0991-01	MW-15002	Ground Water	at	10/26/20 14:30	10/28/20 13:03
20J0991-02	MW-15003	Ground Water	at	10/26/20 15:25	10/28/20 13:03
20J0991-03	MW-15004	Ground Water	at	10/26/20 16:16	10/28/20 13:03
20J0991-04	MW-15007	Ground Water	at	10/27/20 08:15	10/28/20 13:03
20J0991-05	MW-15008	Ground Water	at	10/27/20 09:30	10/28/20 13:03
20J0991-06	MW-15005	Ground Water	at	10/27/20 10:45	10/28/20 13:03
20J0991-07	MW-15006	Ground Water	at	10/27/20 11:40	10/28/20 13:03
20J0991-08	MW-15009	Ground Water	at	10/27/20 13:20	10/28/20 13:03
20J0991-09	MW-15010	Ground Water	at	10/27/20 14:25	10/28/20 13:03
20J0991-10	MW-15011	Ground Water	at	10/27/20 15:25	10/28/20 13:03
20J0991-11	MW-15011D	Ground Water	at	10/27/20 15:40	10/28/20 13:03
20J0991-12	MW-15014	Ground Water	at	10/28/20 08:40	10/28/20 13:03
20J0991-13	MW-15013	Ground Water	at	10/28/20 09:40	10/28/20 13:03
20J0991-14	MW-15022	Ground Water	at	10/28/20 10:50	10/28/20 13:03
20J0991-15	MW-15020	Ground Water	at	10/28/20 14:25	10/30/20 12:35
20J0991-16	MW-17005	Ground Water	at	10/28/20 15:20	10/30/20 12:35
20J0991-17	MW-17001R	Ground Water	at	10/29/20 08:25	10/30/20 12:35
20J0991-18	MW-15016R	Ground Water	at	10/29/20 09:00	10/30/20 12:35
20J0991-19	MW-15017	Ground Water	at	10/29/20 10:15	10/30/20 12:35
20J0991-20	MW-17002	Ground Water	at	10/29/20 10:50	10/30/20 12:35
20J0991-21	MW-17003	Ground Water	at	10/29/20 12:25	10/30/20 12:35
20J0991-22	MW-15018	Ground Water	at	10/29/20 13:05	10/30/20 12:35
20J0991-23	MW-17004	Ground Water	at	10/29/20 14:50	10/30/20 12:35
20J0991-24	MW-15019	Ground Water	at	10/29/20 15:30	10/30/20 12:35
20J0991-25	MW-15015R	Ground Water	at	10/30/20 08:15	10/30/20 12:35
20J0991-26	MW-15023	Ground Water	at	10/30/20 09:20	10/30/20 12:35
20J0991-27	MW-15021	Ground Water	at	10/30/20 10:55	10/30/20 12:35
20J0991-28	MW-17006	Ground Water	at	10/30/20 11:40	10/30/20 12:35

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## AN EXPLANATION OF TERMS AND SYMBOLS WHICH MAY OCCUR IN THIS REPORT

### DEFINITIONS

LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
DUP	Matrix Duplicate
RDL	Reporting Detection Limit
MCL	Maximum Contamination Limit
TIC	Tentatively Identified Compound
<, ND or U	Indicates the compound was analyzed for but not detected
*	Indicates a result that exceeds its associated MCL or Surrogate control limits
N	Indicates that the laboratory is not accredited by NELAP for this compound
NA	Indicates that the compound is not available.

NOTE: Samples for volatiles that have been extracted with a water miscible solvent were corrected for the total volume of the solvent/water mixture.

Solid matrices Method Blanks are at 100% solids as such results are the same wet or dry.

### DATA QUALIFIERS

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Trace ID: 20J0991-12

**Analysis: EPA 200.8 Rev. 5.4**

Beryllium	Note 402.5 : The reporting limit was raised due to a dilution required because of sample matrix interference with the internal standards.
Chromium	Note 402.5 : The reporting limit was raised due to a dilution required because of sample matrix interference with the internal standards.
Cobalt	Note 402.5 : The reporting limit was raised due to a dilution required because of sample matrix interference with the internal standards.

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Trace ID: 20J0991-23

**Analysis: EPA 200.8 Rev. 5.4**

Beryllium	Note 402.5 : The reporting limit was raised due to a dilution required because of sample matrix interference with the internal standards.
Chromium	Note 402.5 : The reporting limit was raised due to a dilution required because of sample matrix interference with the internal standards.
Cobalt	Note 402.5 : The reporting limit was raised due to a dilution required because of sample matrix interference with the internal standards.

---

Trace ID: 20J0991-25

**Analysis: EPA 200.8 Rev. 5.4**

Beryllium	Note 402.5 : The reporting limit was raised due to a dilution required because of sample matrix interference with the internal standards.
Chromium	Note 402.5 : The reporting limit was raised due to a dilution required because of sample matrix interference with the internal standards.

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**Cobalt**

Note 402.5 : The reporting limit was raised due to a dilution required because of sample matrix interference with the internal standards.

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Trace ID: T104100-MS1

**Analysis: EPA 200.7 Rev. 4.4****Calcium**

Note 243 : The MS recovery was out of control. Because the background concentration of this analyte is greater than four times the spike amount, no data require qualification.

---

Trace ID: T104101-MS1

**Analysis: EPA 200.7 Rev. 4.4****Calcium**

Note 243 : The MS recovery was out of control. Because the background concentration of this analyte is greater than four times the spike amount, no data require qualification.

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**Analysis: EPA 200.8 Rev. 5.4****Thallium**

Note 240 : The MS recovery was out of control high. The result for this analyte, in the non-spiked version of the sample, must be considered estimated.

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Trace ID: T104149-DUP1

**Analysis: SM 2540 C-11****Total Dissolved Solids**

Note 623 : The relative percent difference between the sample and sample duplicate is out of control. The sample result should be considered estimated.

---

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-01 Matrix: Ground Water Date Collected: 10/26/20 14:30  
Sample ID: MW-15002 Date Received: 10/28/20 13:03 Field pH: 7.50

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.27 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	85 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	0.0043 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.066 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00032 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.71 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	34 mg/L	0.50	5	10/29/20	cm	10/29/20	cm
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-01 Matrix: Ground Water Date Collected: 10/26/20 14:30  
Sample ID: MW-15002 Date Received: 10/28/20 13:03 Field pH: 7.50

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	510 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-02 Matrix: Ground Water Date Collected: 10/26/20 15:25  
Sample ID: MW-15003 Date Received: 10/28/20 13:03 Field pH: 7.44

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.31 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	140 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.0042 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.097 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00052 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.38 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	480 mg/L	5.0	50	10/29/20	cm	10/30/20	cm
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-02 Matrix: Ground Water Date Collected: 10/26/20 15:25  
Sample ID: MW-15003 Date Received: 10/28/20 13:03 Field pH: 7.44

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	1400 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-03 Matrix: Ground Water Date Collected: 10/26/20 16:16  
Sample ID: MW-15004 Date Received: 10/28/20 13:03 Field pH: 7.13

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.20 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	70 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	0.0017 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.0046 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.046 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00049 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.69 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	110 mg/L	2.5	25	10/29/20	cm	10/30/20	cm
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-03 Matrix: Ground Water Date Collected: 10/26/20 16:16  
Sample ID: MW-15004 Date Received: 10/28/20 13:03 Field pH: 7.13

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	620 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-04 Matrix: Ground Water Date Collected: 10/27/20 08:15  
Sample ID: MW-15007 Date Received: 10/28/20 13:03 Field pH: 7.02

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.12 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	63 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	0.0014 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.0031 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.064 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00073 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	0.0053 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.49 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	500 mg/L	10	100	10/29/20	cm	10/30/20	cm
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-04 Matrix: Ground Water Date Collected: 10/27/20 08:15  
Sample ID: MW-15007 Date Received: 10/28/20 13:03 Field pH: 7.02

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	1200 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-05 Matrix: Ground Water Date Collected: 10/27/20 09:30  
Sample ID: MW-15008 Date Received: 10/28/20 13:03 Field pH: 7.72

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.13 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	78 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	0.0094 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.018 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.060 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.21 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	45 mg/L	0.50	5	10/29/20	cm	10/29/20	cm
Sulfate as SO <sub>4</sub>	57 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-05 Matrix: Ground Water Date Collected: 10/27/20 09:30  
Sample ID: MW-15008 Date Received: 10/28/20 13:03 Field pH: 7.72

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	420 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-06 Matrix: Ground Water Date Collected: 10/27/20 10:45  
Sample ID: MW-15005 Date Received: 10/28/20 13:03 Field pH: 7.56

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.022 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	58 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.0024 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.15 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00051 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	0.0016 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	0.0017 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	<0.10 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	3.6 mg/L	0.50	5	10/29/20	cm	10/29/20	cm
Sulfate as SO <sub>4</sub>	5.5 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-06 Matrix: Ground Water Date Collected: 10/27/20 10:45  
Sample ID: MW-15005 Date Received: 10/28/20 13:03 Field pH: 7.56

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	290 mg/L	40	4	10/29/20	ans	10/29/20	ans
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Analysis Method: SM 2540 D-11

Batch: T104027

Total Suspended Solids	16 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-07 Matrix: Ground Water Date Collected: 10/27/20 11:40  
Sample ID: MW-15006 Date Received: 10/28/20 13:03 Field pH: 7.53

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.051 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	60 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	0.0018 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	0.00065 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.0085 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.034 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	0.00054 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	0.0097 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	0.00055 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.32 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	200 mg/L	2.5	25	10/29/20	cm	10/30/20	cm
Sulfate as SO <sub>4</sub>	25 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-07 Matrix: Ground Water Date Collected: 10/27/20 11:40  
Sample ID: MW-15006 Date Received: 10/28/20 13:03 Field pH: 7.53

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	760 mg/L	40	4	10/29/20	ans	10/29/20	ans
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Analysis Method: SM 2540 D-11

Batch: T104027

Total Suspended Solids	4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-08 Matrix: Ground Water Date Collected: 10/27/20 13:20  
Sample ID: MW-15009 Date Received: 10/28/20 13:03 Field pH: 8.32

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	1.1 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	74 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	0.046 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.0010 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.055 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	<0.10 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	55 mg/L	1.0	10	10/29/20	cm	10/30/20	cm
Sulfate as SO <sub>4</sub>	12 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-08 Matrix: Ground Water Date Collected: 10/27/20 13:20  
Sample ID: MW-15009 Date Received: 10/28/20 13:03 Field pH: 8.32

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	500 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-09 Matrix: Ground Water Date Collected: 10/27/20 14:25  
Sample ID: MW-15010 Date Received: 10/28/20 13:03 Field pH: 7.39

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.51 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	78 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	0.028 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.039 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	0.0016 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.38 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	35 mg/L	0.50	5	10/29/20	cm	10/29/20	cm
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-09 Matrix: Ground Water Date Collected: 10/27/20 14:25  
Sample ID: MW-15010 Date Received: 10/28/20 13:03 Field pH: 7.39

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	520 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-10 Matrix: Ground Water Date Collected: 10/27/20 15:25  
Sample ID: MW-15011 Date Received: 10/28/20 13:03 Field pH: 8.34

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	1.5 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	120 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.024 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.074 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	0.0014 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.25 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	42 mg/L	0.50	5	10/29/20	cm	10/29/20	cm
Sulfate as SO <sub>4</sub>	81 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-10 Matrix: Ground Water Date Collected: 10/27/20 15:25  
Sample ID: MW-15011 Date Received: 10/28/20 13:03 Field pH: 8.34

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	610 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-11 Matrix: Ground Water Date Collected: 10/27/20 15:40  
Sample ID: MW-15011D Date Received: 10/28/20 13:03 Field pH: 8.34

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	1.4 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	120 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.023 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.072 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	0.0013 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.24 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	43 mg/L	0.50	5	10/29/20	cm	10/29/20	cm
Sulfate as SO <sub>4</sub>	83 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-11 Matrix: Ground Water Date Collected: 10/27/20 15:40  
Sample ID: MW-15011D Date Received: 10/28/20 13:03 Field pH: 8.34

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	600 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-12 Matrix: Ground Water Date Collected: 10/28/20 08:40  
Sample ID: MW-15014 Date Received: 10/28/20 13:03 Field pH: 11.11

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	1.0 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	350 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.035 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.0021 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.48 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00050 mg/L	0.00050	2	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	<0.00050 mg/L	0.00050	2	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.0010 mg/L	0.0010	2	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	0.044 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	0.00065 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.33 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	24 mg/L	0.50	5	10/29/20	cm	10/29/20	cm
Sulfate as SO <sub>4</sub>	870 mg/L	30	50	10/29/20	cm	10/30/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-12 Matrix: Ground Water Date Collected: 10/28/20 08:40  
Sample ID: MW-15014 Date Received: 10/28/20 13:03 Field pH: 11.11

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	1600 mg/L	40	4	10/29/20	ans	10/29/20	ans
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Analysis Method: SM 2540 D-11

Batch: T104027

Total Suspended Solids	5.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-13 Matrix: Ground Water Date Collected: 10/28/20 09:40  
Sample ID: MW-15013 Date Received: 10/28/20 13:03 Field pH: 7.52

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	1.1 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	52 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	0.024 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.048 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	0.0037 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.49 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	24 mg/L	0.50	5	10/29/20	cm	10/29/20	cm
Sulfate as SO <sub>4</sub>	5.9 mg/L	3.0	5	10/29/20	cm	10/29/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-13 Matrix: Ground Water Date Collected: 10/28/20 09:40  
Sample ID: MW-15013 Date Received: 10/28/20 13:03 Field pH: 7.52

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	<40 mg/L	40	4	10/29/20	ans	10/29/20	ans
<b>Total Dissolved Solids</b>	<b>310 mg/L</b>	<b>40</b>	<b>4</b>	<b>11/04/20</b>	<b>cm</b>	<b>11/04/20</b>	<b>cm</b>

### Analysis Method: SM 2540 D-11

Batch: T104027

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-14 Matrix: Ground Water Date Collected: 10/28/20 10:50  
Sample ID: MW-15022 Date Received: 10/28/20 13:03 Field pH: 7.37

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	8.6 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	180 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.020 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.29 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104020

Fluoride	0.44 mg/L	0.10	5	10/29/20	cm	10/29/20	cm
Chloride	42 mg/L	0.50	5	10/29/20	cm	10/29/20	cm
Sulfate as SO <sub>4</sub>	700 mg/L	30	50	10/29/20	cm	10/30/20	cm

