

January 29, 2020

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TRANSMITTAL OF 2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT AND  
FOURTH QUARTER 2019 HYDROGEOLOGICAL MONITORING REPORT FOR JH CAMPBELL POWER PLANT POND  
A CCR UNIT

Mr. Walters,

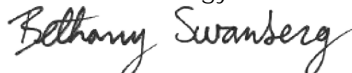
On March 18, 2019, Consumers Energy submitted the Pond A Hydrogeological Monitoring Plan, JH Campbell Power Plant, West Olive, Michigan (Pond A HMP) (TRC, March 2019; Revised July 2019), which includes the Pond A Assessment Monitoring Plan (Pond A AMP), to EGLE to comply with the requirements of Part 115, Rule 299.4905 and the December 21, 2018 Consent Agreement No. 115-01-2018. The Pond A HMP and AMP were revised per EGLE comments on July 30, 2019 and approved by EGLE on August 13, 2019. The Pond A HMP and AMP were implemented during the fourth quarter of 2019. Results from the fourth quarter monitoring at Pond A are combined with the Annual Report required under §257.90(e) of the USEPA RCRA CCR Rule.

Enclosed you will find the above-referenced groundwater monitoring report for JH Campbell Pond A. The monitoring was conducted by TRC and Consumers Energy Laboratory Services and the report was prepared by TRC under the direction of Consumers Energy Environmental Services. The report was prepared in conformance with the JH Campbell approved HMP and AMP, and, for the fourth quarter monitoring event, the report includes the items listed in Appendix A (Solid Waste Monitoring Submittal Components) of the May 15, 2015 Michigan Department of Environmental Quality - Office of Waste Management and Radiological Protection (now EGLE) communication prescribing the format for solid waste disposal facility monitoring submittals.

Should you have any questions regarding this submittal, please contact the undersigned at 517 788 0282.

Regards,

Consumers Energy



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Encl: JHC Pond A – 2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT AND  
FOURTH QUARTER 2019 HYDROGEOLOGICAL MONITORING REPORT FOR JH CAMPBELL POWER  
PLANT POND A CCR UNIT

JHC Pond A – 4Q2019 Laboratory Analysis Data Spreadsheet



2019 Annual Groundwater Monitoring and  
Corrective Action Report and Fourth  
Quarter 2019 Hydrogeological Monitoring  
Report

**JH Campbell Power Plant  
Pond A CCR Unit**

West Olive, Michigan

January 2020



2019 Annual Groundwater Monitoring and  
Corrective Action Report and Fourth Quarter 2019  
Hydrogeological Monitoring Report

JH Campbell Power Plant  
Pond A CCR Unit

*West Olive, Michigan*

January 2020

*Prepared For  
Consumers Energy Company*

A handwritten signature in black ink, appearing to read "Sarah B. Holmstrom".

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Project Hydrogeologist

A handwritten signature in black ink, appearing to read "Graham Crockford".

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Graham Crockford, C.P.G.  
Program Manager

TRC | Consumers Energy

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# Executive Summary

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On behalf of Consumers Energy, TRC has prepared this report for JH Campbell (JHC) Pond A to cover the period of January 1, 2019 to December 31, 2019. This report serves purposes under both the CCR Rule and Part 115 and includes the following:

- Annual Report documenting the status of groundwater monitoring and corrective action for 2019 in accordance with §257.90(e); and
- Quarterly Hydrogeological Monitoring Report for the fourth quarter of 2019 prepared in accordance with the *Format for Solid Waste Disposal Monitoring Submittals* by the Michigan Department of Environment, Great Lakes, and Energy (EGLE).

Under the CCR Rule, Pond A was in assessment monitoring at the beginning and at the end of the period covered by this report. Data that have been collected and evaluated in 2019, including assessment monitoring data from November 2018, are presented in this report. Given the alignment of PA 640 to comply with the RCRA CCR Rule and the congruencies between the two programs, this report also serves as the fourth quarter 2019 Hydrogeological Monitoring Report.

Consumers Energy first reported the potential for statistically significant increases (SSIs) for Appendix III constituents in the *Annual Groundwater Monitoring Report, JH Campbell Power Plant, Pond A CCR Unit* (TRC, January 2018). The statistical evaluation of the Appendix III indicator parameters confirming SSIs over background were as follows:

- Boron at JHC-MW-15006, JHC-MW-15007, JHC-MW-15008, JHC-MW-15009, JHC-MW-15010, and JHC-MW-15011; and
- Sulfate at JHC-MW-15006, JHC-MW-15007, JHC-MW-15008, JHC-MW-15009, JHC-MW-15010, and JHC-MW-15011.

On April 25, 2018, Consumers Energy entered assessment monitoring upon determining that an Alternate Source Demonstration for the Appendix III constituents was not successful. After subsequent sampling for Appendix IV constituents, Consumers Energy provided notification that arsenic was present at statistically significant levels above the federal groundwater protection standard (GWPS) established at 10 ug/L (TRC, 2019) in one out of six downgradient monitoring wells at Pond A as follows:

- Arsenic at JHC-MW-15011.

The *Assessment of Corrective Measures* (ACM) was initiated on April 15, 2019 and was certified and submitted to the EGLE on September 11, 2019 in accordance with the schedule in §257.96 and in compliance with R 443(3) of the Part 115 Rules. The certification for a 60-day time

extension to the 90-day completion period of the ACM required per §257.96(a) is included in this report.

The ACM documents that the groundwater nature and extent has been defined, as required in §257.95(g)(1). Per §257.96(b), Consumers Energy is continuing to monitor groundwater in accordance with the assessment monitoring program as specified in §257.95 in addition to quarterly groundwater monitoring in accordance with the EGLE-approved Pond A Hydrogeological Monitoring Plan (Pond A HMP), which was implemented starting in fourth quarter 2019. Overall, the assessment monitoring statistical evaluations have confirmed that arsenic is the only Appendix IV constituent present at statistically significant levels above the groundwater protection standards (GWPS) and groundwater monitoring downgradient from Pond A further demonstrate that there are currently no adverse effects on human health or the environment from either surface water or groundwater due to the CCR management at Pond A.

Consumers Energy has not selected a remedy pursuant to §257.97 and R 444 of Part 115. The semiannual progress report describing the progress in selecting and designing the remedy required pursuant to §257.97(a) is included in this report. The *"JH Campbell Generating Facility Pond A Closure Plan, West Olive, Michigan"* prepared by Golder in October 2016 was submitted to and approved by EGLE and an updated closure plan detailing the final cover system was submitted to the EGLE in February 2019. Cover construction was completed in summer 2019 and the Closure Certification Report was approved by the EGLE on November 25, 2019. Changes in groundwater chemistry continue to be evaluated following the completion of capping at Pond A. Groundwater monitoring in 2020 will reduce uncertainty surrounding potential changes in redox conditions and the effect on contaminant transport. These observations will be critical for the comparison of corrective measures alternatives.

Consumers Energy will continue to evaluate corrective measures in accordance with §257.96 and §257.97 as outlined in the ACM and 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 site groundwater conditions and inform the remedy selection. The next quarterly monitoring event is tentatively scheduled for February 2020 and then next semiannual assessment monitoring event is scheduled to occur in the May 2020.



# Section 1

## Introduction

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On April 17, 2015, the United States Environmental Protection Agency (USEPA) published the final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) (the CCR Rule) (USEPA, April 2015 as amended). Standards for groundwater monitoring and corrective action codified in the CCR Rule (40 CFR 257.90 – 257.98), apply to the Consumers Energy Company (Consumers Energy) Pond A CCR Unit at the JH Campbell Power Plant Site (JHC Pond A). Pursuant to the CCR Rule, no later than January 31, 2018, and annually thereafter, the owner or operator of a CCR unit must prepare an annual groundwater monitoring and corrective action report for the CCR unit documenting the status of groundwater monitoring and corrective action for the preceding year in accordance with §257.90(e).

On December 28, 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). On March 18, 2019, Consumers Energy submitted the *Pond A Hydrogeological Monitoring Plan, JH Campbell Power Plant, West Olive, Michigan* (Pond A HMP) (TRC, March 2019; Revised July 2019), which includes the *Pond A Assessment Monitoring Plan* (Pond A AMP), to EGLE to comply with the requirements of Part 115, Rule 299.4905 and the December 21, 2018 Consent Agreement No. 115-01-2018. The Pond A HMP and AMP were revised per EGLE comments on July 30, 2019 and approved by EGLE on August 13, 2019. The Pond A HMP and AMP were implemented during the fourth quarter of 2019.

On behalf of Consumers Energy, TRC has prepared this Annual Groundwater Monitoring Report JHC Pond A to cover the period of January 1, 2019 to December 31, 2019. Pond A was in assessment monitoring at the beginning and at the end of the period covered by this report. Data that have been collected and evaluated in 2019, including assessment monitoring data from November 2018, are presented in this report. Given the alignment of PA 640 to comply with the RCRA CCR Rule and the congruencies between the two programs, this report also serves as the fourth quarter 2019 Hydrogeological Monitoring Report.

### 1.1 Statement of Adherence to Approved Hydrogeological Monitoring Plan

This fourth quarter 2019 JH Campbell Pond A Hydrogeological Monitoring Report and 2019 Annual Groundwater Monitoring Report (Report) has been prepared by TRC on behalf of Consumers Energy to present groundwater monitoring data collected from the JH Campbell Pond A. This report was prepared in accordance with the items listed in Appendix A (Solid

Waste Monitoring Submittal Components) of the May 15, 2015 Michigan Department of Environmental Quality - Office of Waste Management and Radiological Protection (MDEQ-OWMRP), now the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Materials Management Division (MMD) communication prescribing the format for solid waste disposal facility monitoring submittals as published in OWMRP-115-29, dated July 5, 2013 *Format for Solid Waste Disposal Monitoring Submittals*. All references herein to the EGLE are inclusive of the MDEQ. Information contained in this report was prepared in adherence to the July 2019 *Pond A Hydrogeological Monitoring Plan* and associated *Pond A Assessment Monitoring Plan*, approved by the EGLE on August 13, 2019.

## 1.2 Program Summary

Consumers Energy first reported the potential for statistically significant increases (SSIs) for Appendix III constituents in the *Annual Groundwater Monitoring Report, JH Campbell Power Plant, Pond A CCR Unit* (TRC, January 2018). The statistical evaluation of the Appendix III indicator parameters confirming SSIs over background were as follows:

- Boron at JHC-MW-15006, JHC-MW-15007, JHC-MW-15008, JHC-MW-15009, JHC-MW-15010, and JHC-MW-15011; and
- Sulfate at JHC-MW-15006, JHC-MW-15007, JHC-MW-15008, JHC-MW-15009, JHC-MW-15010, and JHC-MW-15011.

As discussed in the *2018 Annual Groundwater Monitoring Report for the JH Campbell Power Plant Pond A CCR Unit* (2018 Annual Report) (TRC, January 2019), Consumers Energy initiated an Assessment Monitoring Program for Pond A pursuant to §257.95 of the CCR Rule that included sampling and analyzing groundwater within the groundwater monitoring system for all constituents listed in Appendix III and Appendix IV. On April 25, 2018, Consumers Energy entered assessment monitoring upon determining that an Alternate Source Demonstration for the Appendix III constituents was not successful. After subsequent sampling for Appendix IV constituents, Consumers Energy provided notification that arsenic was present at statistically significant levels above the federal groundwater protection standards (GWPS) established at 10 ug/L (TRC, 2019) in one out of six downgradient monitoring wells at Pond A as follows:

- Arsenic at JHC-MW-15011.

The CCR Rule 40 CFR §257.96(a) requires that an owner or operator initiate an assessment of corrective measures (ACM) to prevent further release, to remediate any releases, and to restore impacted areas to original conditions if any Appendix IV constituent has been detected at a statistically significant level exceeding a GWPS. The *Assessment of Corrective Measures (ACM)* (TRC, September 2019) was initiated on April 15, 2019 and was certified and submitted to EGLE on September 11, 2019 in accordance with the schedule in §257.96. In addition, Consumers Energy is preparing a site-wide remedial action plan (RAP) for the JH Campbell site per the

Consent Agreement No. 115-01-2018 executed by Consumers Energy and the EGLE on December 21, 2018.

The ACM documents that the groundwater nature and extent has been defined, as required in §257.95(g)(1), based on the site-specific hydrogeology and data collected from existing monitoring wells. Although arsenic concentrations exceed the GWPS in on-site groundwater, arsenic is delineated within the limits of the property owned by Consumers Energy and there are currently no adverse effects on human health or the environment from either surface water or groundwater due to CCR management at Pond A.

Consumers Energy will continue to evaluate corrective measures in accordance with §257.96 and §257.97 as outlined in the ACM and 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 as presented in this report.

### 1.3 Site Overview

The JH Campbell Plant is a coal fired power generation facility located in West Olive, Michigan, on the eastern shore of Lake Michigan. It is bordered by the Pigeon River on the south, 156<sup>th</sup> Avenue on the east, and Croswell Street to the north with Lakeshore Drive bisecting the site from north to south. The power generating plant consists of three coal fired electric generating units located on the western side of the site and the CCR disposal area is on the east side of the site, east of Lakeshore Drive. Figure 1 is a site location map showing the facility and the surrounding area.

Currently, there are no remaining active CCR surface impoundments at the JHC solid waste disposal facility. The CCR disposal area had contained two primary components: a system of wet ash ponds and a dry ash disposal facility (i.e., the Dry Ash Landfill). The CCR surface impoundments located within the former wet ash pond area are Pond 1-2 Bottom Ash Ponds (Ponds 1-2), Pond 3 North and Pond 3 South Bottom Ash Pond (collectively Pond 3), and Pond A. All of these impoundments have been deactivated and decommissioned. The existing Dry Ash Landfill is a double-composite geomembrane lined landfill which is licensed and permitted for CCR disposal and includes two double-lined leachate and contact water retention ponds. Site features are shown on Figure 2.

Dry, moisture-conditioned CCR from the three coal fired electric generating units continues to be managed in the licensed Dry Ash Landfill which is regulated under Part 115 of the Natural Resources and Environmental Protection Act (NREPA), PA 451 of 1994, as amended, and monitored in adherence to the facility's EGLE-approved *Hydrogeological Monitoring Plan (HMP) for JH Campbell Ash Storage Facility, Consumers Power Company, Solid Waste Disposal Area, Coal Ash, Type III* (September 1996).

The surface impoundments in the wet ash pond areas (Pond 3 and Ponds 1-2) were decommissioned throughout 2017 and 2018 and replaced with concrete bottom ash treatment tanks, which became operational in July 2018. In addition, Pond A has been decommissioned with final cover placed in summer 2019. Groundwater monitoring is being conducted at Pond A during the post-closure period under the *Pond A Hydrogeological Monitoring Plan, JH Campbell Power Plant, West Olive, Michigan* (March 2019; Revised July 2019) (approved by EGLE August 13, 2019), as well as in accordance with the RCRA CCR Rule.

Bottom ash is currently sluiced to the concrete tanks where it is dewatered. The settled and dewatered bottom ash is beneficially reused or managed at the Dry Ash Landfill. Sluice water decanted from the tanks flows through a permitted ditching system to the recirculation pond. Water in the recirculation pond is then discharged through a National Pollutant Discharge Elimination System (NPDES) permitted outfall and into Pigeon River.

The purpose of the dry ash disposal facility is to contain dry bottom and fly ash produced as a result of burning coal for power production. Dry ash from all generating units is stored in silos until it is placed into the facility or is sold and shipped off site. This report focuses on Pond A.

## 1.4 Geology/Hydrogeology

The upgradient/background wells are located to the north-northwest of the JHC Dry Ash Landfill. Groundwater is typically encountered around 30 to 35 feet below ground surface (ft bgs), except in the recently excavated areas of Bottom Ash Ponds 1-2 and Bottom Ash Pond 3 South where groundwater is now within 5 to 10 ft bgs due to grade changes, and generally flows to the south-southeast toward the Pigeon River. The subsurface materials encountered at the JH Campbell site generally consist of approximately 40 to 60 feet of poorly graded, fine-grained lacustrine sand. A laterally extensive clay-rich till is generally encountered within approximately 40 to 60 ft bgs across the site that according to deep drilling logs conducted at the JH Campbell Power Plant (just west of the CCR units) is on the order of 80 feet thick and extends to the top of shale bedrock approximately 140 ft bgs.

# Section 2

## Groundwater Monitoring

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### 2.1 Monitoring Well Network

In accordance with 40 CFR 257.91, Consumers Energy established a groundwater monitoring system for the JHC Pond A, which consists of 12 monitoring wells (six background monitoring wells and six downgradient monitoring wells) that are screened in the uppermost aquifer. The monitoring well locations are shown on Figure 2. Six monitoring wells located north-northwest of the Dry Ash Landfill provide data on background groundwater quality that has not been affected by CCR management at the site (JHC-MW-15023 through JHC-MW-15028). Background groundwater quality data from these six background wells are additionally used for the CCR groundwater monitoring program at three other CCR units on the JHC site. The six downgradient wells (JHC-MW-15006 through JHC-MW-15011) are located south and southeast of Pond A.

As shown on Figure 2, monitoring wells JHC-MW-15029 and JHC-MW-15030 are used for water level measurements only.

#### 2.1.1 Monitoring Wells Removed

Monitoring well JHC-MW-15008, located downgradient of Pond A, was decommissioned in June 2019 due to insufficient groundwater recharge as a result of the groundwater table re-equilibrating to a lower elevation subsequent to decommissioning Pond A. JHC-MW-15008R was installed in the vicinity of the decommissioned well JHC-MW-15008 to continue to evaluate groundwater downgradient of Pond A. Well decommissioning, installation, and construction are documented in Appendix A.

#### 2.1.2 Monitoring Wells Installed

Five shallow and deep step-out temporary monitoring wells were installed downgradient of Pond A (TW-19-04A, TW-19-04B, TW-19-05, TW-19-06A, and TW-19-06B) in June 2019. These were installed in order to further characterize the nature and extent of statistically significant exceedances of Appendix IV constituents compared to GWPSs established in October 2018 (TRC, October 2018). Well installation and construction details are documented in Appendix A.

## 2.2 November 2018 Assessment Groundwater Monitoring

As discussed in the 2018 Annual Report, the second 2018 semiannual monitoring event was conducted in November 2018, but laboratory analysis and data quality review were ongoing as of the writing of the 2018 Annual Report. A summary of the November 2018 assessment monitoring event was prepared under a separate cover, submitted to the EGLE on March 15, 2019, and is included in Appendix B.

## 2.3 April 2019 Assessment Monitoring

Per §257.95(d), all wells in the CCR monitoring program must be sampled at least semiannually. One semiannual event must include analysis for all constituents from Appendix III and Appendix IV and one semiannual event may include analysis for all constituents in Appendix III and those constituents in Appendix IV of the CCR Rule that were detected during prior sampling. In addition to the Appendix III and IV constituents, field parameters including dissolved oxygen, oxidation reduction potential, specific conductivity, temperature, and turbidity were collected at each well. Samples were collected and analyzed according to the *JH Campbell Monitoring Program Sample Analysis Plan (SAP)* (ARCADIS, May 2016).

### 2.3.1 Data Summary

The first semiannual groundwater assessment monitoring event for 2019 was performed on April 22 through April 26 and April 29, 2019 by TRC personnel, and samples were analyzed by Eurofins TestAmerica Laboratories Inc. (TestAmerica) in accordance with the SAP. Static water elevation data were also collected. Groundwater samples were collected from the 6 background monitoring wells and 6 downgradient monitoring wells for the Appendix III and Appendix IV constituents and field parameters. A summary of the groundwater data collected during the April 2019 event is provided on Table 1 (static groundwater elevation data), Table 2 (field data), Table 3 (background well analytical results), and Table 4 (Pond A downgradient well analytical results).

### 2.3.2 Data Quality Review

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

### 2.3.3 Groundwater Flow Rate and Direction

Groundwater elevations measured across the Site during the April 2019 event are provided on Table 1. April 2019 groundwater elevations were used to construct the groundwater contour map provided on Figure 3. The average hydraulic gradient was

calculated using the following well pairs: JHC-MW-15029/JHC-MW-15030, JHC-MW-15029/JHC-MW-15005, JHC-MW-15019/JHC-MW-15035 and JHC-MW-15023/JHC-MW-15037 (Figure 2). Using the mean hydraulic conductivity of 62 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.4, the estimated average seepage velocity is approximately 0.66 ft/day or 240 ft/year for the April 2019 event.

The general groundwater flow direction is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells are appropriately positioned to detect the presence of Appendix III and IV constituents that could potentially migrate from Pond A.

## 2.4 October 2019 Assessment Monitoring

TRC personnel performed gauging and sampling of monitoring wells associated with Pond A from October 7 through October 11, 2019. This event serves as the second semiannual assessment monitoring event in accordance with the CCR Rule and the fourth quarter 2019 monitoring event per the Pond A HMP and AMP. The AMP consists of quarterly monitoring at the background and downgradient monitoring wells outlined in Section 2.1 above, as well as groundwater-surface water interface (GSI) compliance monitoring wells MW-13-96, MW-14S, PZ-24S, and PZ-40S located further downgradient of Pond A. Groundwater monitoring was performed in accordance with the SAP and the approved site Pond A HMP and AMP. Groundwater samples collected during the October 2019 event were submitted to TestAmerica for analysis of the following metals and inorganic indicator constituents:

Section 11511a(3)(c) – Detection Monitoring Constituents	Section 11519b(2) – Assessment Monitoring Constituents
Boron	Antimony
Calcium	Arsenic
Chloride	Barium
Fluoride	Beryllium
Iron	Cadmium
pH	Chromium, total
Sulfate	Cobalt
Total Dissolved Solids (TDS)	Copper
	Fluoride
	Lead
	Lithium
	Mercury
	Molybdenum
	Nickel
	Radium 226/228

Section 11511a(3)(c) – Detection Monitoring Constituents	Section 11519b(2) – Assessment Monitoring Constituents
	Selenium Silver Thallium Vanadium Zinc

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

Groundwater samples were collected using a peristaltic pump or submersible pump in accordance with low flow sampling protocol and were not field filtered to allow for total metals analysis. Monitoring wells JHC-MW-15007, JHC-MW-15009, and MW-13 were dry during this sampling event; therefore, samples were not collected from these wells. All samples were collected in vendor-provided, nitric acid pre-preserved (metals only) and unpreserved sample containers and submitted to the laboratory for analysis. TRC followed chain of custody procedures to document the sample handling.

TRC collected quality assurance/quality control (QA/QC) samples during the October 2019 groundwater sampling event. The QA/QC samples consisted one field duplicate (JHC-MW-15008R), and two field matrix spike/matrix spike duplicate (MS/MSD) sample collected from MW-40s and JHC-MW-15010. Field and trip blanks were not collected specifically at Pond A; however, blanks were collected at the associated downgradient nature and extent locations and at other locations at the site during the October 2019 sampling event.

#### 2.4.1 Analytical Data and Relevant Screening Criteria

Analytical results from the fourth quarter (second semiannual) 2019 monitoring event are included in the attached laboratory reports (Appendix I). Fourth quarter 2019 groundwater analytical data is summarized in Table 3 (background monitoring wells), Table 4 (downgradient monitoring wells), and Table 5 (GSI monitoring wells), as well as the associated Part 201 generic drinking water criteria and generic GSI criteria.



## 2.4.2 Data Quality Review

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

## 2.4.3 Groundwater Flow Rate and Direction

Groundwater elevations measured across the Site during the October 2019 event are provided on Table 1. October 2019 groundwater elevations were used to construct the groundwater contour map provided on Figure 4. The average hydraulic gradient was calculated using the following well pairs: JHC-MW-15029/JHC-MW-15030, JHC-MW-15029/JHC-MW-15005, JHC-MW-15019/JHC-MW-15035 and JHC-MW-15023/JHC-MW-15037 (Figure 2). Using the mean hydraulic conductivity of 62 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.4, the estimated average seepage velocity is approximately 0.66 ft/day or 239 ft/year for the October 2019 event.

The general groundwater flow direction is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells are appropriately positioned to detect the presence of constituents that could potentially migrate from Pond A.

# Section 3

## Statistical Evaluation

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Assessment monitoring is continuing at Pond A in accordance with the AMP and while corrective measures are further evaluated in accordance with §257.96 and §257.97 as outlined in the ACM. The following section summarizes the statistical approach applied to assess the 2019 groundwater data in accordance with the assessment monitoring program. The statistical evaluation details are provided in Appendix B (*November 2018 Assessment Monitoring Data Summary and Statistical Evaluation*), Appendix D (*June 2018 Statistical Evaluation of Initial Assessment Monitoring Event*), Appendix E (*April 2019 Assessment Monitoring Data Summary and Statistical Evaluation*), and Appendix F (*October 2019 Assessment Monitoring Data Summary and Statistical Evaluation*).

### 3.1 Establishing Groundwater Protection Standards

The Appendix IV GWPSs are used to assess whether Appendix IV constituent concentrations are present in groundwater at unacceptable levels as a result of CCR Unit operations by statistically comparing concentrations in the downgradient wells to the GWPSs for each Appendix IV constituent. The calculation of the GWPSs is documented in the *Groundwater Protection Standards* technical memorandum included in Appendix C of the 2018 Annual Report.

Pursuant to the Pond A AMP, GWPSs were established for the Appendix III constituents in accordance with 40 CFR 257.95(h)<sup>1</sup>. The calculation of the Appendix III GWPSs is documented in the *Groundwater Protection Standards* technical memorandum included in Appendix G of this Annual Report. Per the Pond A AMP, GWPSs will be established for the Section 11511a(3) constituents not included in Appendix III of the CCR rule (i.e. iron) and the Section 11519b(2) constituents not included in Appendix IV of the CCR rule (i.e. copper, nickel, silver, vanadium, and zinc) following the collection of a minimum of four independent data points.

### 3.2 Data Comparison to Groundwater Protection Standards

Consistent with the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance) (USEPA, 2009), the preferred method for comparisons to a fixed standard are confidence limits. An exceedance of the standard occurs when the 99 percent lower confidence level of the downgradient data exceeds the GWPS. As documented in the January 14, 2019 *Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g)*, arsenic was present at statistically significant levels above the GWPSs in one of

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<sup>1</sup> As amended per Phase One, Part One of the CCR Rule (83 FR 36435).

the six downgradient wells (JHC-MW-15011) at Pond A based on the statistical data comparison for the first semiannual assessment monitoring event (June 2018) (Appendix D).

The four semiannual statistical evaluations have confirmed that arsenic at JHC-MW-15011 is the only Appendix IV constituent present at statistically significant levels above the GWPSs. The statistical evaluation of the data collected during both semiannual assessment monitoring events for 2019 indicates that the lower confidence limit for arsenic at JHC-MW-15011 is equal to the GWPS (10 ug/L), which is a slight decrease from the lower confidence limit of 11 ug/L observed during the June 2018 event. As shown in the data tables and trend tests included in Appendix F, arsenic concentrations observed in 2019 at monitoring well JHC-MW-15011 are showing a general increase compared to previous events. Although the increasing concentrations do not show a statistically significant increasing trend, the variability in the dataset caused by the increasing concentrations results in a wider confidence interval. As a result, the lower confidence limit is lower, and the upper confidence limit is higher compared to previous events. A summary of the confidence intervals for April 2019 and October 2019 are provided in Table 6 and Table 7, respectively. Table 8 provides a summary of the statistically significant GWPS exceedances over the most recent four monitoring events.

No other constituents were observed at statistically significant levels exceeding the Appendix III or Appendix IV GWPSs in downgradient monitoring wells at the JHC Pond A CCR unit during the 2019 reporting period.

Groundwater chemistry is currently changing as a result of closure activities performed at Pond A. As discussed in the ACM, Pond A has been decommissioned and capped, and groundwater flow direction has changed such that groundwater generally flows to the south-southeast and mounding is no longer observed. The cessation of hydraulic loading and recharge of the aquifer are expected to have changed groundwater conditions, and many Appendix III and Appendix IV constituents may be affected by this change. Groundwater conditions will continue to be monitored while corrective measures continue to be evaluated and a remedy is selected. Groundwater monitoring in 2020 may reduce uncertainty surrounding the potential changes in groundwater oxidation-reduction conditions and the effect on contaminant transport. These observations will be critical for the comparison of corrective measures alternatives.

### 3.3 GSI Compliance Monitoring Trends

Pursuant to the AMP, trend tests will be used to evaluate groundwater quality at the GSI monitoring wells. The GSI monitoring wells will be evaluated for detected constituents (antimony, arsenic, barium, chromium (total), lithium, molybdenum, and selenium) that, based on monitoring data from Pond A, have the potential to exceed generic GSI criteria at the Pond A downgradient monitoring wells as detailed in the AMP. An insufficient number of data points

exist for the GSI monitoring wells to complete a statistical evaluation of trends at all locations for fourth quarter 2019. Trend analysis will be completed following the collection of a minimum of four sampling events under the CCR monitoring program and the Pond A AMP<sup>2</sup>. In the interim, time-series plots for the GSI monitoring wells MW-13, MW-14S, P-24S, and PZ-40S, including data collected from June 2018 through October 2019 for the aforementioned GSI monitoring constituents detailed in the Pond A AMP, are included in Appendix H.

All of the constituent concentrations at the GSI monitoring wells are below their respective Part 201 generic GSI criteria in October 2019 (Table 4) and there are no apparent trends based on review of the available data shown on the trend plots (Appendix H).

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<sup>2</sup> Consistent with the Unified Guidance, a minimum of four observations, preferably eight or more, is required to construct trends using the Sen's Slope estimator.

# Section 4

## Corrective Action

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Consumers Energy provided notification that arsenic was present at statistically significant levels above the federal groundwater protection standard (GWPS) established at 10 ug/L (TRC, 2019) in one out of six downgradient monitoring wells at Pond A as follows:

- Arsenic at JHC-MW-15011.

The CCR Rule 40 CFR §257.96(a) requires that an owner or operator initiate an assessment of corrective measures (ACM) to prevent further release, to remediate any releases, and to restore impacted areas to original conditions if any Appendix IV constituent has been detected at a statistically significant level exceeding a GWPS. The *Assessment of Corrective Measures (ACM)* (TRC, September 2019) was initiated on April 15, 2019 and was certified and submitted to EGLE on September 11, 2019 in accordance with the schedule in §257.96. In addition, Consumers Energy is preparing a site-wide remedial action plan (RAP) for the JH Campbell site per the Consent Agreement No. 115-01-2018 executed by Consumers Energy and the EGLE on December 21, 2018.

### 4.1 Nature and Extent Groundwater Sampling

Per §257.95(g)(1), in the event that the facility determines, pursuant to §257.93(h), that there is a statistical exceedance of the GWPSs for one or more of the Appendix IV constituents, the facility must characterize the nature and extent of the release of CCR as well as any site conditions that may affect the remedy selected. The nature and extent data consist of Appendix III and IV constituents collected from the background and downgradient CCR monitoring well networks and from supplemental downgradient wells in the HMP monitoring well network. In addition to the existing HMP wells, TRC, on behalf of Consumers Energy, installed shallow and deep step out wells nested with existing downgradient wells MW-14, PZ-23, PZ-24, and PZ-40 (shallow well only) in April 2018 to further characterize the horizontal and vertical distribution of Appendix III and IV constituents in groundwater downgradient from the CCR units. Five shallow and deep step-out temporary monitoring wells were installed downgradient of Pond A (TW-19-04A, TW-19-04B, TW-19-05, TW-19-06A, and TW-19-06B) in June 2019. The locations of the additional downgradient step out wells are shown on Figure 2. A summary of the nature and extent groundwater data collected from February through October 2019, including both the April 2019 and October 2019 semiannual events, are provided on Table 1 (static water level data) and Table 9 (analytical results). The soil boring logs and well construction diagrams for the step out monitoring wells utilized for the nature and extent groundwater sampling are included in Appendix A.

As discussed in the ACM, the nature and extent of contamination (e.g. arsenic in groundwater) relative to GWPSs has been defined per the RCRA CCR rule requirements based on the site-specific hydrogeology. The presence of nearby surface water bodies (Recirculation Pond and the Pigeon River) as well as the unimpacted background monitoring wells to the north provide the boundaries for the extent of the GWPS exceedances. In addition, the underlying clay unit prevents the downward vertical migration of groundwater. Although Michigan Part 201 residential drinking water criteria are exceeded, there are no onsite drinking water wells downgradient from Ponds 1-2 and the closest downgradient drinking water wells are located south and east of the Pigeon River, separated hydraulically by the river. Shallow groundwater has the potential to vent to nearby surface water boundaries that are not used for drinking water. Although several Appendix III and IV constituents exceed the Michigan Part 201 generic groundwater-surface water interface (GSI) criteria in on-site wells, compliance for the GSI pathway is currently met for the Appendix III and IV constituents, including arsenic, based on data collected from the step out wells/GSI monitoring wells and the NPDES outfall at the Recirculation Pond.

## 4.2 Assessment of Corrective Measures

The ACM was completed on September 11, 2019 as a step towards developing a final remedy. The certification for a 60-day time extension to the 90-day completion period of the ACM required per §257.96(a) is included in Appendix K of this report.

Several groundwater remediation alternatives evaluated in the ACM are considered technically feasible to reduce on-site groundwater concentrations. The following corrective measures were retained for further evaluation in conjunction with closure in place for Pond A:

- Groundwater Monitoring and Institutional Controls;
- Post Source Control/Removal Monitoring;
- Groundwater Capture/Control;
- Impermeable Barrier with Groundwater Capture/Control;
- Active Geochemical Sequestration; and
- Passive Geochemical Sequestration.

Consumers Energy plans to utilize an adaptive management strategy for selecting the final groundwater remedy for Pond A in coordination with the specified CCR source material management strategies discussed in the ACM. Under this remedy selection strategy, measures that remove source material, reduce infiltration, and/or minimize the potential for future migration during the closure process may be implemented to address existing conditions

followed by monitoring and evaluation of the performance after closure. Adjustments will be made to the corrective measure remedy, as needed, to achieve the remedial goals (e.g. GWPS and/or risk/exposure/pathway-based criteria).

### 4.3 Remedy Selection

Consumers Energy has not selected a remedy pursuant to §257.97 and R 444 of Part 115. The semiannual progress report describing the progress in selecting and designing the remedy required pursuant to §257.97(a) is included in Appendix L of this report. Pond A has been closed according to the *“JH Campbell Generating Facility Pond A Closure Plan, West Olive, Michigan”* (Golder, October 2016) and the updated closure plan detailing the final cover system that was submitted to the EGLE in February 2019. Pond A is undergoing closure in place in accordance with the requirements for CCR landfills under RCRA (§257.102(d)). Cover construction was completed in summer 2019 and the Closure Certification Report was approved by the EGLE on November 25, 2019. Changes in groundwater chemistry continue to be evaluated following the completion of capping at Pond A. Groundwater monitoring in 2020 will reduce uncertainty surrounding potential changes in redox conditions and the effect on contaminant transport. These observations will be critical for the comparison of corrective measures alternatives.

# Section 5

## Conclusions and Recommendations

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Assessment monitoring is ongoing at the JHC Pond A CCR unit while corrective action continues to be assessed. Pond A has been decommissioned and the final cover has been placed. Overall, the statistical evaluations have confirmed that arsenic is the only Appendix IV constituent present at statistically significant levels above the GWPSs and compliance for the GSI pathway is currently met based on data collected from the GSI monitoring wells located downgradient from Pond A.

The ACM also documents that groundwater nature and extent have been defined, as required in §257.95(g)(1). Although arsenic concentrations had exceeded the GWPS in on-site groundwater, an evaluation of risk demonstrates that there are currently no adverse effects on human health or the environment from either surface water or groundwater due to CCR management at Pond A.

Consumers Energy has also completed the final cover for Pond A in summer of 2019. The ACM report provided a high-level assessment of groundwater remediation technologies that could potentially address site-specific constituents of concern (i.e. arsenic) under known groundwater conditions. Changes in groundwater chemistry continue to be evaluated following the completion of capping at Pond A. Groundwater monitoring in 2020 will reduce uncertainty surrounding potential changes in groundwater oxidation-reduction conditions and the effect on contaminant transport. These observations will be critical for the comparison of corrective measures alternatives.

Consumers Energy will continue to evaluate corrective measures in accordance with §257.96 and §257.97. The groundwater management remedy for the JHC Pond A will be selected as soon as feasible to, at a minimum, meet the federal standards of §257.97(b) of the CCR Rule. Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98. The next quarterly Pond A HMP monitoring event is tentatively scheduled for February 2020 and the next semiannual monitoring event is tentatively scheduled for May 2020.



# Section 6

## References

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# Tables

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Table 1  
 Summary of Groundwater Elevation Data – February 2019 - October 2019  
 JH Campbell – RCRA CCR Monitoring Program  
 West Olive, Michigan

Well Location	Ground Surface Elevation (ft)	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)	February 26, 2019		April 22, 2019		August 12, 2019		October 7, 2019		
					Depth to Water (ft BTOC)	Groundwater Elevation (ft)	Depth to Water (ft BTOC)	Groundwater Elevation (ft)	Depth to Water (ft BTOC)	Groundwater Elevation (ft)	Depth to Water (ft BTOC)	Groundwater Elevation (ft)	
<b>Background</b>													
JHC-MW-15023	617.01	619.98	Sand	603.0 to 593.0	--	--	15.40	604.58	16.70	603.28	15.85	604.13	
JHC-MW-15024	613.79	616.62	Sand	606.8 to 596.8	--	--	10.55	606.07	11.59	605.03	11.15	605.47	
JHC-MW-15025	614.14	617.17	Sand	607.1 to 597.1	--	--	9.64 <sup>(2)</sup>	607.53	10.65	606.52	10.08	607.09	
JHC-MW-15026	615.09	618.04	Sand	607.1 to 597.1	--	--	11.63	606.41	12.21	605.83	11.88	606.16	
JHC-MW-15027	614.77	617.30	Sand	604.8 to 594.8	--	--	12.11	605.19	12.51	604.79	12.42	604.88	
JHC-MW-15028	611.02	613.80	Sand	603.0 to 593.0	--	--	12.08	601.72	12.30	601.50	12.00	601.80	
JHC-MW-15029	608.08	610.95	Sand	600.1 to 590.1	--	--	9.83	601.12	10.18	600.77	9.50	601.45	
JHC-MW-15030	604.05	607.17	Sand	600.1 to 590.1	--	--	8.21	598.96	8.94	598.23	7.75	599.42	
<b>Pond 1N, 1S, 2N, 2S</b>													
JHC-MW-15001	607.02	609.53	Sand	603.5 to 598.5	11.23	598.30	11.42	598.11	11.70	597.83	11.10	598.43	
JHC-MW-15002	618.18	621.27	Sand	590.2 to 580.2	23.70	597.57	23.77	597.50	23.74	597.53	23.49	597.78	
JHC-MW-15003	623.16	627.20	Sand	595.2 to 585.2	32.14	595.06	32.28	594.92	32.38	594.82	32.05	595.15	
JHC-MW-15005	606.22	609.99	Sand	579.2 to 569.2	17.78 <sup>(3)</sup>	592.21	17.90	592.09	17.98	592.01	17.78	592.21	
JHC-MW-18004	602.92	605.72	Sand	596.9 to 586.9	11.10 <sup>(3)</sup>	594.62	11.34	594.38	11.65	594.07	10.98	594.74	
JHC-MW-18005	600.30	603.16	Sand	595.3 to 585.3	9.35 <sup>(3)</sup>	593.81	10.09	593.07	10.28	592.88	10.01	593.15	
<b>Pond 3N, 3S</b>													
JHC-MW-15013	632.40	635.25	Sand	604.4 to 594.4	34.40	600.85	34.47	600.78	34.58	600.67	34.00	601.25	
JHC-MW-15015	632.46	635.20	Sand	604.5 to 594.5	33.75	601.45	33.68	601.52	33.68	601.52	33.20	602.00	
JHC-MW-15016	631.81	632.52	Sand	603.8 to 593.8	30.98 <sup>(3)</sup>	601.54	30.90	601.62	30.97	601.55	30.54	601.98	
JHC-MW-18001	609.09	611.98	Sand	603.1 to 593.1	11.02 <sup>(3)</sup>	600.96	11.03	600.95	11.22	600.76	10.62	601.36	
JHC-MW-18002	605.53	608.93	Sand	602.0 to 592.0	8.25 <sup>(3)</sup>	600.68	8.27	600.66	8.59	600.34	7.94	600.99	
JHC-MW-18003	605.36	608.78	Sand	601.9 to 591.9	8.18 <sup>(3)</sup>	600.60	8.26	600.52	8.45	600.33	7.80	600.98	
<b>Landfill</b>													
JHC-MW-15017	613.69	616.61	Sand	603.7 to 593.7	--	--	13.71	602.90	14.00	602.61	13.58	603.03	
JHC-MW-15018	614.26	617.02	Sand	604.3 to 594.3	--	--	14.43	602.59	14.70	602.32	14.43	602.59	
JHC-MW-15019	609.81	612.86	Sand	603.8 to 593.8	--	--	10.80	602.06	11.07	601.79	11.00	601.86	
JHC-MW-15022	620.92	623.79	Sand	597.9 to 587.9	--	--	27.51	596.28	28.00	595.79	27.72	596.07	
JHC-MW-15031	632.94	635.87	Sand	599.9 to 589.9	--	--	42.03	593.84	42.19	593.68	42.35	593.52	
JHC-MW-15032	611.32	614.29	Sand	598.3 to 588.3	--	--	15.61	598.68	16.38	597.91	15.71	598.58	
JHC-MW-15033	618.08	620.99	Sand	602.1 to 592.1	--	--	20.22	600.77	21.19	599.80	20.42	600.57	
JHC-MW-15034	612.90	615.97	Sand	601.9 to 591.9	--	--	14.38	601.59	14.98	600.99	14.15	601.82	
JHC-MW-15035	632.53	634.28	Sand	599.5 to 589.5	--	--	39.32	594.96	39.50	594.78	39.78	594.50	
JHC-MW-15036	617.94	618.34	Sand	597.9 to 587.9	--	--	25.62	592.72	25.89	592.45	25.90	592.44	
JHC-MW-15037	614.28	616.06	Sand	591.3 to 586.3	--	--	24.20	591.86	24.41	591.65	24.35	591.71	
<b>Pond A</b>													
JHC-MW-15006	624.74	627.58	Sand	599.7 to 589.7	33.65	593.93	33.66	593.92	34.08	593.50	34.00	593.58	
JHC-MW-15007	624.82	627.70	Sand	602.8 to 592.8	33.97	593.73	33.98	593.72	34.45	593.25	34.29	593.41	
JHC-MW-15008	632.43	635.30	Sand	604.4 to 594.4	Dry		Dry		Decommissioned		Decommissioned		
JHC-MW-15008R <sup>(4)</sup>	632.32	634.67	Sand	597.3 to 587.3	NA	NA	NA	NA	42.05	592.62	41.98	592.69	
JHC-MW-15009	632.33	635.32	Sand	602.3 to 592.3	41.72	593.60	41.60	593.72	42.10	593.22	42.28	593.04	
JHC-MW-15010	632.55	635.57	Sand	602.6 to 592.6	41.37	594.20	41.10	594.47	41.58	593.99	41.90	593.67	
JHC-MW-15011	627.71	630.83	Sand	600.7 to 590.7	37.81	593.02	37.85	592.98	38.07	592.76	37.85	592.98	

**Notes:**

Survey conducted by Nederveld, November 2015, October 2018, December 2018, and August 2019.

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

TOC: Top of well casing.

--: Not measured

NA: Not Applicable

(1): The static water level for PZ-24S was taken on April 24, 2019.

(2): The static water level for JHC-MW-15025 was taken on April 23, 2019.

(3): The static water level data for JHC-MW-15005, JHC-MW-18001, JHC-MW-18002, JHC-MW-18003, JHC-MW-18004, and JHC-MW-18005 were collected on February 27, 2019;

JHC-MW-15016 was sampled on February 28, 2019.

(4): JHC-MW-15008R installed in June 2019.

**Table 2**  
 Summary of Field Parameter Results – April 2019 - October 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)
<b>Background</b>							
JHC-MW-15023	4/23/2019	2.21	79.5	5.9	106	8.8	10.0
	10/8/2019	0.49	106.0	6.2	97	10.4	4.8
JHC-MW-15024	4/23/2019	1.56	73.7	7.2	321	7.3	3.9
	10/8/2019	0.61	25.3	7.4	261	11.8	3.0
JHC-MW-15025	4/23/2019	7.47	70.1	6.7	140	6.8	14.6
	10/8/2019	2.15	9.8	8.1	370	11.7	2.2
JHC-MW-15026	4/22/2019	5.02	55.8	6.9	136	10.0	7.6
	10/7/2019	3.70	110.5	7.3	140	11.5	11.6
JHC-MW-15027	4/22/2019	5.99	61.0	6.5	79	9.1	8.9
	10/7/2019	4.75	134.6	6.3	70	11.4	3.5
JHC-MW-15028	4/22/2019	7.60	48.0	7.6	81	9.6	5.0
	10/7/2019	6.37	84.5	7.2	87	14.2	3.9
<b>Pond A</b>							
JHC-MW-15006	4/24/2019	0.99	78.5	7.6	406	13.7	4.9
	10/10/2019	0.27	-18.0	7.8	357	14.2	1.2
JHC-MW-15007	4/24/2019	3.15	44.9	7.4	618	14.2	6.7
	10/9/2019 <sup>(1)</sup>	--	--	--	--	--	--
JHC-MW-15008	4/24/2019 <sup>(1)</sup>	--	--	--	--	--	--
JHC-MW-15008R	8/13/2019	6.64	4.8	7.4	263	13.3	2.1
	10/9/2019	3.25	35.8	7.3	793	13.0	0.4
JHC-MW-15009	4/24/2019	4.30	39.5	7.4	688	13.8	3.0
	10/9/2019 <sup>(1)</sup>	--	--	--	--	--	--
JHC-MW-15010	4/23/2019	2.35	79.8	6.6	476	12.5	3.2
	10/9/2019	3.60	60.5	6.9	573	16.3	14.9
JHC-MW-15011	4/23/2019	1.12	29.5	8.8	479	14.7	3.8
	10/10/2019	0.23	-175.3	8.4	895	14.7	0.6
<b>Pond A GSI</b>							
MW-13	10/10/2019 <sup>(1)</sup>	--	--	--	--	--	--
MW-14S	10/10/2019	3.91	30.6	5.67	19.8	15.05	1.89
PZ-24S	10/10/2019	2.94	48.7	5.5	23.6	15.48	1.55
PZ-40S	10/10/2019	1.51	57.7	5.1	15.1	12.25	2.78

**Notes:**

mg/L - Milligrams per Liter.

mV - Millivolts.

SU - Standard units

umhos/cm - Micromhos per centimeter.

°C - Degrees Celcius

NTU - Nephelometric Turbidity Unit.

-- - Not sampled.

(1) - Not sampled; insufficient amount of groundwater present to collect sample.

**Table 3**  
 Summary of Background Well Groundwater Sampling Results (Analytical): April 2019 - October 2019  
 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

		Sample Location:				JHC-MW-15023		JHC-MW-15024		JHC-MW-15025		JHC-MW-15026		JHC-MW-15027		JHC-MW-15028	
		Sample Date:				4/23/2019	10/8/2019	4/23/2019	10/8/2019	4/23/2019	10/8/2019	4/22/2019	10/7/2019	4/22/2019	10/7/2019	4/22/2019	10/7/2019
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	Background											
<b>Appendix III</b>																	
Boron	ug/L	NC	500	500	7,200	54	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Calcium	mg/L	NC	NC	NC	500	9.5	9.5	29	29	13	23	12	13	7.4	7.9	10	10
Chloride	mg/L	250**	250	250	500	3.1	3.7	30	13	11	35	8.8	5.4	2.0	< 2.0	< 2.0	< 2.0
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250	250	500	12	12	7.5	7.5	8.5	10	8.6	8.4	7.5	12	5.5	5.5
Total Dissolved Solids	mg/L	500**	500	500	500	75	91	180	270	75	210	140	100	< 50	62	< 50	76
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>	<b>5.9</b>	<b>6.2</b>	7.2	7.4	6.7	8.1	6.9	7.3	6.5	<b>6.3</b>	7.6	7.2
<b>Appendix IV</b>																	
Antimony	ug/L	6	6.0	6.0	130	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	10	10	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	2,000	2,000	2,000	820	22	21	17	16	20	8.6	14	11	23	39	5.4	7.2
Beryllium	ug/L	4	4.0	4.0	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	5.0	5.0	3.5	< 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	< 1.0	1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.6
Cobalt	ug/L	NC	40	100	100	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0
Fluoride	ug/L	4,000	NC	NC	NC	< 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	4.0	4.0	39	< 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	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Mercury	ug/L	2	2.0	2.0	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
Molybdenum	ug/L	NC	73	210	3,200	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Radium-226	pCi/L	NC	NC	NC	NC	0.108	< 0.147	< 0.0821	0.173	< 0.0726	< 0.124	< 0.0974	0.139	< 0.103	0.249	< 0.0933	0.125
Radium-228	pCi/L	NC	NC	NC	NC	< 0.355	< 0.390	< 0.349	0.379	< 0.353	< 0.348	< 0.355	< 0.387	< 0.340	< 0.348	< 0.308	< 0.349
Radium-226/228	pCi/L	5	NC	NC	NC	< 0.355	< 0.390	< 0.349	0.552	< 0.353	0.381	< 0.355	< 0.387	< 0.340	0.394	< 0.308	< 0.349
Selenium	ug/L	50	50	50	5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	2	2.0	2.0	3.7	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
<b>Michigan Part 115 Parameters</b>																	
Iron	ug/L	<b>300**</b>	<b>300<sup>(1)</sup></b>	<b>300<sup>(1)</sup></b>	500,000	--	<b>460</b>	--	<b>320</b>	--	< 20	--	26	--	44	--	50
Copper	ug/L	1,000**	1,000 <sup>(1)</sup>	1,000 <sup>(1)</sup>	15	--	2.1	--	< 1.0	--	< 1.0	--	< 1.0	--	< 1.0	--	< 1.0
Nickel	ug/L	NC	100	100	86	--	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0
Silver	ug/L	100**	34	98	0.20	--	< 0.20	--	< 0.20	--	< 0.20	--	< 0.20	--	< 0.20	--	< 0.20
Vanadium	ug/L	NC	4.5	62	27	--	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0
Zinc	ug/L	5,000**	2,400	5,000 <sup>(1)</sup>	190	--	< 10	--	< 10	--	18	--	< 10	--	< 10	--	< 10

**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 site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE 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.  
 All metals were analyzed as total unless otherwise specified.  
 (1) - Criterion is the aesthetic drinking water value per footnote (E).

**Table 4**  
 Summary of Groundwater Sampling Results (Analytical): April 2019 - October 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

		Sample Location:																											
		JHC-MW-15006		JHC-MW-15007		JHC-MW-15008		JHC-MW-15008R		JHC-MW-15009		JHC-MW-15010		JHC-MW-15011															
		Sample Date: 4/24/2019		10/10/2019		4/24/2019		10/9/2019 <sup>(2)</sup>		4/24/2019 <sup>(2)</sup>		8/13/2019		10/9/2019		4/24/2019		10/9/2019 <sup>(2)</sup>		4/23/2019		10/9/2019		4/23/2019		10/10/2019			
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>																								
<b>Appendix III</b>																													
Boron	ug/L	NC	500	500	7,200	240	230	190	--	--	93	130	200	--	2,800	2,800	440	690											
Calcium	mg/L	NC	NC	NC	500	41	35	79	--	--	33	100	92	--	58	84	43	110											
Chloride	mg/L	250**	250	250	500	21	22	23	--	--	2.2	16	17	--	2.0	< 2.0	18	9.4											
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	--	--	170	< 1,000	< 1,000	--	< 1,000	< 1,000	< 1,000	< 1,000											
Sulfate	mg/L	250**	250	250	500	75	55	54	--	--	20	220	130	--	24	32	86	180											
Total Dissolved Solids	mg/L	500**	500	500	500	240	190	360	--	--	150	< 50	430	--	270	330	280	550											
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.6	7.8	7.4	--	--	7.4	7.3	7.4	--	6.6	6.9	8.8	8.4											
<b>Appendix IV</b>																													
Antimony	ug/L	6	6.0	6.0	130	< 1.0	< 1.0	< 1.0	--	--	1.2	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0											
Arsenic	ug/L	10	10	10	10	5.1	4.3	4.0	--	--	< 1.0	< 1.0	< 1.0	--	< 1.0	< 1.0	36	44											
Barium	ug/L	2,000	2,000	2,000	820	230	180	320	--	--	110	340	360	--	250	270	170	360											
Beryllium	ug/L	4	4.0	4.0	18	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0											
Cadmium	ug/L	5	5.0	5.0	3.5	< 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	4.1	< 1.0	35	--	--	3.8	4.5	17	--	1.2	370	9.0	1.4											
Cobalt	ug/L	NC	40	100	100	< 6.0	< 6.0	< 6.0	--	--	< 6.0	< 6.0	< 6.0	--	< 6.0	< 6.0	< 6.0	< 6.0											
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	--	--	170	< 1,000	< 1,000	--	< 1,000	< 1,000	< 1,000	< 1,000											
Lead	ug/L	NC	4.0	4.0	39	< 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	< 10	12	--	--	10	15	11	--	13	17	11	14											
Mercury	ug/L	2	2.0	2.0	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	73	210	3,200	10	9.1	7.2	--	--	6.8	< 5.0	5.7	--	< 5.0	14	21	11											
Radium-226	pCi/L	NC	NC	NC	NC	0.234	0.310	0.217	--	--	0.183	0.449	0.351	--	0.198	0.643	0.0720	0.298											
Radium-228	pCi/L	NC	NC	NC	NC	< 0.343	< 0.524	0.392	--	--	0.468	0.817	0.674	--	< 0.326	1.12	< 0.343	0.665											
Radium-226/228	pCi/L	5	NC	NC	NC	0.488	< 0.524	0.609	--	--	0.651	1.27	1.02	--	0.515	1.76	< 0.343	0.963											
Selenium	ug/L	50	50	50	5.0	< 1.0	1.3	4.1	--	--	12	110	61	--	32	210	13	76											
Thallium	ug/L	2	2.0	2.0	3.7	< 2.0	< 2.0	< 2.0	--	--	< 2.0	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0											
<b>Michigan Part 115 Parameters</b>																													
Iron	ug/L	300**	300 <sup>(1)</sup>	300 <sup>(1)</sup>	500,000	--	43	--	--	--	--	99	--	--	--	2,100	--	120											
Copper	ug/L	1,000**	1,000 <sup>(1)</sup>	1,000 <sup>(1)</sup>	15	--	< 1.0	--	--	--	--	< 1.0	--	--	--	12	--	< 1.0											
Nickel	ug/L	NC	100	100	86	--	< 2.0	--	--	--	--	2.7	--	--	--	200	--	< 2.0											
Silver	ug/L	100**	34	98	0.20	--	< 0.20	--	--	--	--	< 0.20	--	--	0.48	--	< 0.20												
Vanadium	ug/L	NC	4.5	62	27	--	8.0	--	--	--	--	< 2.0	--	--	5.5	--	14												
Zinc	ug/L	5,000**	2,400	5,000 <sup>(1)</sup>	190	--	< 10	--	--	--	--	< 10	--	--	< 10	--	< 10												

**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.  
 -- - not analyzed.  
 \* - 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 site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE 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.  
 All metals were analyzed as total unless otherwise specified.  
 (1) - Criterion is the aesthetic drinking water value per footnote (E).  
 (2) - Not sampled; insufficient amount of groundwater present to collect sample.

**Table 5**  
 Summary of Groundwater Sampling Results (Analytical): October 2019  
 JH Campbell Pond A GSI Monitoring Wells – Assessment Monitoring Program  
 West Olive, Michigan

						Sample Location:	MW-13	MW-14S	PZ-24S	PZ-40S
						Sample Date:	10/10/2019 <sup>(2)</sup>	10/10/2019	10/10/2019	10/10/2019
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	GSI Compliance Monitoring				
<b>Appendix III</b>										
Boron	ug/L	NC	500	500	7,200	--	< 50	< 50	< 50	
Calcium	mg/L	NC	NC	NC	500	--	2.1	2.9	1.5	
Chloride	mg/L	250**	250	250	500	--	< 2.0	< 2.0	< 2.0	
Fluoride	ug/L	4,000	NC	NC	NC	--	< 1,000	< 1,000	< 1,000	
Sulfate	mg/L	250**	250	250	500	--	3.6	4.0	3.4	
Total Dissolved Solids	mg/L	500**	500	500	500	--	61	< 50	< 50	
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>	--	<b>5.7</b>	<b>5.5</b>	<b>5.1</b>	
<b>Appendix IV</b>										
Antimony	ug/L	6	6.0	6.0	130	--	< 1.0	< 1.0	< 1.0	
Arsenic	ug/L	10	10	10	10	--	< 1.0	1.1	< 1.0	
Barium	ug/L	2,000	2,000	2,000	820	--	9.5	34	23	
Beryllium	ug/L	4	4.0	4.0	18	--	< 1.0	< 1.0	< 1.0	
Cadmium	ug/L	5	5.0	5.0	3.5	--	< 0.20	< 0.20	< 0.20	
Chromium	ug/L	100	100	100	11	--	< 1.0	1.6	1.3	
Cobalt	ug/L	NC	40	100	100	--	< 6.0	< 6.0	< 6.0	
Fluoride	ug/L	4,000	NC	NC	NC	--	< 1,000	< 1,000	< 1,000	
Lead	ug/L	NC	4.0	4.0	39	--	< 1.0	< 1.0	< 1.0	
Lithium	ug/L	NC	170	350	440	--	< 10	< 10	< 10	
Mercury	ug/L	2	2.0	2.0	0.20#	--	< 0.20	< 0.20	< 0.20	
Molybdenum	ug/L	NC	73	210	3,200	--	< 5.0	< 5.0	< 5.0	
Radium-226	pCi/L	NC	NC	NC	NC	--	< 0.145	0.248	0.178	
Radium-228	pCi/L	NC	NC	NC	NC	--	< 0.445	0.511	< 0.473	
Radium-226/228	pCi/L	5	NC	NC	NC	--	0.501	0.759	< 0.473	
Selenium	ug/L	50	50	50	5.0	--	< 1.0	< 1.0	< 1.0	
Thallium	ug/L	2	2.0	2.0	3.7	--	< 2.0	< 2.0	< 2.0	
<b>Michigan Part 115 Parameters</b>										
Iron	ug/L	<b>300**</b>	<b>300<sup>(1)</sup></b>	<b>300<sup>(1)</sup></b>	500,000	--	280	<b>570</b>	110	
Copper	ug/L	1,000**	1,000 <sup>(1)</sup>	1,000 <sup>(1)</sup>	15	--	< 1.0	< 1.0	< 1.0	
Nickel	ug/L	NC	100	100	86	--	< 2.0	< 2.0	< 2.0	
Silver	ug/L	100**	34	98	0.20	--	< 0.20	< 0.20	< 0.20	
Vanadium	ug/L	NC	4.5	62	27	--	< 2.0	3.1	< 2.0	
Zinc	ug/L	5,000**	2,400	5,000 <sup>(1)</sup>	190	--	< 10	< 10	< 10	

**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.
- - not analyzed.
- \* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.
- \*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR), April 2012.
- <sup>^</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using site-specific hardness of 180 mg CaCO<sub>3</sub>/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE 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.
- Blue shading indicates GSI monitoring constituents sampled in accordance with the Pond A Assessment Monitoring Plan (TRC March 2019, Rev. July 2019).
- All metals were analyzed as total unless otherwise specified.
- (1) - Criterion is the aesthetic drinking water value per footnote (E).
- (2) - Not sampled; insufficient amount of groundwater present to collect sample.



**Table 6**  
 Summary of Groundwater Protection Standard Exceedances – April 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Constituent	Units	GWPS	JHC-MW-15006		JHC-MW-15009		JHC-MW-15011	
			LCL	UCL	LCL	UCL	LCL	UCL
Arsenic	ug/L	10	4.2	11	--	--	10	30
Selenium	ug/L	50	--	--	0.5	26	--	--

**Notes:**

ug/L - micrograms per Liter

-- - Not Applicable; well/parameter pair did not directly exceed the GWPS and was not included in further analysis.

GWPS - Groundwater Protection Standard as established in TRC's Technical Memorandum dated October 15, 2018.

UCL - Upper Confidence Limit ( $\alpha = 0.01$ ) of the downgradient data set.

LCL - Lower Confidence Limit ( $\alpha = 0.01$ ) of the downgradient data set.

Indicates a statistically significant exceedance of the GWPS. An exceedance occurs when the LCL is greater than the GWPS.

**Table 7**  
 Summary of Groundwater Protection Standard Exceedances – October 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Constituent	Units	GWPS	JHC-MW-15006		JHC-MW-15009		JHC-MW-15010		JHC-MW-15011	
			LCL	UCL	LCL	UCL	LCL	UCL	LCL	UCL
Boron	ug/L	500	--	--	--	--	77	2,800	120	510
TDS	mg/L	500	--	--	--	--	--	--	150	550
pH	SU	5.5 - 8.8	--	--	--	--	--	--	7.4	9.0
Arsenic	ug/L	10	--	--	--	--	--	--	10	36
Chromium	ug/L	100	--	--	--	--	0.50	370	--	--
Selenium	ug/L	50	1.7	110	0.44	26	0.46	76	0.50	76

**Notes:**

ug/L - micrograms per Liter

-- - Not Applicable; well/parameter pair did not directly exceed the GWPS and was not included in further analysis.

GWPS - Groundwater Protection Standard as established in TRC's Technical

Memorandum dated October 15, 2018 and December 21, 2019.

UCL - Upper Confidence Limit ( $\alpha = 0.01$ ) of the downgradient data set.

LCL - Lower Confidence Limit ( $\alpha = 0.01$ ) of the downgradient data set.

Indicates a statistically significant exceedance of the GWPS. An exceedance occurs when the LCL is greater than the GWPS.

**Table 8**  
 Summary of Groundwater Exceedances  
 Fourth Quarter 2019  
 JH Campbell Plant Pond A, West Olive, Michigan

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

<b>Data is in (X) ug/L or          ( ) mg/L          unless otherwise stated</b>
--

Facility: JH Campbell – WDS# 395496

Well #	Location	Parameter	Part 201 GRCC	Statistical Limit (or 'CC' for Control Charts)	4 Qtr. 2019 ( <b>bold &gt;201</b> )	2 Qtr. 2019 ( <b>bold &gt;201</b> )	4 Qtr. 2018 ( <b>bold &gt;201</b> )	2 Qtr. 2018 ( <b>bold &gt;201</b> )
JHC-MW-15011	Downgradient	Arsenic	10	LCL	<b>44</b> <sup>(1)</sup>	<b>36</b> <sup>(1)</sup>	<b>32.2</b>	<b>15.0</b>

**Notes:**  
 Table summarizes statistically significant Groundwater Protection Standards (GWPSs) exceedances as determined using confidence intervals.  
 LCL - Lower confidence limit  
 (1) - Exceeded Part 201 GRCC but did not result in a statistically significant GWPS exceedance.

**Table 9**  
 Summary of Groundwater Sampling Results (Analytical): February 2019 - October 2019  
 JH Campbell Nature and Extent Wells – RCRA CCR Monitoring Program  
 West Olive, Michigan

Constituent	Unit	Sample Location:				MW-13		MW-14	MW-14D		MW-14S				PZ-23
		EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^	4/24/2019	4/23/2019	4/23/2019	10/9/2019	2/15/2019	4/18/2019	4/23/2019	8/13/2019	10/10/2019	4/23/2019
<b>Appendix III</b>															
Boron	ug/L	NC	500	500	7,200	< 50	66	180	170	27	< 20	< 50	20	< 50	220
Calcium	mg/L	NC	NC	NC	500	8.5	21	40	39	--	--	2.0	--	2.1	39
Chloride	mg/L	250**	250	250	500	< 2.0	9.5	20	21	--	--	2.3	--	< 2.0	13
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	--	--	< 1,000	--	< 1,000	< 1,000
Sulfate	mg/L	250**	250	250	500	5.3	17	28	32	--	--	4.0	--	3.6	49
Total Dissolved Solids	mg/L	500**	500	500	500	< 50	130	200	220	--	--	< 50	--	61	200
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	6.7	6.8	7.9	8.1	5.8	6.1	5.5	5.6	5.7	7.4
<b>Appendix IV</b>															
Antimony	ug/L	6	6.0	6.0	130	1.1	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1.0	< 1	< 1.0	< 1.0
Arsenic	ug/L	10	10	10	10	< 1.0	< 1.0	1.6	1.3	< 1	< 1	< 1.0	< 1	< 1.0	< 1.0
Barium	ug/L	2,000	2,000	2,000	820	8.7	16	46	50	--	--	8.3	--	9.5	14
Beryllium	ug/L	4	4.0	4.0	18	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	--	< 1.0	< 1.0
Cadmium	ug/L	5	5.0	5.0	3.5	< 0.20	< 0.20	< 0.20	< 0.20	--	--	< 0.20	--	< 0.20	< 0.20
Chromium	ug/L	100	100	100	11	2.3	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1.0	< 1	< 1.0	< 1.0
Cobalt	ug/L	NC	40	100	100	< 6.0	< 6.0	< 6.0	< 6.0	--	--	< 6.0	--	< 6.0	< 6.0
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	--	--	< 1,000	--	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	39	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	--	< 1.0	< 1.0
Lithium	ug/L	NC	170	350	440	12	< 10	20	18	< 10	< 10	< 10	< 10	< 10	< 10
Mercury	ug/L	2	2.0	2.0	<b>0.20#</b>	< 0.20	< 0.20	< 0.20	< 0.20	--	--	< 0.20	--	< 0.20	< 0.20
Molybdenum	ug/L	NC	73	210	3,200	< 5.0	< 5.0	20	21	< 5	< 5	< 5.0	< 5	< 5.0	10
Radium-226	pCi/L	NC	NC	NC	NC	< 0.0808	< 0.0845	< 0.110	0.193	--	--	< 0.0790	--	< 0.145	< 0.102
Radium-228	pCi/L	NC	NC	NC	NC	< 0.373	< 0.352	< 0.347	< 0.713	--	--	< 0.332	--	< 0.445	< 0.373
Radium-226/228	pCi/L	5	NC	NC	NC	< 0.373	< 0.352	< 0.347	0.749	--	--	< 0.332	--	0.501	< 0.373
Selenium	ug/L	<b>50</b>	<b>50</b>	<b>50</b>	<b>5.0</b>	2.6	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1.0	< 1	< 1.0	3.6
Thallium	ug/L	2	2.0	2.0	3.7	< 2.0	< 2.0	< 2.0	< 2.0	--	--	< 2.0	--	< 2.0	< 2.0
<b>Michigan Part 115 Parameters</b>															
Iron	ug/L	300**	300 <sup>(1)</sup>	300 <sup>(1)</sup>	500,000	--	--	--	--	--	--	--	--	280	--
Copper	ug/L	1,000**	1,000 <sup>(1)</sup>	1,000 <sup>(1)</sup>	15	--	--	--	--	--	--	--	--	< 1.0	--
Nickel	ug/L	NC	100	100	86	--	--	--	--	< 2	< 2	--	< 2	< 2.0	--
Silver	ug/L	100**	34	98	0.20	--	--	--	--	--	--	--	--	< 0.20	--
Vanadium	ug/L	NC	4.5	62	27	--	--	--	--	< 2	< 2	--	< 2	< 2.0	--
Zinc	ug/L	5,000**	2,400	5,000 <sup>(1)</sup>	190	--	--	--	--	--	--	--	--	< 10	--

**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.
- - not analyzed.
- \* - 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 site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE 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.
- All metals were analyzed as total unless otherwise specified.
- (1) - Criterion is the aesthetic drinking water value per footnote (E).

**Table 9**  
 Summary of Groundwater Sampling Results (Analytical): February 2019 - October 2019  
 JH Campbell Nature and Extent Wells – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						PZ-23D		PZ-23S				PZ-24		PZ-24D		
Sample Date:						4/23/2019	10/9/2019	2/15/2019	4/17/2019	4/23/2019	8/12/2019	10/9/2019	4/24/2019	10/9/2019	4/24/2019	10/9/2019
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^											
<b>Appendix III</b>																
Boron	ug/L	NC	500	500	7,200	820	800	37	34	< 50	23	< 50	170	200	250	240
Calcium	mg/L	NC	NC	NC	500	24	28	--	--	8.6	--	6.4	27	35	40	40
Chloride	mg/L	250**	250	250	500	22	23	--	--	< 2.0	--	< 2.0	18	14	18	18
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	--	--	< 1,000	--	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250	250	500	52	52	--	--	5.4	--	3.4	< 2.0	48	25	24
Total Dissolved Solids	mg/L	500**	500	500	500	130	150	--	--	< 50	--	480	170	250	200	180
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	8.6	8.7	7.0	7.1	6.9	6.7	6.6	6.7	7.0	7.7	7.5
<b>Appendix IV</b>																
Antimony	ug/L	6	6.0	6.0	130	< 1.0	< 1.0	< 1	< 1	< 1.0	< 1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	10	10	10	< 1.0	< 1.0	< 1	< 1	< 1.0	< 1	< 1.0	< 1.0	< 1.0	8.7	5.4
Barium	ug/L	2,000	2,000	2,000	820	25	27	--	--	< 5.0	--	< 5.0	20	27	61	63
Beryllium	ug/L	4	4.0	4.0	18	< 1.0	< 1.0	--	--	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	5.0	5.0	3.5	< 0.20	< 0.20	--	--	< 0.20	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chromium	ug/L	100	100	100	11	< 1.0	< 1.0	< 1	< 1	< 1.0	< 1	< 1.0	< 1.0	1.2	< 1.0	< 1.0
Cobalt	ug/L	NC	40	100	100	< 6.0	< 6.0	--	--	< 6.0	--	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	--	--	< 1,000	--	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	39	< 1.0	< 1.0	--	--	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	170	350	440	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Mercury	ug/L	2	2.0	2.0	<b>0.20#</b>	< 0.20	< 0.20	--	--	< 0.20	--	< 0.20	< 0.20	< 0.20	< 0.20	<b>0.21</b>
Molybdenum	ug/L	NC	73	210	3,200	12	12	8	7	6.5	11	6.0	13	11	27	22
Radium-226	pCi/L	NC	NC	NC	NC	< 0.110	< 0.116	--	--	0.119	--	0.136	< 0.0841	0.260	< 0.0842	0.144
Radium-228	pCi/L	NC	NC	NC	NC	< 0.392	< 0.743	--	--	0.383	--	< 0.637	0.483	< 0.679	< 0.359	< 0.668
Radium-226/228	pCi/L	5	NC	NC	NC	< 0.392	< 0.743	--	--	0.502	--	< 0.637	0.494	< 0.679	< 0.359	< 0.668
Selenium	ug/L	<b>50</b>	<b>50</b>	<b>50</b>	<b>5.0</b>	< 1.0	< 1.0	1	< 1	< 1.0	< 1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	2	2.0	2.0	3.7	< 2.0	< 2.0	--	--	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
<b>Michigan Part 115 Parameters</b>																
Iron	ug/L	300**	300 <sup>(1)</sup>	300 <sup>(1)</sup>	500,000	--	--	--	--	--	--	--	--	--	--	--
Copper	ug/L	1,000**	1,000 <sup>(1)</sup>	1,000 <sup>(1)</sup>	15	--	--	--	--	--	--	--	--	--	--	--
Nickel	ug/L	NC	100	100	86	--	--	< 2	< 2	--	< 2	< 2	--	--	--	--
Silver	ug/L	100**	34	98	0.20	--	--	--	--	--	--	--	--	--	--	--
Vanadium	ug/L	NC	4.5	62	27	--	--	< 2	< 2	--	< 2	< 2	--	--	--	--
Zinc	ug/L	5,000**	2,400	5,000 <sup>(1)</sup>	190	--	--	--	--	--	--	--	--	--	--	--

**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.
- - not analyzed.
- \* - 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 site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE 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.
- All metals were analyzed as total unless otherwise specified.
- (1) - Criterion is the aesthetic drinking water value per footnote {E}.

**Table 9**  
 Summary of Groundwater Sampling Results (Analytical): February 2019 - October 2019  
 JH Campbell Nature and Extent Wells – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						PZ-24S					PZ-40		PZ-40S				
Sample Date:						2/15/2019	4/18/2019	4/24/2019	8/12/2019	10/10/2019	4/24/2019	10/9/2019	2/15/2019	4/18/2019	4/24/2019	8/12/2019	10/10/2019
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>												
<b>Appendix III</b>																	
Boron	ug/L	NC	500	500	7,200	45	31	< 50	32	< 50	170	190	< 20	< 20	< 50	< 20	< 50
Calcium	mg/L	NC	NC	NC	500	--	--	4.0	--	2.9	16	15	--	--	2.1	--	1.5
Chloride	mg/L	250**	250	250	500	--	--	< 2.0	--	< 2.0	9.3	8.4	--	--	< 2.0	--	< 2.0
Fluoride	ug/L	4,000	NC	NC	NC	--	--	< 1,000	--	< 1,000	< 1,000	< 1,000	--	--	< 1,000	--	< 1,000
Sulfate	mg/L	250**	250	250	500	--	--	4.5	--	4.0	19	21	--	--	4.4	--	3.4
Total Dissolved Solids	mg/L	500**	500	500	500	--	--	< 50	--	< 50	93	86	--	--	< 50	--	< 50
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>	<b>5.5</b>	<b>5.9</b>	<b>5.5</b>	<b>5.6</b>	<b>5.5</b>	<b>6.4</b>	<b>6.5</b>	<b>5.1</b>	<b>5.2</b>	<b>4.9</b>	<b>5.0</b>	<b>5.1</b>
<b>Appendix IV</b>																	
Antimony	ug/L	6	6.0	6.0	130	< 1	< 1	< 1.0	< 1	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1.0	< 1	< 1.0
Arsenic	ug/L	10	10	10	10	< 1	< 1	< 1.0	1	1.1	< 1.0	< 1.0	< 1	< 1	< 1.0	< 1	< 1.0
Barium	ug/L	2,000	2,000	2,000	820	--	--	23	--	34	17	18	--	--	23	--	23
Beryllium	ug/L	4	4.0	4.0	18	--	--	< 1.0	--	< 1.0	< 1.0	< 1.0	--	--	< 1.0	--	< 1.0
Cadmium	ug/L	5	5.0	5.0	3.5	--	--	< 0.20	--	< 0.20	< 0.20	< 0.20	--	--	< 0.20	--	< 0.20
Chromium	ug/L	100	100	100	11	1	1	1.5	2	1.6	< 1.0	1.3	2	1	1.7	< 1	1.3
Cobalt	ug/L	NC	40	100	100	--	--	< 6.0	--	< 6.0	< 6.0	< 6.0	--	--	< 6.0	--	< 6.0
Fluoride	ug/L	4,000	NC	NC	NC	--	--	< 1,000	--	< 1,000	< 1,000	< 1,000	--	--	< 1,000	--	< 1,000
Lead	ug/L	NC	4.0	4.0	39	--	--	< 1.0	--	< 1.0	< 1.0	< 1.0	--	--	< 1.0	--	< 1.0
Lithium	ug/L	NC	170	350	440	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Mercury	ug/L	2	2.0	2.0	<b>0.20#</b>	--	--	< 0.20	--	< 0.20	< 0.20	< 0.20	--	--	< 0.20	--	< 0.20
Molybdenum	ug/L	NC	73	210	3,200	< 5	< 5	< 5.0	< 5	< 5.0	11	6.4	< 5	< 5	< 5.0	< 5	< 5.0
Radium-226	pCi/L	NC	NC	NC	NC	--	--	< 0.0852	--	0.248	< 0.0984	0.222	--	--	< 0.100	--	0.178
Radium-228	pCi/L	NC	NC	NC	NC	--	--	< 0.357	--	0.511	< 0.410	< 0.587	--	--	< 0.409	--	< 0.473
Radium-226/228	pCi/L	5	NC	NC	NC	--	--	< 0.357	--	0.759	< 0.410	< 0.587	--	--	< 0.409	--	< 0.473
Selenium	ug/L	<b>50</b>	<b>50</b>	<b>50</b>	<b>5.0</b>	< 1	< 1	< 1.0	< 1	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1.0	< 1	< 1.0
Thallium	ug/L	2	2.0	2.0	3.7	--	--	< 2.0	--	< 2.0	< 2.0	< 2.0	--	--	< 2.0	--	< 2.0
<b>Michigan Part 115 Parameters</b>																	
Iron	ug/L	<b>300**</b>	<b>300<sup>(1)</sup></b>	<b>300<sup>(1)</sup></b>	500,000	--	--	--	--	<b>570</b>	--	--	--	--	--	--	110
Copper	ug/L	1,000**	1,000 <sup>(1)</sup>	1,000 <sup>(1)</sup>	15	--	--	--	--	< 1.0	--	--	--	--	--	--	< 1.0
Nickel	ug/L	NC	100	100	86	10	< 2	--	< 2	< 2.0	--	--	< 2	< 2	--	< 2	< 2.0
Silver	ug/L	100**	34	98	0.20	--	--	--	--	< 0.20	--	--	--	--	--	--	< 0.20
Vanadium	ug/L	NC	4.5	62	27	3	3	--	4	3.1	--	--	< 2	< 2	--	< 2	< 2.0
Zinc	ug/L	5,000**	2,400	5,000 <sup>(1)</sup>	190	--	--	--	--	< 10	--	--	--	--	--	--	< 10

**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.  
 -- - not analyzed.  
 \* - 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 site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE 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.  
 All metals were analyzed as total unless otherwise specified.  
 (1) - Criterion is the aesthetic drinking water value per footnote (E).

**Table 9**  
 Summary of Groundwater Sampling Results (Analytical): February 2019 - October 2019  
 JH Campbell Nature and Extent Wells – RCRA CCR Monitoring Program  
 West Olive, Michigan

		Sample Location:				TW-19-04A		TW-19-04B		TW-19-05		TW-19-06A		TW-19-06B	
		Sample Date:				8/13/2019	10/8/2019	8/13/2019	10/8/2019	8/13/2019	10/8/2019	8/13/2019	10/8/2019	8/13/2019	10/8/2019
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI^										
<b>Appendix III</b>															
Boron	ug/L	NC	500	500	7,200	530	1,200	140	150	120	130	410	270	200	360
Calcium	mg/L	NC	NC	NC	500	55	53	51	51	42	39	16	16	18	23
Chloride	mg/L	250**	250	250	500	11	4.0	22	23	15	8.8	3.3	--	26	--
Fluoride	ug/L	4,000	NC	NC	NC	120	< 1,000	70	< 1,000	260	< 1,000	290	--	50	--
Sulfate	mg/L	250**	250	250	500	49	57	28	33	26	24	14	--	33	--
Total Dissolved Solids	mg/L	500**	500	500	500	250	260	240	250	210	200	97	--	120	--
pH, Field	SU	6.5 - 8.5**	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.1	7.5	7.9	8.2	7.5	7.8	7.4	7.4	8.9	9.3
<b>Appendix IV</b>															
Antimony	ug/L	6	6.0	6.0	130	3.5	3.7	1.5	1.8	2.4	3.2	< 1.0	1.0	< 1.0	< 1.0
Arsenic	ug/L	10	10	10	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	2,000	2,000	2,000	820	81	78	62	66	12	12	6.9	< 5.0	< 5.0	11
Beryllium	ug/L	4	4.0	4.0	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	5.0	5.0	3.5	< 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	< 1.0	< 1.0	< 1.0	1.2	< 1.0	1.3	< 1.0	< 1.0	< 1.0	1.0
Cobalt	ug/L	NC	40	100	100	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0
Fluoride	ug/L	4,000	NC	NC	NC	120	< 1,000	70	< 1,000	260	< 1,000	290	--	50	--
Lead	ug/L	NC	4.0	4.0	39	< 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	19	18	< 10	< 10	21	22	< 10	< 10	< 10	< 10
Mercury	ug/L	2	2.0	2.0	<b>0.20#</b>	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	NC	73	210	3,200	6.2	7.8	< 5.0	< 5.0	< 5.0	5.7	52	10	11	<b>87</b>
Radium-226	pCi/L	NC	NC	NC	NC	< 0.187	0.252	< 0.133	0.308	< 0.168	< 0.161	< 0.159	0.324	< 0.202	0.169
Radium-228	pCi/L	NC	NC	NC	NC	< 0.414	< 0.472	< 0.422	0.838	< 0.423	< 0.543	0.800	< 0.513	< 0.500	< 0.521
Radium-226/228	pCi/L	5	NC	NC	NC	< 0.414	0.501	< 0.422	1.15	< 0.423	< 0.543	0.891	0.606	< 0.500	< 0.521
Selenium	ug/L	<b>50</b>	<b>50</b>	<b>50</b>	<b>5.0</b>	<b>210</b>	<b>410</b>	< 1.0	< 1.0	<b>10</b>	<b>25</b>	< 1.0	< 1.0	< 1.0	<b>7.5</b>
Thallium	ug/L	2	2.0	2.0	3.7	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
<b>Michigan Part 115 Parameters</b>															
Iron	ug/L	<b>300**</b>	<b>300<sup>(1)</sup></b>	<b>300<sup>(1)</sup></b>	500,000	< 10	--	<20	--	23	--	140	--	160	--
Copper	ug/L	1,000**	1,000 <sup>(1)</sup>	1,000 <sup>(1)</sup>	15	< 1.0	--	< 1.0	--	< 1.0	--	< 1.0	--	< 1.0	--
Nickel	ug/L	NC	100	100	86	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0	--
Silver	ug/L	100**	34	98	0.20	< 0.20	--	< 0.20	--	< 0.20	--	< 0.20	--	< 0.20	--
Vanadium	ug/L	NC	4.5	62	27	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0	--	< 2.0	--
Zinc	ug/L	5,000**	2,400	5,000 <sup>(1)</sup>	190	< 10	--	< 10	--	< 10	--	< 10	--	< 10	--

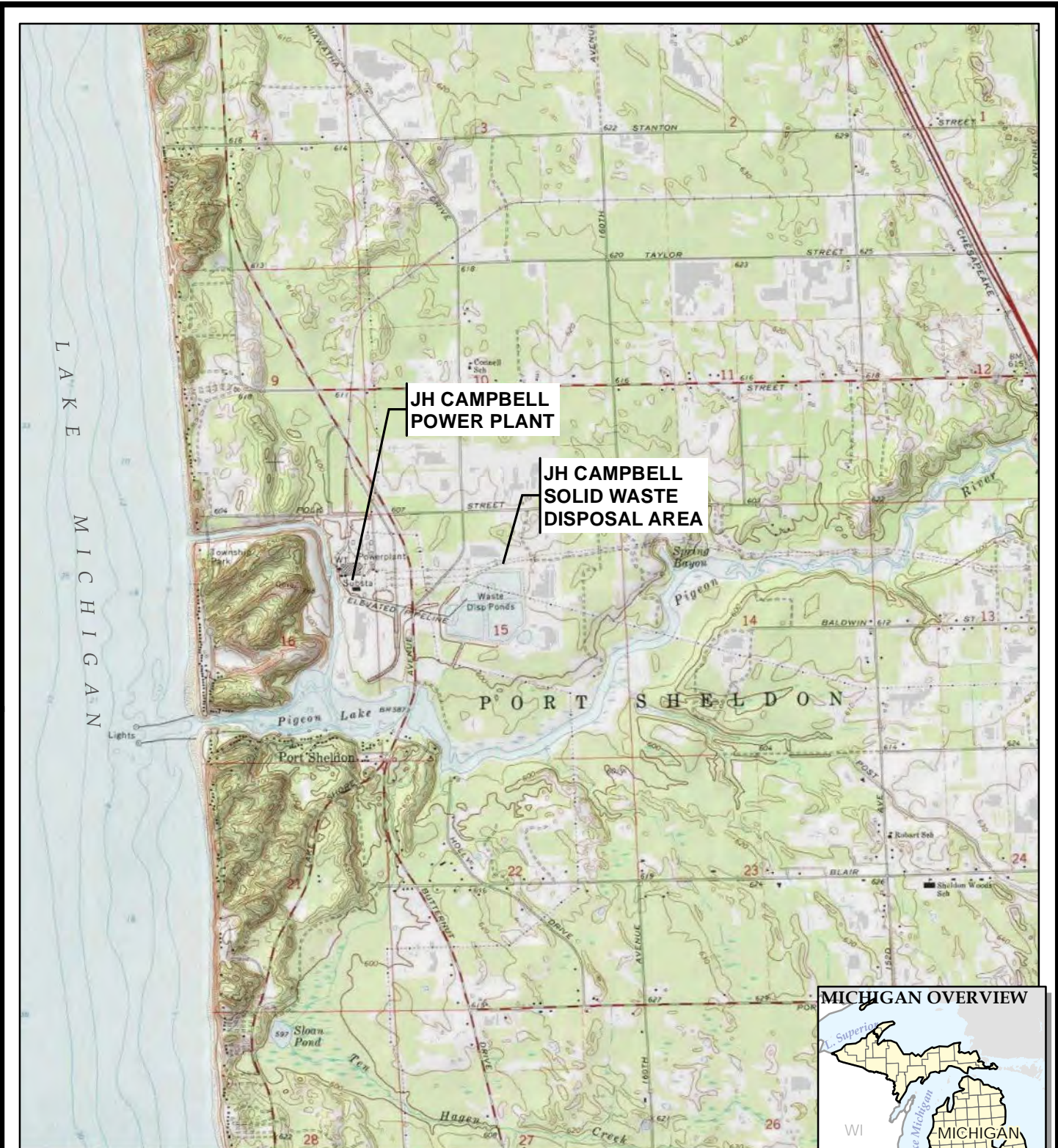
**Notes:**

- 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.
- - not analyzed.
- \* - 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 site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE 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.
- All metals were analyzed as total unless otherwise specified.
- (1) - Criterion is the aesthetic drinking water value per footnote (E).

# Figures

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BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.



1540 Eisenhower Place  
Ann Arbor, MI 48108-3284  
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PROJECT:  
**CONSUMERS ENERGY COMPANY  
JH CAMPBELL POWER PLANT  
WEST OLIVE, MICHIGAN**

TITLE:  
**SITE LOCATION MAP**

DRAWN BY:	S. MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	S. HOLMSTROM
DATE:	JANUARY 2020
PROJ. NO.:	322174
FILE:	322174-001-022.mxd

**FIGURE 1**



**LEGEND**

- BACKGROUND MONITORING WELL
- DOWNGRADIANT BOTTOM ASH POND 1/2 N/S MONITORING WELL
- DOWNGRADIANT BOTTOM ASH POND 3 N/S MONITORING WELL
- DOWNGRADIANT LANDFILL MONITORING WELL
- DOWNGRADIANT POND A MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- DECOMMISSIONED MONITORING WELL
- NEW DOWNGRADIANT BOTTOM ASH POND 1/2 N/S MONITORING WELL (2018)
- NEW DOWNGRADIANT BOTTOM ASH POND 3 N/S MONITORING WELL (2018)
- NATURE AND EXTENT WELL

- NOTES**
1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2018.
  2. WELL LOCATIONS BASED ON SURVEY DATA THROUGH 12/07/2018.
  3. MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
  4. MONITORING WELL DECOMMISSIONED JUNE 14, 2018.
  5. MONITORING WELL DECOMMISSIONED OCTOBER 10, 2018.
  6. JHC-MW-1800X MONITORING WELLS INSTALLED IN DECEMBER 2018.
  7. MONITORING WELL DECOMMISSIONED JUNE 24, 2019.
  8. JHC-MW-15008R AND TW-19-XX MONITORING WELLS INSTALLED IN JUNE 2019.

0 700 1,400  
Feet

1" = 700'  
1:8,400

PROJECT: **CONSUMERS ENERGY COMPANY  
JH CAMPBELL POWER PLANT  
WEST OLIVE, MICHIGAN**

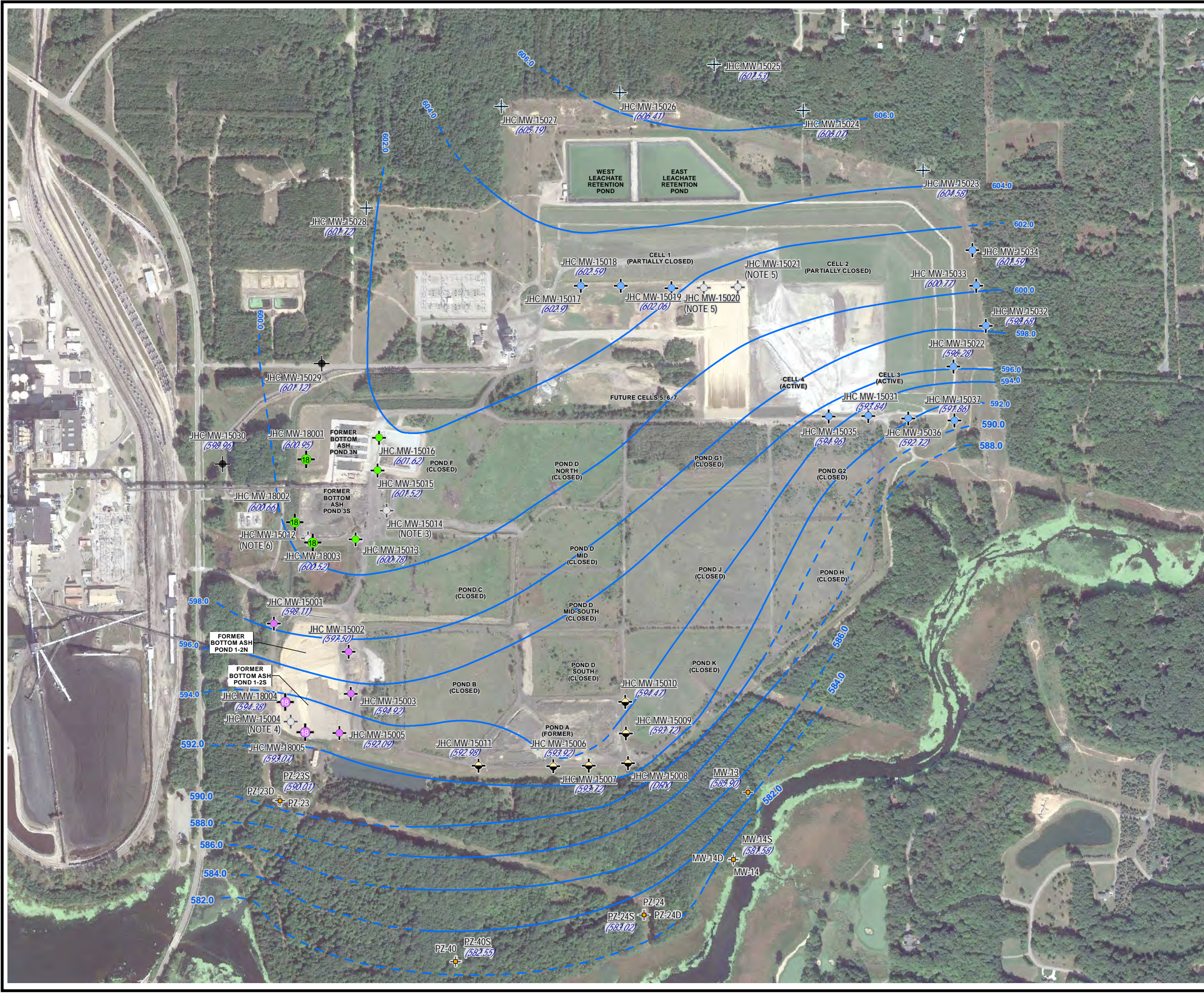
TITLE: **SITE PLAN  
WITH CCR MONITORING WELL LOCATIONS**

DRAWN BY: S. MAJOR	PROJ NO.: 322174-001
CHECKED BY: B. YELEN	
APPROVED BY: S. HOLMSTROM	<b>FIGURE 2</b>
DATE: JANUARY 2020	

FILE NO.: 322174-001-030.mxd

**TRC**

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

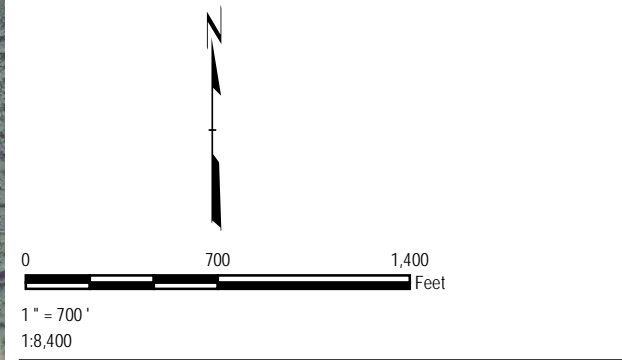


**LEGEND**

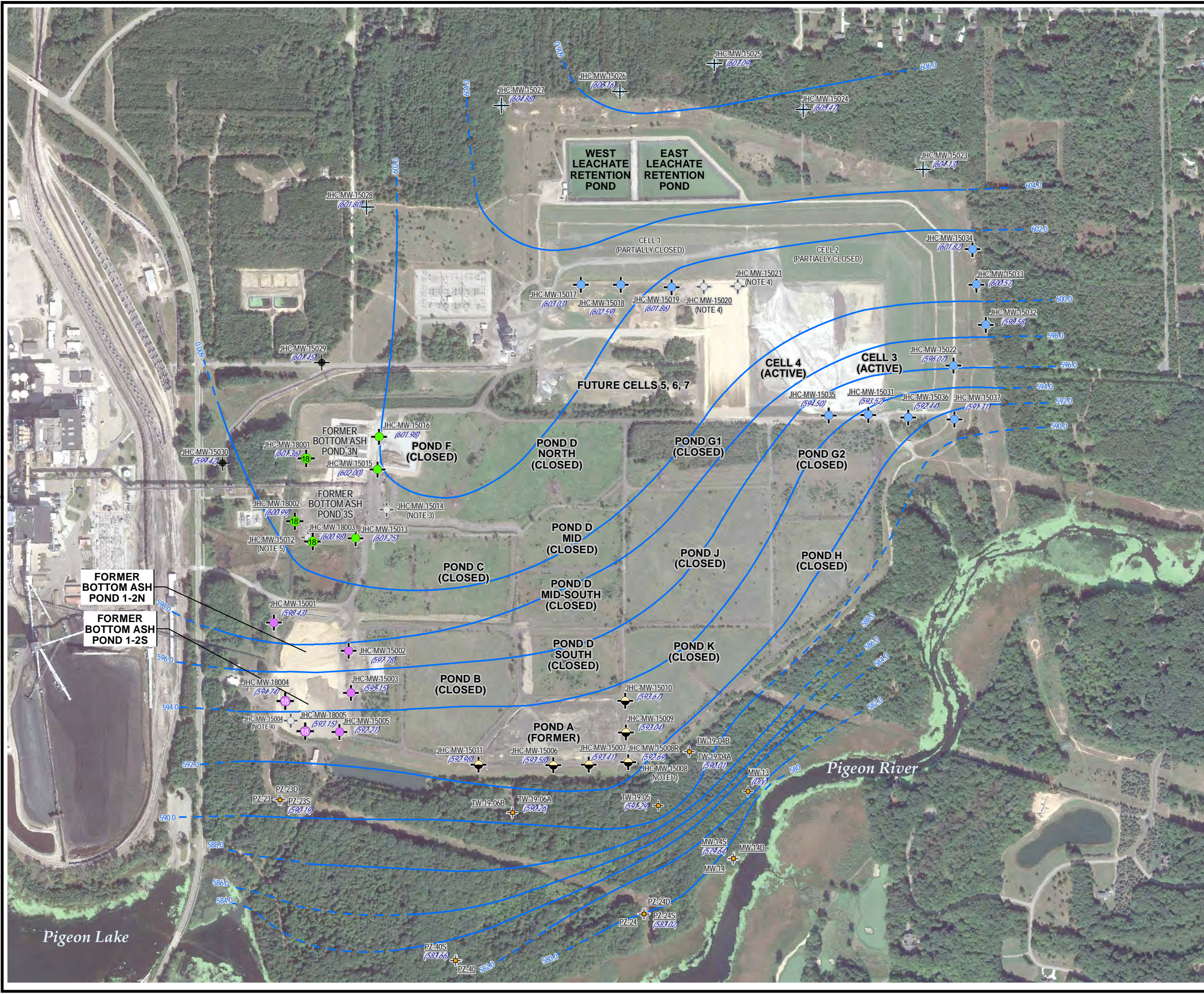
- BACKGROUND MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- DOWNGRADIENT BOTTOM ASH POND 1/2 N/S MONITORING WELL
- DOWNGRADIENT BOTTOM ASH POND 3 N/S MONITORING WELL
- DOWNGRADIENT LANDFILL MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- POND A MONITORING WELL
- NEW DOWNGRADIENT BOTTOM ASH POND 1/2 N/S MONITORING WELL (2018)
- NEW DOWNGRADIENT BOTTOM ASH POND 3 N/S MONITORING WELL (2018)
- NATURE AND EXTENT WELLS
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (600.97) GROUNDWATER ELEVATION (FEET)

**NOTES**

1. BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2018.
2. WELL LOCATIONS BASED ON SURVEY DATA THROUGH 12/07/2018.
3. MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
4. MONITORING WELL DECOMMISSIONED JUNE 14, 2018.
5. MONITORING WELL DECOMMISSIONED OCTOBER 10, 2018.
6. JHC-MW-1800X MONITORING WELLS INSTALLED IN DECEMBER 2018.
7. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.



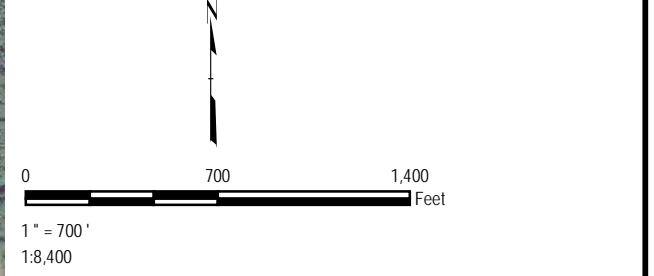
PROJECT:		<b>CONSUMERS ENERGY COMPANY JH CAMPBELL POWER PLANT WEST OLIVE, MICHIGAN</b>	
TITLE:		<b>GROUNDWATER CONTOUR MAP APRIL 2019</b>	
DRAWN BY:	S. MAJOR	PROJ NO.:	322174-001
CHECKED BY:	B. YELEN	<b>FIGURE 3</b>	
APPROVED BY:	S. HOLMSTROM		
DATE:	JANUARY 2020		
		1540 Eisenhower Place Ann Arbor, MI 48108-3284 Phone: 734.971.7080 www.trccompanies.com	
FILE NO.:		322174-001-024.mxd	



### LEGEND

- BACKGROUND MONITORING WELL
- DOWNGRAIENT BOTTOM ASH POND 1/2 N/S MONITORING WELL
- DOWNGRAIENT BOTTOM ASH POND 3 N/S MONITORING WELL
- DOWNGRAIENT LANDFILL MONITORING WELL
- DOWNGRAIENT POND A MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- DECOMMISSIONED MONITORING WELL
- NEW DOWNGRAIENT BOTTOM ASH POND 1/2 N/S MONITORING WELL (2018)
- NEW DOWNGRAIENT BOTTOM ASH POND 3 N/S MONITORING WELL (2018)
- NATURE AND EXTENT WELL
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (600.97) GROUNDWATER ELEVATION (FEET) SHALLOW WELLS

- ### NOTES
- BASE MAP IMAGERY FROM GOOGLE EARTH PRO, 2018.
  - WELL LOCATIONS BASED ON SURVEY DATA THROUGH 12/07/2018.
  - MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
  - MONITORING WELL DECOMMISSIONED JUNE 14, 2018.
  - MONITORING WELL DECOMMISSIONED OCTOBER 10, 2018.
  - JHC-MW-1800X MONITORING WELLS INSTALLED IN DECEMBER 2018.
  - MONITORING WELL DECOMMISSIONED JUNE 24, 2019.
  - JHC-MW-15008R AND TW-19-XX MONITORING WELLS INSTALLED IN JUNE 2019.



PROJECT:		<b>CONSUMERS ENERGY COMPANY JH CAMPBELL POWER PLANT WEST OLIVE, MICHIGAN</b>	
TITLE:		<b>GROUNDWATER CONTOUR MAP OCTOBER 2019</b>	
DRAWN BY:	M. VAPHIADIS	PROJ NO.:	322174-001
CHECKED BY:	B. YELEN	<b>FIGURE 4</b>	
APPROVED BY:	S. HOLMSTROM		
DATE:	JANUARY 2020		

FILE NO.: 322174-001-029.mxd

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# Appendix A

## Monitoring Well Installation & Decommissioning Logs

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**WELL CONSTRUCTION LOG**

**WELL NO. JHC MW-15008R**

Facility/Project Name: <b>Consumers Energy Company: JH Campbell</b>		Date Drilling Started: <b>6/24/19</b>	Date Drilling Completed: <b>6/25/19</b>	Project Number: <b>322174.0002</b>	
Drilling Firm: <b>Stearns Drilling</b>	Drilling Method: <b>Direct Push/HSA</b>	Surface Elev. (ft) <b>632.3</b>	TOC Elevation (ft) <b>634.67</b>	Total Depth (ft bgs) <b>45.0</b>	Borehole Dia. (in) <b>2/8</b>
Boring Location: Southeast of Pond A. N: 517558.9 E: 12636031.7		Personnel Logged By - Paula Lancaster Driller - Roger Christiansen		Drilling Equipment: <b>Geoprobe 7822 DT</b>	
Civil Town/City/or Village: <b>West Olive</b>	County: <b>Ottawa</b>	State: <b>MI</b>	Water Level Observations: While Drilling: Date/Time <u>6/24/19 14:50</u> ▽ Depth (ft bgs) <u>38.8</u> After Drilling: Date/Time <u>6/25/19 08:45</u> ▾ Depth (ft bgs) <u>38.8</u>		

SAMPLE	NUMBER AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
	1 GP	66		0 - 5	<b>FILL</b> mostly ash and gravel. <b>SAND</b> mostly fine sand, light yellowish brown (10YR 6/4), dry, loose.				Soil boring reamed to a depth of 47 feet below ground surface using 4.25 inch hollow stem augers prior to well installation.
	2 GP	80		5 - 7.5	Changes to some gravel at 3.5 feet below ground surface. Changes to no gravel at 3.7 feet below ground surface. Changes to yellowish brown (10YR 5/4), moist at 3.8 feet below ground surface.				
	3 GP	100		7.5 - 10	Changes to few to little gravel, brown (10YR 5/3) at 7.5 feet below ground surface.				
	4 GP	100		10 - 20	Changes to no gravel, yellowish brown (10YR 5/6) at 10.0 feet below ground surface.	SP			
	5 GP	70		20 - 45					

SOIL BORING-WELL CONSTRUCTION LOG 322174.0002.0000.GPJ TRC\_CORP\_INCHES.GDT 10/11/19

Signature: Firm: TRC 1540 Eisenhower Place Ann Arbor, Michigan 734-971-7080 Fax 734-971-9022

Checked By: Jennifer Reed



WELL CONSTRUCTION LOG

WELL NO. JHC MW-15008R

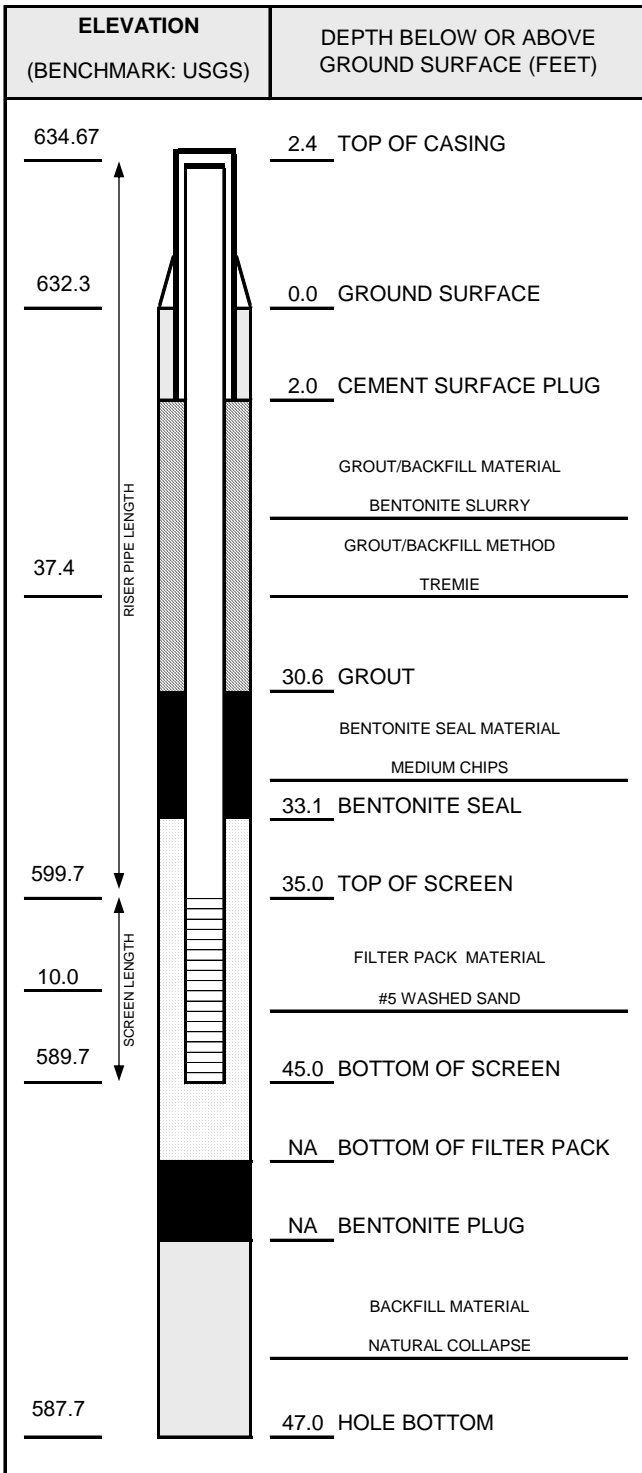
SOIL BORING WELL CONSTRUCTION LOG 322174.0002.0000.GPJ TRC CORP. INCHES.GDT 10/11/19

SAMPLE		BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
NUMBER AND TYPE	RECOVERY (%)							
6	73			Changes to fine to medium sand, dark yellowish brown (10YR 6/6) at 27.0 feet below ground surface. Changes to brown (10YR 4/3) with staining at 28.25 feet below ground surface. Changes to medium sand, few coarse sand, dark yellowish brown (10YR 4/6) at 28.6 feet below ground surface.	SP			
7	73		30	<b>SAND</b> mostly medium sand, little coarse sand, few fine sand, little fine gravel, dark yellowish brown (10YR 4/6), dry, loose.				
			32.5	Changes to mostly medium sand, few fine sand, few coarse sand, trace fine gravel at 32.5 feet below ground surface.				
			34.0	Changes to mostly fine sand, trace medium to coarse sand, light yellowish brown (10YR 6/4) at 34.0 feet below ground surface.				
8	65							
			39.25	Changes to mostly medium sand, trace to few coarse sand, trace fine gravel, wet at 39.25 feet below ground surface.				
			39.5	Changes to mostly fine to medium sand at 39.5 feet below ground surface.				
9	65			Changes to mostly medium sand, trace coarse sand, trace fine sand, dark brown (10YR 4/6), loose at 40.0 feet below ground surface.	SW			
10	0		45	Soil boring blind drilled from 45.0 to 47.0 feet below ground surface using hollow stem augers.				
			47.0	End of boring at 47.0 feet below ground surface.				
			50					
			55					



# WELL CONSTRUCTION DIAGRAM

PROJ. NAME: CEC JHC RAP Area 2019 Work		WELL ID: <b>JHC MW-15008R</b>
PROJ. NO: 322174.0002	DATE INSTALLED: 6/25/2019	INSTALLED BY: Stearns/P. Lancaster
		CHECKED BY: B. Yelen



CASING AND SCREEN DETAILS	
<b>TYPE OF RISER:</b>	<u>2-INCH PVC</u>
PIPE SCHEDULE:	<u>40</u>
PIPE JOINTS:	<u>THREADED O-RINGS</u>
<b>SCREEN TYPE:</b>	<u>2-INCH PVC</u>
SCR. SLOT SIZE:	<u>0.01-INCH</u>
BOREHOLE DIAMETER:	<u>8</u> IN. FROM <u>0</u> TO <u>47</u> FT. <u>      </u> IN. FROM <u>      </u> TO <u>      </u> FT.
SURF. CASING DIAMETER:	<u>4</u> IN. FROM <u>0</u> TO <u>2.5</u> FT. <u>      </u> IN. FROM <u>      </u> TO <u>      </u> FT.

WELL DEVELOPMENT	
DEVELOPMENT METHOD:	<u>SURGE AND PUMP</u>
TIME DEVELOPING:	<u>1</u> HOURS
WATER REMOVED:	<u>100</u> GALLONS
WATER ADDED:	<u>5</u> GALLONS
WATER CLARITY BEFORE / AFTER DEVELOPMENT	
CLARITY BEFORE:	<u>Turbid</u>
COLOR BEFORE:	<u>yellowish brown</u>
CLARITY AFTER:	<u>None</u>
COLOR AFTER:	<u>None</u>
ODOR (IF PRESENT):	<u>None</u>

WATER LEVEL SUMMARY				
MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	45.00	T/PVC	6/25/2019	8:45
DTB AFTER DEVELOPING:	45.00	T/PVC	6/26/2019	9:35
SWL BEFORE DEVELOPING:	38.80	T/PVC	6/25/2019	8:45
SWL AFTER DEVELOPING:	38.70	T/PVC	6/26/2019	9:35
OTHER SWL:		T/PVC		
OTHER SWL:		T/PVC		

NOTES:

PROTECTIVE CASING DETAILS	
PERMANENT, LEGIBLE WELL LABEL ADDED?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
PROTECTIVE COVER AND LOCK INSTALLED?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
LOCK KEY NUMBER:	





## MONITORING WELL DECOMMISSIONING LOG

PROJECT NAME: Consumers Energy Company: JH Campbell		MONITORING WELL ID: JHC-MW-15008	
PROJECT NUMBER: 322174.0002	DATE: 06/24/2019	LOCATION: Southeast of Pond A.	LOCATION COORDINATES:
OBSERVED BY: Paula Lancaster			N: 517560.39
DRILLING CONTRACTOR: STEARNS DRILLING			E: 12636031.25
CREW CHIEF: Roger Christiansen		TOP OF CASING ELEV.: 635.30	SURFACE ELEV.: 632.43

PROTECTIVE COVER TYPE:	<input checked="" type="checkbox"/> STICK-UP	<input type="checkbox"/> FLUSH MOUNT	<input type="checkbox"/> TRAF. BOX	<input type="checkbox"/> OTHER _____		
PROTECTIVE COVER DIAMETER:	<input checked="" type="checkbox"/> 4"	<input type="checkbox"/> 8"	<input type="checkbox"/> 9"	<input type="checkbox"/> 10"	<input type="checkbox"/> 12"	<input type="checkbox"/> OTHER _____
WELL MATERIAL:	<input checked="" type="checkbox"/> PVC	<input type="checkbox"/> SS	<input type="checkbox"/> IRON	<input type="checkbox"/> GALVANIZED STEEL	<input type="checkbox"/> OTHER _____	
WELL CASING DIAMETER:	<input type="checkbox"/> 1"	<input checked="" type="checkbox"/> 2"	<input type="checkbox"/> 4"	<input type="checkbox"/> 6"	<input type="checkbox"/> 8"	<input type="checkbox"/> OTHER _____
WELL SCREEN MATERIAL:	<input checked="" type="checkbox"/> PVC	<input type="checkbox"/> SS	<input type="checkbox"/> IRON	<input type="checkbox"/> GALVANIZED STEEL	<input type="checkbox"/> OTHER _____	
WELL SCREEN LENGTH:	<input type="checkbox"/> 5-FT	<input checked="" type="checkbox"/> 10-FT	<input type="checkbox"/> UNKNOWN	<input type="checkbox"/> OTHER _____	DTW: <u>Not measured</u> T/ PVC	
WELL SCREEN SLOT SIZE:	<input checked="" type="checkbox"/> 0.01"	<input type="checkbox"/> 0.02"	<input type="checkbox"/> UNKNOWN	<input type="checkbox"/> OTHER _____	DTB: <u>Not measured</u> T/ PVC	

DECOMMISSIONING PROCEDURE
<p><b>NOTES:</b></p> <p>Well casing filled with medium bentonite pellets then hydrated. Pro-cover and concrete pad removed. Well casing cut off at 2 feet below grade. Remaining hole backfilled and brought to grade with the surrounding surface sand.</p>

GROUTING PROCEDURE:	NOTES:
GROUT TYPE: NA GROUT MIX: GROUT INTERVAL:                      FT-BGS    TO                      FT-BGS BENTONITE SEAL: MEDIUM CHIPS SEAL INTERVAL:                      2    FT-BGS    TO                      38    FT-BGS	

ADDITIONAL COMMENTS:
----------------------

SIGNED

CHECKED



SOIL BORING LOG

BORING NO. TW-19-04A

Facility/Project Name: Consumers Energy Company: JH Campbell		Date Drilling Started: 6/20/19	Date Drilling Completed: 6/20/19	Project Number: 322174.0002
Drilling Firm: Stearns Drilling	Drilling Method: Direct Push	Surface Elev. (ft) 608.2	TOC Elevation (ft) 611.44	Total Depth (ft bgs) 25.0
Boring Location: Adjacent to TW-19-04B, approximately 280 feet southwest of MW-10AR along the road. N: 517637.1 E: 12636479.0		Personnel Logged By - Paula Lancaster Driller - Roger Christiansen		Drilling Equipment: Geoprobe 7822 DT
Civil Town/City/or Village: West Olive	County: Ottawa	State: MI	Water Level Observations: While Drilling:      Date/Time After Drilling:      Date/Time 6/20/19 11:45      Depth (ft bgs) 17.5	

SAMPLE	NUMBER AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	COMMENTS
					TOPSOIL/SAND mostly medium sand, few fine sand, few silt, dark brown (10YR 3/3), dry, loose, organic material present.			TW-19-04A was blind drilled to the boring terminus. Lithology information described in this boring log was taken from TW-19-04B.
				5	SAND mostly medium sand, few to little fine sand, dark brown (10YR 4/6), dry, loose.			
					Grades to mostly medium sand, little to some fine sand, pale brown (10YR 6/3) at 5.0 feet below ground surface.			
					Changes to brown (10YR 5/3), wet at 18.0 feet below ground surface.			Temporary monitoring well screen was set between 17.0 and 22.0 feet below ground surface.
					End of boring at 25.0 feet below ground surface.			

SOIL BORING WELL CONSTRUCTION LOG 322174.0002.GPJ TRC\_CORP\_INCHES.GDT 11/21/19

Signature: Firm: TRC 1540 Eisenhower Place Ann Arbor, Michigan 734-971-7080 Fax 734-971-9022

Checked By: Jennifer Reed



# SOIL BORING LOG

**BORING NO. TW-19-04B**

Page 1 of 1

Facility/Project Name: <b>Consumers Energy Company: JH Campbell</b>		Date Drilling Started: <b>6/19/19</b>	Date Drilling Completed: <b>6/20/19</b>	Project Number: <b>322174.0002</b>
Drilling Firm: <b>Stearns Drilling</b>	Drilling Method: <b>Direct Push</b>	Surface Elev. (ft) <b>608.3</b>	TOC Elevation (ft) <b>611.21</b>	Total Depth (ft bgs) <b>38.0</b>
Boring Location: Approximately 280 feet southwest of MW-10AR along the road. N: 517635.8 E: 12636481.8		Personnel Logged By - Paula Lancaster Driller - Roger Christiansen		Drilling Equipment: <b>Geoprobe 7822 DT</b>
Civil Town/City/or Village: <b>West Olive</b>	County: <b>Ottawa</b>	State: <b>MI</b>	Water Level Observations: While Drilling: Date/Time <u>6/19/19 00:00</u> ▾ Depth (ft bgs) <u>18.0</u> After Drilling: Date/Time <u>6/20/19 11:15</u> ▾ Depth (ft bgs) <u>17.7</u>	

SAMPLE NUMBER AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	COMMENTS
1 GP	70			<b>TOPSOIL/SAND</b> mostly medium sand, few fine sand, few silt, dark brown (10YR 3/3), dry, loose, organic material present.			
2 GP	72		5	<b>SAND</b> mostly medium sand, few to little fine sand, dark brown (10YR 4/6), dry, loose.			
3 GP	75		10	Grades to mostly medium sand, little to some fine sand, pale brown (10YR 6/3) at 5.0 feet below ground surface.			
4 GP	70		18	▼ Changes to brown (10YR 5/3), wet at 18.0 feet below ground surface.	SP		
5 GP	86		25	Changes to trace gravel at 25.0 feet below ground surface.			
6 GP	100		30	Changes to fine to very fine sand at 30.0 feet below ground surface.			
7 GP	100		35	<b>SILT</b> mostly silt, gray (10YR 5/1), dry, very hard, non-plastic.	ML		
8 GP	100		38	End of boring at 38.0 feet below ground surface.			

Temporary monitoring well screen was set between 25.0 and 30.0 feet below ground surface.

SOIL BORING WELL CONSTRUCTION LOG 322174.0002.GPJ TRC CORP. INCHES.GDT 11/21/19

Signature: Firm: TRC 1540 Eisenhower Place Ann Arbor, Michigan 734-971-7080 Fax 734-971-9022

Checked By: Jennifer Reed




**SOIL BORING LOG**

**BORING NO. TW-19-05**

Facility/Project Name: <b>Consumers Energy Company: JH Campbell</b>		Date Drilling Started: <b>6/20/19</b>	Date Drilling Completed: <b>6/21/19</b>	Project Number: <b>322174.0002</b>
Drilling Firm: <b>Stearns Drilling</b>	Drilling Method: <b>Direct Push</b>	Surface Elev. (ft) <b>603.4</b>	TOC Elevation (ft) <b>606.36</b>	Total Depth (ft bgs) <b>25.0</b>
Boring Location: Southeast of Pond A. N: 517238.8 E: 12636253.4		Personnel Logged By - Paula Lancaster Driller - Roger Christiansen		Drilling Equipment: <b>Geoprobe 7822 DT</b>
Civil Town/City/or Village: <b>West Olive</b>	County: <b>Ottawa</b>	State: <b>MI</b>	Water Level Observations: While Drilling: Date/Time <u>6/20/19 15:35</u> ▾ Depth (ft bgs) <u>10.8</u> After Drilling: Date/Time <u>6/21/19 09:05</u> ▼ Depth (ft bgs) <u>11.5</u>	

SAMPLE	NUMBER AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	COMMENTS
	1 GP	70		0 - 1	<b>SILTY SAND</b> mostly very fine to fine sand, little to some silt, dark grayish brown (10YR 3/2), moist, loose.	SC-SM		
	2 GP	72		1 - 5	<b>SAND</b> mostly very fine to fine sand, trace silt, dark yellowish brown (10YR 4/6), moist, loose. Changes to no silt, yellowish brown (10YR 5/6) at 2.7 feet below ground surface. Grades to yellowish brown (10YR 5/4) at 4.0 feet below ground surface.  Grades to pale brown (10YR 6/3) at 7.7 feet below ground surface.	SW		
	3 GP	100		5 - 10	Changes to brown (10YR 5/3), wet at 10.5 feet below ground surface.			Temporary monitoring well screen was set between 10.6 and 15.6 feet below ground surface.
	4 GP	100		10 - 17	Changes to 1.0 inch interval of mostly silt, little to some clay, brown (10YR 5/3), no odor, wet, soft, small pieces of charred material present. Changes to mostly medium sand, some fine sand, trace coarse sand, brown (10YR 5/3), wet, loose.	SP		
	5 GP	100		17 - 20	<b>SAND</b> mostly medium sand, some fine sand, little coarse sand, trace fine gravel, brown (10YR 5/3) at 16.5 feet below ground surface. Changes to mostly fine sand, few medium sand, trace coarse sand, yellowish brown (10YR 5/4) at 17.0 feet below ground surface.	CL		
				20 - 25	<b>SILTY CLAY</b> mostly clay, little to some silt, gray (10YR 6/1), moist, soft, plastic.			
					<b>CLAYEY SILT</b> mostly silt, little to some clay, gray (10YR 6/1), moist, hard, non-plastic.			
					<b>SILT</b> mostly silt, gray (10YR 6/1), moist, hard, non-plastic.	ML		
				25	End of boring at 25.0 feet below ground surface.			

SOIL BORING WELL CONSTRUCTION LOG 322174.0002.GPJ TRC\_CORP\_INCHES.GDT 11/21/19

Signature:  Firm: TRC 1540 Eisenhower Place Ann Arbor, Michigan 734-971-7080 Fax 734-971-9022

Checked By: Jennifer Reed



**SOIL BORING LOG**

**BORING NO. TW-19-06A**

Page 1 of 1

Facility/Project Name: <b>Consumers Energy Company: JH Campbell</b>		Date Drilling Started: <b>6/21/19</b>	Date Drilling Completed: <b>6/21/19</b>	Project Number: <b>322174.0002</b>
Drilling Firm: <b>Stearns Drilling</b>	Drilling Method: <b>Direct Push</b>	Surface Elev. (ft) <b>599.6</b>	TOC Elevation (ft) <b>602.54</b>	Total Depth (ft bgs) <b>15.0</b>
Boring Location: <b>Adjacent to TW-19-06B, south of Pond A on the west side.</b>		Personnel Logged By - <b>Paula Lancaster</b> Driller - <b>Roger Christiansen</b>		Drilling Equipment: <b>Geoprobe 7822 DT</b>
N: <b>517186.2</b> E: <b>12635178.8</b>				
Civil Town/City/or Village: <b>West Olive</b>	County: <b>Ottawa</b>	State: <b>MI</b>	Water Level Observations: While Drilling: _____ Date/Time _____ After Drilling: _____ Date/Time <b>6/24/19 10:00</b> Depth (ft bgs) _____ Depth (ft bgs) <b>8.85</b>	

SAMPLE	NUMBER AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	COMMENTS
				0	<b>TOPSOIL/SILTY SAND</b> mostly fine to medium sand, little to some silt, very dark brown (10YR 2/2), moist, loose, organic material present.	SM		TW-19-06A was blind drilled to the boring terminus. Lithology information described in this boring log was taken from TW-19-06B.
				2	<b>SAND</b> mostly fine sand, few silt, dark yellowish brown (10YR 3/6), dry, loose. Changes to no silt at 2.7 feet below ground surface.			
				4	Grades to pale brown (10YR 6/3) at 3.8 feet below ground surface. Grades to very pale brown (10YR 7/3) at 4.5 feet below ground surface.			
				8	Changes to interval of charred wood pieces present at 8.0 feet below ground surface. Changes to wet at 9.0 feet below ground surface.	SP		Temporary monitoring well screen was set between 7.30 and 12.30 feet below ground surface.
				14	Grades to light yellowish brown (10YR 6/3) at 14.0 feet below ground surface.			
				15.0	End of boring at 15.0 feet below ground surface.			

SOIL BORING WELL CONSTRUCTION LOG 322174.0002.GPJ TRC\_CORP\_INCHES.GDT 11/21/19

Signature: Firm: TRC 1540 Eisenhower Place Ann Arbor, Michigan 734-971-7080 Fax 734-971-9022

Checked By: Jennifer Reed



# SOIL BORING LOG

**BORING NO. TW-19-06B**

Page 1 of 1

Facility/Project Name: <b>Consumers Energy Company: JH Campbell</b>		Date Drilling Started: <b>6/21/19</b>	Date Drilling Completed: <b>6/21/19</b>	Project Number: <b>322174.0002</b>	
Drilling Firm: <b>Stearns Drilling</b>	Drilling Method: <b>Direct Push</b>	Surface Elev. (ft) <b>599.4</b>	TOC Elevation (ft) <b>602.31</b>	Total Depth (ft bgs) <b>29.0</b>	Borehole Dia. (in) <b>2/3.25</b>
Boring Location: <b>South of Pond A on the west side.</b>		Personnel Logged By - <b>Paula Lancaster</b> Driller - <b>Roger Christiansen</b>		Drilling Equipment: <b>Geoprobe 7822 DT</b>	
N: <b>517189.6</b> E: <b>12635179.2</b>		Water Level Observations: While Drilling: Date/Time <b>6/21/19 00:00</b> ∇ Depth (ft bgs) <b>9.0</b> After Drilling: Date/Time <b>6/21/19 12:30</b> ∇ Depth (ft bgs) <b>8.60</b>			
Civil Town/City/or Village: <b>West Olive</b>	County: <b>Ottawa</b>	State: <b>MI</b>			

SAMPLE NUMBER AND TYPE	RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	COMMENTS
1 GP	66			<b>TOPSOIL/SILTY SAND</b> mostly fine to medium sand, little to some silt, very dark brown (10YR 2/2), no odor, moist, loose, organic material present.	SM		
2 GP	73		5	<b>SAND</b> mostly fine sand, few silt, dark yellowish brown (10YR 3/6), dry, loose. Grades to no silt at 2.7 feet below ground surface. Grades to pale brown (10YR 6/3) at 3.83 feet below ground surface. Changes to very pale brown (10YR 7/3) at 4.50 feet below ground surface.			
3 GP	100		10	▼ Changes to interval of charred wood pieces present at 8.0 feet below ground surface. Changes to wet at 9.0 feet below ground surface.			
4 GP	100		15	Grades to light yellowish brown (10YR 6/3) at 14.0 feet below ground surface.	SP		
5 GP	100		20	<b>SAND</b> mostly medium sand, few fine sand, few to little coarse sand, trace fine gravel, dark gray (10YR 4/1), wet, loose.	SW		
6 GP	100		25	<b>SILT</b> mostly silt, gray (10YR 5/1), dry, hard, non plastic.	ML		
				Changes to moist to dry, medium hard at 27.5 feet below ground surface.			
				End of boring at 29.0 feet below ground surface.			

Temporary monitoring well screen was set between 15.8 and 20.8 feet below ground surface.

SOIL BORING WELL CONSTRUCTION LOG 322174.0002.GPJ TRC\_CORP\_INCHES.GDT 11/21/19

Signature:	Firm: <b>TRC</b> 1540 Eisenhower Place Ann Arbor, Michigan	734-971-7080 Fax 734-971-9022
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Checked By: Jennifer Reed

# Appendix B November 2018 Assessment Monitoring Data Summary

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March 14, 2019

Bethany Swanberg  
Environmental Services – Landfill Operations Compliance  
Consumers Energy Company  
1945 W. Parnall Road  
Jackson, MI 49201

Subject: November 2018 Assessment Monitoring Data Summary and Statistical Evaluation,  
Consumers Energy, JH Campbell Site, Pond A CCR Unit

Dear Ms. Swanberg:

Consumers Energy Company (CEC) is continuing semiannual assessment monitoring in accordance with §257.95 of the CCR Rule<sup>1</sup> for the JH Campbell Power Plant (JHC) Pond A located in West Olive, Michigan. During the statistical evaluation of the initial assessment monitoring event, arsenic was present in one downgradient monitoring well at statistically significant levels exceeding the Groundwater Protection Standard (GWPS). Therefore, CEC will initiate an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined (no later than April 14, 2019). As discussed in the *2018 Annual Groundwater Monitoring Report (2018 Annual Report)* (TRC, January 2019), prepared by TRC on behalf of CEC, the second semiannual monitoring event was conducted in November 2018, but laboratory analysis and data quality review were ongoing as of the writing of the 2018 Annual Report. Therefore, the summary of the November 2018 groundwater data would be prepared under separate cover after laboratory analysis is complete and results have been reviewed for usability. This letter report has been prepared to provide the summary of the November 2018 assessment groundwater monitoring results, data quality review, and statistical data evaluation.

## Assessment Monitoring Sampling Summary

TRC conducted the second semiannual assessment monitoring event for Appendix III and IV constituents at the Pond A CCR Unit in accordance with the *JH Campbell Monitoring Program Sample Analysis Plan (SAP)* (ARCADIS, 2016). The semiannual assessment monitoring event was performed

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<sup>1</sup> USEPA final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) published April 17, 2015, as amended per Phase One, Part One of the CCR Rule (83 FR 36435).



on November 12 through November 16, 2018. Downgradient monitoring wells JHC-MW-15006, JHC-MW-15007, JHC-MW-15009 through JHC-MW-15011 and background monitoring wells JHC-MW-15023 through JHC-MW-15028 were sampled during this monitoring event. The locations of the monitoring wells are depicted on Figure 1. Monitoring well JHC-MW-15008 had an insufficient volume of groundwater present within it; therefore, a groundwater sample was unable to be collected at that location.

TRC personnel collected static water level measurements from the JHC Pond A CCR unit well network during the November 2018 sampling event. Static water elevation data are summarized in Table 1. Groundwater elevation data are shown on Figure 2. Monitoring wells were purged with peristaltic pumps or submersible pumps utilizing low-flow sampling methodology. Field parameters were stabilized at each monitoring well prior to collecting groundwater samples. Field parameters for each monitoring well are summarized in Table 2.

The groundwater samples were analyzed by Pace Analytical Services, LLC (Pace) for Appendix III and IV constituents during in accordance with the SAP. The analytical results for the background monitoring wells are summarized in Table 3 and the analytical results for the downgradient monitoring wells are summarized in Table 4.

## Groundwater Flow Rate and Direction

Groundwater elevation data collected during the November 2018 event were generally similar to data collected previously in the background and detection monitoring events. The data showed that groundwater within the uppermost aquifer generally flows to the south-southeast across the Site, with a southwesterly groundwater flow component on the western edge of the Site. The groundwater mounding previously observed in the immediate vicinity of Unit 1-2 Bottom Ash Ponds (Unit 1-2) and Bottom Ash Ponds 3 North and 3 South (Unit 3) is no longer apparent subsequent to completing decommissioning activities at both units in September and October 2018, respectively. Slight mounding is still observed in the vicinity of Pond A as groundwater continues to equilibrate in response to permanent discontinuation of hydraulic loading in June 2018. Groundwater elevations measured across the Site during the November 2018 sampling event are provided on Table 1 and were used to construct the groundwater contour map provided on Figure 2.

The figure shows that current groundwater flow is generally consistent with previous monitoring events since the background sampling events commenced in December 2015. The average hydraulic gradient throughout the Site during the November 2018 event is estimated at 0.0039 ft/ft. The gradient was calculated using the following well pairs: JHC-MW-15029/JHC-MW-15030, JHC-MW-15029/JHC-MW-15005, JHC-MW-15019/JHC-MW-15035 and JHC-MW-15023/JHC-MW-15037 (Figure 1). Using the mean hydraulic conductivity of 62 ft/day (ARCADIS, 2016) and an assumed effective porosity of 0.4, the estimated average seepage velocity is approximately 0.61 ft/day or 220 ft/year for the November 2018 event.



The general groundwater flow direction measured during these assessment monitoring events is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells are appropriately positioned to detect the presence of Appendix III/IV constituents that could potentially migrate from the Pond A CCR Unit.

## Data Quality

Analytical data were found to be usable for assessment monitoring and were generally consistent with previous sampling events. The Data Quality Reviews are included as Attachment A.

## Assessment Monitoring Statistical Evaluation

Following the second semiannual assessment monitoring sampling event, the compliance well groundwater concentrations for Appendix IV constituents were compared to the GWPSs to determine if a statistically significant exceedance had occurred in accordance with §257.95. Consistent with the *Unified Guidance*<sup>2</sup>, the preferred method for comparisons to a fixed standard are confidence limits. An exceedance of the standard occurs when the 99 percent lower confidence level of the downgradient data exceeds the GWPS. GWPSs were established in accordance with §257.95(h), as detailed in the October 15, 2018 *Groundwater Protection Standards* technical memorandum, which was also included in the 2018 Annual Report.

Confidence intervals were established per the statistical methods detailed in the *Statistical Evaluation of November 2018 Assessment Monitoring Sampling Event* technical memorandum provided in Attachment B. For each Appendix IV constituent, the concentrations were first compared directly to the GWPS. Constituent-well combinations that included a direct exceedance of the GWPSs were retained for further statistical analysis using confidence limits. The calculated upper and lower confidence limits and comparison of the lower confidence limits to the GWPSs are provided in Table 5.

The statistical evaluation of the second semiannual assessment monitoring event data indicates that the following constituent is present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the JHC Pond A CCR unit:

<b>Constituent</b>	<b>GWPS</b>	<b># Downgradient Wells Observed</b>
Arsenic	10 ug/L	1 of 6

This result is consistent with the results of the initial assessment monitoring data statistical evaluation and CEC will continue to initiate an assessment of corrective measures by April 14, 2019, per §257.95(g). CEC will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

---

<sup>2</sup> USEPA. 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*. Office of Conservation and Recovery. EPA 530/R-09-007.




Ms. Swanberg  
Consumers Energy Company  
March 14, 2019  
Page 4

Sincerely,

TRC



Graham Crookford  
Program Manager



Sarah B. Holmstrom  
Hydrogeologist/Project Manager

#### Attachments

Table 1.	Summary of Groundwater Elevation Data
Table 2.	Summary of Field Parameter Results
Table 3.	Summary of Background Well Groundwater Sampling Results (Analytical)
Table 4.	Summary of Groundwater Sampling Results (Analytical)
Table 5.	Summary of Groundwater Protection Standard Exceedances – November 2018
Figure 1.	Monitoring Well Network and Site Plan
Figure 2.	Groundwater Contour Map – November 2018
Attachment A	Data Quality Reviews
Attachment B	Statistical Evaluation of November 2018 Assessment Monitoring Sampling Event

cc: Brad Runkel, Consumers Energy  
Harold D. Register, Jr., Consumers Energy  
Central Files

# Tables

**Table 1**  
**Summary of Groundwater Elevation Data – November 2018**  
**JH Campbell – RCRA CCR Monitoring Program**  
**West Olive, Michigan**

Well Location	Ground Surface Elevation (ft)	TOC Elevation (ft)	Geologic Unit of Screen Interval	Screen Interval Elevation (ft)	November 12, 2018		
					Depth to Water (ft BTOC)	Groundwater Elevation (ft)	
<b>Background</b>							
JHC-MW-15023	617.01	619.98	Sand	603.0 to 593.0	16.28	603.70	
JHC-MW-15024	613.79	616.62	Sand	606.8 to 596.8	11.42	605.20	
JHC-MW-15025	614.14	617.17	Sand	607.1 to 597.1	10.60	606.57	
JHC-MW-15026	615.09	618.04	Sand	607.1 to 597.1	12.35	605.69	
JHC-MW-15027	614.77	617.30	Sand	604.8 to 594.8	12.76	604.54	
JHC-MW-15028	611.02	613.80	Sand	603.0 to 593.0	12.48	601.32	
JHC-MW-15029	608.08	610.95	Sand	600.1 to 590.1	9.78	601.17	
JHC-MW-15030	604.05	607.17	Sand	600.1 to 590.1	8.25 <sup>(1)</sup>	598.92	
<b>Unit 1N, 1S, 2N, 2S</b>							
JHC-MW-15001	607.02	609.53	Sand	603.5 to 598.5	10.90	598.63	
JHC-MW-15002 <sup>(2)</sup>	618.18	621.27	Sand	590.2 to 580.2	23.18	598.09	
JHC-MW-15003 <sup>(2)</sup>	623.16	627.20	Sand	595.2 to 585.2	31.78	595.42	
JHC-MW-15005 <sup>(2)</sup>	606.22	609.99	Sand	579.2 to 569.2	17.75	592.24	
<b>Unit 3N, 3S</b>							
JHC-MW-15013	632.40	635.25	Sand	604.4 to 594.4	33.90	601.35	
JHC-MW-15015	632.46	635.20	Sand	604.5 to 594.5	33.20	602.00	
JHC-MW-15016	631.81	632.52	Sand	603.8 to 593.8	30.56 <sup>(1)</sup>	601.96	
<b>Landfill</b>							
JHC-MW-15017	613.69	616.61	Sand	603.7 to 593.7	13.85	602.76	
JHC-MW-15018	614.26	617.02	Sand	604.3 to 594.3	14.61	602.41	
JHC-MW-15019	609.81	612.86	Sand	603.8 to 593.8	11.04	601.82	
JHC-MW-15022	620.92	623.79	Sand	597.9 to 587.9	27.89	595.90	
JHC-MW-15031	632.94	635.87	Sand	599.9 to 589.9	42.32	593.55	
JHC-MW-15032	611.32	614.29	Sand	598.3 to 588.3	16.06	598.23	
JHC-MW-15033	618.08	620.99	Sand	602.1 to 592.1	20.79	600.20	
JHC-MW-15034	612.90	615.97	Sand	601.9 to 591.9	14.57	601.40	
JHC-MW-15035	632.53	634.28	Sand	599.5 to 589.5	39.60	594.68	
JHC-MW-15036	617.94	618.34	Sand	597.9 to 587.9	25.92	592.42	
JHC-MW-15037	614.28	616.06	Sand	591.3 to 586.3	24.45	591.61	
<b>Pond A</b>							
JHC-MW-15006	624.74	627.58	Sand	599.7 to 589.7	33.36	594.22	
JHC-MW-15007	624.82	627.70	Sand	602.8 to 592.8	33.75	593.95	
JHC-MW-15008	632.43	635.30	Sand	604.4 to 594.4	40.37	594.93	
JHC-MW-15009	632.33	635.32	Sand	602.3 to 592.3	41.55	593.77	
JHC-MW-15010	632.55	635.57	Sand	602.6 to 592.6	41.00	594.57	
JHC-MW-15011	627.71	630.83	Sand	600.7 to 590.7	37.70	593.13	

**Notes:**

Survey conducted by Nederveld, November 2015, October 2018, and December 2018.

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

TOC: Top of well casing.

ft BTOC: Feet below top of well casing.

(1) - The static water levels for JHC-MW-15016 and JHC-MW-15030 were collected on November 15, 2018.

(2) - Surface elevation and TOC resurveyed December 2018 post construction activities.

**Table 2**  
 Summary of Field Parameter Results – November 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location	Sample Date	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	pH (SU)	Specific Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)
<b>Background</b>							
JHC-MW-15023	11/13/2018	0.86	30.3	6.1	75	9.8	6.9
JHC-MW-15024	11/13/2018	0.97	18.7	7.1	135	9.8	6.0
JHC-MW-15025	11/13/2018	2.60	30.7	7.9	145	9.7	5.9
JHC-MW-15026	11/13/2018	6.50	129.8	6.8	86	9.6	3.8
JHC-MW-15027	11/13/2018	5.90	148.8	6.4	79	9.2	12.4
JHC-MW-15028	11/13/2018	5.81	17.5	7.8	82	11.9	7.0
<b>Pond A</b>							
JHC-MW-15006	11/15/2018	0.53	-90.5	7.8	311	14.7	2.7
JHC-MW-15007	11/15/2018	1.10	-26.0	7.6	414	15.3	8.5
JHC-MW-15008 <sup>(1)</sup>	11/15/2018	--	--	--	--	--	--
JHC-MW-15009	11/15/2018	1.90	9.5	7.6	412	12.1	9.9
JHC-MW-15010	11/14/2018	1.20	19.8	7.5	443	10.6	4.5
JHC-MW-15011	11/15/2018	0.68	51.3	9.1	352	13.5	6.4

**Notes:**

- mg/L - Milligrams per Liter.
- mV - Millivolts.
- SU - Standard units
- umhos/cm - Micromhos per centimeter.
- °C - Degrees Celsius
- NTU - Nephelometric Turbidity Unit.
- - Not sampled.
- (1) - JHC-MW-15008 had an insufficient amount of groundwater present to collect sample.

**Table 3**  
 Summary of Background Well Groundwater Sampling Results (Analytical): November  
 2018 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

						Sample Location:	JHC-MW-15023	JHC-MW-15024	JHC-MW-15025	JHC-MW-15026	JHC-MW-15027	JHC-MW-15028
						Sample Date:	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018	11/13/2018
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	Background						
<b>Appendix III</b>												
Boron	ug/L	NC	500	500	7,200	46.9	< 20.0	23.9	< 20.0	< 20.0	< 20.0	< 20.0
Calcium	mg/L	NC	NC	NC	500	15.6	28.0	16.7	9.2	9.6	11.4	11.4
Chloride	mg/L	250**	250	250	500	10.7	17.7	12.8	7.0	5.2	4.0	4.0
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250**	250	250	500	12.2	7.0	8.6	8.0	9.0	4.9	4.9
Total Dissolved Solids	mg/L	500**	500	500	500	80	180	94	< 50.0	54	50	50
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>	<b>6.1</b>	7.1	7.9	6.8	<b>6.4</b>	7.8	7.8
<b>Appendix IV</b>												
Antimony	ug/L	6	6.0	6.0	130	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	10	10	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	2,000	2,000	2,000	820	21.7	16.2	14.1	10.5	30.6	5.5	5.5
Beryllium	ug/L	4	4.0	4.0	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	5.0	5.0	3.5	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chromium	ug/L	100	100	100	11	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cobalt	ug/L	NC	40	100	100	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Lead	ug/L	NC	4.0	4.0	39	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	170	350	440	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	NC	73	210	3,200	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Radium-226	pCi/L	NC	NC	NC	NC	< 0.531	1.21	< 0.677	0.615	< 0.695	< 0.688	< 0.688
Radium-228	pCi/L	NC	NC	NC	NC	< 0.894	< 1.03	< 0.862	< 1.08	0.961	< 1.05	< 1.05
Radium-226/228	pCi/L	5	NC	NC	NC	< 1.43	1.76	< 1.54	< 1.25	1.61	< 1.74	< 1.74
Selenium	ug/L	50	50	50	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	2	2.0	2.0	3.7	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

**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.

<sup>^</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using site-specific hardness of 180 mg CaCO<sub>3</sub>/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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.

All metals were analyzed as total unless otherwise specified.

**Table 4**  
 Summary of Groundwater Sampling Results (Analytical): November 2018 JH Campbell  
 Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

						Sample Location:	JHC-MW-15006	JHC-MW-15007	JHC-MW-15008 <sup>(1)</sup>	JHC-MW-15009	JHC-MW-15010	JHC-MW-15011
						Sample Date:	11/15/2018	11/15/2018	11/15/2018	11/15/2018	11/14/2018	11/15/2018
Constituent	Unit	EPA MCL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	downgradient						
<b>Appendix III</b>												
Boron	ug/L	NC	500	500	7,200	203	142	--	188	120	337	
Calcium	mg/L	NC	NC	NC	500	26.8	42.6	--	46.2	59.6	29.1	
Chloride	mg/L	250**	250	250	500	24.8	20.6	--	17.7	7.9	21.0	
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	--	< 1,000	< 1,000	< 1,000	
Sulfate	mg/L	250**	250	250	500	27.0	19.2	--	26.9	33.3	29.2	
Total Dissolved Solids	mg/L	500**	500	500	500	140	166	--	234	262	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>	7.8	7.6	--	7.6	7.5	<b>9.1</b>	
<b>Appendix IV</b>												
Antimony	ug/L	6	6.0	6.0	130	< 1.0	< 1.0	--	1.2	< 1.0	< 1.0	
Arsenic	ug/L	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	4.7	4.0	--	< 1.0	< 1.0	<b>32.2</b>	
Barium	ug/L	2,000	2,000	2,000	820	144	177	--	178	211	98.6	
Beryllium	ug/L	4	4.0	4.0	18	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	
Cadmium	ug/L	5	5.0	5.0	3.5	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20	
Chromium	ug/L	100	100	100	<b>11</b>	2.3	<b>31.3</b>	--	<b>14.1</b>	1.5	< 1.0	
Cobalt	ug/L	NC	40	100	100	< 6.0	< 6.0	--	< 6.0	< 6.0	< 6.0	
Fluoride	ug/L	4,000	NC	NC	NC	< 1,000	< 1,000	--	< 1,000	< 1,000	< 1,000	
Lead	ug/L	NC	4.0	4.0	39	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	
Lithium	ug/L	NC	170	350	440	13	16	--	14	12	10	
Mercury	ug/L	2	2.0	2.0	0.20#	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20	
Molybdenum	ug/L	NC	73	210	3,200	12.2	7.6	--	6.1	5.0	9.3	
Radium-226	pCi/L	NC	NC	NC	NC	< 0.740	0.864	--	< 0.896	< 0.858	< 0.512	
Radium-228	pCi/L	NC	NC	NC	NC	< 0.588	< 0.688	--	0.800	0.814	< 0.519	
Radium-226/228	pCi/L	5	NC	NC	NC	< 1.33	1.40	--	< 1.47	< 1.43	< 1.03	
Selenium	ug/L	50	50	50	<b>5</b>	< 1.0	< 1.0	--	<b>12.6</b>	<b>34.1</b>	< 1.0	
Thallium	ug/L	2	2.0	2.0	3.7	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	

**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.

-- - Not Sampled.

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

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

<sup>^</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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.

All metals were analyzed as total unless otherwise specified.

(1) Insufficient amount of groundwater present to collect sample.



**Table 5**  
 Summary of Groundwater Protection Standard Exceedances – November 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Constituent	Units	GWPS	JHC-MW-15006		JHC-MW-15011	
			LCL	UCL	LCL	UCL
Arsenic	ug/L	10	4.4	12	11	26

**Notes:**

ug/L - micrograms per Liter

GWPS - Groundwater Protection Standard as established in TRC's Technical Memorandum dated October 15, 2018.

UCL - Upper Confidence Limit ( $\alpha = 0.01$ ) of the downgradient data set.

LCL - Lower Confidence Limit ( $\alpha = 0.01$ ) of the downgradient data set.

Indicates a statistically significant exceedance of the GWPS. An exceedance occurs when the LCL is greater than the GWPS.

# Figures



**LEGEND**

- BACKGROUND MONITORING WELL
- DOWNGRADIENT BOTTOM ASH POND 1/2 N/S MONITORING WELL
- DOWNGRADIENT BOTTOM ASH POND 3 N/S MONITORING WELL
- DOWNGRADIENT LANDFILL MONITORING WELL
- DOWNGRADIENT POND A MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- DECOMMISSIONED MONITORING WELL
- NEW DOWNGRADIENT BOTTOM ASH POND 1/2 N/S MONITORING WELL (2018)
- NEW DOWNGRADIENT BOTTOM ASH POND 3 N/S MONITORING WELL (2018)

- NOTES**
1. BASE MAP IMAGERY FROM USDA – NATIONAL AGRICULTURE IMAGERY PROGRAM, 7/20/2016.
  2. WELL LOCATIONS SURVEYED BY NEDERVELD ON 11/25/2015.
  3. MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
  4. MONITORING WELL DECOMMISSIONED JUNE 14, 2018.
  5. MONITORING WELL DECOMMISSIONED OCTOBER 10, 2018.
  6. JHC-MW-1800X MONITORING WELLS INSTALLED IN DECEMBER 2018.

0 600 1,200  
Feet

1" = 600'  
1:7,200

PROJECT: CONSUMERS ENERGY COMPANY  
JH CAMPBELL POWER PLANT  
WEST OLIVE, MICHIGAN

TITLE: SITE PLAN  
WITH CCR MONITORING WELL LOCATIONS

DRAWN BY: J. PAPEZ PROJ NO.: 290806-001

CHECKED BY: S. HOLMSTROM

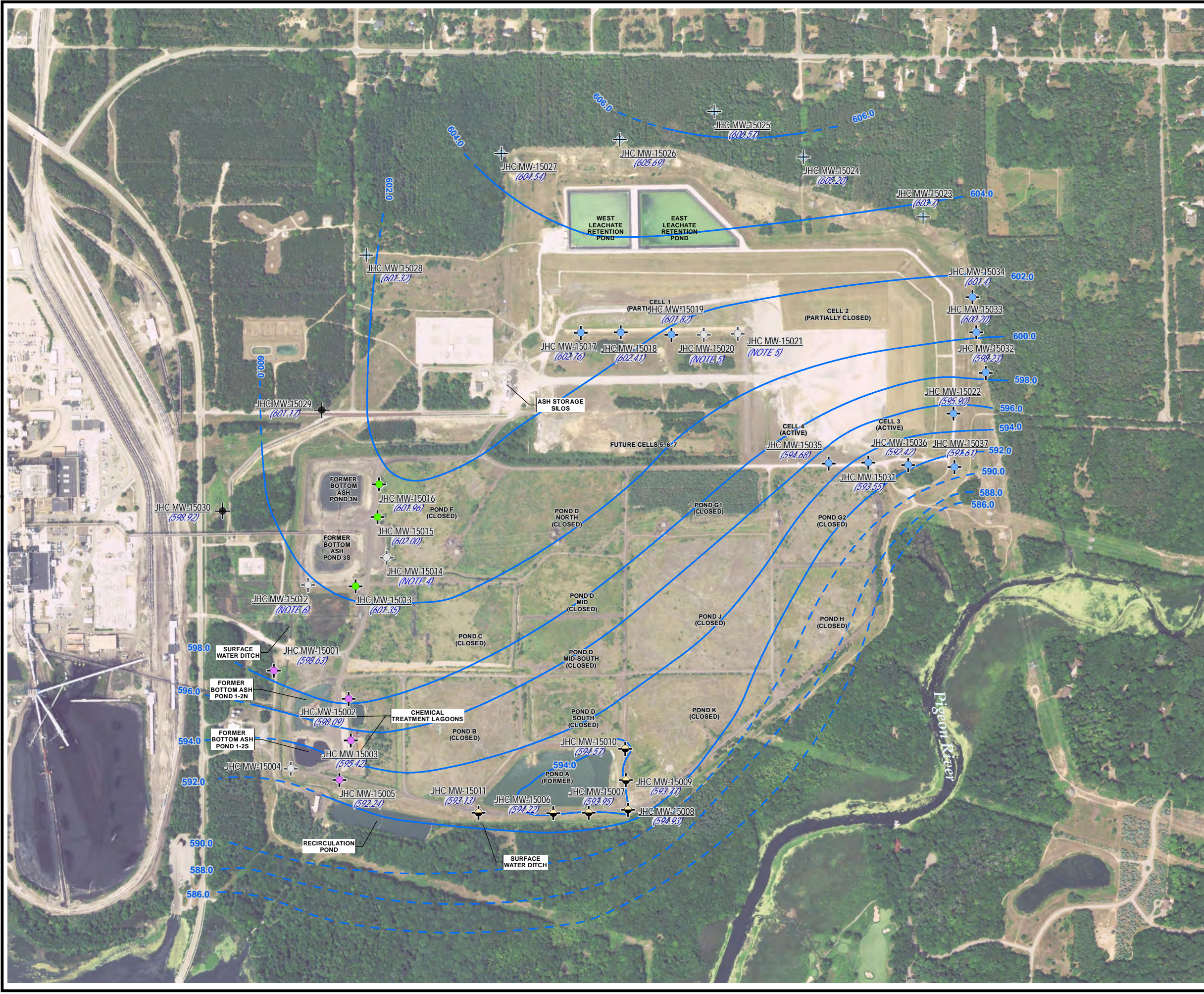
APPROVED BY: G. CROCKFORD

DATE: JANUARY 2019

**FIGURE 1**

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

FILE NO.: 290806-001-015.mxd

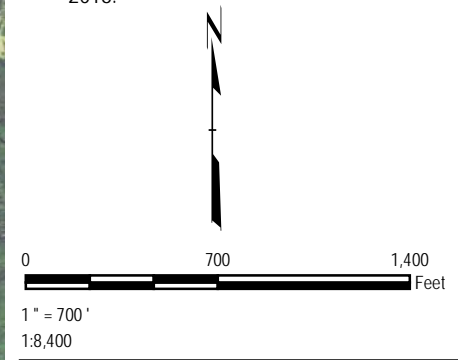


**LEGEND**

- BACKGROUND MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- 1/2 N/S MONITORING WELL
- 3 N/S MONITORING WELL
- DOWNGRADE LANDFILL MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- POND A MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (600.97) GROUNDWATER ELEVATION (FEET)

**NOTES**

1. BASE MAP IMAGERY FROM USDAL-NATIONAL AGRICULTURE IMAGERY PROGRAM, 7/20/2016.
2. WELL LOCATIONS SURVEYED BY NEDERVELD ON 11/25/2015.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
4. MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
5. MONITORING WELL DECOMMISSIONED JUNE 14, 2018.
6. MONITORING WELL DECOMMISSIONED OCTOBER 10, 2018.



PROJECT:		<b>CONSUMERS ENERGY COMPANY JH CAMPBELL POWER PLANT WEST OLIVE, MICHIGAN</b>	
TITLE:		<b>GROUNDWATER CONTOUR MAP NOVEMBER 2018</b>	
DRAWN BY:	S. MAJOR	PROJ NO.:	322174-001
CHECKED BY:	K. LOWERY	<b>FIGURE 2</b>	
APPROVED BY:	S. HOLMSTROM		
DATE:	MARCH 2019		
		1540 Eisenhower Place Ann Arbor, MI 48108-3284 Phone: 734.971.7080 www.trcsolutions.com	
FILE NO.:	290806-001-019.mxd		

# **Attachment A**

## **Data Quality Reviews**

# Laboratory Data Quality Review

## Groundwater Monitoring Event November 2018

### CEC JH Campbell Background

Groundwater samples were collected by TRC for the November 2018 sampling event. Samples were analyzed for anions, total dissolved solids, alkalinity, and total metals (except for antimony and selenium) by Pace Analytical Services, LLC (Pace) located in Grand Rapids, Michigan, for antimony and selenium by Pace located in Indianapolis, IN, and for radium by Pace located in Greensburg, Pennsylvania. The laboratory analytical results are reported in laboratory reports 4620343 and 4620344.

During the November 2018 sampling event, a groundwater sample was collected from each of the following wells:

- JHC-MW-15023
- JHC-MW-15024
- JHC-MW-15025
- JHC-MW-15026
- JHC-MW-15027
- JHC-MW-15028

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	SW-846 300.0
Total Dissolved Solids	SM 2540C-11
Alkalinity (Total, Bicarbonate, Carbonate)	SM 2320B-11
Total Metals	SW-846 6010C/6020A/7470A
Radium (Radium-226, Radium-228, Total Radium)	EPA 903.1, EPA 904.0

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

### Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017) and the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

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

- Data for method blanks, equipment blanks, and field blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), where applicable. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for tracer and carriers, where applicable, for radiochemistry only. Tracers and/or carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for laboratory duplicates, when available. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

## **Review Summary**

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

- Appendix IV constituents will be utilized for the purposes of an assessment monitoring program.
- Data are usable for the purposes of the assessment monitoring program.
- When the data are evaluated through an assessment monitoring statistical program, findings below may be used to support the removal of outliers.

## QA/QC Sample Summary

- The temperature for one of the six coolers upon receipt at the laboratory was  $>6^{\circ}\text{C}$  ( $10.3^{\circ}\text{C}$ ). The samples were collected on 11/13/18, but the sample coolers were not received by the laboratory until 11/14/18. The results for fluoride, chloride, sulfate, alkalinity, and TDS in samples JHC-MW-15023\_20181113, JHC-MW-15024\_20181113; JHC-MW-15025\_20181113; JHC-MW-15026\_20181113; JHC-MW-15027\_20181113, JHC-MW-15028\_20181113, Dup#05\_20181113, EB#05\_20181113, and FB#05\_20181113 may be biased low. The data were within or above the range of historical results with the exception of bicarbonate and total alkalinity in JHC-MW-15024 and JHC-MW-15025, which were below the range of historical concentrations.
- No target analytes were detected in the method blank.
- One field blank (FB#05\_20181113) and one equipment blank (EB#05\_20181113) were collected; no analytes were detected in these blank samples.
- LCS recoveries were within laboratory control limits.
- MS/MSDs were performed on sample JHC-MW-15025\_20181113 for radium, metals, and anions, and MS analysis was performed on sample JHC-MW-15025\_20181113 for alkalinity. All percent recoveries (%R) and relative percent differences (RPDs) were with the QC limits.
- Laboratory duplicate analyses were performed on sample JHC-MW-15025\_20181113 for anions, alkalinity, and TDS; the RPDs between the parent and duplicate sample were within the QC limits.
- The field duplicate pair samples were Dup#05\_20181113 and JHC-MW-15028\_20181113; the RPDs for total alkalinity (98%) and bicarbonate alkalinity (98%) did not meet criteria. Potential variability exists for total alkalinity and bicarbonate alkalinity results for samples JHC-MW-15023\_20181113, JHC-MW-15024\_20181113; JHC-MW-15025\_20181113; JHC-MW-15026\_20181113; JHC-MW-15027\_20181113, JHC-MW-15028\_20181113, and Dup#05\_20181113 due to field duplicate variability (see attached table).
- The RLs for chloride (2 mg/L) and TDS (50 mg/L) in the equipment blank (EB#05\_20181113) and field blank (FB#05\_20181113), and for TDS (50 mg/L) in sample JHC-MW-15026\_20181113 exceeded the project-required RL of 1 mg/L.
  - The nondetect result for TDS in sample JHC-MW-15026\_20181113 may not meet project objectives since the RL is above the project-required RL of 1 mg/L. The RL of 50 mg/L is below all project criteria; therefore, data usability is not affected.
  - The exceeded RLs for the nondetect results for chloride and TDS in the equipment blank (EB#05\_20181113) and field blank (FB#05\_20181113) do not affect data usability.
- Carrier and tracer recoveries, where applicable, were within 30-110%.



**Attachment A**  
 Summary of Data Non-Conformances  
 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
JHC-MW-15023_20181113	11/13/2018	Fluoride, Chloride, Sulfate, Total Alkalinity, Bicarbonate Alkalinity, Carbonate Alkalinity, TDS	Cooler(s) was received with temperature >6°C. Sample results may be biased low.
JHC-MW-15024_20181113	11/13/2018		
JHC-MW-15025_20181113	11/13/2018		
JHC-MW-15026_20181113	11/13/2018		
JHC-MW-15027_20181113	11/13/2018		
JHC-MW-15028_20181113	11/13/2018		
EB#05_20181113	11/13/2018		
FB#05_20181113	11/13/2018		
DUP#05_20181113	11/13/2018		
JHC-MW-15023_20181113	11/13/2018	Total alkalinity, Bicarbonate alkalinity	RPD for the field duplicate pair exceeded 30%. Potential uncertainty exists due to the field duplicate variability.
JHC_MW-15024_20181113	11/13/2018		
JHC-MW-15025_20181113	11/13/2018		
JHC-MW-15026_20181113	11/13/2018		
JHC-MW-15027_20181113	11/13/2018		
JHC-MW-15028_20181113	11/13/2018		
DUP#05_20181113	11/13/2018		

**Notes:**

RPD: Relative Percent Difference =  $| \text{sample result} - \text{duplicate result} | / ( (\text{sample result} + \text{duplicate result}) / 2 )$

# Laboratory Data Quality Review

## Groundwater Monitoring Event November 2018

### CEC JH Campbell Pond A

Groundwater samples were collected by TRC for the November 2018 sampling event. Samples were analyzed for anions, total dissolved solids, alkalinity, and total metals (except for antimony and selenium) by Pace Analytical Services, LLC (Pace) located in Grand Rapids, Michigan, for antimony and selenium by Pace located in Indianapolis, IN, and for radium by Pace located in Greensburg, Pennsylvania. The laboratory analytical results are reported in laboratory reports 4620411 and 4620412.

During the November 2018 sampling event, a groundwater sample was collected from each of the following wells:

- JHC-MW-15006
- JHC-MW-15007
- JHC-MW-15009
- JHC-MW-15010
- JHC-MW-15011

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	SW-846 300.0
Total Dissolved Solids	SM 2540C-11
Alkalinity (Total, Bicarbonate, Carbonate)	SM 2320B-11
Total Metals	SW-846 6010C/6020A/7470A
Radium (Radium-226, Radium-228, Total Radium)	EPA 903.1, EPA 904.0

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

### Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017) and the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

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

- Data for method blanks, equipment blanks, and field blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), where applicable. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for tracer and carriers, where applicable, for radiochemistry only. Tracers and/or carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for laboratory duplicates, when available. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

## **Review Summary**

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

- Appendix IV constituents will be utilized for the purposes of an assessment monitoring program.
- Data are usable for the purposes of the assessment monitoring program.
- When the data are evaluated through an assessment monitoring statistical program, findings below may be used to support the removal of outliers.

## QA/QC Sample Summary

- The temperature for three of the six coolers upon receipt at the laboratory were  $>6^{\circ}\text{C}$  (ranging from  $7.3\text{-}9.3^{\circ}\text{C}$ ). The results for fluoride, chloride, sulfate, alkalinity, and TDS in sample JHC-MW-15010\_20181114 collected on 11/14/18 and received on 11/15/18 may be biased low (see attached table). All other samples were collected on 11/15/18, received on the same day as sample collection, and contained ice upon receipt; thus, there was no adverse impact to data usability. Results were within the range of historical concentrations with the exception of chloride, bicarbonate alkalinity, and total alkalinity at JHC-MW-15010. The chloride concentration at JHC-MW-15010 was below the range of historical results. The bicarbonate and total alkalinity concentrations at JHC-MW-15010 were above the range of historical results.
- There were no contaminants detected in the method blank with the following exceptions:
  - Ra-226 at  $0.992 \pm 0.632$  pCi/L was detected in the method blank. The Ra-226 results in samples EB#01\_20181115 and JHC-MW-15007\_20181115 had normalized absolute differences  $<1.96$ ; thus these results may be false positives (see attached table).
  - The MB data was not provided in the data package for the anions analyzed on 12/6/18: Samples JHC-MW-15006\_20181115; JHC-MW-15007\_20181115; JHC-MW-15009\_20181115; JHC-MW-15011\_20181115, Dup#01\_20181115, and EB#01\_20181115 were analyzed 2 to 4 hours beyond the laboratory's 24-hr batch window (starting from the analysis time of the MB). Due to limitations of the laboratory's software, more than one batch QC (i.e., MB) cannot be reported per sample, regardless of analytical date. The laboratory stated that the batch MB was associated with batches of 20 samples; thus, additional QC was not reported by the laboratory for samples that need to be re-analyzed due to instrument verification issues or dilution. The laboratory also stated that instrument verification via calibration blanks and standards was verified daily prior to sample analysis to ensure the instrument was in control. There was no impact on the overall usability of the data for the samples listed above due to this issue.
- One field blank (FB#01\_20181115) was collected; no analytes were detected in this blank sample.
- One equipment blank (EB#01\_20181115) was collected and the following analytes were detected:
  - Chloride at  $2.0$  mg/L; the chloride result in sample JHC-MW-15010\_20181114 may be a false positive since the result was less than  $5x$  the blank result. The result at JHC-MW-15010 was below the range of historical results.
  - Barium at  $1.6$   $\mu\text{g/L}$ ; no impact on data usability since barium was  $>5x$  the blank concentration in all samples.
  - Ra-226 at  $0.63 \pm 0.434$  pCi/L; the Ra-226 result in sample JHC-MW-15007\_20181115 had a normalized absolute difference  $<1.96$ ; thus the result may be a false positive (see attached table). However, the result was within the range of historical concentrations.

- Ra-228 at  $1.07 \pm 0.469$  pCi/L; the Ra-228 results in samples JHC-MW-15009\_20181115 and JHC-MW-15010\_20181114 had normalized absolute differences  $<1.96$ ; thus these results may be false positives (see attached table). However, the results were within the range of historical concentrations.
- Total Radium at  $1.70 \pm 0.903$  pCi/L; the total radium result in sample JHC-MW-15007\_20181115 had a normalized absolute difference  $<1.96$ ; thus the result may be a false positive (see attached table). However, the result was within the range of historical results.
- LCS recoveries were within laboratory control limits with the following exception:
  - The LCS data was not provided in the data package for the anions analyzed on 12/6/18: Samples JHC-MW-15006\_20181115; JHC-MW-15007\_20181115; JHC-MW-15009\_20181115; JHC-MW-15011\_20181115, Dup#01\_20181115, and EB#01\_20181115 were analyzed 2 to 4 hours beyond the laboratory's 24-hr batch window (starting from the analysis time of the MB). Due to limitations of the laboratory's software, more than one batch QC (i.e., LCS) cannot be reported per sample, regardless of analytical date. The laboratory stated that the batch LCS was associated with batches of 20 samples; thus, additional QC was not reported by the laboratory for samples that need to be re-analyzed due to instrument verification issues or dilution. The laboratory also stated that instrument verification via calibration blanks and standards was verified daily prior to sample analysis to ensure the instrument was in control. There was no impact on the overall usability of the data for the samples listed above due to this issue.
- MS/MSDs were performed on sample JHC-MW-15010\_20181114 for radium, metals, and anions, and MS analysis was performed on sample MW-15009\_20181115 for alkalinity. The relative percent differences (RPDs) were within the QC limits.
  - The recoveries for chloride (82%/88%), fluoride (82%/89%), and/or sulfate (88%/acceptable) in the MS/MSD analyses performed on sample JHC-MW-15010\_20181114 were below the lower laboratory control limits. The positive and/or nondetect results for chloride, fluoride, and sulfate in samples JHC-MW-15006\_20181115; JHC-MW-15007\_20181115; JHC-MW-15009\_20181115; JHC-MW-15010\_20181114; JHC-MW-15011\_20181115, and Dup#01\_20181115 may be biased low. (see attached table). The results were within the range of historical concentrations with the exception of chloride at JHC-MW-15010 and sulfate at JHC-MW-15007, which were below the range of historical results.
- Laboratory duplicate analyses were performed on the following samples; RPDs between the parent and duplicate sample were within the QC limits.
  - For anions on sample JHC-MW-15010\_20181114
  - For alkalinity on samples JHC- MW-15009\_20181115 and JHC-MW-15010\_20181114
  - For TDS on sample JHC-MW-15010\_20181114 and JHC-MW-15011\_20181115
- The field duplicate pair samples were Dup#01\_20181115 and JHC-MW-15009\_20181115; all criteria were met.

- The RLs for chloride (2 mg/L) and TDS (50 mg/L) exceeded the project-required RLs of 1 mg/L in equipment blank (EB#01\_20181115) and field blank (FB#01\_20181115). This does not affect data usability since these are QC samples.
- Carrier and tracer recoveries, where applicable, were within 30-110%.

**Attachment A**  
 Summary of Data Non-Conformances  
 JH Campbell Pond A Downgradient – RCRA CCR Monitoring Program  
 West Olive, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
JHC-MW-15010_20181114	11/14/2018	Fluoride, Chloride, Sulfate, Total Alkalinity, Bicarbonate Alkalinity, Carbonate Alkalinity, TDS	Cooler(s) was received with temperature >6°C. Sample results may be biased low.
JHC-MW-15010_20181114	11/14/2018	Chloride	Detection in equipment blank (EB-01). Sample result ≤5X the blank concentration. Result may be a false positive.
EB#01_20181115	11/15/2018	Radium-226	Detection in method blank. Normalized absolute difference between sample and blank <1.96; indicates a possible false positive result; however, the data was within the range of historical concentrations.
JHC-MW-15007_20181115	11/15/2018		
JHC-MW-15009_20181115	11/15/2018	Radium-228	Detection in equipment blank. Normalized absolute difference between sample and blank <1.96; indicates a possible false positive result; however, data is within range of historical concentrations.
JHC-MW-15010_20181114	11/14/2018		
JHC-MW-15007_20181115	11/15/2018	Total Radium	Detection in equipment blank. Normalized absolute difference between sample and blank <1.96; indicates a possible false positive result; however, data is within range of historical concentrations.
JHC-MW-15006_20181115	11/15/2018	Fluoride	MS/MSD recoveries below lower control limits. Results may be biased low; however, data is within range of historical concentrations.
JHC-MW-15007_20181115	11/15/2018		
JHC-MW-15009_20181115	11/15/2018		
JHC-MW-15010_20181114	11/14/2018		
DUP#01_20181115	11/15/2018		
JHC-MW-15006_20181115	11/15/2018	Chloride	MS/MSD recoveries below lower control limits. Results may be biased low.
JHC-MW-15007_20181115	11/15/2018		
JHC-MW-15009_20181115	11/15/2018		
JHC-MW-15010_20181114	11/14/2018		
DUP#01_20181115	11/15/2018		
JHC-MW-15006_20181115	11/15/2018	Sulfate	MS recovery below lower control limits. Results may be biased low; however, data were within range of historical concentrations.
JHC-MW-15007_20181115	11/15/2018		
JHC-MW-15009_20181115	11/15/2018		
JHC-MW-15010_20181114	11/14/2018		
DUP#01_20181115	11/15/2018		

**Notes:**

MS/MSD: Matrix Spike/Matrix Spike Duplicate

**Attachment B**  
**Statistical Evaluation of November 2018 Assessment**  
**Monitoring Sampling Event**



## Technical Memorandum

**Date:** March 14, 2019

**To:** Bethany Swanberg, CEC

**cc:** Brad Runkel, CEC  
JR Register, CEC

**From:** Darby Litz, TRC  
Sarah Holmstrom, TRC  
Kristin Lowery, TRC

**Project No.:** 290806.0000.0000

**Subject:** Statistical Evaluation of November 2018 Assessment Monitoring Sampling Event,  
JH Campbell Pond A CCR Unit, Consumers Energy Company, West Olive, Michigan

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During the statistical evaluation of the initial assessment monitoring event, arsenic was present in one downgradient monitoring well at statistically significant levels exceeding the Groundwater Protection Standard (GWPS). Therefore, Consumers Energy Company (CEC) will initiate an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined (no later than April 14, 2019).

Currently, CEC is continuing semiannual assessment monitoring in accordance with §257.95 of the CCR Rule<sup>1</sup> at the JH Campbell Power Plant (JHC) Pond A. The second semiannual assessment monitoring event for 2018 was conducted on November 12 through November 16, 2018. In accordance with §257.95, the assessment monitoring data must be compared to GWPSs to determine whether or not Appendix IV constituents are detected at statistically significant levels above the GWPSs. GWPSs were established in accordance with §257.95(h), as detailed in the October 15, 2018 *Groundwater Protection Standards* technical memorandum, which was also included in the 2018 *Annual Groundwater Monitoring Report* (TRC, January 2019). The following narrative describes the methods employed and the results obtained and the Sanitas™ output files are included as an attachment.

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<sup>1</sup> USEPA final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) published April 17, 2015, as amended per Phase One, Part One of the CCR Rule (83 FR 36435).

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The statistical evaluation of the second semiannual assessment monitoring event data indicates that the following constituent is present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the JHC Pond A CCR unit:

<u>Constituent</u>	<u>GWPS</u>	<u># Downgradient Wells Observed</u>
Arsenic	10 ug/L	1 of 6

This result is consistent with the results of the initial assessment monitoring data statistical evaluation and CEC will continue to initiate an assessment of corrective measures per §257.95(g). CEC will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

### Assessment Monitoring Statistical Evaluation

The compliance well network at the JHC Pond A CCR Unit consists of six wells (JHC-MW-15006 through JHC-MW-15011) located south and east of the Pond A. A groundwater sample was unable to be collected from JHC-MW-15008 due to an insufficient amount of water present in the well at the time of the November 2018 sampling event.

Following the second semiannual assessment monitoring sampling event, compliance well data for the JHC Pond A were evaluated in accordance with the Groundwater Statistical Evaluation Plan (Stats Plan) (TRC, October 2017). An assessment monitoring program was developed to evaluate concentrations of CCR constituents present in the uppermost aquifer relative to acceptable levels (i.e. GWPSs). In order to decide as to whether or not the GWPSs have been exceeded, the change in concentration observed at the downgradient wells during a given assessment monitoring event must be large enough, after accounting for variability in the sample data, that the result is unlikely to have occurred merely by chance. Consistent with the Unified Guidance<sup>2</sup>, the preferred method for comparisons to a fixed standard are confidence limits. An exceedance of the standard occurs when the 99 percent lower confidence level of the downgradient data exceeds the GWPS. Based on the number of historical observations in the representative sample population, the population mean, the population standard deviation, and a selected confidence level (i.e. 99 percent), an upper and lower confidence limit is calculated. The true concentration, with 99 percent confidence, will fall between and lower and upper confidence limits.

The concentrations observed in the downgradient wells are deemed to be a statistically significant exceedance when the 99 percent lower confidence limit of the downgradient data exceeds the GWPS. If the confidence interval straddles the GWPS (i.e. the lower confidence level is below the GWPS but the upper confidence level is above), the statistical test results are inconclusive and there is not

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<sup>2</sup> USEPA. 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*. Office of Conservation and Recovery. EPA 530/R-09-007.

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compelling evidence that the measured concentration is a result of a release from the CCR unit versus the inherent variability of the sample data. This statistical approach is consistent with the statistical methods for assessment monitoring presented in §257.93(f) and (g). Statistical evaluation methodologies built into the CCR Rule, and numerous other federal rules, are key in determining whether or not individually measured data points represent a concentration increase over the baseline or a fixed standard (such as a GWPS in an assessment monitoring program).