Analysis Method: SM 2540 C-11

Batch: T104031

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-14 Matrix: Ground Water Date Collected: 10/28/20 10:50  
Sample ID: MW-15022 Date Received: 10/28/20 13:03 Field pH: 7.37

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	1200 mg/L	40	4	10/29/20	ans	10/29/20	ans
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**Analysis Method: SM 2540 D-11**

*Batch: T104027*

Total Suspended Solids	<4.0 mg/L	4.0	1	10/29/20	ans	10/29/20	ans
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-15 Matrix: Ground Water Date Collected: 10/28/20 14:25  
Sample ID: MW-15020 Date Received: 10/30/20 12:35 Field pH: 6.73

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.90 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	110 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.0053 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.36 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00049 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	<0.10 mg/L	0.10	5	10/30/20	cm	10/30/20	cm
Chloride	140 mg/L	2.5	25	10/30/20	cm	11/02/20	cm
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/30/20	cm	10/30/20	cm

Analysis Method: SM 2540 C-11

Batch: T104149

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-15 Matrix: Ground Water Date Collected: 10/28/20 14:25  
Sample ID: MW-15020 Date Received: 10/30/20 12:35 Field pH: 6.73

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	680 mg/L	40	4	11/03/20	cm	11/03/20	cm
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Analysis Method: SM 2540 D-11

Batch: T104120

Total Suspended Solids	78 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-16 Matrix: Ground Water Date Collected: 10/28/20 15:20  
Sample ID: MW-17005 Date Received: 10/30/20 12:35 Field pH: 7.44

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.43 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	76 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc
Lithium	0.013 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.17 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00044 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	0.12 mg/L	0.10	5	10/30/20	cm	10/30/20	cm
Chloride	22 mg/L	0.50	5	10/30/20	cm	10/30/20	cm
Sulfate as SO <sub>4</sub>	6.1 mg/L	3.0	5	10/30/20	cm	10/30/20	cm

Analysis Method: SM 2540 C-11

Batch: T104149

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-16 Matrix: Ground Water Date Collected: 10/28/20 15:20  
Sample ID: MW-17005 Date Received: 10/30/20 12:35 Field pH: 7.44

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	340 mg/L	40	4	11/03/20	cm	11/03/20	cm
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Analysis Method: SM 2540 D-11

Batch: T104120

Total Suspended Solids	<8.0 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-17 Matrix: Ground Water Date Collected: 10/29/20 08:25  
Sample ID: MW-17001R Date Received: 10/30/20 12:35 Field pH: 6.98

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	2.1 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	160 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.093 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.00071 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.10 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	0.12 mg/L	0.10	5	10/30/20	cm	10/30/20	cm
Chloride	21 mg/L	0.50	5	10/30/20	cm	10/30/20	cm
Sulfate as SO <sub>4</sub>	4.1 mg/L	3.0	5	10/30/20	cm	10/30/20	cm

Analysis Method: SM 2540 C-11

Batch: T104149

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-17 Matrix: Ground Water Date Collected: 10/29/20 08:25  
Sample ID: MW-17001R Date Received: 10/30/20 12:35 Field pH: 6.98

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	620 mg/L	40	4	11/03/20	cm	11/03/20	cm
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**Analysis Method: SM 2540 D-11**

*Batch: T104120*

Total Suspended Solids	<8.0 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-18 Matrix: Ground Water Date Collected: 10/29/20 09:00  
Sample ID: MW-15016R Date Received: 10/30/20 12:35 Field pH: 6.66

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.15 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	200 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.0050 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.0016 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.89 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00071 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	0.0010 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	<0.10 mg/L	0.10	5	10/30/20	cm	10/30/20	cm
Chloride	320 mg/L	5.0	50	10/30/20	cm	11/02/20	cm
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/30/20	cm	10/30/20	cm

Analysis Method: SM 2540 C-11

Batch: T104149

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-18 Matrix: Ground Water Date Collected: 10/29/20 09:00  
Sample ID: MW-15016R Date Received: 10/30/20 12:35 Field pH: 6.66

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	1200 mg/L	40	4	11/03/20	cm	11/03/20	cm
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Analysis Method: SM 2540 D-11

Batch: T104120

Total Suspended Solids	120 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-19 Matrix: Ground Water Date Collected: 10/29/20 10:15  
Sample ID: MW-15017 Date Received: 10/30/20 12:35 Field pH: 6.59

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	0.15 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	240 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.0035 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.0020 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	1.0 mg/L	0.025	10	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00082 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	0.00096 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	<0.10 mg/L	0.10	5	10/30/20	cm	10/30/20	cm
Chloride	230 mg/L	2.5	25	10/30/20	cm	11/02/20	cm
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/30/20	cm	10/30/20	cm

Analysis Method: SM 2540 C-11

Batch: T104149

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-19 Matrix: Ground Water Date Collected: 10/29/20 10:15  
Sample ID: MW-15017 Date Received: 10/30/20 12:35 Field pH: 6.59

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	1200 mg/L	40	4	11/03/20	cm	11/03/20	cm
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Analysis Method: SM 2540 D-11

Batch: T104120

Total Suspended Solids	150 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-20 Matrix: Ground Water Date Collected: 10/29/20 10:50  
Sample ID: MW-17002 Date Received: 10/30/20 12:35 Field pH: 7.57

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104157

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/07/20	ckd	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104100

Boron	16 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc
Calcium	220 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc
Lithium	0.14 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104100

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Arsenic	0.0014 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Barium	0.071 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Chromium	0.00040 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd
Molybdenum	0.0035 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	0.24 mg/L	0.10	5	10/30/20	cm	10/30/20	cm
Chloride	3.9 mg/L	0.50	5	10/30/20	cm	10/30/20	cm
Sulfate as SO <sub>4</sub>	280 mg/L	15	25	10/30/20	cm	11/02/20	cm

Analysis Method: SM 2540 C-11

Batch: T104149

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-20 Matrix: Ground Water Date Collected: 10/29/20 10:50  
Sample ID: MW-17002 Date Received: 10/30/20 12:35 Field pH: 7.57

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	860 mg/L	40	4	11/03/20	cm	11/03/20	cm
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**Analysis Method: SM 2540 D-11**

*Batch: T104120*

Total Suspended Solids	<8.0 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-21 Matrix: Ground Water Date Collected: 10/29/20 12:25  
Sample ID: MW-17003 Date Received: 10/30/20 12:35 Field pH: 7.44

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104158

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/05/20	dc	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104101

Boron	0.48 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc	
Calcium	86 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc	
Lithium	0.020 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc	N

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104101

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Arsenic	0.0079 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Barium	0.12 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd	
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd	
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Molybdenum	0.0076 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd	N
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd	
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd	

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	<0.10 mg/L	0.10	5	10/30/20	cm	10/30/20	cm	
Chloride	11 mg/L	0.50	5	10/30/20	cm	10/30/20	cm	
Sulfate as SO <sub>4</sub>	52 mg/L	3.0	5	10/30/20	cm	10/30/20	cm	

Analysis Method: SM 2540 C-11

Batch: T104149

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-21 Matrix: Ground Water Date Collected: 10/29/20 12:25  
Sample ID: MW-17003 Date Received: 10/30/20 12:35 Field pH: 7.44

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	400 mg/L	40	4	11/03/20	cm	11/03/20	cm
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**Analysis Method: SM 2540 D-11**

*Batch: T104120*

Total Suspended Solids	<8.0 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-22 Matrix: Ground Water Date Collected: 10/29/20 13:05  
Sample ID: MW-15018 Date Received: 10/30/20 12:35 Field pH: 7.37

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104158

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/05/20	dc	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104101

Boron	0.64 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc	
Calcium	110 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc	
Lithium	0.033 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc	N

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104101

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Barium	0.24 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd	
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Chromium	0.00029 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd	
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd	N
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd	
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd	

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	0.15 mg/L	0.10	5	10/30/20	cm	10/30/20	cm	
Chloride	65 mg/L	1.0	10	10/30/20	cm	11/02/20	cm	
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/30/20	cm	10/30/20	cm	

Analysis Method: SM 2540 C-11

Batch: T104149

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-22 Matrix: Ground Water Date Collected: 10/29/20 13:05  
Sample ID: MW-15018 Date Received: 10/30/20 12:35 Field pH: 7.37

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	490 mg/L	40	4	11/03/20	cm	11/03/20	cm
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Analysis Method: SM 2540 D-11

Batch: T104120

Total Suspended Solids	32 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-23 Matrix: Ground Water Date Collected: 10/29/20 14:50  
Sample ID: MW-17004 Date Received: 10/30/20 12:35 Field pH: 7.68

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104158

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/05/20	dc	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104101

Boron	0.83 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc	
Calcium	150 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc	
Lithium	0.013 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc	N

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104101

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Arsenic	0.00065 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Barium	0.37 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd	
Beryllium	<0.00050 mg/L	0.00050	2	11/03/20	dlo	11/05/20	ckd	402.5
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Chromium	<0.00050 mg/L	0.00050	2	11/03/20	dlo	11/05/20	ckd	402.5
Cobalt	<0.0010 mg/L	0.0010	2	11/03/20	dlo	11/05/20	ckd	402.5
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd	
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd	
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd	

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	0.12 mg/L	0.10	5	10/30/20	cm	10/30/20	cm	
Chloride	5.1 mg/L	0.50	5	10/30/20	cm	10/30/20	cm	
Sulfate as SO <sub>4</sub>	220 mg/L	15	25	10/30/20	cm	11/02/20	cm	

Analysis Method: SM 2540 C-11

Batch: T104149

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-23 Matrix: Ground Water Date Collected: 10/29/20 14:50  
Sample ID: MW-17004 Date Received: 10/30/20 12:35 Field pH: 7.68

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	620 mg/L	40	4	11/03/20	cm	11/03/20	cm
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**Analysis Method: SM 2540 D-11**

*Batch: T104120*

Total Suspended Solids	<8.0 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-24 Matrix: Ground Water Date Collected: 10/29/20 15:30  
Sample ID: MW-15019 Date Received: 10/30/20 12:35 Field pH: 6.94

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104158

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/05/20	dc	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104101

Boron	0.73 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc	
Calcium	110 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc	
Lithium	0.0054 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc	N

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104101

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Barium	0.34 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd	
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Chromium	0.00053 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cobalt	0.00064 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd	
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd	N
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd	
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd	

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	<0.10 mg/L	0.10	5	10/30/20	cm	10/30/20	cm	
Chloride	94 mg/L	2.5	25	10/30/20	cm	11/02/20	cm	
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/30/20	cm	10/30/20	cm	

Analysis Method: SM 2540 C-11

Batch: T104170

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-24 Matrix: Ground Water Date Collected: 10/29/20 15:30  
Sample ID: MW-15019 Date Received: 10/30/20 12:35 Field pH: 6.94

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	600 mg/L	40	4	11/03/20	cm	11/03/20	cm
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Analysis Method: SM 2540 D-11

Batch: T104120

Total Suspended Solids	66 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-25 Matrix: Ground Water Date Collected: 10/30/20 08:15  
Sample ID: MW-15015R Date Received: 10/30/20 12:35 Field pH: 7.89

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104158

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/06/20	dc	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104101

Boron	0.87 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc	
Calcium	240 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc	
Lithium	0.027 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc	N

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104101

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Arsenic	0.012 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Barium	0.14 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd	
Beryllium	<0.00050 mg/L	0.00050	2	11/03/20	dlo	11/05/20	ckd	402.5
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Chromium	<0.00050 mg/L	0.00050	2	11/03/20	dlo	11/05/20	ckd	402.5
Cobalt	<0.0010 mg/L	0.0010	2	11/03/20	dlo	11/05/20	ckd	402.5
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Molybdenum	0.018 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd	N
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd	
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd	

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	0.14 mg/L	0.10	5	10/30/20	cm	10/30/20	cm	
Chloride	20 mg/L	0.50	5	10/30/20	cm	10/30/20	cm	
Sulfate as SO <sub>4</sub>	670 mg/L	30	50	10/30/20	cm	11/02/20	cm	

Analysis Method: SM 2540 C-11

Batch: T104170

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-25 Matrix: Ground Water Date Collected: 10/30/20 08:15  
Sample ID: MW-15015R Date Received: 10/30/20 12:35 Field pH: 7.89

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	1200 mg/L	40	4	11/03/20	cm	11/03/20	cm
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**Analysis Method: SM 2540 D-11**

*Batch: T104120*

Total Suspended Solids	<8.0 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-26 Matrix: Ground Water Date Collected: 10/30/20 09:20  
Sample ID: MW-15023 Date Received: 10/30/20 12:35 Field pH: 7.68

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104158

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/06/20	dc	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104101

Boron	0.61 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc	
Calcium	73 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc	
Lithium	0.013 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc	N

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104101

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Arsenic	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Barium	0.070 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd	
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd	
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Molybdenum	0.0059 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd	N
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd	
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd	

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	0.12 mg/L	0.10	5	10/30/20	cm	10/30/20	cm	
Chloride	12 mg/L	0.50	5	10/30/20	cm	10/30/20	cm	
Sulfate as SO <sub>4</sub>	130 mg/L	6.0	10	10/30/20	cm	11/02/20	cm	

Analysis Method: SM 2540 C-11

Batch: T104170

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-26 Matrix: Ground Water Date Collected: 10/30/20 09:20  
Sample ID: MW-15023 Date Received: 10/30/20 12:35 Field pH: 7.68

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	340 mg/L	40	4	11/03/20	cm	11/03/20	cm
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**Analysis Method: SM 2540 D-11**

*Batch: T104120*

Total Suspended Solids	<4.0 mg/L	4.0	1	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-27 Matrix: Ground Water Date Collected: 10/30/20 10:55  
Sample ID: MW-15021 Date Received: 10/30/20 12:35 Field pH: 6.94

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104158

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/06/20	dc	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104101

Boron	0.54 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc	
Calcium	92 mg/L	0.26	1	11/03/20	dlo	11/05/20	dc	
Lithium	0.0021 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc	N

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104101

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Arsenic	0.00073 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Barium	0.28 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd	
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Chromium	0.00072 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd	
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd	
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd	
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd	

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	<0.10 mg/L	0.10	5	10/30/20	cm	10/30/20	cm	
Chloride	150 mg/L	2.5	25	10/30/20	cm	11/02/20	cm	
Sulfate as SO <sub>4</sub>	<3.0 mg/L	3.0	5	10/30/20	cm	10/30/20	cm	

Analysis Method: SM 2540 C-11

Batch: T104170

### CERTIFICATE OF ANALYSIS

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Trace Analytical Laboratories, Inc.  
2241 Black Creek Road  
Muskegon, MI 49444-2673



231-773-5998 Phone  
888-979-4469 Fax  
[www.trace-labs.com](http://www.trace-labs.com)

## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

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Trace ID: 20J0991-27 Matrix: Ground Water Date Collected: 10/30/20 10:55  
Sample ID: MW-15021 Date Received: 10/30/20 12:35 Field pH: 6.94

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	660 mg/L	40	4	11/03/20	cm	11/03/20	cm
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Analysis Method: SM 2540 D-11

Batch: T104120

Total Suspended Solids	32 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

Trace ID: 20J0991-28 Matrix: Ground Water Date Collected: 10/30/20 11:40  
Sample ID: MW-17006 Date Received: 10/30/20 12:35 Field pH: 7.02

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### METALS, TOTAL

Analysis Method: EPA 7470A

Batch: T104158

Mercury	<0.00020 mg/L	0.00020	1	11/05/20	dlo	11/06/20	dc	N
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### METALS, TOTAL

Analysis Method: EPA 200.7 Rev. 4.4

Batch: T104101

Boron	0.98 mg/L	0.0088	1	11/03/20	dlo	11/05/20	dc	
Calcium	220 mg/L	2.6	10	11/03/20	dlo	11/05/20	dc	
Lithium	0.057 mg/L	0.0012	1	11/03/20	dlo	11/05/20	dc	N

Analysis Method: EPA 200.8 Rev. 5.4

Batch: T104101

Antimony	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Arsenic	0.00065 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Barium	0.19 mg/L	0.0025	1	11/03/20	dlo	11/05/20	ckd	
Beryllium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cadmium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Chromium	<0.00025 mg/L	0.00025	1	11/03/20	dlo	11/05/20	ckd	
Cobalt	<0.00052 mg/L	0.00052	1	11/03/20	dlo	11/05/20	ckd	
Lead	<0.00055 mg/L	0.00055	1	11/03/20	dlo	11/05/20	ckd	
Molybdenum	<0.0012 mg/L	0.0012	1	11/03/20	dlo	11/05/20	ckd	N
Selenium	<0.00050 mg/L	0.00050	1	11/03/20	dlo	11/05/20	ckd	
Thallium	<0.00038 mg/L	0.00038	1	11/03/20	dlo	11/05/20	ckd	

### WET CHEMISTRY

Analysis Method: EPA 300.0 Rev. 2.1

Batch: T104069

Fluoride	0.13 mg/L	0.10	5	10/30/20	cm	10/30/20	cm
Chloride	19 mg/L	0.50	5	10/30/20	cm	10/30/20	cm
Sulfate as SO <sub>4</sub>	340 mg/L	15	25	10/30/20	cm	11/02/20	cm

Analysis Method: SM 2540 C-11

Batch: T104170

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## ANALYTICAL RESULTS

Trace Project ID: 20J0991  
Client Project ID: BC Cobb

---

Trace ID: 20J0991-28 Matrix: Ground Water Date Collected: 10/30/20 11:40  
Sample ID: MW-17006 Date Received: 10/30/20 12:35 Field pH: 7.02

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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### WET CHEMISTRY

Total Dissolved Solids	940 mg/L	40	4	11/03/20	cm	11/03/20	cm
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**Analysis Method: SM 2540 D-11**

*Batch: T104120*

Total Suspended Solids	<8.0 mg/L	8.0	2	11/02/20	cm	11/02/20	cm
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## CERTIFICATE OF ANALYSIS

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## LABORATORY REPORT

If you have any questions concerning this report, please do not hesitate to call us at (800) 332-4345 or (574) 233-4777.

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## STATE CERTIFICATION LIST

<b>State</b>	<b>Certification</b>	<b>State</b>	<b>Certification</b>
Alabama	40700	Missouri	880
Alaska	IN00035	Montana	CERT0026
Arizona	AZ0432	Nebraska	NE-OS-05-04
Arkansas	IN00035	Nevada	IN00035
California	2920	New Hampshire*	2124
Colorado	IN00035	New Jersey*	IN598
Colorado Radiochemistry	IN00035	New Mexico	IN00035
Connecticut	PH-0132	New York*	11398
Delaware	IN035	North Carolina	18700
Florida(Primary AB)*	E87775	North Dakota	R-035
Georgia	929	Ohio	87775
Hawaii	IN035	Oklahoma	D9508
Idaho	IN00035	Oregon*	4156
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Illinois Microbiology	17767	Puerto Rico	IN00035
Illinois Radiochemistry	IN00035	Rhode Island	LA000343
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Indiana Microbiology	M-76-07	South Dakota	IN00035
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Minnesota*	018-999-338	Wisconsin	999766900
Mississippi	IN035	Wyoming	IN035
EPA	IN00035		

\*NELAP/TNI Recognized Accreditation Bodies

110 South Hill Street  
 South Bend, IN 46617  
 Tel: (574) 233-4777  
 Fax: (574) 233-8207  
 1 800 332 4345

## Laboratory Report

Client:	Trace Analytical Laboratories	Report:	502624
Attn:	Jon Mink 2241 Black Creek Road Muskegon, MI 49444	Priority:	Standard Written
		Status:	Final
		PWS ID:	Not Supplied

Sample Information					
EEA ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
4764871	MW-15002	7500-Ra B	10/26/20 14:30	Client	11/02/20 09:00
4764871	MW-15002	7500-Ra D	10/26/20 14:30	Client	11/02/20 09:00
4764872	MW-15003	7500-Ra B	10/26/20 15:25	Client	11/02/20 09:00
4764872	MW-15003	7500-Ra D	10/26/20 15:25	Client	11/02/20 09:00
4764873	MW-15004	7500-Ra B	10/26/20 16:16	Client	11/02/20 09:00
4764873	MW-15004	7500-Ra D	10/26/20 16:16	Client	11/02/20 09:00
4764874	MW-15007	7500-Ra B	10/27/20 08:15	Client	11/02/20 09:00
4764874	MW-15007	7500-Ra D	10/27/20 08:15	Client	11/02/20 09:00
4764875	MW-15008	7500-Ra B	10/27/20 09:30	Client	11/02/20 09:00
4764875	MW-15008	7500-Ra D	10/27/20 09:30	Client	11/02/20 09:00
4764876	MW-15005	7500-Ra B	10/27/20 10:45	Client	11/02/20 09:00
4764876	MW-15005	7500-Ra D	10/27/20 10:45	Client	11/02/20 09:00
4764877	MW-15006	7500-Ra B	10/27/20 11:40	Client	11/02/20 09:00
4764877	MW-15006	7500-Ra D	10/27/20 11:40	Client	11/02/20 09:00
4764878	MW-15009	7500-Ra B	10/27/20 13:20	Client	11/02/20 09:00
4764878	MW-15009	7500-Ra D	10/27/20 13:20	Client	11/02/20 09:00
4764879	MW-15010	7500-Ra B	10/27/20 14:25	Client	11/02/20 09:00
4764879	MW-15010	7500-Ra D	10/27/20 14:25	Client	11/02/20 09:00
4764880	MW-15011	7500-Ra B	10/27/20 15:25	Client	11/02/20 09:00
4764880	MW-15011	7500-Ra D	10/27/20 15:25	Client	11/02/20 09:00
4764881	MW-15011D	7500-Ra B	10/27/20 15:40	Client	11/02/20 09:00
4764881	MW-15011D	7500-Ra D	10/27/20 15:40	Client	11/02/20 09:00
4764882	MW-15014	7500-Ra B	10/28/20 08:40	Client	11/02/20 09:00
4764882	MW-15014	7500-Ra D	10/28/20 08:40	Client	11/02/20 09:00
4764883	MW-15013	7500-Ra B	10/28/20 09:40	Client	11/02/20 09:00
4764883	MW-15013	7500-Ra D	10/28/20 09:40	Client	11/02/20 09:00
4764884	MW-15022	7500-Ra B	10/28/20 10:50	Client	11/02/20 09:00
4764884	MW-15022	7500-Ra D	10/28/20 10:50	Client	11/02/20 09:00
4764885	MW-15020	7500-Ra B	10/28/20 14:25	Client	11/02/20 09:00
4764885	MW-15020	7500-Ra D	10/28/20 14:25	Client	11/02/20 09:00
4764886	MW-17005	7500-Ra B	10/28/20 15:20	Client	11/02/20 09:00

4764886	MW-17005	7500-Ra D	10/28/20 15:20	Client	11/02/20 09:00
4764887	MW-17001R	7500-Ra B	10/29/20 08:25	Client	11/02/20 09:00
4764887	MW-17001R	7500-Ra D	10/29/20 08:25	Client	11/02/20 09:00
4764888	MW-15016R	7500-Ra B	10/29/20 09:00	Client	11/02/20 09:00
4764888	MW-15016R	7500-Ra D	10/29/20 09:00	Client	11/02/20 09:00
4764889	MW-15017	7500-Ra B	10/29/20 10:15	Client	11/02/20 09:00
4764889	MW-15017	7500-Ra D	10/29/20 10:15	Client	11/02/20 09:00
4764890	MW-17002	7500-Ra B	10/29/20 10:50	Client	11/02/20 09:00
4764890	MW-17002	7500-Ra D	10/29/20 10:50	Client	11/02/20 09:00
4764891	MW-17003	7500-Ra B	10/29/20 12:25	Client	11/02/20 09:00
4764891	MW-17003	7500-Ra D	10/29/20 12:25	Client	11/02/20 09:00
4764892	MW-15018	7500-Ra B	10/29/20 13:05	Client	11/02/20 09:00
4764892	MW-15018	7500-Ra D	10/29/20 13:05	Client	11/02/20 09:00
4764893	MW-17004	7500-Ra B	10/29/20 14:50	Client	11/02/20 09:00
4764893	MW-17004	7500-Ra D	10/29/20 14:50	Client	11/02/20 09:00
4764894	MW-15019	7500-Ra B	10/29/20 15:30	Client	11/02/20 09:00
4764894	MW-15019	7500-Ra D	10/29/20 15:30	Client	11/02/20 09:00
4764895	MW-15015R	7500-Ra B	10/30/20 08:15	Client	11/02/20 09:00
4764895	MW-15015R	7500-Ra D	10/30/20 08:15	Client	11/02/20 09:00
4764896	MW-15023	7500-Ra B	10/30/20 09:20	Client	11/02/20 09:00
4764896	MW-15023	7500-Ra D	10/30/20 09:20	Client	11/02/20 09:00
4764897	MW-15021	7500-Ra B	10/30/20 10:55	Client	11/02/20 09:00
4764897	MW-15021	7500-Ra D	10/30/20 10:55	Client	11/02/20 09:00
4764898	MW-17006	7500-Ra B	10/30/20 11:40	Client	11/02/20 09:00
4764898	MW-17006	7500-Ra D	10/30/20 11:40	Client	11/02/20 09:00

**Report Summary**

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call Karen Fullmer at (574) 233-4777.

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Authorized Signature

Title

12/01/2020

Client Name: Trace Analytical Laboratories

Report #: 502624

Sampling Point: MW-15002

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.48	1.0	0.31 ± 0.43	pCi/L	11/04/20 11:20	11/12/20 14:10	4764871
15262-20-1	Radium-228	7500-Ra D	---	0.56	1.00	-0.04 ± 0.53	pCi/L	11/04/20 11:20	11/11/20 14:57	4764871
---	Combined Radium	calc.	5 *	0.56	1.0	< 0.56	pCi/L	11/04/20 11:20	11/12/20 14:10	4764871

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15003

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.42	1.0	0.47 ± 0.43	pCi/L	11/04/20 11:20	11/12/20 14:10	4764872
15262-20-1	Radium-228	7500-Ra D	---	0.46	1.0	0.56 ± 0.46	pCi/L	11/04/20 11:20	11/11/20 14:57	4764872
---	Combined Radium	calc.	5 *	0.46	1.0	1.03 ± 0.63	pCi/L	11/04/20 11:20	11/12/20 14:10	4764872

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15004

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.39	1.00	0.08 ± 0.28	pCi/L	11/04/20 11:20	11/12/20 14:10	4764873
15262-20-1	Radium-228	7500-Ra D	---	0.48	1.0	0.55 ± 0.49	pCi/L	11/20/20 11:26	11/25/20 16:03	4764873
---	Combined Radium	calc.	5 *	0.48	1.00	0.63 ± 0.56	pCi/L	11/04/20 11:20	11/25/20 16:03	4764873

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15007

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.43	1.0	0.46 ± 0.44	pCi/L	11/04/20 11:20	11/12/20 14:10	4764874
15262-20-1	Radium-228	7500-Ra D	---	0.47	1.0	0.94 ± 0.49	pCi/L	11/04/20 11:20	11/11/20 14:57	4764874
---	Combined Radium	calc.	5 *	0.47	1.0	1.40 ± 0.66	pCi/L	11/04/20 11:20	11/12/20 14:10	4764874

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15008

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.41	1.00	-0.02 ± 0.24	pCi/L	11/04/20 11:20	11/12/20 14:10	4764875
15262-20-1	Radium-228	7500-Ra D	---	0.50	1.0	0.20 ± 0.49	pCi/L	11/04/20 11:20	11/11/20 14:57	4764875
---	Combined Radium	calc.	5 *	0.50	1.00	< 0.50	pCi/L	11/04/20 11:20	11/12/20 14:10	4764875

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15005

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.39	1.0	0.33 ± 0.37	pCi/L	11/04/20 11:20	11/12/20 14:10	4764876
15262-20-1	Radium-228	7500-Ra D	---	0.56	1.00	0.02 ± 0.53	pCi/L	11/04/20 11:20	11/11/20 14:57	4764876
---	Combined Radium	calc.	5 *	0.56	1.0	< 0.56	pCi/L	11/04/20 11:20	11/12/20 14:10	4764876

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15006

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.33	1.0	0.21 ± 0.28	pCi/L	11/04/20 11:20	11/12/20 14:10	4764877
15262-20-1	Radium-228	7500-Ra D	---	0.45	1.0	0.39 ± 0.45	pCi/L	11/04/20 11:20	11/11/20 14:57	4764877
---	Combined Radium	calc.	5 *	0.45	1.0	<b>0.60 ± 0.53</b>	pCi/L	11/04/20 11:20	11/12/20 14:10	4764877