For each detected Appendix IV constituent, the concentrations from each well were first compared directly to the GWPS, as shown on Table A1. Parameter-well combinations that included a direct exceedance of the GWPS within the past eight monitoring events (August 2016 to November 2018) were retained for further analysis. Arsenic in JHC-MW-15006 and JHC-MW-15011 had individual results exceeding the GWPS.

Groundwater data were then evaluated utilizing Sanitas™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas™ statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated, as appropriate, for each of the CCR Appendix IV parameters using a 99 percent confidence level, i.e., a significance level ( $\alpha$ ) of 0.01. The following narrative describes the methods employed, the results obtained and the Sanitas™ output files are included as an attachment.

The statistical data evaluation included the following steps:

- Review of data quality checklists for the data sets;
- Graphical representation of the monitoring data as time versus concentration by well-constituent pair;
- Outlier testing of individual data points that appear from the graphical representations as potential outliers;
- Evaluation of visual trends apparent in the graphical representations for statistical significance;
- Evaluation of percentage of non-detects for each well-constituent pair;
- Distribution of the data; and
- Calculation of the confidence intervals for each cumulative dataset.

The results of these evaluations are presented and discussed below.

Initially, the baseline (December 2015 through August 2017) results and the assessment monitoring results (April through November 2018) were observed visually for potential trends and outliers. No trends or outliers were identified. Data from each round were evaluated for completeness, overall

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quality, and usability and were deemed appropriate for the purposes of the CCR assessment monitoring program. The Sanitas™ software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent eight sampling events. Eight independent sampling events provide the appropriate density of data as recommended per the Unified Guidance yet are collected recently enough to provide an indication of current condition. The tests were run with a per-well significance of  $\alpha = 0.01$ . The software outputs are included in Attachment 1 along with data reports showing the values used for the evaluation. The percentage of non-detect observations are also included in Attachment 1. Non-detect data was handled in accordance with the Stats Plan for the purposes of calculating the confidence intervals.

The Sanitas™ software generates an output that includes graphs of the parametric or non-parametric confidence intervals for each well along with notes on data transformations, as appropriate. The data sets for JHC-MW-15006 and JHC-MW-15011 were found to be normally distributed. The confidence interval test compares the lower confidence limit to the GWPS. The statistical evaluation of the Appendix IV parameters shows an exceedance for arsenic at one monitoring well (JHC-MW-15011). This result is consistent with the results of the initial assessment monitoring data statistical evaluation and CEC will continue to initiate an assessment of corrective measures per §257.95(g). CEC will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

### Attachments

Table A1.	Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to November 2018
Attachment 1	Sanitas™ Output

# Technical Memorandum

## Table

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to November 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15006												
Sample Date:						12/4/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/25/2018	6/20/2018	6/20/2018	11/15/2018
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient												
<b>Appendix III</b>																		
Boron	ug/L	NC	NA	51	NA	419	302	212	143	175	142	158	151	119	--	144	147	203
Calcium	mg/L	NC	NA	46	NA	29.5	28.6	51.7	34.2	39.5	41.1	35.7	40.0	32.8	--	38.5	38.6	26.8
Chloride	mg/L	250*	NA	43	NA	16.8	22.2	21.8	17	16.9	22.7	22.3	18.4	17.7	--	17.2	17.2	24.8
Fluoride	ug/L	4,000	NA	1,000	NA	< 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
Sulfate	mg/L	250*	NA	14	NA	27.7	36.3	33.3	31.2	32.6	28.6	28.3	28.9	31.1	--	27.5	27.5	27.0
Total Dissolved Solids	mg/L	500*	NA	258	NA	150	180	220	210	180	220	216	206	172	--	376	268	140
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	7.8	7.4	7.7	7.4	7.5	7.6	7.4	7.5	7.4	8.0	7.4	--	7.8
<b>Appendix IV</b>																		
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	NA	1	<b>10</b>	<b>14</b>	<b>12</b>	<b>14</b>	<b>12</b>	<b>14</b>	9	7.5	8.5	--	4.8	4.3	4.7	4.7
Barium	ug/L	2,000	NA	35	2,000	173	118	206	174	157	195	166	220	--	158	141	146	144
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	NA	0.2	5	< 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	NA	2	100	8	1	2	1	2	4	1.6	2.0	--	1.5	1.5	1.8	2.3
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 15.0	< 6.0
Fluoride	ug/L	4,000	NA	1,000	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
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	40	10	40	10.1	< 10	10	16	14	< 10	13	16	--	13	12	12	13
Mercury	ug/L	2	NA	0.2	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	100	5	100	8	11	7	9	7	6	7.2	5.9	--	< 5.0	5.4	5.5	12.2
Radium-226	pCi/L	NC	NA	NA	NA	< 0.240	0.186	< 0.233	< 0.412	< 0.195	< 0.294	< 0.508	< 0.807	--	< 0.896	< 0.540	< 0.483	< 0.740
Radium-228	pCi/L	NC	NA	NA	NA	< 0.539	< 0.618	0.589	1.52	< 0.374	0.853	< 0.783	< 0.881	--	< 0.779	< 0.963	< 0.944	< 0.588
Radium-226/228	pCi/L	5	NA	1.93	5	< 0.539	0.691	0.694	1.58	< 0.374	1.00	< 1.29	< 1.69	--	< 1.68	< 1.50	< 1.43	< 1.33
Selenium	ug/L	50	NA	5	50	< 1	1	4	< 1	2	< 1	3.4	< 1.0	--	1.3	< 1.0	< 1.0	< 1.0
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0

**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.  
 \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.  
 (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to November 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15007											
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018	11/15/2018
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient											
<b>Appendix III</b>																	
Boron	ug/L	NC	NA	51	NA	101	99	151	134	126	109	153	141	98	--	157	142
Calcium	mg/L	NC	NA	46	NA	37.0	51.0	34.2	45.5	38.2	39.0	42.4	32.1	32.2	--	38.7	42.6
Chloride	mg/L	250*	NA	43	NA	17.9	27.8	18.5	17.4	17.0	22.9	20.1	17.5	17.3	--	17.5	20.6
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	14	NA	34.8	35.8	30.8	32.2	31.7	29.7	29.1	31.6	32.3	--	26.2	19.2
Total Dissolved Solids	mg/L	500*	NA	258	NA	190	240	200	200	190	220	202	170	188	--	298	166
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	7.3	7.3	7.3	7.2	7.3	7.4	7.3	7.4	7.3	8.4 <sup>(1)</sup>	7.4	7.6
<b>Appendix IV</b>																	
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	NA	1	10	3	3	3	4	4	3	3.2	4.0	--	3.3	2.9	4.0
Barium	ug/L	2,000	NA	35	2,000	119	133	152	144	130	132	143	130	--	121	115	177
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20
Chromium	ug/L	100	NA	2	100	8	3	2	2	2	3	1.2	1.1	--	< 1.0	1.2	31.3
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0
Fluoride	ug/L	4,000	NA	1,000	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
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	40	10	40	15.7	11.4	14	21	17	11	14	16	--	11	15	16
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	NC	100	5	100	6	6	8	8	7	8	6.1	6.1	--	< 5.0	< 5.0	7.6
Radium-226	pCi/L	NC	NA	NA	NA	< 0.222	< 0.157	< 0.249	< 0.444	< 0.258	< 0.358	< 0.427	< 0.430	--	< 1.03	< 0.736	0.864
Radium-228	pCi/L	NC	NA	NA	NA	< 0.522	0.662	< 0.558	< 0.753	0.439	1.22	< 1.15	< 0.904	--	< 1.02	< 1.12	< 0.688
Radium-226/228	pCi/L	5	NA	1.93	5	< 0.522	0.8	< 0.558	< 0.753	0.637	1.43	< 1.58	< 1.33	--	< 2.05	< 1.86	1.40
Selenium	ug/L	50	NA	5	50	2	2	< 1	< 1	2	< 1	2.2	1.1	--	< 1.0	1.3	< 1.0
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.
- \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rule. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to November 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15008											
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018	11/15/2018 <sup>(2)</sup>
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient											
<b>Appendix III</b>																	
Boron	ug/L	NC	NA	51	NA	146	95	111	195	181	97	128	153	116	--	87.7	--
Calcium	mg/L	NC	NA	46	NA	43.2	46.9	46.2	64	46.5	42.9	42.5	47.1	37.5	--	39	--
Chloride	mg/L	250*	NA	43	NA	19.3	25.8	58.4	37.0	45.5	25.3	24.0	22.3	16.6	--	20.4	--
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	--
Sulfate	mg/L	250*	NA	14	NA	36.1	31	30.8	29.6	33.6	28	29.8	31.8	28.4	--	25.5	--
Total Dissolved Solids	mg/L	500*	NA	258	NA	220	230	300	300	260	230	260	340	190	--	210	--
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	6.8	6.9	6.9	7.0	6.8	7.2	7.1	7.1	7.1	7.9 <sup>(1)</sup>	7.2	--
<b>Appendix IV</b>																	
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	1.1	--	1.1	< 1.0	--
Arsenic	ug/L	10	NA	1	10	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	--
Barium	ug/L	2,000	NA	35	2,000	184	146	173	172	229	111	124	186	--	118	120	--
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	--
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	--
Chromium	ug/L	100	NA	2	100	2	2	2	3	2	7	7.8	5.4	--	1.3	1.5	--
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	--
Fluoride	ug/L	4,000	NA	1,000	4,000	< 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	15	1	15	< 1	< 1	< 1	< 1	2	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	--
Lithium	ug/L	NC	40	10	40	20.2	16.2	13	15	21	12	13	18	--	14	15	--
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	--
Molybdenum	ug/L	NC	100	5	100	5	5	5	7	< 5	10	9.4	8.6	--	5.8	5.1	--
Radium-226	pCi/L	NC	NA	NA	NA	0.421	0.211	< 0.270	< 0.400	0.256	0.539	< 0.599	< 0.437	--	< 0.493	0.928	--
Radium-228	pCi/L	NC	NA	NA	NA	0.577	< 0.561	0.557	0.701	0.719	0.928	< 0.892	< 1.06	--	< 0.847	< 0.698	--
Radium-226/228	pCi/L	5	NA	1.93	5	0.998	< 0.561	0.677	1.04	0.975	1.47	< 1.49	< 1.50	--	< 1.34	1.56	--
Selenium	ug/L	50	NA	5	50	6	4	6	3	8	2	2.3	2.4	--	1.7	2.0	--
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	--

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.
- \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rule. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.



**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to November 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15009														
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	4/26/2018	6/20/2018	11/15/2018	11/15/2018	
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient														
<b>Appendix III</b>																				
Boron	ug/L	NC	NA	51	NA	127	97	117	204	174	86	126	156	144	--	Field Dup	--	91.4	188	187
Calcium	mg/L	NC	NA	46	NA	52.6	50.8	43.7	61.0	45.2	43.3	40.1	41.2	34.3	--	--	--	41.2	46.2	46.4
Chloride	mg/L	250*	NA	43	NA	17.0	22.5	26.2	16.9	15.7	23.7	23.8	20.1	17.7	--	--	--	22.9	17.7	17.7
Fluoride	ug/L	4,000	NA	1,000	NA	< 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
Sulfate	mg/L	250*	NA	14	NA	33.1	33.3	38.2	29.5	32.7	27.5	28.6	31.6	32.7	--	--	--	18.2	26.9	27.1
Total Dissolved Solids	mg/L	500*	NA	258	NA	240	220	260	240	220	230	188	208	178	--	--	--	214	234	202
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	7.3	7.2	7.3	7.3	7.0	7.4	7.4	7.5	7.4	8.4 <sup>(1)</sup>	--	--	7.7	7.6	--
<b>Appendix IV</b>																				
Antimony	ug/L	6	NA	2	6	1	< 1	< 1	< 1	< 1	< 1	1.1	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	1.2	< 1.0
Arsenic	ug/L	10	NA	1	10	< 1	1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	2,000	NA	35	2,000	236	151	162	169	202	150	132	198	--	130	125	130	130	178	181
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	NA	0.2	5	< 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
Chromium	ug/L	100	NA	2	100	5	4	2	2	3	6	5	6.6	--	1.3	1.3	< 1.0	14.1	11.8	
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0
Fluoride	ug/L	4,000	NA	1,000	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
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	40	10	40	15.4	10.6	< 10	11	16	< 10	11	11	--	< 10	< 10	< 10	< 10	14	14
Mercury	ug/L	2	NA	0.2	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
Molybdenum	ug/L	NC	100	5	100	6	6	8	6	5	6	22.3	7.4	--	5.5	5.5	< 5.0	6.1	6.1	
Radium-226	pCi/L	NC	NA	NA	NA	0.405	< 0.217	< 0.272	< 0.395	< 0.248	< 0.333	0.553	< 0.455	--	< 0.169	< 0.709	< 0.631	< 0.896	< 0.705	
Radium-228	pCi/L	NC	NA	NA	NA	0.770	0.647	0.827	< 0.800	1.11	0.627	< 1.08	1.04	--	< 1.26	< 1.14	< 0.634	0.800	< 0.663	
Radium-226/228	pCi/L	5	NA	1.93	5	1.18	0.811	0.987	< 0.8	1.28	0.877	< 1.23	< 1.40	--	< 1.43	< 1.85	< 1.27	< 1.47	< 1.37	
Selenium	ug/L	50	NA	5	50	7	20	< 1	1	9	1	4.7	< 1.0	--	< 1.0	1.0	10.3	12.6	12.6	
Thallium	ug/L	2	NA	2	2	2.19	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	

**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.  
 \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rule. All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.  
 (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to November 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15010											
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/16/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018	11/14/2018
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient											
<b>Appendix III</b>																	
Boron	ug/L	NC	NA	51	NA	101	83	131	146	121	77	127	164	109	--	98.4	120
Calcium	mg/L	NC	NA	46	NA	41.7	48.1	49.5	41.2	35.6	41.4	36.1	39.4	33.0	--	40.9	59.6
Chloride	mg/L	250*	NA	43	NA	17.1	25.4	21.4	18.0	16.1	26.1	23.1	19.1	17.8	--	22.2	7.9
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Sulfate	mg/L	250*	NA	14	NA	46.9	36.2	76.4	32.0	32.4	31.1	29.7	37.0	32.6	--	39.9	33.3
Total Dissolved Solids	mg/L	500*	NA	258	NA	190	220	280	220	160	220	236	338	220	--	294	262
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	6.9	6.8	6.6	6.8	6.8	7.1	7.1	7.3	7.2	8.0 <sup>(1)</sup>	7.3	7.5
<b>Appendix IV</b>																	
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	1	1	1	1.4	1.5	--	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	NA	1	10	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Barium	ug/L	2,000	NA	35	2,000	149	149	129	146	135	132	160	179	--	137	122	211
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	0.4	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20
Chromium	ug/L	100	NA	2	100	5	2	1	1	2	3	< 1.0	< 1.0	--	1.4	1.1	1.5
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0
Fluoride	ug/L	4,000	NA	1,000	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
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	40	10	40	17.5	14.2	27	22	20	< 10	11	12	--	10	< 10	12
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	NC	100	5	100	8	5	10	15	29	21	36.8	13.2	--	11.0	7.6	5.0
Radium-226	pCi/L	NC	NA	NA	NA	0.368	< 0.220	< 0.259	< 0.352	0.284	< 0.398	< 0.892	0.745	--	0.505	< 0.489	< 0.858
Radium-228	pCi/L	NC	NA	NA	NA	0.544	< 0.440	0.460	0.933	0.625	0.819	1.10	< 0.808	--	< 1.03	< 0.655	0.814
Radium-226/228	pCi/L	5	NA	1.93	5	0.912	< 0.44	0.711	1.04	0.909	0.918	< 1.95	1.36	--	< 1.20	< 1.14	< 1.43
Selenium	ug/L	50	NA	5	50	3	4	14	< 1	< 1	2	7.7	< 1.0	--	3.0	11.0	34.1
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.
- \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rule. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to November 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15011															
Sample Date:						12/4/2015	3/10/2016	6/22/2016	8/30/2016	11/16/2016	4/19/2017	6/21/2017	6/21/2017	8/15/2017	8/15/2017	9/26/2017	9/26/2017	4/25/2018	6/19/2018	11/15/2018	
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient															
<b>Appendix III</b>																					
Boron	ug/L	NC	NA	51	NA	345	280	286	419	457	110	179	Field Dup	288	Field Dup	249	Field Dup	219	--	229	337
Calcium	mg/L	NC	NA	46	NA	25.0	35.4	41.6	38.2	25.4	48.2	32.7	31.4	32.9	32.9	31.7	33.6	--	30.3	29.1	
Chloride	mg/L	250*	NA	43	NA	16.6	21.6	23.4	16.9	16.8	24.7	24.8	24.8	19.6	19.6	17.7	17.7	--	23.0	21.0	
Fluoride	ug/L	4,000	NA	1,000	NA	< 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	
Sulfate	mg/L	250*	NA	14	NA	23.2	37.7	29.4	6.1	12.3	35.1	24.3	24.3	15.7	15.9	17.6	17.5	--	26.1	29.2	
Total Dissolved Solids	mg/L	500*	NA	258	NA	100	170	200	170	140	240	144	174	188	174	230	154	--	180	150	
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	7.6	7.7	7.7	7.4	7.4	7.9	7.5	--	7.6	--	7.5	--	8.5	8.1	9.1	
<b>Appendix IV</b>																					
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	< 1	< 1	1	2.5	3.1	1.1	1.2	--	--	< 1.0	< 1.0	< 1.0	
Arsenic	ug/L	10	NA	1	10	15	12	12	19	23	11	10.6	10.9	18.2	17.5	--	--	16.8	15.0	32.2	
Barium	ug/L	2,000	NA	35	2,000	163	147	175	181	142	161	152	145	171	161	--	--	116	123	98.6	
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	
Cadmium	ug/L	5	NA	0.2	5	< 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	NA	2	100	3	1	< 1	< 1	1	4	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	< 15.0	< 15.0	--	--	< 15.0	< 15.0	< 6.0	
Fluoride	ug/L	4,000	NA	1,000	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	
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	1.2	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	
Lithium	ug/L	NC	40	10	40	17.3	12.1	10	19	18	< 10	12	11	11	13	--	--	14	11	10	
Mercury	ug/L	2	NA	0.2	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	100	5	100	12	8	10	14	16	13	11.7	11.8	13.0	13.0	--	--	8.2	8.2	9.3	
Radium-226	pCi/L	NC	NA	NA	NA	< 0.342	< 0.225	0.305	< 0.456	< 0.209	< 0.424	0.263	< 0.755	0.291	< 0.707	--	--	< 0.702	< 0.463	< 0.512	
Radium-228	pCi/L	NC	NA	NA	NA	0.617	0.705	0.613	0.907	< 0.551	0.548	< 0.590	< 0.505	< 0.951	1.02	--	--	< 0.568	0.931	< 0.519	
Radium-226/228	pCi/L	5	NA	1.93	5	0.662	0.77	0.918	0.95	< 0.551	0.584	< 0.733	< 1.26	< 1.11	1.61	--	--	< 1.27	< 1.34	< 1.03	
Selenium	ug/L	50	NA	5	50	< 1	< 1	< 1	< 1	< 1	12	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	1.6	< 1.0	
Thallium	ug/L	2	NA	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	< 2.0	< 2.0	--	--	< 2.0	< 2.0	< 2.0	

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.
- \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rule. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Attachment 1**  
**Sanitas™ Output**

# Summary Report

Constituent: Antimony, Total Analysis Run 2/20/2019 12:40 PM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
 ND/Trace = 51  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 2.8  
 Mean Value = 1.05  
 Median Value = 1  
 Standard Deviation = 0.2355  
 Coefficient of Variation = 0.2243  
 Skewness = 6.615

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	11	1	1	1	1	0	0	NaN
JHC-MW-15007	11	10	1	1	1	1	0	0	NaN
JHC-MW-15008	10	8	1	1.1	1.02	1	0.04216	0.04134	1.5
JHC-MW-15009	11	8	1	1.1	1.018	1	0.04045	0.03973	1.65
JHC-MW-15010	11	6	1	1.5	1.082	1	0.1834	0.1695	1.707
JHC-MW-15011	11	8	1	2.8	1.177	1	0.5401	0.4588	2.812

# Summary Report

Constituent: Arsenic, Total Analysis Run 2/20/2019 12:40 PM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
 ND/Trace = 31  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 32.2  
 Mean Value = 5.523  
 Median Value = 2.9  
 Standard Deviation = 6.652  
 Coefficient of Variation = 1.204  
 Skewness = 1.712

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	0	4.5	14	9.545	9	3.855	0.4039	-0.1175
JHC-MW-15007	11	0	2.9	4	3.4	3.2	0.4879	0.1435	0.4282
JHC-MW-15008	10	10	1	1	1	1	0	0	NaN
JHC-MW-15009	11	10	1	1	1	1	0	0	NaN
JHC-MW-15010	11	11	1	1	1	1	0	0	NaN
JHC-MW-15011	11	0	10.75	32.2	16.78	15	6.359	0.3789	1.336

# Summary Report

Constituent: Barium, Total Analysis Run 2/20/2019 12:40 PM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
 ND/Trace = 0  
 Wells = 6  
 Minimum Value = 98.6  
 Maximum Value = 236  
 Mean Value = 154.2  
 Median Value = 149  
 Standard Deviation = 30.36  
 Coefficient of Variation = 0.1969  
 Skewness = 0.6699

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	0	118	220	168.6	166	29.72	0.1763	0.1756
JHC-MW-15007	11	0	115	177	136	132	17.61	0.1295	1.071
JHC-MW-15008	10	0	111	229	156.3	159	38.65	0.2473	0.4228
JHC-MW-15009	11	0	127.5	236	167	162	34.4	0.206	0.6155
JHC-MW-15010	11	0	122	211	149.9	146	25.74	0.1717	1.301
JHC-MW-15011	11	0	98.6	181	147.4	148.5	25.8	0.1751	-0.547

# Summary Report

Constituent: Beryllium, Total    Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy    Data: JHC\_Sanitas\_19.02.18

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For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 65  
Wells = 6  
Minimum Value = 1  
Maximum Value = 1  
Mean Value = 1  
Median Value = 1  
Standard Deviation = 0  
Coefficient of Variation = 0  
Skewness = NaN

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	11	1	1	1	1	0	0	NaN
JHC-MW-15007	11	11	1	1	1	1	0	0	NaN
JHC-MW-15008	10	10	1	1	1	1	0	0	NaN
JHC-MW-15009	11	11	1	1	1	1	0	0	NaN
JHC-MW-15010	11	11	1	1	1	1	0	0	NaN
JHC-MW-15011	11	11	1	1	1	1	0	0	NaN



# Summary Report

Constituent: Cadmium, Total Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

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For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 64  
Wells = 6  
Minimum Value = 0.2  
Maximum Value = 0.4  
Mean Value = 0.2031  
Median Value = 0.2  
Standard Deviation = 0.02481  
Coefficient of Variation = 0.1222  
Skewness = 7.875

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	11	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15007	11	11	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15008	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15009	11	11	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15010	11	10	0.2	0.4	0.2182	0.2	0.0603	0.2764	2.846
JHC-MW-15011	11	11	0.2	0.2	0.2	0.2	0	0	NaN

# Summary Report

Constituent: Chromium, Total Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 11  
Wells = 6  
Minimum Value = 1  
Maximum Value = 31.3  
Mean Value = 3.103  
Median Value = 2  
Standard Deviation = 4.232  
Coefficient of Variation = 1.364  
Skewness = 4.911

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	0	1	8	2.459	2	2.008	0.8164	2.142
JHC-MW-15007	11	1	1	31.3	5.073	2	8.92	1.758	2.618
JHC-MW-15008	10	0	1.3	7.8	3.4	2	2.412	0.7093	0.941
JHC-MW-15009	11	1	1	12.95	4.441	4	3.406	0.767	1.397
JHC-MW-15010	11	2	1	5	1.818	1.4	1.227	0.6749	1.772
JHC-MW-15011	11	7	1	4	1.455	1	1.036	0.7121	1.826

# Summary Report

Constituent: Cobalt, Total Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

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For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 65  
Wells = 6  
Minimum Value = 6  
Maximum Value = 15  
Mean Value = 14.31  
Median Value = 15  
Standard Deviation = 2.417  
Coefficient of Variation = 0.1689  
Skewness = -3.175

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	11	6	15	14.18	15	2.714	0.1913	-2.846
JHC-MW-15007	11	11	6	15	14.18	15	2.714	0.1913	-2.846
JHC-MW-15008	10	10	15	15	15	15	0	0	NaN
JHC-MW-15009	11	11	6	15	14.18	15	2.714	0.1913	-2.846
JHC-MW-15010	11	11	6	15	14.18	15	2.714	0.1913	-2.846
JHC-MW-15011	11	11	6	15	14.18	15	2.714	0.1913	-2.846

# Summary Report

Constituent: Fluoride Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

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For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 71  
ND/Trace = 71  
Wells = 6  
Minimum Value = 1000  
Maximum Value = 1000  
Mean Value = 1000  
Median Value = 1000  
Standard Deviation = 0  
Coefficient of Variation = 0  
Skewness = NaN

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	12	12	1000	1000	1000	1000	0	0	NaN
JHC-MW-15007	12	12	1000	1000	1000	1000	0	0	NaN
JHC-MW-15008	11	11	1000	1000	1000	1000	0	0	NaN
JHC-MW-15009	12	12	1000	1000	1000	1000	0	0	NaN
JHC-MW-15010	12	12	1000	1000	1000	1000	0	0	NaN
JHC-MW-15011	12	12	1000	1000	1000	1000	0	0	NaN

# Summary Report

Constituent: Lead, Total Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

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For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 63  
Wells = 6  
Minimum Value = 1  
Maximum Value = 2  
Mean Value = 1.017  
Median Value = 1  
Standard Deviation = 0.1245  
Coefficient of Variation = 0.1224  
Skewness = 7.762

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	11	1	1	1	1	0	0	NaN
JHC-MW-15007	11	11	1	1	1	1	0	0	NaN
JHC-MW-15008	10	9	1	2	1.1	1	0.3162	0.2875	2.667
JHC-MW-15009	11	11	1	1	1	1	0	0	NaN
JHC-MW-15010	11	11	1	1	1	1	0	0	NaN
JHC-MW-15011	11	10	1	1.1	1.009	1	0.03015	0.02988	2.846

# Summary Report

Constituent: Lithium, Total Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 9  
Wells = 6  
Minimum Value = 10  
Maximum Value = 27  
Mean Value = 13.79  
Median Value = 13  
Standard Deviation = 3.674  
Coefficient of Variation = 0.2665  
Skewness = 1.148

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	2	10	16	12.46	13	2.286	0.1834	0.3019
JHC-MW-15007	11	0	11	21	14.74	15	2.978	0.2021	0.4767
JHC-MW-15008	10	0	12	21	15.74	15	3.091	0.1964	0.5803
JHC-MW-15009	11	4	10	16	11.73	11	2.274	0.1939	1.036
JHC-MW-15010	11	2	10	27	15.06	12	5.778	0.3836	0.8995
JHC-MW-15011	11	1	10	19	13.17	12	3.394	0.2577	0.7177

# Summary Report

Constituent: Mercury, Total Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

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For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 65  
Wells = 6  
Minimum Value = 0.2  
Maximum Value = 0.2  
Mean Value = 0.2  
Median Value = 0.2  
Standard Deviation = 0  
Coefficient of Variation = 0  
Skewness = NaN

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	11	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15007	11	11	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15008	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15009	11	11	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15010	11	11	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15011	11	11	0.2	0.2	0.2	0.2	0	0	NaN

# Summary Report

Constituent: Molybdenum, Total Analysis Run 2/20/2019 12:40 PM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
 ND/Trace = 5  
 Wells = 6  
 Minimum Value = 5  
 Maximum Value = 36.8  
 Mean Value = 9.089  
 Median Value = 7.6  
 Standard Deviation = 5.659  
 Coefficient of Variation = 0.6226  
 Skewness = 2.848

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	1	5	12.2	7.614	7	2.292	0.3011	0.8731
JHC-MW-15007	11	2	5	8	6.618	6.1	1.157	0.1748	-0.02086
JHC-MW-15008	10	1	5	10	6.59	5.45	2.019	0.3064	0.7136
JHC-MW-15009	11	1	5	22.3	7.573	6	4.967	0.6559	2.681
JHC-MW-15010	11	0	5	36.8	14.69	11	10.27	0.6989	1.1
JHC-MW-15011	11	0	8	16	11.22	11.75	2.676	0.2384	0.2445



# Summary Report

Constituent: Radium-226 Analysis Run 2/20/2019 12:40 PM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
 ND/Trace = 49  
 Wells = 6  
 Minimum Value = 0.157  
 Maximum Value = 1.03  
 Mean Value = 0.4545  
 Median Value = 0.412  
 Standard Deviation = 0.2224  
 Coefficient of Variation = 0.4892  
 Skewness = 0.8633

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	10	0.186	0.896	0.4592	0.412	0.2594	0.5648	0.497
JHC-MW-15007	11	10	0.157	1.03	0.4705	0.427	0.2845	0.6048	0.8501
JHC-MW-15008	10	5	0.211	0.928	0.4554	0.429	0.2084	0.4576	1.036
JHC-MW-15009	11	9	0.217	0.896	0.4649	0.405	0.2127	0.4575	0.7023
JHC-MW-15010	11	7	0.22	0.892	0.4882	0.398	0.2394	0.4905	0.6764
JHC-MW-15011	11	8	0.209	0.702	0.3891	0.342	0.1421	0.3653	0.79

# Summary Report

Constituent: Radium-226/228 Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

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For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 34  
Wells = 6  
Minimum Value = 0.374  
Maximum Value = 2.05  
Mean Value = 1.119  
Median Value = 1.14  
Standard Deviation = 0.4027  
Coefficient of Variation = 0.3598  
Skewness = 0.1605

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	7	0.374	1.69	1.124	1.29	0.4839	0.4303	-0.2525
JHC-MW-15007	11	7	0.522	2.05	1.175	1.33	0.5435	0.4627	0.1937
JHC-MW-15008	10	4	0.561	1.56	1.161	1.19	0.3621	0.3118	-0.4168
JHC-MW-15009	11	6	0.8	1.85	1.196	1.23	0.3176	0.2656	0.4888
JHC-MW-15010	11	5	0.44	1.95	1.092	1.04	0.4007	0.367	0.5575
JHC-MW-15011	11	5	0.551	1.36	0.9723	0.95	0.3048	0.3135	-0.04887

# Summary Report

Constituent: Radium-228 Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

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For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 33  
Wells = 6  
Minimum Value = 0.374  
Maximum Value = 1.52  
Mean Value = 0.7746  
Median Value = 0.7315  
Standard Deviation = 0.2315  
Coefficient of Variation = 0.2989  
Skewness = 0.7287

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	8	0.374	1.52	0.7715	0.779	0.303	0.3928	1.269
JHC-MW-15007	11	8	0.439	1.22	0.8215	0.753	0.2748	0.3346	0.131
JHC-MW-15008	10	5	0.557	1.06	0.754	0.71	0.172	0.2281	0.3824
JHC-MW-15009	11	4	0.627	1.26	0.866	0.8	0.2198	0.2537	0.4979
JHC-MW-15010	11	4	0.44	1.1	0.748	0.808	0.2222	0.2971	0.08574
JHC-MW-15011	11	4	0.519	0.9855	0.685	0.613	0.1724	0.2517	0.8248

# Summary Report

Constituent: Selenium, Total    Analysis Run 2/20/2019 12:40 PM  
 Client: Consumers Energy    Data: JHC\_Sanitas\_19.02.18

For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
 ND/Trace = 25  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 34.1  
 Mean Value = 3.749  
 Median Value = 1.6  
 Standard Deviation = 5.437  
 Coefficient of Variation = 1.45  
 Skewness = 3.416

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	6	1	4	1.609	1	1.085	0.6742	1.467
JHC-MW-15007	11	5	1	2.2	1.418	1.1	0.5115	0.3607	0.5245
JHC-MW-15008	10	0	1.7	8	3.74	2.7	2.187	0.5849	0.8458
JHC-MW-15009	11	2	1	20	6.236	4.7	6.278	1.007	0.9462
JHC-MW-15010	11	3	1	34.1	7.436	3	9.858	1.326	1.983
JHC-MW-15011	11	9	1	12	2.055	1	3.303	1.608	2.831

# Summary Report

Constituent: Thallium, Total Analysis Run 2/20/2019 12:40 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

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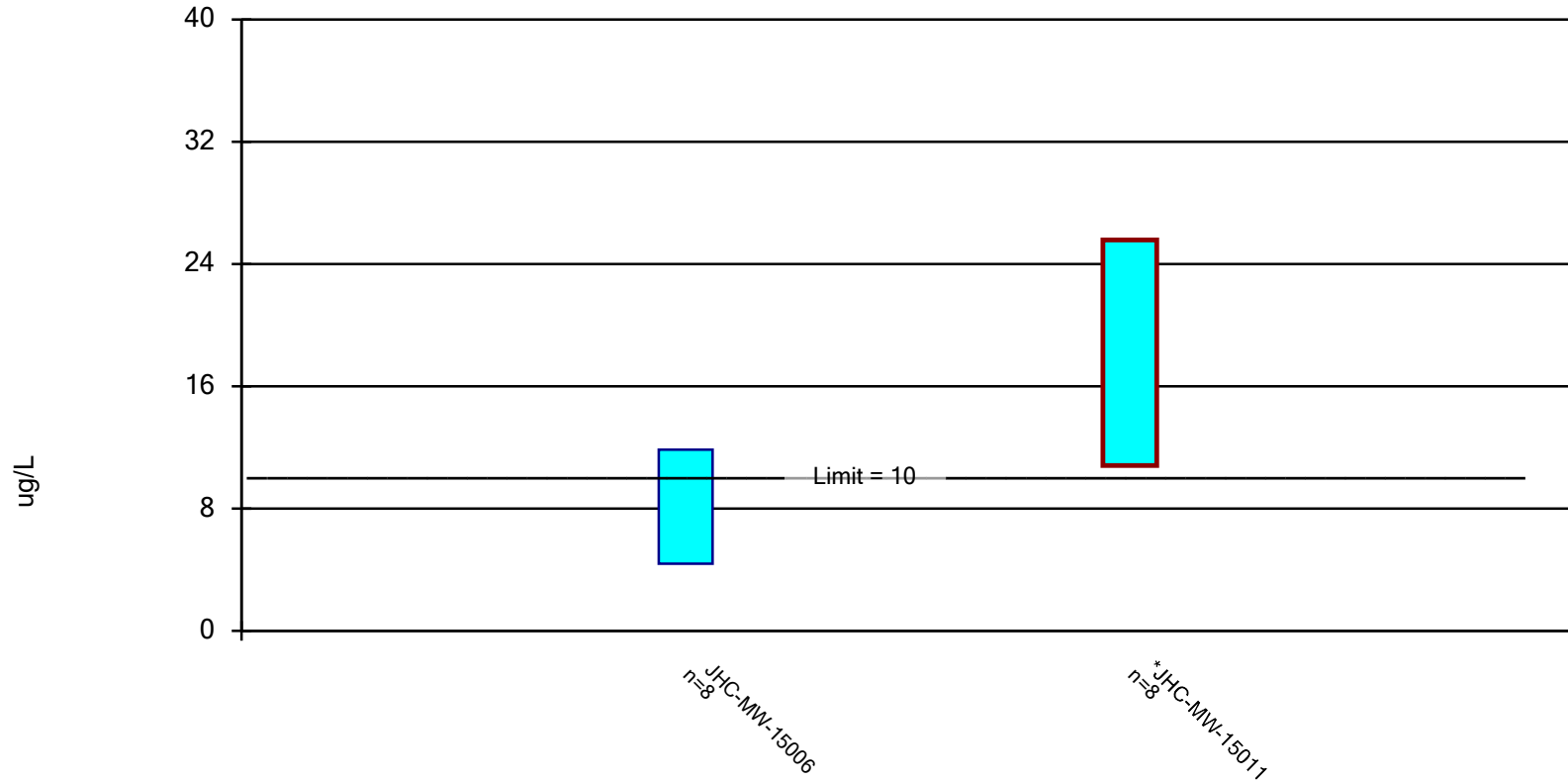
For observations made between 12/3/2015 and 11/15/2018, a summary of the selected data set:

Observations = 65  
ND/Trace = 64  
Wells = 6  
Minimum Value = 2  
Maximum Value = 2.19  
Mean Value = 2.003  
Median Value = 2  
Standard Deviation = 0.02357  
Coefficient of Variation = 0.01177  
Skewness = 7.875

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	11	2	2	2	2	0	0	NaN
JHC-MW-15007	11	11	2	2	2	2	0	0	NaN
JHC-MW-15008	10	10	2	2	2	2	0	0	NaN
JHC-MW-15009	11	10	2	2.19	2.017	2	0.05729	0.0284	2.846
JHC-MW-15010	11	11	2	2	2	2	0	0	NaN
JHC-MW-15011	11	11	2	2	2	2	0	0	NaN

## Parametric Confidence Interval

Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, Total Analysis Run 2/18/2019 2:29 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

# Confidence Interval

Constituent: Arsenic, Total (ug/L) Analysis Run 2/18/2019 2:30 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.02.18

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	JHC-MW-15006	JHC-MW-15011
8/30/2016	12	19
11/15/2016	14	
11/16/2016		23
4/18/2017	9	
4/19/2017		11
6/21/2017	7.5	10.75 (D)
8/15/2017	8.5	17.85 (D)
4/25/2018	4.8	16.8
6/19/2018		15
6/20/2018	4.5 (D)	
11/15/2018	4.7	32.2
Mean	8.125	18.2
Std. Dev.	3.52	6.963
Upper Lim.	11.86	25.58
Lower Lim.	4.394	10.82

# Appendix C

## Data Quality Review

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# Laboratory Data Quality Review

## Groundwater Monitoring Event April 2019

### CEC JH Campbell Background

Groundwater samples were collected by TRC for the April 2019 sampling event. Samples were analyzed for anions, total dissolved solids, and total metals by Eurofins TestAmerica, located in Irvine, California (Eurofins TA - Irvine). The lithium analyses by method SW-846 6020 were subcontracted to Eurofins TA in North Canton, Ohio (Eurofins TA – Canton) and the radium analyses were subcontracted to Eurofins TA in St. Louis, Missouri (Eurofins TA – St. Louis). The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 440-239742-1 and 440-239737-1.

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

- JHC-MW-15023
- JHC-MW-15024
- JHC-MW-15025
- JHC-MW-15026
- JHC-MW-15027
- JHC-MW-15028

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	SW-846 300.0
Total Dissolved Solids	SM 2540C-11
Total Metals	SW-846 6010B/6020A/7470A
Radium (Radium-226, Radium-228, Total Radium)	EPA 903.0, EPA 904.0

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

### Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017) and the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or

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

- Data for laboratory control samples (LCSs) and/or LCS duplicates (LCSDs). The LCSs and/or LCSDs are used to assess the accuracy and/or precision of the analytical method for each analyte spiked using a clean matrix;
- Data for matrix spikes (MSs) and/or matrix spike duplicates (MSDs), when performed on project samples. The MS/MSDs are used to assess the accuracy and/or precision of the analytical method for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for carriers, where applicable, for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for laboratory duplicates, when available. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

## **Review Summary**

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

- Appendix III and Appendix IV constituents will be utilized for the purposes of an assessment monitoring program.
- Data are usable for the purposes of the assessment monitoring program.
- When the data are evaluated through an assessment monitoring statistical program, findings below may be used to support the removal of outliers.

## **QA/QC Sample Summary**

- The holding time and preservation criteria were met with one exception; the TDS holding time for samples JHC-MW-15024 and JHC-MW-15025 exceeded the 7-day holding time criteria by one hour and two hours, respectively. These results may be estimated, biased low, as summarized in the attached table.

- No target analytes were detected in the method blanks.
- One field blank (FB-05) and one equipment blank (EB-05) were collected; no analytes were detected in these blank samples.
- LCS and/or LCSD recoveries and relative percent differences (RPDs), where applicable, were within laboratory control limits. The following issue was noted:
- Note that the LCS/LCSD in analytical batch 437243 had an RER (replicate error ratio) result outside of the acceptance criteria of <1 (1.33) for Radium-226. However, duplicate precision was demonstrated by an acceptable RPD (27%), which was within the laboratory control limit of 40%. Thus, there was no impact on the data usability.
- MS/MSDs were not performed on samples in this data set.
- Laboratory duplicate analyses were not performed on samples in this data set.
- The field duplicate pair samples were DUP-05 and JHC-MW-15028; all criteria were met.
- Carrier recoveries for radium analyses were within laboratory control criteria.

**Attachment A**  
Summary of Data Non-Conformances  
JH Campbell Background – RCRA CCR Monitoring Program  
West Olive, Michigan

<b>Samples</b>	<b>Collection Date</b>	<b>Analyte</b>	<b>Non-Conformance/Issue</b>
JHC-MW-15024	4/23/2019	TDS	Analysis performed past holding time; sample results may be biased low.
JHC-MW-15025	4/23/2019		

# Laboratory Data Quality Review Groundwater Monitoring Event April 2019 CEC JH Campbell Pond A

Groundwater samples were collected by TRC for the April 2019 sampling event. Samples were analyzed for anions, total dissolved solids, and/or total metals by Eurofins TestAmerica, located in Irvine, California (Eurofins TA - Irvine). The lithium analyses by method SW-846 6020 were subcontracted to Eurofins TA in North Canton, Ohio (Eurofins TA – Canton) and the radium analyses were subcontracted to Eurofins TA in St. Louis, Missouri (Eurofins TA – St. Louis). The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 440-239742-2, 440-239941-3, 440-239937-1, and 440-239737-2.

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

- JHC-MW-15006
- JHC-MW-15007
- JHC-MW-15009
- JHC-MW-15010
- JHC-MW-15011

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	SW-846 300.0
Total Dissolved Solids	SM 2540C-11
Total Metals	SW-846 6010B/6020A/7470A
Radium (Ra-226, Ra-228, Combined Ra-226 & Ra-228)	EPA 903.0, EPA 904.0

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

## Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017) and the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

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

- Data for method blanks, equipment blanks, and field blanks, if applicable. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and/or the LCS duplicate (LCSDs) samples. The LCSs and/or LCSDs are used to assess the accuracy and precision of the analytical method for each analyte spiked;
- Data for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. The MS/MSDs are used to assess the accuracy and precision of the analytical method for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for carriers, where applicable, for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

## **Review Summary**

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

- Appendix III and Appendix IV constituents will be utilized for the purposes of an assessment monitoring program.
- Data are usable for the purposes of the assessment monitoring program.
- When the data are evaluated through an assessment monitoring statistical program, findings below may be used to support the removal of outliers.

## **QA/QC Sample Summary**

- Holding time and preservation criteria were met.
- There were no contaminants detected in the method blanks.

- One field blank (FB-01) and one equipment blank (EB-01) were collected; FB-02 was not submitted for radium analyses. No analytes were detected in these blank samples.
- LCS and/or LCSD percent recoveries (%Rs) and relative percent differences (RPDs) were within laboratory control limits.
- MS/MSDs were performed on sample JHC-MW-15010 for metals and anions. The RPDs were within the QC limits.
  - The %Rs of calcium in the MS/MSD and post digestion spike (PDS) were outside of the acceptance criteria. However, the calcium concentrations in the parent sample JHC-MW-15010 were >4x the spike concentrations; therefore, the laboratory control limits were not applicable. Data usability was not affected.
- Laboratory duplicate analyses were performed for TDS on samples JHC MW 15010 and JHC-MW-15006; the RPD between the parent and duplicate sample were within the QC limit.
- The field duplicate pair samples were Dup-01 and JHC-MW-15009; all criteria were met.
- Carrier recoveries for radium analyses, where applicable, were within laboratory control criteria.

## Laboratory Data Quality Review Groundwater Monitoring Event August 2019 CEC JH Campbell Pond A and RAP

Groundwater samples were collected by TRC for the August 2019 sampling event. Samples were analyzed for lithium, anions, and total dissolved solids by Eurofins TA in North Canton, Ohio (Eurofins TA – Canton). The remaining metals analyses were subcontracted to Eurofins TA in Irvine, California (Eurofins TA - Irvine). The radium analyses were subcontracted to Eurofins TA in St. Louis, Missouri (Eurofins TA – St. Louis). The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 240-117425-1 and 240-117425-2.

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

- JHC-MW-15008R
- TW-19-04A
- TW-19-04B
- TW-19-05
- TW-19-06A
- TW-19-06B

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	SW-846 300.0
Total Dissolved Solids	SM 2540C-11
Total Metals	SW-846 6010B/6020/7470A
Radium (Radium-226, Radium-228, Combined Radium)	EPA 903.0, EPA 904.0

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

### Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017) and the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

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



- Data for method blanks, equipment blanks, and field blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and LCS duplicates (LCSDs), where applicable. The LCS/LCSDs are used to assess the accuracy and precision of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), where applicable. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for carriers, where applicable, for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for laboratory duplicates, where applicable. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

## **Review Summary**

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

- Appendix III and Appendix IV constituents will be utilized for the purposes of an assessment monitoring program.
- Data are usable for the purposes of the assessment monitoring program.
- When the data are evaluated through an assessment monitoring statistical program, findings below may be used to support the removal of outliers.

## **QA/QC Sample Summary**

- Holding time criteria were met except the TDS holding time for samples TW-19-06B and TW-19-04A exceeded the 7-day holding time criteria by 1 day and 1 hour, respectively. These results may be estimated, biased low, as summarized in the attached table.

- Mercury was detected in one of the method blanks at a concentration of 0.000508 mg/L. However, data usability was not affected since mercury was not detected in the associated samples.
- Radium-228 was detected in one of the method blanks at a concentration of 0.5648 pCi/L. Potential false positives exist for positive results for radium-228 and combined radium-226 and radium-228 as noted in the attached table.
- One field blank (FB-3) and one equipment blank (EB-3) were collected; no analytes were detected in EB-3.
  - TDS was detected at a concentration of 21 mg/L in FB-3. The presence of TDS in the field blank should not impact sample results.
- LCS/LCSD recoveries and relative percent differences (RPDs), where applicable, were within laboratory control limits.
- MS/MSDs were performed on sample TW-19-04A for metals and anions. The RPDs were within the QC limits.
  - The recoveries of calcium and selenium in the MS were below the acceptance criteria. However, the calcium concentration in the parent sample TW-19-04A was >4x the spike concentration; therefore, the laboratory control limits for calcium were not applicable. Data usability was not affected for calcium. Potential low bias exists for the results for selenium in all groundwater samples in this data set as noted in the attached table.
- Laboratory duplicate analyses were performed for TDS on samples TW-19-04A and TW-19-06B; the RPD between the parent and duplicate sample were within the QC limit.
- The field duplicate pair samples were Dup-3 and TW-19-04B. The RPD for TDS (52.3%) exceeded the acceptance limits. Potential uncertainty exists for positive results for TDS in all groundwater samples in this data set as noted in the attached table.
- Carrier recoveries, where applicable, were within 40-110%.

**Attachment A**  
 Summary of Data Non-Conformances  
 JH Campbell Pond A and RAP – RCRA CCR Monitoring Program  
 West Olive, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
TW-19-06B	8/13/2019	TDS	Analysis performed past holding time; sample results may be biased low.
TW-19-04A	8/13/2019		
JHC-MW-15008R	8/13/2019	Selenium	MS recovery below lower control limits. Results may be biased low.
TW-19-04A	8/13/2019		
TW-19-04B	8/13/2019		
TW-19-05	8/13/2019		
TW-19-06A	8/13/2019		
TW-19-06B	8/13/2019		
DUP-3	8/13/2019		
JHC-MW-15008R	8/13/2019	TDS	Field duplicate variability (RPD >20%). Potential uncertainty.
TW-19-04A	8/13/2019		
TW-19-04B	8/13/2019		
TW-19-05	8/13/2019		
TW-19-06A	8/13/2019		
TW-19-06B	8/13/2019		
DUP-3	8/13/2019		
TW-19-06A	8/13/2019	Radium-228, Combined Radium-226 and Radium-228	Detection in method blank. Normalized absolute difference between blank and sample <1.96; indicates possible false positive results.

**Notes:**

## Laboratory Data Quality Review Groundwater Monitoring Event October 2019 Consumers Energy JH Campbell Background

Groundwater samples were collected by TRC for the October 2019 sampling event. Samples were analyzed for lithium, anions, and total dissolved solids by Eurofins TA in North Canton, Ohio (Eurofins TA – Canton). The remaining analyses were subcontracted to Eurofins TA in Irvine, California (Eurofins TA – Irvine). The radium analyses were subcontracted to Eurofins TA in St. Louis (Eurofins TA – St. Louis). The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 240-120197-1, 240-120197-2, and 240-120197-3.

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

- JHC-MW-15023
- JHC-MW-15024
- JHC-MW-15025
- JHC-MW-15026
- JHC-MW-15027
- JHC-MW-15028

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids	SM 2540C-11
Total Metals	SW-846 6010B/6020/7470A
Radium (Radium-226, Radium-228, Combined Radium)	EPA 903.0, EPA 904.0

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

### Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017) and the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;
- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or

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

- Data for laboratory control samples (LCSs). The LCSs are used to assess the accuracy of the analytical method using a clean matrix. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), where applicable. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Percent recoveries for tracer and carriers, where applicable, for radiochemistry only. Tracers and/or carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for laboratory duplicates, when available. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

## **Review Summary**

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

- Appendix III and IV constituents will be utilized for the purposes of an assessment monitoring program.
- Data are usable for the purposes of the assessment monitoring program.
- When the data are evaluated through an assessment monitoring statistical program, findings below may be used to support the removal of outliers.

## QA/QC Sample Summary

- Holding time criteria were met with the following exceptions. The holding time for mercury was exceeded by 10 days in samples JHC-MW-15023, JHC-MW-15024, JHC-MW-15025, EB-1, and FB-1 and 11 days in samples JHC-MW-15026, JHC-MW-15027, and JHC-MW-15028. These results may be estimated, biased low, as summarized in the attached table, Attachment A.
- A method blank was analyzed with each analytical batch. Target analytes were not detected in the method blank samples with the following exception. Normalized absolute difference comparisons between blank and sample that are between 1.96 and 2.58 may indicate biased high results and normalized absolute differences <1.96 may indicate a false positive sample result.
  - Radium-228 was detected in method blank 160-446063/20-A at a concentration of  $0.5137 \pm 0.259$  pCi/L. The detected radium-228 results for the samples associated with this method blank were potentially impacted, as summarized in the attached table, Attachment A.
- One equipment blank (EB-1) and one field blank (FB-1) were collected. Target analytes were not detected in these blank samples with the following exceptions:
  - Combined radium was detected in EB-1 at  $0.383 \pm 0.232$  pCi/L. The detected combined results for the samples associated with this equipment blank were potentially impacted, as summarized in the attached table, Attachment A.
- The LCS and/or LCSD recoveries and relative percent differences (RPDs), where applicable, for all analytes were within QC limits.
- MS and MSD analyses were performed on were performed sample JHC-MW-15025 for metals and anions. All recoveries and RPDs were within the QC limits with the following exceptions.
  - The recoveries of calcium were outside of the acceptance criteria in the MS/MSD analyses. The calcium concentration in this sample was >4x the spike concentrations; therefore, the MS/MSD results for calcium were not evaluated. Data usability was not affected.
- Laboratory duplicate analysis was performed on sample JCW-MW-15025 for TDS; the RPD was within QC limits.
- The field duplicate pair samples were DUP-1 and JHC-MW-12028. The absolute difference for chromium (absolute difference >RL) exceeded the acceptance limits. Potential uncertainty exists for positive results for chromium in all groundwater samples in this data set as noted in the attached table, Attachment A.
- Samples did not undergo a 21-day wait period prior to radium analysis; however, combined radium results were all < 5 pCi/L so there is no impact on data usability.
- Carrier recoveries, where applicable, were within 40-110%.

**Attachment A**  
 Summary of Data Non-Conformances  
 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
JHC-MW-15024	10/8/2019	Radium-228	Detection in method blank. Normalized absolute difference between blank and sample <1.96; indicates possible false positive result.
JHC-MW-15024	10/8/2019	Combined Radium	Detection in equipment blank (EB-1). Normalized absolute difference between blank and samples <1.96; indicates possible false positive results.
JHC-MW-15025	10/8/2019		
JHC-MW-15027	10/7/2019		
JHC-MW-15023	10/8/2019	Mercury	Holding time for mercury exceeded; indicates potential low bias in mercury results.
JHC-MW-15024	10/8/2019		
JHC-MW-15025	10/8/2019		
JHC-MW-15026	10/7/2019		
JHC-MW-15027	10/7/2019		
JHC-MW-15028	10/7/2019		
DUP-01	10/7/2019		
EB-1	10/8/2019		
FB-1	10/8/2019		
JHC-MW-15023	10/8/2019		
JHC-MW-15024	10/8/2019		
JHC-MW-15025	10/8/2019		
JHC-MW-15026	10/7/2019		
JHC-MW-15027	10/7/2019		
JHC-MW-15028	10/7/2019		
DUP-01	10/7/2019		

## Laboratory Data Quality Review Groundwater Monitoring Event October 2019 CEC JH Campbell Pond A and Downgradient

Groundwater samples were collected by TRC for the October 2019 sampling event. Samples were analyzed for lithium, anions, and total dissolved solids (TDS) by Eurofins TA in North Canton, Ohio (Eurofins TA – Canton). The remaining metals analyses were subcontracted to Eurofins TA in Irvine, California (Eurofins TA - Irvine). The radium analyses were subcontracted to Eurofins TA in St. Louis, Missouri (Eurofins TA – St. Louis). The laboratory analytical results were reported in laboratory sample delivery groups (SDGs) 240-120306-1, 240-120306-2, 240-120400-1, 240-120400-2, 240-120412-1, and 240-120412-2.

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

- JHC-MW-15006
- JHC-MW-15011
- PZ-40S
- JHC-MW-15008R
- MW-14S
- JHC-MW-15010
- PZ-24S

Each sample was analyzed for the following constituents:

Analyte Group	Method
Anions (Fluoride, Chloride, Sulfate)	EPA 300.0
Total Dissolved Solids (TDS)	SM 2540C-11
Total Metals	SW-846 6020, SW-846 6010B, SW-846 7470A
Radium (Radium-226, Radium-228, Combined Radium)	EPA 903.0, EPA 904.0

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

### Data Usability Review Procedure

The analytical data were reviewed using the USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017) and the Department of Energy Evaluation of Radiochemical Data Usability (USDOE, 1997). The following items were included in the evaluation of the data:

- Sample receipt, as noted in the cover page or case narrative;
- Technical holding times for analyses;



- Reporting limits (RLs) compared to project-required RLs;
- Data for method blanks, equipment blanks, and field blanks. Method blanks are used to assess potential contamination arising from laboratory sample preparation and/or analytical procedures. Field and equipment blanks are used to assess potential contamination arising from field procedures;
- Data for laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs), when performed. The LCSs and/or LCSDs are used to assess the accuracy of the analytical method using a clean matrix;
- Percent recoveries for matrix spike (MS) and matrix spike duplicates (MSD), when performed on project samples. Percent recoveries are calculated for each analyte spiked and used to assess bias due to sample matrix effects;
- Data for laboratory duplicates, when performed on project samples. The laboratory duplicates are replicate analyses of one sample and are used to assess the precision of the analytical method;
- Percent recoveries for carriers, where applicable, for radiochemistry only. Carriers are used to assess the chemical yield for the preparation and/or instrument efficiency;
- Data for blind field duplicates. Field duplicate samples are used to assess variability introduced by the sampling and analytical processes; and
- Overall usability of the data.

This data usability report addresses the following items:

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

## **Review Summary**

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

- Appendix III and IV constituents as well as iron, copper, nickel, silver, vanadium, and zinc will be utilized for the purposes of an assessment monitoring program.
- Data are usable for the purposes of the assessment monitoring program.
- When the data are evaluated through an assessment monitoring statistical program, findings below may be used to support the removal of outliers.

## QA/QC Sample Summary

- A method blank was analyzed with each analytical batch. Target analytes were not detected in the method blank samples with the following exception. Normalized absolute difference comparisons between blank and sample that are between 1.96 and 2.58 may indicate biased high results and normalized absolute differences <1.96 may indicate a false positive sample result.
  - Radium-226 was detected in method blank 160-446490/22-A at a concentration of  $0.2261 \pm 0.102$  pCi/L. The detected radium-226 results for the samples associated with this method blank were potentially impacted (either potential false positives or potential high biases), as summarized in the attached table, Attachment A.
- One equipment blank (EB-5) and one field blank (FB-5) were collected. Target analytes were not detected in these blank samples with the following exception.
  - Radium-226 was detected in EB-5 at  $0.138 \pm 0.0879$  pCi/L. However, this result was deemed a potential false positive result due to method blank contamination and therefore did not further impact any field samples.
- The LCS and/or LCSD recoveries and relative percent differences (RPDs), where applicable, for all analytes were within QC limits.
- MS and MSD analyses were performed on samples JHC-MW-15010 and PZ-40S for metals and anions, JHC-MW-15006 for anions, and DUP-5 for mercury. The relative percent differences (RPDs) were within the QC limits.
  - The recoveries of selenium in the MS/MSD analyses performed on sample JHC-MW-15010 were below the control limits. Potential low bias exists for the results for selenium in the groundwater samples from SDGs 240-120306-1 and 240-120400-1, as summarized in the attached table, Attachment A.
  - The recoveries of iron and nickel in the MS/MSD analyses performed on sample JHC-MW-15010 were above the control limits. Potential high bias exists for the detected results for iron and nickel in the groundwater samples from SDGs 240-120306-1 and 240-120400-1, as summarized in the attached table, Attachment A.
  - The recoveries of chromium were outside of the control limits in the MS/MSD analyses performed on sample JHC-MW-15010. The results for chromium in the parent sample were >4x the spike concentration; therefore, the MS/MSD control limits are not applicable.
- The field duplicate pair samples were DUP-5 and JHC-MW-15008R. All criteria were met with the following exceptions.
  - The RPD for iron (41%) and the absolute difference for TDS were above the acceptance criteria. Potential uncertainty exists for iron and TDS in all groundwater samples collected during this event, as summarized in the attached table, Attachment A.

- The laboratory was contacted during this review to verify the nondetect TDS result in sample JHC-MW-15008R; the laboratory stated that based on the sample's conductivity and comparison to DUP-5, there may have been an error in reporting. Since the laboratory no longer had this sample they were unable to re-analyze the sample for TDS.
- Laboratory duplicate analyses were performed on samples JHC-MW-15010 and PZ-40S for TDS; the RPDs were within QC limits.
- Samples did not undergo a 21-day wait period prior to radium-226 analysis; however, combined radium results were < 5 pCi/L so there is no impact on data usability.
- Carrier, where applicable, were within 40-110%.

**Attachment A**  
 Summary of Data Non-Conformances for Groundwater Analytical Data  
 JH Campbell Pond A and Downgradient- RCRA CCR Monitoring Program  
 Essexville, Michigan

Samples	Collection Date	Analyte	Non-Conformance/Issue
JHC-MW-15006	10/10/2019	Radium-226	Detection in method blank. Normalized absolute difference between blank and samples < 1.96; indicates potential false positive results.
JHC-MW-15008R	10/9/2019		
JHC-MW-15011	10/10/2019		
PZ-24S	10/10/2019		
PZ-40S	10/10/2019		
EB-5	10/10/2019		
DUP-5	10/9/2019	Radium-226	Detection in method blank. Normalized absolute difference between blank and sample between 1.96 and 2.58; indicates possible high bias result.
JHC-MW-15010	10/9/2019	Iron	Field duplicate variability (relative percent difference >30%); indicates potential uncertainty.
JHC-MW-15006	10/10/2019		
JHC-MW-15008R	10/9/2019		
JHC-MW-15011	10/10/2019		
DUP-5	10/9/2019		
MW-14S	10/10/2019		
PZ-24S	10/10/2019		
PZ-40S	10/10/2019		
JHC-MW-15010	10/9/2019	Iron	High recoveries in matrix spike (MS) and MS duplicate analyses; indicates potential high bias.
JHC-MW-15006	10/10/2019		
JHC-MW-15008R	10/9/2019		
JHC-MW-15011	10/10/2019		
DUP-5	10/9/2019		
JHC-MW-15010	10/9/2019	Nickel	High recoveries in matrix spike (MS) and MS duplicate analyses; indicates potential high bias.
JHC-MW-15008R	10/9/2019		
DUP-5	10/9/2019		
JHC-MW-15010	10/9/2019	TDS	Field duplicate variability (absolute difference > reporting limit); indicates potential uncertainty.
JHC-MW-15006	10/10/2019		
JHC-MW-15008R	10/9/2019		
JHC-MW-15011	10/10/2019		
DUP-5	10/9/2019		
MW-14S	10/10/2019		
PZ-24S	10/10/2019		
PZ-40S	10/10/2019		

**Attachment A**

Summary of Data Non-Conformances for Groundwater Analytical Data  
JH Campbell Pond A and Downgradient- RCRA CCR Monitoring Program  
Essexville, Michigan

<b>Samples</b>	<b>Collection Date</b>	<b>Analyte</b>	<b>Non-Conformance/Issue</b>
JHC-MW-15010	10/9/2019	Selenium	Low recoveries in matrix spike (MS) and MS duplicate analyses; indicates potential low bias.
JHC-MW-15006	10/10/2019		
JHC-MW-15008R	10/9/2019		
JHC-MW-15011	10/10/2019		
DUP-5	10/9/2019		

# Appendix D

## June 2018 Statistical Evaluation of Initial Assessment Monitoring Sampling Event

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January 14, 2019

Bethany Swanberg  
Environmental Services  
Consumers Energy Company  
1945 W. Parnall Road  
Jackson, MI 49201

Subject: Statistical Evaluation of Initial Assessment Monitoring Sampling Event,  
JH Campbell Pond A CCR Unit, Consumers Energy Company, West Olive, Michigan

Dear Ms. Swanberg:

Consumers Energy Company (CEC) reported in the January 31, 2018 *Annual Groundwater Monitoring Report for the JH Campbell Power Plant Pond A CCR Unit* for the JH Campbell (JHC) site in West Olive, Michigan, that boron and sulfate were observed within groundwater at one or more downgradient monitoring well(s) with potential statistically significant increases (SSIs) above background concentration levels. TRC completed an Alternate Source Demonstration for the parameters listed above and did not find strong enough evidence within 90 days to determine that the observation of constituents above background was attributable to an error or source other than the coal combustion residual (CCR) unit.

Therefore, CEC initiated an Assessment Monitoring Program for the Pond A CCR unit pursuant to §257.95 of the CCR Rule<sup>1</sup> that included sampling and analyzing groundwater within the groundwater monitoring system for all constituents listed in Appendix IV. The results from the initial assessment monitoring sampling event were used to establish groundwater protection standards (GWPSs) for the Appendix IV constituents in accordance with §257.95(h), as presented in the October 15, 2018 *Assessment Monitoring Data Summary and Establishment of Groundwater Protection Standards*. The GWPS is established as the higher of the EPA Maximum Contaminant Level (MCL) or statistically derived background level for constituents with MCLs and the higher of the EPA Regional Screening Levels (RSLs) or background level for Appendix IV constituents with RSLs. The JHC Pond A monitoring system was subsequently sampled for the Appendix III and Appendix IV constituents within 90 days from the initial Appendix IV sampling event (June 2018). In accordance with §257.95, the assessment

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<sup>1</sup> USEPA final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) published April 17, 2015, as amended per Phase One, Part One of the CCR Rule (83 FR 36435).

monitoring data must be compared to GWPSs to determine whether or not Appendix IV constituents are detected at statistically significant levels above the GWPSs.

This letter report presents a summary of the collected assessment monitoring data and the comparison of the assessment monitoring data to the GWPSs. The results of the assessment monitoring evaluation indicate that the following constituent is present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the JHC Pond A CCR unit:

<b>Constituent</b>	<b>GWPS</b>	<b># Downgradient Wells Observed</b>
Arsenic	10 ug/L	1 of 6

As such, per §257.95(g), the facility must either conduct an alternate source demonstration or initiate an assessment of corrective measures according to §257.96 within 90 days of detecting a statistical exceedance of the GWPSs.

## Background

The JH Campbell Plant is a coal fired power generation facility located in West Olive, Michigan, on the eastern shore of Lake Michigan. It is bordered by the Pigeon River on the south, 156th Avenue on the east, and Croswell Street to the north with Lakeshore Drive bisecting the site from north to south. The power generating plant consists of three coal fired electric generating units located on the western side of the site and the CCR disposal area is on the east side of the site, east of Lakeshore Drive. Figure 1 is a site location map showing the facility and the surrounding area. Site features are shown on Figure 2.

The JHC Pond A unit is currently inactive and undergoing decommissioning. CEC provided notification of initiation of closure on September 17, 2018 to the Michigan Department of Environmental Quality (MDEQ) to implement the certified closure plan by removal of CCR under the self-implementing requirements and schedule of the CCR Rule. Groundwater monitoring is also ongoing throughout the JHC site in accordance with the MDEQ-approved Hydrogeological Monitoring Plan (HMP)<sup>2</sup> for the Dry Ash Landfill, which includes additional monitoring downgradient from the JHC Pond A CCR unit.

## Groundwater Monitoring System

In accordance with 40 CFR 257.91, CEC established a groundwater monitoring system for the JHC Pond A unit, which consists of 12 monitoring wells (six background monitoring wells and six downgradient monitoring wells) that are screened in the uppermost aquifer. The monitoring well

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<sup>2</sup> Consumers Energy Company. 1996. *Hydrogeological Monitoring Plan (HMP) for JH Campbell Ash Storage Facility, Consumers Power Company, Solid Waste Disposal Area, Coal Ash, Type III*. September.





locations are shown on Figure 2. Six monitoring wells located north-northwest of the JHC Pond A provide data on background groundwater quality that has not been affected by the CCR unit (JHC-MW-15023 through JHC-MW-15028). Background groundwater quality data from these six background wells are additionally used for the CCR groundwater monitoring program at three other CCR units on the JHC site.

Groundwater within the uppermost aquifer generally flows to the south-southeast across the Site, with a southwesterly groundwater flow component on the western edge of the Site. Groundwater contour maps were constructed using the static water elevation data from the April 2018 and June 2018 assessment monitoring sampling events are provided as Figures 3 and 4, respectively. The general groundwater flow direction in the vicinity of the Pond A CCR unit is similar to that identified in previous monitoring rounds and continues to demonstrate that the downgradient wells (JHC-MW-15006 through JHC-MW-15011) are appropriately positioned to assess the presence of Appendix IV parameters downgradient from the Pond A CCR unit.

## Data Quality

Data from each sampling round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The review was completed using the following quality control (QC) information which at a minimum included chain-of-custody forms, investigative sample results including blind field duplicates, and, as provided by the laboratory, method blanks, laboratory control spikes, laboratory duplicates. The data were found to be complete and usable for the purposes of the CCR monitoring program.

## Assessment Monitoring Statistical Evaluation

Following the initial and resample assessment monitoring sampling event, compliance well data for the JHC Pond A were evaluated in accordance with the Groundwater Statistical Evaluation Plan (Stats Plan) (TRC, October 2017). Consistent with the Unified Guidance<sup>3</sup>, the preferred method for comparisons to a fixed standard are confidence limits. An exceedance of the standard occurs when the 99 percent lower confidence level of the downgradient data exceeds the GWPS.

For each detected Appendix IV constituent, the concentrations from each well were first compared directly to the GWPS, as shown on Table 1. Parameter-well combinations that included a direct exceedance of the GWPS were retained for further analysis. Arsenic in JHC-MW-15006 and JHC-MW-15011 had individual results exceeding the GWPS.

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<sup>3</sup> USEPA. 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*. Office of Conservation and Recovery. EPA 530/R-09-007.



Groundwater data were then evaluated utilizing Sanitas™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas™ statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated, as appropriate, for each of the CCR Appendix IV parameters using a 99 percent confidence level, i.e., a significance level ( $\alpha$ ) of 0.01. The following narrative describes the methods employed, the results obtained and the Sanitas™ output files are included as an attachment.

The statistical data evaluation included the following steps:

- Review of data quality checklists for the data sets for CCR Appendix IV constituents;
- Graphical representation of the monitoring data as time versus concentration by well-constituent pair;
- Outlier testing of individual data points that appear from the graphical representations as potential outliers;
- Evaluation of visual trends apparent in the graphical representations for statistical significance;
- Evaluation of percentage of non-detects for each well-constituent pair;
- Distribution of the data; and
- Calculation of the confidence intervals for each cumulative dataset.

The results of these evaluations are presented and discussed below.

Initially, the baseline (December 2015 through August 2017) results and the two assessment monitoring results (April and June 2018) were observed visually for potential trends and outliers. No trends or outliers were identified. The Sanitas™ software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent 8 sampling events. Eight independent sampling events provide the appropriate density of data as recommended per the Unified Guidance yet are collected recently enough to provide an indication of current condition. The tests were run with a per-well significance of  $\alpha = 0.01$ . The software outputs are included in Attachment A along with data reports showing the values used for the evaluation. The percentage of non-detect observations are also included in Attachment A. Non-detect data was handled in accordance with the Stats Plan for the purposes of calculating the confidence intervals.

The Sanitas™ software generates an output that includes graphs of the parametric or non-parametric confidence intervals for each well along with notes on data transformations, as appropriate. The data sets for JHC-MW-15006 and JHC-MW-15011 were found to be normally distributed. The confidence interval test compares the lower confidence limit to the GWPS. The calculated upper and lower



confidence limits and comparison of the lower confidence limits to the GWPSs are also summarized in Table 2.

The statistical evaluation of the Appendix IV parameters shows an exceedance for arsenic at JHC-MW-15011. Per §257.95(g), the facility must either conduct an alternate source demonstration or initiate an assessment of corrective measures according to §257.96 within 90 days of detecting a statistical exceedance of the GWPSs.


### Next Steps

In accordance with the CCR Rule, CEC will enter this statistical evaluation of the assessment monitoring data into the operating record by January 14, 2019. The notification of the GWPS exceedances to the state will be posted by CEC to a public CCR compliance website as required by §257.105(h)(8) by February 13, 2019. By April 14, 2019, in accordance with §257.95(g)(3), an assessment of corrective measures will be initiated. This assessment will be completed no later than September 11, 2019 in accordance with the timeframes provided in §257.96(a)(1).

Sincerely,

TRC

  
Graham Crockford  
Program Manager

  
Sarah B. Holmstrom  
Project Hydrogeologist

### Attachments

Table 1.	Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to June 2018
Table 2.	Summary of Groundwater Protection Standard Exceedances – June 2018
Figure 1.	Site Location Map
Figure 2.	Site Plan
Figure 3.	Shallow Groundwater Contour Map – April 24, 2018
Figure 4.	Shallow Groundwater Contour Map – June 18, 2018
Attachment A	Sanitas™ Output

cc: Brad Runkel, Consumers Energy  
JR Register, Consumers Energy  
Michelle Marion, Consumers Energy  
Central Files



# Tables

**Table 1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to June 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15006											
Sample Date:						12/4/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/25/2018	6/20/2018	6/20/2018
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient											
<b>Appendix III</b>																	Field Dup
Boron	ug/L	NC	NA	51	NA	419	302	212	143	175	142	158	151	119	--	144	147
Calcium	mg/L	NC	NA	46	NA	29.5	28.6	51.7	34.2	39.5	41.1	35.7	40.0	32.8	--	38.5	38.6
Chloride	mg/L	250*	NA	43	NA	16.8	22.2	21.8	17	16.9	22.7	22.3	18.4	17.7	--	17.2	17.2
Fluoride	ug/L	4,000	NA	1,000	NA	< 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*	NA	4.8 - 9.2	NA	7.8	7.4	7.7	7.4	7.5	7.6	7.4	7.5	7.4	8.0	7.4	--
Sulfate	mg/L	250*	NA	14	NA	27.7	36.3	33.3	31.2	32.6	28.6	28.3	28.9	31.1	--	27.5	27.5
Total Dissolved Solids	mg/L	500*	NA	258	NA	150	180	220	210	180	220	216	206	172	--	376	268
<b>Appendix IV</b>																	
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	NA	1	<b>10</b>	<b>14</b>	<b>12</b>	<b>14</b>	<b>12</b>	<b>14</b>	9	7.5	8.5	--	4.8	4.3	4.7
Barium	ug/L	2,000	NA	35	2,000	173	118	206	174	157	195	166	220	--	158	141	146
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20
Chromium	ug/L	100	NA	2	100	8	1	2	1	2	4	1.6	2	--	1.5	1.5	1.8
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 15.0
Fluoride	ug/L	4,000	NA	1,000	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
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	40	10	40	10.1	< 10	10	16	14	< 10	13	16	--	13	12	12
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	NC	100	5	100	8	11	7	9	7	6	7.2	5.9	--	< 5.0	5.4	5.5
Radium-226	pCi/L	5	NA	NA	NA	< 0.24	0.186	< 0.233	< 0.412	< 0.195	< 0.294	< 0.508	< 0.807	--	< 0.896	< 0.540	< 0.483
Radium-226/228	pCi/L	5	NA	1.93	5	< 0.539	0.691	0.694	1.58	< 0.374	1.00	< 1.29	< 1.69	--	< 1.68	< 1.50	< 1.43
Radium-228	pCi/L	5	NA	NA	NA	< 0.539	< 0.618	0.589	1.52	< 0.374	0.853	< 0.783	< 0.881	--	< 0.779	< 0.963	< 0.944
Selenium	ug/L	50	NA	5	50	< 1	1	4	< 1	2	< 1	3.4	< 1.0	--	1.3	< 1.0	< 1.0
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0

**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.  
 \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table 1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to June 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15007										
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient										
<b>Appendix III</b>																
Boron	ug/L	NC	NA	51	NA	101	99	151	134	126	109	153	141	98	--	157
Calcium	mg/L	NC	NA	46	NA	37	51	34.2	45.5	38.2	39.0	42.4	32.1	32.2	--	38.7
Chloride	mg/L	250*	NA	43	NA	17.9	27.8	18.5	17.4	17	22.9	20.1	17.5	17.3	--	17.5
Fluoride	ug/L	4,000	NA	1,000	NA	< 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*	NA	4.8 - 9.2	NA	7.3	7.3	7.3	7.2	7.3	7.4	7.3	7.4	7.3	8.4 <sup>(1)</sup>	7.4
Sulfate	mg/L	250*	NA	14	NA	34.8	35.8	30.8	32.2	31.7	29.7	29.1	31.6	32.3	--	26.2
Total Dissolved Solids	mg/L	500*	NA	258	NA	190	240	200	200	190	220	202	170	188	--	298
<b>Appendix IV</b>																
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0
Arsenic	ug/L	10	NA	1	<b>10</b>	3	3	3	4	4	3	3.2	4.0	--	3.3	2.9
Barium	ug/L	2,000	NA	35	2,000	119	133	152	144	130	132	143	130	--	121	115
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20
Chromium	ug/L	100	NA	2	100	8	3	2	2	2	3	1.2	1.1	--	< 1.0	1.2
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0
Fluoride	ug/L	4,000	NA	1,000	4,000	< 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	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0
Lithium	ug/L	NC	40	10	40	15.7	11.4	14	21	17	11	14	16	--	11	15
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20
Molybdenum	ug/L	NC	100	5	100	6	6	8	8	7	8	6.1	6.1	--	< 5.0	< 5.0
Radium-226	pCi/L	5	NA	NA	NA	< 0.222	< 0.157	< 0.249	< 0.444	< 0.258	< 0.358	< 0.427	< 0.430	--	< 1.03	< 0.736
Radium-226/228	pCi/L	5	NA	1.93	5	< 0.522	0.8	< 0.558	< 0.753	0.637	1.43	< 1.58	< 1.33	--	< 2.05	< 1.86
Radium-228	pCi/L	5	NA	NA	NA	< 0.522	0.662	< 0.558	< 0.753	0.439	1.22	< 1.15	< 0.904	--	< 1.02	< 1.12
Selenium	ug/L	50	NA	5	50	2	2	< 1	< 1	2	< 1	2.2	1.1	--	< 1.0	1.3
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0

**Notes:**

ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.  
 \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.  
 All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table 1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to June 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15008										
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient										
<b>Appendix III</b>																
Boron	ug/L	NC	NA	51	NA	146	95	111	195	181	97	128	153	116	--	87.7
Calcium	mg/L	NC	NA	46	NA	43.2	46.9	46.2	64	46.5	42.9	42.5	47.1	37.5	--	39
Chloride	mg/L	250*	NA	43	NA	19.3	25.8	58.4	37.0	45.5	25.3	24.0	22.3	16.6	--	20.4
Fluoride	ug/L	4,000	NA	1,000	NA	< 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*	NA	4.8 - 9.2	NA	6.8	6.9	6.9	7.0	6.8	7.2	7.1	7.1	7.1	7.1	7.2
Sulfate	mg/L	250*	NA	14	NA	36.1	31	30.8	29.6	33.6	28	29.8	31.8	28.4	--	25.5
Total Dissolved Solids	mg/L	500*	NA	258	NA	220	230	300	300	260	230	260	340	190	--	210
<b>Appendix IV</b>																
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	1.1	--	1.1	< 1.0
Arsenic	ug/L	10	NA	1	<b>10</b>	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0
Barium	ug/L	2,000	NA	35	2,000	184	146	173	172	229	111	124	186	--	118	120
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20
Chromium	ug/L	100	NA	2	100	2	2	2	3	2	7	7.8	5.4	--	1.3	1.5
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0
Fluoride	ug/L	4,000	NA	1,000	4,000	< 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	15	1	15	< 1	< 1	< 1	< 1	2	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0
Lithium	ug/L	NC	40	10	40	20.2	16.2	13	15	21	12	13	18	--	14	15
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20
Molybdenum	ug/L	NC	100	5	100	5	5	5	7	< 5	10	9.4	8.6	--	5.8	5.1
Radium-226	pCi/L	5	NA	NA	NA	0.421	0.211	< 0.27	< 0.4	0.256	0.539	< 0.599	< 0.437	--	< 0.493	0.928
Radium-226/228	pCi/L	5	NA	1.93	5	0.998	< 0.561	0.677	1.04	0.975	1.47	< 1.49	< 1.50	--	< 1.34	1.56
Radium-228	pCi/L	5	NA	NA	NA	0.577	< 0.561	0.557	0.701	0.719	0.928	< 0.892	< 1.06	--	< 0.847	< 0.698
Selenium	ug/L	50	NA	5	50	6	4	6	3	8	2	2.3	2.4	--	1.7	2.0
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0

**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.  
 \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.  
 All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table 1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to June 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15009											
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	4/26/2018	6/20/2018
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient											
<b>Appendix III</b>																	
Boron	ug/L	NC	NA	51	NA	127	97	117	204	174	86	126	156	144	--	Field Dup	91.4
Calcium	mg/L	NC	NA	46	NA	52.6	50.8	43.7	61.0	45.2	43.3	40.1	41.2	34.3	--	--	41.2
Chloride	mg/L	250*	NA	43	NA	17	22.5	26.2	16.9	15.7	23.7	23.8	20.1	17.7	--	--	22.9
Fluoride	ug/L	4,000	NA	1,000	NA	< 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*	NA	4.8 - 9.2	NA	7.3	7.2	7.3	7.3	7.0	7.4	7.4	7.5	7.4	8.4 <sup>(1)</sup>	--	7.7
Sulfate	mg/L	250*	NA	14	NA	33.1	33.3	38.2	29.5	32.7	27.5	28.6	31.6	32.7	--	--	18.2
Total Dissolved Solids	mg/L	500*	NA	258	NA	240	220	260	240	220	230	188	208	178	--	--	214
<b>Appendix IV</b>																	
Antimony	ug/L	6	NA	2	6	1	< 1	< 1	< 1	< 1	< 1	1.1	< 1.0	--	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	NA	1	<b>10</b>	< 1	1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Barium	ug/L	2,000	NA	35	2,000	236	151	162	169	202	150	132	198	--	130	125	130
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20
Chromium	ug/L	100	NA	2	100	5	4	2	2	3	6	5	6.6	--	1.3	1.3	< 1.0
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 15.0
Fluoride	ug/L	4,000	NA	1,000	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
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	40	10	40	15.4	10.6	< 10	11	16	< 10	11	11	--	< 10	< 10	< 10
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20
Molybdenum	ug/L	NC	100	5	100	6	6	8	6	5	6	22.3	7.4	--	5.5	5.5	< 5.0
Radium-226	pCi/L	5	NA	NA	NA	0.405	< 0.217	< 0.272	< 0.395	< 0.248	< 0.333	0.553	< 0.455	--	< 0.169	< 0.709	< 0.631
Radium-226/228	pCi/L	5	NA	1.93	5	1.18	0.811	0.987	< 0.8	1.28	0.877	< 1.23	< 1.40	--	< 1.43	< 1.85	< 1.27
Radium-228	pCi/L	5	NA	NA	NA	0.77	0.647	0.827	< 0.8	1.11	0.627	< 1.08	1.04	--	< 1.26	< 1.14	< 0.634
Selenium	ug/L	50	NA	5	50	7	20	< 1	1	9	1	4.7	< 1.0	--	< 1.0	1.0	10.3
Thallium	ug/L	2	NA	2	<b>2</b>	<b>2.19</b>	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0

**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.  
 \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.



**Table 1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to June 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15010										
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/16/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient										
<b>Appendix III</b>																
Boron	ug/L	NC	NA	51	NA	101	83	131	146	121	77	127	164	109	--	98.4
Calcium	mg/L	NC	NA	46	NA	41.7	48.1	49.5	41.2	35.6	41.4	36.1	39.4	33.0	--	40.9
Chloride	mg/L	250*	NA	43	NA	17.1	25.4	21.4	18.0	16.1	26.1	23.1	19.1	17.8	--	22.2
Fluoride	ug/L	4,000	NA	1,000	NA	< 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*	NA	4.8 - 9.2	NA	6.9	6.8	6.6	6.8	6.8	7.1	7.1	7.3	7.2	8.0 <sup>(1)</sup>	7.3
Sulfate	mg/L	250*	NA	14	NA	46.9	36.2	76.4	32	32.4	31.1	29.7	37	32.6	--	39.9
Total Dissolved Solids	mg/L	500*	NA	258	NA	190	220	280	220	160	220	236	338	220	--	294
<b>Appendix IV</b>																
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	1	1	1	1.4	1.5	--	< 1.0	< 1.0
Arsenic	ug/L	10	NA	1	<b>10</b>	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0
Barium	ug/L	2,000	NA	35	2,000	149	149	129	146	135	132	160	179	--	137	122
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	0.4	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20
Chromium	ug/L	100	NA	2	100	5	2	1	1	2	3	< 1.0	< 1.0	--	1.4	1.1
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0
Fluoride	ug/L	4,000	NA	1,000	4,000	< 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	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0
Lithium	ug/L	NC	40	10	40	17.5	14.2	27	22	20	< 10	11	12	--	10	< 10
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20
Molybdenum	ug/L	NC	100	5	100	8	5	10	15	29	21	36.8	13.2	--	11.0	7.6
Radium-226	pCi/L	5	NA	NA	NA	0.368	< 0.22	< 0.259	< 0.352	0.284	< 0.398	< 0.892	0.745	--	0.505	< 0.489
Radium-226/228	pCi/L	5	NA	1.93	5	0.912	< 0.44	0.711	1.04	0.909	0.918	< 1.95	1.36	--	< 1.20	< 1.14
Radium-228	pCi/L	5	NA	NA	NA	0.544	< 0.44	0.46	0.933	0.625	0.819	1.1	< 0.808	--	< 1.03	< 0.655
Selenium	ug/L	50	NA	5	50	3	4	14	< 1	< 1	2	7.7	< 1.0	--	3.0	11
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.
- \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.
- All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table 1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to June 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15011																
Sample Date:						12/4/2015	3/10/2016	6/22/2016	8/30/2016	11/16/2016	4/19/2017	6/21/2017	6/21/2017	8/15/2017	8/15/2017	9/26/2017	9/26/2017	4/25/2018	6/19/2018			
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient																
<b>Appendix III</b>																						
Boron	ug/L	NC	NA	51	NA	345	280	286	419	457	110	179	Field Dup	201	288	271	249	Field Dup	219	--	229	
Calcium	mg/L	NC	NA	46	NA	25	35.4	41.6	38.2	25.4	48.2	32.7	31.4	32.9	32.9	31.7	33.6	--	--	--	30.3	
Chloride	mg/L	250*	NA	43	NA	16.6	21.6	23.4	16.9	16.8	24.7	24.8	24.8	19.6	19.6	17.7	17.7	--	--	--	23	
Fluoride	ug/L	4,000	NA	1,000	NA	< 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*	NA	4.8 - 9.2	NA	7.6	7.7	7.7	7.4	7.4	7.9	7.5	--	7.6	--	7.5	--	8.5	--	--	8.1	
Sulfate	mg/L	250*	NA	14	NA	23.2	37.7	29.4	6.1	12.3	35.1	24.3	24.3	15.7	15.9	17.6	17.5	--	--	--	26.1	
Total Dissolved Solids	mg/L	500*	NA	258	NA	100	170	200	170	140	240	144	174	188	174	230	154	--	--	--	180	
<b>Appendix IV</b>																						
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	< 1	< 1	1	2.5	3.1	1.1	1.2	--	--	--	--	< 1.0	< 1.0	
Arsenic	ug/L	10	NA	1	<b>10</b>	<b>15</b>	<b>12</b>	<b>12</b>	<b>19</b>	<b>23</b>	<b>11</b>	<b>10.6</b>	<b>10.9</b>	<b>18.2</b>	<b>17.5</b>	--	--	--	--	<b>16.8</b>	<b>15.0</b>	
Barium	ug/L	2,000	NA	35	2,000	163	147	175	181	142	161	152	145	171	161	--	--	--	--	116	123	
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0	--	--	--	--	< 1.0	< 1.0	
Cadmium	ug/L	5	NA	0.2	5	< 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	NA	2	100	3	1	< 1	< 1	1	4	< 1.0	< 1.0	< 1.0	< 1.0	--	--	--	--	< 1.0	< 1.0	
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	< 15.0	< 15.0	--	--	--	--	< 15.0	< 15.0	
Fluoride	ug/L	4,000	NA	1,000	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	
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	1.2	< 1.0	< 1.0	< 1.0	--	--	--	--	< 1.0	< 1.0	
Lithium	ug/L	NC	40	10	40	17.3	12.1	10	19	18	< 10	12	11	11	13	--	--	--	--	14	11	
Mercury	ug/L	2	NA	0.2	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	100	5	100	12	8	10	14	16	13	11.7	11.8	13.0	13.0	--	--	--	--	8.2	8.2	
Radium-226	pCi/L	5	NA	NA	NA	< 0.342	< 0.225	0.305	< 0.456	< 0.209	< 0.424	0.263	< 0.755	0.291	< 0.707	--	--	--	--	< 0.702	< 0.463	
Radium-226/228	pCi/L	5	NA	1.93	5	0.662	0.77	0.918	0.95	< 0.551	0.584	< 0.733	< 1.26	< 1.11	1.61	--	--	--	--	< 1.27	< 1.34	
Radium-228	pCi/L	5	NA	NA	NA	0.617	0.705	0.613	0.907	< 0.551	0.548	< 0.590	< 0.505	< 0.951	1.02	--	--	--	--	< 0.568	0.931	
Selenium	ug/L	50	NA	5	50	< 1	< 1	< 1	< 1	< 1	12	< 1.0	< 1.0	< 1.0	< 1.0	--	--	--	--	< 1.0	1.6	
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	< 2.0	< 2.0	--	--	--	--	< 2.0	< 2.0	

**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April, 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.  
 \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.  
 All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table 2**  
 Summary of Groundwater Protection Standard Exceedances – June 2018  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Constituent	Units	GWPS	JHC-MW-15006		JHC-MW-15011	
			LCL	UCL	LCL	UCL
Arsenic	ug/L	10	5.3	13	11	20

**Notes:**

ug/L - micrograms per Liter

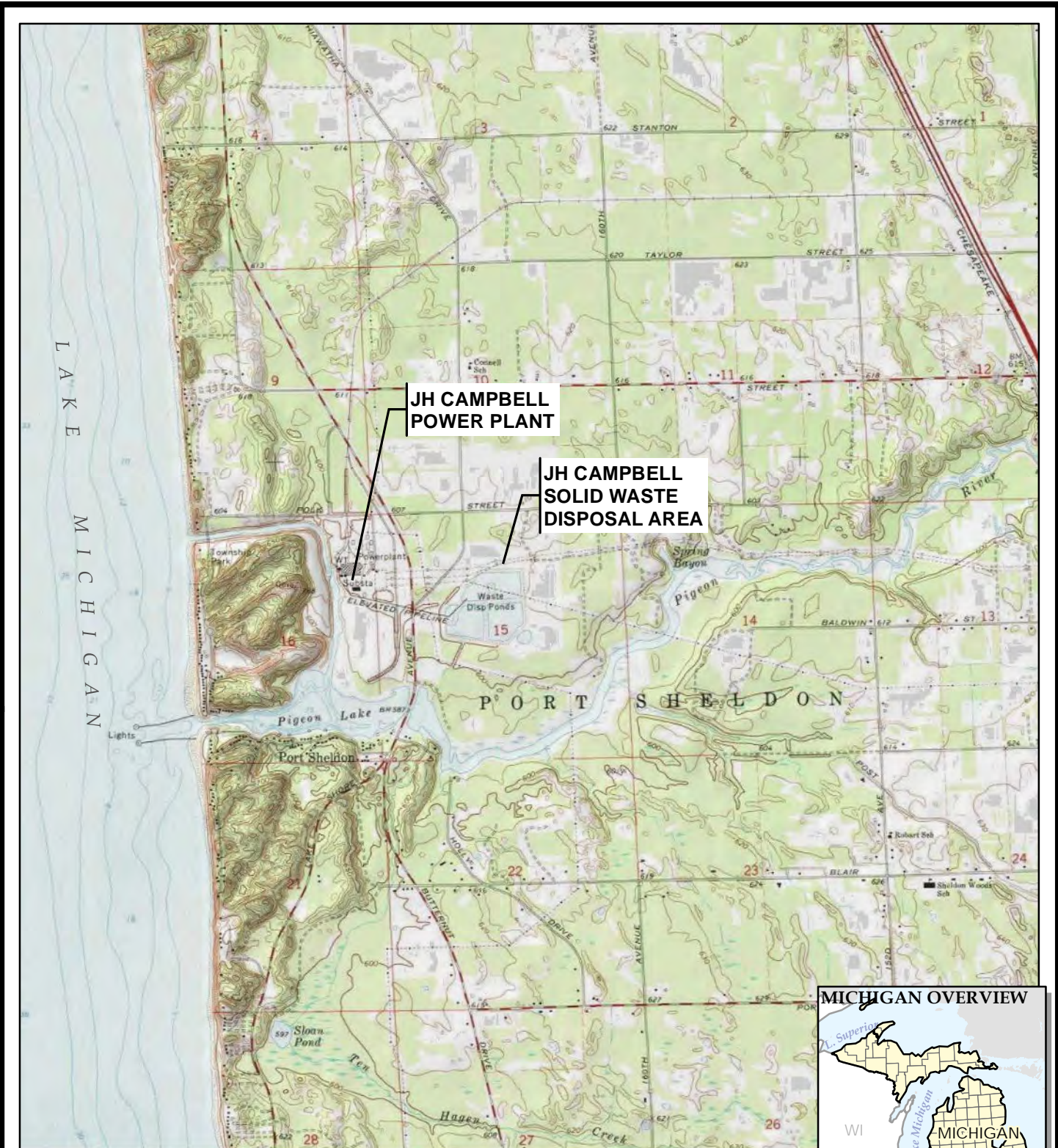
GWPS - Groundwater Protection Standard as established in TRC's Technical Memorandum dated October 15, 2018.