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15009

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.25	1.00	0.05 ± 0.16	pCi/L	11/04/20 11:20	11/12/20 14:13	4764878
15262-20-1	Radium-228	7500-Ra D	---	0.51	1.0	<b>0.98 ± 0.54</b>	pCi/L	11/04/20 11:20	11/12/20 13:36	4764878
---	Combined Radium	calc.	5 *	0.51	1.00	<b>1.03 ± 0.56</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764878

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15010

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.29	1.00	0.05 ± 0.20	pCi/L	11/04/20 11:20	11/12/20 14:13	4764879
15262-20-1	Radium-228	7500-Ra D	---	0.54	1.0	<b>1.3 ± 0.6</b>	pCi/L	11/04/20 11:20	11/12/20 13:36	4764879
---	Combined Radium	calc.	5 *	0.54	1.00	<b>1.35 ± 0.62</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764879

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15011

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.26	1.0	0.15 ± 0.22	pCi/L	11/04/20 11:20	11/12/20 14:13	4764880
15262-20-1	Radium-228	7500-Ra D	---	0.59	1.0	<b>0.80 ± 0.61</b>	pCi/L	11/04/20 11:20	11/12/20 13:35	4764880
---	Combined Radium	calc.	5 *	0.59	1.0	<b>0.95 ± 0.65</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764880

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15011D

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.40	1.0	0.33 ± 0.38	pCi/L	11/04/20 11:20	11/12/20 14:13	4764881
15262-20-1	Radium-228	7500-Ra D	---	0.52	1.0	<b>1.5 ± 0.6</b>	pCi/L	11/04/20 11:20	11/12/20 13:35	4764881
---	Combined Radium	calc.	5 *	0.52	1.0	<b>1.83 ± 0.70</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764881

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15014

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.21	1.0	0.15 ± 0.19	pCi/L	11/04/20 11:20	11/12/20 14:13	4764882
15262-20-1	Radium-228	7500-Ra D	---	0.76	1.0	<b>0.91 ± 0.78</b>	pCi/L	11/04/20 11:20	11/12/20 13:37	4764882
---	Combined Radium	calc.	5 *	0.76	1.0	<b>1.06 ± 0.80</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764882

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15013

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.28	1.0	0.19 ± 0.25	pCi/L	11/04/20 11:20	11/12/20 14:13	4764883
15262-20-1	Radium-228	7500-Ra D	---	0.69	1.0	<b>0.87 ± 0.70</b>	pCi/L	11/04/20 11:20	11/12/20 13:37	4764883
---	Combined Radium	calc.	5 *	0.69	1.0	<b>1.06 ± 0.74</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764883

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15022

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.15	1.0	<b>0.26 ± 0.19</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764884
15262-20-1	Radium-228	7500-Ra D	---	0.67	1.0	-0.16 ± 0.59	pCi/L	11/04/20 11:20	11/12/20 13:37	4764884
---	Combined Radium	calc.	5 *	0.67	1.0	< 0.67	pCi/L	11/04/20 11:20	11/12/20 14:13	4764884

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15020

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.27	1.0	<b>0.78 ± 0.40</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764885
15262-20-1	Radium-228	7500-Ra D	---	0.66	1.0	<b>1.7 ± 0.8</b>	pCi/L	11/04/20 11:20	11/12/20 13:38	4764885
---	Combined Radium	calc.	5 *	0.66	1.0	<b>2.48 ± 0.86</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764885

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-17005

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.27	1.0	0.15 ± 0.22	pCi/L	11/04/20 11:20	11/12/20 14:13	4764886
15262-20-1	Radium-228	7500-Ra D	---	0.75	1.0	<b>0.81 ± 0.76</b>	pCi/L	11/04/20 11:20	11/12/20 13:37	4764886
---	Combined Radium	calc.	5 *	0.75	1.0	<b>0.96 ± 0.79</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764886

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-17001R

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.26	1.0	<b>0.27 ± 0.26</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764887
15262-20-1	Radium-228	7500-Ra D	---	0.66	1.0	<b>0.66 ± 0.66</b>	pCi/L	11/04/20 11:20	11/12/20 13:37	4764887
---	Combined Radium	calc.	5 *	0.66	1.0	<b>0.93 ± 0.71</b>	pCi/L	11/04/20 11:20	11/12/20 14:13	4764887

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15016R

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.32	1.0	<b>1.6 ± 0.9</b>	pCi/L	11/04/20 14:05	11/19/20 14:45	4764888
15262-20-1	Radium-228	7500-Ra D	---	0.48	1.0	<b>2.4 ± 0.6</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764888
---	Combined Radium	calc.	5 *	0.48	1.0	<b>4.0 ± 1.1</b>	pCi/L	11/04/20 14:05	11/19/20 14:45	4764888

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15017

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.12	1.0	<b>2.2 ± 0.4</b>	pCi/L	11/04/20 14:05	11/23/20 14:50	4764889
15262-20-1	Radium-228	7500-Ra D	---	0.41	1.0	<b>3.5 ± 0.6</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764889
---	Combined Radium	calc.	5 *	0.41	1.0	<b>5.7 ± 0.7</b>	pCi/L	11/04/20 14:05	11/23/20 14:50	4764889

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-17002

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.28	1.0	<b>0.39 ± 0.31</b>	pCi/L	11/04/20 14:05	11/12/20 14:43	4764890
15262-20-1	Radium-228	7500-Ra D	---	0.59	1.0	<b>0.55 ± 0.59</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764890
---	Combined Radium	calc.	5 *	0.59	1.0	<b>0.94 ± 0.67</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764890

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-17003

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.41	1.0	<b>0.46 ± 0.42</b>	pCi/L	11/04/20 14:05	11/12/20 14:43	4764891
15262-20-1	Radium-228	7500-Ra D	---	0.48	1.0	<b>0.92 ± 0.51</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764891
---	Combined Radium	calc.	5 *	0.48	1.0	<b>1.38 ± 0.66</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764891

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15018

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.34	1.0	<b>0.73 ± 0.45</b>	pCi/L	11/04/20 14:05	11/12/20 14:43	4764892
15262-20-1	Radium-228	7500-Ra D	---	0.45	1.0	<b>1.0 ± 0.5</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764892
---	Combined Radium	calc.	5 *	0.45	1.0	<b>1.73 ± 0.66</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764892

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-17004

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.30	1.0	<b>0.28 ± 0.30</b>	pCi/L	11/04/20 14:05	11/12/20 14:43	4764893
15262-20-1	Radium-228	7500-Ra D	---	0.47	1.0	<b>0.76 ± 0.49</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764893
---	Combined Radium	calc.	5 *	0.47	1.0	<b>1.04 ± 0.57</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764893

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15019

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.32	1.0	<b>0.74 ± 0.63</b>	pCi/L	11/04/20 14:05	11/19/20 14:45	4764894
15262-20-1	Radium-228	7500-Ra D	---	0.46	1.0	<b>0.90 ± 0.49</b>	pCi/L	11/04/20 14:05	11/12/20 19:21	4764894
---	Combined Radium	calc.	5 *	0.46	1.0	<b>1.64 ± 0.80</b>	pCi/L	11/04/20 14:05	11/19/20 14:45	4764894

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Client Name: Trace Analytical Laboratories

Report #: 502624

Sampling Point: MW-15015R

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.27	1.00	0.09 ± 0.20	pCi/L	11/04/20 14:05	11/12/20 14:43	4764895
15262-20-1	Radium-228	7500-Ra D	---	0.47	1.0	0.49 ± 0.47	pCi/L	11/04/20 14:05	11/12/20 19:21	4764895
---	Combined Radium	calc.	5 *	0.47	1.00	0.58 ± 0.51	pCi/L	11/04/20 14:05	11/12/20 19:21	4764895

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15023

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.32	1.0	0.15 ± 0.25	pCi/L	11/04/20 14:05	11/12/20 14:43	4764896
15262-20-1	Radium-228	7500-Ra D	---	0.47	1.0	0.63 ± 0.48	pCi/L	11/04/20 14:05	11/12/20 19:21	4764896
---	Combined Radium	calc.	5 *	0.47	1.0	0.78 ± 0.54	pCi/L	11/04/20 14:05	11/12/20 19:21	4764896

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-15021

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.31	1.0	0.47 ± 0.36	pCi/L	11/04/20 14:05	11/12/20 14:43	4764897
15262-20-1	Radium-228	7500-Ra D	---	0.48	1.0	1.3 ± 0.5	pCi/L	11/04/20 14:05	11/12/20 19:21	4764897
---	Combined Radium	calc.	5 *	0.48	1.0	1.77 ± 0.64	pCi/L	11/04/20 14:05	11/12/20 19:21	4764897

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

Sampling Point: MW-17006

PWS ID: Not Supplied

Radionuclides										
Analyte ID #	Analyte	Method	Reg Limit	MDA 95**	MRL	Result	Units	Preparation Date	Analyzed	EEA ID #
13982-63-3	Radium-226	7500-Ra B	---	0.26	1.0	0.44 ± 0.32	pCi/L	11/04/20 14:05	11/12/20 14:51	4764898
15262-20-1	Radium-228	7500-Ra D	---	0.72	1.0	0.74 ± 0.72	pCi/L	11/04/20 14:05	11/12/20 15:59	4764898
---	Combined Radium	calc.	5 *	0.72	1.0	1.18 ± 0.79	pCi/L	11/04/20 14:05	11/12/20 15:59	4764898

\*\* Minimum Detectable Activity (MDA95) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

† EEA has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

## Lab Definitions

**Continuing Calibration Check Standard (CCC) / Continuing Calibration Verification (CCV) / Initial Calibration Verification Standard (ICV) / Initial Performance Check (IPC)** - is a standard containing one or more of the target analytes that is prepared from the same standards used to calibrate the instrument. This standard is used to verify the calibration curve at the beginning of each analytical sequence, and may also be analyzed throughout and at the end of the sequence. The concentration of continuing standards may be varied, when prescribed by the reference method, so that the range of the calibration curve is verified on a regular basis. CCL, CCM, and CCH are the CCC standards at low, mid, and high concentration levels, respectively.

**Internal Standards (IS)** - are pure compounds with properties similar to the analytes of interest, which are added to field samples or extracts, calibration standards, and quality control standards at a known concentration. They are used to measure the relative responses of the analytes of interest and surrogates in the sample, calibration standard or quality control standard.

**Laboratory Duplicate (LD)** - is a field sample aliquot taken from the same sample container in the laboratory and analyzed separately using identical procedures. Analysis of laboratory duplicates provides a measure of the precision of the laboratory procedures.

**Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)** - is an aliquot of reagent water to which known concentrations of the analytes of interest are added. The LFB is analyzed exactly the same as the field samples. LFBs are used to determine whether the method is in control. FBL, FBM, and FBH are the LFB samples at low, mid, and high concentration levels, respectively.

**Laboratory Method Blank (LMB) / Laboratory Reagent Blank (LRB)** - is a sample of reagent water included in the sample batch analyzed in the same way as the associated field samples. The LMB is used to determine if method analytes or other background contamination have been introduced during the preparation or analytical procedure. The LMB is analyzed exactly the same as the field samples.

**Laboratory Trip Blank (LTB) / Field Reagent Blank (FRB)** - is a sample of laboratory reagent water placed in a sample container in the laboratory and treated as a field sample, including storage, preservation, and all analytical procedures. The FRB/LTB container follows the collection bottles to and from the collection site, but the FRB/LTB is not opened at any time during the trip. The FRB/LTB is primarily a travel blank used to verify that the samples were not contaminated during shipment.

If applicable, the calculation of the matrix spike (MS) or matrix spike duplicate (MSD) percent recovery is as follows:  $(\text{MS or MSD value} - \text{Sample value}) * 100 / \text{spike target} / \text{dilution factor} = \text{Recovery \%}$

**Matrix Spike Duplicate Sample (MSD) / Laboratory Fortified Sample Matrix Duplicate (LFSMD)** - is a sample aliquot taken from the same field sample source as the Matrix Spike Sample to which known quantities of the analytes of interest are added in the laboratory. The MSD is analyzed exactly the same as the field samples. Analysis of the MSD provides a measure of the precision of the laboratory procedures in a specific matrix. SDL, SDM, and SDH / LFSMDL, LFSMDM, and LFSMDH are the MSD or LFSMD at low, mid, and high concentration levels, respectively.

**Matrix Spike Sample (MS) / Laboratory Fortified Sample Matrix (LFSM)** - is a sample aliquot taken from field sample source to which known quantities of the analytes of interest are added in the laboratory. The MS is analyzed exactly the same as the field samples. The purpose is to demonstrate recovery of the analytes from a sample matrix to determine if the specific matrix contributes bias to the analytical results. MSL, MSM, and MSH / LFSML, LFSMM, and LFSMH are the MS or LFSM at low, mid, and high concentration levels, respectively.

**Quality Control Standard (QCS) / Second Source Calibration Verification (SSCV)** - is a solution containing known concentrations of the analytes of interest prepared from a source different from the source of the calibration standards. The solution is obtained from a second manufacturer or lot if the lot can be demonstrated by the manufacturer as prepared independently from other lots. The QCS sample is analyzed using the same procedures as field samples. The QCS is used as a check on the calibration standards used in the method on a routine basis.

**Reporting Limit Check (RLC) / Initial Calibration Check Standard (ICCS)** - is a procedural standard that is analyzed each day to evaluate instrument performance at or below the minimum reporting limit (MRL).

**Surrogate Standard (SS) / Surrogate Analyte (SUR)** - is a pure compound with properties similar to the analytes of interest, which is highly unlikely to be found in any field sample, that is added to the field samples, calibration standards, blanks and quality control standards before sample preparation. The SS is used to evaluate the efficiency of the sample preparation process.



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## CHAIN OF CUSTODY RECORD

REPORT TO:		SAMPLER (Signature)		FWS ID #		STATE (sample origin)		PROJECT NAME		PO#		TURNAROUND TIME	
						MI						MATRIX CODE	
BILL TO:		COMPLIANCE MONITORING		Yes X		POPULATION SERVED		SOURCE WATER		BC Cobb 20.0991		# OF CONTAINERS	
LAB Number		COLLECTION		SAMPLING SITE		TEST NAME		SAMPLE REMARKS		CHLORINATED		YES NO	
		DATE	TIME	AM	PM								
1	470915	10/26/20	14:30	x	MW-15002	Radium 226/228						1	GW SW
2	470912	10/26/20	15:25	x	MW-15003	Radium 226/228						1	GW SW
3	470913	10/26/20	16:16	x	MW-15004	Radium 226/228						1	GW SW
4	470914	10/27/20	8:15	x	MW-15007	Radium 226/228						1	GW SW
5	470915	10/27/20	9:30	x	MW-15008	Radium 226/228						1	GW SW
6	470916	10/27/20	10:45	x	MW-15005	Radium 226/228						1	GW SW
7	470917	10/27/20	11:40	x	MW-15006	Radium 226/228						1	GW SW
8	470918	10/27/20	13:20	x	MW-15009	Radium 226/228						1	GW SW
9	470919	10/27/20	14:25	x	MW-15010	Radium 226/228						1	GW SW
10	470920	10/27/20	15:25	x	MW-15011	Radium 226/228						1	GW SW
11	470921	10/27/20	15:40	x	MW-15011D	Radium 226/228						1	GW SW
12	470922	10/28/20	8:40	x	MW-15014	Radium 226/228						1	GW SW
13	470923	10/28/20	9:40	x	MW-15013	Radium 226/228						1	GW SW
14	470924	10/28/20	10:50	x	MW-15022	Radium 226/228						1	GW SW
RELINQUISHED BY:(Signature)		DATE	TIME	RECEIVED BY:(Signature)		DATE	TIME	LAB RESERVES THE RIGHT TO RETURN UNUSED PORTIONS OF NON-AQUEOUS SAMPLES TO CLIENT		TESTS			
RELINQUISHED BY:(Signature)		AM / PM	AM / PM	RECEIVED BY:(Signature)		DATE	AM / PM	CONDITIONS UPON RECEIPT (check one):					
RELINQUISHED BY:(Signature)		AM / PM	AM / PM	RECEIVED FOR LABORATORY BY:		DATE	AM / PM	11-02-2020		Not Written		N/A	
MATRIX CODES:		TURNAROUND TIME (TAT) - SURCHARGES											
DW=DRINKING WATER		SW = Standard Written: (15 working days)		0%				IV* = Immediate Verbal: (3 working days)		100%			
RW=REAGENT WATER		RV = Rush Verbal: (5 working days)		50%				IW* = Immediate Written: (3 working days)		125%			
GM=GROUND WATER		RW* = Rush Written: (5 working days)		75%				SP* = Weekend, Holiday		CALL			
EW=EXPOSURE WATER								STAT* = Less than 48 hours		CALL			
PW=POOL WATER													
WW=WASTE WATER													

\* Please call, expedited service not available for all testing

Samples received unannounced with less than 48 hours holding time remaining may be subject to additional charges.

06-LO-F0435 Issue 6.0 Effective Date: 2016-09-20  
Sample analysis will be provided according to the standard EEA/Water Services Terms, which are available upon request. Any other terms proposed by Customer are deemed material alterations and are rejected unless expressly agreed to in writing by



**Eaton Analytical**

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**REPORT TO:**

Jon Mink, Tim Brewer (umink@trace-labs.com, tbrewer@trace-labs.com) Trace Analytical Laboratories, Inc., 2241 Black Creek Rd., Muskegon, MI 49442 231-773-5988  
**BILL TO:**  
 Accounts Payable, Trace Analytical Laboratories, Inc., 2241 Black Creek Rd., Muskegon, MI 49444

## CHAIN OF CUSTODY RECORD

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LAB Number	COLLECTION	SAMPLING SITE		TEST NAME	SAMPLE REMARKS	CHLORINATED YES NO	# OF CONTAINERS	MATRIX CODE	TURNAROUND TIME
		DATE	TIME	AM PM					
15	10/28/20 14:25	X	MW-16020	Radium 226/228					SW
16	10/28/20 15:20	X	MW-17005	Radium 226/228					SW
17	10/29/20 8:25	X	MW-17001R	Radium 226/228					SW
18	10/29/20 9:00	X	MW-15016R	Radium 226/228					SW
19	10/29/20 10:15	X	MW-15017	Radium 226/228					SW
20	10/29/20 10:50	X	MW-17002	Radium 226/228					SW
21	10/29/20 12:25	X	MW-17003	Radium 226/228					SW
22	10/29/20 13:05	X	MW-15018	Radium 226/228					SW
23	10/29/20 14:50	X	MW-17004	Radium 226/228					SW
24	10/29/20 15:30	X	MW-15019	Radium 226/228					SW
25	10/30/20 8:15	X	MW-15015R	Radium 226/228					SW
26	10/30/20 9:20	X	MW-15023	Radium 226/228					SW
27	10/30/20 10:55	X	MW-15021	Radium 226/228					SW
28	10/30/20 11:40	X.	MW-17006	Radium 226/228					SW
RELINQUISHED BY: (Signature)									
LAB RESERVES THE RIGHT TO RETURN UNUSED PORTIONS OF NON-AQUEOUS SAMPLES TO CLIENT									
LAB COMMENTS									
RELINQUISHED BY: (Signature)									
DATE TIME RECEIVED BY: (Signature)									
AM PM DATE TIME									
RELINQUISHED BY: (Signature)									
DATE TIME RECEIVED FOR LABORATORY BY:									
AM PM DATE TIME									
<b>MATRIX CODES:</b>									
DW=DRINKING WATER SW = Standard Written: (15 working days) RW= REAGENT WATER RV= Rush Verbal: (5 working days) GW=GROUND WATER RW* = Rush Written: (5 working days) EV=EXPOSURE WATER 75% SW=SURFACE WATER PW=POOL WATER WW=WASTE WATER									
<b>TURN-AROUND TIME (TAT) - SURCHARGES</b>									
IV* = Immediate Verbal: (3 working days) 100% IW* = Immediate Written: (3 working days) 125% SP* = Weekend, Holiday CALL STAT* = Less than 48 hours CALL									

\* Please call, expedited service not available for all testing  
 Sample analysis will be provided according to the standard EEA/Water Services Terms, which are available upon request. Any other terms proposed by Customer are deemed material alterations and are rejected unless expressly agreed to in writing by Customer.  
 06-L-O-F-0435 Issue 6.0 Effective Date: 2016-09-20

K. J. 11-2-2016  
 409556 AND  
 109257  
 502627

Samples received unannounced with less  
 than 48 hours holding time remaining  
 may be subject to additional charges.

**Eurofins Eaton Analytical**
**Run Log**

 Run ID: **282307**   Method: **7500-Ra B**

Type	Sample Id	Sample Site	Matrix	Instrument ID	Analysis Date	Calibration File
FS	4764871	MW-15002	GW	DU	11/12/2020 14:10	
FS	4764872	MW-15003	GW	DU	11/12/2020 14:10	
FS	4764873	MW-15004	GW	DU	11/12/2020 14:10	
FS	4764874	MW-15007	GW	DU	11/12/2020 14:10	
FS	4764875	MW-15008	GW	DU	11/12/2020 14:10	
FS	4764876	MW-15005	GW	DU	11/12/2020 14:10	
FS	4764877	MW-15006	GW	DU	11/12/2020 14:10	
LRB	4776693		RW	DU	11/12/2020 14:10	
LFB	4776694		RW	DU	11/12/2020 14:10	
MS	4776695	MW-15002	GW	DU	11/12/2020 14:10	
MSD	4776696	MW-15002	GW	DU	11/12/2020 14:10	

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Result Flag	Amount	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #	
FS	Radium-226	7500-Ra B	0.48	MW-15002		0.31		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4764871		
FS	Radium-226	7500-Ra B	0.42	MW-15003		0.47		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4764872		
FS	Radium-226	7500-Ra B	0.39	MW-15004		0.08		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4764873		
FS	Radium-226	7500-Ra B	0.43	MW-15007		0.46		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4764874		
FS	Radium-226	7500-Ra B	0.41	MW-15008		-0.02		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4764875		
FS	Radium-226	7500-Ra B	0.39	MW-15005		0.33		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4764876		
FS	Radium-226	7500-Ra B	0.33	MW-15006		0.21		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4764877		
LRB	Radium-226	7500-Ra B	0.29	---		0.0200		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4776693		
LFB	Radium-226	7500-Ra B	0.290	---		10.3400	9.98	pCi/L	104	90 - 110	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4776694	
MS	Radium-226	7500-Ra B	0.350	MW-15002		10.1600	11.08	pCi/L	92	80 - 120	---	1.0	11/04/2020 11:20	11/12/2020 14:10	4776695	
MSD	Radium-226	7500-Ra B	0.370	MW-15002		11.3100	11.0	pCi/L	103	80 - 120	11	20	1.0	11/04/2020 11:20	11/12/2020 14:10	4776696

**Eurofins Eaton Analytical**
**Run Log**

 Run ID: **282309** Method: **7500-Ra B**

<u>Type</u>	<u>Sample Id</u>	<u>Sample Site</u>	<u>Matrix</u>	<u>Instrument ID</u>	<u>Analysis Date</u>	<u>Calibration File</u>
FS	4764878	MW-15009	GW	C1	11/12/2020 14:13	
FS	4764879	MW-15010	GW	C1	11/12/2020 14:13	
FS	4764880	MW-15011	GW	C1	11/12/2020 14:13	
FS	4764881	MW-15011D	GW	C1	11/12/2020 14:13	
FS	4764882	MW-15014	GW	C1	11/12/2020 14:13	
FS	4764883	MW-15013	GW	C1	11/12/2020 14:13	
FS	4764884	MW-15022	GW	C1	11/12/2020 14:13	
FS	4764885	MW-15020	GW	C1	11/12/2020 14:13	
FS	4764886	MW-17005	GW	C1	11/12/2020 14:13	
FS	4764887	MW-17001R	GW	C1	11/12/2020 14:13	
LRB	4776730		RW	C1	11/12/2020 14:13	
LFB	4776731		RW	C1	11/12/2020 14:13	
MS	4776732	MW-17001R	GW	C1	11/12/2020 14:13	
MSD	4776733	MW-17001R	GW	C1	11/12/2020 14:13	

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Result Flag	Amount	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #	
FS	Radium-226	7500-Ra B	0.25	MW-15009		0.05		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764878		
FS	Radium-226	7500-Ra B	0.29	MW-15010		0.05		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764879		
FS	Radium-226	7500-Ra B	0.26	MW-15011		0.15		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764880		
FS	Radium-226	7500-Ra B	0.40	MW-15011D		0.33		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764881		
FS	Radium-226	7500-Ra B	0.21	MW-15014		0.15		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764882		
FS	Radium-226	7500-Ra B	0.28	MW-15013		0.19		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764883		
FS	Radium-226	7500-Ra B	0.15	MW-15022		0.26		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764884		
FS	Radium-226	7500-Ra B	0.27	MW-15020		0.78		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764885		
FS	Radium-226	7500-Ra B	0.27	MW-17005		0.15		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764886		
FS	Radium-226	7500-Ra B	0.26	MW-17001R		0.27		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4764887		
LRB	Radium-226	7500-Ra B	0.29			0.0600		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4776730		
LFB	Radium-226	7500-Ra B	0.280			10.7800	9.98	pCi/L	108	90 - 110	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4776731	
MS	Radium-226	7500-Ra B	0.23	MW-17001R		9.0100	11.34	pCi/L	<b>79</b>	80 - 120	---	1.0	11/04/2020 11:20	11/12/2020 14:13	4776732	
MSD	Radium-226	7500-Ra B	0.24	MW-17001R		9.2100	11.35	pCi/L	81	80 - 120	2.2	20	1.0	11/04/2020 11:20	11/12/2020 14:13	4776733

**Eurofins Eaton Analytical**
**Run Log**

 Run ID: **282310**   Method: **7500-Ra B**

<u>Type</u>	<u>Sample Id</u>	<u>Sample Site</u>	<u>Matrix</u>	<u>Instrument ID</u>	<u>Calibration File</u>
FS	4764890	MW-17002	GW	C1	11/12/2020 14:43
FS	4764891	MW-17003	GW	C1	11/12/2020 14:43
FS	4764892	MW-15018	GW	C1	11/12/2020 14:43
FS	4764893	MW-17004	GW	C1	11/12/2020 14:43
FS	4764895	MW-15015R	GW	C1	11/12/2020 14:43
FS	4764896	MW-15023	GW	C1	11/12/2020 14:43
FS	4764897	MW-15021	GW	C1	11/12/2020 14:43
LRB	4776743		RW	C1	11/12/2020 14:43
LFB	4776744		RW	C1	11/12/2020 14:43
MS	4776745	MW-15021	GW	C1	11/12/2020 14:43
MSD	4776746	MW-15021	GW	C1	11/12/2020 14:43

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Result Flag	Amount	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #	
FS	Radium-226	7500-Ra B	0.28	MW-17002		0.39		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4764890		
FS	Radium-226	7500-Ra B	0.41	MW-17003		0.46		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4764891		
FS	Radium-226	7500-Ra B	0.34	MW-15018		0.73		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4764892		
FS	Radium-226	7500-Ra B	0.30	MW-17004		0.28		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4764893		
FS	Radium-226	7500-Ra B	0.27	MW-15015R		0.09		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4764895		
FS	Radium-226	7500-Ra B	0.32	MW-15023		0.15		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4764896		
FS	Radium-226	7500-Ra B	0.31	MW-15021		0.47		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4764897		
LRB	Radium-226	7500-Ra B	0.32	---		0.0800		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4776743		
LFB	Radium-226	7500-Ra B	0.30	---		9.9100	9.98	pCi/L	99	90 - 110	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4776744	
MS	Radium-226	7500-Ra B	0.380	MW-15021		12.2500	11.55	pCi/L	106	80 - 120	---	1.0	11/04/2020 14:05	11/12/2020 14:43	4776745	
MSD	Radium-226	7500-Ra B	0.370	MW-15021		10.1100	11.55	pCi/L	87	80 - 120	19	20	1.0	11/04/2020 14:05	11/12/2020 14:43	4776746



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## Eurofins Eaton Analytical

### Run Log

Type	Sample Id	Sample Site	Matrix	Instrument ID	Analysis Date
FS	4764898	MW-17006	GW	C1	11/12/2020 14:51
LRB	4776761		RW	C1	11/12/2020 14:51
LFB	4776763		RW	C1	11/12/2020 14:51

Type	Sample Id	Sample Site	Matrix	Instrument ID	Analysis Date

### Run ID: 282311 Method: 7500-Ra B

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Amount	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #
FS	Radium-226	7500-Ra B	0.26	MW-17006	0.44		pCi/L	---	---	1.0	11/12/2020 14:05	11/12/2020 14:51	47764898	
LRB	Radium-226	7500-Ra B	0.24		0.0100		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 14:51	47776761	
LFB	Radium-226	7500-Ra B	0.250		10.5300	9.98	pCi/L	106	90 - 110	---	1.0	11/04/2020 14:05	11/12/2020 14:51	47776763