UCL - Upper Confidence Limit ( $\alpha = 0.01$ ) of the downgradient data set.

LCL - Lower Confidence Limit ( $\alpha = 0.01$ ) of the downgradient data set.

Indicates a statistically significant exceedance of the GWPS. An exceedance occurs when the LCL is greater than the GWPS.

# Figures



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.



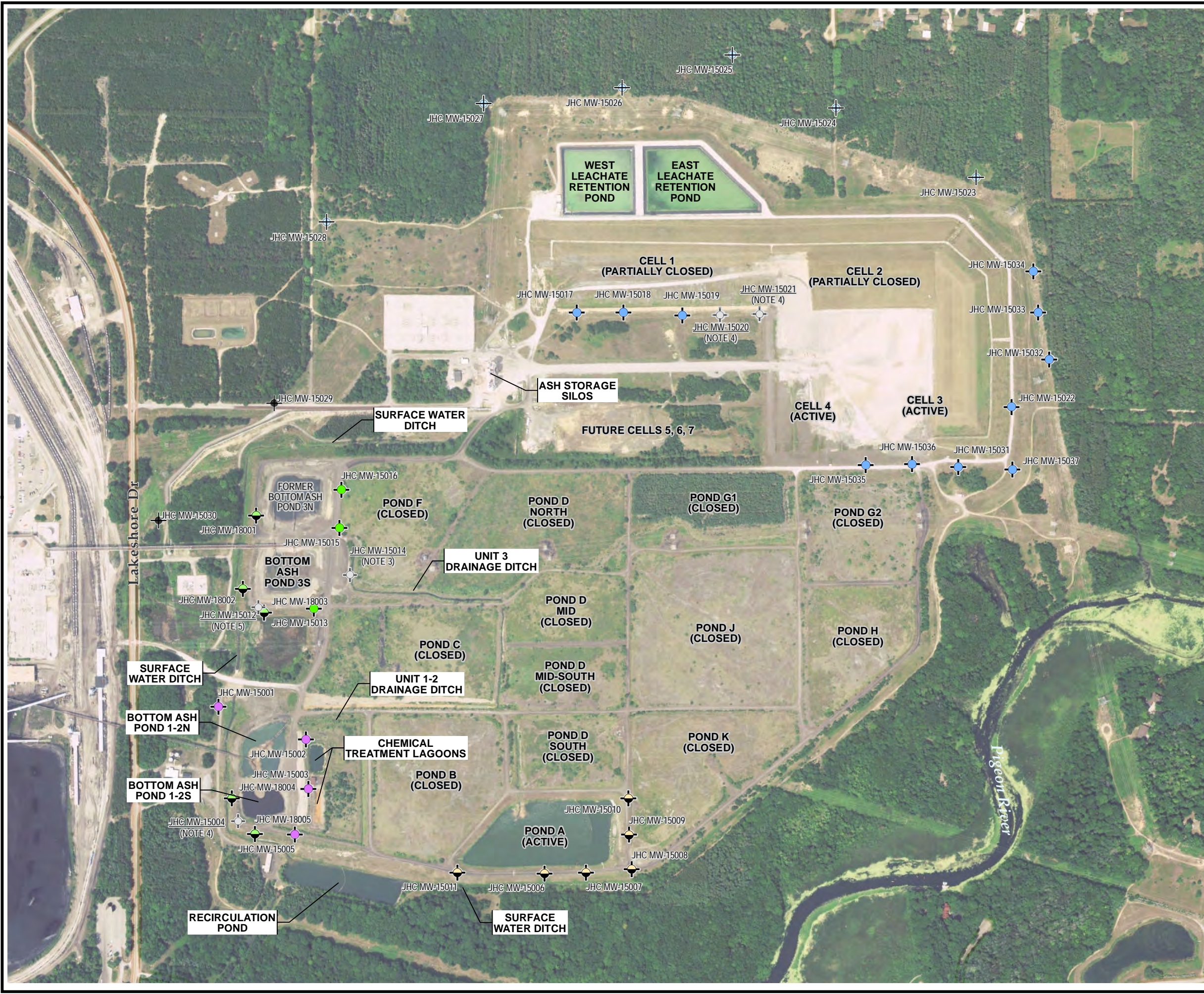
1540 Eisenhower Place  
Ann Arbor, MI 48108-3284  
Phone: 734.971.7080

PROJECT:  
**CONSUMERS ENERGY COMPANY  
JH CAMPBELL POWER PLANT  
WEST OLIVE, MICHIGAN**

TITLE:  
**SITE LOCATION MAP**

DRAWN BY:	J. PAPEZ
CHECKED BY:	S. HOLMSTROM
APPROVED BY:	G. CROCKFORD
DATE:	NOVEMBER 2018
PROJ. NO.:	269767-005
FILE:	269767-005-009SLM.mxd

**FIGURE 1**



**LEGEND**

- BACKGROUND MONITORING WELL
- DOWNGRAIDENT BOTTOM ASH POND 1/2 N/S MONITORING WELL
- DOWNGRAIDENT BOTTOM ASH POND 3 N/S MONITORING WELL
- DOWNGRAIDENT LANDFILL MONITORING WELL
- DOWNGRAIDENT POND A MONITORING WELL
- MONITORING WELL (2018)
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- DECOMMISSIONED MONITORING WELL

- NOTES**
1. BASE MAP IMAGERY FROM USDA – NATIONAL AGRICULTURE IMAGERY PROGRAM, 7/20/2016.
  2. WELL LOCATIONS SURVEYED BY NEDERVELD ON 11/25/2015.
  3. MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
  4. MONITORING WELL DECOMMISSIONED JUNE 14, 2018.
  5. MONITORING WELL DECOMMISSIONED OCTOBER 10, 2018.
  6. JHC-MW-1800X MONITORING WELLS INSTALLED IN LATE 2018.

0 600 1,200  
Feet

1" = 600'  
1:7,200

PROJECT: CONSUMERS ENERGY COMPANY  
JH CAMPBELL POWER PLANT  
WEST OLIVE, MICHIGAN

TITLE: **SITE PLAN  
WITH CCR MONITORING WELL LOCATIONS**

DRAWN BY: J. PAPEZ PROJ NO.: 290806-001

CHECKED BY: S. HOLMSTROM

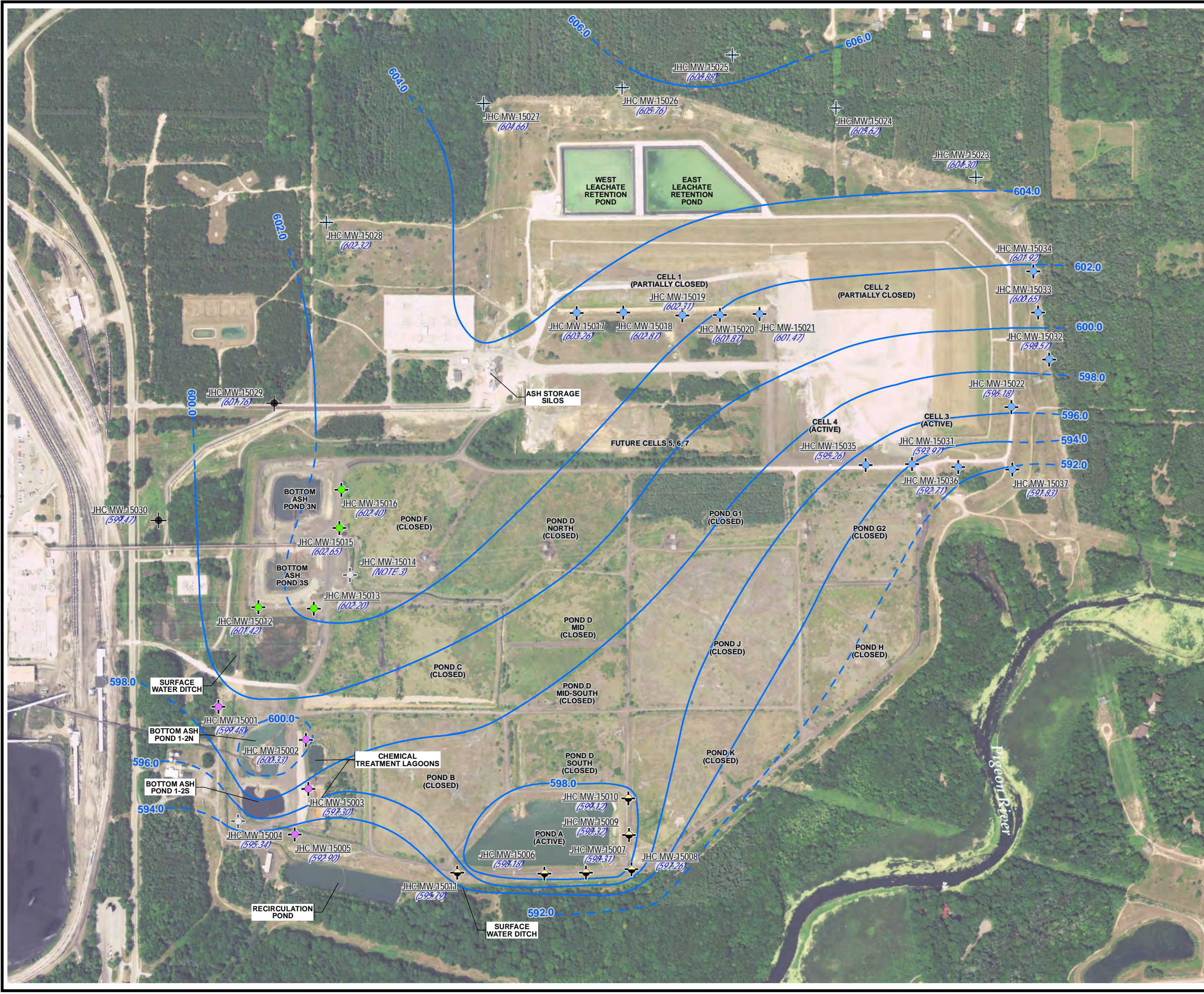
APPROVED BY: G. CROCKFORD

DATE: JANUARY 2019

**FIGURE 2**

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

FILE NO.: 290806-001-013.mxd

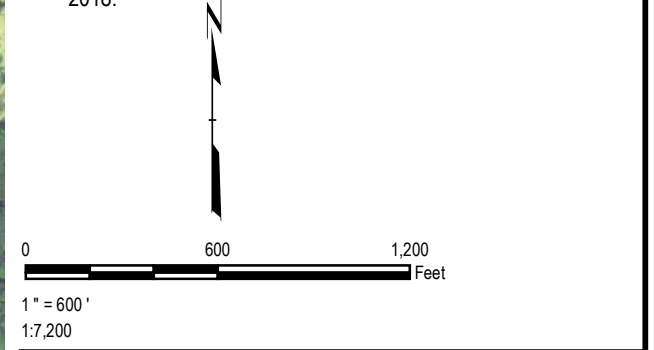


**LEGEND**

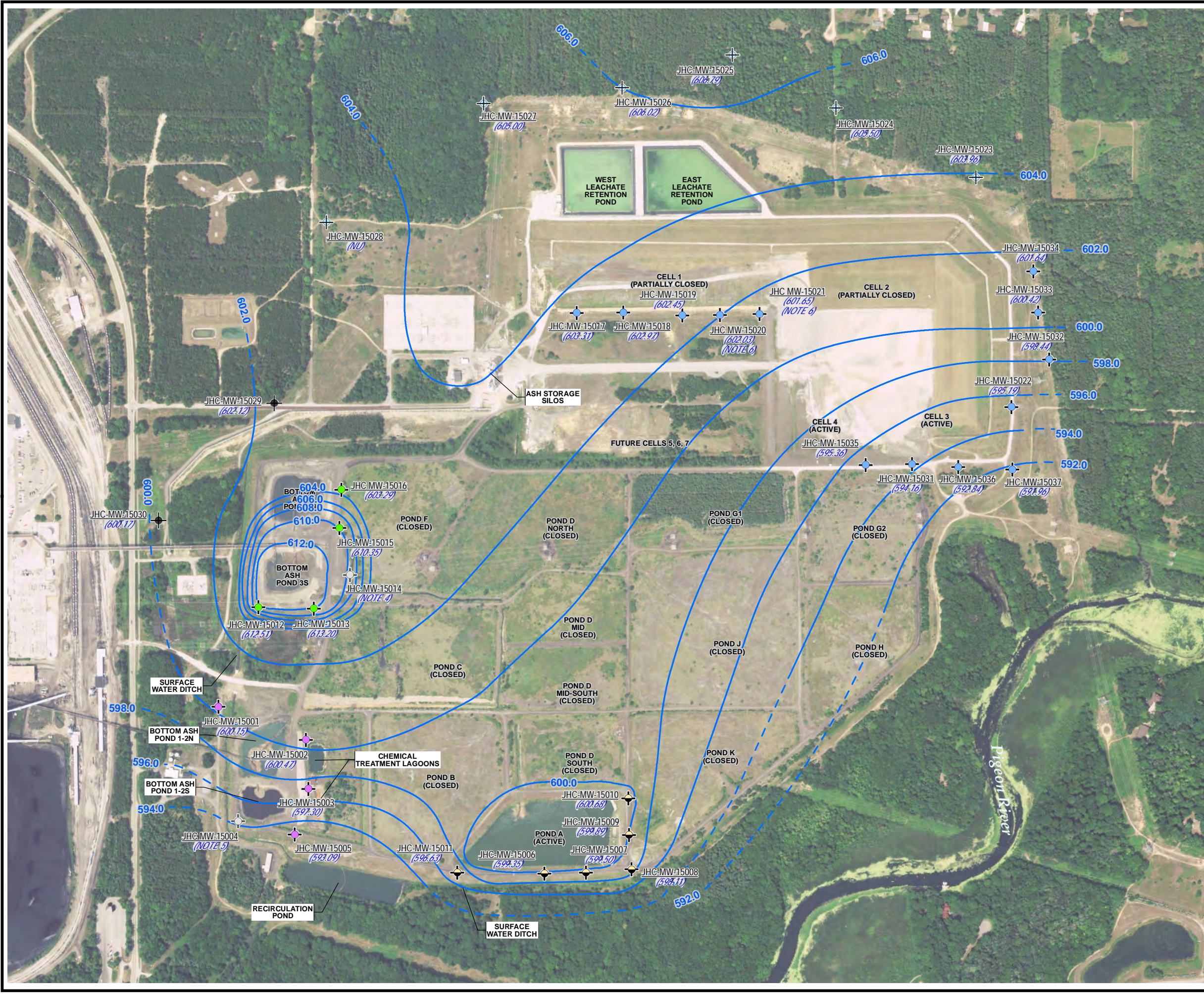
- BACKGROUND MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- DOWNGRADEMENT BOTTOM ASH POND 1/2 N/S MONITORING WELL
- DOWNGRADEMENT BOTTOM ASH POND 3 N/S MONITORING WELL
- DOWNGRADEMENT LANDFILL MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- POND A MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (600.97)* GROUNDWATER ELEVATION (FEET)

**NOTES**

1. BASE MAP IMAGERY FROM USDAL-NATIONAL AGRICULTURE IMAGERY PROGRAM, 7/20/2016.
2. WELL LOCATIONS SURVEYED BY NEDERVELD ON 11/25/2015.
3. MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
4. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
5. ASH SLUICING OPERATIONS AT UNIT 3 WERE TEMPORARILY CEASED FROM MARCH 14 TO APRIL 26, 2018.



<b>PROJECT:</b>	
<b>CONSUMERS ENERGY COMPANY JH CAMPBELL POWER PLANT WEST OLIVE, MICHIGAN</b>	
<b>TITLE:</b>	
<b>GROUNDWATER CONTOUR MAP APRIL 24, 2018</b>	
DRAWN BY: S. MAJOR	PROJ NO.: 290806-001
CHECKED BY: C. SCIESZKA	
APPROVED BY: S. HOLMSTROM	<b>FIGURE 3</b>
DATE: NOVEMBER 2018	
1540 Eisenhower Place Ann Arbor, MI 48108-3284 Phone: 734.971.7080 www.trcsolutions.com	
FILE NO.: 290806-001-007.mxd	

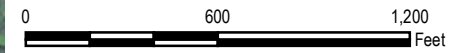
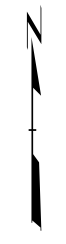


**LEGEND**

- BACKGROUND MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- DOWNGRADEMENT BOTTOM ASH POND 1/2 N/S MONITORING WELL
- DOWNGRADEMENT BOTTOM ASH POND 3 N/S MONITORING WELL
- DOWNGRADEMENT LANDFILL MONITORING WELL
- MONITORING WELL (STATIC WATER LEVEL ONLY)
- POND A MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (2' INTERVAL, DASHED WHERE INFERRED)
- (600.97)* GROUNDWATER ELEVATION (FEET)
- (NU)* ANOMALOUS DATA NOT USED TO CONSTRUCT CONTOUR MAP

**NOTES**

1. BASE MAP IMAGERY FROM USDAL-NATIONAL AGRICULTURE IMAGERY PROGRAM, 7/20/2016.
2. WELL LOCATIONS SURVEYED BY NEDERVELD ON 11/25/2015.
3. GROUNDWATER ELEVATIONS DISPLAYED IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
4. MONITORING WELL DECOMMISSIONED NOVEMBER 13, 2017.
5. MONITORING WELL DECOMMISSIONED JUNE 14, 2018.
6. GROUNDWATER ELEVATION DATA COLLECTED ON JUNE 11, 2018, MONITORING WELL DECOMMISSIONED ON JUNE 14, 2018.



1" = 600'  
1:7,200

PROJECT:		<b>CONSUMERS ENERGY COMPANY JH CAMPBELL POWER PLANT WEST OLIVE, MICHIGAN</b>	
TITLE:		<b>GROUNDWATER CONTOUR MAP JUNE 18, 2018</b>	
DRAWN BY:	S. MAJOR	PROJ NO.:	290806-001
CHECKED BY:	C. SCIESZKA	<b>FIGURE 4</b>	
APPROVED BY:	S. HOLMSTROM		
DATE:	NOVEMBER 2018		
FILE NO.:		290806-001-010.mxd	



1540 Eisenhower Place  
Ann Arbor, MI 48108-3284  
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**Attachment A**  
**Sanitas™ Output**

# Summary Report

Constituent: Antimony, Total Analysis Run 11/15/2018 10:02 AM  
 Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
 ND/Trace = 47  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 2.8  
 Mean Value = 1.053  
 Median Value = 1  
 Standard Deviation = 0.2448  
 Coefficient of Variation = 0.2326  
 Skewness = 6.359

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	10	1	1	1	1	0	0	NaN
JHC-MW-15007	10	9	1	1	1	1	0	0	NaN
JHC-MW-15008	10	8	1	1.1	1.02	1	0.04216	0.04134	1.5
JHC-MW-15009	10	8	1	1.1	1.01	1	0.03162	0.03131	2.667
JHC-MW-15010	10	5	1	1.5	1.09	1	0.1912	0.1754	1.556
JHC-MW-15011	10	7	1	2.8	1.195	1	0.5659	0.4736	2.634

# Summary Report

Constituent: Arsenic, Total Analysis Run 11/15/2018 10:02 AM  
 Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
 ND/Trace = 29  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 23  
 Mean Value = 5.268  
 Median Value = 1.95  
 Standard Deviation = 5.927  
 Coefficient of Variation = 1.125  
 Skewness = 1.214

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	0	4.5	14	10.03	10.5	3.694	0.3683	-0.3022
JHC-MW-15007	10	0	2.9	4	3.34	3.1	0.4695	0.1406	0.6985
JHC-MW-15008	10	10	1	1	1	1	0	0	NaN
JHC-MW-15009	10	9	1	1	1	1	0	0	NaN
JHC-MW-15010	10	10	1	1	1	1	0	0	NaN
JHC-MW-15011	10	0	10.75	23	15.24	15	3.984	0.2614	0.569

# Summary Report

Constituent: Barium, Total Analysis Run 11/15/2018 10:02 AM  
 Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
 ND/Trace = 0  
 Wells = 6  
 Minimum Value = 111  
 Maximum Value = 236  
 Mean Value = 153.5  
 Median Value = 148.8  
 Standard Deviation = 29.51  
 Coefficient of Variation = 0.1922  
 Skewness = 0.8329

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	0	118	220	171.1	169.5	30.13	0.1761	-0.006776
JHC-MW-15007	10	0	115	152	131.9	131	11.8	0.08945	0.2124
JHC-MW-15008	10	0	111	229	156.3	159	38.65	0.2473	0.4228
JHC-MW-15009	10	0	127.5	236	165.8	156.5	35.99	0.2172	0.7049
JHC-MW-15010	10	0	122	179	143.8	141.5	16.73	0.1163	0.799
JHC-MW-15011	10	0	116	181	152.3	154.8	21.19	0.1392	-0.417

# Summary Report

Constituent: Beryllium, Total Analysis Run 11/15/2018 10:02 AM  
Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

---

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
ND/Trace = 60  
Wells = 6  
Minimum Value = 1  
Maximum Value = 1  
Mean Value = 1  
Median Value = 1  
Standard Deviation = 0  
Coefficient of Variation = 0  
Skewness = NaN

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	10	1	1	1	1	0	0	NaN
JHC-MW-15007	10	10	1	1	1	1	0	0	NaN
JHC-MW-15008	10	10	1	1	1	1	0	0	NaN
JHC-MW-15009	10	10	1	1	1	1	0	0	NaN
JHC-MW-15010	10	10	1	1	1	1	0	0	NaN
JHC-MW-15011	10	10	1	1	1	1	0	0	NaN

# Summary Report

Constituent: Cadmium, Total Analysis Run 11/15/2018 10:02 AM  
Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

---

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
ND/Trace = 59  
Wells = 6  
Minimum Value = 0.2  
Maximum Value = 0.4  
Mean Value = 0.2033  
Median Value = 0.2  
Standard Deviation = 0.02582  
Coefficient of Variation = 0.127  
Skewness = 7.551

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15007	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15008	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15009	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15010	10	9	0.2	0.4	0.22	0.2	0.06325	0.2875	2.667
JHC-MW-15011	10	10	0.2	0.2	0.2	0.2	0	0	NaN

# Summary Report

Constituent: Chromium, Total Analysis Run 11/15/2018 10:02 AM  
 Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
 ND/Trace = 10  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 8  
 Mean Value = 2.544  
 Median Value = 2  
 Standard Deviation = 1.964  
 Coefficient of Variation = 0.772  
 Skewness = 1.495

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	0	1	8	2.475	1.825	2.115	0.8547	2.02
JHC-MW-15007	10	1	1	8	2.45	2	2.083	0.8504	2.093
JHC-MW-15008	10	0	1.3	7.8	3.4	2	2.412	0.7093	0.941
JHC-MW-15009	10	1	1	6.6	3.59	3.5	2.01	0.56	0.1343
JHC-MW-15010	10	2	1	5	1.85	1.25	1.289	0.6966	1.632
JHC-MW-15011	10	6	1	4	1.5	1	1.08	0.7201	1.673

# Summary Report

Constituent: Cobalt, Total Analysis Run 11/15/2018 10:02 AM  
Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

---

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
ND/Trace = 60  
Wells = 6  
Minimum Value = 15  
Maximum Value = 15  
Mean Value = 15  
Median Value = 15  
Standard Deviation = 0  
Coefficient of Variation = 0  
Skewness = NaN

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	10	15	15	15	15	0	0	NaN
JHC-MW-15007	10	10	15	15	15	15	0	0	NaN
JHC-MW-15008	10	10	15	15	15	15	0	0	NaN
JHC-MW-15009	10	10	15	15	15	15	0	0	NaN
JHC-MW-15010	10	10	15	15	15	15	0	0	NaN
JHC-MW-15011	10	10	15	15	15	15	0	0	NaN



# Summary Report

Constituent: Fluoride Analysis Run 11/15/2018 10:02 AM  
Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

---

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 66  
ND/Trace = 66  
Wells = 6  
Minimum Value = 1000  
Maximum Value = 1000  
Mean Value = 1000  
Median Value = 1000  
Standard Deviation = 0  
Coefficient of Variation = 0  
Skewness = NaN

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	11	11	1000	1000	1000	1000	0	0	NaN
JHC-MW-15007	11	11	1000	1000	1000	1000	0	0	NaN
JHC-MW-15008	11	11	1000	1000	1000	1000	0	0	NaN
JHC-MW-15009	11	11	1000	1000	1000	1000	0	0	NaN
JHC-MW-15010	11	11	1000	1000	1000	1000	0	0	NaN
JHC-MW-15011	11	11	1000	1000	1000	1000	0	0	NaN

# Summary Report

Constituent: Lead, Total Analysis Run 11/15/2018 10:02 AM  
Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

---

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
ND/Trace = 58  
Wells = 6  
Minimum Value = 1  
Maximum Value = 2  
Mean Value = 1.018  
Median Value = 1  
Standard Deviation = 0.1295  
Coefficient of Variation = 0.1272  
Skewness = 7.442

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	10	1	1	1	1	0	0	NaN
JHC-MW-15007	10	10	1	1	1	1	0	0	NaN
JHC-MW-15008	10	9	1	2	1.1	1	0.3162	0.2875	2.667
JHC-MW-15009	10	10	1	1	1	1	0	0	NaN
JHC-MW-15010	10	10	1	1	1	1	0	0	NaN
JHC-MW-15011	10	9	1	1.1	1.01	1	0.03162	0.03131	2.667

# Summary Report

Constituent: Lithium, Total Analysis Run 11/15/2018 10:02 AM  
 Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
 ND/Trace = 9  
 Wells = 6  
 Minimum Value = 10  
 Maximum Value = 27  
 Mean Value = 13.85  
 Median Value = 13  
 Standard Deviation = 3.774  
 Coefficient of Variation = 0.2724  
 Skewness = 1.113

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	2	10	16	12.41	12.5	2.402	0.1936	0.3598
JHC-MW-15007	10	0	11	21	14.61	14.5	3.108	0.2127	0.5891
JHC-MW-15008	10	0	12	21	15.74	15	3.091	0.1964	0.5803
JHC-MW-15009	10	4	10	16	11.5	10.8	2.261	0.1966	1.376
JHC-MW-15010	10	2	10	27	15.37	13.1	5.996	0.3901	0.7529
JHC-MW-15011	10	1	10	19	13.49	12.05	3.402	0.2522	0.5954

# Summary Report

Constituent: Mercury, Total Analysis Run 11/15/2018 10:02 AM  
Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

---

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
ND/Trace = 60  
Wells = 6  
Minimum Value = 0.2  
Maximum Value = 0.2  
Mean Value = 0.2  
Median Value = 0.2  
Standard Deviation = 0  
Coefficient of Variation = 0  
Skewness = NaN

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15007	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15008	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15009	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15010	10	10	0.2	0.2	0.2	0.2	0	0	NaN
JHC-MW-15011	10	10	0.2	0.2	0.2	0.2	0	0	NaN

# Summary Report

Constituent: Molybdenum, Total Analysis Run 11/15/2018 10:02 AM  
 Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
 ND/Trace = 5  
 Wells = 6  
 Minimum Value = 5  
 Maximum Value = 36.8  
 Mean Value = 9.177  
 Median Value = 7.5  
 Standard Deviation = 5.838  
 Coefficient of Variation = 0.6362  
 Skewness = 2.775

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	1	5	11	7.155	7	1.808	0.2527	0.8969
JHC-MW-15007	10	2	5	8	6.52	6.1	1.17	0.1794	0.1743
JHC-MW-15008	10	1	5	10	6.59	5.45	2.019	0.3064	0.7136
JHC-MW-15009	10	1	5	22.3	7.72	6	5.21	0.6749	2.507
JHC-MW-15010	10	0	5	36.8	15.66	12.1	10.28	0.6564	1.024
JHC-MW-15011	10	0	8	16	11.42	11.88	2.739	0.2399	0.07262

# Summary Report

Constituent: Radium-226/228 Analysis Run 11/15/2018 10:02 AM  
 Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
 ND/Trace = 30  
 Wells = 6  
 Minimum Value = 0.374  
 Maximum Value = 2.05  
 Mean Value = 1.102  
 Median Value = 1.04  
 Standard Deviation = 0.4119  
 Coefficient of Variation = 0.3739  
 Skewness = 0.2677

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	6	0.374	1.69	1.104	1.145	0.5049	0.4575	-0.1272
JHC-MW-15007	10	7	0.522	2.05	1.152	1.065	0.5674	0.4926	0.3085
JHC-MW-15008	10	4	0.561	1.56	1.161	1.19	0.3621	0.3118	-0.4168
JHC-MW-15009	10	5	0.8	1.85	1.169	1.205	0.3208	0.2745	0.7277
JHC-MW-15010	10	4	0.44	1.95	1.058	0.979	0.4055	0.3832	0.7972
JHC-MW-15011	10	4	0.551	1.36	0.9665	0.934	0.3207	0.3318	0.009376

# Summary Report

Constituent: Selenium, Total Analysis Run 11/15/2018 10:02 AM  
 Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

Observations = 60  
 ND/Trace = 22  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 20  
 Mean Value = 3.233  
 Median Value = 1.65  
 Standard Deviation = 3.804  
 Coefficient of Variation = 1.176  
 Skewness = 2.363

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	5	1	4	1.67	1	1.124	0.6728	1.322
JHC-MW-15007	10	4	1	2.2	1.46	1.2	0.519	0.3555	0.3666
JHC-MW-15008	10	0	1.7	8	3.74	2.7	2.187	0.5849	0.8458
JHC-MW-15009	10	2	1	20	5.6	2.85	6.232	1.113	1.279
JHC-MW-15010	10	3	1	14	4.77	3	4.592	0.9626	1.04
JHC-MW-15011	10	8	1	12	2.16	1	3.463	1.603	2.652

# Summary Report

Constituent: Thallium, Total Analysis Run 11/15/2018 10:02 AM  
Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

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For observations made between 12/4/2015 and 6/21/2018, a summary of the selected data set:

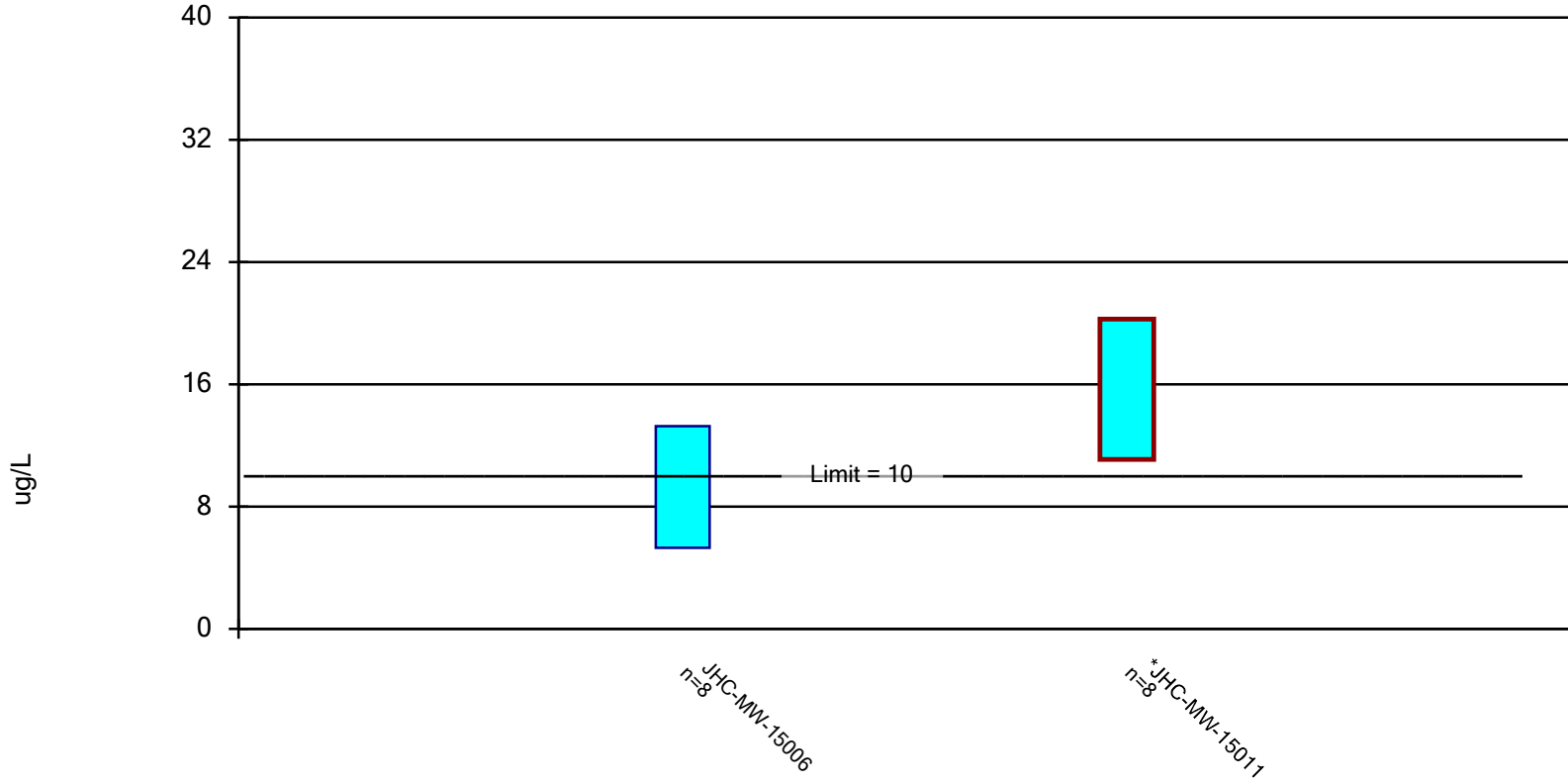
Observations = 60  
ND/Trace = 59  
Wells = 6  
Minimum Value = 2  
Maximum Value = 2.19  
Mean Value = 2.003  
Median Value = 2  
Standard Deviation = 0.02453  
Coefficient of Variation = 0.01225  
Skewness = 7.551

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	10	10	2	2	2	2	0	0	NaN
JHC-MW-15007	10	10	2	2	2	2	0	0	NaN
JHC-MW-15008	10	10	2	2	2	2	0	0	NaN
JHC-MW-15009	10	9	2	2.19	2.019	2	0.06008	0.02976	2.667
JHC-MW-15010	10	10	2	2	2	2	0	0	NaN
JHC-MW-15011	10	10	2	2	2	2	0	0	NaN



### Parametric Confidence Interval

Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, Total Analysis Run 11/27/2018 4:44 PM

Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

# Confidence Interval

Constituent: Arsenic, Total (ug/L) Analysis Run 11/27/2018 4:45 PM

Client: Consumers Energy Data: JHC\_Pond\_A\_Sanitas

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	JHC-MW-15006	JHC-MW-15011
6/22/2016	14	
6/23/2016		12
8/30/2016	12	
8/31/2016		19
11/16/2016	14	23
4/19/2017	9	11
6/21/2017	7.5	10.75 (D)
8/15/2017	8.5	17.85 (D)
4/26/2018	4.8	16.8
6/20/2018	4.5 (D)	15
Mean	9.288	15.68
Std. Dev.	3.756	4.322
Upper Lim.	13.27	20.26
Lower Lim.	5.307	11.09

# Appendix E

## April 2019 Assessment Monitoring Statistical Evaluation

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## Technical Memorandum

**Date:** August 8, 2019; Revised January 10, 2020

**To:** Bethany Swanberg, Consumers Energy

**cc:** Brad Runkel, Consumers Energy  
JR Register, Consumers Energy

**From:** Darby Litz, TRC  
Sarah Holmstrom, TRC  
Meredith Brehob, TRC

**Project No.:** 322174.0000.0000 Phase 1 Task 3

**Subject:** Statistical Evaluation of April 2019 Assessment Monitoring Sampling Event,  
JH Campbell Pond A CCR Unit, Consumers Energy Company, West Olive, Michigan

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During the statistical evaluation of the initial assessment monitoring event at the JH Campbell Power Plant Pond A bottom ash pond (JHC Pond A), arsenic was present in one downgradient monitoring well at statistically significant levels exceeding the Groundwater Protection Standard (GWPS). Therefore, Consumers Energy Consumers Energy initiated an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined.

<b>Constituent</b>	<b>GWPS</b>	<b># Downgradient Wells Observed</b>
Arsenic	10 ug/L	1 of 6

Currently, Consumers Energy is continuing semiannual assessment monitoring in accordance with §257.95 of the CCR Rule<sup>1</sup> at the JH Campbell Power Plant (JHC) Pond A. The first semiannual assessment monitoring event for 2019 was conducted on April 22 through April 29, 2019. In accordance with §257.95, the assessment monitoring data must be compared to GWPSs to determine whether or not Appendix IV constituents are detected at statistically significant levels above the GWPSs. GWPSs were established in accordance with §257.95(h), as detailed in the October 15, 2018 *Groundwater Protection Standards* technical memorandum, which was also included in the 2018 *Annual*

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<sup>1</sup> USEPA final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) published April 17, 2015, as amended per Phase One, Part One of the CCR Rule (83 FR 36435).

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*Groundwater Monitoring Report* (TRC, January 2019). The following narrative describes the methods employed and the results obtained and the Sanitas™ output files are included as an attachment.

The statistical evaluation of the first semiannual assessment monitoring event for 2019 data indicates that no new constituents are present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the JHC Pond A CCR unit. The results are consistent with the results of the previous assessment monitoring data statistical evaluations where arsenic at JHC-MW-15011 is the only constituent present at statistically significant levels. Consumers Energy will continue the assessment of corrective measures per §257.95(g). Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

### Assessment Monitoring Statistical Evaluation

The downgradient compliance well network at the JHC Pond A CCR Unit consists of six wells (JHC-MW-15006 through JHC-MW-15011) located south and east of Pond A. TRC was unable to collect a groundwater sample from JHC-MW-15008 due to dry conditions in the well at the time of the April 2019 sampling event.

Following the second semiannual assessment monitoring sampling event, compliance well data for JHC Pond A were evaluated in accordance with the Groundwater Statistical Evaluation Plan (Stats Plan) (TRC, October 2017). An assessment monitoring program was developed to evaluate concentrations of CCR constituents present in the uppermost aquifer relative to acceptable levels (i.e., GWPSs). To evaluate whether or not a new GWPS exceedance is statistically significant, the difference in concentration observed at the downgradient wells during a given assessment monitoring event compared to the GWPS, the change in concentration observed at the downgradient wells during a given assessment monitoring event must be large enough, after accounting for variability in the sample data, that the result is unlikely to have occurred merely by chance. Consistent with the Unified Guidance<sup>2</sup>, the preferred method for comparisons to a fixed standard are confidence limits. An exceedance of the standard occurs when the 99 percent lower confidence level of the downgradient data exceeds the GWPS. Based on the number of historical observations in the representative sample population, the population mean, the population standard deviation, and a selected confidence level (i.e., 99 percent), an upper and lower confidence limit is calculated. The true concentration, with 99 percent confidence, will fall between and lower and upper confidence limits.

For constituents at monitoring well locations that have no previously identified statistically significant GWPS exceedances, the concentrations observed in the downgradient wells are deemed to be a statistically significant exceedance when the 99 percent lower confidence limit of the downgradient

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<sup>2</sup> USEPA. 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*. Office of Conservation and Recovery. EPA 530/R-09-007.

## Technical Memorandum

data exceeds the GWPS<sup>3</sup>. If the confidence interval straddles the GWPS (i.e., the lower confidence level is below the GWPS but the upper confidence level is above), the statistical test result indicates that there is insufficient confidence that the measured concentrations are different from the GWPS and thus no compelling evidence that the measured concentration is a result of a release from the CCR unit versus the inherent variability of the sample data. This statistical approach is consistent with the statistical methods for assessment monitoring presented in §257.93(f) and (g). Statistical evaluation methodologies built into the CCR Rule, and numerous other federal rules, are key in determining whether or not individually measured data points represent a concentration increase over the baseline or a fixed standard (such as a GWPS in an assessment monitoring program).

For each detected Appendix IV constituent, the concentrations from each well were first compared directly to the GWPS, as shown on Table A1. Parameter-well combinations that included a direct exceedance of the GWPS within the past eight monitoring events (November 2016 to April 2019) were retained for further analysis. Arsenic in JHC-MW-15006 and JHC-MW-15011 and selenium in JHC-MW-15009 had individual results exceeding the GWPS.

Groundwater data were then evaluated utilizing Sanitas™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas™ statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated, as appropriate, for each of the CCR Appendix IV constituents using a 99 percent confidence level for each individual statistical test, i.e., a significance level ( $\alpha$ ) of 0.01. The following narrative describes the methods employed, the results obtained and the Sanitas™ output files are included as an attachment.

The statistical data evaluation included the following steps:

- Review of data quality checklists for the data sets;
- Graphical representation of the monitoring data as time versus concentration by well-constituent pair;
- Outlier testing of individual data points that appear from the graphical representations as potential outliers;
- Evaluation of visual trends apparent in the graphical representations for statistical significance;
- Evaluation of percentage of non-detects for each well-constituent pair;
- Distribution of the data; and
- Calculation of the confidence intervals for each cumulative dataset.

The results of these evaluations are presented and discussed below.

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<sup>3</sup> For pH, an exceedance occurs when the lower confidence level exceeds the upper GWPS or the upper confidence level is below the lower GWPS.

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Initially, the baseline (December 2015 through August 2017) results and the assessment monitoring results (April 2018 through April 2019) were observed visually for potential trends and outliers. No trends or outliers were identified, with the exception of a statistically significant downward trend for arsenic at JHC-MW-15006. However, the trend was not significant over the most recent eight data points and the most recent seven data points are below the GWPS; therefore, no adjustments to the statistical methods were necessary. Data from each round were evaluated for completeness, overall quality, and usability and were deemed appropriate for the purposes of the CCR assessment monitoring program. The Sanitas™ software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent eight sampling events. Eight independent sampling events provide the appropriate density of data as recommended per the Unified Guidance yet are collected recently enough to provide an indication of current condition. The tests were run with a per-well significance of  $\alpha = 0.01$ . The software outputs are included in Attachment 1 along with data reports showing the values used for the evaluation. The percentage of non-detect observations are also included in Attachment 1. Non-detect data was handled in accordance with the Stats Plan for the purposes of calculating the confidence intervals.

The Sanitas™ software generates an output that includes graphs of the parametric or non-parametric confidence intervals for each well along with notes on data transformations, as appropriate. The data sets were found to be normally distributed, with the exception of arsenic in JHC-MW-15006 and selenium in JHC-MW-15011, which were first transformed before running the statistical tests, as noted on the graphs. The confidence interval test compares the lower confidence limit to the GWPS. The statistical evaluation of the Appendix IV parameters shows that there are no new statistically significant exceedances.

Arsenic was identified at downgradient monitoring well JHC-MW-15011 at statistically significant levels exceeding the GWPS during the initial assessment monitoring event conducted in June 2018. The ongoing statistical evaluation of the arsenic at JHC-MW-15011 indicates that the lower confidence limit for arsenic at JHC-MW-15011 is equal to the GWPS (10 ug/L), which is a slight decrease from the lower confidence limit of 11 ug/L observed during the initial assessment monitoring event in June 2018. As shown in Table A1 and Attachment 1, arsenic concentrations at monitoring well JHC-MW-15011 are showing a general increase compared to previous events, introducing additional variability in the dataset. The variability in the dataset caused by the increasing concentrations results in widening the confidence interval. As a result, the lower confidence limit is lower and the upper confidence limit is higher compared to previous events. Given that the arsenic at JHC-MW-15011 has already been identified as being statistically significant and triggered corrective action, the result is consistent with the results of the previous assessment monitoring data statistical evaluations. Consumers Energy will continue to monitor changes in groundwater chemistry and the assessment of corrective measures per §257.95(g). Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

## Technical Memorandum

### Attachments

Table A1.	Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to April 2019
Attachment 1	Sanitas™ Output



# Technical Memorandum

## Table

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to April 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15006														
Sample Date:						12/4/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/25/2018	6/20/2018	6/20/2018	11/15/2018	4/24/2019	
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient														
<b>Appendix III</b>																				
Boron	ug/L	NC	NA	51	NA	419	302	212	143	175	142	158	151	119	--	144	147	203	240	
Calcium	mg/L	NC	NA	46	NA	29.5	28.6	51.7	34.2	39.5	41.1	35.7	40.0	32.8	--	38.5	38.6	26.8	41	
Chloride	mg/L	250*	NA	43	NA	16.8	22.2	21.8	17	16.9	22.7	22.3	18.4	17.7	--	17.2	17.2	24.8	21	
Fluoride	ug/L	4,000	NA	1,000	NA	< 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	
Sulfate	mg/L	250*	NA	14	NA	27.7	36.3	33.3	31.2	32.6	28.6	28.3	28.9	31.1	--	27.5	27.5	27	75	
Total Dissolved Solids	mg/L	500*	NA	258	NA	150	180	220	210	180	220	216	206	172	--	376	268	140	240	
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	7.8	7.4	7.7	7.4	7.5	7.6	7.4	7.5	7.4	8.0	7.4	--	7.8	7.6	
<b>Appendix IV</b>																				
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Arsenic	ug/L	10	NA	1	<b>10</b>	<b>14</b>	<b>12</b>	<b>14</b>	<b>12</b>	<b>14</b>	9	7.5	8.5	--	4.8	4.3	4.7	4.7	5.1	
Barium	ug/L	2,000	NA	35	2,000	173	118	206	174	157	195	166	220	--	158	141	146	144	230	
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Cadmium	ug/L	5	NA	0.2	5	< 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	NA	2	100	8	1	2	1	2	4	1.6	2.0	--	1.5	1.5	1.8	2.3	4.1	
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	
Fluoride	ug/L	4,000	NA	1,000	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	
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Lithium	ug/L	NC	40	10	40	10.1	< 10	10	16	14	< 10	13	16	--	13	12	12	13	< 10	
Mercury	ug/L	2	NA	0.2	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	100	5	100	8	11	7	9	7	6	7.2	5.9	--	< 5.0	5.4	5.5	12.2	10	
Radium-226	pCi/L	NC	NA	NA	NA	< 0.240	0.186	< 0.233	< 0.412	< 0.195	< 0.294	< 0.508	< 0.807	--	< 0.896	< 0.540	< 0.483	< 0.740	0.234	
Radium-228	pCi/L	NC	NA	NA	NA	< 0.539	< 0.618	0.589	1.52	< 0.374	0.853	< 0.783	< 0.881	--	< 0.779	< 0.963	< 0.944	< 0.588	< 0.343	
Radium-226/228	pCi/L	5	NA	1.93	5	< 0.539	0.691	0.694	1.58	< 0.374	1.00	< 1.29	< 1.69	--	< 1.68	< 1.50	< 1.43	< 1.33	0.488	
Selenium	ug/L	50	NA	5	<b>50</b>	< 1	1	4	< 1	2	< 1	3.4	< 1.0	--	1.3	< 1.0	< 1.0	< 1.0	< 1.0	
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.
- \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to April 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15007													
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018	11/15/2018	4/24/2019	
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient													
<b>Appendix III</b>																			
Boron	ug/L	NC	NA	51	NA	101	99	151	134	126	109	153	141	98	--	157	142	190	
Calcium	mg/L	NC	NA	46	NA	37.0	51.0	34.2	45.5	38.2	39.0	42.4	32.1	32.2	--	38.7	42.6	79	
Chloride	mg/L	250*	NA	43	NA	17.9	27.8	18.5	17.4	17.0	22.9	20.1	17.5	17.3	--	17.5	20.6	23	
Fluoride	ug/L	4,000	NA	1,000	NA	< 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	
Sulfate	mg/L	250*	NA	14	NA	34.8	35.8	30.8	32.2	31.7	29.7	29.1	31.6	32.3	--	26.2	19.2	54	
Total Dissolved Solids	mg/L	500*	NA	258	NA	190	240	200	200	190	220	202	170	188	--	298	166	360	
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	7.3	7.3	7.3	7.2	7.3	7.4	7.3	7.4	7.3	8.4 <sup>(1)</sup>	7.4	7.6	7.4	
<b>Appendix IV</b>																			
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	
Arsenic	ug/L	10	NA	1	<b>10</b>	3	3	3	4	4	3	3.2	4.0	--	3.3	2.9	4.0	4.0	
Barium	ug/L	2,000	NA	35	2,000	119	133	152	144	130	132	143	130	--	121	115	177	320	
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	
Cadmium	ug/L	5	NA	0.2	5	< 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	NA	2	100	8	3	2	2	2	3	1.2	1.1	--	< 1.0	1.2	31.3	35	
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0	< 6.0	
Fluoride	ug/L	4,000	NA	1,000	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	
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	
Lithium	ug/L	NC	40	10	40	15.7	11.4	14	21	17	11	14	16	--	11	15	16	12	
Mercury	ug/L	2	NA	0.2	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	100	5	100	6	6	8	8	7	8	6.1	6.1	--	< 5.0	< 5.0	7.6	7.2	
Radium-226	pCi/L	NC	NA	NA	NA	< 0.222	< 0.157	< 0.249	< 0.444	< 0.258	< 0.358	< 0.427	< 0.430	--	< 1.03	< 0.736	0.864	0.217	
Radium-228	pCi/L	NC	NA	NA	NA	< 0.522	0.662	< 0.558	< 0.753	0.439	1.22	< 1.15	< 0.904	--	< 1.02	< 1.12	< 0.688	0.392	
Radium-226/228	pCi/L	5	NA	1.93	5	< 0.522	0.8	< 0.558	< 0.753	0.637	1.43	< 1.58	< 1.33	--	< 2.05	< 1.86	1.40	0.609	
Selenium	ug/L	50	NA	5	<b>50</b>	2	2	< 1	< 1	2	< 1	2.2	1.1	--	< 1.0	1.3	< 1.0	4.1	
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.
- \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to April 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15008												
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018	11/15/2018 <sup>(2)</sup>	4/24/2019 <sup>(2)</sup>
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient												
<b>Appendix III</b>																		
Boron	ug/L	NC	NA	51	NA	146	95	111	195	181	97	128	153	116	--	87.7	--	--
Calcium	mg/L	NC	NA	46	NA	43.2	46.9	46.2	64	46.5	42.9	42.5	47.1	37.5	--	39	--	--
Chloride	mg/L	250*	NA	43	NA	19.3	25.8	58.4	37.0	45.5	25.3	24.0	22.3	16.6	--	20.4	--	--
Fluoride	ug/L	4,000	NA	1,000	NA	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	--	--
Sulfate	mg/L	250*	NA	14	NA	36.1	31	30.8	29.6	33.6	28	29.8	31.8	28.4	--	25.5	--	--
Total Dissolved Solids	mg/L	500*	NA	258	NA	220	230	300	300	260	230	260	340	190	--	210	--	--
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	6.8	6.9	6.9	7.0	6.8	7.2	7.1	7.1	7.1	7.9 <sup>(1)</sup>	7.2	--	--
<b>Appendix IV</b>																		
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	1.1	--	1.1	< 1.0	--	--
Arsenic	ug/L	10	NA	1	<b>10</b>	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	--	--
Barium	ug/L	2,000	NA	35	2,000	184	146	173	172	229	111	124	186	--	118	120	--	--
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	--	--
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	--	--
Chromium	ug/L	100	NA	2	100	2	2	2	3	2	7	7.8	5.4	--	1.3	1.5	--	--
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	--	--
Fluoride	ug/L	4,000	NA	1,000	4,000	< 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	15	1	15	< 1	< 1	< 1	< 1	2	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	--	--
Lithium	ug/L	NC	40	10	40	20.2	16.2	13	15	21	12	13	18	--	14	15	--	--
Mercury	ug/L	2	NA	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	--	--
Molybdenum	ug/L	NC	100	5	100	5	5	5	7	< 5	10	9.4	8.6	--	5.8	5.1	--	--
Radium-226	pCi/L	NC	NA	NA	NA	0.421	0.211	< 0.270	< 0.400	0.256	0.539	< 0.599	< 0.437	--	< 0.493	0.928	--	--
Radium-228	pCi/L	NC	NA	NA	NA	0.577	< 0.561	0.557	0.701	0.719	0.928	< 0.892	< 1.06	--	< 0.847	< 0.698	--	--
Radium-226/228	pCi/L	5	NA	1.93	5	0.998	< 0.561	0.677	1.04	0.975	1.47	< 1.49	< 1.50	--	< 1.34	1.56	--	--
Selenium	ug/L	50	NA	5	<b>50</b>	6	4	6	3	8	2	2.3	2.4	--	1.7	2.0	--	--
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	--	--

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.
- \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to April 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15009																	
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	4/26/2018	6/20/2018	11/15/2018	11/15/2018	4/24/2019	4/24/2019		
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient																	
<b>Appendix III</b>																							
Boron	ug/L	NC	NA	51	NA	127	97	117	204	174	86	126	156	144	--	Field Dup	91.4	188	Field Dup	200	190		
Calcium	mg/L	NC	NA	46	NA	52.6	50.8	43.7	61.0	45.2	43.3	40.1	41.2	34.3	--	--	41.2	46.2	46.4	92	89		
Chloride	mg/L	250*	NA	43	NA	17.0	22.5	26.2	16.9	15.7	23.7	23.8	20.1	17.7	--	--	22.9	17.7	17.7	17	16		
Fluoride	ug/L	4,000	NA	1,000	NA	< 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		
Sulfate	mg/L	250*	NA	14	NA	33.1	33.3	38.2	29.5	32.7	27.5	28.6	31.6	32.7	--	--	18.2	26.9	27.1	130	130		
Total Dissolved Solids	mg/L	500*	NA	258	NA	240	220	260	240	220	230	188	208	178	--	--	214	234	202	430	440		
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	7.3	7.2	7.3	7.3	7.0	7.4	7.4	7.5	7.4	8.4 <sup>(1)</sup>	--	7.7	7.6	--	7.4	--		
<b>Appendix IV</b>																							
Antimony	ug/L	6	NA	2	6	1	< 1	< 1	< 1	< 1	< 1	1.1	< 1.0	--	< 1.0	< 1.0	< 1.0	1.2	< 1.0	< 1.0	< 1.0		
Arsenic	ug/L	10	NA	1	<b>10</b>	< 1	1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
Barium	ug/L	2,000	NA	35	2,000	236	151	162	169	202	150	132	198	--	130	125	130	178	181	360	360		
Beryllium	ug/L	4	NA	1	4	< 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		
Cadmium	ug/L	5	NA	0.2	5	< 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		
Chromium	ug/L	100	NA	2	100	5	4	2	2	3	6	5	6.6	--	1.3	1.3	< 1.0	14.1	11.8	17	14		
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	< 6.0	< 6.0		
Fluoride	ug/L	4,000	NA	1,000	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		
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
Lithium	ug/L	NC	40	10	40	15.4	10.6	< 10	11	16	< 10	11	11	--	< 10	< 10	< 10	14	14	11	11		
Mercury	ug/L	2	NA	0.2	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		
Molybdenum	ug/L	NC	100	5	100	6	6	8	6	5	6	22.3	7.4	--	5.5	5.5	< 5.0	6.1	6.1	5.7	5.6		
Radium-226	pCi/L	NC	NA	NA	NA	0.405	< 0.217	< 0.272	< 0.395	< 0.248	< 0.333	0.553	< 0.455	--	< 0.169	< 0.709	< 0.631	< 0.896	< 0.705	0.351	0.289		
Radium-228	pCi/L	NC	NA	NA	NA	0.770	0.647	0.827	< 0.800	1.11	0.627	< 1.08	1.04	--	< 1.26	< 1.14	< 0.634	0.800	< 0.663	0.674	0.509		
Radium-226/228	pCi/L	5	NA	1.93	5	1.18	0.811	0.987	< 0.8	1.28	0.877	< 1.23	< 1.40	--	< 1.43	< 1.85	< 1.27	< 1.47	< 1.37	1.02	0.798		
Selenium	ug/L	50	NA	5	<b>50</b>	7	20	< 1	1	9	1	4.7	< 1.0	--	< 1.0	1.0	10.3	12.6	12.6	<b>61</b>	<b>63</b>		
Thallium	ug/L	2	NA	2	<b>2</b>	<b>2.19</b>	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		

**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.  
 \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.  
 (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to April 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15010													
Sample Date:						12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/16/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018	11/14/2018	4/23/2019	
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient													
<b>Appendix III</b>																			
Boron	ug/L	NC	NA	51	NA	101	83	131	146	121	77	127	164	109	--	98.4	120	2,800	
Calcium	mg/L	NC	NA	46	NA	41.7	48.1	49.5	41.2	35.6	41.4	36.1	39.4	33.0	--	40.9	59.6	58	
Chloride	mg/L	250*	NA	43	NA	17.1	25.4	21.4	18.0	16.1	26.1	23.1	19.1	17.8	--	22.2	7.9	2.0	
Fluoride	ug/L	4,000	NA	1,000	NA	< 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	
Sulfate	mg/L	250*	NA	14	NA	46.9	36.2	76.4	32.0	32.4	31.1	29.7	37.0	32.6	--	39.9	33.3	24	
Total Dissolved Solids	mg/L	500*	NA	258	NA	190	220	280	220	160	220	236	338	220	--	294	262	270	
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	6.9	6.8	6.6	6.8	6.8	7.1	7.1	7.3	7.2	8.0 <sup>(1)</sup>	7.3	7.5	6.6	
<b>Appendix IV</b>																			
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	1	1	1	1.4	1.5	--	< 1.0	< 1.0	< 1.0	< 1.0	
Arsenic	ug/L	10	NA	1	<b>10</b>	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	
Barium	ug/L	2,000	NA	35	2,000	149	149	129	146	135	132	160	179	--	137	122	211	250	
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	
Cadmium	ug/L	5	NA	0.2	5	< 0.2	< 0.2	0.4	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20	< 0.20	
Chromium	ug/L	100	NA	2	100	5	2	1	1	2	3	< 1.0	< 1.0	--	1.4	1.1	1.5	1.2	
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0	< 6.0	
Fluoride	ug/L	4,000	NA	1,000	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	
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	
Lithium	ug/L	NC	40	10	40	17.5	14.2	27	22	20	< 10	11	12	--	10	< 10	12	13	
Mercury	ug/L	2	NA	0.2	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	100	5	100	8	5	10	15	29	21	36.8	13.2	--	11.0	7.6	5.0	< 5.0	
Radium-226	pCi/L	NC	NA	NA	NA	0.368	< 0.220	< 0.259	< 0.352	0.284	< 0.398	< 0.892	0.745	--	0.505	< 0.489	< 0.858	0.198	
Radium-228	pCi/L	NC	NA	NA	NA	0.544	< 0.440	0.460	0.933	0.625	0.819	1.10	< 0.808	--	< 1.03	< 0.655	0.814	< 0.326	
Radium-226/228	pCi/L	5	NA	1.93	5	0.912	< 0.44	0.711	1.04	0.909	0.918	< 1.95	1.36	--	< 1.20	< 1.14	< 1.43	0.515	
Selenium	ug/L	50	NA	5	<b>50</b>	3	4	14	< 1	< 1	2	7.7	< 1.0	--	3.0	11.0	34.1	32	
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.
- \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to April 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:						JHC-MW-15011																	
Sample Date:						12/4/2015	3/10/2016	6/22/2016	8/30/2016	11/16/2016	4/19/2017	6/21/2017	6/21/2017	8/15/2017	8/15/2017	9/26/2017	9/26/2017	4/25/2018	6/19/2018	11/15/2018	4/23/2019		
Constituent	Unit	EPA MCL	EPA RSL	UTL	GWPS	downgradient																	
<b>Appendix III</b>																							
Boron	ug/L	NC	NA	51	NA	345	280	286	419	457	110	179	Field Dup	288	Field Dup	249	Field Dup	219	--	229	337	440	
Calcium	mg/L	NC	NA	46	NA	25.0	35.4	41.6	38.2	25.4	48.2	32.7	31.4	32.9	32.9	31.7	33.6	--	30.3	29.1	43		
Chloride	mg/L	250*	NA	43	NA	16.6	21.6	23.4	16.9	16.8	24.7	24.8	24.8	19.6	19.6	17.7	17.7	--	23.0	21.0	18		
Fluoride	ug/L	4,000	NA	1,000	NA	< 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		
Sulfate	mg/L	250*	NA	14	NA	23.2	37.7	29.4	6.1	12.3	35.1	24.3	24.3	15.7	15.9	17.6	17.5	--	26.1	29.2	86		
Total Dissolved Solids	mg/L	500*	NA	258	NA	100	170	200	170	140	240	144	174	188	174	230	154	--	180	150	280		
pH, Field	SU	6.5 - 8.5*	NA	4.8 - 9.2	NA	7.6	7.7	7.7	7.4	7.4	7.9	7.5	--	7.6	--	7.5	--	8.5	8.1	9.1	8.8		
<b>Appendix IV</b>																							
Antimony	ug/L	6	NA	2	6	< 1	< 1	< 1	< 1	< 1	1	2.5	3.1	1.1	1.2	--	--	< 1.0	< 1.0	< 1.0	< 1.0		
Arsenic	ug/L	10	NA	1	<b>10</b>	<b>15</b>	<b>12</b>	<b>12</b>	<b>19</b>	<b>23</b>	<b>11</b>	<b>10.6</b>	<b>10.9</b>	<b>18.2</b>	<b>17.5</b>	--	--	<b>16.8</b>	<b>15.0</b>	<b>32.2</b>	<b>36</b>		
Barium	ug/L	2,000	NA	35	2,000	163	147	175	181	142	161	152	145	171	161	--	--	116	123	98.6	170		
Beryllium	ug/L	4	NA	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	< 1.0		
Cadmium	ug/L	5	NA	0.2	5	< 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		
Chromium	ug/L	100	NA	2	100	3	1	< 1	< 1	1	4	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	9.0		
Cobalt	ug/L	NC	6	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	< 15.0	< 15.0	--	--	< 15.0	< 15.0	< 6.0	< 6.0		
Fluoride	ug/L	4,000	NA	1,000	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		
Lead	ug/L	NC	15	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.2	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	< 1.0		
Lithium	ug/L	NC	40	10	40	17.3	12.1	10	19	18	< 10	12	11	11	13	--	--	14	11	10	< 10		
Mercury	ug/L	2	NA	0.2	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		
Molybdenum	ug/L	NC	100	5	100	12	8	10	14	16	13	11.7	11.8	13.0	13.0	--	--	8.2	8.2	9.3	21		
Radium-226	pCi/L	NC	NA	NA	NA	< 0.342	< 0.225	0.305	< 0.456	< 0.209	< 0.424	0.263	< 0.755	0.291	< 0.707	--	--	< 0.702	< 0.463	< 0.512	0.0720		
Radium-228	pCi/L	NC	NA	NA	NA	0.617	0.705	0.613	0.907	< 0.551	0.548	< 0.590	< 0.505	< 0.951	1.02	--	--	< 0.568	0.931	< 0.519	< 0.343		
Radium-226/228	pCi/L	5	NA	1.93	5	0.662	0.77	0.918	0.95	< 0.551	0.584	< 0.733	< 1.26	< 1.11	1.61	--	--	< 1.27	< 1.34	< 1.03	< 0.343		
Selenium	ug/L	50	NA	5	<b>50</b>	< 1	< 1	< 1	< 1	< 1	12	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	1.6	< 1.0	13		
Thallium	ug/L	2	NA	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	< 2.0	< 2.0	--	--	< 2.0	< 2.0	< 2.0	< 2.0		

**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018.  
 \* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.  
 (2) Not sampled; insufficient amount of groundwater present to collect sample.

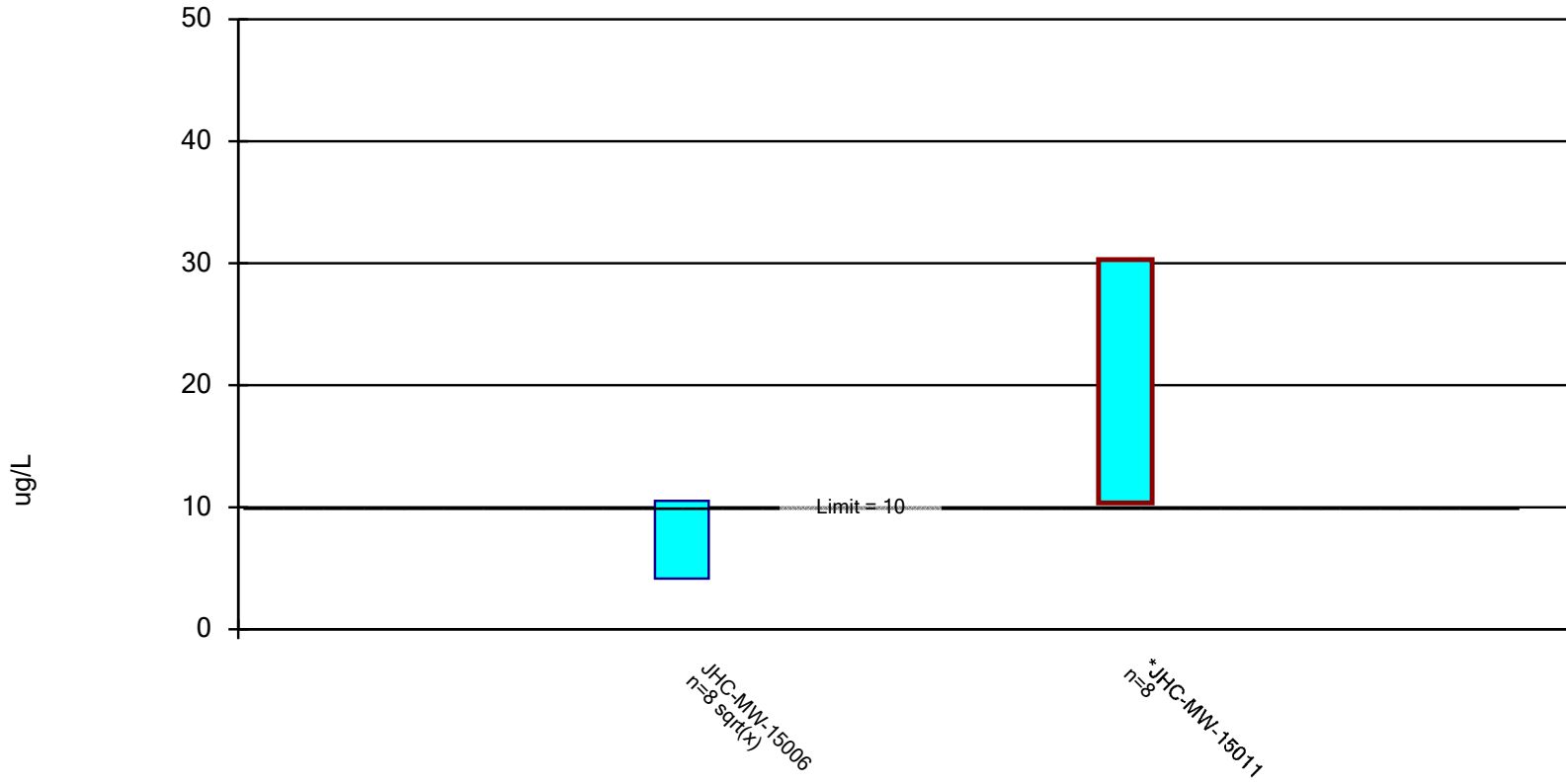
## **Technical Memorandum**

# **Attachment 1 Sanitas™ Output**



### Parametric Confidence Interval

Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Using the number of significant figures consistent with the GWPS, the lower confidence limit is equal to the GWPS; therefore the limit is not exceeded

Constituent: Arsenic, Total Analysis Run 6/10/2019 10:34 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.06.03

# Confidence Interval

Constituent: Arsenic, Total (ug/L) Analysis Run 6/10/2019 10:35 AM

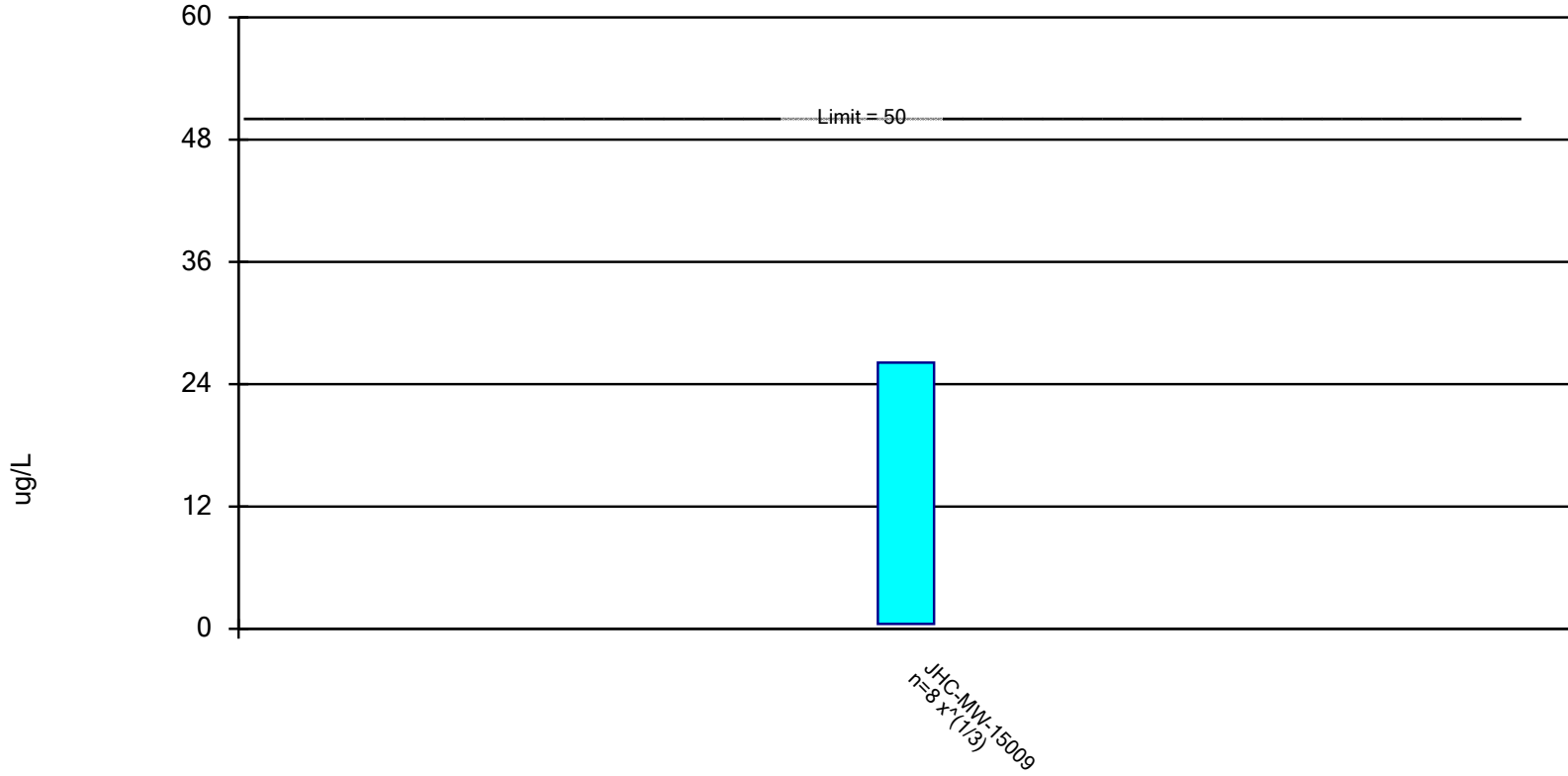
Client: Consumers Energy Data: JHC\_Sanitas\_19.06.03

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	JHC-MW-15006	JHC-MW-15011
11/15/2016	14	
11/16/2016		23
4/18/2017	9	
4/19/2017		11
6/21/2017	7.5	10.75 (D)
8/15/2017	8.5	17.85 (D)
4/25/2018	4.8	16.8
6/19/2018		15
6/20/2018	4.5 (D)	
11/15/2018	4.7	32.2
4/23/2019		36
4/24/2019	5.1	
<b>Mean</b>	7.263	20.33
<b>Std. Dev.</b>	3.272	9.407
<b>Upper Lim.</b>	10.53	30.3
<b>Lower Lim.</b>	4.155	10.35

### Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, Total Analysis Run 6/10/2019 10:34 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.06.03

# Confidence Interval

Constituent: Selenium, Total (ug/L) Analysis Run 6/10/2019 10:35 AM

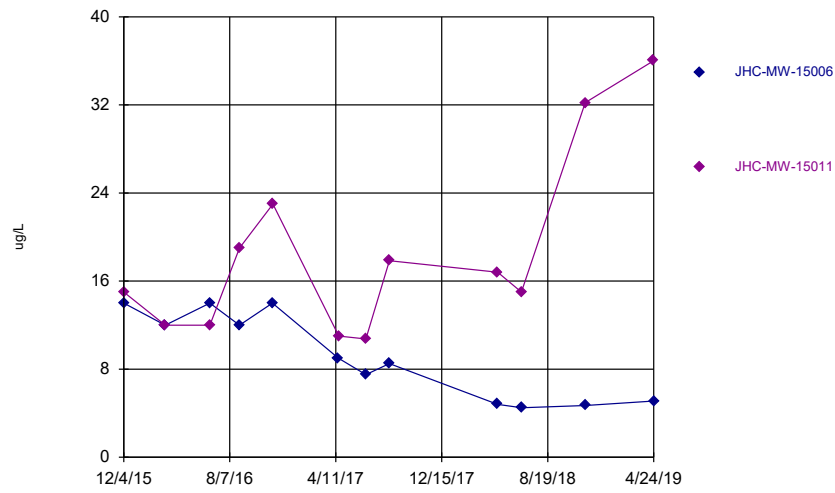
Client: Consumers Energy Data: JHC\_Sanitas\_19.06.03

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JHC-MW-15009

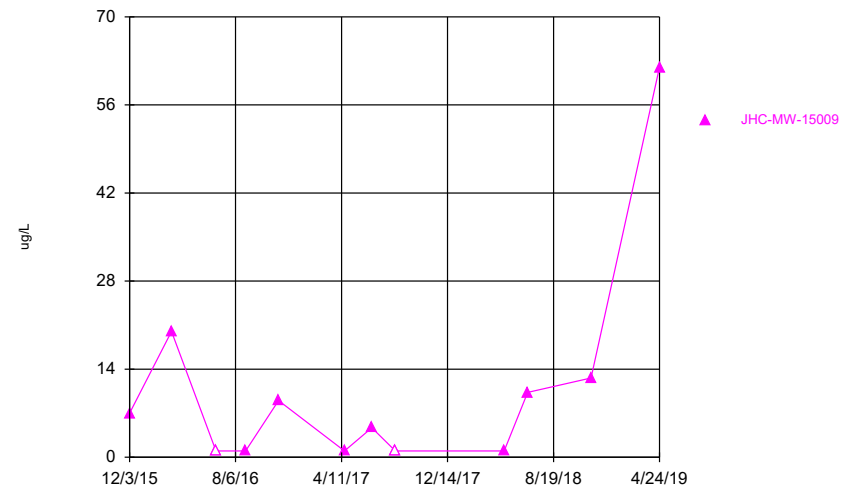
11/15/2016	9
4/18/2017	1
6/21/2017	4.7
8/15/2017	<1
4/26/2018	1 (D)
6/20/2018	10.3
11/15/2018	12.6 (D)
4/24/2019	62 (D)
<b>Mean</b>	12.64
<b>Std. Dev.</b>	20.48
<b>Upper Lim.</b>	26.12
<b>Lower Lim.</b>	0.4842

### Arsenic, Total



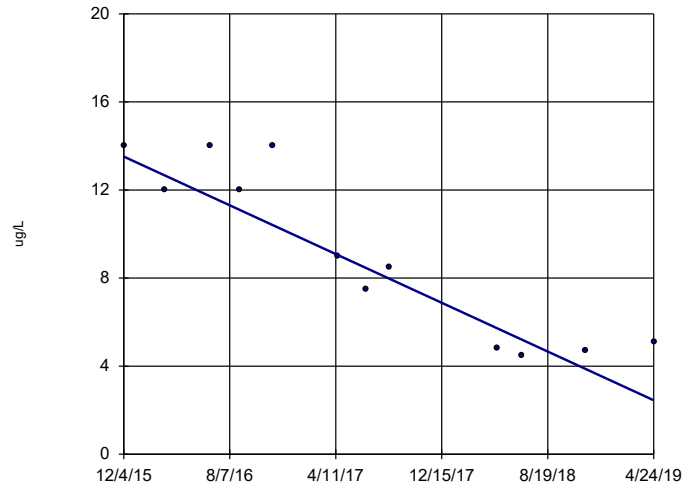
Time Series Analysis Run 6/10/2019 10:28 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.06.03

### Selenium, Total



Time Series Analysis Run 6/10/2019 10:28 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.06.03

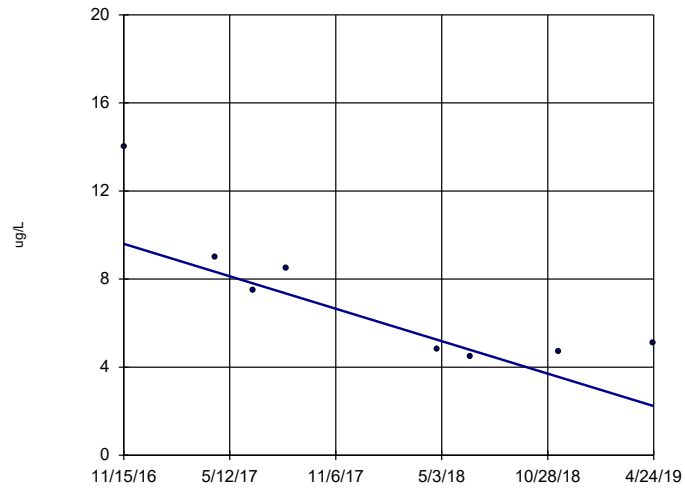
Arsenic, Total  
JHC-MW-15006



n = 12  
Slope = -3.264  
units per year.  
Mann-Kendall  
statistic = -46  
critical = -35  
Decreasing trend  
significant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

Sen's Slope Estimator Analysis Run 6/10/2019 10:29 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.06.03

### Arsenic, Total JHC-MW-15006



n = 8  
Slope = -3.022  
units per year.  
Mann-Kendall  
statistic = -18  
critical = -20  
Trend not sig-  
nificant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

Sen's Slope Estimator Analysis Run 8/7/2019 4:14 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.06.03 - Copy

# Appendix F October 2019 Assessment Monitoring Statistical Evaluation

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## Technical Memorandum

**Date:** January 10, 2020

**To:** Bethany Swanberg, Consumers Energy

**cc:** Brad Runkel, Consumers Energy  
JR Register, Consumers Energy

**From:** Darby Litz, TRC  
Sarah Holmstrom, TRC  
Kristin Lowery, TRC

**Project No.:** 322174.0000.0000 Phase 1 Task 3

**Subject:** Statistical Evaluation of October 2019 Assessment Monitoring Sampling Event, JH Campbell Pond A CCR Unit, Consumers Energy Company, West Olive, Michigan

During the statistical evaluation of the initial assessment monitoring event at the JH Campbell Power Plant Pond A bottom ash pond (JHC Pond A), arsenic was present in one downgradient monitoring well at statistically significant levels exceeding the Groundwater Protection Standard (GWPS). Therefore, Consumers Energy Company (Consumers Energy) initiated an Assessment of Corrective Measures (ACM) within 90 days from when the Appendix IV exceedance was determined.

<u>Constituent</u>	<u>GWPS</u>	<u># Downgradient Wells Observed</u>
Arsenic	10 ug/L	1 of 6

On December 28, 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The December 2018 amendments to Part 115 were developed to provide the State of Michigan oversight of CCR impoundments and landfills and to better align existing state solid waste management rules and statutes with the CCR Rule. On March 18, 2019, Consumers Energy submitted the *Pond A Hydrogeological Monitoring Plan, JH Campbell Power Plant, West Olive, Michigan* (Pond A HMP) (TRC, March 2019; Revised July 2019), which includes the *Pond A Assessment Monitoring Plan* (Pond A AMP), to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to comply with the requirements of Part 115, Rule 299.4905 and the December 21, 2018 Consent Agreement No. 115-01-2018. The Pond A HMP and AMP were approved by EGLE on August 13, 2019 and were implemented during the fourth quarter

## Technical Memorandum

of 2019. The ACM was initiated on April 15, 2019 and was certified and submitted to EGLE on September 11, 2019.

Currently, Consumers Energy is continuing semiannual assessment monitoring at Pond A in accordance with §257.95 of the CCR Rule<sup>1</sup> and in accordance with the Pond A HMP and. The second semiannual assessment monitoring event for 2019 (fourth quarter 2019 event under the Pond A HMP/AMP) was conducted on October 7 through October 11, 2019, 2019. In accordance with §257.95 and the Pond A AMP, the assessment monitoring data must be compared to GWPSs to determine whether or not Appendix III and Appendix IV constituents are detected at statistically significant levels above the GWPSs. Appendix IV GWPSs were established in accordance with §257.95(h), as detailed in the October 15, 2018 *Groundwater Protection Standards* technical memorandum, which was also included in the 2018 *Annual Groundwater Monitoring Report* (TRC, January 2019) and Appendix III GWPSs were established in accordance with §257.95(h) and the HMP, as detailed in the December 23, 2019 *Groundwater Protection Standards – Consumers Energy, JH Campbell Site, Pond A CCR Unit* memorandum, which will be included in the 2019 *Annual Groundwater Monitoring Report*. The following narrative describes the methods employed and the results obtained and the Sanitas™ output files are included as an attachment.

The statistical evaluation of the second semiannual assessment monitoring event for 2019 data indicates that no new constituents are present at statistically significant levels exceeding the GWPS in downgradient monitoring wells at the JHC Pond A CCR unit. The results are consistent with the results of the previous assessment monitoring data statistical evaluations where arsenic at JHC-MW-15011 is the only constituent present at statistically significant levels. Consumers Energy will continue the assessment of corrective measures per §257.95(g). Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

### Assessment Monitoring Statistical Evaluation

The downgradient compliance well network at the JHC Pond A CCR Unit consists of six wells (JHC-MW-15006 through JHC-MW-15011) located south and east of Pond A. TRC was unable to collect a groundwater sample from JHC-MW-15007 and JHC-MW-15009 due to dry conditions in the well at the time of the October 2019 sampling event.

The water table in the area of Pond A has continued to drop as groundwater equilibrates following cessation of hydraulic loading and placement of the cover at Pond A. As a result, the water table had dropped below the well screen at JHC-MW-15008 such that the monitoring well could no longer be used to collect groundwater samples. Monitoring well JHC-MW-15008 was decommissioned in June

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<sup>1</sup> USEPA final rule for the regulation and management of Coal Combustion Residuals (CCR) under the Resource Conservation and Recovery Act (RCRA) published April 17, 2015, as amended per Phase One, Part One of the CCR Rule (83 FR 36435).

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2019 and replaced with JHC-MW-15008R. The replacement well was installed at a location adjacent to and side-gradient from the original well location and screened at a lower depth (across the water table) in order to monitor groundwater quality downgradient from Pond A. Monitoring well JHC-MW-15008R replaces JHC-MW-15008 in Pond A assessment monitoring program and data from the replacement well will be combined with the existing well for statistical evaluation.

Following the second semiannual assessment monitoring sampling event, compliance well data for JHC Pond A were evaluated in accordance with the Groundwater Statistical Evaluation Plan (Stats Plan) (TRC, October 2017) and the Pond A HMP and AMP. An assessment monitoring program was developed to evaluate concentrations of CCR constituents present in the uppermost aquifer relative to acceptable levels (i.e., GWPSs). To evaluate whether or not a new GWPS exceedance is statistically significant, the difference in concentration observed at the downgradient wells during a given assessment monitoring event compared to the GWPS must be large enough, after accounting for variability in the sample data, that the result is unlikely to have occurred merely by chance. Consistent with the Unified Guidance<sup>2</sup>, the preferred method for comparisons to a fixed standard are confidence limits. An exceedance of the standard occurs when the 99 percent lower confidence level of the downgradient data exceeds the GWPS. Based on the number of historical observations in the representative sample population, the population mean, the population standard deviation, and a selected confidence level (i.e., 99 percent), an upper and lower confidence limit is calculated. The true concentration, with 99 percent confidence, will fall between and lower and upper confidence limits.

For constituents at monitoring wells that have no previously identified statistically significant GWPS exceedances, the concentrations observed in the downgradient wells are deemed to be a statistically significant exceedance when the 99 percent lower confidence limit of the downgradient data exceeds the GWPS<sup>3</sup>. If the confidence interval straddles the GWPS (i.e., the lower confidence level is below the GWPS but the upper confidence level is above), the statistical test result indicates that there is insufficient confidence that the measured concentrations are different from the GWPS and thus no compelling evidence that the measured concentration is a result of a release from the CCR unit versus the inherent variability of the sample data. This statistical approach is consistent with the statistical methods for assessment monitoring presented in §257.93(f) and (g). Statistical evaluation methodologies built into the CCR Rule, and numerous other federal rules, are key in determining whether or not individually measured data points represent a concentration increase over the baseline or a fixed standard (such as a GWPS in an assessment monitoring program).

For each detected Appendix III and Appendix IV constituent, the concentrations from each well were first compared directly to the GWPS, as shown on Table A1. Parameter-well combinations that included a direct exceedance of the GWPS within the past eight monitoring events (April 2017 to October 2019 for JHC-MW-15006, JHC-MW-15010, and JHC-MW-15011 and November 2016 to October

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<sup>2</sup> USEPA. 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*. Office of Conservation and Recovery. EPA 530/R-09-007.

<sup>3</sup> For pH, an exceedance occurs when the lower confidence level exceeds the upper GWPS or the upper confidence level is below the lower GWPS.

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2019 for JHC-MW-15007, JHC-MW-15008/R, and JHC-MW-15009) were retained for further analysis. Boron in JHC-MW-15010 and JHC-MW-15011, total dissolved solids (TDS) in JHC-MW-15011, pH in JHC-MW-15011, arsenic in JHC-MW-15011, chromium in JHC-MW-15010, and selenium in JHC-MW-15008R, JHC-MW-15009, JHC-MW-15010, and JHC-MW-15011 had individual results exceeding the GWPSs. As noted previously, JHC-MW-15009 was dry during the second semiannual assessment monitoring event for 2019. However, statistical evaluation was repeated for that well using the most recent 8 analytical results for selenium.

Groundwater data were then evaluated utilizing Sanitas™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in the Unified Guidance. Within the Sanitas™ statistical program, confidence limits were selected to perform the statistical comparison of compliance data to a fixed standard. Parametric and non-parametric confidence intervals were calculated, as appropriate, for each of the CCR Appendix III or Appendix IV constituents using a 99 percent confidence level for each individual statistical test, i.e., a significance level ( $\alpha$ ) of 0.01. The following narrative describes the methods employed, the results obtained and the Sanitas™ output files are included as an attachment.

The statistical data evaluation included the following steps:

- Review of data quality checklists for the data sets;
- Graphical representation of the monitoring data as time versus concentration by well-constituent pair;
- Outlier testing of individual data points that appear from the graphical representations as potential outliers;
- Evaluation of visual trends apparent in the graphical representations for statistical significance;
- Evaluation of percentage of non-detects for each well-constituent pair;
- Distribution of the data; and
- Calculation of the confidence intervals for each cumulative dataset.

The results of these evaluations are presented and discussed below.

Initially, the baseline (December 2015 through August 2017) results and the assessment monitoring results (April 2018 through October 2019) were observed visually for potential trends and outliers. . Potential increasing trends were noted for boron and arsenic in JHC-MW-15011, and selenium in JHC-MW-15010 and JHC-MW-15011. Groundwater conditions are re-equilibrating following capping activities at JHC Pond A completed in Summer 2019. Because hydrogeologic conditions are in the process of stabilizing, in order to be conservative, the suspect data have been kept in the assessment monitoring data set pending the collection of additional data. The suspect data will be tested for outliers once stabilized groundwater characteristics have been assessed.

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Data from each round were evaluated for completeness, overall quality, and usability and were deemed appropriate for the purposes of the CCR assessment monitoring program. The Sanitas™ software was then used to test compliance at the downgradient monitoring wells using the confidence interval method for the most recent eight sampling events. Eight independent sampling events provide an appropriate density of data as recommended per the Unified Guidance yet are collected recently enough to provide an indication of current condition. The tests were run with a per-well significance of  $\alpha = 0.01$ . The software outputs are included in Attachment 1 along with data reports showing the values used for the evaluation. The percentage of non-detect observations are also included in Attachment 1. Non-detect data were handled in accordance with the Stats Plan for the purposes of calculating the confidence intervals.

The Sanitas™ software generates an output that includes graphs of the parametric or non-parametric confidence intervals for each well along with notes on data transformations, as appropriate. The data set for arsenic in JHC MW-15011 was found to be normally distributed. The data sets for selenium in JHC-MW-15009 and JHC-MW-15010 were normalized by a natural log transformation and a one-third power transformation, respectively. The data sets for boron in JHC-MW-15010, TDS in JHC-MW-15011, chromium in JHC-MW-15010, and selenium in JHC-MW-15008/8R and JHC-MW-15011 were non-normal and non-parametric tests were used. The confidence interval test compares the lower confidence limit to the GWPS. The statistical evaluation of the Appendix III and Appendix IV parameters shows no new statistically significant exceedances of the GWPSs.

Arsenic was identified at downgradient monitoring well JHC-MW-15011 at statistically significant levels exceeding the GWPS during the initial assessment monitoring event conducted in June 2018. The ongoing statistical evaluation of the arsenic at JHC-MW-15011 indicates that the lower confidence limit for arsenic at JHC-MW-15011 is equal to the GWPS (10 ug/L), which is a slight decrease from the lower confidence limit of 11 ug/L observed during the initial assessment monitoring event in June 2018. As shown in Table A1 and Attachment 1, arsenic concentrations at monitoring well JHC-MW-15011 are showing a general increase compared to previous events. Although the increasing concentrations do not show a statistically significant increasing trend, the variability in the dataset caused by the increasing concentrations results in widening the confidence interval. As a result, the lower confidence limit is lower and the upper confidence limit is higher compared to previous events. Given that the arsenic at JHC-MW-15011 has already been identified as being statistically significant and triggered corrective action, the result is consistent with the results of the previous assessment monitoring data statistical evaluations. Consumers Energy will continue to monitor changes in groundwater chemistry and the assessment of corrective measures per §257.95(g). Consumers Energy will continue executing the self-implementing groundwater compliance schedule in conformance with §257.90 - §257.98.

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### Attachments

Table A1.	Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to October 2019
Attachment 1	Sanitas™ Output

# Technical Memorandum

## Table

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to October 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:									<b>JHC-MW-15006</b>																			
Sample Date:									12/4/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/25/2018	6/20/2018	6/20/2018	11/15/2018	4/24/2019	10/10/2019					
Constituent	Unit	EPA MCL	EPA RSL	MI Residential*	MI Non-Residential*	MI GSI^	UTL	GWPS	downgradient																			
<b>Appendix III</b>																												
Boron	ug/L	NC	NA	500	500	7,200	54	<b>500</b>	419	302	212	143	175	142	158	151	119	--	144	147	203	240	230					
Calcium	mg/L	NC	NA	NC	NC	500	40	500	29.5	28.6	51.7	34.2	39.5	41.1	35.7	40.0	32.8	--	38.5	38.6	26.8	41	35					
Chloride	mg/L	250**	NA	250	250	500	70	250	16.8	22.2	21.8	17	16.9	22.7	22.3	18.4	17.7	--	17.2	17.2	24.8	21	22					
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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					
Sulfate	mg/L	250**	NA	250	250	500	13	250	27.7	36.3	33.3	31.2	32.6	28.6	28.3	28.9	31.1	--	27.5	27.5	27	75	55					
Total Dissolved Solids	mg/L	500**	NA	500	500	500	240	<b>500</b>	150	180	220	210	180	220	216	206	172	--	376	268	140	240	190					
pH, Field	SU	6.5 - 8.5**	NA	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	5.5 - 8.8	<b>5.5 - 8.8</b>	7.8	7.4	7.7	7.4	7.5	7.6	7.4	7.5	7.4	8.0	7.4	--	7.8	7.6	7.8					
<b>Appendix IV</b>																												
Antimony	ug/L	6	NA	6.0	6.0	130	2	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
Arsenic	ug/L	10	NA	10	10	10	1	<b>10</b>	<b>14</b>	<b>12</b>	<b>14</b>	<b>12</b>	<b>14</b>	9	7.5	8.5	--	4.8	4.3	4.7	4.7	5.1	4.3					
Barium	ug/L	2,000	NA	2,000	2,000	820	35	2,000	173	118	206	174	157	195	166	220	--	158	141	146	144	230	180					
Beryllium	ug/L	4	NA	4.0	4.0	18	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
Cadmium	ug/L	5	NA	5.0	5.0	3.5	0.2	5	< 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					
Chromium	ug/L	100	NA	100	100	11	2	<b>100</b>	8	1	2	1	2	4	1.6	2.0	--	1.5	1.5	1.8	2.3	4.1	< 1.0					
Cobalt	ug/L	NC	6	40	100	100	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0					
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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					
Lead	ug/L	NC	15	4.0	4.0	39	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
Lithium	ug/L	NC	40	170	350	0.20#	10	40	10.1	< 10	10	16	14	< 10	13	16	--	13	12	12	13	< 10	< 10					
Mercury	ug/L	2	NA	2.0	2.0	0.2	0.2	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					
Molybdenum	ug/L	NC	100	73	210	3,200	5	100	8	11	7	9	7	6	7.2	5.9	--	< 5.0	5.4	5.5	12.2	10	9.1					
Radium-226	pCi/L	NC	NA	NC	NC	NC	NA	NA	< 0.240	0.186	< 0.233	< 0.412	< 0.195	< 0.294	< 0.508	< 0.807	--	< 0.896	< 0.540	< 0.483	< 0.740	0.234	0.310					
Radium-228	pCi/L	NC	NA	NC	NC	NC	NA	NA	< 0.539	< 0.618	0.589	1.52	< 0.374	0.853	< 0.783	< 0.881	--	< 0.779	< 0.963	< 0.944	< 0.588	< 0.343	< 0.524					
Radium-226/228	pCi/L	5	NA	NC	NC	NC	1.93	5	< 0.539	0.691	0.694	1.58	< 0.374	1.00	< 1.29	< 1.69	--	< 1.68	< 1.50	< 1.43	< 1.33	0.488	< 0.524					
Selenium	ug/L	50	NA	50	50	5.0	5	<b>50</b>	< 1	1	4	< 1	2	< 1	3.4	< 1.0	--	1.3	< 1.0	< 1.0	< 1.0	< 1.0	1.3					
Thallium	ug/L	2	NA	2.0	2.0	3.7	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0					

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018. Appendix III GWPS is the most restrictive of the MCL/Part 201 criteria, or the UTL if the UTL exceeds the applicable criteria as established in TRC's Technical Memorandum dated December 23, 2019.
- \* - 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 site-specific hardness of 180 mg CaCO<sub>3</sub>/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE policy and procedure 09-014 dated June 20, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.
- (3) JHC-MW-15008 was decommissioned on June 24, 2019. Replacement well JHC-MW-15008R was installed on June 25, 2019.



**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to October 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:									JHC-MW-15007													
Sample Date:									12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018	11/15/2018	4/24/2019	10/9/2019 <sup>(2)</sup>
Constituent	Unit	EPA MCL	EPA RSL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	UTL	GWPS	downgradient													
<b>Appendix III</b>																						
Boron	ug/L	NC	NA	500	500	7,200	54	<b>500</b>	101	99	151	134	126	109	153	141	98	--	157	142	190	--
Calcium	mg/L	NC	NA	NC	NC	500	40	500	37.0	51.0	34.2	45.5	38.2	39.0	42.4	32.1	32.2	--	38.7	42.6	79	--
Chloride	mg/L	250**	NA	250	250	500	70	250	17.9	27.8	18.5	17.4	22.9	20.1	17.5	17.3	--	--	17.5	20.6	23	--
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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	--
Sulfate	mg/L	250**	NA	250	250	500	13	250	34.8	35.8	30.8	32.2	31.7	29.7	29.1	31.6	32.3	--	26.2	19.2	54	--
Total Dissolved Solids	mg/L	500**	NA	500	500	500	240	<b>500</b>	190	240	200	200	190	220	202	170	188	--	298	166	360	--
pH, Field	SU	6.5 - 8.5**	NA	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	5.5 - 8.8	<b>5.5 - 8.8</b>	7.3	7.3	7.3	7.2	7.3	7.4	7.3	7.4	7.3	8.4 <sup>(1)</sup>	7.4	7.6	7.4	--
<b>Appendix IV</b>																						
Antimony	ug/L	6	NA	6.0	6.0	130	2	6	< 1	< 1	< 1	1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	--
Arsenic	ug/L	10	NA	10	10	10	1	<b>10</b>	3	3	3	4	4	3	3.2	4.0	--	3.3	2.9	4.0	4.0	--
Barium	ug/L	2,000	NA	2,000	2,000	820	35	2,000	119	133	152	144	130	132	143	130	--	121	115	177	320	--
Beryllium	ug/L	4	NA	4.0	4.0	18	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	--
Cadmium	ug/L	5	NA	5.0	5.0	3.5	0.2	5	< 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	NA	100	100	11	2	<b>100</b>	8	3	2	2	2	3	1.2	1.1	--	< 1.0	1.2	31.3	35	--
Cobalt	ug/L	NC	6	40	100	100	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0	< 6.0	--
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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	--
Lead	ug/L	NC	15	4.0	4.0	39	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	--
Lithium	ug/L	NC	40	170	350	0.20#	10	40	15.7	11.4	14	21	17	11	14	16	--	11	15	16	12	--
Mercury	ug/L	2	NA	2.0	2.0	0.2	0.2	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	100	73	210	3,200	5	100	6	6	8	8	7	8	6.1	6.1	--	< 5.0	< 5.0	7.6	7.2	--
Radium-226	pCi/L	NC	NA	NC	NC	NC	NA	NA	< 0.222	< 0.157	< 0.249	< 0.444	< 0.258	< 0.358	< 0.427	< 0.430	--	< 1.03	< 0.736	0.864	0.217	--
Radium-228	pCi/L	NC	NA	NC	NC	NC	NA	NA	< 0.522	0.662	< 0.558	< 0.753	0.439	1.22	< 1.15	< 0.904	--	< 1.02	< 1.12	< 0.688	0.392	--
Radium-226/228	pCi/L	5	NA	NC	NC	NC	1.93	5	< 0.522	0.8	< 0.558	< 0.753	0.637	1.43	< 1.58	< 1.33	--	< 2.05	< 1.86	1.40	0.609	--
Selenium	ug/L	50	NA	50	50	5.0	5	<b>50</b>	2	2	< 1	< 1	2	< 1	2.2	1.1	--	< 1.0	1.3	< 1.0	4.1	--
Thallium	ug/L	2	NA	2.0	2.0	3.7	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	--

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018. Appendix III GWPS is the most restrictive of the MCL/Part 201 criteria, or the UTL if the UTL exceeds the applicable criteria as established in TRC's Technical Memorandum dated December 23, 2019.
- \* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.
- \*\* - Secondary Maximum Contaminant Level (SMCL), EPA Secondary Drinking Water Regulations (SDWR) April 2012.
- <sup>^</sup> - Michigan Part 201 Groundwater Surface Water Interface (GSI) Criteria. Hardness-dependent criteria calculated using site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE policy and procedure 09-014 dated June 20, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.
- (3) JHC-MW-15008 was decommissioned on June 24, 2019. Replacement well JHC-MW-15008R was installed on June 25, 2019.

**Table A1**  
Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to October 2019  
JH Campbell Pond A – RCRA CCR Monitoring Program  
West Olive, Michigan

Sample Location:									JHC-MW-15008 <sup>(3)</sup>												JHC-MW-15008R <sup>(3)</sup>					
Sample Date:									12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018	11/15/2018 <sup>(2)</sup>	4/24/2019 <sup>(2)</sup>	8/13/2019	10/9/2019	10/9/2019		
Constituent	Unit	EPA MCL	EPA RSL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	UTL	GWPS	downgradient															Field Dup		
<b>Appendix III</b>																										
Boron	ug/L	NC	NA	500	500	7,200	54	<b>500</b>	146	95	111	195	181	97	128	153	116	--	87.7	--	--	93	130	130		
Calcium	mg/L	NC	NA	NC	NC	500	40	500	43.2	46.9	46.2	64	46.5	42.9	42.5	47.1	37.5	--	39	--	--	33	100	100		
Chloride	mg/L	250**	NA	250	250	500	70	250	19.3	25.8	58.4	37.0	45.5	25.3	24.0	22.3	16.6	--	20.4	--	--	2.2	16	16		
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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	--	--	170	< 1,000	< 1,000	
Sulfate	mg/L	250**	NA	250	250	500	13	250	36.1	31	30.8	29.6	33.6	28	29.8	31.8	28.4	--	25.5	--	--	20	220	220		
Total Dissolved Solids	mg/L	500**	NA	500	500	500	240	<b>500</b>	220	230	300	300	260	230	260	340	190	--	210	--	--	150	< 50	430		
pH, Field	SU	6.5 - 8.5**	NA	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	5.5 - 8.8	<b>5.5 - 8.8</b>	6.8	6.9	6.9	7.0	6.8	7.2	7.1	7.1	7.1	7.9 <sup>(1)</sup>	7.2	--	--	7.4	7.3	--		
<b>Appendix IV</b>																										
Antimony	ug/L	6	NA	6.0	6.0	130	2	6	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	1.1	--	1.1	< 1.0	--	--	1.2	< 1.0	< 1.0		
Arsenic	ug/L	10	NA	10	10	10	1	<b>10</b>	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0		
Barium	ug/L	2,000	NA	2,000	2,000	820	35	2,000	184	146	173	172	229	111	124	186	--	118	120	--	--	110	340	320		
Beryllium	ug/L	4	NA	4.0	4.0	18	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0		
Cadmium	ug/L	5	NA	5.0	5.0	3.5	0.2	5	< 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	NA	100	100	11	2	<b>100</b>	2	2	2	3	2	7	7.8	5.4	--	1.3	1.5	--	--	3.8	4.5	4.5		
Cobalt	ug/L	NC	6	40	100	100	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	--	--	< 6.0	< 6.0	< 6.0		
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	4,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	--	--	170	< 1,000	< 1,000		
Lead	ug/L	NC	15	4.0	4.0	39	1	15	< 1	< 1	< 1	< 1	2	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0		
Lithium	ug/L	NC	40	170	350	0.20#	10	40	20.2	16.2	13	15	21	12	13	18	--	14	15	--	--	10	15	15		
Mercury	ug/L	2	NA	2.0	2.0	0.2	0.2	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	100	73	210	3,200	5	100	5	5	5	7	< 5	10	9.4	8.6	--	5.8	5.1	--	--	6.8	< 5.0	< 5.0		
Radium-226	pCi/L	NC	NA	NC	NC	NC	NA	NA	0.421	0.211	< 0.270	< 0.400	0.256	0.539	< 0.599	< 0.437	--	< 0.493	0.928	--	--	0.183	0.449	0.751		
Radium-228	pCi/L	NC	NA	NC	NC	NC	NA	NA	0.577	< 0.561	0.557	0.701	0.719	0.928	< 0.892	< 1.06	--	< 0.847	< 0.698	--	--	0.468	0.817	0.744		
Radium-226/228	pCi/L	5	NA	NC	NC	NC	1.93	5	0.998	< 0.561	0.677	1.04	0.975	1.47	< 1.49	< 1.50	--	< 1.34	1.56	--	--	0.651	1.27	1.49		
Selenium	ug/L	50	NA	50	50	5.0	5	<b>50</b>	6	4	6	3	8	2	2.3	2.4	--	1.7	2.0	--	--	12	<b>110</b>	<b>110</b>		
Thallium	ug/L	2	NA	2.0	2.0	3.7	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	--	--	< 2.0	< 2.0	< 2.0		

**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 NA - not applicable.  
 NC - no criteria.  
 -- - not analyzed.  
 MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.  
 RSL - Regional Screening Level from 83 FR 36435.  
 UTL - Upper Tolerance Limit (95%) of the background data set.  
 GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018. Appendix III GWPS is the most restrictive of the MCL/Part 201 criteria, or the UTL if the UTL exceeds the applicable criteria as established in TRC's Technical Memorandum dated December 23, 2019.  
 ^ - 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 site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE policy and procedure 09-014 dated June 20, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.  
 All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.  
 (2) Not sampled; insufficient amount of groundwater present to collect sample.  
 (3) JHC-MW-15008 was decommissioned on June 24, 2019. Replacement well JHC-MW-15008R was installed on June 25, 2019.

Table A1  
Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to October 2019  
JH Campbell Pond A – RCRA CCR Monitoring Program  
West Olive, Michigan

Sample Location:									JHC-MW-15009																	
Sample Date:									12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/15/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	4/26/2018	6/20/2018	11/15/2018	11/15/2018	4/24/2019	4/24/2019	10/9/2019 <sup>(2)</sup>	
Constituent	Unit	EPA MCL	EPA RSL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	UTL	GWPS	downgradient																	
<b>Appendix III</b>																										
Boron	ug/L	NC	NA	500	500	7,200	54	<b>500</b>	127	97	117	204	174	86	126	156	144	--	Field Dup	--	91.4	188	187	200	190	--
Calcium	mg/L	NC	NA	NC	NC	500	40	500	52.6	50.8	43.7	61.0	45.2	43.3	40.1	41.2	34.3	--	Field Dup	--	41.2	46.2	46.4	92	89	--
Chloride	mg/L	250**	NA	250	250	500	70	250	17.0	22.5	26.2	16.9	15.7	23.7	23.8	20.1	17.7	--	Field Dup	--	22.9	17.7	17.7	17	16	--
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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	--
Sulfate	mg/L	250**	NA	250	250	500	13	250	33.1	33.3	38.2	29.5	32.7	27.5	28.6	31.6	32.7	--	Field Dup	--	18.2	26.9	27.1	130	130	--
Total Dissolved Solids	mg/L	500**	NA	500	500	500	240	<b>500</b>	240	220	260	240	220	230	188	208	178	--	Field Dup	--	214	234	202	430	440	--
pH, Field	SU	6.5 - 8.5**	NA	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	5.5 - 8.8	<b>5.5 - 8.8</b>	7.3	7.2	7.3	7.3	7.0	7.4	7.4	7.5	7.4	8.4 <sup>(1)</sup>	Field Dup	--	7.7	7.6	--	7.4	--	--
<b>Appendix IV</b>																										
Antimony	ug/L	6	NA	6.0	6.0	130	2	6	1	< 1	< 1	< 1	< 1	< 1	1.1	< 1.0	--	Field Dup	< 1.0	< 1.0	< 1.0	1.2	< 1.0	< 1.0	< 1.0	--
Arsenic	ug/L	10	NA	10	10	10	1	<b>10</b>	< 1	1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	Field Dup	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--
Barium	ug/L	2,000	NA	2,000	2,000	820	35	2,000	236	151	162	169	202	150	132	198	--	Field Dup	130	125	130	178	181	360	360	--
Beryllium	ug/L	4	NA	4.0	4.0	18	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	Field Dup	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--
Cadmium	ug/L	5	NA	5.0	5.0	3.5	0.2	5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	Field Dup	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--
Chromium	ug/L	100	NA	100	100	11	2	<b>100</b>	5	4	2	2	3	6	5	6.6	--	Field Dup	1.3	1.3	< 1.0	14.1	11.8	17	14	--
Cobalt	ug/L	NC	6	40	100	100	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	Field Dup	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	< 6.0	< 6.0	--
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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	--
Lead	ug/L	NC	15	4.0	4.0	39	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	Field Dup	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	--
Lithium	ug/L	NC	40	170	350	0.20#	10	40	15.4	10.6	< 10	11	16	< 10	11	11	--	Field Dup	< 10	< 10	< 10	14	14	11	11	--
Mercury	ug/L	2	NA	2.0	2.0	0.2	0.2	2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	Field Dup	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	--
Molybdenum	ug/L	NC	100	73	210	3,200	5	100	6	6	8	6	5	6	22.3	7.4	--	Field Dup	5.5	5.5	< 5.0	6.1	6.1	5.7	5.6	--
Radium-226	pCi/L	NC	NA	NC	NC	NC	NA	NA	0.405	< 0.217	< 0.272	< 0.395	< 0.248	< 0.333	0.553	< 0.455	--	Field Dup	< 0.169	< 0.709	< 0.631	< 0.896	< 0.705	0.351	0.289	--
Radium-228	pCi/L	NC	NA	NC	NC	NC	NA	NA	0.770	0.647	0.827	< 0.800	1.11	0.627	< 1.08	1.04	--	Field Dup	< 1.26	< 1.14	< 0.634	0.800	< 0.663	0.674	0.509	--
Radium-226/228	pCi/L	5	NA	NC	NC	NC	1.93	5	1.18	0.811	0.987	< 0.8	1.28	0.877	< 1.23	< 1.40	--	Field Dup	< 1.43	< 1.85	< 1.27	< 1.47	< 1.37	1.02	0.798	--
Selenium	ug/L	50	NA	50	50	5.0	5	<b>50</b>	7	20	< 1	1	9	1	4.7	< 1.0	--	Field Dup	< 1.0	1.0	10.3	12.6	12.6	<b>61</b>	<b>63</b>	--
Thallium	ug/L	2	NA	2.0	2.0	3.7	2	<b>2</b>	<b>2.19</b>	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	Field Dup	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	--

**Notes:**  
ug/L - micrograms per liter.  
mg/L - milligrams per liter.  
SU - standard units; pH is a field parameter.  
pCi/L - picocuries per liter.  
NA - not applicable.  
NC - no criteria.  
-- - not analyzed.  
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.  
RSL - Regional Screening Level from 83 FR 36435.  
UTL - Upper Tolerance Limit (95%) of the background data set.  
GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018. Appendix III GWPS is the most restrictive of the MCL/Part 201 criteria, or the UTL if the UTL exceeds the applicable criteria as established in TRC's Technical Memorandum dated December 23, 2019.  
\* - 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 site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE policy and procedure 09-014 dated June 20, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.  
All metals were analyzed as total unless otherwise specified.  
(1) pH value potentially biased high due to groundwater quality meter malfunction.  
(2) Not sampled; insufficient amount of groundwater present to collect sample.  
(3) JHC-MW-15008 was decommissioned on June 24, 2019. Replacement well JHC-MW-15008R was installed on June 25, 2019.

**Table A1**  
Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to October 2019  
JH Campbell Pond A – RCRA CCR Monitoring Program  
West Olive, Michigan

Sample Location:									JHC-MW-15010													
Sample Date:									12/3/2015	3/10/2016	6/22/2016	8/30/2016	11/16/2016	4/18/2017	6/21/2017	8/15/2017	9/26/2017	4/26/2018	6/20/2018	11/14/2018	4/23/2019	10/9/2019
Constituent	Unit	EPA MCL	EPA RSL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	UTL	GWPS	downgradient													
<b>Appendix III</b>																						
Boron	ug/L	NC	NA	500	500	7,200	54	<b>500</b>	101	83	131	146	121	77	127	164	109	--	98.4	120	<b>2,800</b>	<b>2,800</b>
Calcium	mg/L	NC	NA	NC	NC	500	40	500	41.7	48.1	49.5	41.2	35.6	41.4	36.1	39.4	33.0	--	40.9	59.6	58	84
Chloride	mg/L	250**	NA	250	250	500	70	250	17.1	25.4	21.4	18.0	16.1	26.1	23.1	19.1	17.8	--	22.2	7.9	2.0	< 2.0
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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
Sulfate	mg/L	250**	NA	250	250	500	13	250	46.9	36.2	76.4	32.0	32.4	31.1	29.7	37.0	32.6	--	39.9	33.3	24	32
Total Dissolved Solids	mg/L	500**	NA	500	500	500	240	<b>500</b>	190	220	280	220	160	220	236	338	220	--	294	262	270	330
pH, Field	SU	6.5 - 8.5**	NA	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	5.5 - 8.8	<b>5.5 - 8.8</b>	6.9	6.8	6.6	6.8	6.8	7.1	7.1	7.3	7.2	8.0 <sup>(1)</sup>	7.3	7.5	6.6	6.9
<b>Appendix IV</b>																						
Antimony	ug/L	6	NA	6.0	6.0	130	2	6	< 1	< 1	< 1	1	1	1	1.4	1.5	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	10	NA	10	10	10	1	<b>10</b>	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	2,000	NA	2,000	2,000	820	35	2,000	149	149	129	146	135	132	160	179	--	137	122	211	250	270
Beryllium	ug/L	4	NA	4.0	4.0	18	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	5	NA	5.0	5.0	3.5	0.2	5	< 0.2	< 0.2	0.4	< 0.2	< 0.2	< 0.2	< 0.20	< 0.20	--	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chromium	ug/L	100	NA	100	100	11	2	<b>100</b>	5	2	1	1	2	3	< 1.0	< 1.0	--	1.4	1.1	1.5	1.2	<b>370</b>
Cobalt	ug/L	NC	6	40	100	100	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0	< 6.0	< 6.0
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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
Lead	ug/L	NC	15	4.0	4.0	39	1	15	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	NC	40	170	350	0.20#	10	40	17.5	14.2	27	22	20	< 10	11	12	--	10	< 10	12	13	17
Mercury	ug/L	2	NA	2.0	2.0	0.2	0.2	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	100	73	210	3,200	5	100	8	5	10	15	29	21	36.8	13.2	--	11.0	7.6	5.0	< 5.0	14
Radium-226	pCi/L	NC	NA	NC	NC	NC	NA	NA	0.368	< 0.220	< 0.259	< 0.352	0.284	< 0.398	< 0.892	0.745	--	0.505	< 0.489	< 0.858	0.198	0.643
Radium-228	pCi/L	NC	NA	NC	NC	NC	NA	NA	0.544	< 0.440	0.460	0.933	0.625	0.819	1.10	< 0.808	--	< 1.03	< 0.655	0.814	< 0.326	1.12
Radium-226/228	pCi/L	5	NA	NC	NC	NC	1.93	5	0.912	< 0.44	0.711	1.04	0.909	0.918	< 1.95	1.36	--	< 1.20	< 1.14	< 1.43	0.515	1.76
Selenium	ug/L	50	NA	50	50	5.0	5	<b>50</b>	3	4	14	< 1	< 1	2	7.7	< 1.0	--	3.0	11.0	34.1	32	<b>210</b>
Thallium	ug/L	2	NA	2.0	2.0	3.7	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

**Notes:**

- ug/L - micrograms per liter.
- mg/L - milligrams per liter.
- SU - standard units; pH is a field parameter.
- pCi/L - picocuries per liter.
- NA - not applicable.
- NC - no criteria.
- - not analyzed.
- MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
- RSL - Regional Screening Level from 83 FR 36435.
- UTL - Upper Tolerance Limit (95%) of the background data set.
- GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL as established in TRC's Technical Memorandum dated October 15, 2018. Appendix III GWPS is the most restrictive of the MCL/Part 201 criteria, or the UTL if the UTL exceeds the applicable criteria as established in TRC's Technical Memorandum dated December 23, 2019.
- \* - Michigan Part 201 Generic Drinking Water Cleanup Criteria, December 30, 2013.
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- # - 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 EGLE policy and procedure 09-014 dated June 20, 2012.
- Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules. All metals were analyzed as total unless otherwise specified.
- (1) pH value potentially biased high due to groundwater quality meter malfunction.
- (2) Not sampled; insufficient amount of groundwater present to collect sample.
- (3) JHC-MW-15008 was decommissioned on June 24, 2019. Replacement well JHC-MW-15008R was installed on June 25, 2019.

**Table A1**  
 Comparison of Groundwater Sampling Results to Groundwater Protection Standards – December 2015 to October 2019  
 JH Campbell Pond A – RCRA CCR Monitoring Program  
 West Olive, Michigan

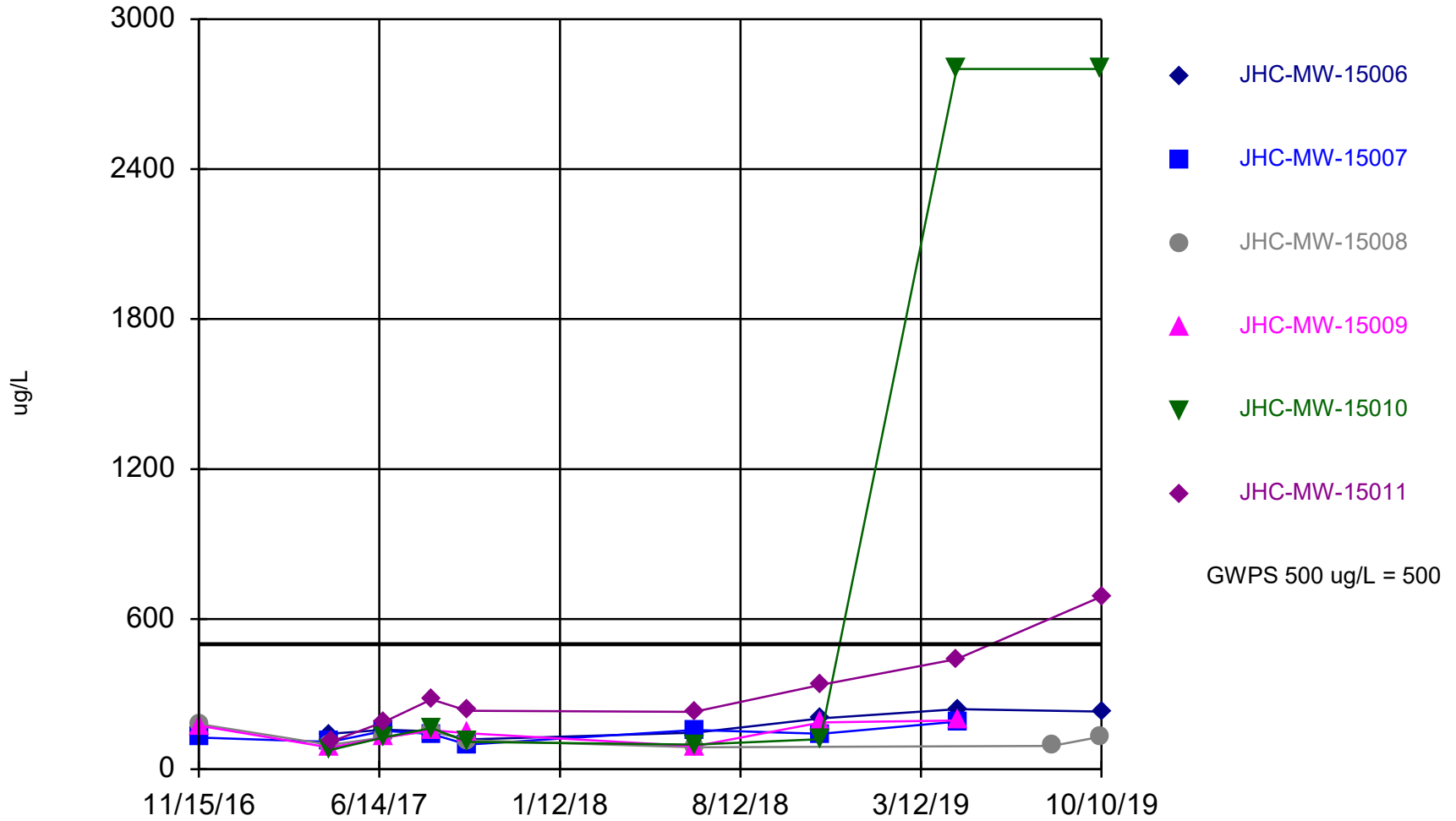
Constituent	Unit	EPA MCL	EPA RSL	MI Residential*	MI Non-Residential*	MI GSI <sup>^</sup>	UTL	GWPS	Sample Location: JHC-MW-15011																	
									Sample Date:																	
									12/4/2015	3/10/2016	6/22/2016	8/30/2016	11/16/2016	4/19/2017	6/21/2017	6/21/2017	8/15/2017	8/15/2017	9/26/2017	9/26/2017	4/25/2018	6/19/2018	11/15/2018	4/23/2019	10/10/2019	
downgradient																										
<b>Appendix III</b>																		Field Dup		Field Dup		Field Dup				
Boron	ug/L	NC	NA	500	500	7,200	54	<b>500</b>	345	280	286	419	457	110	179	201	288	271	249	219	--	229	337	440	<b>690</b>	
Calcium	mg/L	NC	NA	NC	NC	500	40	500	25.0	35.4	41.6	38.2	25.4	48.2	32.7	31.4	32.9	32.9	31.7	33.6	--	30.3	29.1	43	110	
Chloride	mg/L	250**	NA	250	250	500	70	250	16.6	21.6	23.4	16.9	16.8	24.7	24.8	24.8	19.6	19.6	17.7	17.7	--	23.0	21.0	18	9.4	
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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	
Sulfate	mg/L	250**	NA	250	250	500	13	250	23.2	37.7	29.4	6.1	12.3	35.1	24.3	24.3	15.7	15.9	17.6	17.5	--	26.1	29.2	86	180	
Total Dissolved Solids	mg/L	500**	NA	500	500	500	240	<b>500</b>	100	170	200	170	140	240	144	174	188	174	230	154	--	180	150	280	<b>550</b>	
pH, Field	SU	6.5 - 8.5**	NA	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	5.5 - 8.8	<b>5.5 - 8.8</b>	7.6	7.7	7.7	7.4	7.4	7.9	7.5	--	7.6	--	7.5	--	--	8.5	8.1	<b>9.1</b>	8.8	8.4
<b>Appendix IV</b>																										
Antimony	ug/L	6	NA	6.0	6.0	130	2	6	< 1	< 1	< 1	< 1	< 1	1	2.5	3.1	1.1	1.2	--	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Arsenic	ug/L	10	NA	10	10	10	1	<b>10</b>	<b>15</b>	<b>12</b>	<b>12</b>	<b>19</b>	<b>23</b>	<b>11</b>	<b>10.6</b>	<b>10.9</b>	<b>18.2</b>	<b>17.5</b>	--	--	<b>16.8</b>	<b>15.0</b>	<b>32.2</b>	<b>36</b>	<b>44</b>	
Barium	ug/L	2,000	NA	2,000	2,000	820	35	2,000	163	147	175	181	142	161	152	145	171	161	--	--	116	123	98.6	170	360	
Beryllium	ug/L	4	NA	4.0	4.0	18	1	4	< 1	< 1	< 1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Cadmium	ug/L	5	NA	5.0	5.0	3.5	0.2	5	< 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	
Chromium	ug/L	100	NA	100	100	11	2	<b>100</b>	3	1	< 1	< 1	1	4	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	9.0	1.4	
Cobalt	ug/L	NC	6	40	100	100	15	15	< 15	< 15	< 15	< 15	< 15	< 15	< 15.0	< 15.0	< 15.0	< 15.0	--	--	< 15.0	< 15.0	< 6.0	< 6.0	< 6.0	
Fluoride	ug/L	4,000	NA	NC	NC	NC	1,000	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	
Lead	ug/L	NC	15	4.0	4.0	39	1	15	< 1	< 1	< 1	< 1	< 1	< 1	1.2	< 1.0	< 1.0	< 1.0	--	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Lithium	ug/L	NC	40	170	350	0.20#	10	40	17.3	12.1	10	19	18	< 10	12	11	11	13	--	--	14	11	10	< 10	14	
Mercury	ug/L	2	NA	2.0	2.0	0.2	0.2	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	
Molybdenum	ug/L	NC	100	73	210	3,200	5	100	12	8	10	14	16	13	11.7	11.8	13.0	13.0	--	--	8.2	8.2	9.3	21	11	
Radium-226	pCi/L	NC	NA	NC	NC	NC	NA	NA	< 0.342	< 0.225	0.305	< 0.456	< 0.209	< 0.424	0.263	< 0.755	0.291	< 0.707	--	--	< 0.702	< 0.463	< 0.512	0.0720	0.298	
Radium-228	pCi/L	NC	NA	NC	NC	NC	NA	NA	0.617	0.705	0.613	0.907	< 0.551	0.548	< 0.590	< 0.505	< 0.951	1.02	--	--	< 0.568	0.931	< 0.519	< 0.343	0.665	
Radium-226/228	pCi/L	5	NA	NC	NC	NC	1.93	5	0.662	0.77	0.918	0.95	< 0.551	0.584	< 0.733	< 1.26	< 1.11	1.61	--	--	< 1.27	< 1.34	< 1.03	< 0.343	0.963	
Selenium	ug/L	50	NA	50	50	5.0	5	<b>50</b>	< 1	< 1	< 1	< 1	< 1	12	< 1.0	< 1.0	< 1.0	< 1.0	--	--	< 1.0	1.6	< 1.0	13	<b>76</b>	
Thallium	ug/L	2	NA	2.0	2.0	3.7	2	<b>2</b>	< 2	< 2	< 2	< 2	< 2	< 2	< 2.0	< 2.0	< 2.0	< 2.0	--	--	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	

**Notes:**  
 ug/L - micrograms per liter.  
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 \* - 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 site-specific hardness of 180 mg CaCO3/L as measured at surface water sample SW-01 collected on April 9, 2018 from the Pigeon River. 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 EGLE policy and procedure 09-014 dated June 20, 2012.  
**Bold** value indicates an exceedance of the GWPS. Data from downgradient monitoring wells are screened against the GWPS for evaluation purposes only. Confidence intervals will be used to determine compliance per the CCR rules.  
 All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.  
 (2) Not sampled; insufficient amount of groundwater present to collect sample.  
 (3) JHC-MW-15008 was decommissioned on June 24, 2019. Replacement well JHC-MW-15008R was installed on June 25, 2019.

## **Technical Memorandum**

# **Attachment 1 Sanitas™ Output**

### Time Series

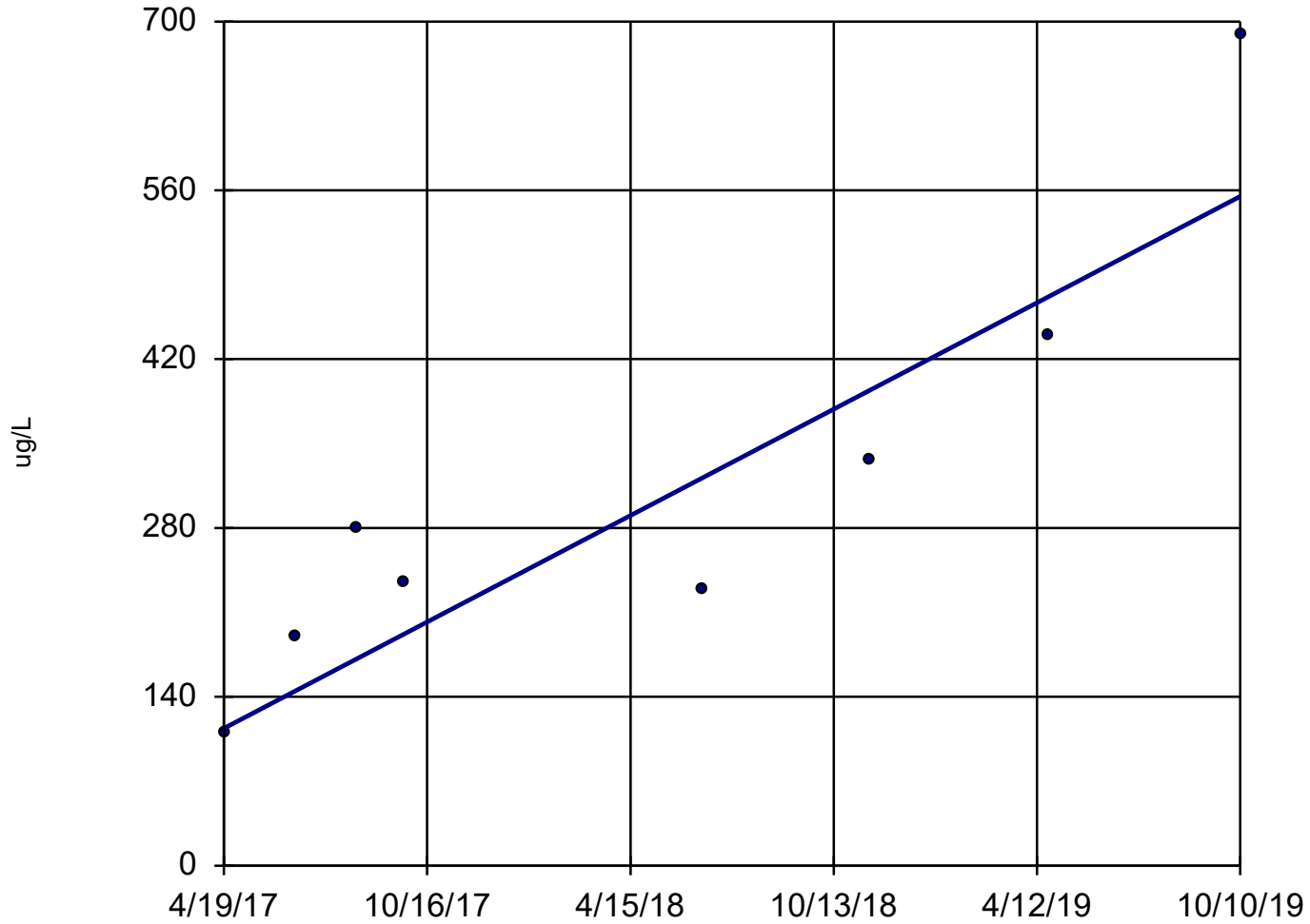


Constituent: Boron, Total Analysis Run 12/20/2019 10:34 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

# Sen's Slope Estimator

JHC-MW-15011



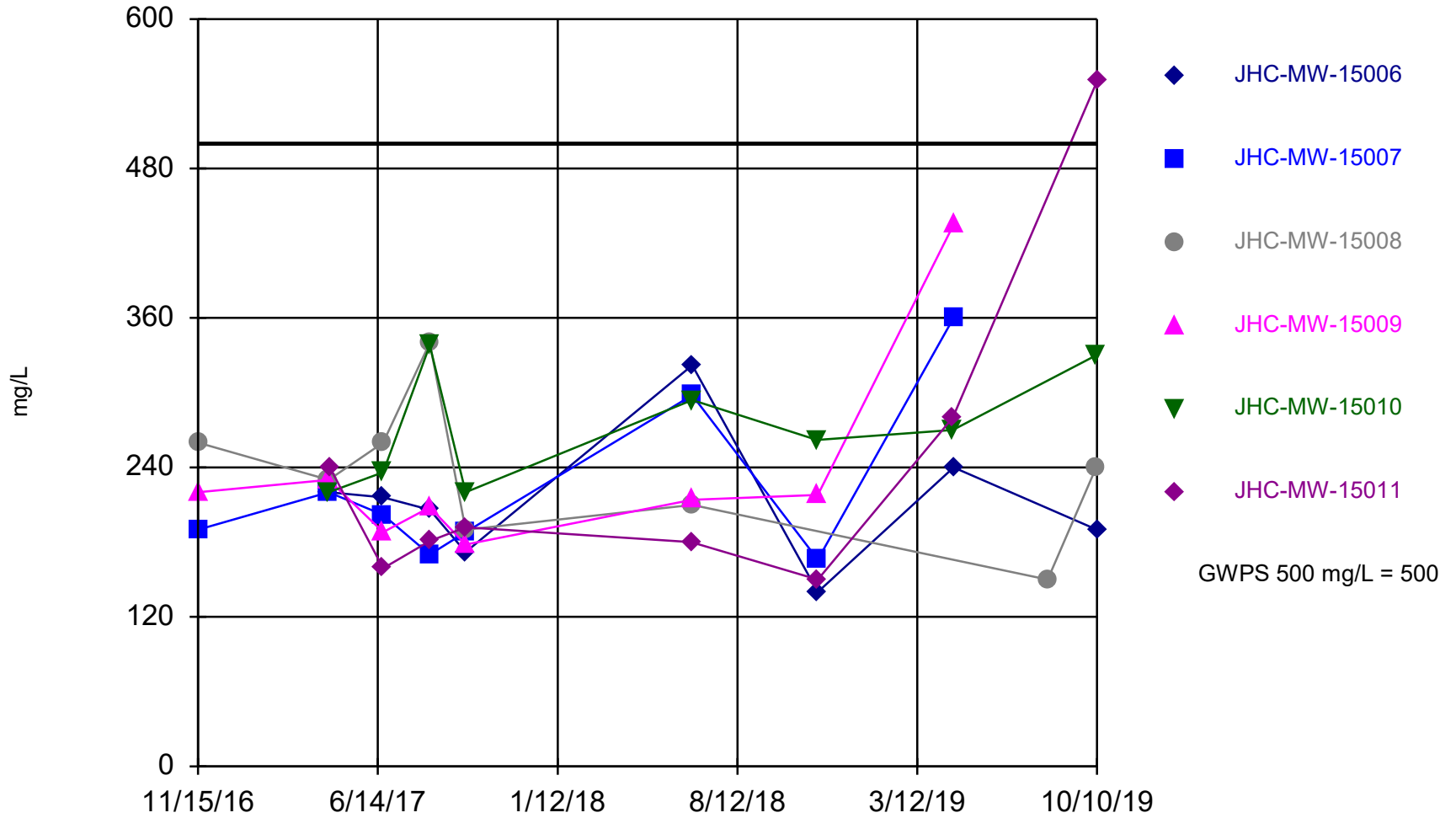
n = 8  
Slope = 178.1  
units per year.  
Mann-Kendall  
statistic = 22  
critical = 20  
Increasing trend  
significant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

Constituent: Boron, Total Analysis Run 12/20/2019 10:36 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14



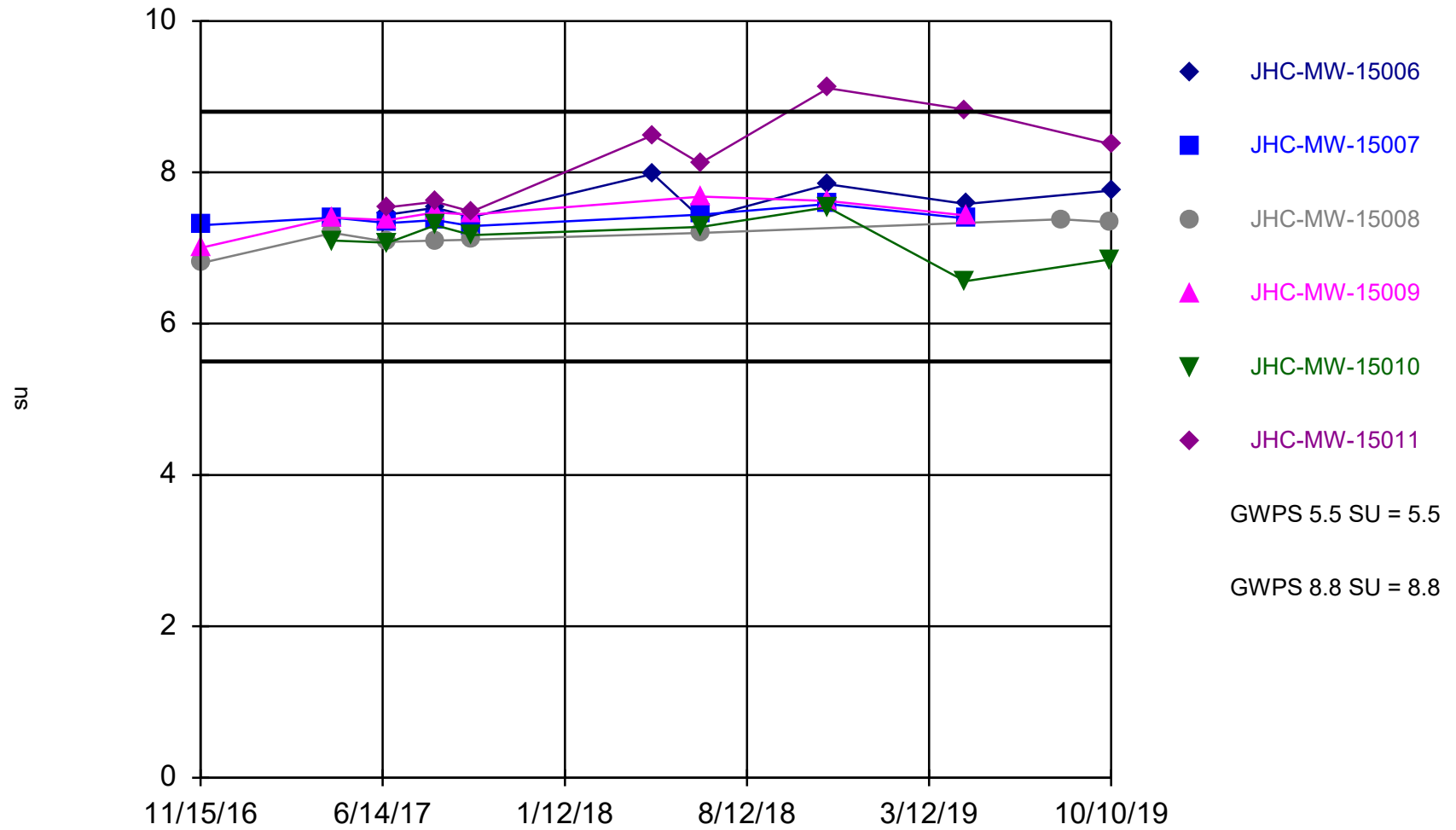
### Time Series



Constituent: Total Dissolved Solids, Total Analysis Run 12/20/2019 10:37 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

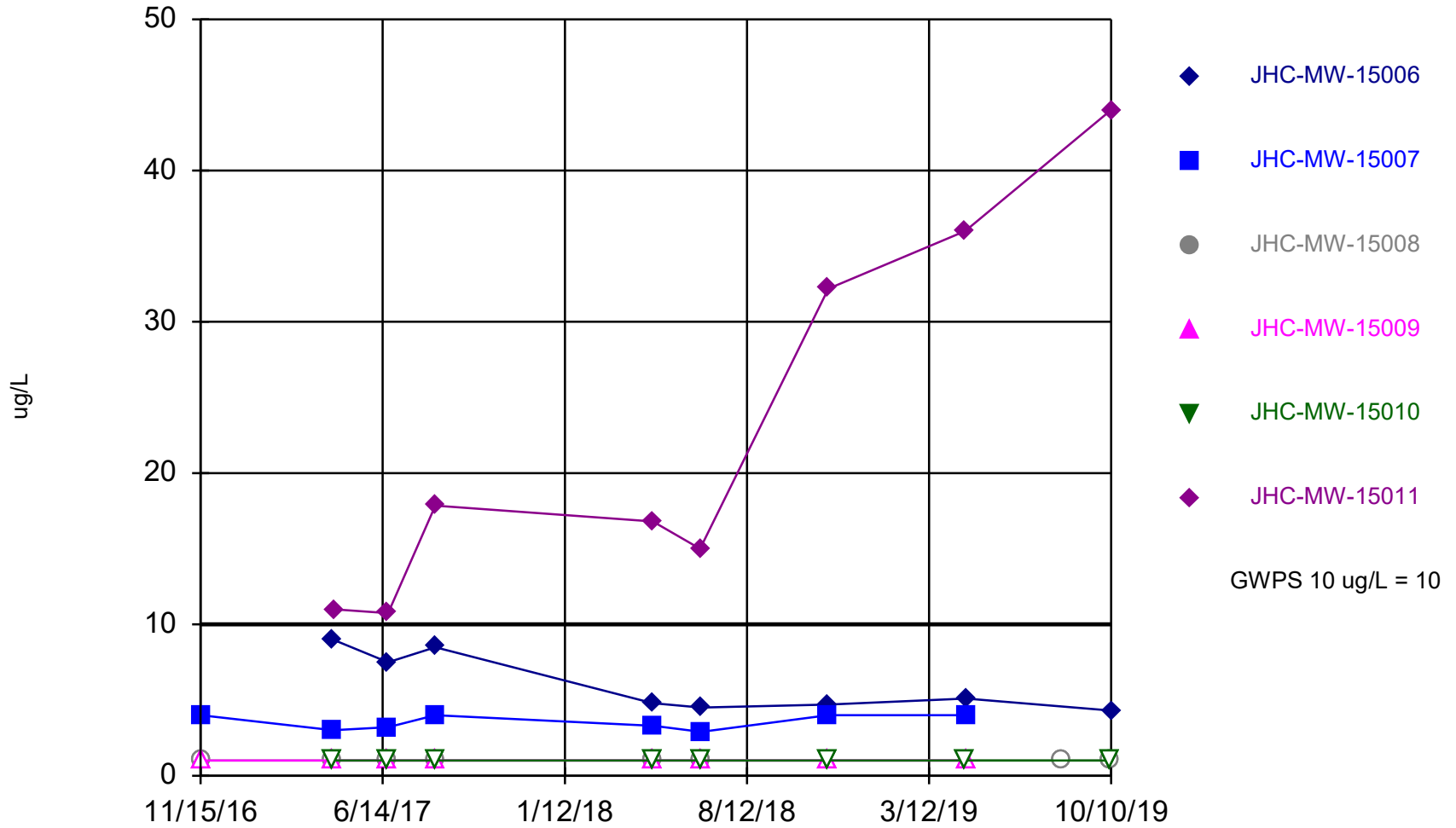
### Time Series



Constituent: pH, Field Analysis Run 12/23/2019 11:00 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

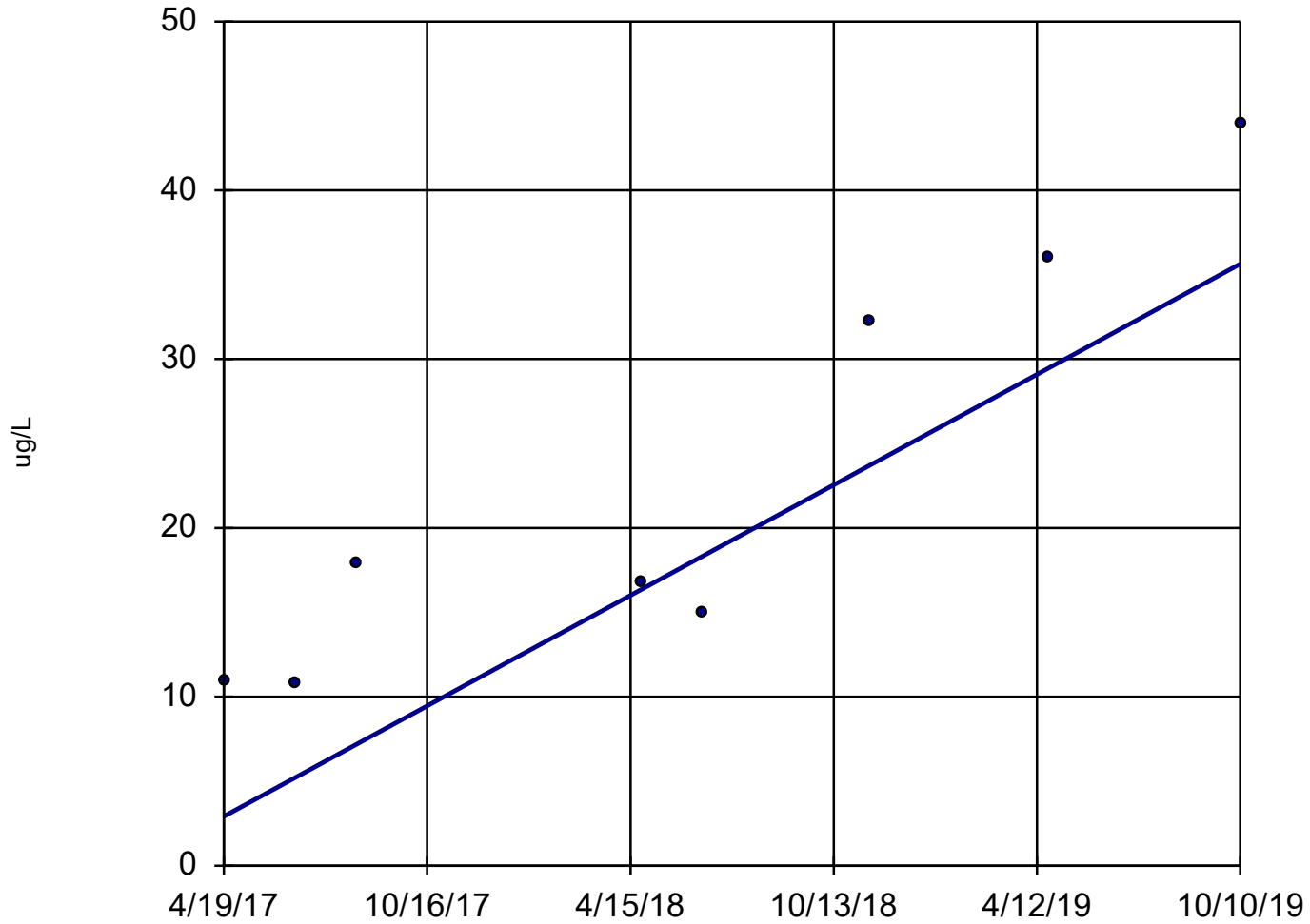
### Time Series



Constituent: Arsenic, Total Analysis Run 12/9/2019 4:52 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

# Sen's Slope Estimator

JHC-MW-15011

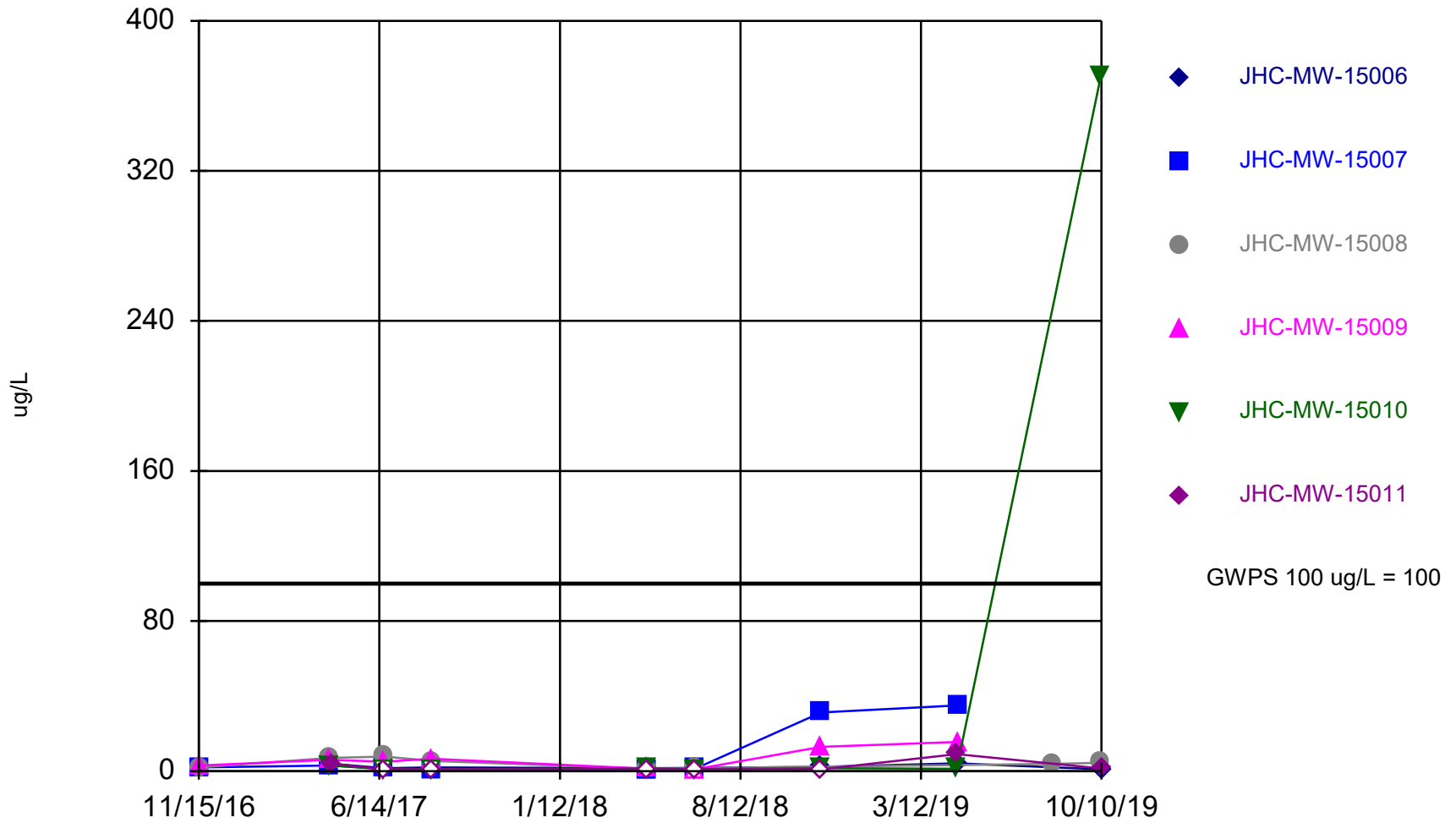


n = 8  
Slope = 13.21  
units per year.  
Mann-Kendall  
statistic = 20  
critical = 20  
Trend not sig-  
nificant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

Constituent: Arsenic, Total Analysis Run 12/10/2019 6:42 AM

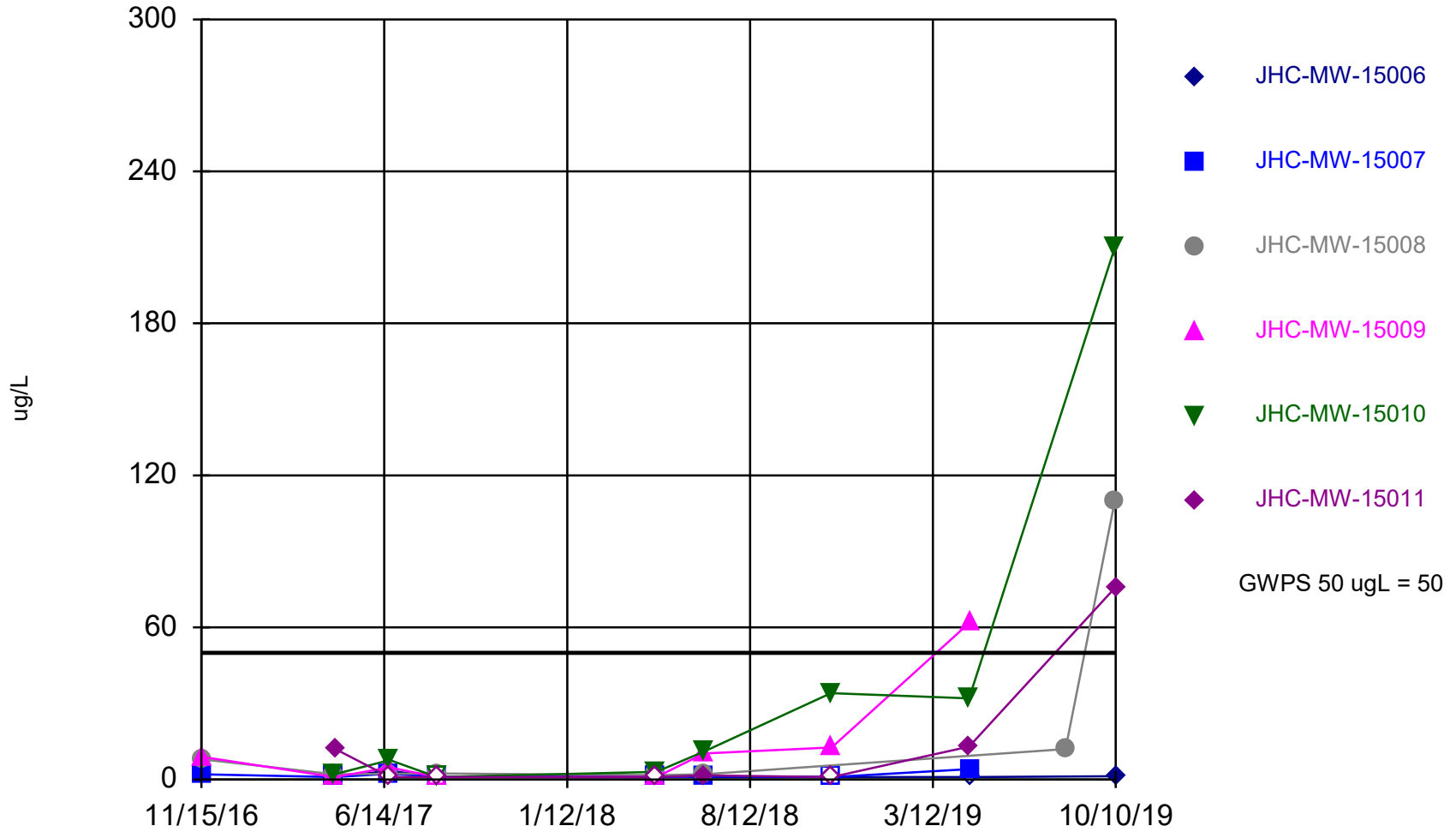
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

### Time Series



Constituent: Chromium, Total Analysis Run 12/9/2019 4:53 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

### Time Series

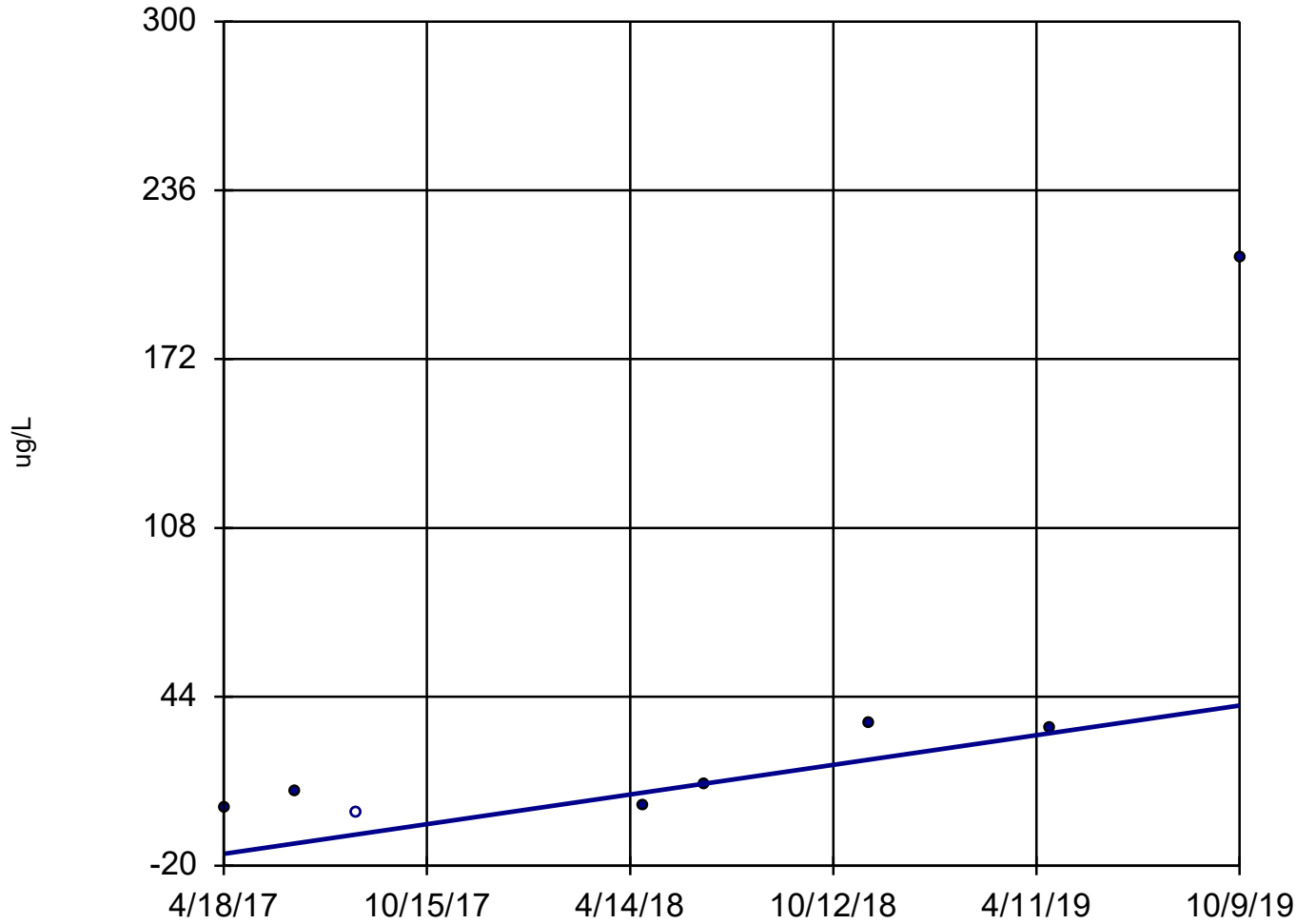


Constituent: Selenium, Total Analysis Run 12/9/2019 4:42 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

## Sen's Slope Estimator

JHC-MW-15010



n = 8  
Slope = 22.67  
units per year.  
Mann-Kendall  
statistic = 20  
critical = 20  
Trend not sig-  
nificant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

Constituent: Selenium, Total Analysis Run 12/10/2019 6:43 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

# Summary Report

Constituent: Boron, Total Analysis Run 12/20/2019 10:22 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

For observations made between 11/15/2016 and 10/10/2019, a summary of the selected data set:

Observations = 48  
ND/Trace = 0  
Wells = 6  
Minimum Value = 77  
Maximum Value = 2800  
Mean Value = 280.3  
Median Value = 148.3  
Standard Deviation = 540.6  
Coefficient of Variation = 1.929  
Skewness = 4.346

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	8	0	119	240	173.6	154.5	44.69	0.2575	0.4575
JHC-MW-15007	8	0	98	190	139.5	141.5	28.99	0.2078	0.2152
JHC-MW-15008	8	0	87.7	181	123.2	122	32.09	0.2605	0.5965
JHC-MW-15009	8	0	86	195	145	150	41.38	0.2854	-0.2982
JHC-MW-15010	8	0	77	2800	786.9	123.5	1243	1.579	1.153
JHC-MW-15011	8	0	110	690	313.7	256.8	181.1	0.5773	1.127



# Summary Report

Constituent: Total Dissolved Solids, Total Analysis Run 12/20/2019 10:22 AM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

For observations made between 11/15/2016 and 10/10/2019, a summary of the selected data set:

Observations = 48  
 ND/Trace = 0  
 Wells = 6  
 Minimum Value = 140  
 Maximum Value = 550  
 Mean Value = 236.9  
 Median Value = 220  
 Standard Deviation = 76.48  
 Coefficient of Variation = 0.3228  
 Skewness = 1.895

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	8	0	140	322	213.3	211	53.79	0.2523	0.8138
JHC-MW-15007	8	0	166	360	224.3	196	68.87	0.3071	1.144
JHC-MW-15008	8	0	150	340	235	235	56.32	0.2396	0.4002
JHC-MW-15009	8	0	178	435	236.4	216	82.07	0.3472	2.066
JHC-MW-15010	8	0	220	338	271.3	266	46.3	0.1707	0.3048
JHC-MW-15011	8	0	150	550	241.5	186.5	131.9	0.546	1.832

# Summary Report

Constituent: pH, Field Analysis Run 12/23/2019 11:00 AM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

For observations made between 11/15/2016 and 10/10/2019, a summary of the selected data set:

Observations = 48  
 ND/Trace = 0  
 Wells = 6  
 Minimum Value = 6.56  
 Maximum Value = 9.11  
 Mean Value = 7.481  
 Median Value = 7.4  
 Standard Deviation = 0.4719  
 Coefficient of Variation = 0.06308  
 Skewness = 1.456

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	8	0	7.39	7.98	7.616	7.555	0.2193	0.02879	0.5183
JHC-MW-15007	8	0	7.29	7.58	7.388	7.38	0.09316	0.01261	1.037
JHC-MW-15008	8	0	6.8	7.38	7.151	7.155	0.1795	0.0251	-0.6598
JHC-MW-15009	8	0	7	7.68	7.426	7.435	0.2034	0.02739	-0.9791
JHC-MW-15010	8	0	6.56	7.54	7.109	7.135	0.2989	0.04204	-0.5158
JHC-MW-15011	8	0	7.48	9.11	8.194	8.245	0.6148	0.07504	0.1419

# Summary Report

Constituent: Arsenic, Total Analysis Run 12/9/2019 4:53 PM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

For observations made between 11/15/2016 and 10/10/2019, a summary of the selected data set:

Observations = 48  
 ND/Trace = 24  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 44  
 Mean Value = 5.925  
 Median Value = 1.95  
 Standard Deviation = 9.331  
 Coefficient of Variation = 1.575  
 Skewness = 2.688

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	8	0	4.3	9	6.05	4.95	1.948	0.322	0.6007
JHC-MW-15007	8	0	2.9	4	3.55	3.65	0.4957	0.1396	-0.1693
JHC-MW-15008	8	8	1	1	1	1	0	0	NaN
JHC-MW-15009	8	8	1	1	1	1	0	0	NaN
JHC-MW-15010	8	8	1	1	1	1	0	0	NaN
JHC-MW-15011	8	0	10.75	44	22.95	17.33	12.64	0.5506	0.6019

# Summary Report

Constituent: Chromium, Total Analysis Run 12/9/2019 4:54 PM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

For observations made between 11/15/2016 and 10/10/2019, a summary of the selected data set:

Observations = 48  
 ND/Trace = 10  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 370  
 Mean Value = 12.05  
 Median Value = 1.825  
 Standard Deviation = 53.2  
 Coefficient of Variation = 4.417  
 Skewness = 6.546

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	8	1	1	4.1	2.269	1.825	1.162	0.5123	0.8054
JHC-MW-15007	8	1	1	35	9.475	1.6	14.66	1.547	1.164
JHC-MW-15008	8	0	1.3	7.8	4.163	4.15	2.479	0.5956	0.2047
JHC-MW-15009	8	1	1	15.5	6.419	5.5	5.273	0.8214	0.7204
JHC-MW-15010	8	2	1	370	47.53	1.3	130.3	2.742	2.268
JHC-MW-15011	8	5	1	9	2.425	1	2.851	1.176	1.796

# Summary Report

Constituent: Selenium, Total Analysis Run 12/9/2019 4:55 PM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

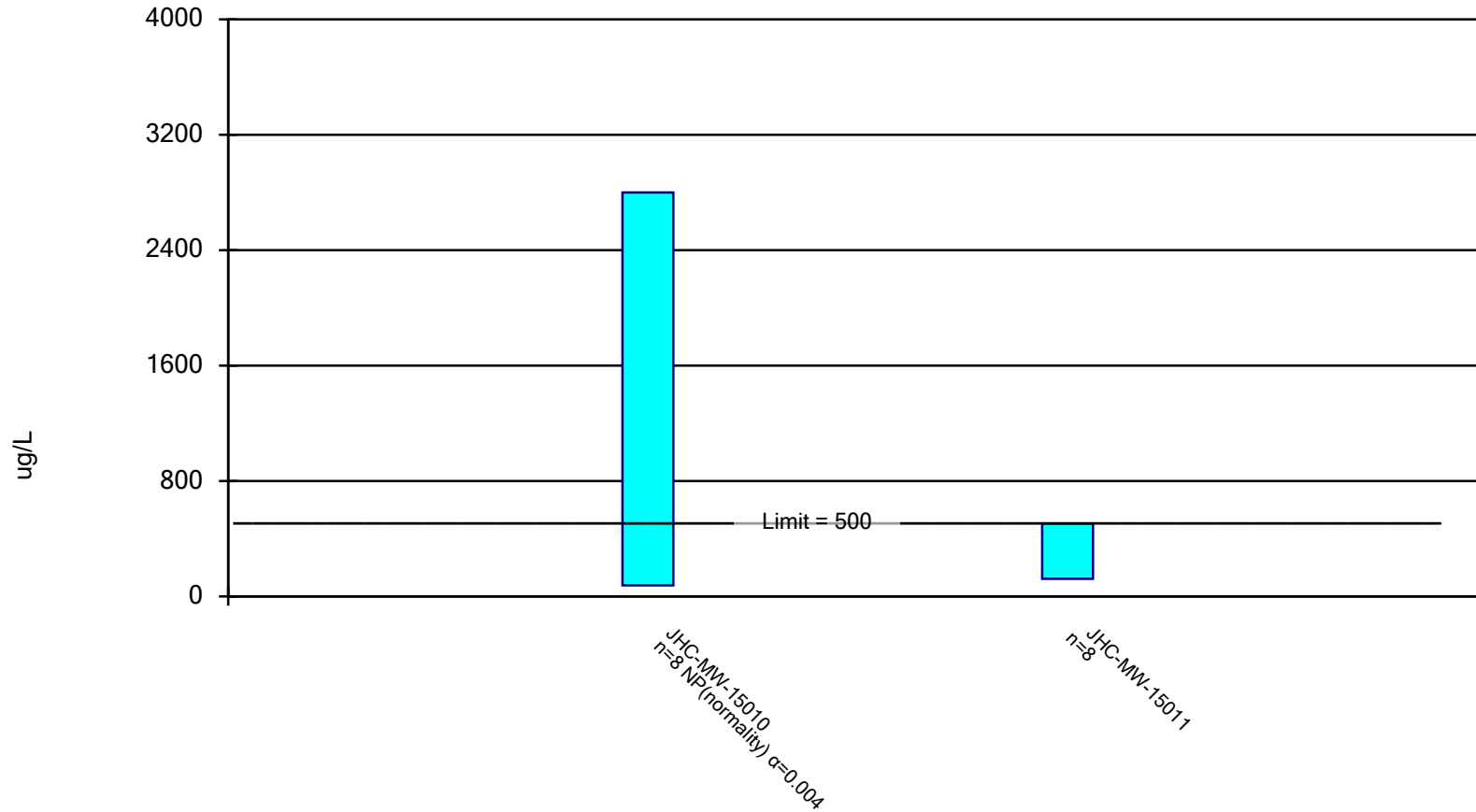
For observations made between 11/15/2016 and 10/10/2019, a summary of the selected data set:

Observations = 48  
 ND/Trace = 14  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 210  
 Mean Value = 14.04  
 Median Value = 2  
 Standard Deviation = 35.64  
 Coefficient of Variation = 2.538  
 Skewness = 4.134

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15006	8	5	1	3.4	1.375	1	0.8294	0.6032	2.152
JHC-MW-15007	8	3	1	4.1	1.713	1.2	1.075	0.6277	1.52
JHC-MW-15008	8	0	1.7	110	17.55	2.35	37.54	2.139	2.224
JHC-MW-15009	8	1	1	62	12.7	6.85	20.44	1.609	2.047
JHC-MW-15010	8	1	1	210	37.6	9.35	70.88	1.885	2.119
JHC-MW-15011	8	4	1	76	13.33	1.3	25.84	1.939	2.098

## Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Boron, Total Analysis Run 12/20/2019 10:35 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