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## Eurofins Eaton Analytical

### Run Log

Type	Sample Id	Sample Site	Matrix	Instrument ID	Analysis Date
FS	4764888	MW-15016R	GW	DU	11/19/2020 14:45
FS	4764894	MW-15019	GW	DU	11/19/2020 14:45

Type	Sample Id	Sample Site	Matrix	Instrument ID	Analysis Date
FS	4764888	MW-15016R	GW	DU	11/19/2020 14:45
FS	4764894	MW-15019	GW	DU	11/19/2020 14:45

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Amount	Result Flag	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #
FS	Radium-226	7500-Ra B	0.32	MW-15016R	1.6			pCi/L	---	---	---	---	1.0	11/04/2020 14:05	11/19/2020 14:45 4764888
FS	Radium-226	7500-Ra B	0.32	MW-15019	0.74			pCi/L	---	---	---	---	1.0	11/04/2020 14:05	11/19/2020 14:45 4764894



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## Eurofins Eaton Analytical

### Run Log

Run ID: **282653** Method: **7500-Ra B**

Type	Sample Id	Sample Site	Matrix	Instrument ID	Analysis Date	Calibration File
FS	4764889	MW-15017	GW	DU	11/23/2020 14:50	

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Amount	Result Flag	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Dil Factor	Extracted	Analyzed	EEA ID #
FS	Radium-226	7500-Ra B	0.12	MW-15017	2.2			pCi/L	---	---	---	---	1.0	11/04/2020 14:05	11/23/2020 14:50	4764889

**Eurofins Eaton Analytical**
**Run Log**

 Run ID: **282083**   Method: **7500-Ra D**

<u>Type</u>	<u>Sample Id</u>	<u>Sample Site</u>	<u>Matrix</u>	<u>Instrument ID</u>	<u>Analysis Date</u>
FS	4764871	MW-15002	GW	DU	11/11/2020 14:57
FS	4764872	MW-15003	GW	DU	11/11/2020 14:57
FS	4764874	MW-15007	GW	DU	11/11/2020 14:57
FS	4764875	MW-15008	GW	DU	11/11/2020 14:57
FS	4764876	MW-15005	GW	DU	11/11/2020 14:57
FS	4764877	MW-15006	GW	DU	11/11/2020 14:57
LRB	4773342	RW	RW	DU	11/11/2020 14:57
LFB	4773343		DU	DU	11/11/2020 14:57

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Amount	Result Flag	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #
FS	Radium-228	7500-Ra D	0.56	MW-15002	-0.04			pCi/L	---	---	---	---	1.0	11/04/2020 11:20	11/11/2020 14:57 4764871
FS	Radium-228	7500-Ra D	0.46	MW-15003	0.56			pCi/L	---	---	---	---	1.0	11/04/2020 11:20	11/11/2020 14:57 4764872
FS	Radium-228	7500-Ra D	0.47	MW-15007	0.94			pCi/L	---	---	---	---	1.0	11/04/2020 11:20	11/11/2020 14:57 4764874
FS	Radium-228	7500-Ra D	0.50	MW-15008	0.20			pCi/L	---	---	---	---	1.0	11/04/2020 11:20	11/11/2020 14:57 4764875
FS	Radium-228	7500-Ra D	0.56	MW-15005	0.02			pCi/L	---	---	---	---	1.0	11/04/2020 11:20	11/11/2020 14:57 4764876
FS	Radium-228	7500-Ra D	0.45	MW-15006	0.39			pCi/L	---	---	---	---	1.0	11/04/2020 11:20	11/11/2020 14:57 4764877
LFB	Radium-228	7500-Ra D	0.41	---	0.0600			pCi/L	---	---	---	---	1.0	11/04/2020 11:20	11/11/2020 14:57 4773342
LFB	Radium-228	7500-Ra D	0.37	---	9.1100	8.78		pCi/L	104	80 - 120	---	---	1.0	11/04/2020 11:20	11/11/2020 14:57 4773343

**Eurofins Eaton Analytical**
**Run Log**

 Run ID: **282196** Method: **7500-Ra D**

<u>Type</u>	<u>Sample Id</u>	<u>Sample Site</u>	<u>Matrix</u>	<u>Instrument ID</u>	<u>Calibration File</u>	<u>Analysis Date</u>
FS	4764880	MW-15011	GW	DU	11/12/2020 13:35	
FS	4764881	MW-15011D	GW	DU	11/12/2020 13:35	
FS	4764878	MW-15009	GW	DU	11/12/2020 13:36	
FS	4764879	MW-15010	GW	DU	11/12/2020 13:36	
LRB	4775069		RW	DU	11/12/2020 13:36	
LFB	4775070		RW	DU	11/12/2020 13:36	
FS	4764882	MW-15014	GW	DU	11/12/2020 13:37	
FS	4764883	MW-15013	GW	DU	11/12/2020 13:37	
FS	4764884	MW-15022	GW	DU	11/12/2020 13:37	
FS	4764886	MW-17005	GW	DU	11/12/2020 13:37	
FS	4764887	MW-17001R	GW	DU	11/12/2020 13:37	
MS	4775073	MW-15009	GW	DU	11/12/2020 13:37	
MSD	4775074	MW-15009	GW	DU	11/12/2020 13:37	
FS	4764885	MW-15020	GW	DU	11/12/2020 13:38	

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Result Flag	Amount	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #	
FS	Radium-228	7500-Ra D	0.59	MW-15011		0.80		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:35	4764880		
FS	Radium-228	7500-Ra D	0.52	MW-15011D		1.5		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:35	4764881		
FS	Radium-228	7500-Ra D	0.51	MW-15009		0.98		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:36	4764878		
FS	Radium-228	7500-Ra D	0.54	MW-15010		1.3		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:36	4764879		
LRB	Radium-228	7500-Ra D	0.53	---		0.280		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:36	4775069		
LFB	Radium-228	7500-Ra D	0.57	---		8.4900	8.78	pCi/L	97	80 - 120	---	1.0	11/04/2020 11:20	11/12/2020 13:36	4775070	
FS	Radium-228	7500-Ra D	0.76	MW-15014		0.91		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:37	4764882		
FS	Radium-228	7500-Ra D	0.69	MW-15013		0.87		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:37	4764883		
FS	Radium-228	7500-Ra D	0.67	MW-15022		-0.16		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:37	4764884		
FS	Radium-228	7500-Ra D	0.75	MW-17005		0.81		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:37	4764886		
FS	Radium-228	7500-Ra D	0.66	MW-17001R		0.66		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:37	4764887		
MS	Radium-228	7500-Ra D	0.570	MW-15009		10.9400	10.68	pCi/L	103	70 - 130	---	1.0	11/04/2020 11:20	11/12/2020 13:37	4775073	
MSD	Radium-228	7500-Ra D	0.530	MW-15009		11.2400	11.23	pCi/L	100	70 - 130	27	20	1.0	11/04/2020 11:20	11/12/2020 13:37	4775074
FS	Radium-228	7500-Ra D	0.66	MW-15020		1.7		pCi/L	---	---	1.0	11/04/2020 11:20	11/12/2020 13:38	4764885		

**Eurofins Eaton Analytical**
**Run Log**

 Run ID: **282209** Method: **7500-Ra D**

<u>Type</u>	<u>Sample Id</u>	<u>Sample Site</u>	<u>Matrix</u>	<u>Instrument ID</u>	<u>Analysis Date</u>
FS	4764888	MW-15016R	GW	DU	11/12/2020 19:21
FS	4764889	MW-15017	GW	DU	11/12/2020 19:21
FS	4764890	MW-17002	GW	DU	11/12/2020 19:21
FS	4764891	MW-17003	GW	DU	11/12/2020 19:21
FS	4764892	MW-15018	GW	DU	11/12/2020 19:21
FS	4764893	MW-17004	GW	DU	11/12/2020 19:21
FS	4764894	MW-15019	GW	DU	11/12/2020 19:21
FS	4764895	MW-15015R	GW	DU	11/12/2020 19:21
FS	4764896	MW-15023	GW	DU	11/12/2020 19:21
FS	4764897	MW-15021	GW	DU	11/12/2020 19:21
LFB	4775486		RW	DU	11/12/2020 19:21
MS	4775487	MW-15016R	GW	DU	11/12/2020 19:21
MSD	4775488	MW-15016R	GW	DU	11/12/2020 19:21
LRB	4775485		RW	DU	11/12/2020 19:40

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Result Flag	Amount	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #	
FS	Radium-228	7500-Ra D	0.48	MW-15016R		2.4		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764888		
FS	Radium-228	7500-Ra D	0.41	MW-15017		3.5		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764889		
FS	Radium-228	7500-Ra D	0.59	MW-17002		0.55		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764890		
FS	Radium-228	7500-Ra D	0.48	MW-17003		0.92		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764891		
FS	Radium-228	7500-Ra D	0.45	MW-15018		1.0		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764892		
FS	Radium-228	7500-Ra D	0.47	MW-17004		0.76		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764893		
FS	Radium-228	7500-Ra D	0.46	MW-15019		0.90		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764894		
FS	Radium-228	7500-Ra D	0.47	MW-15015R		0.49		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764895		
FS	Radium-228	7500-Ra D	0.47	MW-15023		0.63		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764896		
FS	Radium-228	7500-Ra D	0.48	MW-15021		1.3		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4764897		
LFB	Radium-228	7500-Ra D	0.400			10.0100	8.78	pCi/L	114	80 - 120	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4775486	
MS	Radium-228	7500-Ra D	0.460	MW-15016R		13.1300	12.15	pCi/L	110	70 - 130	---	1.0	11/04/2020 14:05	11/12/2020 19:21	4775487	
MSD	Radium-228	7500-Ra D	0.460	MW-15016R		12.2700	12.15	pCi/L	101	70 - 130	6.8	20	1.0	11/04/2020 14:05	11/12/2020 19:21	4775488
LRB	Radium-228	7500-Ra D	0.38			0.180		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 19:40	4775485		



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## Run Log

Run ID: **282211** Method: **7500-Ra D**

Type	Sample Id	Sample Site	Matrix	Instrument ID	Analysis Date
FS	4764898	MW-17006	GW	DU	11/12/2020 15:59
LRB	4775494		RW	DU	11/12/2020 15:59
MS	4774907	MW-17006	GW	DU	11/12/2020 16:00
MSD	4774908	MW-17006	GW	DU	11/12/2020 16:00
LFB	4775495		RW	DU	11/12/2020 16:06

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Amount	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #	
FS	Radium-228	7500-Ra D	0.72	MW-17006	0.74		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 15:59	47764898		
LRB	Radium-228	7500-Ra D	0.62	---	0.480		pCi/L	---	---	1.0	11/04/2020 14:05	11/12/2020 15:59	47754949		
MS	Radium-228	7500-Ra D	0.680	MW-17006	10.2300	10.46	pCi/L	98	70 - 130	---	1.0	11/04/2020 14:05	11/12/2020 16:00	4774907	
MSD	Radium-228	7500-Ra D	0.700	MW-17006	11.0500	10.44	pCi/L	106	70 - 130	7.7	20	1.0	11/04/2020 14:05	11/12/2020 16:00	4774908
LFB	Radium-228	7500-Ra D	0.58	---	9.3000	8.78	pCi/L	106	80 - 120	---	1.0	11/04/2020 14:05	11/12/2020 16:06	4775495	



Eaton Analytical

## Eurofins Eaton Analytical

## Run Log

Run ID: **282686**Method: **7500-Ra D**

Type	Sample Id	Sample Site	Matrix	Instrument ID	Analysis Date
LRB	4784659	RW	DU	11/25/2020 15:15	
LFB	4784660	RW	DU	11/25/2020 15:15	
FS	4764873	GW	DU	11/25/2020 16:03	

Type	Sample Id	Sample Site	Matrix	Instrument ID	Analysis Date
LRB	4784659	RW	DU	11/25/2020 15:15	
LFB	4784660	RW	DU	11/25/2020 15:15	
FS	4764873	GW	DU	11/25/2020 16:03	

## QC Summary Report

Sample Type	Analyte	Method	MDA95	Client ID	Amount	Target	Units	% Recovery	Recovery Limits	RPD	RPD Limit	Extracted	Analyzed	EEA ID #
LRB	Radium-228	7500-Ra D	0.53	---	-0.54		pCi/L	---	---	1.0	11/20/2020 11:26	11/25/2020 15:15	4784659	
LFB	Radium-228	7500-Ra D	0.60	---	7.5100	8.74	pCi/L	86	80 - 120	---	1.0	11/20/2020 11:26	11/25/2020 15:15	4784660
FS	Radium-228	7500-Ra D	0.48	MW-15004	0.55		pCi/L	---	---	1.0	11/20/2020 11:26	11/25/2020 16:03	4764873	

<b>Sample Type Key</b>			
<b>Type (Abbr.)</b>	<b>Sample Type</b>	<b>Type (Abbr.)</b>	<b>Sample Type</b>
FS	Field Sample		
LFB	Laboratory Fortified Blank		
LRB	Laboratory Reagent Blank		
MS	Matrix Spike		
MSD	Matrix Spike Duplicate		

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## QUALITY CONTROL RESULTS

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104157	Analysis Description: Mercury, Total, EPA 7470/7471
QC Batch Method: EPA 7470A Prep	Analysis Method: EPA 7470A

### METHOD BLANK: T104157-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Mercury	mg/L	<0.00020	0.00020	

### LABORATORY CONTROL SAMPLE: T104157-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Mercury	mg/L	0.00200	0.00164	82	77-122	

### MATRIX SPIKE / MATRIX SPIKE DUPLICATE: T104157-MSD1

Original: 20J0991-01

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Notes
Mercury	mg/L	0	0.00200	0.00161	0.00169	80	84	76-123	5	20	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104158

Analysis Description: Mercury, Total, EPA 7470/7471

QC Batch Method: EPA 7470A Prep

Analysis Method: EPA 7470A

### METHOD BLANK: T104158-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Mercury	mg/L	<0.00020	0.00020	

### LABORATORY CONTROL SAMPLE: T104158-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Mercury	mg/L	0.00200	0.00187	94	77-122	