# Confidence Interval

Constituent: Boron, Total (ug/L) Analysis Run 12/20/2019 10:36 AM

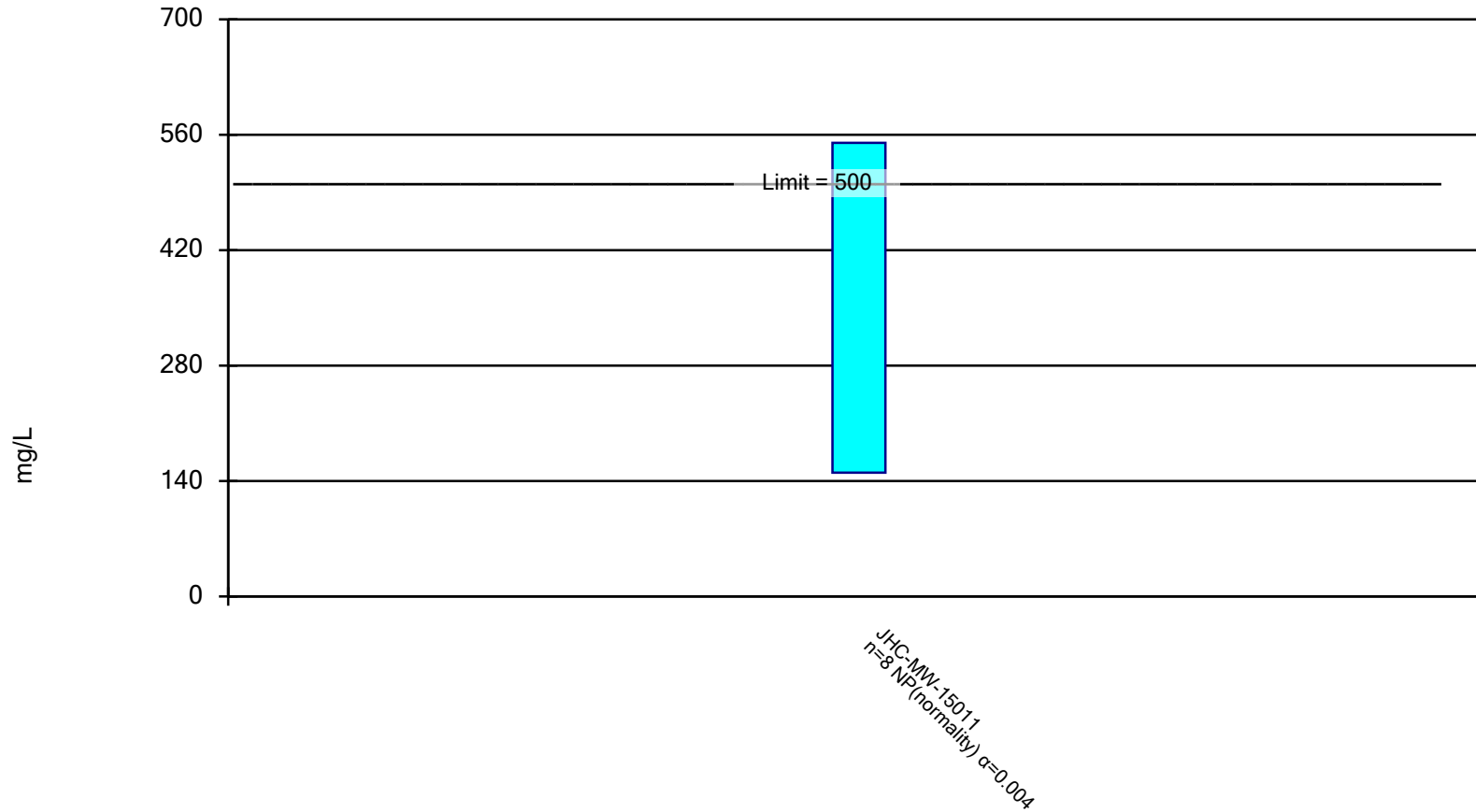
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

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	JHC-MW-15010	JHC-MW-15011
4/18/2017	77	
4/19/2017		110
6/21/2017	127	190 (D)
8/15/2017	164	279.5 (D)
9/26/2017	109	234 (D)
6/19/2018		229
6/20/2018	98.4	
11/14/2018	120	
11/15/2018		337
4/23/2019	2800	440
10/9/2019	2800	
10/10/2019		690
Mean	786.9	313.7
Std. Dev.	1243	181.1
Upper Lim.	2800	505.6
Lower Lim.	77	121.7

## Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: Total Dissolved Solids, Total Analysis Run 12/20/2019 10:37 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14



# Confidence Interval

Constituent: Total Dissolved Solids, Total (mg/L) Analysis Run 12/20/2019 10:38 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

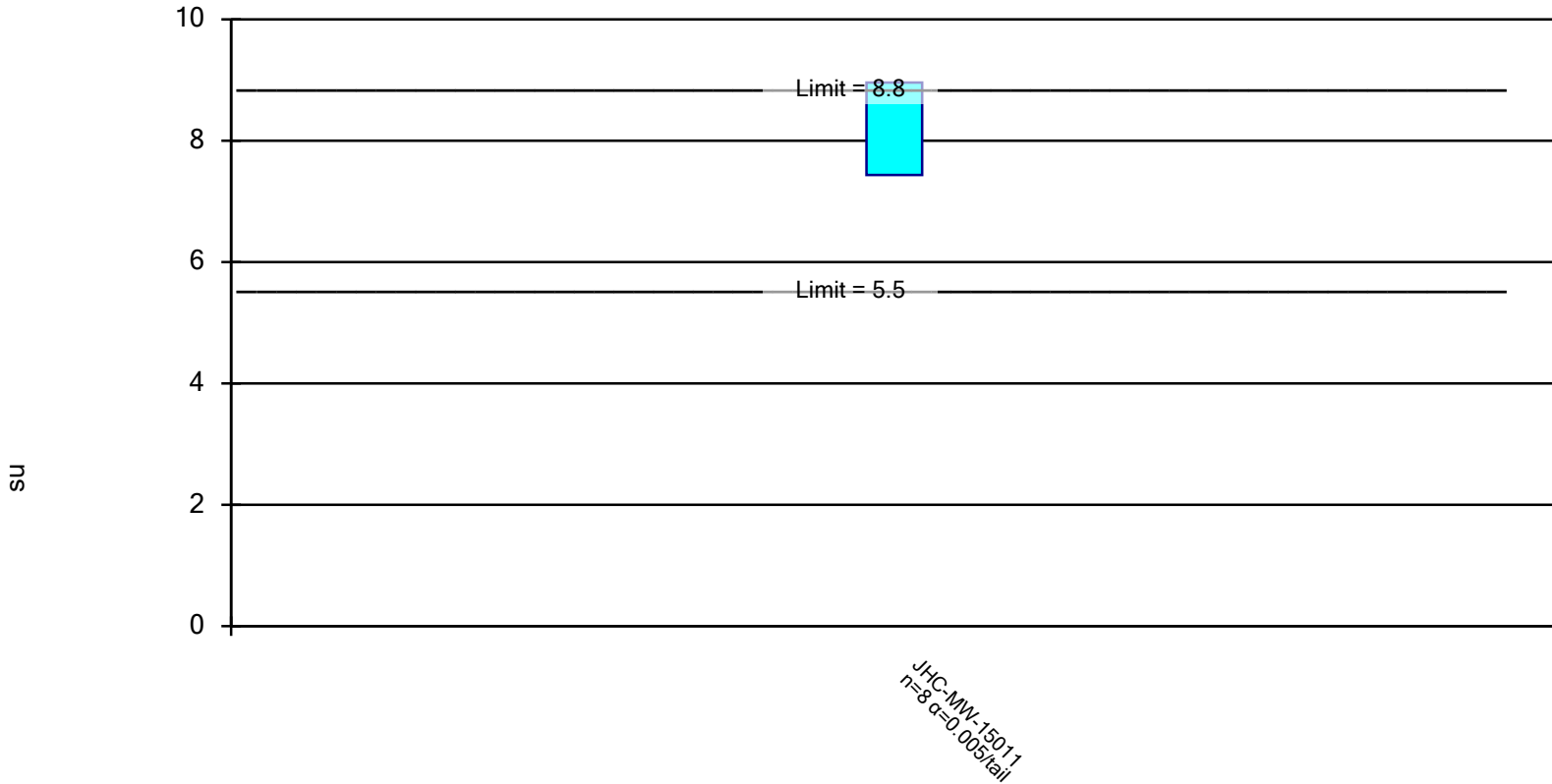
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JHC-MW-15011

4/19/2017	240
6/21/2017	159 (D)
8/15/2017	181 (D)
9/26/2017	192 (D)
6/19/2018	180
11/15/2018	150
4/23/2019	280
10/10/2019	550
Mean	241.5
Std. Dev.	131.9
Upper Lim.	550
Lower Lim.	150

## Parametric Confidence Interval

Compliance Limit is not exceeded. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: pH, Field Analysis Run 12/23/2019 11:01 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

# Confidence Interval

Constituent: pH, Field (su) Analysis Run 12/23/2019 11:01 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

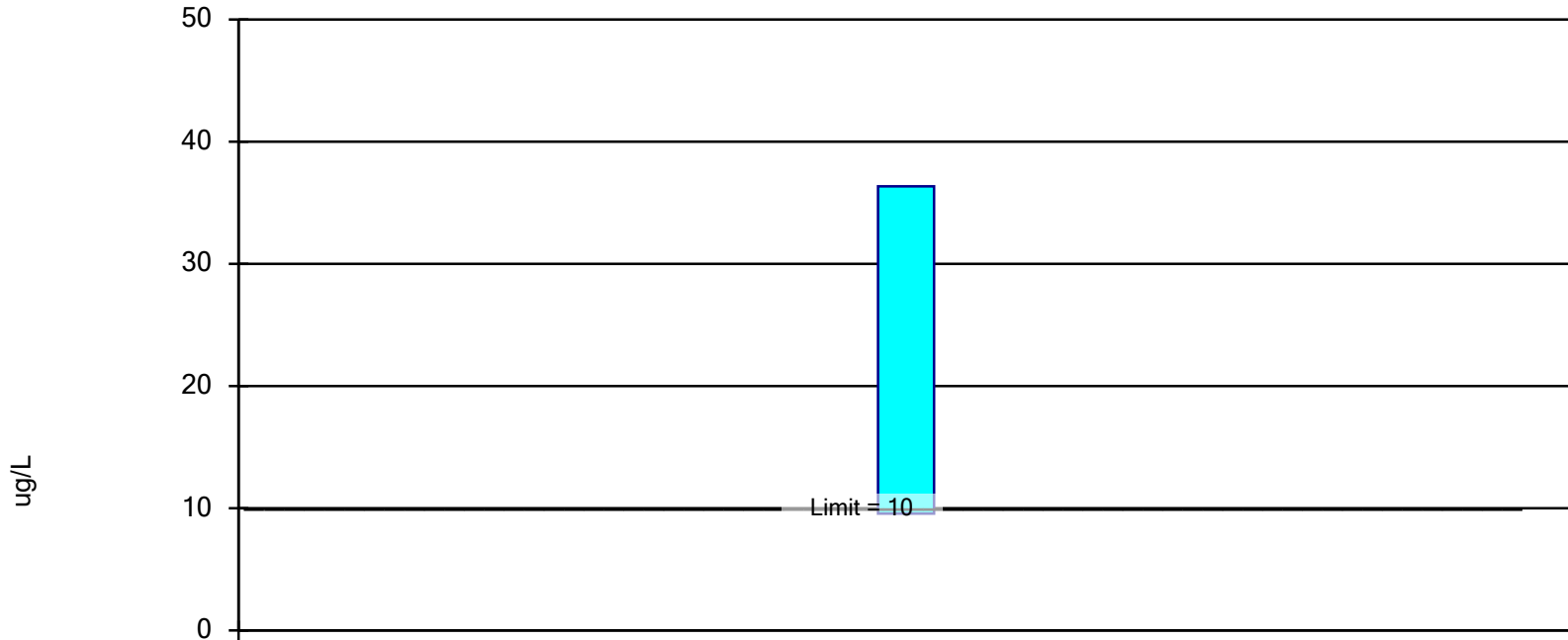
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JHC-MW-15011

6/21/2017	7.54
8/15/2017	7.61
9/26/2017	7.48
4/25/2018	8.49
6/19/2018	8.12
11/15/2018	9.11
4/23/2019	8.83
10/10/2019	8.37
Mean	8.194
Std. Dev.	0.6148
Upper Lim.	8.954
Lower Lim.	7.433

## Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



JHC-MW-15011  
n=8

Using the number of significant figures consistent with the GWPS, the lower confidence limit is equal to the GWPS; therefore the limit is not exceeded

Constituent: Arsenic, Total Analysis Run 11/27/2019 11:11 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

# Confidence Interval

Constituent: Arsenic, Total (ug/L) Analysis Run 11/27/2019 11:13 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

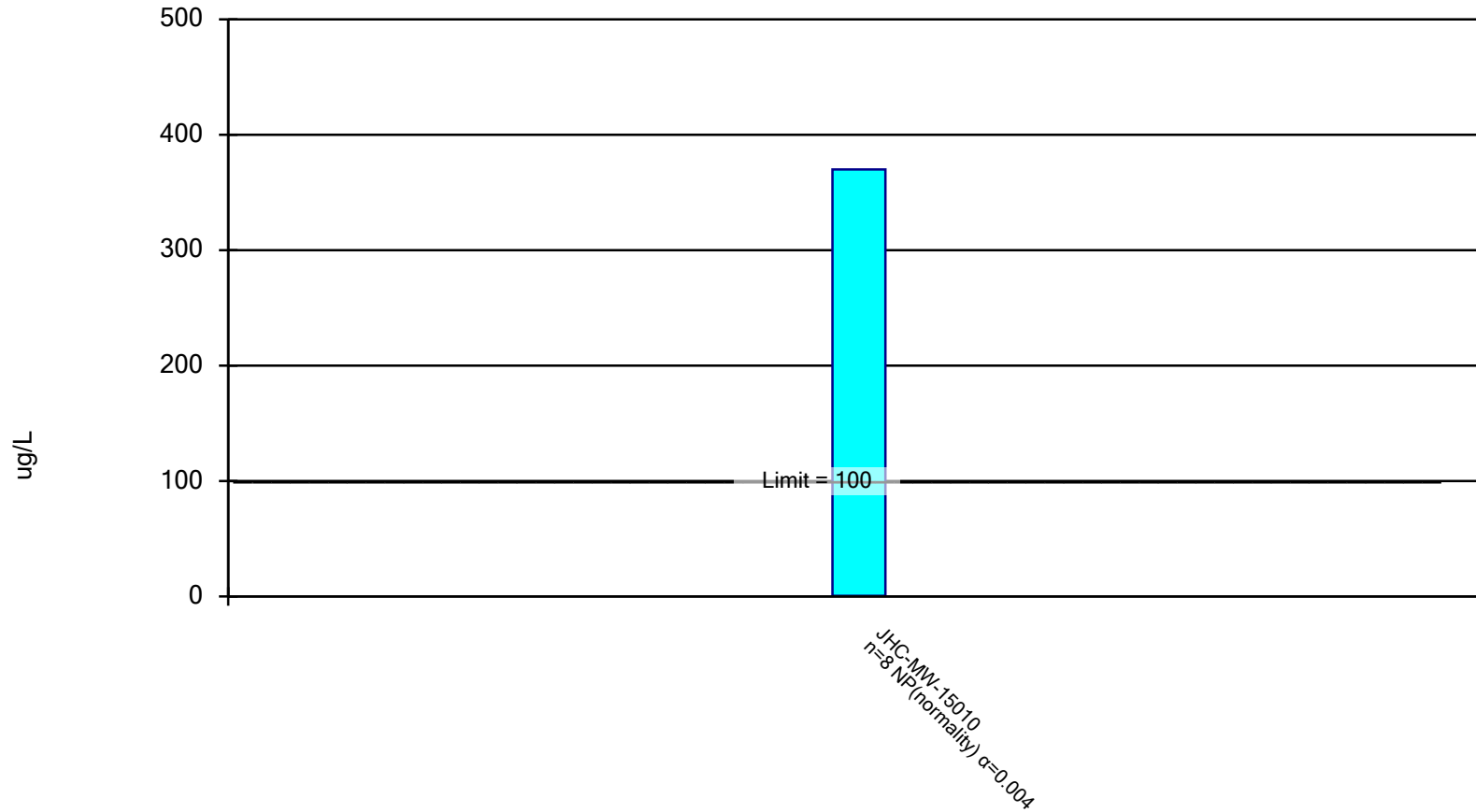
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JHC-MW-15011

4/19/2017	11
6/21/2017	10.75 (D)
8/15/2017	17.85 (D)
4/25/2018	16.8
6/19/2018	15
11/15/2018	32.2
4/23/2019	36
10/10/2019	44
<b>Mean</b>	22.95
<b>Std. Dev.</b>	12.64
<b>Upper Lim.</b>	36.34
<b>Lower Lim.</b>	9.557

## Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: Chromium, Total Analysis Run 11/27/2019 11:16 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

# Confidence Interval

Constituent: Chromium, Total (ug/L) Analysis Run 11/27/2019 11:16 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

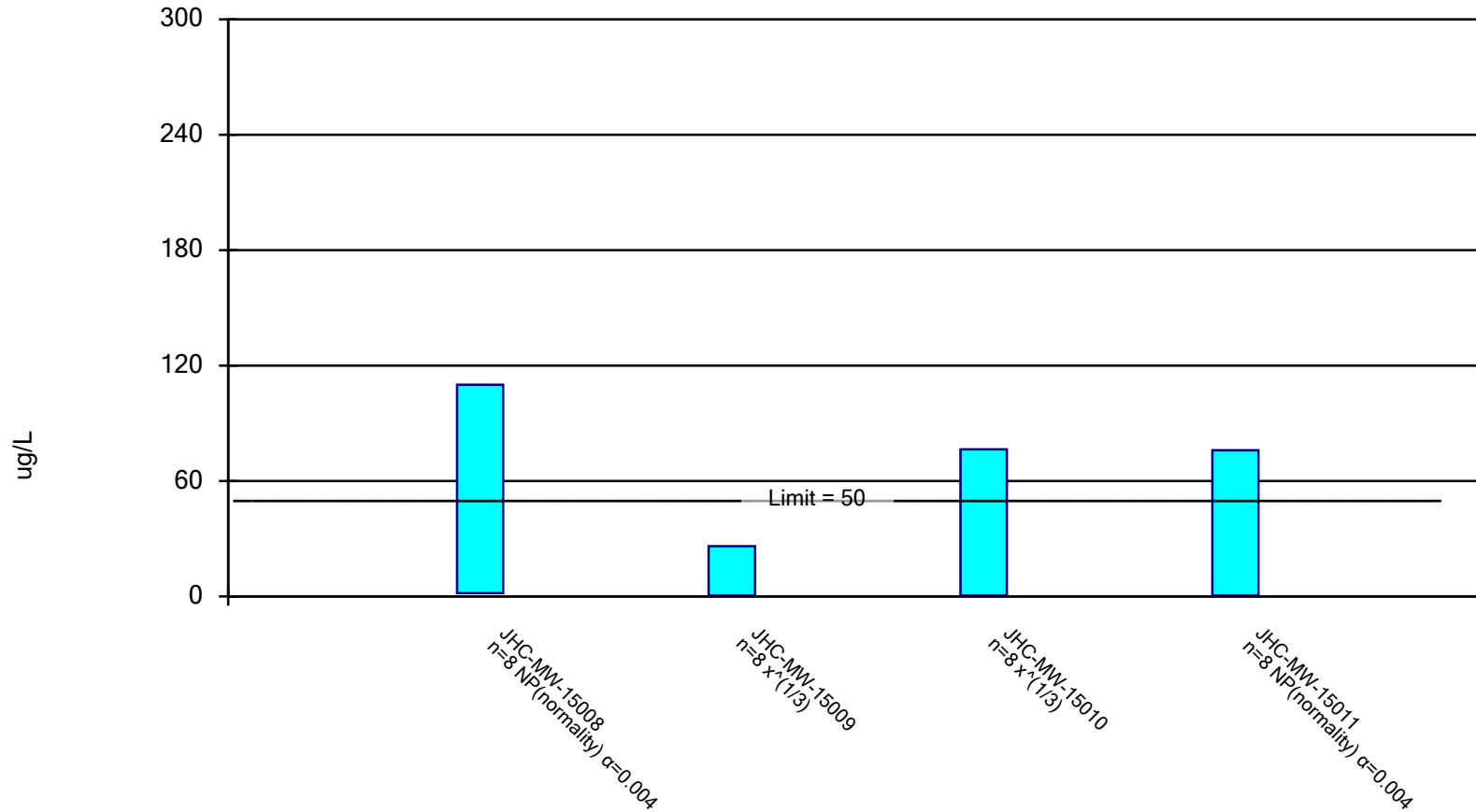
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JHC-MW-15010

4/18/2017	3
6/21/2017	<1
8/15/2017	<1
4/26/2018	1.4
6/20/2018	1.1
11/14/2018	1.5
4/23/2019	1.2
10/9/2019	370
Mean	47.4
Std. Dev.	130.4
Upper Lim.	370
Lower Lim.	0.5

## Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, Total Analysis Run 11/27/2019 11:37 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14



# Confidence Interval

Constituent: Selenium, Total (ug/L) Analysis Run 11/27/2019 11:37 AM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

	JHC-MW-15008	JHC-MW-15009	JHC-MW-15010	JHC-MW-15011
11/15/2016	8	9		
4/18/2017	2	1	2	
4/19/2017				12
6/21/2017	2.3	4.7	7.7	<1 (D)
8/15/2017	2.4	<1	<1	<1 (D)
4/25/2018				<1
4/26/2018	1.7	0.75 (D)	3	
6/19/2018				1.6
6/20/2018	2	10.3	11	
11/14/2018			34.1	
11/15/2018		12.6 (D)		<1
4/23/2019			32	13
4/24/2019		62 (D)		
8/13/2019	12 (R)			
10/9/2019	110 (RD)		210	
10/10/2019				76
Mean	17.55	12.61	37.54	13.08
Std. Dev.	37.54	20.5	70.92	25.98
Upper Lim.	110	26.14	76.41	76
Lower Lim.	1.7	0.4417	0.4575	0.5

# Appendix G

## Appendix III Groundwater Protection Standards

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## Technical Memorandum

**Date:** December 23, 2019

**To:** Beth Swanberg, Consumers Energy  
Brad Runkel, Consumers Energy

**From:** Darby Litz, TRC  
Sarah Holmstrom, TRC  
Meredith Brehob, TRC

**Project No.:** 322174.0001 Phase 001, Task 003

**Subject:** Groundwater Protection Standards – Consumers Energy, JH Campbell Site, Pond A CCR Unit

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On April 17, 2015, the United States Environmental Protection Agency (USEPA) issued the Coal Combustion Residual (CCR) Resource Conservation and Recovery Act (RCRA) Rule (40 CFR 257 Subpart D) (“CCR Rule”) to regulate the solid waste management of CCRs at electrical generating facilities. The scope of the CCR Rule applies to inactive, existing, and newly constructed CCR units. The CCR Rule, which became effective on October 19, 2015, applies to the Consumers Energy Pond A located at the JH Campbell Power Plant Site (the Site). Pond A is currently inactive, but at the time the CCR Rule went into effect, was an active CCR surface impoundment at the JH Campbell solid waste disposal facility. Consumers Energy began monitoring groundwater at Pond A in accordance with the CCR Rule in 2015 and initiated assessment monitoring pursuant to the CCR Rule in 2018.

On December 28, 2018, the State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (a.k.a., Michigan Part 115 Solid Waste Management). The December 2018 amendments to Part 115 were developed to provide state of Michigan oversight of coal combustion residual impoundments and landfills and to ensure compliance with the federal CCR standards through a permitting program. It should be noted that the Michigan statute does not act in lieu of the federal standards until such a time as the US EPA authorizes the permit program. Additionally, on December 21, 2018, Consumer Energy and the Michigan Department of Environmental Quality (MDEQ)<sup>1</sup> executed Consent Agreement No. 115-01-2018. As outlined in Section 4.5 of the agreement, within 60 business days of executing the Consent Agreement, Consumers Energy agreed to submit a Hydrogeologic Monitoring Plan (HMP) for Pond A for EGLE review and approval. The Revised

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<sup>1</sup> On April 22, 2019, the MDEQ became known as the Michigan Department of Environment, Great Lakes, and Energy (EGLE). All references herein to the EGLE are inclusive of the MDEQ.

## Technical Memorandum

HMP, including an Assessment Monitoring Plan (AMP), was submitted on July 30, 2019 and approved by EGLE on August 13, 2019.

Pursuant to the AMP, groundwater protection standards (GWPSs) will be established for the detection monitoring constituents in Section 11511a(3) in accordance with 40 CFR 257.95(h)<sup>2</sup>. Per 40 CFR 257.95(h), the GWPSs will be the higher of background statistical limits, the U.S. EPA maximum contaminant level (MCL) or a risk-based screening level. For constituents that do not have an established MCL, the Michigan Part 201 drinking water criteria were used to develop the GWPSs. For constituents that have statistically derived background levels higher than the MCL/risk-based screening level, the GWPS will be the background level. This memorandum presents the background statistical limits and GWPSs derived for the Appendix III constituents for the Site using the aforementioned approach pursuant to §257.95(h).

Following the implementation of the Pond A HMP and AMP, the background data for the JH Campbell site were evaluated in accordance with the Groundwater Statistical Evaluation Plan (Stats Plan) (TRC, October 2017). The JHC site groundwater data are maintained within a database accessible through Sanitas™ statistical software. Sanitas™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in U.S. EPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (Unified Guidance; UG). Within the Sanitas™ statistical program (and the UG), tolerance limits were selected to perform the statistical calculation for background limits. Use of tolerance limits is a streamlined approach that offers adequate statistical power under the current, initial stage of establishing background and developing the monitoring program. Additionally, tolerance limits are recommended by the UG as an acceptable approach to establish background-based groundwater protection standards for assessment monitoring under the CCR rule. Upper tolerance limits (UTLs) were calculated for each of the CCR Appendix III constituents, with both an upper and lower tolerance limit calculated for pH. GWPSs will be calculated for the additional Section 11511a(3) constituents (iron) and Section 11519b(2) (copper, nickel, silver, vanadium, and zinc) after background is established in accordance with the HMP and the AMP. The following narrative describes the methods employed and the results obtained and the Sanitas™ output files are included as an attachment.

The set of background wells utilized for the JH Campbell CCR units at the Site includes JHC-MW-15023, JHC-MW-15024, JHC-MW-15025, JHC-MW-15026, JHC-MW-15027, and JHC-MW-15028. Analytical data collected from the background monitoring wells from December 2015 to April 2019 are presented in attached Table A1. The background evaluation included the following steps:

- Review of data quality reports for the baseline/background data sets for CCR Appendix III constituents;

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<sup>2</sup> As amended per Phase One, Part One of the CCR Rule (83 FR 36435).

## Technical Memorandum

- Graphical representation of the baseline data as time versus concentration (T v. C) by well/constituent pair;
- Outlier testing of individual data points that appear from the graphical representations as potential outliers;
- Evaluation of percentage of non-detects for each background well-constituent (w/c) pair;
- Distribution of the data;
- Calculation of the UTL for each cumulative background data set (upper and lower confidence limits calculated for pH); and
- Establishment of GWPS as the MCL or Part 201 drinking water criteria, or the statistical limit if the statistical limit is higher than the MCL/Part 201 criteria for each Appendix III constituent.

The results of these evaluations are presented and discussed below.

### Data Quality

Data from each sampling round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The review was completed using the following quality control (QC) information which at a minimum included chain-of-custody forms, investigative sample results including blind field duplicates, and matrix spike and matrix spike duplicates (MS/MSDs) recoveries, and, as provided by the laboratory, method blanks, laboratory control spikes, and laboratory duplicates. The data were found to be complete and usable for the purposes of the CCR monitoring program.

Field parameter data (pH) from each sampling round were reviewed for completeness, overall quality and usability including calibration data and stabilization data. Data was complete and usable for the purposes of the CCR monitoring program, with the exception of pH results for JHC-MW-15024, JHC-MW-15025, and JHC-MW-15026 in April 2018, which were rejected as potentially biased high due to groundwater quality meter malfunction.

### Time versus Concentration Graphs

The T v. C graphs show no potential outliers for Appendix III constituents in the background well sets (Sanitas™ outputs). While variations in results are present, the graphs do not suggest that data sets, as a whole, likely have overall trending or seasonality. The data sets are of relatively short duration for making such observations.

### Outlier Testing

No suspect data points were identified in the T v. C graphs (Sanitas™ outputs). The Dixon's Outlier Test in Sanitas™ was therefore not employed for outlier testing.

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### Percentage of Non-Detects

Table 1 summarizes the percentage of results below the reporting limit for each w/c pair.

Table 1  
Summary of Percentage of Appendix III Baseline Results Below Reporting Limit

WELL	CONSTITUENT	PERCENT NON-DETECT
JHC-MW-15023	Boron	0
	Calcium	0
	Chloride	8
	Fluoride	100
	pH	0
	Sulfate	8
	TDS	17
JHC-MW-15024	Boron	42
	Calcium	0
	Chloride	0
	Fluoride	100
	pH	0
	Sulfate	8
	TDS	0
JHC-MW-15025	Boron	17
	Calcium	0
	Chloride	0
	Fluoride	100
	pH	0
	Sulfate	8
	TDS	0
JHC-MW-15026	Boron	100
	Calcium	8
	Chloride	0
	Fluoride	100
	pH	0
	Sulfate	8
	TDS	8
JHC-MW-15027	Boron	92
	Calcium	0
	Chloride	0
	Fluoride	100
	pH	0
	Sulfate	8
	TDS	8

# Technical Memorandum

Table 1  
Summary of Percentage of Appendix III Baseline Results Below Reporting Limit

WELL	CONSTITUENT	PERCENT NON-DETECT
JHC-MW-15028	Boron	83
	Calcium	0
	Chloride	83
	Fluoride	100
	pH	0
	Sulfate	8
	TDS	17
COMBINED	Boron	56
	Calcium	1
	Chloride	15
	Fluoride	100
	pH	0
	Sulfate	8
	TDS	8

## Technical Memorandum

### Distribution of the Data Sets

The distribution of the data sets is determined by the Sanitas™ software during calculation of the upper tolerance limit. The Shapiro-Francia normality test is used for samples sizes greater than 50. Non-detect/censored data were handled in accordance with the Stats Plan. If the data appear to be non-normal, mathematical transformations of the data may be utilized such that the transformed data follow a normal distribution (e.g., lognormal distributions). Alternatively, non-parametric tests may be utilized when data cannot be normalized. Table 2 summarizes the distributions determined by the Sanitas™ software. The distribution is based on the combined baseline results for all six background monitoring wells.

Table 2  
Summary of Background/Baseline Data Distributions

CONSTITUENT	DISTRIBUTION
Boron	Non-Parametric (>50% censored data)
Calcium	Normalized by square root transformation
Chloride	Normalized by natural log transformation after Kaplan Meier adjustment
Fluoride	All ND – use highest RL
pH	Non-normal (no value exists in the tolerance factor table for n=75)
Sulfate	Normalized by square transformation
TDS	Normalized by cube root transformation

ND = Non-detect

RL = Reporting Limit

### Upper Tolerance Limits

Table 3 presents the calculated upper tolerance limits for the background/baseline data sets. For data sets with normal distributions or distributions normalized by transformation, UTLs are calculated for 95 percent coverage and 95 percent confidence using parametric tolerance limits. For non-normal background datasets, a nonparametric tolerance limit is utilized, resulting in the highest value from the background dataset as the UTL. GWPSs are set in accordance with §257.95(h) and Part 115 Rule 4441(9). For constituents with an MCL, the GWPS is set at the MCL. For constituents without an established MCL, the GWPS is set at the lowest of the Part 201 criteria. If the statistical background level is greater than the MCL/Part 201 criteria, the background level becomes the GWPS. Compliance with the GWPSs will be determined using confidence limits in accordance with the Assessment Monitoring Plan. Verification resampling (1 of 2) is recommended per the Stats Plan and UG to achieve a site-wide false positive rate within the range specified in the CCR rule and PA 640.





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Table 3  
Groundwater Protection Standards

CONSTITUENT	UNITS	UPPER TOLERANCE LIMIT – FROM SANITAS™	MAXIMUM CONTAMINANT LEVEL	PART 201 RESIDENTIAL DW CRITERIA	PART 201 NON-RESIDENTIAL DW CRITERIA	PART 201 GSI CRITERIA	GROUNDWATER PROTECTION STANDARD
Boron	ug/L	54	NC	500	500	7,200	500
Calcium	mg/L	40	NC	NC	NC	500	500
Chloride	mg/L	70	250*	250	250	500	250
Fluoride	ug/L	RL (1,000)	4,000	NC	NC	NC	4,000
pH	su	5.5 – 8.8	6.5 - 8.5*	6.5 – 8.5	6.5 - 8.5	6.5 - 9.0	5.5 - 8.8
Sulfate	mg/L	13	250*	250	250	500	250
TDS	mg/L	240	500*	500**	500**	500	500

DL = Detection Limit

NC = No Criteria

DW = Drinking Water

GSI = Groundwater-Surface Water Interface

\* = Secondary MCL

\*\* = Criteria is the aesthetic drinking water value per Footnote {E}

## Attachments

Table A1 – Summary of Groundwater Sampling Results (Analytical)

Sanitas™ Output Files

**Technical Memorandum**

**Table A1**  
**Summary of Groundwater Sampling Results**  
**(Analytical)**

**Table A1**  
 Summary of CCR Groundwater Analytical Data – December 2015 - April 2019  
 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:		JHC-MW-15023												
Sample Date:		12/4/2015	3/10/2016	6/23/2016	8/31/2016	11/16/2016	4/20/2017	6/21/2017	8/15/2017	9/26/2017	4/25/2018	6/19/2018	11/13/2018	4/23/2019
Constituent	Unit													
<b>Appendix III</b>														
Boron	ug/L	51	43	37	42	48	49	37.9	48	40.1	--	42.4	46.9	54
Calcium	mg/L	16.1	16.9	9.89	12.3	15.5	9.6	5.3	5.8	7.9	--	9.3	15.6	9.5
Chloride	mg/L	6.44	5.92	2.17	2.9	5.44	2.25	< 1.0	1.8	4.3	--	5.0	10.7	3.1
Fluoride	ug/L	< 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	6.3	5.8	5.5	5.6	5.8	5.5	5.8	5.8	5.8	6.1 <sup>(1)</sup>	6.0	6.1	5.9
Sulfate	mg/L	10.5	12.3	14.1	12.6	12.3	13.7	10	12.9	< 2.0	--	10.7	12.2	12
Total Dissolved Solids	mg/L	71	78	68	77	83	78	< 50.0	60	< 50.0	--	68	80	75
<b>Appendix IV</b>														
Antimony	ug/L	< 1	2	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	22	33	23	20	26	35	21.7	23.2	--	24.8	21.5	21.7	22
Beryllium	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	< 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	< 1	<1	<1	< 1	< 1	2	< 1.0	< 1.0	--	1.1	< 1.0	< 1.0	< 1.0
Cobalt	ug/L	< 15	<15	<15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0	< 6.0
Fluoride	ug/L	< 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	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	< 10	<10	<10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10
Mercury	ug/L	< 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	< 5	<5	<5	< 5	< 5	< 5	< 5.0	< 5.0	--	< 5.0	< 5.0	< 5.0	< 5.0
Radium-226	pCi/L	< 0.182	<0.163	<0.189	< 0.328	< 0.175	< 0.26	< 0.687	< 0.686	--	< 0.647	< 0.729	< 0.531	0.108
Radium-228	pCi/L	0.838	1.05	0.652	0.78	0.827	1.01	< 0.662	< 0.819	--	< 0.802	< 0.884	< 0.894	< 0.355
Radium-226/228	pCi/L	0.672	1.20	0.780	0.906	0.88	1.14	< 1.35	< 1.51	--	< 1.45	< 1.61	< 1.43	< 0.355
Selenium	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	< 2	<2	<2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0

**Notes:**

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

All metals were analyzed as total unless otherwise specified.

(1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table A1**  
 Summary of CCR Groundwater Analytical Data – December 2015 - April 2019  
 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:		JHC-MW-15024												
Sample Date:		12/4/2015	3/10/2016	6/23/2016	9/1/2016	11/16/2016	4/20/2017	6/21/2017	8/15/2017	9/26/2017	4/25/2018	6/19/2018	11/13/2018	4/23/2019
Constituent	Unit													
<b>Appendix III</b>														
Boron	ug/L	22	22	<20	23	23	27	22.6	24.8	< 20.0	--	< 20.0	< 20.0	< 50
Calcium	mg/L	31	41.7	41.5	42.4	35	37.4	34.6	33.4	28.5	--	31.7	28.0	29
Chloride	mg/L	25.2	36.5	33.0	42	21.8	33.6	42.4	43.4	31.3	--	50.3	17.7	30
Fluoride	ug/L	< 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	7.4	7.3	7.3	7.4	7.1	7.5	7.7	7.4	7.3	9.0 <sup>(1)</sup>	7.4	7.1	7.2
Sulfate	mg/L	9.85	9.32	9.20	9.59	8.38	9.2	8.1	10.9	< 2.0	--	9.1	7.0	7.5
Total Dissolved Solids	mg/L	180	200	210	270	180	210	176	218	142	--	258	180	180
<b>Appendix IV</b>														
Antimony	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	18	19	19	21	19	19	18.5	18.1	--	21.2	20	16.2	17
Beryllium	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	< 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	< 1	<1	<1	< 1	1	2	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Cobalt	ug/L	< 15	<15	<15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0	< 6.0
Fluoride	ug/L	< 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	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	< 10	<10	<10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10
Mercury	ug/L	< 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	< 5	<5	<5	< 5	< 5	< 5	< 5.0	< 5.0	--	< 5.0	< 5.0	< 5.0	< 5.0
Radium-226	pCi/L	< 0.179	<0.238	<0.196	0.317	< 0.245	0.245	< 0.701	< 0.709	--	< 0.416	< 0.738	1.21	< 0.0821
Radium-228	pCi/L	0.631	0.548	<0.576	< 0.473	< 0.514	< 0.641	< 0.697	< 0.841	--	< 0.689	< 0.723	<1.03	< 0.349
Radium-226/228	pCi/L	0.523	0.548	<0.576	0.568	< 0.514	< 0.641	< 1.40	< 1.55	--	< 1.11	< 1.46	1.76	< 0.349
Selenium	ug/L	< 1	<1	<1	< 1	1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	< 2	<2	<2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0

**Notes:**

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

All metals were analyzed as total unless otherwise specified.

(1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table A1**  
 Summary of CCR Groundwater Analytical Data – December 2015 - April 2019  
 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:		JHC-MW-15025												
Sample Date:		12/4/2015	3/10/2016	6/23/2016	9/1/2016	11/16/2016	4/20/2017	6/21/2017	8/14/2017	9/25/2017	4/25/2018	6/19/2018	11/13/2018	4/23/2019
Constituent	Unit													
<b>Appendix III</b>														
Boron	ug/L	32	25	<20	23	27	20	20.7	25.4	29.5	--	21.4	23.9	< 50
Calcium	mg/L	29.5	31.0	20.2	25.7	25.4	20.5	18.9	17.1	22.5	--	14.2	16.7	13
Chloride	mg/L	29.7	26.2	19.3	34.1	22.3	19.9	27.1	15.9	19.7	--	15.4	12.8	11
Fluoride	ug/L	< 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	8.1	8.0	7.4	7.4	7.5	7.5	7.4	7.3	7.3	8.4 <sup>(1)</sup>	7.0	7.9	6.7
Sulfate	mg/L	10.6	8.07	8.03	8.19	8.83	7.56	7.3	10.4	< 2.0	--	8.6	8.6	8.5
Total Dissolved Solids	mg/L	170	160	120	200	150	120	66	154	132	--	112	94	75
<b>Appendix IV</b>														
Antimony	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	7	7	15	10	7	11	10.1	7.8	--	8.8	13.1	14.1	20
Beryllium	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	< 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	< 1	1	<1	1	2	2	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Cobalt	ug/L	< 15	<15	<15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0	< 6.0
Fluoride	ug/L	< 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	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	< 10	<10	<10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10
Mercury	ug/L	< 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	< 5	<5	<5	< 5	< 5	< 5	< 5.0	< 5.0	--	< 5.0	< 5.0	< 5.0	< 5.0
Radium-226	pCi/L	< 0.313	<0.176	<0.191	< 0.27	< 0.198	< 0.36	< 0.820	< 0.763	--	< 0.748	< 0.576	< 0.677	< 0.0726
Radium-228	pCi/L	0.714	0.623	0.565	0.997	< 0.498	0.69	0.794	< 0.772	--	< 0.848	< 0.758	< 0.862	< 0.353
Radium-226/228	pCi/L	0.629	0.666	0.676	1.09	< 0.498	0.919	< 1.50	< 1.54	--	< 1.60	< 1.33	< 1.54	< 0.353
Selenium	ug/L	< 1	<1	3	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	< 2	<2	<2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0

**Notes:**

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

All metals were analyzed as total unless otherwise specified.

(1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table A1**  
 Summary of CCR Groundwater Analytical Data – December 2015 - April 2019  
 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:		JHC-MW-15026													
Sample Date:		12/7/2015	3/10/2016	6/24/2016	9/1/2016	11/16/2016	4/20/2017	6/21/2017	8/14/2017	9/25/2017	4/25/2018	6/18/2018	6/18/2018	11/13/2018	4/22/2019
Constituent	Unit														
<b>Appendix III</b>													Field Dup		
Boron	ug/L	< 20	<20	<20	< 20	< 20	< 20	< 20.0	< 20.0	< 20.0	--	< 20.0	< 20.0	< 20.0	< 50
Calcium	mg/L	< 1	7.83	11.1	11.9	7.68	5.81	4.1	8.6	4.7	--	9.8	9.2	9.2	12
Chloride	mg/L	1.13	2.32	5.95	6.94	3.03	4.37	3	5.9	2.2	--	5.4	5.4	7.0	8.8
Fluoride	ug/L	< 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	6.4	6.2	5.7	6.6	6.2	5.9	6.2	6.8	6.1	6.8 <sup>(1)</sup>	6.9	--	6.8	6.9
Sulfate	mg/L	7.59	7.02	7.88	7.82	8.07	6.62	5.2	9.4	< 2.0	--	7.5	7.5	8.0	8.6
Total Dissolved Solids	mg/L	40	43	62	79	47	34	68	156	64	--	70	82	< 50.0	140
<b>Appendix IV</b>															
Antimony	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	9	9	13	12	9	9	7.1	9.4	--	9.5	9	9.7	10.5	14
Beryllium	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	< 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	< 1	1	<1	< 1	1	1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cobalt	ug/L	< 15	<15	<15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0
Fluoride	ug/L	< 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	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	< 10	<10	<10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10
Mercury	ug/L	< 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	< 5	<5	<5	< 5	< 5	< 5	< 5.0	< 5.0	--	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Radium-226	pCi/L	< 0.156	<0.170	<0.176	< 0.248	< 0.218	< 0.357	< 0.897	< 0.803	--	< 0.523	< 0.864	< 0.618	0.615	< 0.0974
Radium-228	pCi/L	1.12	<0.557	1.62	1.58	2.85	1.18	1.01	1.12	--	< 0.789	< 0.735	< 1.48	<1.08	< 0.355
Radium-226/228	pCi/L	1.06	<0.557	1.70	1.58	2.85	1.36	< 1.61	1.75	--	< 1.31	< 1.60	< 0.857	<1.25	< 0.355
Selenium	ug/L	< 1	<1	2	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	< 2	<2	<2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

**Notes:**

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

All metals were analyzed as total unless otherwise specified.

(1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table A1**  
 Summary of CCR Groundwater Analytical Data – December 2015 - April 2019  
 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:		JHC-MW-15027												
Sample Date:		12/7/2015	3/11/2016	6/24/2016	9/1/2016	11/17/2016	4/21/2017	6/21/2017	8/14/2017	9/25/2017	4/25/2018	6/18/2018	11/13/2018	4/22/2019
Constituent	Unit													
<b>Appendix III</b>														
Boron	ug/L	23	<20	<20	< 20	< 20	< 20	< 20.0	< 20.0	< 20.0	--	< 20.0	< 20.0	< 50
Calcium	mg/L	27.3	16.4	19.6	18.3	18.2	9.06	6	8.7	9.7	--	11.5	9.6	7.4
Chloride	mg/L	7.25	3.04	11.7	8.93	5.9	2.64	1.4	1.6	1.8	--	7.1	5.2	2.0
Fluoride	ug/L	< 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	6.8	6.9	6.7	6.2	6.8	6.5	6.5	6.8	6.7	6.6 <sup>(1)</sup>	6.8	6.4	6.5
Sulfate	mg/L	10.4	9.91	9.16	8.75	8.89	9.26	6.7	9	< 2.0	--	8.5	9.0	7.5
Total Dissolved Solids	mg/L	120	80	100	89	85	57	70	50	112	--	60	54	< 50
<b>Appendix IV</b>														
Antimony	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Barium	ug/L	15	13	22	16	14	11	31.7	10.8	--	40.7	29.5	30.6	23
Beryllium	ug/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	ug/L	< 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	1	<1	1	1	1	2	1.1	1.1	--	1.5	< 1.0	< 1.0	< 1.0
Cobalt	ug/L	< 15	<15	<15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 6.0	< 6.0
Fluoride	ug/L	< 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	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Lithium	ug/L	< 10	<10	<10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10
Mercury	ug/L	< 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	< 5	<5	<5	< 5	< 5	< 5	< 5.0	< 5.0	--	< 5.0	< 5.0	< 5.0	< 5.0
Radium-226	pCi/L	< 0.199	<0.239	<0.165	< 0.218	< 0.266	< 0.418	< 0.842	< 0.628	--	< 0.573	< 0.783	< 0.695	< 0.103
Radium-228	pCi/L	0.900	0.738	0.759	1.18	2.43	0.702	1.45	0.964	--	< 0.782	< 0.641	0.961	< 0.340
Radium-226/228	pCi/L	0.900	0.738	0.777	1.18	2.51	0.897	1.87	< 1.36	--	< 1.36	< 1.42	1.61	< 0.340
Selenium	ug/L	< 1	<1	2	< 1	< 1	< 1	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	< 2	<2	<2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0

**Notes:**

ug/L - micrograms per liter.

mg/L - milligrams per liter.

SU - standard units; pH is a field parameter.

pCi/L - picocuries per liter.

All metals were analyzed as total unless otherwise specified.

(1) pH value potentially biased high due to groundwater quality meter malfunction.

**Table A1**  
 Summary of CCR Groundwater Analytical Data – December 2015 - April 2019  
 JH Campbell Background – RCRA CCR Monitoring Program  
 West Olive, Michigan

Sample Location:		JHC-MW-15028																	
Sample Date:		12/7/2015	3/11/2016	6/24/2016	9/1/2016	11/17/2016	4/21/2017	6/21/2017	8/14/2017	9/25/2017	4/25/2018	4/25/2018	6/18/2018	11/13/2018	11/13/2018	4/22/2019	4/22/2019		
Constituent	Unit																		
<b>Appendix III</b>																			
Boron	ug/L	26	<20	<20	< 20	20	< 20	< 20.0	< 20.0	< 20.0	--	Field Dup	--	< 20.0	< 20.0	Field Dup	< 20.0	< 50	< 50
Calcium	mg/L	13.1	16	11.4	14.4	12.6	10.4	13.7	11.4	12.7	--	--	8.9	11.4	11.6	10	10		
Chloride	mg/L	< 1	<1	<1	< 1	< 1	< 1	< 1.0	< 1.0	< 1.0	--	--	3.0	4.0	4.0	< 2.0	< 2.0		
Fluoride	ug/L	< 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	8.24	8.7	7.9	7.5	8.4	8.1	8.8	8.8	8.8	8.5 <sup>(1)</sup>	--	--	8.1	7.8	--	7.6	--	--
Sulfate	mg/L	5.08	5.10	5.05	4.93	5.08	5.87	3.3	5.3	< 2.0	--	--	4.2	4.9	4.9	5.5	5.5		
Total Dissolved Solids	mg/L	63	60	61	69	64	56	< 50.0	54	54	--	--	< 50.0	50	54	< 50	52		
<b>Appendix IV</b>																			
Antimony	ug/L	< 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
Arsenic	ug/L	< 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
Barium	ug/L	< 5	<5	<5	< 5	< 5	5	5.3	5.4	--	5.3	5.1	5.3	5.5	4.4	5.4	5.2		
Beryllium	ug/L	< 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
Cadmium	ug/L	< 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
Chromium	ug/L	< 1	<1	<1	< 1	1	1	1.2	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cobalt	ug/L	< 15	<15	<15	< 15	< 15	< 15	< 15.0	< 15.0	--	< 15.0	< 15.0	< 15.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0	< 6.0
Fluoride	ug/L	< 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	< 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
Lithium	ug/L	< 10	<10	<10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Mercury	ug/L	< 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
Molybdenum	ug/L	< 5	<5	<5	< 5	< 5	< 5	< 5.0	< 5.0	--	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Radium-226	pCi/L	< 0.181	<0.149	0.166	< 0.189	< 0.181	< 0.346	< 0.566	< 0.905	--	< 0.438	< 0.573	< 0.945	< 0.688	< 0.830	< 0.0933	< 0.0917		
Radium-228	pCi/L	< 0.573	0.446	<0.529	< 0.519	< 0.522	< 0.714	0.666	< 0.962	--	< 0.619	< 0.649	< 0.827	< 1.05	< 0.728	< 0.308	< 0.353		
Radium-226/228	pCi/L	< 0.573	0.461	<0.529	< 0.519	< 0.522	< 0.714	< 1.12	< 1.87	--	< 1.06	< 1.22	< 1.77	< 1.74	< 1.56	< 0.308	< 0.353		
Selenium	ug/L	3	5	3	2	4	3	< 1.0	< 1.0	--	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Thallium	ug/L	< 2	<2	<2	< 2	< 2	< 2	< 2.0	< 2.0	--	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

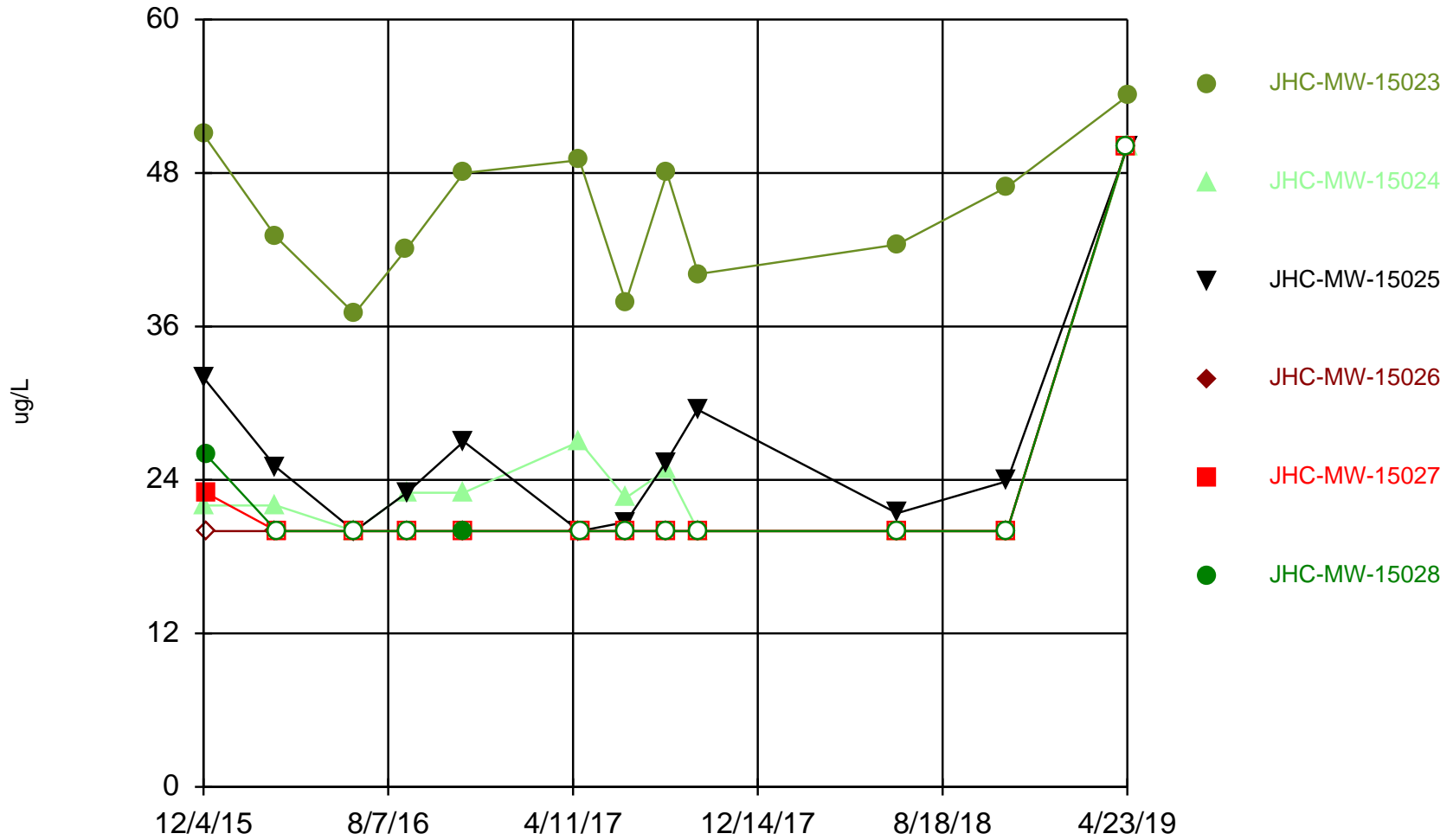
**Notes:**  
 ug/L - micrograms per liter.  
 mg/L - milligrams per liter.  
 SU - standard units; pH is a field parameter.  
 pCi/L - picocuries per liter.  
 All metals were analyzed as total unless otherwise specified.  
 (1) pH value potentially biased high due to groundwater quality meter malfunction.



## **Technical Memorandum**

# **Sanitas™ Output Files**

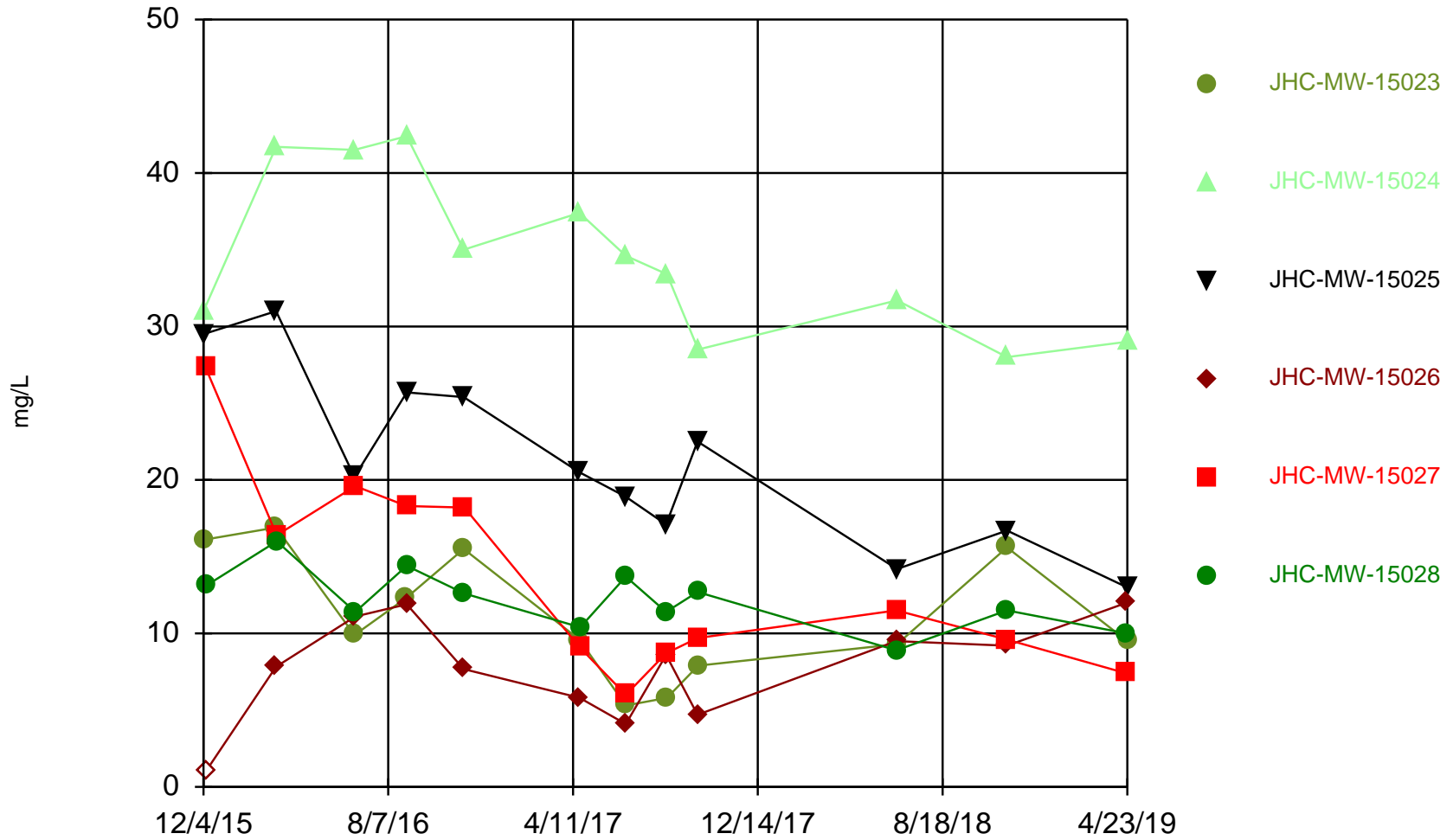
### Time Series



Constituent: Boron, Total Analysis Run 10/28/2019 12:35 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

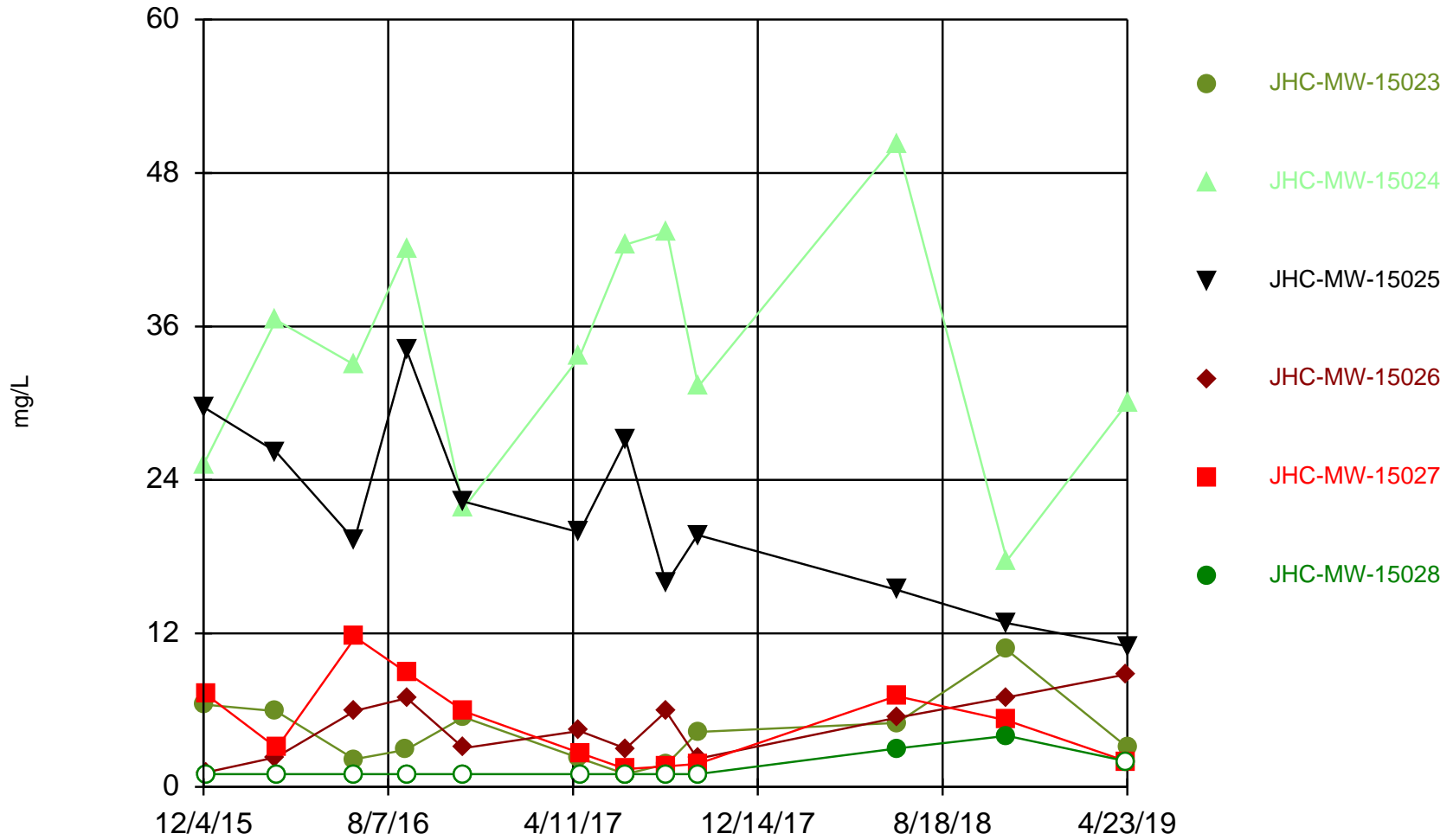
### Time Series



Constituent: Calcium, Total Analysis Run 10/28/2019 12:35 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

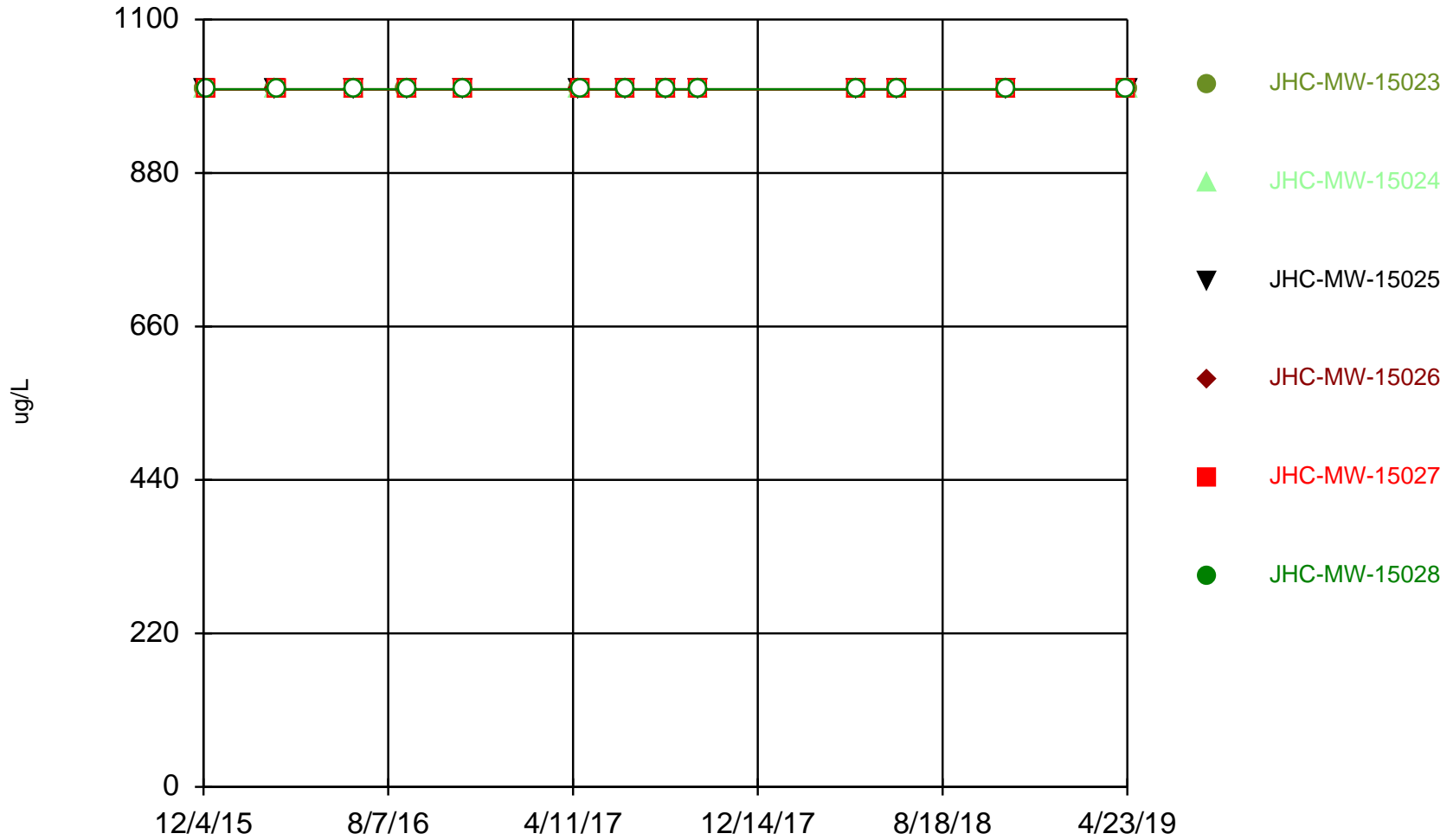
### Time Series



Constituent: Chloride Analysis Run 10/28/2019 12:35 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

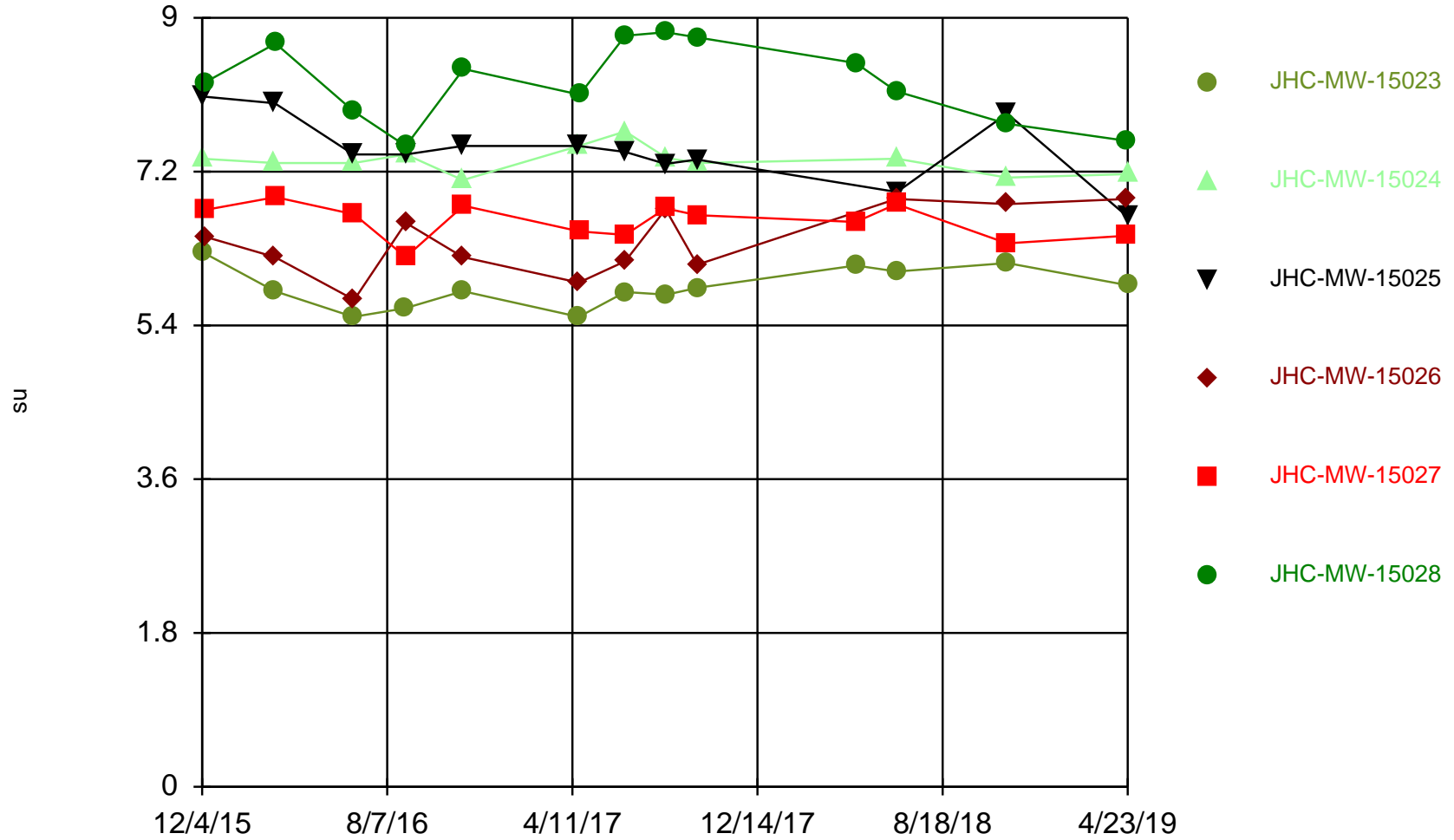
### Time Series



Constituent: Fluoride Analysis Run 10/28/2019 12:35 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

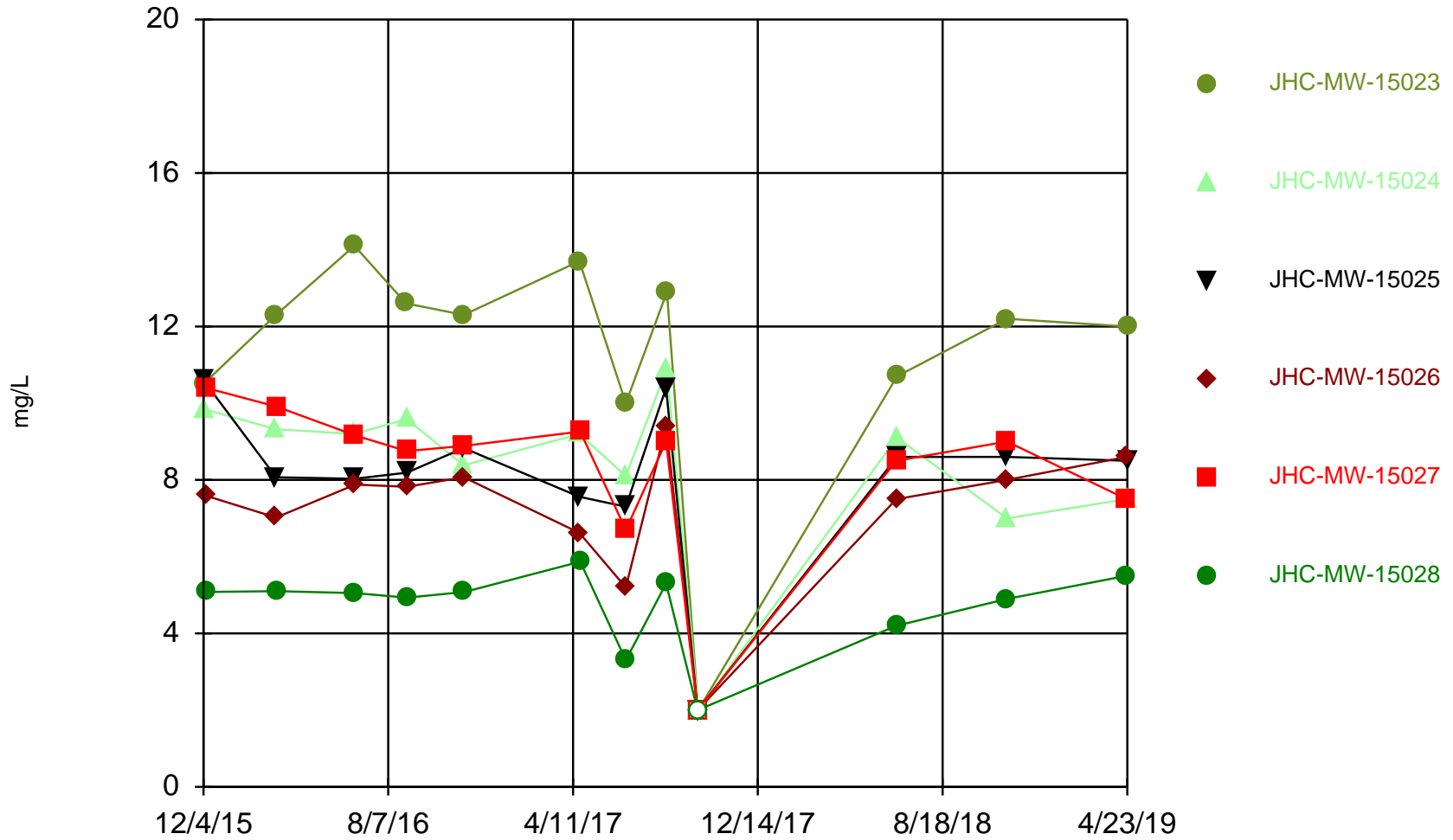
### Time Series



Constituent: pH, Field Analysis Run 10/28/2019 12:35 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

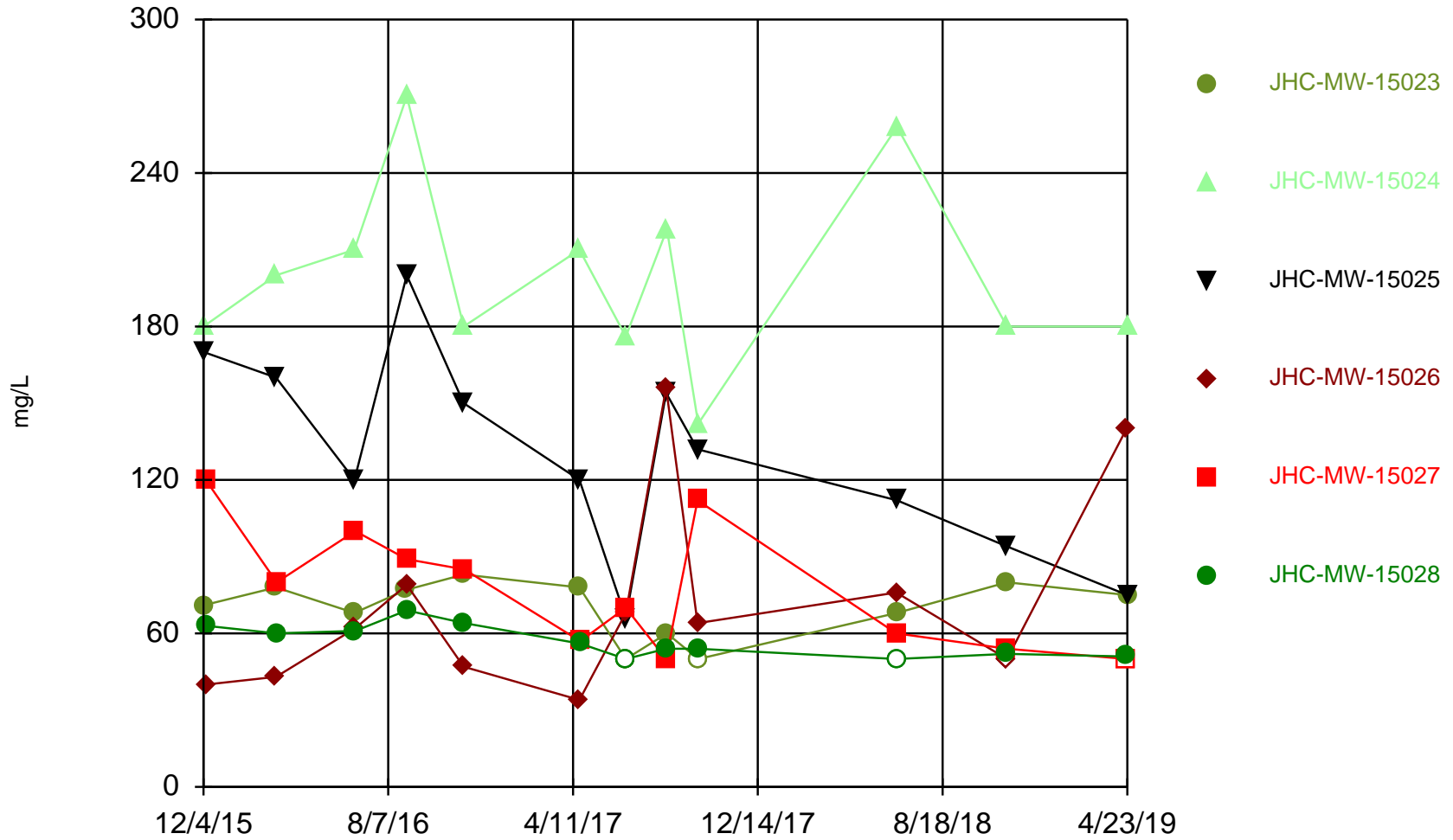
### Time Series



Constituent: Sulfate Analysis Run 10/28/2019 12:35 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

### Time Series



Constituent: Total Dissolved Solids, Total Analysis Run 10/28/2019 12:35 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08



# Summary Report

Constituent: Boron, Total Analysis Run 10/28/2019 12:49 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

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For observations made between 12/4/2015 and 4/23/2019, a summary of the selected data set:

Observations = 72  
ND/Trace = 40  
Wells = 6  
Minimum Value = 20  
Maximum Value = 54  
Mean Value = 27.37  
Median Value = 20  
Standard Deviation = 11.18  
Coefficient of Variation = 0.4086  
Skewness = 1.253

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15023	12	0	37	54	44.94	44.95	5.332	0.1186	0.0529
JHC-MW-15024	12	5	20	50	24.53	22.3	8.302	0.3384	2.673
JHC-MW-15025	12	2	20	50	26.49	24.45	8.303	0.3134	2.032
JHC-MW-15026	12	12	20	50	22.5	20	8.66	0.3849	3.015
JHC-MW-15027	12	11	20	50	22.75	20	8.625	0.3791	2.964
JHC-MW-15028	12	10	20	50	23	20	8.676	0.3772	2.826

# Summary Report

Constituent: Calcium, Total Analysis Run 10/28/2019 12:49 PM  
 Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

For observations made between 12/4/2015 and 4/23/2019, a summary of the selected data set:

Observations = 72  
 ND/Trace = 1  
 Wells = 6  
 Minimum Value = 1  
 Maximum Value = 42.4  
 Mean Value = 16.72  
 Median Value = 13.05  
 Standard Deviation = 10.08  
 Coefficient of Variation = 0.6029  
 Skewness = 0.9603

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15023	12	0	5.3	16.9	11.14	9.745	4.058	0.3643	0.1195
JHC-MW-15024	12	0	28	42.4	34.52	34	5.237	0.1517	0.3276
JHC-MW-15025	12	0	13	31	21.23	20.35	5.757	0.2712	0.2912
JHC-MW-15026	12	1	1	12	7.785	8.215	3.362	0.4319	-0.5248
JHC-MW-15027	12	0	6	27.3	13.48	10.6	6.403	0.475	0.7781
JHC-MW-15028	12	0	8.9	16	12.18	12.05	1.988	0.1633	0.2331

# Summary Report

Constituent: Chloride Analysis Run 10/28/2019 12:49 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

For observations made between 12/4/2015 and 4/23/2019, a summary of the selected data set:

Observations = 72  
ND/Trace = 11  
Wells = 6  
Minimum Value = 1  
Maximum Value = 50.3  
Mean Value = 11.73  
Median Value = 5.9  
Standard Deviation = 12.94  
Coefficient of Variation = 1.104  
Skewness = 1.266

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15023	12	1	1	10.7	4.252	3.7	2.683	0.6311	1.058
JHC-MW-15024	12	0	17.7	50.3	33.93	33.3	9.588	0.2826	-0.0462
JHC-MW-15025	12	0	11	34.1	21.12	19.8	7.029	0.3329	0.333
JHC-MW-15026	12	0	1.13	8.8	4.67	4.885	2.356	0.5044	0.1281
JHC-MW-15027	12	0	1.4	11.7	4.88	4.12	3.353	0.6871	0.6575
JHC-MW-15028	12	10	1	4	1.5	1	1	0.6667	1.709

# Summary Report

Constituent: Fluoride Analysis Run 10/28/2019 12:49 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

For observations made between 12/4/2015 and 4/23/2019, a summary of the selected data set:

Observations = 78

ND/Trace = 78

Wells = 6

Minimum Value = 1000

Maximum Value = 1000

Mean Value = 1000

Median Value = 1000

Standard Deviation = 0

Coefficient of Variation = 0

Skewness = NaN

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15023	13	13	1000	1000	1000	1000	0	0	NaN
JHC-MW-15024	13	13	1000	1000	1000	1000	0	0	NaN
JHC-MW-15025	13	13	1000	1000	1000	1000	0	0	NaN
JHC-MW-15026	13	13	1000	1000	1000	1000	0	0	NaN
JHC-MW-15027	13	13	1000	1000	1000	1000	0	0	NaN
JHC-MW-15028	13	13	1000	1000	1000	1000	0	0	NaN

# Summary Report

Constituent: pH, Field Analysis Run 10/28/2019 12:49 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

---

For observations made between 12/4/2015 and 4/23/2019, a summary of the selected data set:

Observations = 75  
ND/Trace = 0  
Wells = 6  
Minimum Value = 5.5  
Maximum Value = 8.83  
Mean Value = 6.976  
Median Value = 6.88  
Standard Deviation = 0.8637  
Coefficient of Variation = 0.1238  
Skewness = 0.2694

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15023	13	0	5.5	6.26	5.845	5.8	0.2355	0.0403	0.1362
JHC-MW-15024	12	0	7.1	7.67	7.328	7.325	0.1573	0.02147	0.5439
JHC-MW-15025	12	0	6.67	8.08	7.454	7.415	0.4023	0.05398	-0.1807
JHC-MW-15026	12	0	5.7	6.88	6.387	6.32	0.4015	0.06286	-0.1513
JHC-MW-15027	13	0	6.2	6.9	6.616	6.69	0.207	0.03129	-0.5304
JHC-MW-15028	13	0	7.5	8.83	8.243	8.24	0.4661	0.05655	-0.2254

# Summary Report

Constituent: Sulfate Analysis Run 10/28/2019 12:49 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

For observations made between 12/4/2015 and 4/23/2019, a summary of the selected data set:

Observations = 72  
ND/Trace = 6  
Wells = 6  
Minimum Value = 2  
Maximum Value = 14.1  
Mean Value = 7.961  
Median Value = 8.285  
Standard Deviation = 2.894  
Coefficient of Variation = 0.3635  
Skewness = -0.3195

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15023	12	1	2	14.1	11.28	12.25	3.167	0.2809	-2.254
JHC-MW-15024	12	1	2	10.9	8.345	9.15	2.26	0.2708	-1.925
JHC-MW-15025	12	1	2	10.6	8.057	8.345	2.15	0.2669	-1.839
JHC-MW-15026	12	1	2	9.4	7.142	7.705	1.922	0.2692	-1.69
JHC-MW-15027	12	1	2	10.4	8.256	8.945	2.197	0.2661	-2.074
JHC-MW-15028	12	1	2	5.87	4.693	5.065	1.067	0.2275	-1.538

# Summary Report

Constituent: Total Dissolved Solids, Total Analysis Run 10/28/2019 12:49 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.08.08

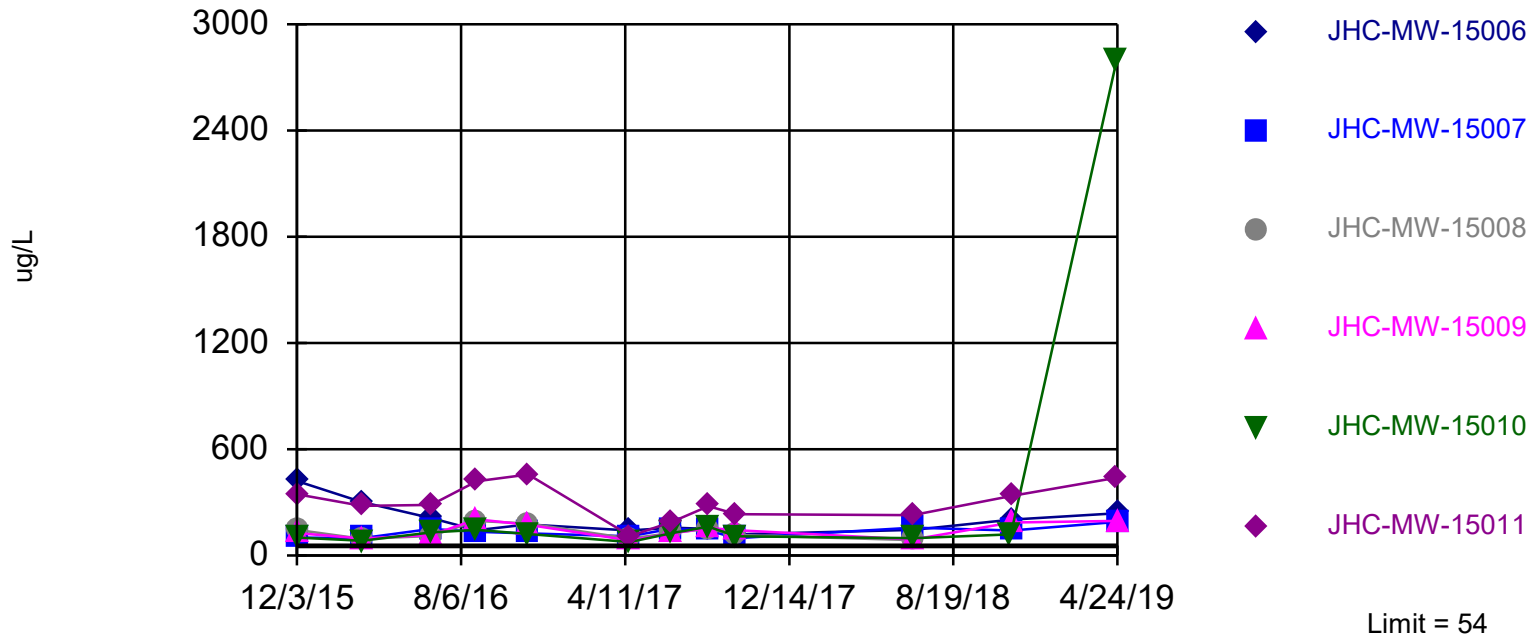
For observations made between 12/4/2015 and 4/23/2019, a summary of the selected data set:

Observations = 72  
ND/Trace = 6  
Wells = 6  
Minimum Value = 34  
Maximum Value = 270  
Mean Value = 100.9  
Median Value = 76.5  
Standard Deviation = 57.71  
Coefficient of Variation = 0.572  
Skewness = 1.11

<u>Well</u>	<u>#Obs.</u>	<u>ND/Trace</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>	<u>Median</u>	<u>Std.Dev.</u>	<u>CV</u>	<u>Skewness</u>
JHC-MW-15023	12	2	50	83	69.83	73	11.2	0.1604	-0.7866
JHC-MW-15024	12	0	142	270	200.3	190	36.09	0.1801	0.5872
JHC-MW-15025	12	0	66	200	129.4	126	39.68	0.3066	0.004761
JHC-MW-15026	12	1	34	156	71.58	63	38.54	0.5384	1.307
JHC-MW-15027	12	1	50	120	77.25	75	24.39	0.3157	0.4392
JHC-MW-15028	12	2	50	69	57	55	6.267	0.1099	0.5

Exceeds Limit: JHC-MW-15006, JHC-MW-15007, JHC-MW-15008, JHC-MW-15009...