### MATRIX SPIKE / MATRIX SPIKE DUPLICATE: T104158-MSD1

Original: 20J0991-21

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Notes
Mercury	mg/L	0	0.00200	0.00188	0.00195	94	97	76-123	3	20	

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Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104100	Analysis Description: Calcium, Total
QC Batch Method: EPA 200.2	Analysis Method: EPA 200.7 Rev. 4.4

#### METHOD BLANK: T104100-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Boron	mg/L	<0.0088	0.0088	
Calcium	mg/L	<0.26	0.26	
Lithium	mg/L	<0.0012	0.0012	

#### LABORATORY CONTROL SAMPLE: T104100-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Boron	mg/L	1.60	1.45	91	85-115	
Calcium	mg/L	16.0	15.0	93	85-115	
Lithium	mg/L	1.60	1.54	96	85-115	

#### MATRIX SPIKE: T104100-MS1      Original: 20J0991-01

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Boron	mg/L	0.267	1.60	1.76	94	70-130	
Calcium	mg/L	84.5	16.0	112	171	70-130	243
Lithium	mg/L	0.00433	1.60	1.54	96	70-130	

#### MATRIX SPIKE: T104100-MS2      Original: 20J0991-07

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Boron	mg/L	0.0509	1.60	1.60	97	70-130	
Calcium	mg/L	59.8	16.0	78.4	116	70-130	
Lithium	mg/L	0.00178	1.60	1.43	89	70-130	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104101	Analysis Description: Lithium, Total
QC Batch Method: EPA 200.2	Analysis Method: EPA 200.7 Rev. 4.4

#### METHOD BLANK: T104101-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Boron	mg/L	<0.0088	0.0088	

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**METHOD BLANK: T104101-BLK1**

Parameter	Units	Blank Result	Reporting Limit	Notes
Calcium	mg/L	<0.26	0.26	
Lithium	mg/L	<0.0012	0.0012	

**LABORATORY CONTROL SAMPLE: T104101-BS1**

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Boron	mg/L	1.60	1.48	92	85-115	
Calcium	mg/L	16.0	16.0	100	85-115	
Lithium	mg/L	1.60	1.57	98	85-115	

**MATRIX SPIKE: T104101-MS1** Original: **20J0991-21**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Boron	mg/L	0.477	1.60	1.90	89	70-130	
Calcium	mg/L	<b>86.4</b>	<b>16.0</b>	112	<b>162</b>	<b>70-130</b>	<b>243</b>
Lithium	mg/L	0.0198	1.60	1.54	95	70-130	

**MATRIX SPIKE: T104101-MS2** Original: **20J0991-22**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Boron	mg/L	0.644	1.60	2.07	89	70-130	
Calcium	mg/L	105	16.0	125	120	70-130	
Lithium	mg/L	0.0332	1.60	1.54	94	70-130	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104100  
QC Batch Method: EPA 200.2

Analysis Description: Antimony, Total  
Analysis Method: EPA 200.8 Rev. 5.4

**METHOD BLANK: T104100-BLK1**

Parameter	Units	Blank Result	Reporting Limit	Notes
Arsenic	mg/L	<0.00055	0.00055	
Barium	mg/L	<0.0025	0.0025	
Beryllium	mg/L	<0.00025	0.00025	
Cadmium	mg/L	<0.00025	0.00025	
Cobalt	mg/L	<0.00052	0.00052	
Chromium	mg/L	<0.00025	0.00025	
Molybdenum	mg/L	<0.0012	0.0012	
Lead	mg/L	0.00059	0.00055	

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**METHOD BLANK: T104100-BLK1**

Parameter	Units	Blank Result	Reporting Limit	Notes
Antimony	mg/L	<0.00025	0.00025	
Selenium	mg/L	<0.00050	0.00050	
Thallium	mg/L	<0.00038	0.00038	

**LABORATORY CONTROL SAMPLE: T104100-BS1**

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Arsenic	mg/L	0.100	0.0947	95	85-115	
Barium	mg/L	1.60	1.75	109	85-115	
Beryllium	mg/L	0.200	0.183	92	85-115	
Cadmium	mg/L	0.0500	0.0527	105	85-115	
Cobalt	mg/L	1.60	1.48	92	85-115	
Chromium	mg/L	0.0500	0.0470	94	85-115	
Molybdenum	mg/L	1.60	1.55	97	85-115	
Lead	mg/L	0.100	0.0964	96	85-115	
Antimony	mg/L	0.100	0.111	111	85-115	
Selenium	mg/L	0.100	0.0947	95	85-115	
Thallium	mg/L	0.100	0.0979	98	85-115	

**MATRIX SPIKE: T104100-MS1**      Original: **20J0991-01**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Arsenic	mg/L	0	0.100	0.0963	96	70-130	
Barium	mg/L	0.0664	1.60	1.85	112	70-130	
Beryllium	mg/L	0	0.200	0.182	91	70-130	
Cadmium	mg/L	0	0.0500	0.0521	104	70-130	
Cobalt	mg/L	0.000209	1.60	1.46	91	70-130	
Chromium	mg/L	0.000320	0.0500	0.0469	93	70-130	
Molybdenum	mg/L	0.000636	1.60	1.63	102	70-130	
Lead	mg/L	0	0.100	0.0990	99	70-130	
Antimony	mg/L	0	0.100	0.112	112	70-130	
Selenium	mg/L	0	0.100	0.0956	96	70-130	
Thallium	mg/L	0	0.100	0.103	103	70-130	

**MATRIX SPIKE: T104100-MS2**      Original: **20J0991-07**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Arsenic	mg/L	0.00853	0.100	0.106	97	70-130	
Barium	mg/L	0.0339	1.60	1.86	114	70-130	

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#### MATRIX SPIKE: T104100-MS2

Original: 20J0991-07

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Beryllium	mg/L	0	0.200	0.181	91	70-130	
Cadmium	mg/L	0	0.0500	0.0524	105	70-130	
Cobalt	mg/L	0.000536	1.60	1.49	93	70-130	
Chromium	mg/L	0.000253	0.0500	0.0475	95	70-130	
Molybdenum	mg/L	0.00974	1.60	1.68	104	70-130	
Lead	mg/L	0	0.100	0.0993	99	70-130	
Antimony	mg/L	0.000647	0.100	0.118	117	70-130	
Selenium	mg/L	0	0.100	0.0921	92	70-130	
Thallium	mg/L	0	0.100	0.103	103	70-130	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104101

Analysis Description: Lead, Total

QC Batch Method: EPA 200.2

Analysis Method: EPA 200.8 Rev. 5.4

#### METHOD BLANK: T104101-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Arsenic	mg/L	<0.00055	0.00055	
Barium	mg/L	<0.0025	0.0025	
Beryllium	mg/L	<0.00025	0.00025	
Cadmium	mg/L	<0.000050	0.000050	
Cobalt	mg/L	<0.00052	0.00052	
Chromium	mg/L	<0.00025	0.00025	
Molybdenum	mg/L	<0.0012	0.0012	
Lead	mg/L	<0.00025	0.00025	
Antimony	mg/L	<0.00025	0.00025	
Selenium	mg/L	<0.00050	0.00050	
Thallium	mg/L	<0.00038	0.00038	

#### LABORATORY CONTROL SAMPLE: T104101-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Arsenic	mg/L	0.100	0.103	103	85-115	
Barium	mg/L	1.60	1.77	110	85-115	
Beryllium	mg/L	0.200	0.180	90	85-115	
Cadmium	mg/L	0.0500	0.0558	112	85-115	
Cobalt	mg/L	1.60	1.47	92	85-115	
Chromium	mg/L	0.0500	0.0464	93	85-115	

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**LABORATORY CONTROL SAMPLE: T104101-BS1**

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Molybdenum	mg/L	1.60	1.52	95	85-115	
Lead	mg/L	0.100	0.104	104	85-115	
Antimony	mg/L	0.100	0.105	105	85-115	
Selenium	mg/L	0.100	0.114	114	85-115	
Thallium	mg/L	0.100	0.110	110	85-115	

**MATRIX SPIKE: T104101-MS1**      Original: **20J0991-21**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Arsenic	mg/L	0.00792	0.100	0.105	97	70-130	
Barium	mg/L	0.119	1.60	1.78	104	70-130	
Beryllium	mg/L	0	0.200	0.176	88	70-130	
Cadmium	mg/L	0	0.0500	0.0524	105	70-130	
Cobalt	mg/L	0.0000973	1.60	1.39	87	70-130	
Chromium	mg/L	0	0.0500	0.0444	89	70-130	
Molybdenum	mg/L	0.00758	1.60	1.55	96	70-130	
Lead	mg/L	0	0.100	0.125	125	70-130	
Antimony	mg/L	0.0000920	0.100	0.0958	96	70-130	
Selenium	mg/L	0	0.100	0.0772	77	70-130	
Thallium	mg/L	0	0.100	0.133	133	70-130	240

**MATRIX SPIKE: T104101-MS2**      Original: **20J0991-22**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Arsenic	mg/L	0.000192	0.100	0.102	102	70-130	
Barium	mg/L	0.237	1.60	2.04	113	70-130	
Beryllium	mg/L	0	0.200	0.180	90	70-130	
Cadmium	mg/L	0	0.0500	0.0548	110	70-130	
Cobalt	mg/L	0.000220	1.60	1.45	91	70-130	
Chromium	mg/L	0.000286	0.0500	0.0468	93	70-130	
Molybdenum	mg/L	0.000700	1.60	1.60	100	70-130	
Lead	mg/L	0	0.100	0.118	118	70-130	
Antimony	mg/L	0	0.100	0.110	110	70-130	
Selenium	mg/L	0	0.100	0.109	109	70-130	
Thallium	mg/L	0	0.100	0.126	126	70-130	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

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QC Batch: T104020  
QC Batch Method: IC Prep W

Analysis Description: Chloride  
Analysis Method: EPA 300.0 Rev. 2.1

#### METHOD BLANK: T104020-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Chloride	mg/L	<0.10	0.10	
Fluoride	mg/L	<0.020	0.020	
Sulfate as SO <sub>4</sub>	mg/L	<1.0	1.0	

#### LABORATORY CONTROL SAMPLE: T104020-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Chloride	mg/L	5.00	<10	102	90-110	
Fluoride	mg/L	1.00	1.01	101	90-110	
Sulfate as SO <sub>4</sub>	mg/L	5.00	5.17	103	90-110	

#### MATRIX SPIKE: T104020-MS1      Original: 20J0991-01

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Chloride	mg/L	34.5	25.0	56.7	89	80-120	
Fluoride	mg/L	0.711	5.00	5.73	100	80-120	
Sulfate as SO <sub>4</sub>	mg/L	0.519	25.0	24.7	97	80-120	

#### MATRIX SPIKE: T104020-MS2      Original: 20J0991-05

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Chloride	mg/L	44.9	25.0	67.2	89	80-120	
Fluoride	mg/L	0.210	5.00	5.26	101	80-120	
Sulfate as SO <sub>4</sub>	mg/L	56.6	25.0	78.3	87	80-120	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104069  
QC Batch Method: IC Prep W

Analysis Description: Sulfate  
Analysis Method: EPA 300.0 Rev. 2.1

#### METHOD BLANK: T104069-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Chloride	mg/L	<0.10	0.10	
Fluoride	mg/L	<0.020	0.020	
Sulfate as SO <sub>4</sub>	mg/L	<1.0	1.0	

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Trace Analytical Laboratories, Inc.  
2241 Black Creek Road  
Muskegon, MI 49444-2673



231-773-5998 Phone  
888-979-4469 Fax  
[www.trace-labs.com](http://www.trace-labs.com)

**LABORATORY CONTROL SAMPLE: T104069-BS1**

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Chloride	mg/L	5.00	5.31	106	90-110	
Fluoride	mg/L	1.00	0.960	96	90-110	
Sulfate as SO <sub>4</sub>	mg/L	5.00	5.34	107	90-110	

**MATRIX SPIKE: T104069-MS1** Original: **20J0991-16**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Chloride	mg/L	21.9	25.0	47.7	103	80-120	
Fluoride	mg/L	0.123	5.00	5.15	101	80-120	
Sulfate as SO <sub>4</sub>	mg/L	6.07	25.0	31.7	103	80-120	

**MATRIX SPIKE: T104069-MS2** Original: **20J0991-17**

Parameter	Units	Original Result	Spike Conc.	MS Result	MS % Rec	% Rec Unit	Notes
Chloride	mg/L	21.4	25.0	46.6	101	80-120	
Fluoride	mg/L	0.124	5.00	5.27	103	80-120	
Sulfate as SO <sub>4</sub>	mg/L	4.10	25.0	34.2	120	80-120	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104031

Analysis Description: Total Dissolved Solids

QC Batch Method: SM 2540 C-11

Analysis Method: SM 2540 C-11

**METHOD BLANK: T104031-BLK1**

Parameter	Units	Blank Result	Reporting Limit	Notes
Total Dissolved Solids	mg/L	<10	10	

**LABORATORY CONTROL SAMPLE: T104031-BS1**

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Total Dissolved Solids	mg/L	500	549	110	80-120	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104149

Analysis Description: Total Dissolved Solids

QC Batch Method: SM 2540 C-11

Analysis Method: SM 2540 C-11

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#### METHOD BLANK: T104149-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Total Dissolved Solids	mg/L	<10	10	

#### LABORATORY CONTROL SAMPLE: T104149-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Total Dissolved Solids	mg/L	520	490	94	80-120	

#### SAMPLE DUPLICATE: T104149-DUP1      Original: 20J0991-15

Parameter	Units	Original Result	DUP Result	RPD	Max RPD	Notes
Total Dissolved Solids	mg/L	680	940	32	10	623

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104170

Analysis Description: Total Dissolved Solids

QC Batch Method: SM 2540 C-11

Analysis Method: SM 2540 C-11

#### METHOD BLANK: T104170-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Total Dissolved Solids	mg/L	<10	10	

#### LABORATORY CONTROL SAMPLE: T104170-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Total Dissolved Solids	mg/L	511	488	95	80-120	

#### SAMPLE DUPLICATE: T104170-DUP1      Original: 20J0991-24

Parameter	Units	Original Result	DUP Result	RPD	Max RPD	Notes
Total Dissolved Solids	mg/L	600	612	2	10	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104252

Analysis Description: Total Dissolved Solids

QC Batch Method: SM 2540 C-11

Analysis Method: SM 2540 C-11

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#### METHOD BLANK: T104252-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Total Dissolved Solids	mg/L	<10	10	

#### LABORATORY CONTROL SAMPLE: T104252-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Total Dissolved Solids	mg/L	500	487	97	80-120	

#### SAMPLE DUPLICATE: T104252-DUP1

Original: 20J0991-13RE1

Parameter	Units	Original Result	DUP Result	RPD	Max RPD	Notes
Total Dissolved Solids	mg/L	308	284	8	10	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104027

Analysis Description: Total Suspended Solids

QC Batch Method: SM 2540 D-11

Analysis Method: SM 2540 D-11

#### METHOD BLANK: T104027-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Total Suspended Solids	mg/L	<4.0	4.0	

#### LABORATORY CONTROL SAMPLE: T104027-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Total Suspended Solids	mg/L	50.0	52.0	104	85-115	

Trace Project ID: 20J0991

Client Project ID: BC Cobb

QC Batch: T104120

Analysis Description: Total Suspended Solids

QC Batch Method: SM 2540 D-11

Analysis Method: SM 2540 D-11

#### METHOD BLANK: T104120-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
Total Suspended Solids	mg/L	<4.0	4.0	

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**LABORATORY CONTROL SAMPLE: T104120-BS1**

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Total Suspended Solids	mg/L	50.0	45.0	90	85-115	

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**TRACE**  
**ANALYTICAL LABORATORIES, INC.**

**Report Results To:**

Company Name: HQR, Inc.	PO #: 1022-0432
Report To: Molly Reeves	Contact Name: lava symcock
Mailing Address: 3521 Benson Blvd	Billing Address (if different): 5405 Data Ct.
City, State, Zip Code: Kalamazoo, MI 49008	City, State, Zip Code: Ann Arbor, MI 48108
Office Phone: Cell Phone: 734-751-1790	Phone Number: 734-333-6405
Email Address: molly.reeves@hqrinc.com	Billing Email Address: lava.symcock@kaminc.com

**Turnaround Requirements:**

- Standard, 5-10 Days  
 3 Day\*  
 1 Day\*

\*Results provided end of business day, requires prior approval.

**Matrix Key:**

S = Soil / Solid	WI = Wipes
W = Water	LW = Liquid Waste
SL = Sludge	A = Air
Oil = Oil	D = Drinking Water

**Analysis Requested**

Possible Health Hazards?

Logged By: <u>JL</u>
Checked By: <u>JL</u>
Soil Volatiles Preserved (circle if applicable):
MeOH                  Low Level                  Lab
Sampling Time:

**CHAIN-OF-CUSTODY RECORD**

Page 1 of 2

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Muskegon, MI 49444-2673      www.trace-labs.com

Trace ID No.  
**20J0991**

Project Name: BC C000			Sampled By: Amika Thomson		Analysis Requested															
Trace No.	Date Collected	Time Collected	Client Sample ID		Metals Field Filtered (Y / N)	Matrix	Number of Containers	Preservation		Remarks										
			Cool	HCl	HNO <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>	NaOH	Other	TSS, TDS, F,C1, SDH, pH		Total metals	Rod 2201228								
1	10/26/10	2:30pm	MW-15002	N	3	2	1		X											
2	10/26/10	3:25pm	MW-15003	N	3	2	1		X											
3	10/26/10	4:16pm	MW-15004	N	3	2	1		X											
4	10/27/10	8:15am	MW-15007	N	3	2	1		X											
5	10/27/10	9:30am	MW-15008	N	3	2	1		X											
6	10/27/10	10:45am	MW-15005	N	3	2	1		X											
7	10/27/10	11:46am	MW-15006	N	3	2	1		X											
8	10/27/10	1:20pm	MW-15009	N	3	2	1		X											
9	10/27/10	2:25pm	MW-15010	N	3	2	1		X											
Please Sign			Released By	Received By	Date	Time	Released By	Received By	Date	Time										
1) Anyka Thompson				AM	10/28/10	1:00pm														
2)																				
3)																				

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**TRECE**  
ANALYTICAL LABORATORIES, INC.

Trace Analytical Laboratories  
2241 Black Creek Road  
Muskegon, MI 49444-2673

Phone 231.773.5994  
Fax 888.979.4469  
[www.trace-labs.com](http://www.trace-labs.com)

Page 2 of 2

**CHAIN-OF-CUSTODY RECORD**

Trace Use

Company Name:	HDR, Inc.	PO #:	10220433
Report To:	Whitney Reeves	Contact Name:	Lara Syrovac
Mailing Address:	3321 Bronson Blvd.	Billing Address (if different):	5405 Delta Ct.
City, State, Zip Code:	Kalamazoo, MI 49008	City, State, Zip Code:	Iron Mountain, MI 49808
Office Phone:	Cell Phone:	Phone Number:	734-751-1796 734-232-6405
Email Address:	mailto:whitney.reeves@hdrinc.com	Billing Email Address:	lara.syrovac@hdrinc.com

Logged By: JS  
 Checked By: NC  
 Soil Volatiles Preserved (circle if applicable):  
 MeOH       Low Level       Lab  
 Sampling Time:

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**CHAIN-OF-CUSTODY RECORD**

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20J0991  
Trace ID No.

Page 1 of 2

**Report Results To:**

Company Name: HDB, Inc.	PO#: 10220433
Report To: Mollie Reeves	Contact Name: Lava Syrocki
Mailing Address: 3321 Bronson Blvd.	Billing Address (if different): 5405 Dart Ct.
City, State, Zip Code: Kalamazoo, MI 49008	City, State, Zip Code: Ann Arbor, MI 48108
Office Phone: Cell Phone: 734-751-1790	Phone Number: 734-332-6405
Email Address: mollie.reeves@hdbinc.com	Billing Email Address: lava.syrocki@hdbinc.com

**Bill To:**

Logged By: NL
Checked By: TS
Soil Volatiles Preserved (circle if applicable):
MEOH Low Level Lab

Sampling Time:

**Turnaround Requirements:**

Standard 5-10 Days

3 Day\*

1 Day\*

\*Results provided end of business day, requires prior approval.

**Matrix Key:**

S = Soil / Solid

W = Wipes

L/W = Liquid Waste

SL = Sludge

A = Air

D = Drinking Water

**Analysis Requested**

Project Name: BC Cobb	Sampled By: Annya Thomson	Analysis Requested									
		Analysis Requested									
Trace No.	Date Collected	Time Collected	Client Sample ID	Metals Field Filtered (Y/N)	Matrix	Number of Containers	Preservation				
15	10/28/20	2:25pm	MW-15020	N	W	3	2	1	X	X	X
16	10/28/20	3:20pm	MW-17005			3	1	1			
17	10/29/20	8:25am	MW - 17001R			3	1	1			
18	10/29/20	9:08am	MW - 15016R			3	1	1			
19	10/29/20	10:15am	MW - 15017			3	1	1			
20	10/29/20	10:15am	MW - 17002			3	1	1			
21	10/29/20	12:25pm	MW - 17003			3	1	1			
22	10/29/20	1:05pm	MW - 15018			3	1	1			
23	10/29/20	2:50pm	MW - 17004			3	1	1			
24	10/29/20	3:30pm	MW - 15019			3	1	1			

Please Sign	Released By	Received By	Date	Time	Released By	Analysis Requested						
						Received By	Date	Time	Released By	Received By	Date	Time
1) Anyka Thomson		Anyka Thomson	10/30/20	12:35pm	2)							
3)												

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### CHAIN-OF-CUSTODY RECORD

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Phone 231.773.5998  
Fax 888.979.4469  
www.trace-labs.com

Trace ID No.  
20J0991

Page 2 of 2

#### Report Results To:

Company Name: HDR, Inc.	PO #: 10220433
Report To: Molina Reeves	Contact Name: lava.sugrue
Mailing Address: 5321 Bronson Blvd	Billing Address (if different): 5205 Data Ct.
City, State, Zip Code: Muskegon, MI 49408	City, State, Zip Code: Ann Arbor, MI 48108
Office Phone: Cell Phone: 734-751-1790	Phone Number: 734-332-6405
Email Address: molina.reeves@harrinc.com	Billing Email Address: lava.sugrue@harrinc.com

#### Turnaround Requirements:

- Standard, 5-10 Days  
 3 Day\*  
 1 Day\*

\*Results provided end of business day, requires prior approval.

#### Analysis Requested

Matrix Key:  
S = Soil / Solid  
W = Water  
SL = Sludge  
OI = Oil  
D = Drinking Water

Trace No.	Date Collected	Time Collected	Client Sample ID	Metals Field Filtered (Y / N)	Matrix	Number of Containers	Preservation				
25	10/30/20	8:15am	MW-15015R	N	W	3	2	Cool	TSS, TDS, F, Cl, SO4		
26	10/30/20	9:20am	MW-15023	Y	HCl	3	1	HNO3	Total Metals		
27	10/30/20	10:55am	MW-15021	Y	H2SO4	3	1	NaOH	Radium 226/228		
28	10/30/20	11:40am	MW-17004	Y	Other	3	1				
Remarks											
Possible Health Hazards?											

#### Trace Use:

Logged By: NC	Checked By: JS
Soil Volatiles Preserved (circle if applicable):	
MoH	Low Level
Sampling Time:	

Please Sign	Released By	Received By	Date	Time	Released By	Received By	Date	Time
1) Anika Thomson		10/30/20	12:25pm	2)				
3)								
In executing this Chain of Custody, the client acknowledges the terms as set forth at <a href="http://www.trace-labs.com/terms-of-agreement">www.trace-labs.com/terms-of-agreement</a> .								



Check this box if you would not like your samples analyzed if received outside of the conditions outlined in the Trace Sample Acceptance Policy at [www.trace-labs.com/downloads](http://www.trace-labs.com/downloads).

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### SAMPLE LOG IN CHECKLIST

Trace ID #:	20J0991	Date:	10/28/20	Package Description:	Cooler	Temperature:	-0.6
Client Name:	HDR	Time:	16:29	Logged in by:	JS		

#### Cooler Receipt

Cooler/samples delivered by:	Trace courier <input type="checkbox"/>	Hand delivered <input checked="" type="checkbox"/>	Name of delivery person: Anyka Thomson
Commercial courier <input type="checkbox"/>	UPS <input type="checkbox"/>	FED EX <input type="checkbox"/>	US Mail <input type="checkbox"/>
Tracking Number:	<input checked="" type="checkbox"/> Not Applicable		
Tracking #: _____			
COC Seals present and intact on cooler?	<input checked="" type="checkbox"/> Not Applicable	<input type="checkbox"/> No	<input type="checkbox"/> Yes
Custody seals signed by Client?	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	Client custody seal # (if applicable): _____

#### Coolant and Temperature

Type of Coolant Used	Slurry w/ crushed, cubed, or chip ice? <input checked="" type="checkbox"/>	Multiple bags of ice around samples? <input type="checkbox"/>	Ice Packs/ Blue Ice : <input type="checkbox"/>	No Coolant Present: <input type="checkbox"/>	Correction Factors:	Digital Stick Thermometer CF = -0.6°C
						IR Thermometer CF = -0.8°C
Ice still present upon receipt (circle one):	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A		Representative Sample Temperature: <input checked="" type="checkbox"/> 1.0	°C (check one below)
					<input checked="" type="checkbox"/> Temp Blank (Stick Thermometer)	
					<input type="checkbox"/> Client Sample (IR Thermometer)	
Melt Water:	<input type="checkbox"/> none °C (Use Digital Stick Thermometer)					

#### General

	Yes	No	NA	Comments
All bottles arrived unbroken with labels in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Each sample point is in a sealed plastic bag?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
Labels filled out completely?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
All bottle labels agree with Chain of Custody (COC)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Sufficient sample to run tests requested?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
*pH checked - samples at correct pH and labeled as such?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Correct chemical preservative added to samples?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Air bubbles absent from VOAs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
COC filled out properly and signed by client?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
COC signed in by TRACE sample custodian?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Was project manager called and samples discussed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____

Notes:

\*EMD pH Test Strips Used:

pH 0-2.5 Lot: HC908519  pH 11.0-13.0 Lot: HC729101

Other: \_\_\_\_\_

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### SAMPLE LOG IN CHECKLIST

Trace ID #:	20J0991	Date:	10/30/20	Package Description:	Cooler	Temperature:	1.3
Client Name:	HDR, Inc			Time:	12:35	Logged in by:	NC

#### Cooler Receipt

Cooler/samples delivered by:	Trace courier <input type="checkbox"/>	Hand delivered <input checked="" type="checkbox"/>	Name of delivery person: _____
	Commercial courier <input type="checkbox"/>	UPS <input type="checkbox"/> FED EX <input type="checkbox"/> US Mail <input type="checkbox"/>	
Tracking Number:	<input checked="" type="checkbox"/> Not Applicable		
	Tracking #: _____		
COC Seals present and intact on cooler?	<input checked="" type="checkbox"/> Not Applicable	<input type="checkbox"/> No	<input type="checkbox"/> Yes
Custody seals signed by Client?	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	Client custody seal # (if applicable): _____

#### Coolant and Temperature

Type of Coolant Used	Slurry w/ crushed, cubed, or chip ice? <input type="checkbox"/>	Multiple bags of ice around samples? <input checked="" type="checkbox"/>	Ice Packs/ Blue Ice : <input type="checkbox"/>	No Coolant Present: <input type="checkbox"/>	Correction Factors:	•Digital Stick Thermometer CF = -0.6°C
					•IR Thermometer CF = -0.8°C	
Ice still present upon receipt (circle one):	<input checked="" type="checkbox"/> Yes	No	N/A	Representative Sample Temperature:	5.7	°C (check one below)
				<input checked="" type="checkbox"/> Temp Blank (Stick Thermometer)		
				<input type="checkbox"/> Client Sample (IR Thermometer)	N/A	°C (Use Digital Stick Thermometer)
Melt Water:						

#### General

	Yes	No	NA	Comments
All bottles arrived unbroken with labels in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Each sample point is in a sealed plastic bag?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Labels filled out completely?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All bottle labels agree with Chain of Custody (COC)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sufficient sample to run tests requested?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
*pH checked - samples at correct pH and labeled as such?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	HNO <sub>3</sub> added @ 14:10
Correct chemical preservative added to samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Air bubbles absent from VOAs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
COC filled out properly and signed by client?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COC signed in by TRACE sample custodian?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was project manager called and samples discussed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

#### Notes:

#### \*EMD pH Test Strips Used:

- pH 0-2.5 Lot: HC908519  pH 11.0-13.0 Lot: HC729101

Other: \_\_\_\_\_

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