### Tolerance Limit Interwell Non-parametric



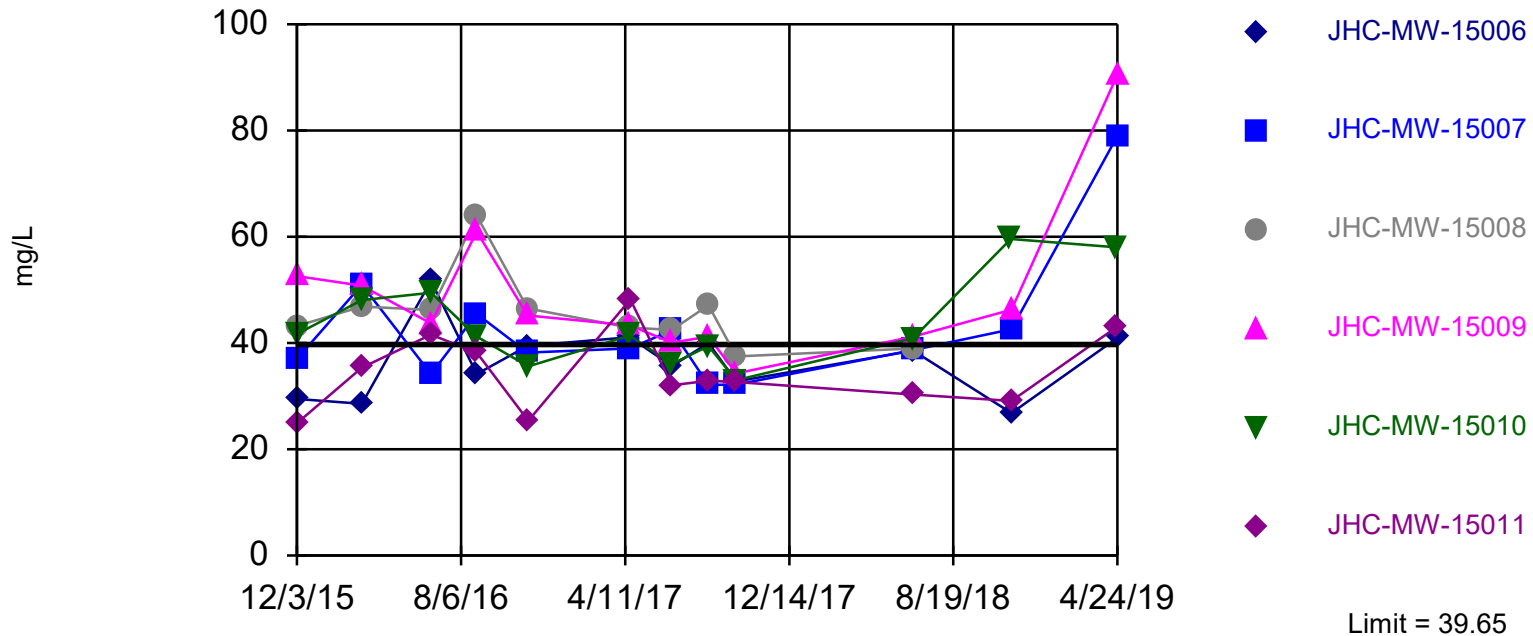
Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 72 background values. 55.56% NDs. 93.95% coverage at alpha=0.01; 95.9% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.02489.

Constituent: Boron, Total Analysis Run 11/22/2019 1:50 PM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14



Exceeds Limit: JHC-MW-15006, JHC-MW-15007, JHC-MW-15008, JHC-MW-15009,...

### Tolerance Limit Interwell Parametric



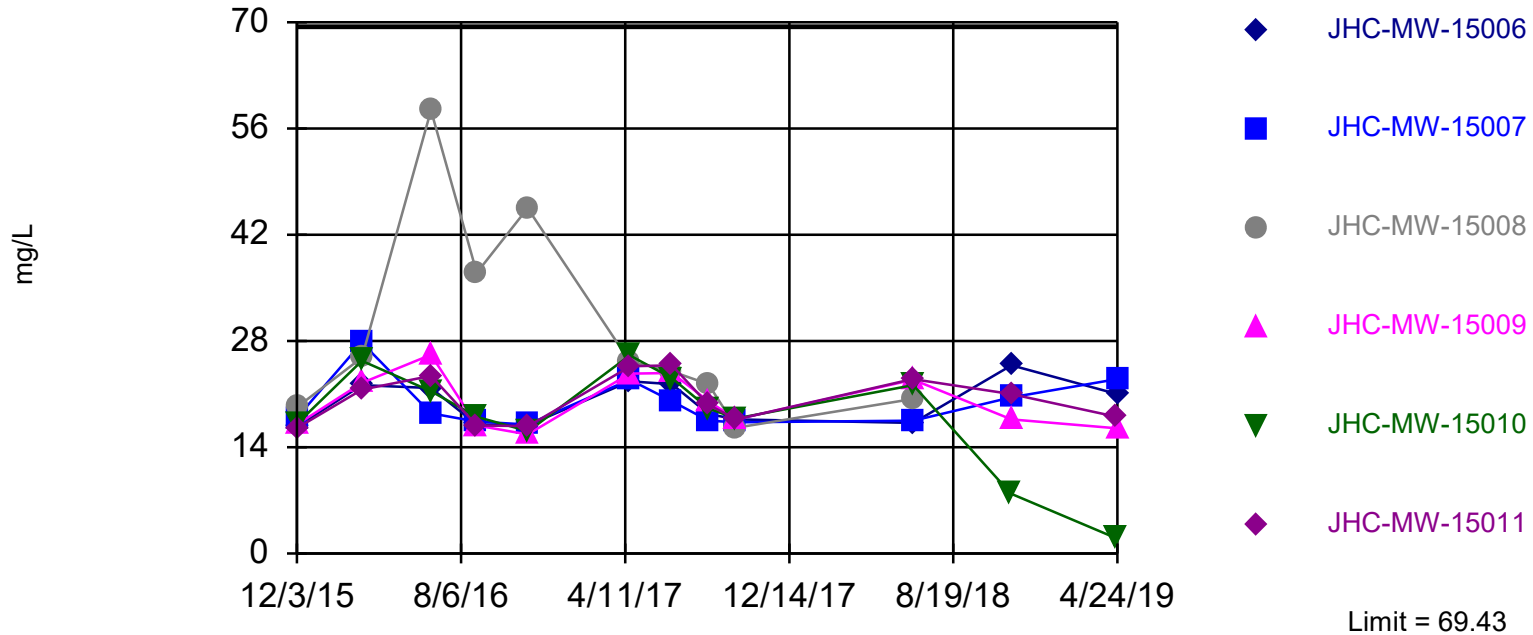
95% coverage. Background Data Summary (based on square root transformation): Mean=3.909, Std. Dev.=1.206, n=72, 1.389% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9607, critical = 0.954. Report alpha = 0.05.

Constituent: Calcium, Total Analysis Run 11/22/2019 1:50 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

Within Limit

Tolerance Limit  
Interwell Parametric



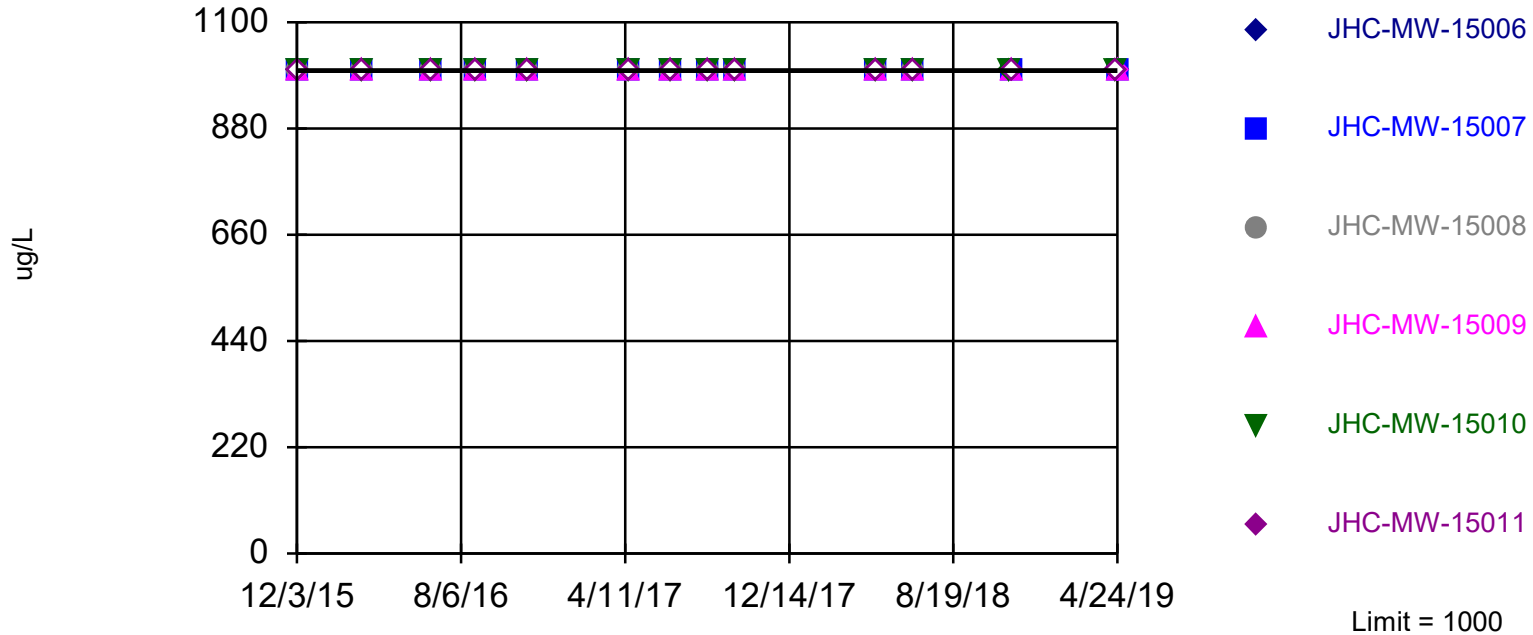
95% coverage. Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=1.751, Std. Dev.=1.257, n=72, 15.28% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9577, critical = 0.954. Report alpha = 0.05.

Constituent: Chloride Analysis Run 11/22/2019 1:50 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

Within Limit

### Tolerance Limit Interwell Non-parametric



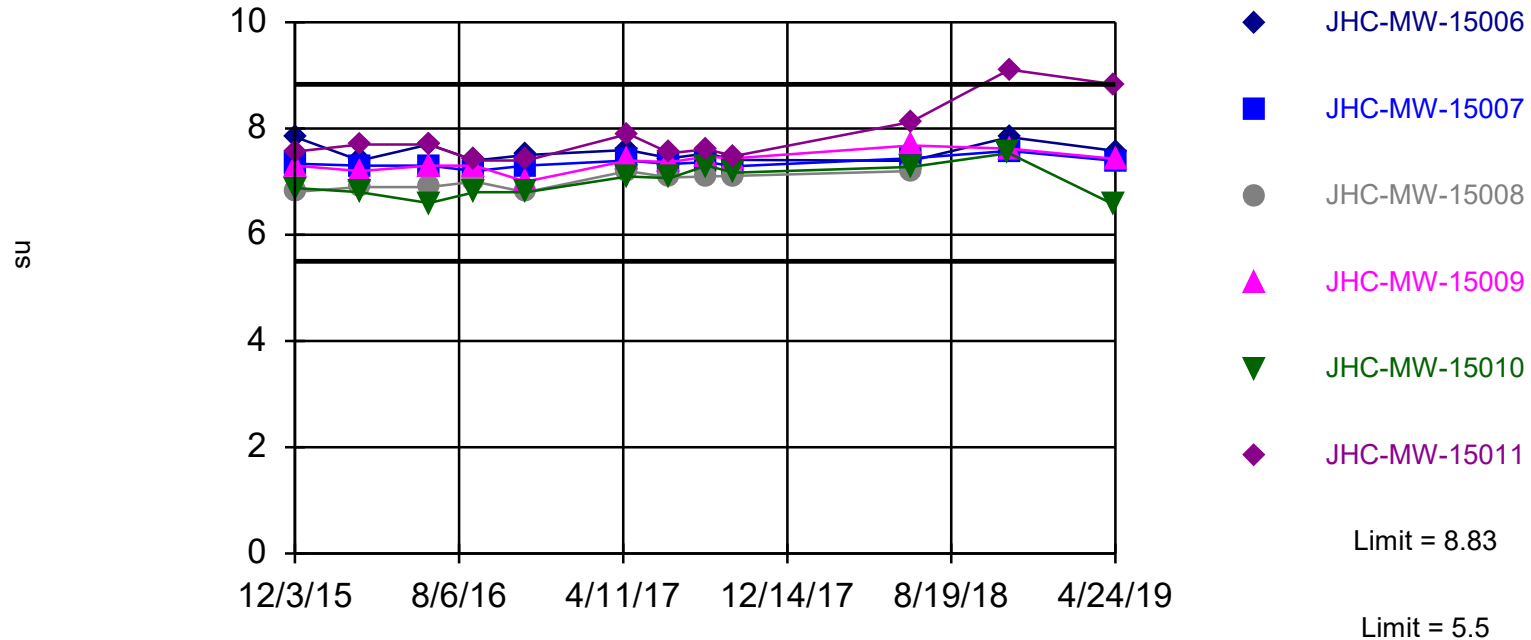
Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 78 background values. 100% NDs. 94.34% coverage at alpha=0.01; 96.29% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.0183.

Constituent: Fluoride Analysis Run 11/22/2019 1:50 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

Exceeds Limits: JHC-MW-15011

## Tolerance Limit Interwell Non-parametric



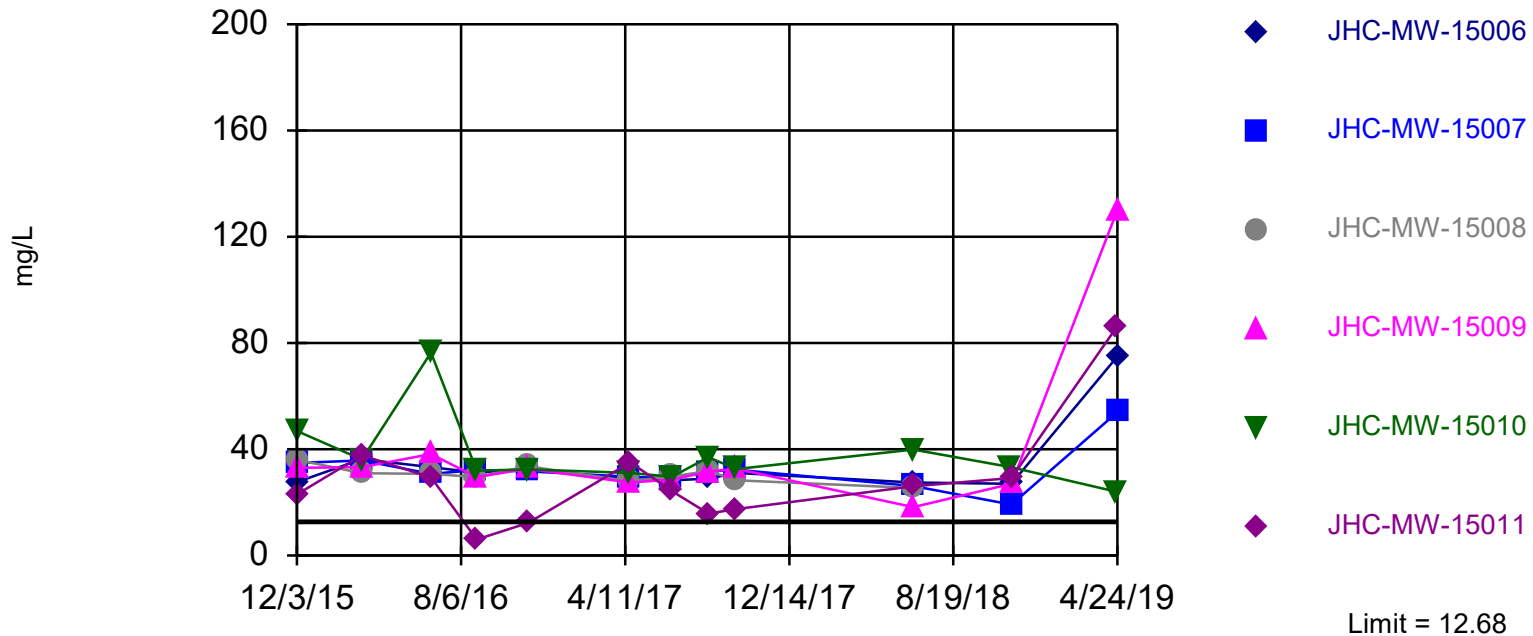
Non-parametric test used in lieu of parametric tolerance limit because no value exists in the tolerance factor table for  $n = 75$ ,  $\alpha = 0.05$ , two-tailed. Limits are highest and lowest of 75 background values. 91.6% coverage at  $\alpha=0.01$ ; 93.95% coverage at  $\alpha=0.05$ ; 97.85% coverage at  $\alpha=0.5$ . Report  $\alpha = 0.1056$  (0.0528 per tail).

Constituent: pH, Field Analysis Run 11/22/2019 1:50 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

Exceeds Limit: JHC-MW-15006, JHC-MW-15007, JHC-MW-15008, JHC-MW-15009,...

### Tolerance Limit Interwell Parametric



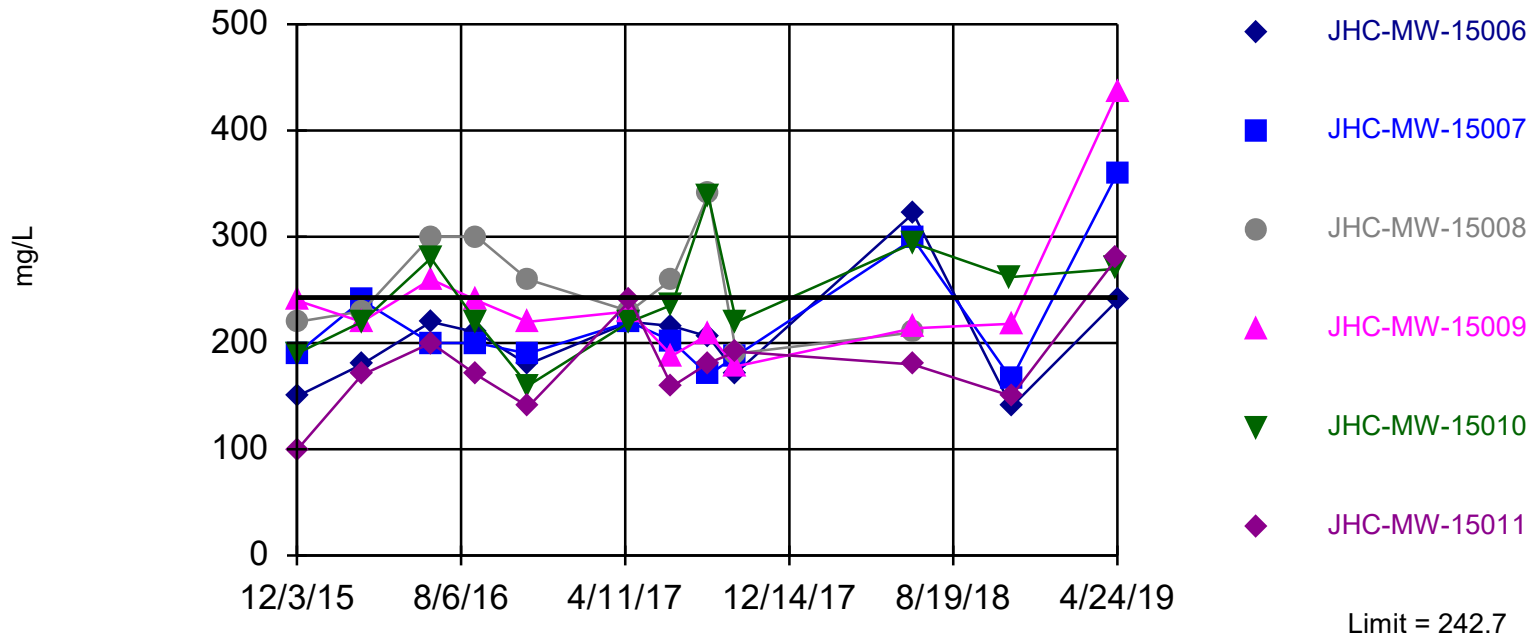
95% coverage. Background Data Summary (based on square transformation): Mean=71.39, Std. Dev.=45.2, n=72, 8.333% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9571, critical = 0.954. Report alpha = 0.05.

Constituent: Sulfate Analysis Run 11/22/2019 1:50 PM

Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

Exceeds Limit: JHC-MW-15006, JHC-MW-15007, JHC-MW-15008, JHC-MW-15009,...

### Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary (based on cube root transformation): Mean=4.441, Std. Dev.=0.9073, n=72, 8.333% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9652, critical = 0.954. Report alpha = 0.05.

Constituent: Total Dissolved Solids, Total Analysis Run 11/22/2019 1:50 PM

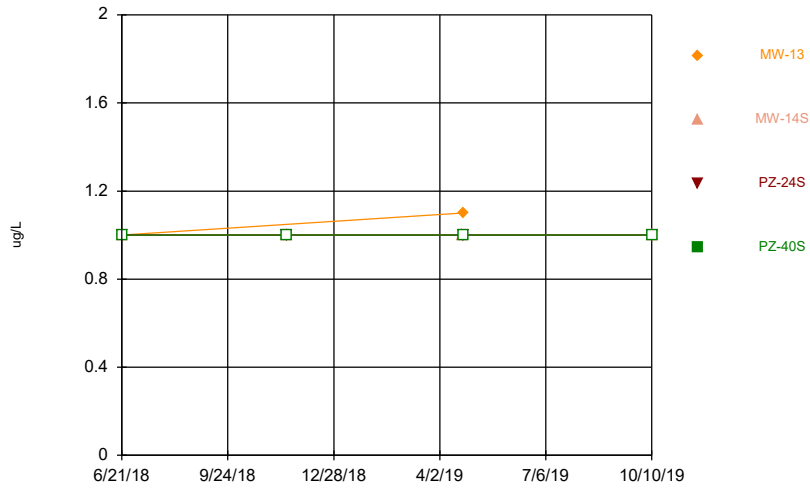
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

# Appendix H

## GSI Time Series Charts

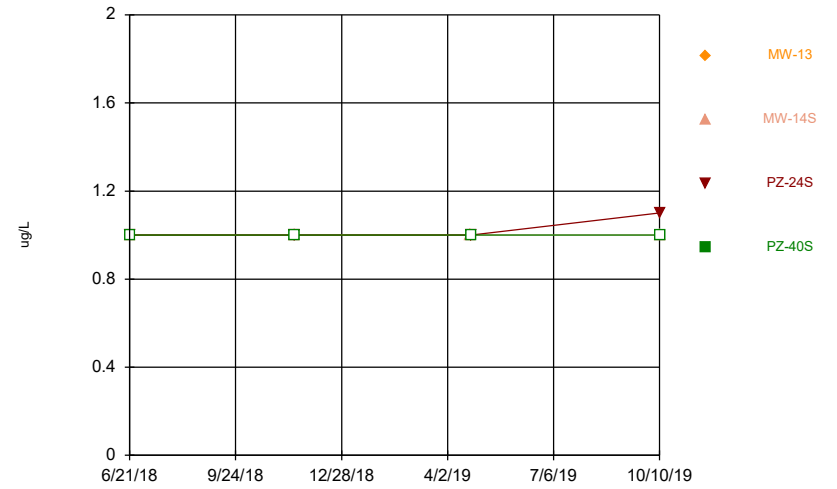
---

### Antimony, Total



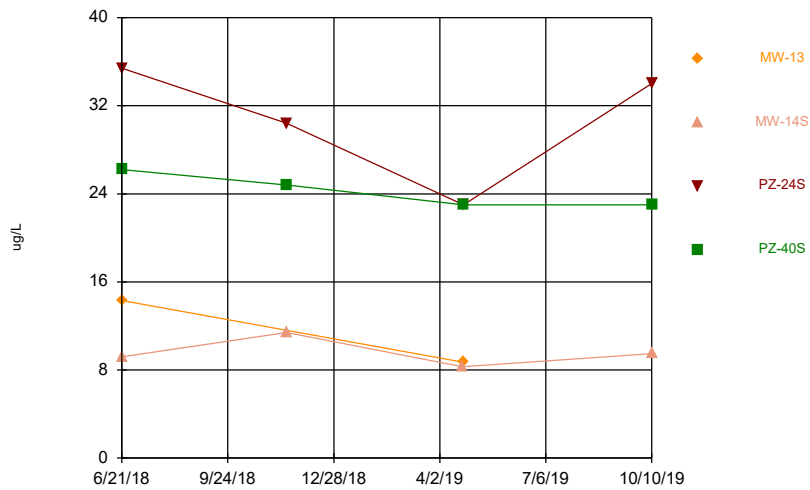
Time Series Analysis Run 1/10/2020 8:54 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

### Arsenic, Total



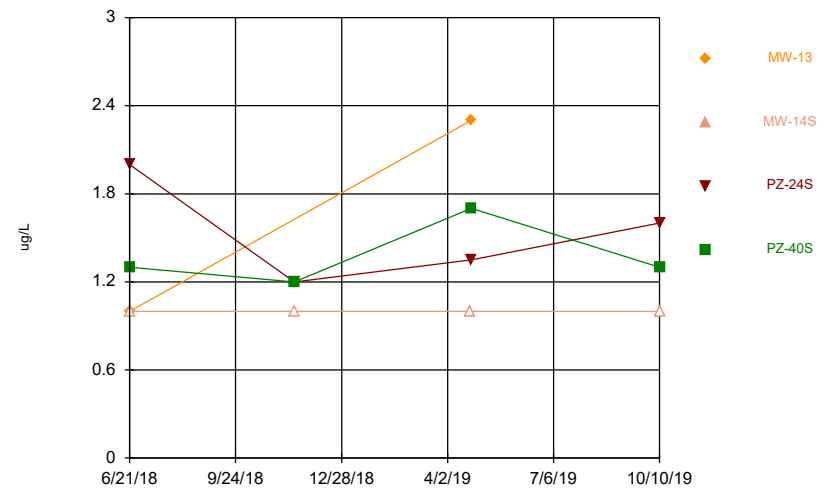
Time Series Analysis Run 1/10/2020 8:54 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

### Barium, Total



Time Series Analysis Run 1/10/2020 8:54 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

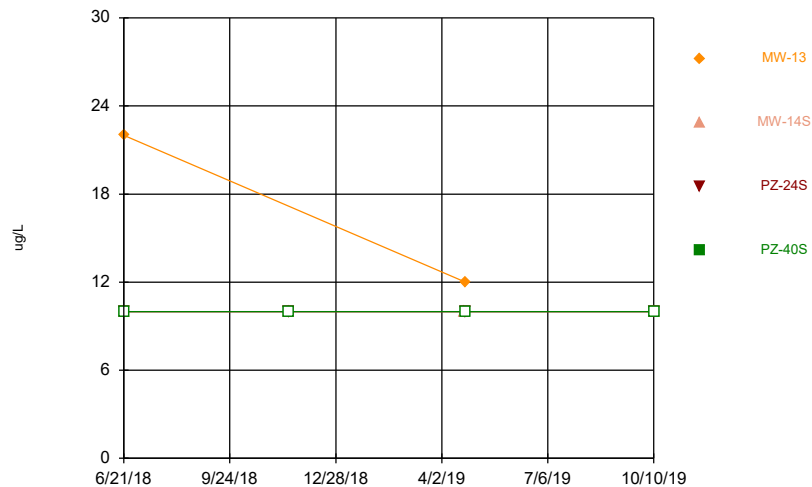
### Chromium, Total



Time Series Analysis Run 1/10/2020 8:54 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

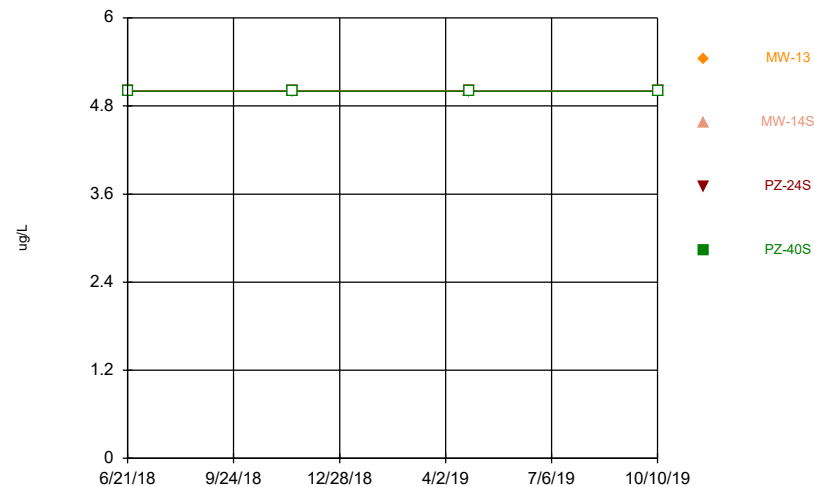


### Lithium, Total



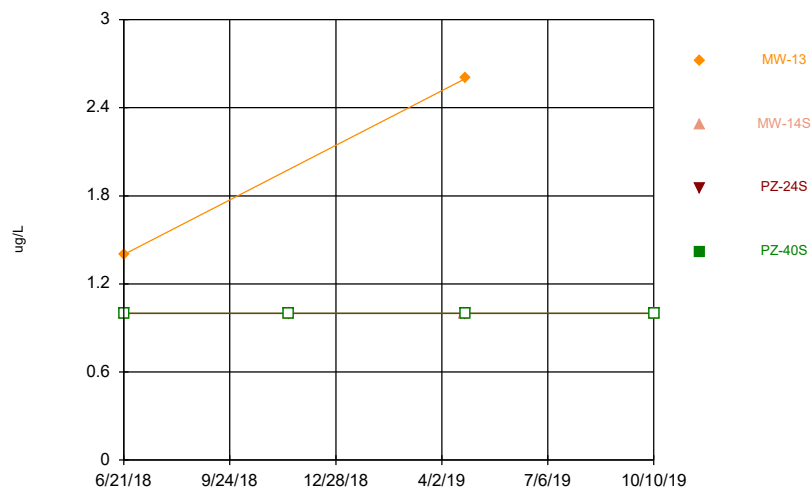
Time Series Analysis Run 1/10/2020 8:54 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

### Molybdenum, Total



Time Series Analysis Run 1/10/2020 8:54 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

### Selenium, Total



Time Series Analysis Run 1/10/2020 8:54 AM  
Client: Consumers Energy Data: JHC\_Sanitas\_19.11.14

# Appendix I

## October 2019 Laboratory Reports

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## ANALYTICAL REPORT

Eurofins TestAmerica, Canton  
4101 Shuffel Street NW  
North Canton, OH 44720  
Tel: (330)497-9396

Laboratory Job ID: 240-120412-1

Client Project/Site: JHC - CCR Pond A + Downgradient

**For:**

TRC Environmental Corporation.  
1540 Eisenhower Place  
Ann Arbor, Michigan 48108-7080

Attn: Darby Litz



*Authorized for release by:  
10/25/2019 8:25:02 PM*

Kris Brooks, Project Manager II  
(330)966-9790  
[kris.brooks@testamericainc.com](mailto:kris.brooks@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Definitions/Glossary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

**Job ID: 240-120412-1**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

**Client: TRC Environmental Corporation.**

**Project: JHC - CCR Pond A + Downgradient**

**Report Number: 240-120412-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The following analyses were performed at the Eurofins TestAmerica, Irvine laboratory: 6010B Total Recoverable Metals (ICP); 6020\_LL Metals (ICPMS); 7470A Mercury.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 10/12/2019 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 1.7° C, 2.8° C and 3.2° C.

### **TOTAL RECOVERABLE METALS (ICP)**

Samples MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3), FB-5 (240-120412-4) and EB-5 (240-120412-5) were analyzed for total recoverable metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 10/17/2019 and analyzed on 10/18/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **TOTAL RECOVERABLE METALS (ICPMS)**

Samples MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3), FB-5 (240-120412-4) and EB-5 (240-120412-5) were analyzed for total recoverable metals (ICPMS) in accordance with EPA SW-846 Method 6020. The samples were prepared on 10/14/2019 and analyzed on 10/15/2019.

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

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## Job ID: 240-120412-1 (Continued)

---

### Laboratory: Eurofins TestAmerica, Canton (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **METALS (ICPMS)**

Samples MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3), FB-5 (240-120412-4) and EB-5 (240-120412-5) were analyzed for metals (ICPMS) in accordance with SW846 Method 6020. The samples were prepared and analyzed on 10/17/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **TOTAL MERCURY**

Samples MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3), FB-5 (240-120412-4) and EB-5 (240-120412-5) were analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 10/16/2019 and analyzed on 10/17/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **TOTAL DISSOLVED SOLIDS**

Samples MW-14S (240-120412-1), PZ-24S (240-120412-2) and PZ-40S (240-120412-3) were analyzed for total dissolved solids in accordance with SM 2540C. The samples were analyzed on 10/14/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **ANIONS**

Samples MW-14S (240-120412-1), PZ-24S (240-120412-2) and PZ-40S (240-120412-3) were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 10/23/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# Method Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL IRV
6020	Metals (ICP/MS)	SW846	TAL CAN
6020	Metals (ICP/MS)	SW846	TAL IRV
7470A	Mercury (CVAA)	SW846	TAL IRV
2540 C-2011	Total Dissolved Solids (Dried at 180 °C)	SM	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL CAN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL IRV
7470A	Preparation, Mercury	SW846	TAL IRV

#### Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



# Sample Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-120412-1	MW-14S	Water	10/10/19 14:40	10/12/19 09:50	
240-120412-2	PZ-24S	Water	10/10/19 15:30	10/12/19 09:50	
240-120412-3	PZ-40S	Water	10/10/19 16:30	10/12/19 09:50	
240-120412-4	FB-5	Water	10/10/19 14:45	10/12/19 09:50	
240-120412-5	EB-5	Water	10/10/19 14:55	10/12/19 09:50	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Detection Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Client Sample ID: MW-14S

## Lab Sample ID: 240-120412-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	2.1		1.0	mg/L	1		6010B	Total Recoverable
Barium	0.0095		0.0050	mg/L	1		6020	Total Recoverable
Iron	0.28		0.010	mg/L	1		6020	Total Recoverable
Total Dissolved Solids	61		50	mg/L	1		2540 C-2011	Total/NA
Sulfate	3.6		2.0	mg/L	1		300.0	Total/NA

## Client Sample ID: PZ-24S

## Lab Sample ID: 240-120412-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	2.9		1.0	mg/L	1		6010B	Total Recoverable
Arsenic	0.0011		0.0010	mg/L	1		6020	Total Recoverable
Barium	0.034		0.0050	mg/L	1		6020	Total Recoverable
Chromium	0.0016		0.0010	mg/L	1		6020	Total Recoverable
Iron	0.57		0.010	mg/L	1		6020	Total Recoverable
Vanadium	0.0031		0.0020	mg/L	1		6020	Total Recoverable
Sulfate	4.0		2.0	mg/L	1		300.0	Total/NA

## Client Sample ID: PZ-40S

## Lab Sample ID: 240-120412-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	1.5		1.0	mg/L	1		6010B	Total Recoverable
Barium	0.023		0.0050	mg/L	1		6020	Total Recoverable
Chromium	0.0013		0.0010	mg/L	1		6020	Total Recoverable
Iron	0.11		0.010	mg/L	1		6020	Total Recoverable
Sulfate	3.4		2.0	mg/L	1		300.0	Total/NA

## Client Sample ID: FB-5

## Lab Sample ID: 240-120412-4

No Detections.

## Client Sample ID: EB-5

## Lab Sample ID: 240-120412-5

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

# Client Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

**Client Sample ID: MW-14S**

**Lab Sample ID: 240-120412-1**

**Date Collected: 10/10/19 14:40**

**Matrix: Water**

**Date Received: 10/12/19 09:50**

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Calcium</b>	<b>2.1</b>		1.0	mg/L		10/17/19 14:20	10/18/19 12:51	1
Boron	0.050	U	0.050	mg/L		10/17/19 14:20	10/18/19 12:51	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:36	1
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 20:00	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:36	1
<b>Barium</b>	<b>0.0095</b>		0.0050	mg/L		10/17/19 14:24	10/17/19 22:36	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:36	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:36	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:36	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:24	10/17/19 22:36	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:36	1
<b>Iron</b>	<b>0.28</b>		0.010	mg/L		10/17/19 14:24	10/17/19 22:36	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:36	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 14:24	10/17/19 22:36	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:36	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:36	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:36	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:36	1
Vanadium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:36	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:24	10/17/19 22:36	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:51	10/17/19 02:58	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>61</b>		50	mg/L			10/14/19 15:49	1
Chloride	2.0	U	2.0	mg/L			10/23/19 13:12	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 13:12	1
<b>Sulfate</b>	<b>3.6</b>		2.0	mg/L			10/23/19 13:12	1

# Client Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

**Client Sample ID: PZ-24S**

**Lab Sample ID: 240-120412-2**

Date Collected: 10/10/19 15:30

Matrix: Water

Date Received: 10/12/19 09:50

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	2.9		1.0	mg/L		10/17/19 14:20	10/18/19 12:53	1
Boron	0.050	U	0.050	mg/L		10/17/19 14:20	10/18/19 12:53	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:38	1
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 20:02	1
Arsenic	0.0011		0.0010	mg/L		10/17/19 14:24	10/17/19 22:38	1
Barium	0.034		0.0050	mg/L		10/17/19 14:24	10/17/19 22:38	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:38	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:38	1
Chromium	0.0016		0.0010	mg/L		10/17/19 14:24	10/17/19 22:38	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:24	10/17/19 22:38	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:38	1
Iron	0.57		0.010	mg/L		10/17/19 14:24	10/17/19 22:38	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:38	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 14:24	10/17/19 22:38	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:38	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:38	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:38	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:38	1
Vanadium	0.0031		0.0020	mg/L		10/17/19 14:24	10/17/19 22:38	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:24	10/17/19 22:38	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:51	10/17/19 03:05	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	50	U	50	mg/L			10/14/19 15:49	1
Chloride	2.0	U	2.0	mg/L			10/23/19 13:32	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 13:32	1
Sulfate	4.0		2.0	mg/L			10/23/19 13:32	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

**Client Sample ID: PZ-40S**

**Lab Sample ID: 240-120412-3**

Date Collected: 10/10/19 16:30

Matrix: Water

Date Received: 10/12/19 09:50

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	1.5		1.0	mg/L		10/17/19 14:20	10/18/19 12:39	1
Boron	0.050	U	0.050	mg/L		10/17/19 14:20	10/18/19 12:39	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:19	1
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 19:44	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:19	1
Barium	0.023		0.0050	mg/L		10/17/19 14:24	10/17/19 22:19	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:19	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:19	1
Chromium	0.0013		0.0010	mg/L		10/17/19 14:24	10/17/19 22:19	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:24	10/17/19 22:19	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:19	1
Iron	0.11		0.010	mg/L		10/17/19 14:24	10/17/19 22:19	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:19	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 14:24	10/17/19 22:19	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:19	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:19	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:19	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:19	1
Vanadium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:19	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:24	10/17/19 22:19	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:51	10/17/19 02:17	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	50	U	50	mg/L			10/14/19 15:49	1
Chloride	2.0	U	2.0	mg/L			10/23/19 13:52	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 13:52	1
Sulfate	3.4		2.0	mg/L			10/23/19 13:52	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

**Client Sample ID: FB-5**

**Lab Sample ID: 240-120412-4**

**Date Collected: 10/10/19 14:45**

**Matrix: Water**

**Date Received: 10/12/19 09:50**

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	1.0	U	1.0	mg/L		10/17/19 14:20	10/18/19 13:02	1
Boron	0.050	U	0.050	mg/L		10/17/19 14:20	10/18/19 13:02	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:42	1
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 20:05	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:42	1
Barium	0.0050	U	0.0050	mg/L		10/17/19 14:24	10/17/19 22:42	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:42	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:42	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:42	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:24	10/17/19 22:42	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:42	1
Iron	0.010	U	0.010	mg/L		10/17/19 14:24	10/17/19 22:42	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:42	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 14:24	10/17/19 22:42	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:42	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:42	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:42	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:42	1
Vanadium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:42	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:24	10/17/19 22:42	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:51	10/17/19 03:08	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

**Client Sample ID: EB-5**

**Lab Sample ID: 240-120412-5**

**Date Collected: 10/10/19 14:55**

**Matrix: Water**

**Date Received: 10/12/19 09:50**

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	1.0	U	1.0	mg/L		10/17/19 14:20	10/18/19 13:04	1
Boron	0.050	U	0.050	mg/L		10/17/19 14:20	10/18/19 13:04	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:44	1
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 20:07	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:44	1
Barium	0.0050	U	0.0050	mg/L		10/17/19 14:24	10/17/19 22:44	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:44	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:44	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:44	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:24	10/17/19 22:44	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:44	1
Iron	0.010	U	0.010	mg/L		10/17/19 14:24	10/17/19 22:44	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:44	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 14:24	10/17/19 22:44	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:44	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:44	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:44	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:44	1
Vanadium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:44	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:24	10/17/19 22:44	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:51	10/17/19 03:10	1

# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Method: 6010B - Metals (ICP)

**Lab Sample ID: MB 440-575076/1-A**  
**Matrix: Water**  
**Analysis Batch: 575328**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575076**

Analyte	MB MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Calcium	1.0	U	1.0	mg/L		10/17/19 14:20	10/18/19 12:35	1
Boron	0.050	U	0.050	mg/L		10/17/19 14:20	10/18/19 12:35	1

**Lab Sample ID: LCS 440-575076/2-A**  
**Matrix: Water**  
**Analysis Batch: 575328**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575076**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.00	1.02		mg/L		102	80 - 120

**Lab Sample ID: 240-120412-3 MS**  
**Matrix: Water**  
**Analysis Batch: 575328**

**Client Sample ID: PZ-40S**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575076**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	0.050	U	1.00	0.970		mg/L		97	75 - 125

**Lab Sample ID: 240-120412-3 MSD**  
**Matrix: Water**  
**Analysis Batch: 575328**

**Client Sample ID: PZ-40S**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575076**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Boron	0.050	U	1.00	0.997		mg/L		100	75 - 125	3	20

## Method: 6020 - Metals (ICP/MS)

**Lab Sample ID: MB 240-405588/1-A**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405588**

Analyte	MB MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 19:28	1

**Lab Sample ID: LCS 240-405588/2-A**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405588**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits

**Lab Sample ID: 240-120412-3 MS**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: PZ-40S**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405588**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits

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# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Method: 6020 - Metals (ICP/MS) (Continued)

**Lab Sample ID: 240-120412-3 MSD**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: PZ-40S**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405588**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.010	U	0.500	0.457		mg/L		91	75 - 125	3	20

**Lab Sample ID: MB 440-575077/1-A**  
**Matrix: Water**  
**Analysis Batch: 575209**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575077**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:15	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:15	1
Barium	0.0050	U	0.0050	mg/L		10/17/19 14:24	10/17/19 22:15	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:15	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:15	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:15	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:24	10/17/19 22:15	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:15	1
Iron	0.010	U	0.010	mg/L		10/17/19 14:24	10/17/19 22:15	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:15	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 14:24	10/17/19 22:15	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 14:24	10/17/19 22:15	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:24	10/17/19 22:15	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:15	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:15	1
Vanadium	0.0020	U	0.0020	mg/L		10/17/19 14:24	10/17/19 22:15	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:24	10/17/19 22:15	1

**Lab Sample ID: LCS 440-575077/2-A**  
**Matrix: Water**  
**Analysis Batch: 575209**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575077**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.0800	0.0833		mg/L		104	80 - 120
Arsenic	0.0800	0.0746		mg/L		93	80 - 120
Barium	0.0800	0.0781		mg/L		98	80 - 120
Beryllium	0.0800	0.0789		mg/L		99	80 - 120
Cadmium	0.0800	0.0763		mg/L		95	80 - 120
Chromium	0.0800	0.0755		mg/L		94	80 - 120
Cobalt	0.0800	0.0767		mg/L		96	80 - 120
Copper	0.0800	0.0768		mg/L		96	80 - 120
Iron	0.800	0.762		mg/L		95	80 - 120
Lead	0.0800	0.0775		mg/L		97	80 - 120
Molybdenum	0.0800	0.0750		mg/L		94	80 - 120
Selenium	0.0800	0.0757		mg/L		95	80 - 120
Silver	0.0800	0.0759		mg/L		95	80 - 120
Nickel	0.0800	0.0770		mg/L		96	80 - 120
Thallium	0.0800	0.0743		mg/L		93	80 - 120
Vanadium	0.0800	0.0756		mg/L		95	80 - 120
Zinc	0.0800	0.0795		mg/L		99	80 - 120

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Method: 6020 - Metals (ICP/MS) (Continued)

**Lab Sample ID: 240-120412-3 MS**  
**Matrix: Water**  
**Analysis Batch: 575209**

**Client Sample ID: PZ-40S**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575077**

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Antimony	0.0010	U	0.0800	0.0814		mg/L		102	75 - 125
Arsenic	0.0010	U	0.0800	0.0739		mg/L		92	75 - 125
Barium	0.023		0.0800	0.0986		mg/L		94	75 - 125
Beryllium	0.0010	U	0.0800	0.0766		mg/L		96	75 - 125
Cadmium	0.00020	U	0.0800	0.0748		mg/L		94	75 - 125
Chromium	0.0013		0.0800	0.0757		mg/L		93	75 - 125
Cobalt	0.0060	U	0.0800	0.0760		mg/L		94	75 - 125
Copper	0.0010	U	0.0800	0.0768		mg/L		95	75 - 125
Iron	0.11		0.800	0.854		mg/L		93	75 - 125
Lead	0.0010	U	0.0800	0.0766		mg/L		95	75 - 125
Molybdenum	0.0050	U	0.0800	0.0737		mg/L		92	75 - 125
Selenium	0.0010	U	0.0800	0.0755		mg/L		94	75 - 125
Silver	0.00020	U	0.0800	0.0748		mg/L		93	75 - 125
Nickel	0.0020	U	0.0800	0.0766		mg/L		95	75 - 125
Thallium	0.0020	U	0.0800	0.0733		mg/L		92	75 - 125
Vanadium	0.0020	U	0.0800	0.0752		mg/L		93	75 - 125
Zinc	0.010	U	0.0800	0.0798		mg/L		91	75 - 125

**Lab Sample ID: 240-120412-3 MSD**  
**Matrix: Water**  
**Analysis Batch: 575209**

**Client Sample ID: PZ-40S**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575077**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Antimony	0.0010	U	0.0800	0.0820		mg/L		102	75 - 125	1	20
Arsenic	0.0010	U	0.0800	0.0738		mg/L		92	75 - 125	0	20
Barium	0.023		0.0800	0.0996		mg/L		96	75 - 125	1	20
Beryllium	0.0010	U	0.0800	0.0769		mg/L		96	75 - 125	0	20
Cadmium	0.00020	U	0.0800	0.0749		mg/L		94	75 - 125	0	20
Chromium	0.0013		0.0800	0.0757		mg/L		93	75 - 125	0	20
Cobalt	0.0060	U	0.0800	0.0758		mg/L		94	75 - 125	0	20
Copper	0.0010	U	0.0800	0.0771		mg/L		95	75 - 125	0	20
Iron	0.11		0.800	0.854		mg/L		93	75 - 125	0	20
Lead	0.0010	U	0.0800	0.0775		mg/L		97	75 - 125	1	20
Molybdenum	0.0050	U	0.0800	0.0738		mg/L		92	75 - 125	0	20
Selenium	0.0010	U	0.0800	0.0754		mg/L		94	75 - 125	0	20
Silver	0.00020	U	0.0800	0.0748		mg/L		93	75 - 125	0	20
Nickel	0.0020	U	0.0800	0.0756		mg/L		94	75 - 125	1	20
Thallium	0.0020	U	0.0800	0.0736		mg/L		92	75 - 125	0	20
Vanadium	0.0020	U	0.0800	0.0748		mg/L		93	75 - 125	1	20
Zinc	0.010	U	0.0800	0.0781		mg/L		89	75 - 125	2	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 440-574815/1-A**  
**Matrix: Water**  
**Analysis Batch: 575116**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 574815**

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:51	10/17/19 02:13	1

Eurofins TestAmerica, Canton

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 440-574815/2-A  
 Matrix: Water  
 Analysis Batch: 575116

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 574815  
 %Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00400	0.00393		mg/L		98	80 - 120

Lab Sample ID: 240-120412-3 MS  
 Matrix: Water  
 Analysis Batch: 575116

Client Sample ID: PZ-40S  
 Prep Type: Total/NA  
 Prep Batch: 574815  
 %Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00020	U	0.00400	0.00401		mg/L		100	75 - 125

Lab Sample ID: 240-120412-3 MSD  
 Matrix: Water  
 Analysis Batch: 575116

Client Sample ID: PZ-40S  
 Prep Type: Total/NA  
 Prep Batch: 574815  
 %Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	0.00020	U	0.00400	0.00406		mg/L					

## Method: 2540 C-2011 - Total Dissolved Solids (Dried at 180 °C)

Lab Sample ID: MB 240-405634/1  
 Matrix: Water  
 Analysis Batch: 405634

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	50	U	50	mg/L			10/14/19 15:49	1

Lab Sample ID: LCS 240-405634/2  
 Matrix: Water  
 Analysis Batch: 405634

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Dissolved Solids	484	477		mg/L		99	80 - 120

Lab Sample ID: 240-120412-3 DU  
 Matrix: Water  
 Analysis Batch: 405634

Client Sample ID: PZ-40S  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Dissolved Solids	50	U	53.0		mg/L		NC	20

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-406967/3  
 Matrix: Water  
 Analysis Batch: 406967

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.0	U	2.0	mg/L			10/23/19 12:32	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 12:32	1
Sulfate	2.0	U	2.0	mg/L			10/23/19 12:32	1

Eurofins TestAmerica, Canton

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

**Lab Sample ID: LCS 240-406967/4**  
**Matrix: Water**  
**Analysis Batch: 406967**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.1		mg/L		102	90 - 110
Fluoride	2.50	2.65		mg/L		106	90 - 110
Sulfate	50.0	52.4		mg/L		105	90 - 110

**Lab Sample ID: 240-120412-3 MS**  
**Matrix: Water**  
**Analysis Batch: 406967**

**Client Sample ID: PZ-40S**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	2.0	U	50.0	55.7		mg/L		110	80 - 120
Fluoride	1.0	U	2.50	2.60		mg/L		103	80 - 120
Sulfate	3.4		50.0	58.9		mg/L		111	80 - 120

**Lab Sample ID: 240-120412-3 MSD**  
**Matrix: Water**  
**Analysis Batch: 406967**

**Client Sample ID: PZ-40S**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	2.0	U	50.0	55.5		mg/L		110	80 - 120	0	15
Fluoride	1.0	U	2.50	2.62		mg/L		104	80 - 120	1	15
Sulfate	3.4		50.0	58.7		mg/L		111	80 - 120	0	15

# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Metals

### Prep Batch: 405588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total Recoverable	Water	3005A	
240-120412-2	PZ-24S	Total Recoverable	Water	3005A	
240-120412-3	PZ-40S	Total Recoverable	Water	3005A	
240-120412-4	FB-5	Total Recoverable	Water	3005A	
240-120412-5	EB-5	Total Recoverable	Water	3005A	
MB 240-405588/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-405588/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-120412-3 MS	PZ-40S	Total Recoverable	Water	3005A	
240-120412-3 MSD	PZ-40S	Total Recoverable	Water	3005A	

### Analysis Batch: 405929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total Recoverable	Water	6020	405588
240-120412-2	PZ-24S	Total Recoverable	Water	6020	405588
240-120412-3	PZ-40S	Total Recoverable	Water	6020	405588
240-120412-4	FB-5	Total Recoverable	Water	6020	405588
240-120412-5	EB-5	Total Recoverable	Water	6020	405588
MB 240-405588/1-A	Method Blank	Total Recoverable	Water	6020	405588
LCS 240-405588/2-A	Lab Control Sample	Total Recoverable	Water	6020	405588
240-120412-3 MS	PZ-40S	Total Recoverable	Water	6020	405588
240-120412-3 MSD	PZ-40S	Total Recoverable	Water	6020	405588

### Prep Batch: 574815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total/NA	Water	7470A	
240-120412-2	PZ-24S	Total/NA	Water	7470A	
240-120412-3	PZ-40S	Total/NA	Water	7470A	
240-120412-4	FB-5	Total/NA	Water	7470A	
240-120412-5	EB-5	Total/NA	Water	7470A	
MB 440-574815/1-A	Method Blank	Total/NA	Water	7470A	
LCS 440-574815/2-A	Lab Control Sample	Total/NA	Water	7470A	
240-120412-3 MS	PZ-40S	Total/NA	Water	7470A	
240-120412-3 MSD	PZ-40S	Total/NA	Water	7470A	

### Prep Batch: 575076

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total Recoverable	Water	3005A	
240-120412-2	PZ-24S	Total Recoverable	Water	3005A	
240-120412-3	PZ-40S	Total Recoverable	Water	3005A	
240-120412-4	FB-5	Total Recoverable	Water	3005A	
240-120412-5	EB-5	Total Recoverable	Water	3005A	
MB 440-575076/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-575076/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-120412-3 MS	PZ-40S	Total Recoverable	Water	3005A	
240-120412-3 MSD	PZ-40S	Total Recoverable	Water	3005A	

### Prep Batch: 575077

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total Recoverable	Water	3005A	
240-120412-2	PZ-24S	Total Recoverable	Water	3005A	
240-120412-3	PZ-40S	Total Recoverable	Water	3005A	

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# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Metals (Continued)

### Prep Batch: 575077 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-4	FB-5	Total Recoverable	Water	3005A	
240-120412-5	EB-5	Total Recoverable	Water	3005A	
MB 440-575077/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-575077/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-120412-3 MS	PZ-40S	Total Recoverable	Water	3005A	
240-120412-3 MSD	PZ-40S	Total Recoverable	Water	3005A	

### Analysis Batch: 575116

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total/NA	Water	7470A	574815
240-120412-2	PZ-24S	Total/NA	Water	7470A	574815
240-120412-3	PZ-40S	Total/NA	Water	7470A	574815
240-120412-4	FB-5	Total/NA	Water	7470A	574815
240-120412-5	EB-5	Total/NA	Water	7470A	574815
MB 440-574815/1-A	Method Blank	Total/NA	Water	7470A	574815
LCS 440-574815/2-A	Lab Control Sample	Total/NA	Water	7470A	574815
240-120412-3 MS	PZ-40S	Total/NA	Water	7470A	574815
240-120412-3 MSD	PZ-40S	Total/NA	Water	7470A	574815

### Analysis Batch: 575209

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total Recoverable	Water	6020	575077
240-120412-2	PZ-24S	Total Recoverable	Water	6020	575077
240-120412-3	PZ-40S	Total Recoverable	Water	6020	575077
240-120412-4	FB-5	Total Recoverable	Water	6020	575077
240-120412-5	EB-5	Total Recoverable	Water	6020	575077
MB 440-575077/1-A	Method Blank	Total Recoverable	Water	6020	575077
LCS 440-575077/2-A	Lab Control Sample	Total Recoverable	Water	6020	575077
240-120412-3 MS	PZ-40S	Total Recoverable	Water	6020	575077
240-120412-3 MSD	PZ-40S	Total Recoverable	Water	6020	575077

### Analysis Batch: 575328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total Recoverable	Water	6010B	575076
240-120412-2	PZ-24S	Total Recoverable	Water	6010B	575076
240-120412-3	PZ-40S	Total Recoverable	Water	6010B	575076
240-120412-4	FB-5	Total Recoverable	Water	6010B	575076
240-120412-5	EB-5	Total Recoverable	Water	6010B	575076
MB 440-575076/1-A	Method Blank	Total Recoverable	Water	6010B	575076
LCS 440-575076/2-A	Lab Control Sample	Total Recoverable	Water	6010B	575076
240-120412-3 MS	PZ-40S	Total Recoverable	Water	6010B	575076
240-120412-3 MSD	PZ-40S	Total Recoverable	Water	6010B	575076

## General Chemistry

### Analysis Batch: 405634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total/NA	Water	2540 C-2011	
240-120412-2	PZ-24S	Total/NA	Water	2540 C-2011	
240-120412-3	PZ-40S	Total/NA	Water	2540 C-2011	
MB 240-405634/1	Method Blank	Total/NA	Water	2540 C-2011	

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# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## General Chemistry (Continued)

### Analysis Batch: 405634 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 240-405634/2	Lab Control Sample	Total/NA	Water	2540 C-2011	
240-120412-3 DU	PZ-40S	Total/NA	Water	2540 C-2011	

### Analysis Batch: 406967

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total/NA	Water	300.0	
240-120412-2	PZ-24S	Total/NA	Water	300.0	
240-120412-3	PZ-40S	Total/NA	Water	300.0	
MB 240-406967/3	Method Blank	Total/NA	Water	300.0	
LCS 240-406967/4	Lab Control Sample	Total/NA	Water	300.0	
240-120412-3 MS	PZ-40S	Total/NA	Water	300.0	
240-120412-3 MSD	PZ-40S	Total/NA	Water	300.0	

# Lab Chronicle

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Client Sample ID: MW-14S

## Lab Sample ID: 240-120412-1

Date Collected: 10/10/19 14:40

Matrix: Water

Date Received: 10/12/19 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			575076	10/17/19 14:20	EP	TAL IRV
Total Recoverable	Analysis	6010B		1	575328	10/18/19 12:51	TQN	TAL IRV
Total Recoverable	Prep	3005A			405588	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 20:00	DSH	TAL CAN
Total Recoverable	Prep	3005A			575077	10/17/19 14:24	EP	TAL IRV
Total Recoverable	Analysis	6020		1	575209	10/17/19 22:36	B1H	TAL IRV
Total/NA	Prep	7470A			574815	10/16/19 14:51	MEM	TAL IRV
Total/NA	Analysis	7470A		1	575116	10/17/19 02:58	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405634	10/14/19 15:49	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406967	10/23/19 13:12	JWW	TAL CAN

## Client Sample ID: PZ-24S

## Lab Sample ID: 240-120412-2

Date Collected: 10/10/19 15:30

Matrix: Water

Date Received: 10/12/19 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			575076	10/17/19 14:20	EP	TAL IRV
Total Recoverable	Analysis	6010B		1	575328	10/18/19 12:53	TQN	TAL IRV
Total Recoverable	Prep	3005A			405588	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 20:02	DSH	TAL CAN
Total Recoverable	Prep	3005A			575077	10/17/19 14:24	EP	TAL IRV
Total Recoverable	Analysis	6020		1	575209	10/17/19 22:38	B1H	TAL IRV
Total/NA	Prep	7470A			574815	10/16/19 14:51	MEM	TAL IRV
Total/NA	Analysis	7470A		1	575116	10/17/19 03:05	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405634	10/14/19 15:49	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406967	10/23/19 13:32	JWW	TAL CAN

## Client Sample ID: PZ-40S

## Lab Sample ID: 240-120412-3

Date Collected: 10/10/19 16:30

Matrix: Water

Date Received: 10/12/19 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			575076	10/17/19 14:20	EP	TAL IRV
Total Recoverable	Analysis	6010B		1	575328	10/18/19 12:39	TQN	TAL IRV
Total Recoverable	Prep	3005A			405588	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 19:44	DSH	TAL CAN
Total Recoverable	Prep	3005A			575077	10/17/19 14:24	EP	TAL IRV
Total Recoverable	Analysis	6020		1	575209	10/17/19 22:19	B1H	TAL IRV
Total/NA	Prep	7470A			574815	10/16/19 14:51	MEM	TAL IRV
Total/NA	Analysis	7470A		1	575116	10/17/19 02:17	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405634	10/14/19 15:49	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406967	10/23/19 13:52	JWW	TAL CAN



# Lab Chronicle

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Client Sample ID: FB-5

Date Collected: 10/10/19 14:45

Date Received: 10/12/19 09:50

## Lab Sample ID: 240-120412-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			575076	10/17/19 14:20	EP	TAL IRV
Total Recoverable	Analysis	6010B		1	575328	10/18/19 13:02	TQN	TAL IRV
Total Recoverable	Prep	3005A			405588	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 20:05	DSH	TAL CAN
Total Recoverable	Prep	3005A			575077	10/17/19 14:24	EP	TAL IRV
Total Recoverable	Analysis	6020		1	575209	10/17/19 22:42	B1H	TAL IRV
Total/NA	Prep	7470A			574815	10/16/19 14:51	MEM	TAL IRV
Total/NA	Analysis	7470A		1	575116	10/17/19 03:08	DB	TAL IRV

## Client Sample ID: EB-5

Date Collected: 10/10/19 14:55

Date Received: 10/12/19 09:50

## Lab Sample ID: 240-120412-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			575076	10/17/19 14:20	EP	TAL IRV
Total Recoverable	Analysis	6010B		1	575328	10/18/19 13:04	TQN	TAL IRV
Total Recoverable	Prep	3005A			405588	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 20:07	DSH	TAL CAN
Total Recoverable	Prep	3005A			575077	10/17/19 14:24	EP	TAL IRV
Total Recoverable	Analysis	6020		1	575209	10/17/19 22:44	B1H	TAL IRV
Total/NA	Prep	7470A			574815	10/16/19 14:51	MEM	TAL IRV
Total/NA	Analysis	7470A		1	575116	10/17/19 03:10	DB	TAL IRV

### Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-1

## Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

## Laboratory: Eurofins TestAmerica, Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-20
Arizona	State	AZ0671	10-14-20
California	LA Cty Sanitation Districts	10256	06-30-20
California	Los Angeles County Sanitation Districts	10256	06-30-20
California	State	2706	06-30-20
Guam	State	19-005R	01-23-20
Hawaii	State	CA01531	01-29-20
Hawaii	State Program	N/A	01-29-20
Kansas	NELAP	E-10420	07-31-20
Nevada	State	CA015312020-4	07-31-20
New Mexico	State	CA01531	01-29-20
New Mexico	State Program	N/A	01-29-20
Oregon	NELAP	4028 - 006	01-29-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-20
Washington	State Program	C900	09-03-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

**Client Information**  
 Client Contact: Brian Yelen  
 Company: TRC Environmental Corporation  
 Address: 1540 Eisenhower Place  
 City: Ann Arbor  
 State, Zip: MI, 48106-7080  
 Phone: 734-971-7080 (Tel) 734-971-9022 (Fax)  
 Email: byelen@trccompanies.com  
 Project Name: JHC - CCR Pond A + Downgradient  
 Site:

**Lab PM:** Brooks, Kris M  
**E-Mail:** kris.brooks@testamericainc.com  
**Carrier Tracking No(s):**  
**COC No:** 440-171551-31502.2  
**Page:** Page 2 of 2  
**Job #:**

**Due Date Requested:**  
**TAT Requested (days):**  
**PO #:** 135141  
**WO #:**  
**Project #:** 44022279  
**SSOW#:**

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=oil, A=air)	Field Filtered Sample (Yes or No)		Perform MSD (Yes or No)		6020 - 1 Metals (L) (CANTON)		2540C, Calcd, 300.0, 280 CANTON		904.0, Ra226Ra228, GFPC (ST LOUIS)		903.0 - Standard Target List (ST LOUIS)		Special Instructions/Note:
					D	N	D	N	D	N	D	N	D	N	D	N	
MW-14S	10.10	1440	G	Water	N	N	N	N	X	X	X	X	X	X	X	X	
PZ-24S	10.10	1530	G	Water	N	N	N	N	X	X	X	X	X	X	X	X	
PZ-40S	10.10	1630	G	Water	N	N	N	N	X	X	X	X	X	X	X	X	
DUP-5				Water													
FB-5	10.10	1445	G	D1	N	N	N	N	X	X	X	X	X	X	X	X	
EB-5	10.10	1455	G	D1	N	N	N	N	X	X	X	X	X	X	X	X	
PZ-40S MS-5	10.10	1630	G	W	N	N	N	N	X	X	X	X	X	X	X	X	
PZ-40S MSD-5	10.10	1630	G	W	N	N	N	N	X	X	X	X	X	X	X	X	



**Possible Hazard Identification**  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Radiological  
 Deliverable Requested: I, II, III, IV, Other (specify)

**Empty Kit Relinquished by:** Date: Time: Method of Shipment:

**Relinquished by:** B. YELEN Date: 10.11.19 Time: 0630 Company: TRC  
 Relinquished by: Fred Cox Date: 10-11-19 Time: 3:00 pm Company: TRC  
 Relinquished by: Date: Time: Company:

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months  
 Special Instructions/QC Requirements:

**Custody Seals Intact:**  Yes  No **Custody Seal No.:**

**Eurofins TestAmerica Canton Sample Receipt Form/Narrative**  
**Canton Facility**

Login # : 120412

Client TRC Environmental Corp Site Name \_\_\_\_\_  
 Cooler Received on 10-12-19 Opened on 10-12-19  
 FedEx: 1<sup>st</sup> Grd  Exp  UPS  FAS  Clipper  Client Drop Off  TestAmerica Courier  Other

Cooler unpacked by:  
[Signature]

Receipt After-hours: Drop-off Date/Time \_\_\_\_\_ Storage Location \_\_\_\_\_

TestAmerica Cooler # 7A Foam Box  Client Cooler  Box  Other \_\_\_\_\_  
 Packing material used: Bubble Wrap  Foam  Plastic Bag  None  Other \_\_\_\_\_  
 COOLANT: Wet Ice  Blue Ice  Dry Ice  Water  None

1. Cooler temperature upon receipt  See Multiple Cooler Form

IR GUN# IR-10 (CF +0.7 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C  
 IR GUN #IR-11 (CF +0.9 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 3 Yes  No   
 -Were the seals on the outside of the cooler(s) signed & dated? Yes  No  NA   
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes  No   
 -Were tamper/custody seals intact and uncompromised? Yes  No  NA
3. Shippers' packing slip attached to the cooler(s)? Yes  No
4. Did custody papers accompany the sample(s)? Yes  No
5. Were the custody papers relinquished & signed in the appropriate place? Yes  No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes  No
7. Did all bottles arrive in good condition (Unbroken)? Yes  No
8. Could all bottle labels be reconciled with the COC? Yes  No
9. Were correct bottle(s) used for the test(s) indicated? Yes  No
10. Sufficient quantity received to perform indicated analyses? Yes  No
11. Are these work share samples? Yes  No   
 If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes  No  NA  pH Strip Lot# HC991818
13. Were VOAs on the COC? Yes  No
14. Were air bubbles >6 mm in any VOA vials?  Larger than this. Yes  No  NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # \_\_\_\_\_ Yes  No
16. Was a LL Hg or Me Hg trip blank present? Yes  No

Tests that are not checked for pH by Receiving:  
  
VOAs  
Oil and Grease  
TOC

Contacted PM \_\_\_\_\_ Date \_\_\_\_\_ by \_\_\_\_\_ via Verbal Voice Mail Other \_\_\_\_\_

Concerning \_\_\_\_\_

**17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES**

Samples processed by:  
[Signature]

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**18. SAMPLE CONDITION**

Sample(s) \_\_\_\_\_ were received after the recommended holding time had expired.  
 Sample(s) \_\_\_\_\_ were received in a broken container.  
 Sample(s) \_\_\_\_\_ were received with bubble >6 mm in diameter. (Notify PM)

**19. SAMPLE PRESERVATION**

Sample(s) \_\_\_\_\_ were further preserved in the laboratory.  
 Time preserved: \_\_\_\_\_ Preservative(s) added/Lot number(s): \_\_\_\_\_

VOA Sample Preservation - Date/Time VOAs Frozen: \_\_\_\_\_

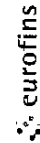




Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container pH</u>	<u>Preservative Added (mls)</u>	<u>Lot #</u>
MW-14S	240-120412-A-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
MW-14S	240-120412-C-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
MW-14S	240-120412-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
MW-14S	240-120412-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
PZ-24S	240-120412-A-2	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-24S	240-120412-C-2	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-24S	240-120412-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
PZ-24S	240-120412-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
PZ-40S	240-120412-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-B-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-C-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-G-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-H-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-I-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-J-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
PZ-40S	240-120412-K-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
FB-5	240-120412-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____
FB-5	240-120412-B-4	Plastic 500ml - with Nitric Acid	<2	_____	_____
EB-5	240-120412-A-5	Plastic 250ml - with Nitric Acid	<2	_____	_____
EB-5	240-120412-B-5	Plastic 500ml - with Nitric Acid	<2	_____	_____
EB-5	240-120412-C-5	Plastic 1 liter - Nitric Acid	<2	_____	_____
EB-5	240-120412-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____

**Chain of Custody Record**



<b>Client Information (Sub Contract Lab)</b>		Lab PM Brooks, Kris M	Carrier Tracking No(s) 1103 6/25 03 79	COC No 240-111609.1								
Client Contact Shipping/Receiving		E-Mail kris.brooks@testamericainc.com	State of Origin Michigan	Page Page 1 of 1								
Company TestAmerica Laboratories, Inc		Accreditations Required (See note)										
Address 17461 Denan Ave, Suite 100, Irvine State: CA, 92614-5817 Phone: 949-261-1022(Tel) 949-260-3297(Fax) Email		Job # 240-120412-1										
Project Name JHC - CCR Groundwater Monitoring 2019		Preservation Codes: M - Hexane N - None C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:										
Site		Analysis Requested										
Due Date Requested: 10/24/2019		Total Number of Containers										
TAT Requested (days)		6020 (L13005A (MOD) 16 Total Metals)										
PO #		6010B/3005A Total Boron, Calcium										
WO #		740A/7470A Prep Total Mercury										
Project # 44022279		Field Filtered Sample (Yes or No)										
SSOW#		Perform MS/MSD (Yes or No)										
Sample Identification - Client ID (Lab ID)		Special Instructions/Note:										
Sample	Sample Date	Sample Time	Sample Type (C-comp, G-grab)	Matrix (Water, Solid, Over-sat, etc)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	740A/7470A Prep Total Mercury	6010B/3005A Total Boron, Calcium	6020 (L13005A (MOD) 16 Total Metals)	Total Number of Containers	Special Instructions/Note:
MW-14S (240-120412-1)	10/10/19	14:40 Eastern	Water	Water		X	X	X	X	1	Client sensitive w/dilutions contact PM if dilutions are needed	
PZ-24S (240-120412-2)	10/10/19	15:30 Eastern	Water	Water		X	X	X	X	1	Client sensitive w/dilutions contact PM if dilutions are needed	
PZ-40S (240-120412-3)	10/10/19	16:30 Eastern	Water	Water		X	X	X	X	3	Client sensitive w/dilutions contact PM if dilutions are needed	
PZ-40S (240-120412-3MS)	10/10/19	16:30 Eastern	MS	Water		X	X	X	X	1	Client sensitive w/dilutions contact PM if dilutions are needed	
PZ-40S (240-120412-3MSD)	10/10/19	16:30 Eastern	MSD	Water		X	X	X	X	1	Client sensitive w/dilutions contact PM if dilutions are needed	
FB-5 (240-120412-4)	10/10/19	14:45 Eastern	Water	Water		X	X	X	X	1	Client sensitive w/dilutions contact PM if dilutions are needed	
EB-5 (240-120412-5)	10/10/19	14:55 Eastern	Water	Water		X	X	X	X	1	Client sensitive w/dilutions contact PM if dilutions are needed	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analysis & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

**Possible Hazard Identification**  
 Unconfirmed  
 Deliverable Requested: I, II, III, IV, Other (specify) \_\_\_\_\_ Primary Deliverable Rank: 2  
 Empty Kit Relinquished by: \_\_\_\_\_ Date: \_\_\_\_\_  
 Relinquished by: *Charles H* Date: 10-14-19 1308 Company: 240  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Custody Seals Intact: \_\_\_\_\_ Custody Seal No.: \_\_\_\_\_  
 Δ Yes Δ No  
 Cooler Temperature(s): °C and Other Remarks: 1.6/2.0 1.2/1.6 12.94 TH1  
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months  
 Special Instructions/QC Requirements: \_\_\_\_\_  
 Method of Shipment: \_\_\_\_\_  
 Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Received by: \_\_\_\_\_ Date/Time: 10/15/19 1030 Company: TH1  
 Ver 01/16 2019

**Chain of Custody Record**

<b>Client Information (Sub Contract Lab)</b>		Sampler	Lab PM	Carrier Tracking No(s)	COC No
Client Contact		Brooks, Kris M	Brooks, Kris M	1103 6/25 6371	240-111608.3
Shipping/Receiving		E-Mail	E-Mail	State of Origin	Page
Company		kris.brooks@testamericainc.com	kris.brooks@testamericainc.com	Michigan	Page 3 of 3
TestAmerica Laboratories, Inc		Accreditations Required (See note)			
Address		Due Date Requested:		Job #	
17461 Derian Ave, Suite 100,		10/24/2019		240-120411-1	
City		IAT Requested (days):		Preservation Codes:	
Irvine				A - HCl M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Anchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA L - EDA W - pH 4-5 Z - other (Specify) Other:	
State, Zip		PO #		Analysis Requested	
CA, 92614-5817					
Phone		WO #			
949-261-1022(Tel) 949-260-3297(Fax)					
Email		Project #			
		44022279			
Project Name		SSOW#			
JHC - CCR Groundwater Monitoring 2019					
Site		Sample Date		Sample Time	
		10/11/19		09:45 Eastern	
Sample Identification - Client ID (Lab ID)		Sample Type (C=comp, G=grab)		Matrix (Weather, Sample, Overstated, In-Trip, A-W)	
EB-1 (240-120411-17)		G=grab		Water	
		Field Filtered Sample (Yes or No)		Field Filtered Sample (Yes or No)	
		X		X	
		60108/FIELD_FLTRD 1 Dissolved Boron		6020_L/FIELD_FLTRD (MOD) 2 Dissolved Metals	
		X		X	
		Total Number of Containers		Special Instructions/Note:	
		1		Client sensitive w/dilutions contact PM if dilutions are needed	
Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody.					
<b>Possible Hazard Identification</b>					
Unconfirmed					
Deliverable Requested: I, II, III, IV, Other (Specify)					
Primary Deliverable Rank: 2					
Time:					
Relinquished by		Date		Method of Shipment	
Charles R		10-11-19 1308		Company	
Relinquished by		Date/Time		Date/Time	
Relinquished by		Date/Time		Date/Time	
				10/15/14 1030	
Custody Seals Intact:		Cooler Temperature(s) °C and Other Remarks		Company	
Yes No		1.6/2.0 1.2/1.6 IR-94		TA1	

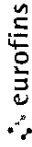




**Eurofins TestAmerica, Canton**

4101 Shuffel Street NW  
North Canton, OH 44720  
Phone: 330-497-9398 Fax: 330-497-0772

**Chain of Custody Record**



Page 2 of 3

Client Information (Sub Contract Lab)		Lab PM		Carrier Tracking No(s)		IOC No	
Company: TestAmerica Laboratories, Inc		Brooks, Kris M		163 025 0379		240-111809 2	
Address: 17461 Derian Ave, Suite 100, Irvine, CA, 92614-5817		E-Mail: kris.brooks@testamericainc.com		State of Origin: Michigan		Page 2 of 3	
Phone: 949-261-1022(Tel) 949-260-3297(Fax)		Accreditations Required (See note)		Job #		240-120411-1	
Email:		Due Date Requested: 10/24/2019		Analysis Requested		Preservation Codes:	
Project Name: JHC - CCR Groundwater Monitoring 2019		TAT Requested (days):		6010/FIELD_FLTRD 1 Dissolved Boron		M - Hexane N - None O - AsNaO2 P - NaZnOAS Q - NaZSO3 R - NaZSO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA L - EDTA Z - other (specify)	
Site: SSOW#		PO #		6020/LFIELD_FLTRD 2 Dissolved Metals		Other:	
Project #		WO #		Field Filtered Sample (Yes or No)		Total Number of Containers	
44022279		44022279		Matrix MS/MSD (Yes or No)		1	
Sample Date		Sample Time		Field Filtered Sample (Yes or No)		Special Instructions/Note:	
10/10/19		14:28 Eastern		X		1 Client sensitive w/dilutions contact PM if dilutions are needed	
10/10/19		14:58 Eastern		X		1 Client sensitive w/dilutions contact PM if dilutions are needed	
10/10/19		15:33 Eastern		X		1 Client sensitive w/dilutions contact PM if dilutions are needed	
10/10/19		13:49 Eastern		X		1 Client sensitive w/dilutions contact PM if dilutions are needed	
10/11/19		09:37 Eastern		X		1 Client sensitive w/dilutions contact PM if dilutions are needed	
10/11/19		09:00 Eastern		X		1 Client sensitive w/dilutions contact PM if dilutions are needed	
10/11/19		08:28 Eastern		X		1 Client sensitive w/dilutions contact PM if dilutions are needed	
10/10/19		Eastern		X		1 Client sensitive w/dilutions contact PM if dilutions are needed	
10/11/19		09:55 Eastern		X		1 Client sensitive w/dilutions contact PM if dilutions are needed	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody.

**Possible Hazard Identification**  
Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank 2

Empty Kit Relinquished by: [Signature]  
Relinquished by: [Signature]  
Relinquished by: [Signature]  
Relinquished by: [Signature]

Custody Seal No: 1 Yes 3 No  
Date/Time: 10/24/19 1308  
Date/Time: 10/15/19 1630  
Date/Time: 10/20/19 1630  
Cooler Temperature(s) °C and Other Remarks: 1.6/2.0 1.7/1.0



# Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-120412-1

**Login Number: 120412**

**List Number: 3**

**Creator: Dolidze, Lado**

**List Source: Eurofins TestAmerica, Irvine**

**List Creation: 10/15/19 12:34 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## ANALYTICAL REPORT

Eurofins TestAmerica, Canton  
4101 Shuffel Street NW  
North Canton, OH 44720  
Tel: (330)497-9396

Laboratory Job ID: 240-120412-2

Client Project/Site: JHC - CCR Pond A + Downgradient

**For:**

TRC Environmental Corporation.  
1540 Eisenhower Place  
Ann Arbor, Michigan 48108-7080

Attn: Darby Litz



*Authorized for release by:  
11/4/2019 8:18:03 PM*

Kris Brooks, Project Manager II  
(330)966-9790  
[kris.brooks@testamericainc.com](mailto:kris.brooks@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

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[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Definitions/Glossary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

## Qualifiers

### Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

**Job ID: 240-120412-2**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

**Client: TRC Environmental Corporation.**

**Project: JHC - CCR Pond A + Downgradient**

**Report Number: 240-120412-2**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

All analysis were performed at Eurofins TestAmerica St. Louis Laboratory.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 10/12/2019 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 1.7° C, 2.8° C and 3.2° C.

### **RADIUM-228**

Samples MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3) and EB-5 (240-120412-5) were analyzed for Radium-228 in accordance with EPA Method 904.0. The samples were prepared on 10/16/2019 and analyzed on 10/24/2019.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3), EB-5 (240-120412-5), (LCS 160-446491/1-A), (LCSD 160-446491/2-A) and (MB 160-446491/22-A)

The following samples had light yellow discoloration: PZ-24S (240-120412-2) and PZ-40S (240-120412-3).

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

---

## Job ID: 240-120412-2 (Continued)

---

### Laboratory: Eurofins TestAmerica, Canton (Continued)

Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3) and EB-5 (240-120412-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **RADIUM-226**

Samples MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3) and EB-5 (240-120412-5) were analyzed for Radium-226 in accordance with EPA Method 903.0. The samples were prepared on 10/16/2019 and analyzed on 10/31/2019.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3), EB-5 (240-120412-5), (LCS 160-446490/1-A), (LCSD 160-446490/2-A) and (MB 160-446490/22-A)

Ra-226 is reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out. The Ra-226 result should be considered to be potentially high biased. Associated samples have activity below the RL. The results are reported with this narrative. MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3), EB-5 (240-120412-5), (LCS 160-446490/1-A), (LCSD 160-446490/2-A) and (MB 160-446490/22-A)

The following samples had light yellow discoloration: PZ-24S (240-120412-2) and PZ-40S (240-120412-3).

Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3) and EB-5 (240-120412-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **COMBINED RADIUM 226 AND RADIUM 228**

Samples MW-14S (240-120412-1), PZ-24S (240-120412-2), PZ-40S (240-120412-3) and EB-5 (240-120412-5) were analyzed for Combined Radium 226 and Radium 228 in accordance with Ra226\_Ra228. The samples were analyzed on 11/04/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Method Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL

#### Protocol References:

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

#### Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



# Sample Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-120412-1	MW-14S	Water	10/10/19 14:40	10/12/19 09:50	
240-120412-2	PZ-24S	Water	10/10/19 15:30	10/12/19 09:50	
240-120412-3	PZ-40S	Water	10/10/19 16:30	10/12/19 09:50	
240-120412-5	EB-5	Water	10/10/19 14:55	10/12/19 09:50	

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# Detection Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

**Client Sample ID: MW-14S**

**Lab Sample ID: 240-120412-1**

No Detections.

**Client Sample ID: PZ-24S**

**Lab Sample ID: 240-120412-2**

No Detections.

**Client Sample ID: PZ-40S**

**Lab Sample ID: 240-120412-3**

No Detections.

**Client Sample ID: EB-5**

**Lab Sample ID: 240-120412-5**

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

**Client Sample ID: MW-14S**

**Lab Sample ID: 240-120412-1**

Date Collected: 10/10/19 14:40

Matrix: Water

Date Received: 10/12/19 09:50

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.117	U	0.0967	0.0972	1.00	0.145	pCi/L	10/16/19 17:41	10/31/19 18:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	79.1		40 - 110					10/16/19 17:41	10/31/19 18:45	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.383	U	0.284	0.286	1.00	0.445	pCi/L	10/16/19 18:25	10/24/19 09:14	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	79.1		40 - 110					10/16/19 18:25	10/24/19 09:14	1
Y Carrier	84.5		40 - 110					10/16/19 18:25	10/24/19 09:14	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.501		0.300	0.302	5.00	0.445	pCi/L		11/04/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

**Client Sample ID: PZ-24S**

**Lab Sample ID: 240-120412-2**

Date Collected: 10/10/19 15:30

Matrix: Water

Date Received: 10/12/19 09:50

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-226</b>	<b>0.248</b>		0.113	0.115	1.00	0.133	pCi/L	10/16/19 17:41	10/31/19 18:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.6		40 - 110					10/16/19 17:41	10/31/19 18:45	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-228</b>	<b>0.511</b>		0.277	0.281	1.00	0.411	pCi/L	10/16/19 18:25	10/24/19 09:14	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.6		40 - 110					10/16/19 18:25	10/24/19 09:14	1
Y Carrier	83.7		40 - 110					10/16/19 18:25	10/24/19 09:14	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Combined Radium 226 + 228</b>	<b>0.759</b>		0.299	0.304	5.00	0.411	pCi/L		11/04/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

**Client Sample ID: PZ-40S**

**Lab Sample ID: 240-120412-3**

Date Collected: 10/10/19 16:30

Matrix: Water

Date Received: 10/12/19 09:50

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.178		0.111	0.112	1.00	0.155	pCi/L	10/16/19 17:41	10/31/19 20:42	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.8		40 - 110					10/16/19 17:41	10/31/19 20:42	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0106	U	0.264	0.264	1.00	0.473	pCi/L	10/16/19 18:25	10/24/19 09:14	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.8		40 - 110					10/16/19 18:25	10/24/19 09:14	1
Y Carrier	80.0		40 - 110					10/16/19 18:25	10/24/19 09:14	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.189	U	0.286	0.287	5.00	0.473	pCi/L		11/04/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

**Client Sample ID: EB-5**

**Lab Sample ID: 240-120412-5**

Date Collected: 10/10/19 14:55

Matrix: Water

Date Received: 10/12/19 09:50

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.138		0.0870	0.0879	1.00	0.118	pCi/L	10/16/19 17:41	10/31/19 20:42	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.1		40 - 110					10/16/19 17:41	10/31/19 20:42	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.271	U	0.263	0.264	1.00	0.426	pCi/L	10/16/19 18:25	10/24/19 09:14	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.1		40 - 110					10/16/19 18:25	10/24/19 09:14	1
Y Carrier	84.9		40 - 110					10/16/19 18:25	10/24/19 09:14	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.409	U	0.277	0.278	5.00	0.426	pCi/L		11/04/19 08:01	1

# Tracer/Carrier Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

## Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

			Percent Yield (Acceptance Limits)			
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)				
240-120412-1	MW-14S	79.1				
240-120412-2	PZ-24S	83.6				
240-120412-3	PZ-40S	82.8				
240-120412-5	EB-5	88.1				
LCS 160-446490/1-A	Lab Control Sample	81.4				
LCSD 160-446490/2-A	Lab Control Sample Dup	83.6				
MB 160-446490/22-A	Method Blank	82.5				
<b>Tracer/Carrier Legend</b>						
Ba Carrier = Ba Carrier						

## Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

			Percent Yield (Acceptance Limits)			
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)			
240-120412-1	MW-14S	79.1	84.5			
240-120412-2	PZ-24S	83.6	83.7			
240-120412-3	PZ-40S	82.8	80.0			
240-120412-5	EB-5	88.1	84.9			
LCS 160-446491/1-A	Lab Control Sample	81.4	82.6			
LCSD 160-446491/2-A	Lab Control Sample Dup	83.6	81.1			
MB 160-446491/22-A	Method Blank	82.5	84.1			
<b>Tracer/Carrier Legend</b>						
Ba Carrier = Ba Carrier						
Y Carrier = Y Carrier						

# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

## Method: 903.0 - Radium-226 (GFPC)

**Lab Sample ID: MB 160-446490/22-A**  
**Matrix: Water**  
**Analysis Batch: 448470**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 446490**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.2261		0.0998	0.102	1.00	0.106	pCi/L	10/16/19 17:41	10/31/19 20:42	1
Carrier	MB	MB	Limits		Prepared	Analyzed	Dil Fac			
	%Yield	Qualifier								
Ba Carrier	82.5		40 - 110		10/16/19 17:41	10/31/19 20:42	1			

**Lab Sample ID: LCS 160-446490/1-A**  
**Matrix: Water**  
**Analysis Batch: 448470**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 446490**

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.4	10.08		1.08	1.00	0.110	pCi/L	89	75 - 125
Carrier	LCS	LCS	Limits		Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier							
Ba Carrier	81.4		40 - 110		10/16/19 17:41	10/31/19 20:42	1		

**Lab Sample ID: LCSD 160-446490/2-A**  
**Matrix: Water**  
**Analysis Batch: 448470**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 446490**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	Limit
				Uncert. (2σ+/-)							
Radium-226	11.4	11.10		1.17	1.00	0.126	pCi/L	98	75 - 125	0.45	1
Carrier	LCSD	LCSD	Limits		Prepared	Analyzed	Dil Fac				
	%Yield	Qualifier									
Ba Carrier	83.6		40 - 110		10/16/19 18:25	10/24/19 09:14	1				

## Method: 904.0 - Radium-228 (GFPC)

**Lab Sample ID: MB 160-446491/22-A**  
**Matrix: Water**  
**Analysis Batch: 447519**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 446491**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.07215	U	0.254	0.254	1.00	0.444	pCi/L	10/16/19 18:25	10/24/19 09:14	1
Carrier	MB	MB	Limits		Prepared	Analyzed	Dil Fac			
	%Yield	Qualifier								
Ba Carrier	82.5		40 - 110		10/16/19 18:25	10/24/19 09:14	1			
Y Carrier	84.1		40 - 110		10/16/19 18:25	10/24/19 09:14	1			



# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

## Method: 904.0 - Radium-228 (GFPC) (Continued)

**Lab Sample ID: LCS 160-446491/1-A**  
**Matrix: Water**  
**Analysis Batch: 447584**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 446491**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	9.46	10.77		1.27	1.00	0.459	pCi/L	114	75 - 125

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	81.4		40 - 110
Y Carrier	82.6		40 - 110

**Lab Sample ID: LCSD 160-446491/2-A**  
**Matrix: Water**  
**Analysis Batch: 447584**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 446491**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	9.46	10.62		1.25	1.00	0.476	pCi/L	112	75 - 125	0.06	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	83.6		40 - 110
Y Carrier	81.1		40 - 110

# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

## Rad

### Prep Batch: 446490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total/NA	Water	PrecSep STD	
240-120412-2	PZ-24S	Total/NA	Water	PrecSep STD	
240-120412-3	PZ-40S	Total/NA	Water	PrecSep STD	
240-120412-5	EB-5	Total/NA	Water	PrecSep STD	
MB 160-446490/22-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-446490/1-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-446490/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

### Prep Batch: 446491

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120412-1	MW-14S	Total/NA	Water	PrecSep_0	
240-120412-2	PZ-24S	Total/NA	Water	PrecSep_0	
240-120412-3	PZ-40S	Total/NA	Water	PrecSep_0	
240-120412-5	EB-5	Total/NA	Water	PrecSep_0	
MB 160-446491/22-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-446491/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-446491/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

# Lab Chronicle

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

## Client Sample ID: MW-14S

Date Collected: 10/10/19 14:40

Date Received: 10/12/19 09:50

Lab Sample ID: 240-120412-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:45	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447519	10/24/19 09:14	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

## Client Sample ID: PZ-24S

Date Collected: 10/10/19 15:30

Date Received: 10/12/19 09:50

Lab Sample ID: 240-120412-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:45	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447519	10/24/19 09:14	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

## Client Sample ID: PZ-40S

Date Collected: 10/10/19 16:30

Date Received: 10/12/19 09:50

Lab Sample ID: 240-120412-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 20:42	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447519	10/24/19 09:14	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

## Client Sample ID: EB-5

Date Collected: 10/10/19 14:55

Date Received: 10/12/19 09:50

Lab Sample ID: 240-120412-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 20:42	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447519	10/24/19 09:14	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

### Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

## Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

## Laboratory: Eurofins TestAmerica, Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-20
Arizona	State	AZ0671	10-14-20
California	LA Cty Sanitation Districts	10256	06-30-20
California	Los Angeles County Sanitation Districts	10256	06-30-20
California	State	2706	06-30-20
Guam	State	19-005R	01-23-20
Hawaii	State	CA01531	01-29-20
Hawaii	State Program	N/A	01-29-20
Kansas	NELAP	E-10420	07-31-20
Nevada	State	CA015312020-4	07-31-20
New Mexico	State	CA01531	01-29-20
New Mexico	State Program	N/A	01-29-20
Oregon	NELAP	4028 - 006	01-29-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-20
Washington	State Program	C900	09-03-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120412-2

## Laboratory: Eurofins TestAmerica, St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-19
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-19
Iowa	State	373	09-17-20
Iowa	State Program	373	12-01-20
Kansas	NELAP	E-10236	10-31-19 *
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-19
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-19
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00028	02-02-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
Washington	State Program	C592	08-30-20
West Virginia DEP	State Program	381	10-31-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

**Client Information**  
 Client Contact: Brian Yelen  
 Company: TRC Environmental Corporation.  
 Address: 1540 Eisenhower Place  
 City: Ann Arbor  
 State, Zip: MI, 48108-7080  
 Phone: 734-971-7080 (Tel) 734-971-9022 (Fax)  
 Email: byelen@trccompanies.com  
 Project Name: JHC - CCR Pond A + Downgradient  
 Site:

**Lab PM:** Brooks, Kris M  
**E-Mail:** kris.brooks@testamericainc.com  
**Carrier Tracking No(s):**  
**COC No:** 440-171551-31502.2  
**Page:** Page 2 of 2  
**Job #:**

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=oil, A=air)	Field Filtered Sample (Yes or No)		Form MSD (Yes or No)		6020 - 1 Metals (L) (CANTON)		2540C, Calcd, 300.0, 28D CANTON		904.0, Ra226Ra228, GFPC (ST LOUIS)		903.0 - Standard Target List (ST LOUIS)		Special Instructions/Note:
					Field Filtered	Form MSD	D	N	D	D	D	D	D	D	D	D	
MW-14S	10.10	1440	G	Water	N	N	N	N	X	X	X	X	X	X	X	X	
PZ-24S	10.10	1530	G	Water	N	N	N	N	X	X	X	X	X	X	X	X	
PZ-40S	10.10	1630	G	Water	N	N	N	N	X	X	X	X	X	X	X	X	
DUP-5				Water													
FB-5	10.10	1445	G	D1	N	N	N	N	X	X	X	X	X	X	X	X	
EB-5	10.10	1455	G	D1	N	N	N	N	X	X	X	X	X	X	X	X	
PZ-40S MS-5	10.10	1630	G	W	N	N	N	N	X	X	X	X	X	X	X	X	
PZ-40S MSD-5	10.10	1630	G	W	N	N	N	N	X	X	X	X	X	X	X	X	

**Possible Hazard Identification**  
 Non-Hazard  Flammable  Skin Irritant  Unknown  Radiological  
 Deliverable Requested: I, II, III, IV, Other (specify)

**Empty Kit Relinquished by:** Date:

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

**Special Instructions/QC Requirements:**

**Received by:** B. YELEN  
**Date:** 10.11.19 0630  
**Company:** TRC

**Received by:** Fild Cx  
**Date:** 10-11-19 3:00 pm  
**Company:**

**Received by:** CEC STAN  
**Date:** 10.11.19 0630  
**Company:** CEC

**Received by:** [Signature]  
**Date:** 10-12-19 950  
**Company:** E-ATC

**Received by:** [Signature]  
**Date:** [Blank]  
**Company:** [Blank]

**Custody Seals Intact:**  Yes  No  
**Custody Seal No.:**

**Method of Shipment:**

**Special Instructions/Note:**



**Eurofins TestAmerica Canton Sample Receipt Form/Narrative**  
**Canton Facility**

Login # : 120412

Client TRC Environmental Corp Site Name \_\_\_\_\_  
 Cooler Received on 10-12-19 Opened on 10-12-19  
 FedEx: 1<sup>st</sup> Grd  Exp  UPS  FAS  Clipper  Client Drop Off  TestAmerica Courier  Other

Cooler unpacked by:  
[Signature]

Receipt After-hours: Drop-off Date/Time \_\_\_\_\_ Storage Location \_\_\_\_\_

TestAmerica Cooler # 7A Foam Box  Client Cooler  Box  Other \_\_\_\_\_  
 Packing material used: Bubble Wrap  Foam  Plastic Bag  None  Other \_\_\_\_\_  
 COOLANT: Wet Ice  Blue Ice  Dry Ice  Water  None

1. Cooler temperature upon receipt  See Multiple Cooler Form  
 IR GUN# IR-10 (CF +0.7 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C  
 IR GUN #IR-11 (CF +0.9 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 3 Yes No  
 -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA  
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No  
 -Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No  
 If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC991818
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials?  Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # \_\_\_\_\_ Yes No
16. Was a LL Hg or Me Hg trip blank present? \_\_\_\_\_ Yes No

Tests that are not checked for pH by Receiving:  
 VOAs  
 Oil and Grease  
 TOC

Contacted PM \_\_\_\_\_ Date \_\_\_\_\_ by \_\_\_\_\_ via Verbal Voice Mail Other \_\_\_\_\_  
 Concerning \_\_\_\_\_

**17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES**

Samples processed by:  
[Signature]

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**18. SAMPLE CONDITION**

Sample(s) \_\_\_\_\_ were received after the recommended holding time had expired.  
 Sample(s) \_\_\_\_\_ were received in a broken container.  
 Sample(s) \_\_\_\_\_ were received with bubble >6 mm in diameter. (Notify PM)

**19. SAMPLE PRESERVATION**

Sample(s) \_\_\_\_\_ were further preserved in the laboratory.  
 Time preserved: \_\_\_\_\_ Preservative(s) added/Lot number(s): \_\_\_\_\_  
 VOA Sample Preservation - Date/Time VOAs Frozen: \_\_\_\_\_

Login #: 120412

Eurofins TestAmerica Canton Sample Receipt Multiple Cooler Form									
Cooler Description (Circle)				IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)		
TA	Client	Box	Other	IR-10 IR-11	2.5	3.2	Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11	1.0	1.7	Water	None	None
TA	Client	Box	Other	IR-10 IR-11	2.1	2.8	Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None
TA	Client	Box	Other	IR-10 IR-11			Wet Ice	Blue Ice	Dry Ice
TA	Client	Box	Other	IR-10 IR-11			Water	None	None

See Temperature Excursion Form

WI-NC-099 Cooler Receipt Form Page 2 Multiple Coolers



Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container pH</u>	<u>Preservative Added (mls)</u>	<u>Lot #</u>
MW-14S	240-120412-A-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
MW-14S	240-120412-C-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
MW-14S	240-120412-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
MW-14S	240-120412-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
PZ-24S	240-120412-A-2	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-24S	240-120412-C-2	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-24S	240-120412-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
PZ-24S	240-120412-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
PZ-40S	240-120412-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-B-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-C-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-G-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-H-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-I-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
PZ-40S	240-120412-J-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
PZ-40S	240-120412-K-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
FB-5	240-120412-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____
FB-5	240-120412-B-4	Plastic 500ml - with Nitric Acid	<2	_____	_____
EB-5	240-120412-A-5	Plastic 250ml - with Nitric Acid	<2	_____	_____
EB-5	240-120412-B-5	Plastic 500ml - with Nitric Acid	<2	_____	_____
EB-5	240-120412-C-5	Plastic 1 liter - Nitric Acid	<2	_____	_____
EB-5	240-120412-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____



# Chain of Custody Record



<b>Client Information (Sub Contract Lab)</b>		Lab PM: Brooks, Kris M		Carrier Tracking No(s):	
Client Contact: Shipping/Receiving		E-Mail: kris.brooks@testamericainc.com		State of Origin: Michigan	
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		COC No: 240-111607.1	
Address: 13715 Rider Trail North,		Due Date Requested: 10/24/2019		Page: Page 1 of 1	
City: Earth City		TAT Requested (days):		Job #:	
State, Zip: MO, 63045		PO #:		240-120412-1	
Phone: 314-298-8566(Tel) 314-298-8757(Fax)		WO #:		Preservation Codes:	
Email:		Project #: 44022279		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
SIS: JHC - CCR Groundwater Monitoring 2019		SSOW#:		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastewat, BT=biological, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PreSep STD Standard Target List	904.0/PreSep STD Standard Target List	Ra226Ra228_GFPc	Total Number of Containers	Special Instructions/Note:
MW-14S (240-120412-1)	10/10/19	14:40 Eastern		Water	X	X	X	X		2	
PZ-24S (240-120412-2)	10/10/19	15:30 Eastern		Water	X	X	X	X		2	
PZ-40S (240-120412-3)	10/10/19	16:30 Eastern		Water	X	X	X	X		2	
EB-5 (240-120412-5)	10/10/19	14:55 Eastern		Water	X	X	X	X		2	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

**Possible Hazard Identification**  
 Unconfirmed  
 Deliverable Requested: I, II, III, IV, Other (specify) \_\_\_\_\_  
 Empty Kit Relinquished by: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_  
 Custody Seals Intact:  Yes  No  
 Custody Seal No.: \_\_\_\_\_

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months  
 Special Instructions/QC Requirements: \_\_\_\_\_

Date: 10-14-19 1248  
 Date/Time: 10-15-19 09:00  
 Company: 240  
 Company: TASA  
 Company: TASA  
 Company: TASA  
 Cooler Temperature(s) °C and Other Remarks: \_\_\_\_\_

# Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-120412-2

**Login Number: 120412**

**List Number: 2**

**Creator: Hellm, Michael**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 10/15/19 01:20 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	19.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## ANALYTICAL REPORT

Eurofins TestAmerica, Canton  
4101 Shuffel Street NW  
North Canton, OH 44720  
Tel: (330)497-9396

Laboratory Job ID: 240-120306-1

Client Project/Site: JHC - CCR Pond A + Downgradient  
Revision: 1

**For:**

TRC Environmental Corporation.  
1540 Eisenhower Place  
Ann Arbor, Michigan 48108-7080

Attn: Darby Litz



Authorized for release by:  
12/12/2019 12:36:17 PM

Kris Brooks, Project Manager II  
(330)966-9790  
[kris.brooks@testamericainc.com](mailto:kris.brooks@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Definitions/Glossary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD Recovery is outside acceptance limits.
U	Indicates the analyte was analyzed for but not detected.

### General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

**Job ID: 240-120306-1**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

Revised

**Client: TRC Environmental Corporation.**

**Project: JHC - CCR Pond A + Downgradient**

**Report Number: 240-120306-1**

Revised 12/12/19: Additional metals were added: Iron, Copper, Silver, Vanadium and Zinc.

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The following analyses were performed at the Eurofins TestAmerica, Irvine laboratory: 6010B Total Recoverable Metals (ICP); 6020\_LL Metals (ICPMS); 7470A Mercury.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 10/10/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

### **TOTAL RECOVERABLE METALS (ICP)**

Sample JHC-MW-15010 (240-120306-1) was analyzed for total recoverable metals (ICP) in accordance with EPA SW-846 Method 6010B. The sample was prepared and analyzed on 10/16/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **TOTAL RECOVERABLE METALS (ICPMS)**

Sample JHC-MW-15010 (240-120306-1) was analyzed for total recoverable metals (ICPMS) in accordance with EPA SW-846 Method

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

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## Job ID: 240-120306-1 (Continued)

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### Laboratory: Eurofins TestAmerica, Canton (Continued)

6020. The sample was prepared on 10/14/2019 and analyzed on 10/15/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### METALS (ICPMS)

Sample JHC-MW-15010 (240-120306-1) was analyzed for metals (ICPMS) in accordance with SW846 Method 6020. The sample was prepared and analyzed on 10/17/2019.

Selenium failed the recovery criteria low for the MS and MSD of sample JHC-MW-15010 (240-120306-1) in batch 440-575137. Chromium failed the recovery criteria high.

Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### TOTAL MERCURY

Sample JHC-MW-15010 (240-120306-1) was analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The sample was prepared on 10/14/2019 and analyzed on 10/15/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### TOTAL DISSOLVED SOLIDS

Sample JHC-MW-15010 (240-120306-1) was analyzed for total dissolved solids in accordance with SM 2540C. The sample was analyzed on 10/11/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### ANIONS

Sample JHC-MW-15010 (240-120306-1) was analyzed for anions in accordance with EPA Method 300.0. The sample was analyzed on 10/22/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.





# Method Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL IRV
6020	Metals (ICP/MS)	SW846	TAL CAN
6020	Metals (ICP/MS)	SW846	TAL IRV
7470A	Mercury (CVAA)	SW846	TAL IRV
2540 C-2011	Total Dissolved Solids (Dried at 180 °C)	SM	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL CAN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL IRV
7470A	Preparation, Mercury	SW846	TAL IRV

#### Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

# Sample Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-120306-1	JHC-MW-15010	Water	10/09/19 13:11	10/10/19 09:30	

---

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Detection Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

**Client Sample ID: JHC-MW-15010**

**Lab Sample ID: 240-120306-1**

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	84		1.0	mg/L	1		6010B	Total
								Recoverable
Boron	2.8		0.050	mg/L	1		6010B	Total
								Recoverable
Lithium	0.017		0.010	mg/L	1		6020	Total
								Recoverable
Barium	0.27		0.0050	mg/L	1		6020	Total
								Recoverable
Chromium	0.37		0.0010	mg/L	1		6020	Total
								Recoverable
Molybdenum	0.014		0.0050	mg/L	1		6020	Total
								Recoverable
Selenium	0.21	F1	0.0010	mg/L	1		6020	Total
								Recoverable
Iron	2.1	F1	0.020	mg/L	1		6020	Total
								Recoverable
Nickel	0.20	F1	0.0020	mg/L	1		6020	Total
								Recoverable
Vanadium	0.0055		0.0020	mg/L	1		6020	Total
								Recoverable
Silver	0.00048		0.00020	mg/L	1		6020	Total
								Recoverable
Copper	0.012		0.0010	mg/L	1		6020	Total
								Recoverable
Total Dissolved Solids	330		50	mg/L	1		2540 C-2011	Total/NA
Sulfate	32		2.0	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

# Client Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

**Client Sample ID: JHC-MW-15010**

**Lab Sample ID: 240-120306-1**

Date Collected: 10/09/19 13:11

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	84		1.0	mg/L		10/16/19 08:24	10/16/19 15:40	1
Boron	2.8		0.050	mg/L		10/16/19 08:24	10/16/19 15:40	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 16:02	1
Lithium	0.017		0.010	mg/L		10/14/19 14:00	10/15/19 14:10	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 16:02	1
Barium	0.27		0.0050	mg/L		10/17/19 08:23	10/17/19 16:02	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 16:02	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 08:23	10/17/19 16:02	1
Chromium	0.37		0.0010	mg/L		10/17/19 08:23	10/17/19 16:02	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 08:23	10/17/19 16:02	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 16:02	1
Molybdenum	0.014		0.0050	mg/L		10/17/19 08:23	10/17/19 16:02	1
Selenium	0.21	F1	0.0010	mg/L		10/17/19 08:23	10/17/19 16:02	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 08:23	10/17/19 16:02	1
Iron	2.1	F1	0.020	mg/L		10/17/19 08:23	10/17/19 16:02	1
Nickel	0.20	F1	0.0020	mg/L		10/17/19 08:23	10/17/19 16:02	1
Vanadium	0.0055		0.0020	mg/L		10/17/19 08:23	10/17/19 16:02	1
Silver	0.00048		0.00020	mg/L		10/17/19 08:23	10/17/19 16:02	1
Copper	0.012		0.0010	mg/L		10/17/19 08:23	10/17/19 16:02	1
Zinc	0.010	U	0.010	mg/L		10/17/19 08:23	10/17/19 16:02	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/14/19 13:14	10/15/19 04:56	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	330		50	mg/L			10/11/19 14:47	1
Chloride	2.0	U	2.0	mg/L			10/22/19 09:42	1
Fluoride	1.0	U	1.0	mg/L			10/22/19 09:42	1
Sulfate	32		2.0	mg/L			10/22/19 09:42	1

# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

## Method: 6010B - Metals (ICP)

**Lab Sample ID: MB 440-574714/1-A**  
**Matrix: Water**  
**Analysis Batch: 574837**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574714**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	1.0	U	1.0	mg/L		10/16/19 08:24	10/16/19 15:33	1
Boron	0.050	U	0.050	mg/L		10/16/19 08:24	10/16/19 15:33	1

**Lab Sample ID: LCS 440-574714/2-A**  
**Matrix: Water**  
**Analysis Batch: 574837**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574714**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	5.00	4.66		mg/L		93	80 - 120
Boron	1.00	0.957		mg/L		96	80 - 120

**Lab Sample ID: 240-120306-1 MS**  
**Matrix: Water**  
**Analysis Batch: 574837**

**Client Sample ID: JHC-MW-15010**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574714**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	84		5.00	89.6	4	mg/L		115	75 - 125
Boron	2.8		1.00	3.78		mg/L		101	75 - 125

**Lab Sample ID: 240-120306-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 574837**

**Client Sample ID: JHC-MW-15010**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574714**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Calcium	84		5.00	89.2	4	mg/L		108	75 - 125	0	20
Boron	2.8		1.00	3.82		mg/L		105	75 - 125	1	20

## Method: 6020 - Metals (ICP/MS)

**Lab Sample ID: MB 240-405563/1-A**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405563**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 14:05	1

**Lab Sample ID: LCS 240-405563/2-A**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405563**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.500	0.491		mg/L		98	80 - 120

**Lab Sample ID: 240-120306-1 MS**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: JHC-MW-15010**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405563**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.017		0.500	0.510		mg/L		99	75 - 125

Eurofins TestAmerica, Canton

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

## Method: 6020 - Metals (ICP/MS) (Continued)

**Lab Sample ID: 240-120306-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: JHC-MW-15010**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405563**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.017		0.500	0.503		mg/L		97	75 - 125	1	20

**Lab Sample ID: MB 440-574965/1-A**  
**Matrix: Water**  
**Analysis Batch: 575137**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574965**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 15:58	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 15:58	1
Barium	0.0050	U	0.0050	mg/L		10/17/19 08:23	10/17/19 15:58	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 15:58	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 08:23	10/17/19 15:58	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 15:58	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 08:23	10/17/19 15:58	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 15:58	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 08:23	10/17/19 15:58	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 15:58	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 08:23	10/17/19 15:58	1
Iron	0.020	U	0.020	mg/L		10/17/19 08:23	10/17/19 15:58	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 08:23	10/17/19 15:58	1
Vanadium	0.0020	U	0.0020	mg/L		10/17/19 08:23	10/17/19 15:58	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 08:23	10/17/19 15:58	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 08:23	10/17/19 15:58	1
Zinc	0.010	U	0.010	mg/L		10/17/19 08:23	10/17/19 15:58	1

**Lab Sample ID: LCS 440-574965/2-A**  
**Matrix: Water**  
**Analysis Batch: 575137**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574965**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.0800	0.0815		mg/L		102	80 - 120
Arsenic	0.0800	0.0738		mg/L		92	80 - 120
Barium	0.0800	0.0738		mg/L		92	80 - 120
Beryllium	0.0800	0.0787		mg/L		98	80 - 120
Cadmium	0.0800	0.0739		mg/L		92	80 - 120
Chromium	0.0800	0.0755		mg/L		94	80 - 120
Cobalt	0.0800	0.0749		mg/L		94	80 - 120
Lead	0.0800	0.0738		mg/L		92	80 - 120
Molybdenum	0.0800	0.0749		mg/L		94	80 - 120
Selenium	0.0800	0.0728		mg/L		91	80 - 120
Thallium	0.0800	0.0750		mg/L		94	80 - 120
Iron	0.800	0.762		mg/L		95	80 - 120
Nickel	0.0800	0.0751		mg/L		94	80 - 120
Vanadium	0.0800	0.0749		mg/L		94	80 - 120
Silver	0.0800	0.0691		mg/L		86	80 - 120
Copper	0.0800	0.0731		mg/L		91	80 - 120
Zinc	0.0800	0.0768		mg/L		96	80 - 120

Eurofins TestAmerica, Canton

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

## Method: 6020 - Metals (ICP/MS) (Continued)

**Lab Sample ID: 240-120306-1 MS**  
**Matrix: Water**  
**Analysis Batch: 575137**

**Client Sample ID: JHC-MW-15010**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574965**

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier	Added	Result	Qualifier					
Antimony	0.0010	U	0.0800	0.0835		mg/L		103	75 - 125	
Arsenic	0.0010	U	0.0800	0.0719		mg/L		89	75 - 125	
Barium	0.27		0.0800	0.363		mg/L		116	75 - 125	
Beryllium	0.0010	U	0.0800	0.0763		mg/L		95	75 - 125	
Cadmium	0.00020	U	0.0800	0.0745		mg/L		93	75 - 125	
Chromium	0.37		0.0800	0.583	4	mg/L		268	75 - 125	
Cobalt	0.0060	U	0.0800	0.0813		mg/L		96	75 - 125	
Lead	0.0010	U	0.0800	0.0752		mg/L		94	75 - 125	
Molybdenum	0.014		0.0800	0.0972		mg/L		105	75 - 125	
Selenium	0.21	F1	0.0800	0.265	F1	mg/L		74	75 - 125	
Thallium	0.0020	U	0.0800	0.0757		mg/L		94	75 - 125	
Iron	2.1	F1	0.800	7.16	F1	mg/L		634	75 - 125	
Nickel	0.20	F1	0.0800	0.355	F1	mg/L		193	75 - 125	
Vanadium	0.0055		0.0800	0.0916		mg/L		108	75 - 125	
Silver	0.00048		0.0800	0.0706		mg/L		88	75 - 125	
Copper	0.012		0.0800	0.0904		mg/L		98	75 - 125	
Zinc	0.010	U	0.0800	0.0766		mg/L		89	75 - 125	

**Lab Sample ID: 240-120306-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 575137**

**Client Sample ID: JHC-MW-15010**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574965**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Antimony	0.0010	U	0.0800	0.0814		mg/L		101	75 - 125	3	20
Arsenic	0.0010	U	0.0800	0.0712		mg/L		88	75 - 125	1	20
Barium	0.27		0.0800	0.348		mg/L		96	75 - 125	4	20
Beryllium	0.0010	U	0.0800	0.0769		mg/L		96	75 - 125	1	20
Cadmium	0.00020	U	0.0800	0.0737		mg/L		92	75 - 125	1	20
Chromium	0.37		0.0800	0.699	4	mg/L		412	75 - 125	18	20
Cobalt	0.0060	U	0.0800	0.0809		mg/L		95	75 - 125	1	20
Lead	0.0010	U	0.0800	0.0729		mg/L		91	75 - 125	3	20
Molybdenum	0.014		0.0800	0.0972		mg/L		105	75 - 125	0	20
Selenium	0.21	F1	0.0800	0.254	F1	mg/L		60	75 - 125	4	20
Thallium	0.0020	U	0.0800	0.0727		mg/L		90	75 - 125	4	20
Iron	2.1	F1	0.800	7.21	F1	mg/L		640	75 - 125	1	20
Nickel	0.20	F1	0.0800	0.390	F1	mg/L		237	75 - 125	9	20
Vanadium	0.0055		0.0800	0.0910		mg/L		107	75 - 125	1	20
Silver	0.00048		0.0800	0.0690		mg/L		86	75 - 125	2	20
Copper	0.012		0.0800	0.0914		mg/L		99	75 - 125	1	20
Zinc	0.010	U	0.0800	0.0748		mg/L		87	75 - 125	2	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 440-574283/1-A**  
**Matrix: Water**  
**Analysis Batch: 574572**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 574283**

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Mercury	0.00020	U	0.00020	mg/L		10/14/19 13:14	10/15/19 04:40	1

Eurofins TestAmerica, Canton

# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

## Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 440-574283/2-A  
Matrix: Water  
Analysis Batch: 574572

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 574283  
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00400	0.00387		mg/L		97	80 - 120

Lab Sample ID: 240-120306-1 MS  
Matrix: Water  
Analysis Batch: 574572

Client Sample ID: JHC-MW-15010  
Prep Type: Total/NA  
Prep Batch: 574283  
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00020	U	0.00400	0.00394		mg/L		98	75 - 125

Lab Sample ID: 240-120306-1 MSD  
Matrix: Water  
Analysis Batch: 574572

Client Sample ID: JHC-MW-15010  
Prep Type: Total/NA  
Prep Batch: 574283  
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	0.00020	U	0.00400	0.00411		mg/L		103	75 - 125	4	20

## Method: 2540 C-2011 - Total Dissolved Solids (Dried at 180 °C)

Lab Sample ID: MB 240-405360/1  
Matrix: Water  
Analysis Batch: 405360

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	50	U	50	mg/L			10/11/19 14:47	1

Lab Sample ID: LCS 240-405360/2  
Matrix: Water  
Analysis Batch: 405360

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Dissolved Solids	484	490		mg/L		101	80 - 120

Lab Sample ID: 240-120306-1 DU  
Matrix: Water  
Analysis Batch: 405360

Client Sample ID: JHC-MW-15010  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Dissolved Solids	330		333		mg/L		0.9	20

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-406785/3  
Matrix: Water  
Analysis Batch: 406785

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.0	U	2.0	mg/L			10/22/19 09:01	1
Fluoride	1.0	U	1.0	mg/L			10/22/19 09:01	1
Sulfate	2.0	U	2.0	mg/L			10/22/19 09:01	1

Eurofins TestAmerica, Canton



# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

**Lab Sample ID: LCS 240-406785/4**  
**Matrix: Water**  
**Analysis Batch: 406785**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	50.2		mg/L		100	90 - 110
Fluoride	2.50	2.52		mg/L		101	90 - 110
Sulfate	50.0	51.5		mg/L		103	90 - 110

**Lab Sample ID: 240-120306-1 MS**  
**Matrix: Water**  
**Analysis Batch: 406785**

**Client Sample ID: JHC-MW-15010**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	2.0	U	50.0	56.3		mg/L		111	80 - 120
Fluoride	1.0	U	2.50	2.86		mg/L		111	80 - 120
Sulfate	32		50.0	86.4		mg/L		109	80 - 120

**Lab Sample ID: 240-120306-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 406785**

**Client Sample ID: JHC-MW-15010**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	2.0	U	50.0	55.2		mg/L		109	80 - 120	2	15
Fluoride	1.0	U	2.50	2.83		mg/L		110	80 - 120	1	15
Sulfate	32		50.0	85.4		mg/L		107	80 - 120	1	15

# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

## Metals

### Prep Batch: 405563

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total Recoverable	Water	3005A	
MB 240-405563/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-405563/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-120306-1 MS	JHC-MW-15010	Total Recoverable	Water	3005A	
240-120306-1 MSD	JHC-MW-15010	Total Recoverable	Water	3005A	

### Analysis Batch: 405929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total Recoverable	Water	6020	405563
MB 240-405563/1-A	Method Blank	Total Recoverable	Water	6020	405563
LCS 240-405563/2-A	Lab Control Sample	Total Recoverable	Water	6020	405563
240-120306-1 MS	JHC-MW-15010	Total Recoverable	Water	6020	405563
240-120306-1 MSD	JHC-MW-15010	Total Recoverable	Water	6020	405563

### Prep Batch: 574283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total/NA	Water	7470A	
MB 440-574283/1-A	Method Blank	Total/NA	Water	7470A	
LCS 440-574283/2-A	Lab Control Sample	Total/NA	Water	7470A	
240-120306-1 MS	JHC-MW-15010	Total/NA	Water	7470A	
240-120306-1 MSD	JHC-MW-15010	Total/NA	Water	7470A	

### Analysis Batch: 574572

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total/NA	Water	7470A	574283
MB 440-574283/1-A	Method Blank	Total/NA	Water	7470A	574283
LCS 440-574283/2-A	Lab Control Sample	Total/NA	Water	7470A	574283
240-120306-1 MS	JHC-MW-15010	Total/NA	Water	7470A	574283
240-120306-1 MSD	JHC-MW-15010	Total/NA	Water	7470A	574283

### Prep Batch: 574714

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total Recoverable	Water	3005A	
MB 440-574714/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-574714/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-120306-1 MS	JHC-MW-15010	Total Recoverable	Water	3005A	
240-120306-1 MSD	JHC-MW-15010	Total Recoverable	Water	3005A	

### Analysis Batch: 574837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total Recoverable	Water	6010B	574714
MB 440-574714/1-A	Method Blank	Total Recoverable	Water	6010B	574714
LCS 440-574714/2-A	Lab Control Sample	Total Recoverable	Water	6010B	574714
240-120306-1 MS	JHC-MW-15010	Total Recoverable	Water	6010B	574714
240-120306-1 MSD	JHC-MW-15010	Total Recoverable	Water	6010B	574714

### Prep Batch: 574965

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total Recoverable	Water	3005A	
MB 440-574965/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-574965/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Eurofins TestAmerica, Canton

# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

## Metals (Continued)

### Prep Batch: 574965 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1 MS	JHC-MW-15010	Total Recoverable	Water	3005A	
240-120306-1 MSD	JHC-MW-15010	Total Recoverable	Water	3005A	

### Analysis Batch: 575137

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total Recoverable	Water	6020	574965
MB 440-574965/1-A	Method Blank	Total Recoverable	Water	6020	574965
LCS 440-574965/2-A	Lab Control Sample	Total Recoverable	Water	6020	574965
240-120306-1 MS	JHC-MW-15010	Total Recoverable	Water	6020	574965
240-120306-1 MSD	JHC-MW-15010	Total Recoverable	Water	6020	574965

## General Chemistry

### Analysis Batch: 405360

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total/NA	Water	2540 C-2011	
MB 240-405360/1	Method Blank	Total/NA	Water	2540 C-2011	
LCS 240-405360/2	Lab Control Sample	Total/NA	Water	2540 C-2011	
240-120306-1 DU	JHC-MW-15010	Total/NA	Water	2540 C-2011	

### Analysis Batch: 406785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total/NA	Water	300.0	
MB 240-406785/3	Method Blank	Total/NA	Water	300.0	
LCS 240-406785/4	Lab Control Sample	Total/NA	Water	300.0	
240-120306-1 MS	JHC-MW-15010	Total/NA	Water	300.0	
240-120306-1 MSD	JHC-MW-15010	Total/NA	Water	300.0	

# Lab Chronicle

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

**Client Sample ID: JHC-MW-15010**

**Lab Sample ID: 240-120306-1**

**Date Collected: 10/09/19 13:11**

**Matrix: Water**

**Date Received: 10/10/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			574714	10/16/19 08:24	BV	TAL IRV
Total Recoverable	Analysis	6010B		1	574837	10/16/19 15:40	P1R	TAL IRV
Total Recoverable	Prep	3005A			405563	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 14:10	DSH	TAL CAN
Total Recoverable	Prep	3005A			574965	10/17/19 08:23	BV	TAL IRV
Total Recoverable	Analysis	6020		1	575137	10/17/19 16:02	P1R	TAL IRV
Total/NA	Prep	7470A			574283	10/14/19 13:14	DB	TAL IRV
Total/NA	Analysis	7470A		1	574572	10/15/19 04:56	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405360	10/11/19 14:47	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406785	10/22/19 09:42	JWW	TAL CAN

#### Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-1

## Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

## Laboratory: Eurofins TestAmerica, Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-20
Arizona	State	AZ0671	10-14-20
California	Los Angeles County Sanitation Districts	10256	06-30-20
California	State	2706	06-30-20
Guam	State	19-005R	01-23-20
Hawaii	State	CA01531	01-29-20
Kansas	NELAP	E-10420	07-31-20
Nevada	State	CA015312020-4	07-31-20
New Mexico	State	CA01531	01-29-20
Oregon	NELAP	4028 - 006	01-29-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-20

### Chain of Custody Record

<b>Client Information</b>		Lab PM: <b>Brooks, Kris M</b>		Garner Tracking No(s): <b>Grand Rapids</b>		COC No: <b>440-171551-31502.1</b>	
Client Contact: <b>Brian Yelen</b>		E-Mail: <b>kris.brooks@testamericacorp.com</b>		Page: <b>Page 1 of 2</b>		Job #:	
Company: <b>TRC Environmental Corporation.</b>		Due Date Requested:		Analysis Requested:		Preservation Codes:	
Address: <b>1540 Eisenhower Place</b>		TAT Requested (days):		903.0 - Standard Target List (ST LOUIS)		M - Hexane	
City: <b>Ann Arbor</b>		PO #: <b>135141</b>		904.0, Ra226Ra228, GFPC (ST LOUIS)		N - None	
State, Zip: <b>MI, 48108-7080</b>		WO #:		250C, Calc'd, 300.0, 280 CANTON		O - AsNaO2	
Phone: <b>734-971-7080 (Tel) 734-971-9022 (Fax)</b>		Project #:		6010B, 6020, LL, 7470A (RVINE)		P - Na2O4S	
Email: <b>byelen@trccompanies.com</b>		SSOW#:		6020 - 1 Metals(L) (CANTON)		Q - Na2SO3	
Project Name: <b>JHC - CCR Pond A + Downgradient</b>		Field Filtered Sample (Yes or No):		Perform Method (Yes or No):		R - Na2S2O3	
Site:		Sample Date		Sample Time		S - H2SO4	
<b>Sample Identification</b>		Sample Type (C=Comp, G=grab)		Preservation Code:		T - TSP Dodecahydrate	
JHC-MW-15006	Water					U - Acetone	
JHC-MW-15007	Water					V - MCAA	
JHC-MW-15008R	Water					W - pH 4-5	
JHC-MW-15009	Water					L - EDA	
JHC-MW-15010	Water	10/29/16 1355	G			Other:	
JHC-MW-15010 MS	Water	11/1/16 1355	G			Total Number of Containers	
JHC-MW-15010 MSD	Water	11/1/16 1355	G			Special Instructions/Note:	
JHC-MW-15011	Water						
MW-13	Water						
<b>Possible Hazard Identification</b>		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		Return To Client <input type="checkbox"/> Archive For _____ Months			
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements:			
Empty Kit Relinquished by:		Date:		Method of Shipment:			
Relinquished by: <b>[Signature]</b>		Date: <b>10/9/19 1417</b>		Received by: <b>[Signature]</b>		Date/Time: <b>10-15 3:00</b>	
Relinquished by: <b>Fed Ex</b>		Date: <b>10-9-19 3:15</b>		Received by: <b>[Signature]</b>		Date/Time: <b>10-10-19 9:30</b>	
Relinquished by:		Date:		Received by:		Date/Time:	
Custody Seals Intact <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			



Eurofins TestAmerica Canton Sample Receipt Form/Narrative

Login #: 120306

Canton Facility

Client TRC Site Name Cooler unpacked by: Ryan Cribley
Cooler Received on 10-19-19 Opened on 10-10-19 930
FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # TA Foam Box Client Cooler Box Other
Packing material used: Bubble Wrap Foam Plastic Bag None Other
COOLANT: Wet Ice Blue Ice Dry Ice Water None

- 1. Cooler temperature upon receipt IR GUN# IR-10 (CF +0.7°C) Observed Cooler Temp. 2.4 °C Corrected Cooler Temp. 3.1 °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 6 Yes No
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC991818
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? Larger than this. Yes No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # Yes No
16. Was a LL Hg or Me Hg trip blank present? Yes No

Tests that are not checked for pH by Receiving: VOAs Oil and Grease TOC

Contacted PM Date by via Verbal Voice Mail Other
Concerning

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: ZL

Blank lines for Chain of Custody and Sample Discrepancies.

18. SAMPLE CONDITION
Sample(s) were received after the recommended holding time had expired.
Sample(s) were received in a broken container.
Sample(s) were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION
Sample(s) were further preserved in the laboratory.
Time preserved: Preservative(s) added/Lot number(s):
VOA Sample Preservation - Date/Time VOAs Frozen:

WI-NC-099

Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container pH</u>	<u>Preservative Added (mls)</u>	<u>Lot #</u>
JHC-MW-15010	240-120306-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-C-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-G-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-H-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-I-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-J-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-K-1	Plastic 1 liter - Nitric Acid	<2	_____	_____





# Chain of Custody Record



TestAmerica, Inc.  
 TestAmerica

Client Information (Sub Contract Lab)		Sampler	Lab PM	Carrier Tracking No(s)	COC No					
TestAmerica Laboratories, Inc 17461 Derian Ave, Suite 100, Irvine, CA, 92614-5817 Phone 949-261-1022(Tel) 949-260-3297(Fax) Email Project Name JHC - CCR Groundwater Monitoring 2019 Site		Brooks, Kris M	Brooks, Kris M	Michigan	240-111364-1					
Due Date Requested: 10/22/2019 TAT Requested (days): PO # WO # Project # 44022279 SSOW#		Phone: kris.brooks@testamericainc.com	E-Mail: kris.brooks@testamericainc.com	State of Origin: Michigan	Page: Page 1 of 1					
Accreditations Required (See note) Analysis Requested M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)		Total Number of Containers: 2 Client sensitive w/dilutions contact PM if dilutions are needed 1 Client sensitive w/dilutions contact PM if dilutions are needed 1 Client sensitive w/dilutions contact PM if dilutions are needed 1								
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Solid, Overwater, etc)	Preservation Code: (PT-Tissue, A-Mix)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A/470A Prep Total Mercury	6200 LI/300SA 11 Total Metals (Sb,As,Ba,Be,Cd,Cr,Co,Pb)	6010B/300SA Total Boron, Calcium
JHC-MW-15010 (240-120306-1)	10/9/19	13:11 Eastern	Water	Water		X	X	X	X	X
JHC-MW-15010 (240-120306-1MS)	10/9/19	13:11 Eastern	MS	Water		X	X	X	X	X
JHC-MW-15010 (240-120306-1MSD)	10/9/19	13:11 Eastern	MSD	Water		X	X	X	X	X

**Possible Hazard Identification**  
 Unconfirmed  
 Deliverable Requested: I, II, III, IV, Other (specify)  
 Primary Deliverable Rank: 2

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

**Special Instructions/QC Requirements:**

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Empty Kit Relinquished by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Relinquished by: *RJA* Date/Time: 10/11/19 - 1610 Company: JA  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Custody Seals Intact:  Yes  No  
 Custody Seal No.: \_\_\_\_\_  
 Cooler Temperature(s) °C and Other Remarks: 1889 4-65-0  
 Date/Time: 10/12/19 10:00 Company: TAIPV

## Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-120306-1

**Login Number: 120306**

**List Number: 3**

**Creator: Escalante, Maria I**

**List Source: Eurofins TestAmerica, Irvine**

**List Creation: 10/12/19 12:52 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## ANALYTICAL REPORT

Eurofins TestAmerica, Canton  
4101 Shuffel Street NW  
North Canton, OH 44720  
Tel: (330)497-9396

Laboratory Job ID: 240-120306-2

Client Project/Site: JHC - CCR Pond A + Downgradient

**For:**

TRC Environmental Corporation.  
1540 Eisenhower Place  
Ann Arbor, Michigan 48108-7080

Attn: Darby Litz



Authorized for release by:  
11/6/2019 3:40:59 PM

Kris Brooks, Project Manager II  
(330)966-9790  
[kris.brooks@testamericainc.com](mailto:kris.brooks@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Definitions/Glossary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

## Qualifiers

### Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

**Job ID: 240-120306-2**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

**Client: TRC Environmental Corporation.**

**Project: JHC - CCR Pond A + Downgradient**

**Report Number: 240-120306-2**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control sample was within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, sample was diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

All analysis were performed at Eurofins TestAmerica St. Louis Laboratory.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The sample was received on 10/10/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

### **RADIUM-228**

Sample JHC-MW-15010 (240-120306-1) was analyzed for Radium-228 in accordance with EPA Method 904.0. The sample was prepared on 10/17/2019 and analyzed on 10/25/2019.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. JHC-MW-15010 (240-120306-1), (LCS 160-446820/1-A), (LCSD 160-446820/2-A) and (MB 160-446820/4-A)

The following sample was prepared at a reduced aliquot due to sediment and gray discoloration: JHC-MW-15010 (240-120306-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

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## Job ID: 240-120306-2 (Continued)

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### Laboratory: Eurofins TestAmerica, Canton (Continued)

demonstrate batch precision.

Insufficient sample volume was available to perform a sample duplicate for the following sample: JHC-MW-15010 (240-120306-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### RADIUM-226

Sample JHC-MW-15010 (240-120306-1) was analyzed for Radium-226 in accordance with EPA Method 903.0. The sample was prepared on 10/17/2019 and analyzed on 11/01/2019.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. JHC-MW-15010 (240-120306-1), (LCS 160-446813/1-A), (LCSD 160-446813/2-A) and (MB 160-446813/4-A)

Ra-226 is reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out. The Ra-226 result should be considered to be potentially high biased. Associated samples have activity below the RL. The results are reported with this narrative. JHC-MW-15010 (240-120306-1), (LCS 160-446813/1-A), (LCSD 160-446813/2-A) and (MB 160-446813/4-A)

The following sample was prepared at a reduced aliquot due to sediment and gray discoloration: JHC-MW-15010 (240-120306-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Insufficient sample volume was available to perform a sample duplicate for the following sample: JHC-MW-15010 (240-120306-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### COMBINED RADIUM 226 AND RADIUM 228

Sample JHC-MW-15010 (240-120306-1) was analyzed for Combined Radium 226 and Radium 228 in accordance with Ra226\_Ra228. The sample was analyzed on 11/06/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Method Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL

**Protocol References:**

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

**Laboratory References:**

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566





# Sample Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

---

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-120306-1	JHC-MW-15010	Water	10/09/19 13:11	10/10/19 09:30	

---

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# Detection Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

**Client Sample ID: JHC-MW-15010**

**Lab Sample ID: 240-120306-1**

No Detections.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

**Client Sample ID: JHC-MW-15010**

**Lab Sample ID: 240-120306-1**

Date Collected: 10/09/19 13:11

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.643		0.229	0.236	1.00	0.246	pCi/L	10/17/19 14:39	11/01/19 17:28	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	101		40 - 110					10/17/19 14:39	11/01/19 17:28	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.12		0.490	0.501	1.00	0.705	pCi/L	10/17/19 15:07	10/25/19 08:43	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	101		40 - 110					10/17/19 15:07	10/25/19 08:43	1
Y Carrier	89.7		40 - 110					10/17/19 15:07	10/25/19 08:43	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.76		0.541	0.554	5.00	0.705	pCi/L		11/06/19 08:39	1

# Tracer/Carrier Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

## Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba Carrier (40-110)							
240-120306-1	JHC-MW-15010	101							
LCS 160-446813/1-A	Lab Control Sample	98.0							
LCSD 160-446813/2-A	Lab Control Sample Dup	104							
MB 160-446813/4-A	Method Blank	100							

#### Tracer/Carrier Legend

Ba Carrier = Ba Carrier

## Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)						
240-120306-1	JHC-MW-15010	101	89.7						
LCS 160-446820/1-A	Lab Control Sample	98.0	85.2						
LCSD 160-446820/2-A	Lab Control Sample Dup	104	89.3						
MB 160-446820/4-A	Method Blank	100	89.7						

#### Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Y Carrier = Y Carrier

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

## Method: 903.0 - Radium-226 (GFPC)

**Lab Sample ID: MB 160-446813/4-A**  
**Matrix: Water**  
**Analysis Batch: 448537**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 446813**

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.2486	U	0.183	0.184	1.00	0.271	pCi/L	10/17/19 14:39	11/01/19 17:28	1
Carrier	MB MB		Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	%Yield	Qualifier	40 - 110					10/17/19 14:39	11/01/19 17:28	1
	100									

**Lab Sample ID: LCS 160-446813/1-A**  
**Matrix: Water**  
**Analysis Batch: 448537**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 446813**

Analyte	LCS LCS		Spike	LCS	LCS	Total	RL	MDC	Unit	%Rec	%Rec. Limits
	%Yield	Qualifier	Added	Result	Qual	Uncert. (2σ+/-)					
Radium-226			22.7	19.11		2.02	1.00	0.251	pCi/L	84	75 - 125
Carrier	LCS LCS		Limits								
Ba Carrier	%Yield	Qualifier	40 - 110								
	98.0										

**Lab Sample ID: LCSD 160-446813/2-A**  
**Matrix: Water**  
**Analysis Batch: 448537**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 446813**

Analyte	LCSD LCSD		Spike	LCSD	LCSD	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
	%Yield	Qualifier	Added	Result	Qual	Uncert. (2σ+/-)							
Radium-226			22.7	17.39		1.86	1.00	0.272	pCi/L	77	75 - 125	0.44	1
Carrier	LCSD LCSD		Limits										
Ba Carrier	%Yield	Qualifier	40 - 110										
	104												

## Method: 904.0 - Radium-228 (GFPC)

**Lab Sample ID: MB 160-446820/4-A**  
**Matrix: Water**  
**Analysis Batch: 447755**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 446820**

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.3128	U	0.420	0.421	1.00	0.700	pCi/L	10/17/19 15:07	10/25/19 08:43	1
Carrier	MB MB		Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	%Yield	Qualifier	40 - 110					10/17/19 15:07	10/25/19 08:43	1
Y Carrier	89.7		40 - 110					10/17/19 15:07	10/25/19 08:43	1

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

## Method: 904.0 - Radium-228 (GFPC) (Continued)

**Lab Sample ID: LCS 160-446820/1-A**  
**Matrix: Water**  
**Analysis Batch: 447755**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 446820**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	18.9	17.97		2.08	1.00	0.709	pCi/L	95	75 - 125

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	98.0		40 - 110
Y Carrier	85.2		40 - 110

**Lab Sample ID: LCSD 160-446820/2-A**  
**Matrix: Water**  
**Analysis Batch: 447755**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 446820**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	18.9	16.49		1.91	1.00	0.699	pCi/L	87	75 - 125	0.37	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	104		40 - 110
Y Carrier	89.3		40 - 110

# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

## Rad

### Prep Batch: 446813

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total/NA	Water	PrecSep STD	
MB 160-446813/4-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-446813/1-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-446813/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

### Prep Batch: 446820

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120306-1	JHC-MW-15010	Total/NA	Water	PrecSep_0	
MB 160-446820/4-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-446820/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-446820/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

# Lab Chronicle

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

**Client Sample ID: JHC-MW-15010**

**Lab Sample ID: 240-120306-1**

**Date Collected: 10/09/19 13:11**

**Matrix: Water**

**Date Received: 10/10/19 09:30**

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Prep	PrecSep STD			446813	10/17/19 14:39	ORM	TAL SL
Total/NA	Analysis	903.0		1	448537	11/01/19 17:28	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446820	10/17/19 15:07	ORM	TAL SL
Total/NA	Analysis	904.0		1	447755	10/25/19 08:43	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	449230	11/06/19 08:39	SMP	TAL SL

**Laboratory References:**

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566





# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

## Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

## Laboratory: Eurofins TestAmerica, Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-20
Arizona	State	AZ0671	10-14-20
California	Los Angeles County Sanitation Districts	10256	06-30-20
California	State	2706	06-30-20
Guam	State	19-005R	01-23-20
Hawaii	State	CA01531	01-29-20
Kansas	NELAP	E-10420	07-31-20
Nevada	State	CA015312020-4	07-31-20
New Mexico	State	CA01531	01-29-20
Oregon	NELAP	4028 - 006	01-29-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-20

# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120306-2

## Laboratory: Eurofins TestAmerica, St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-19
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-19
Iowa	State	373	09-17-20
Iowa	State Program	373	12-01-20
Kansas	NELAP	E-10236	10-31-20
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-19
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-19
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00028	02-02-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
Washington	State Program	C592	08-30-20
West Virginia DEP	State	381	12-01-19
West Virginia DEP	State Program	381	12-31-19

### Chain of Custody Record

**Client Information**  
 Client Contact: Brian Yelen  
 Company: TRC Environmental Corporation.  
 Address: 1540 Eisenhower Place  
 City: Ann Arbor  
 State: MI, Zip: 48108-7080  
 Phone: 734-971-7080 (Tel) 734-971-9022 (Fax)  
 Email: byelen@trccompanies.com  
 Project Name: JHC - CCR Pond A + Downgradient  
 Site:

**Sampler:** Dave DAS  
**Phone:** 7349043310  
**Lab PM:** Brooks, Kris M  
**E-Mail:** kris.brooks@testamericacorp.com  
**Grand Rapids**  
**Garner Tracking No(s):**  
**COC No:** 440-171551-31502.1  
**Page:** Page 1 of 2  
**Job #:**

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Soak, Overstall, etc.)	Preservation Code	Field Filtered Sample (Yes or No)	Analysis Requested		Special Instructions/Note:
							903.0 - Standard Target List (ST LOUIS)	904.0, Ra226Ra228, GFPC (ST LOUIS)	
JHC-MW-15006				Water			D	D	
JHC-MW-15007				Water			D	D	
JHC-MW-15008R				Water			D	D	
JHC-MW-15009				Water			D	D	
JHC-MW-15010	10/29/16	1355	G	Water			D	D	
JHC-MW-15010 MS	11/1/16	1355	G	Water			D	D	
JHC-MW-15010 MSD	11/1/16	1355	G	Water			D	D	
JHC-MW-15011				Water			D	D	
MW-13				Water			D	D	

**Possible Hazard Identification**  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Radiological  
 Deliverable Requested: I, II, III, IV, Other (specify)

**Empty Kit Relinquished by:** \_\_\_\_\_ Date: \_\_\_\_\_  
**Relinquished by:** [Signature] Company: TRC  
**Relinquished by:** [Signature] Company: TRC  
**Relinquished by:** [Signature] Company: TRC

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months  
 Special Instructions/QC Requirements:

**Method of Shipment:** \_\_\_\_\_  
**Date/Time:** 10/19/15 3:00  
**Date/Time:** 10-10-19 9:30  
**Date/Time:** \_\_\_\_\_  
**Company:** TRC  
**Company:** TRC  
**Company:** TRC

**Cooler Temperature(s) °C and Other Remarks:**

**Eurofins TestAmerica Canton Sample Receipt Form/Narrative**


Login # : 120306

**Canton Facility**

Client TRC Site Name \_\_\_\_\_ Cooler unpacked by: Ryan Cribley  
 Cooler Received on 10-19 Opened on 10-19 930  
 FedEx: 1<sup>st</sup> Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other \_\_\_\_\_

**Receipt After-hours: Drop-off Date/Time** \_\_\_\_\_ **Storage Location** \_\_\_\_\_

TestAmerica Cooler # TA Foam Box \_\_\_\_\_ Client Cooler \_\_\_\_\_ Box \_\_\_\_\_ Other \_\_\_\_\_  
 Packing material used: Bubble Wrap Foam Plastic Bag None Other \_\_\_\_\_  
 COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt  See Multiple Cooler Form  
 IR GUN# IR-10 (CF +0.7°C) Observed Cooler Temp. 2-4 °C Corrected Cooler Temp. 3.1 °C  
 IR GUN #IR-11 (CF +0.9°C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 6  Yes  No  
 -Were the seals on the outside of the cooler(s) signed & dated? total  Yes  No  NA  
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  Yes  No  
 -Were tamper/custody seals intact and uncompromised?  Yes  No  NA
3. Shippers' packing slip attached to the cooler(s)?  Yes  No
4. Did custody papers accompany the sample(s)?  Yes  No
5. Were the custody papers relinquished & signed in the appropriate place?  Yes  No
6. Was/were the person(s) who collected the samples clearly identified on the COC?  Yes  No
7. Did all bottles arrive in good condition (Unbroken)?  Yes  No
8. Could all bottle labels be reconciled with the COC?  Yes  No
9. Were correct bottle(s) used for the test(s) indicated?  Yes  No
10. Sufficient quantity received to perform indicated analyses?  Yes  No
11. Are these work share samples?  
 If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt?  Yes  No  NA pH Strip Lot# HC991818
13. Were VOAs on the COC?  Yes  No
14. Were air bubbles >6 mm in any VOA vials?  Yes  No  NA  Larger than this.
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # \_\_\_\_\_  Yes  No
16. Was a LL Hg or Me Hg trip blank present? \_\_\_\_\_  Yes  No

Tests that are not checked for pH by Receiving:  
VOAs  
Oil and Grease  
TOC

Contacted PM \_\_\_\_\_ Date \_\_\_\_\_ by \_\_\_\_\_ via Verbal Voice Mail Other \_\_\_\_\_  
 Concerning \_\_\_\_\_

**17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES** Samples processed by: ZL

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**18. SAMPLE CONDITION**  
 Sample(s) \_\_\_\_\_ were received after the recommended holding time had expired.  
 Sample(s) \_\_\_\_\_ were received in a broken container.  
 Sample(s) \_\_\_\_\_ were received with bubble >6 mm in diameter. (Notify PM)

**19. SAMPLE PRESERVATION**  
 Sample(s) \_\_\_\_\_ were further preserved in the laboratory.  
 Time preserved: \_\_\_\_\_ Preservative(s) added/Lot number(s): \_\_\_\_\_  
 VOA Sample Preservation - Date/Time VOAs Frozen: \_\_\_\_\_

WI-NC-099

Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container pH</u>	<u>Preservative Added (mls)</u>	<u>Lot #</u>
JHC-MW-15010	240-120306-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-C-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-G-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-H-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-I-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-J-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15010	240-120306-K-1	Plastic 1 liter - Nitric Acid	<2	_____	_____





Client Information (Sub Contract Lab)		Sampler:		Lab PM:		Carrier Tracking No(s):		COC No:	
Client Contact: Shipping/Receiving		Phone:		Brooks, Kris M				240-111368.1	
Company: TestAmerica Laboratories, Inc.		E-Mail: kris.brooks@testamericainc.com		State of Origin: Michigan		Page: Page 1 of 1			
Address: 13715 Rider Trail North,		Accreditations Required (See note):		Job #: 240-120306-1		Preservation Codes:		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 L - EDA Z - other (specify)	
City: Earth City		Due Date Requested: 11/7/2019		Field Filtered Sample (Yes or No)		Analysis Requested		Total Number of Containers	
State, Zip: MO, 63045		TAT Requested (days):		Perform MS/MSD (Yes or No)		903.0/PreSep_STD Standard Target List		2	
Phone: 314-298-8566(Tel) 314-298-8757(Fax)		PO #:		904.0/PreSep_0 Standard Target List		Ra226Ra228_GFPc		1	
Email:		WO #:		Field Filtered Sample (Yes or No)				1	
Project Name: JHC - CCR Groundwater Monitoring 2019		Project #: 44022279		Sample Date		Sample Time		Sample Type (C=comp, G=grab)	
Site: JHC - CCR Groundwater Monitoring 2019		SSOW#:		Sample Date		Sample Time		Sample Type (C=comp, G=grab)	
Sample Identification - Client ID (Lab ID)		Sample Date		Sample Time		Sample Type (C=comp, G=grab)		Matrix (W=water, S=solid, O=waste/oli, BT=Toxic, A=Air)	
JHC-MW-15010 (240-120306-1)	10/9/19	13:11 Eastern	Water	Water	X	X	X	X	
JHC-MW-15010 (240-120306-1MS)	10/9/19	13:11 Eastern	MS	Water	X	X	X	X	
JHC-MW-15010 (240-120306-1MSD)	10/9/19	13:11 Eastern	MSD	Water	X	X	X	X	
<p>Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte &amp; accreditation compliance upon out-subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.</p>									
<p><b>Possible Hazard Identification</b>  <input type="checkbox"/> Unconfirmed          Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2          Empty Kit Relinquished by: _____ Date: _____          Relinquished by: _____ Date: 10-11-19 Company: M/b31          Relinquished by: _____ Date: _____ Company: 240          Relinquished by: _____ Date: _____ Company: _____          Custody Seals Intact: _____ Custody Seal No.: _____  <input type="checkbox"/> Yes <input type="checkbox"/> No</p>									
<p><b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b>  <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months          Special Instructions/QC Requirements:</p>									
<p>Method of Shipment: _____          Received by: _____ Date/Time: 10/12/19 09:00 Company: TASTC          Received by: _____ Date/Time: _____ Company: _____          Received by: _____ Date/Time: _____ Company: _____          Cooler Temperature(s) °C and Other Remarks:</p>									



## Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-120306-2

**Login Number: 120306**

**List Number: 2**

**Creator: Harris, Lorin C**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 10/12/19 02:48 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## ANALYTICAL REPORT

Eurofins TestAmerica, Canton  
4101 Shuffel Street NW  
North Canton, OH 44720  
Tel: (330)497-9396

Laboratory Job ID: 240-120400-1

Client Project/Site: JHC - CCR Pond A + Downgradient  
Revision: 1

**For:**

TRC Environmental Corporation.  
1540 Eisenhower Place  
Ann Arbor, Michigan 48108-7080

Attn: Darby Litz



Authorized for release by:  
12/3/2019 7:18:21 PM

Kris Brooks, Project Manager II  
(330)966-9790  
[kris.brooks@testamericainc.com](mailto:kris.brooks@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*





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# Definitions/Glossary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

**Job ID: 240-120400-1**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

Revised

**Client: TRC Environmental Corporation.**

**Project: JHC - CCR Pond A + Downgradient**

**Report Number: 240-120400-1**

Revision 12/03/2019: Corrected the RL for iron.

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The following analyses were performed at the Eurofins TestAmerica, Irvine laboratory: 6010B Total Recoverable Metals (ICP); 6020\_LL Metals (ICPMS); 7470A Mercury.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 10/11/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 3.4° C, 4.2° C and 5.2° C.

### **TOTAL RECOVERABLE METALS (ICP)**

Samples JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4) were analyzed for total recoverable metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 10/17/2019 and 10/18/2019 and analyzed on 10/18/2019 and 10/20/2019.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **TOTAL RECOVERABLE METALS (ICPMS)**

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

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## Job ID: 240-120400-1 (Continued)

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### Laboratory: Eurofins TestAmerica, Canton (Continued)

Samples JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4) were analyzed for total recoverable metals (ICPMS) in accordance with EPA SW-846 Method 6020. The samples were prepared on 10/14/2019 and analyzed on 10/15/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### METALS (ICPMS)

Samples JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4) were analyzed for metals (ICPMS) in accordance with SW846 Method 6020. The samples were prepared and analyzed on 10/17/2019 and 10/21/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### TOTAL MERCURY

Samples JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4) were analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 10/16/2019 and 10/17/2019 and analyzed on 10/17/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### TOTAL DISSOLVED SOLIDS

Samples JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4) were analyzed for total dissolved solids in accordance with SM 2540C. The samples were analyzed on 10/14/2019 and 10/15/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### ANIONS

Samples JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4) were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 10/23/2019 and 10/24/2019.

Samples JHC-MW-15008R (240-120400-2)[10X] and DUP-5 (240-120400-4)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# Method Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL IRV
6020	Metals (ICP/MS)	SW846	TAL CAN
6020	Metals (ICP/MS)	SW846	TAL IRV
7470A	Mercury (CVAA)	SW846	TAL IRV
2540 C-2011	Total Dissolved Solids (Dried at 180 °C)	SM	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL CAN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL IRV
7470A	Preparation, Mercury	SW846	TAL IRV

#### Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

# Sample Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-120400-1	JHC-MW-15006	Water	10/10/19 05:45	10/11/19 09:30	
240-120400-2	JHC-MW-15008R	Water	10/09/19 15:13	10/11/19 09:30	
240-120400-3	JHC-MW-15011	Water	10/10/19 06:33	10/11/19 09:30	
240-120400-4	DUP-5	Water	10/09/19 00:00	10/11/19 09:30	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Detection Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Client Sample ID: JHC-MW-15006

## Lab Sample ID: 240-120400-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	35		1.0	mg/L	1		6010B	Total Recoverable
Boron	0.23		0.050	mg/L	1		6010B	Total Recoverable
Arsenic	0.0043		0.0010	mg/L	1		6020	Total Recoverable
Barium	0.18		0.0050	mg/L	1		6020	Total Recoverable
Iron	0.043		0.020	mg/L	1		6020	Total Recoverable
Molybdenum	0.0091		0.0050	mg/L	1		6020	Total Recoverable
Selenium	0.0013		0.0010	mg/L	1		6020	Total Recoverable
Vanadium	0.0080		0.0020	mg/L	1		6020	Total Recoverable
Total Dissolved Solids	190		50	mg/L	1		2540 C-2011	Total/NA
Chloride	22		2.0	mg/L	1		300.0	Total/NA
Sulfate	55		2.0	mg/L	1		300.0	Total/NA

## Client Sample ID: JHC-MW-15008R

## Lab Sample ID: 240-120400-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	100		1.0	mg/L	1		6010B	Total Recoverable
Boron	0.13		0.050	mg/L	1		6010B	Total Recoverable
Lithium	0.015		0.010	mg/L	1		6020	Total Recoverable
Barium	0.34		0.0050	mg/L	1		6020	Total Recoverable
Chromium	0.0045		0.0010	mg/L	1		6020	Total Recoverable
Iron	0.099		0.020	mg/L	1		6020	Total Recoverable
Selenium	0.11		0.0010	mg/L	1		6020	Total Recoverable
Nickel	0.0027		0.0020	mg/L	1		6020	Total Recoverable
Chloride	16		2.0	mg/L	1		300.0	Total/NA
Sulfate	220		20	mg/L	10		300.0	Total/NA

## Client Sample ID: JHC-MW-15011

## Lab Sample ID: 240-120400-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	110		1.0	mg/L	1		6010B	Total Recoverable
Boron	0.69		0.050	mg/L	1		6010B	Total Recoverable
Lithium	0.014		0.010	mg/L	1		6020	Total Recoverable
Arsenic	0.044		0.0010	mg/L	1		6020	Total Recoverable
Barium	0.36		0.0050	mg/L	1		6020	Total Recoverable
Chromium	0.0014		0.0010	mg/L	1		6020	Total Recoverable

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

# Detection Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Client Sample ID: JHC-MW-15011 (Continued)

## Lab Sample ID: 240-120400-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Iron	0.12		0.020	mg/L	1		6020	Total Recoverable
Molybdenum	0.011		0.0050	mg/L	1		6020	Total Recoverable
Selenium	0.076		0.0010	mg/L	1		6020	Total Recoverable
Vanadium	0.014		0.0020	mg/L	1		6020	Total Recoverable
Total Dissolved Solids	550		50	mg/L	1		2540 C-2011	Total/NA
Chloride	9.4		2.0	mg/L	1		300.0	Total/NA
Sulfate	180		2.0	mg/L	1		300.0	Total/NA

## Client Sample ID: DUP-5

## Lab Sample ID: 240-120400-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	100		1.0	mg/L	1		6010B	Total Recoverable
Boron	0.13		0.050	mg/L	1		6010B	Total Recoverable
Lithium	0.015		0.010	mg/L	1		6020	Total Recoverable
Barium	0.32		0.0050	mg/L	1		6020	Total Recoverable
Chromium	0.0045		0.0010	mg/L	1		6020	Total Recoverable
Copper	0.0011		0.0010	mg/L	1		6020	Total Recoverable
Iron	0.15		0.020	mg/L	1		6020	Total Recoverable
Selenium	0.11		0.0010	mg/L	1		6020	Total Recoverable
Nickel	0.0026		0.0020	mg/L	1		6020	Total Recoverable
Total Dissolved Solids	430		50	mg/L	1		2540 C-2011	Total/NA
Chloride	16		2.0	mg/L	1		300.0	Total/NA
Sulfate	220		20	mg/L	10		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton



# Client Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

**Client Sample ID: JHC-MW-15006**

**Lab Sample ID: 240-120400-1**

Date Collected: 10/10/19 05:45

Matrix: Water

Date Received: 10/11/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	35		1.0	mg/L		10/17/19 14:12	10/18/19 12:14	1
Boron	0.23		0.050	mg/L		10/17/19 14:12	10/18/19 12:14	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:49	1
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 17:03	1
Arsenic	0.0043		0.0010	mg/L		10/17/19 14:17	10/17/19 21:49	1
Barium	0.18		0.0050	mg/L		10/17/19 14:17	10/17/19 21:49	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:49	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:17	10/17/19 21:49	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:49	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:17	10/17/19 21:49	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:49	1
Iron	0.043		0.020	mg/L		10/17/19 14:17	10/17/19 21:49	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:49	1
Molybdenum	0.0091		0.0050	mg/L		10/17/19 14:17	10/17/19 21:49	1
Selenium	0.0013		0.0010	mg/L		10/17/19 14:17	10/17/19 21:49	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:17	10/17/19 21:49	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 14:17	10/17/19 21:49	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:17	10/17/19 21:49	1
Vanadium	0.0080		0.0020	mg/L		10/17/19 14:17	10/17/19 21:49	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:17	10/17/19 21:49	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:49	10/17/19 03:45	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	190		50	mg/L			10/14/19 15:49	1
Chloride	22		2.0	mg/L			10/23/19 06:38	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 06:38	1
Sulfate	55		2.0	mg/L			10/23/19 06:38	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

**Client Sample ID: JHC-MW-15008R**

**Lab Sample ID: 240-120400-2**

Date Collected: 10/09/19 15:13

Matrix: Water

Date Received: 10/11/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	100		1.0	mg/L		10/17/19 14:12	10/18/19 12:17	1
Boron	0.13		0.050	mg/L		10/17/19 14:12	10/18/19 12:17	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:51	1
Lithium	0.015		0.010	mg/L		10/14/19 14:00	10/15/19 17:06	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:51	1
Barium	0.34		0.0050	mg/L		10/17/19 14:17	10/17/19 21:51	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:51	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:17	10/17/19 21:51	1
Chromium	0.0045		0.0010	mg/L		10/17/19 14:17	10/17/19 21:51	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:17	10/17/19 21:51	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:51	1
Iron	0.099		0.020	mg/L		10/17/19 14:17	10/17/19 21:51	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:51	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 14:17	10/17/19 21:51	1
Selenium	0.11		0.0010	mg/L		10/17/19 14:17	10/17/19 21:51	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:17	10/17/19 21:51	1
Nickel	0.0027		0.0020	mg/L		10/17/19 14:17	10/17/19 21:51	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:17	10/17/19 21:51	1
Vanadium	0.0020	U	0.0020	mg/L		10/17/19 14:17	10/17/19 21:51	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:17	10/17/19 21:51	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:49	10/17/19 03:52	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	50	U	50	mg/L			10/14/19 11:45	1
Chloride	16		2.0	mg/L			10/23/19 07:41	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 07:41	1
Sulfate	220		20	mg/L			10/24/19 01:17	10

# Client Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

**Client Sample ID: JHC-MW-15011**

**Lab Sample ID: 240-120400-3**

Date Collected: 10/10/19 06:33

Matrix: Water

Date Received: 10/11/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	110		1.0	mg/L		10/17/19 14:12	10/18/19 12:19	1
Boron	0.69		0.050	mg/L		10/17/19 14:12	10/18/19 12:19	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:53	1
Lithium	0.014		0.010	mg/L		10/14/19 14:00	10/15/19 17:08	1
Arsenic	0.044		0.0010	mg/L		10/17/19 14:17	10/17/19 21:53	1
Barium	0.36		0.0050	mg/L		10/17/19 14:17	10/17/19 21:53	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:53	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:17	10/17/19 21:53	1
Chromium	0.0014		0.0010	mg/L		10/17/19 14:17	10/17/19 21:53	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:17	10/17/19 21:53	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:53	1
Iron	0.12		0.020	mg/L		10/17/19 14:17	10/17/19 21:53	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 21:53	1
Molybdenum	0.011		0.0050	mg/L		10/17/19 14:17	10/17/19 21:53	1
Selenium	0.076		0.0010	mg/L		10/17/19 14:17	10/17/19 21:53	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:17	10/17/19 21:53	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 14:17	10/17/19 21:53	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:17	10/17/19 21:53	1
Vanadium	0.014		0.0020	mg/L		10/17/19 14:17	10/17/19 21:53	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:17	10/17/19 21:53	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:49	10/17/19 03:56	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	550		50	mg/L			10/15/19 12:18	1
Chloride	9.4		2.0	mg/L			10/23/19 08:01	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 08:01	1
Sulfate	180		2.0	mg/L			10/23/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

**Client Sample ID: DUP-5**

**Lab Sample ID: 240-120400-4**

Date Collected: 10/09/19 00:00

Matrix: Water

Date Received: 10/11/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	100		1.0	mg/L		10/18/19 09:04	10/20/19 12:26	1
Boron	0.13		0.050	mg/L		10/18/19 09:04	10/20/19 12:26	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 16:01	1
Lithium	0.015		0.010	mg/L		10/14/19 14:00	10/15/19 17:10	1
Arsenic	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 16:01	1
Barium	0.32		0.0050	mg/L		10/21/19 08:45	10/21/19 16:01	1
Beryllium	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 16:01	1
Cadmium	0.00020	U	0.00020	mg/L		10/21/19 08:45	10/21/19 16:01	1
Chromium	0.0045		0.0010	mg/L		10/21/19 08:45	10/21/19 16:01	1
Cobalt	0.0060	U	0.0060	mg/L		10/21/19 08:45	10/21/19 16:01	1
Copper	0.0011		0.0010	mg/L		10/21/19 08:45	10/21/19 16:01	1
Iron	0.15		0.020	mg/L		10/21/19 08:45	10/21/19 16:01	1
Lead	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 16:01	1
Molybdenum	0.0050	U	0.0050	mg/L		10/21/19 08:45	10/21/19 16:01	1
Selenium	0.11		0.0010	mg/L		10/21/19 08:45	10/21/19 16:01	1
Silver	0.00020	U	0.00020	mg/L		10/21/19 08:45	10/21/19 16:01	1
Nickel	0.0026		0.0020	mg/L		10/21/19 08:45	10/21/19 16:01	1
Thallium	0.0020	U	0.0020	mg/L		10/21/19 08:45	10/21/19 16:01	1
Vanadium	0.0020	U	0.0020	mg/L		10/21/19 08:45	10/21/19 16:01	1
Zinc	0.010	U	0.010	mg/L		10/21/19 08:45	10/21/19 16:01	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/17/19 14:00	10/17/19 23:10	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	430		50	mg/L			10/14/19 11:45	1
Chloride	16		2.0	mg/L			10/23/19 08:22	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 08:22	1
Sulfate	220		20	mg/L			10/24/19 01:37	10

# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Method: 6010B - Metals (ICP)

**Lab Sample ID: MB 440-575071/1-A**  
**Matrix: Water**  
**Analysis Batch: 575328**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575071**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	1.0	U	1.0	mg/L		10/17/19 14:12	10/18/19 11:22	1
Boron	0.050	U	0.050	mg/L		10/17/19 14:12	10/18/19 11:22	1

**Lab Sample ID: LCS 440-575071/2-A**  
**Matrix: Water**  
**Analysis Batch: 575328**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575071**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Calcium	5.00	5.21		mg/L		104	80 - 120
Boron	1.00	0.995		mg/L		99	80 - 120

**Lab Sample ID: MB 440-575239/1-A**  
**Matrix: Water**  
**Analysis Batch: 575476**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575239**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	1.0	U	1.0	mg/L		10/18/19 09:04	10/20/19 11:38	1
Boron	0.050	U	0.050	mg/L		10/18/19 09:04	10/20/19 11:38	1

**Lab Sample ID: LCS 440-575239/2-A**  
**Matrix: Water**  
**Analysis Batch: 575476**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575239**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Calcium	5.00	4.88		mg/L		98	80 - 120
Boron	1.00	0.981		mg/L		98	80 - 120

## Method: 6020 - Metals (ICP/MS)

**Lab Sample ID: MB 240-405549/1-A**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405549**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 15:58	1

**Lab Sample ID: LCS 240-405549/2-A**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405549**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Lithium	0.500	0.496		mg/L		99	80 - 120

**Lab Sample ID: MB 440-575075/1-A**  
**Matrix: Water**  
**Analysis Batch: 575168**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575075**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 20:47	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 20:47	1

Eurofins TestAmerica, Canton

# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Method: 6020 - Metals (ICP/MS) (Continued)

**Lab Sample ID: MB 440-575075/1-A**  
**Matrix: Water**  
**Analysis Batch: 575168**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575075**

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Barium	0.0050	U	0.0050	mg/L		10/17/19 14:17	10/17/19 20:47	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 20:47	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 14:17	10/17/19 20:47	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 20:47	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 14:17	10/17/19 20:47	1
Copper	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 20:47	1
Iron	0.020	U	0.020	mg/L		10/17/19 14:17	10/17/19 20:47	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 20:47	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 14:17	10/17/19 20:47	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 14:17	10/17/19 20:47	1
Silver	0.00020	U	0.00020	mg/L		10/17/19 14:17	10/17/19 20:47	1
Nickel	0.0020	U	0.0020	mg/L		10/17/19 14:17	10/17/19 20:47	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 14:17	10/17/19 20:47	1
Vanadium	0.0020	U	0.0020	mg/L		10/17/19 14:17	10/17/19 20:47	1
Zinc	0.010	U	0.010	mg/L		10/17/19 14:17	10/17/19 20:47	1

**Lab Sample ID: LCS 440-575075/2-A**  
**Matrix: Water**  
**Analysis Batch: 575168**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575075**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Antimony	0.0800	0.0841		mg/L		105	80 - 120
Arsenic	0.0800	0.0762		mg/L		95	80 - 120
Barium	0.0800	0.0773		mg/L		97	80 - 120
Beryllium	0.0800	0.0794		mg/L		99	80 - 120
Cadmium	0.0800	0.0762		mg/L		95	80 - 120
Chromium	0.0800	0.0761		mg/L		95	80 - 120
Cobalt	0.0800	0.0763		mg/L		95	80 - 120
Copper	0.0800	0.0764		mg/L		96	80 - 120
Iron	0.800	0.760		mg/L		95	80 - 120
Lead	0.0800	0.0769		mg/L		96	80 - 120
Molybdenum	0.0800	0.0772		mg/L		97	80 - 120
Selenium	0.0800	0.0766		mg/L		96	80 - 120
Silver	0.0800	0.0770		mg/L		96	80 - 120
Nickel	0.0800	0.0766		mg/L		96	80 - 120
Thallium	0.0800	0.0741		mg/L		93	80 - 120
Vanadium	0.0800	0.0762		mg/L		95	80 - 120
Zinc	0.0800	0.0808		mg/L		101	80 - 120

**Lab Sample ID: MB 440-575554/1-A**  
**Matrix: Water**  
**Analysis Batch: 575685**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575554**

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Antimony	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 15:28	1
Arsenic	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 15:28	1
Barium	0.0050	U	0.0050	mg/L		10/21/19 08:45	10/21/19 15:28	1
Beryllium	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 15:28	1
Cadmium	0.00020	U	0.00020	mg/L		10/21/19 08:45	10/21/19 15:28	1

Eurofins TestAmerica, Canton

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Method: 6020 - Metals (ICP/MS) (Continued)

**Lab Sample ID: MB 440-575554/1-A**  
**Matrix: Water**  
**Analysis Batch: 575685**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575554**

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Chromium	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 15:28	1
Cobalt	0.0060	U	0.0060	mg/L		10/21/19 08:45	10/21/19 15:28	1
Copper	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 15:28	1
Iron	0.020	U	0.020	mg/L		10/21/19 08:45	10/21/19 15:28	1
Lead	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 15:28	1
Molybdenum	0.0050	U	0.0050	mg/L		10/21/19 08:45	10/21/19 15:28	1
Selenium	0.0010	U	0.0010	mg/L		10/21/19 08:45	10/21/19 15:28	1
Silver	0.00020	U	0.00020	mg/L		10/21/19 08:45	10/21/19 15:28	1
Nickel	0.0020	U	0.0020	mg/L		10/21/19 08:45	10/21/19 15:28	1
Thallium	0.0020	U	0.0020	mg/L		10/21/19 08:45	10/21/19 15:28	1
Vanadium	0.0020	U	0.0020	mg/L		10/21/19 08:45	10/21/19 15:28	1
Zinc	0.010	U	0.010	mg/L		10/21/19 08:45	10/21/19 15:28	1

**Lab Sample ID: LCS 440-575554/2-A**  
**Matrix: Water**  
**Analysis Batch: 575685**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 575554**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.0800	0.0743		mg/L		93	80 - 120
Barium	0.0800	0.0770		mg/L		96	80 - 120
Beryllium	0.0800	0.0805		mg/L		101	80 - 120
Cadmium	0.0800	0.0750		mg/L		94	80 - 120
Chromium	0.0800	0.0739		mg/L		92	80 - 120
Cobalt	0.0800	0.0742		mg/L		93	80 - 120
Copper	0.0800	0.0739		mg/L		92	80 - 120
Iron	0.800	0.746		mg/L		93	80 - 120
Lead	0.0800	0.0741		mg/L		93	80 - 120
Molybdenum	0.0800	0.0750		mg/L		94	80 - 120
Selenium	0.0800	0.0744		mg/L		93	80 - 120
Silver	0.0800	0.0735		mg/L		92	80 - 120
Nickel	0.0800	0.0742		mg/L		93	80 - 120
Thallium	0.0800	0.0763		mg/L		95	80 - 120
Vanadium	0.0800	0.0742		mg/L		93	80 - 120
Zinc	0.0800	0.0800		mg/L		100	80 - 120

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 440-574814/1-A**  
**Matrix: Water**  
**Analysis Batch: 575117**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 574814**

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Mercury	0.00020	U	0.00020	mg/L		10/16/19 14:49	10/17/19 02:42	1

Eurofins TestAmerica, Canton

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Method: 7470A - Mercury (CVAA) (Continued)

**Lab Sample ID: LCS 440-574814/2-A**  
**Matrix: Water**  
**Analysis Batch: 575117**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 574814**  
**%Rec.**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00400	0.00404		mg/L		101	80 - 120

**Lab Sample ID: MB 440-575067/1-A**  
**Matrix: Water**  
**Analysis Batch: 575178**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 575067**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/17/19 14:00	10/17/19 23:03	1

**Lab Sample ID: LCS 440-575067/2-A**  
**Matrix: Water**  
**Analysis Batch: 575178**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 575067**  
**%Rec.**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00400	0.00394		mg/L		98	80 - 120

**Lab Sample ID: 240-120400-4 MS**  
**Matrix: Water**  
**Analysis Batch: 575178**

**Client Sample ID: DUP-5**  
**Prep Type: Total/NA**  
**Prep Batch: 575067**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00020	U	0.00400	0.00372		mg/L		93	75 - 125

**Lab Sample ID: 240-120400-4 MSD**  
**Matrix: Water**  
**Analysis Batch: 575178**

**Client Sample ID: DUP-5**  
**Prep Type: Total/NA**  
**Prep Batch: 575067**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Mercury	0.00020	U	0.00400	0.00383		mg/L		96	75 - 125	3	20

## Method: 2540 C-2011 - Total Dissolved Solids (Dried at 180 °C)

**Lab Sample ID: MB 240-405577/1**  
**Matrix: Water**  
**Analysis Batch: 405577**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	50	U	50	mg/L			10/14/19 11:45	1

**Lab Sample ID: LCS 240-405577/2**  
**Matrix: Water**  
**Analysis Batch: 405577**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Dissolved Solids	484	522		mg/L		108	80 - 120

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# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Method: 2540 C-2011 - Total Dissolved Solids (Dried at 180 °C) (Continued)

**Lab Sample ID: MB 240-405634/1**  
**Matrix: Water**  
**Analysis Batch: 405634**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	50	U	50	mg/L			10/14/19 15:49	1

**Lab Sample ID: LCS 240-405634/2**  
**Matrix: Water**  
**Analysis Batch: 405634**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	484	477		mg/L		99	80 - 120

**Lab Sample ID: MB 240-405773/1**  
**Matrix: Water**  
**Analysis Batch: 405773**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	50	U	50	mg/L			10/15/19 12:18	1

**Lab Sample ID: LCS 240-405773/2**  
**Matrix: Water**  
**Analysis Batch: 405773**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	188	195		mg/L		104	80 - 120

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 240-406966/3**  
**Matrix: Water**  
**Analysis Batch: 406966**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.0	U	2.0	mg/L			10/23/19 05:57	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 05:57	1
Sulfate	2.0	U	2.0	mg/L			10/23/19 05:57	1

**Lab Sample ID: LCS 240-406966/4**  
**Matrix: Water**  
**Analysis Batch: 406966**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	48.8		mg/L		98	90 - 110
Fluoride	2.50	2.71		mg/L		108	90 - 110
Sulfate	50.0	52.7		mg/L		105	90 - 110

**Lab Sample ID: 240-120400-1 MS**  
**Matrix: Water**  
**Analysis Batch: 406966**

**Client Sample ID: JHC-MW-15006**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	22		50.0	72.5		mg/L		102	80 - 120
Fluoride	1.0	U	2.50	3.21		mg/L		115	80 - 120

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# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

**Lab Sample ID: 240-120400-1 MS**  
**Matrix: Water**  
**Analysis Batch: 406966**

**Client Sample ID: JHC-MW-15006**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	55		50.0	108		mg/L		106	80 - 120

**Lab Sample ID: 240-120400-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 406966**

**Client Sample ID: JHC-MW-15006**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	22		50.0	73.3		mg/L		103	80 - 120	1	15
Fluoride	1.0	U	2.50	3.25		mg/L		116	80 - 120	1	15
Sulfate	55		50.0	109		mg/L		108	80 - 120	1	15

**Lab Sample ID: MB 240-406967/3**  
**Matrix: Water**  
**Analysis Batch: 406967**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.0	U	2.0	mg/L			10/23/19 12:32	1
Fluoride	1.0	U	1.0	mg/L			10/23/19 12:32	1
Sulfate	2.0	U	2.0	mg/L			10/23/19 12:32	1

**Lab Sample ID: LCS 240-406967/4**  
**Matrix: Water**  
**Analysis Batch: 406967**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.1		mg/L		102	90 - 110
Fluoride	2.50	2.65		mg/L		106	90 - 110
Sulfate	50.0	52.4		mg/L		105	90 - 110

# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Metals

### Prep Batch: 405549

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total Recoverable	Water	3005A	
240-120400-2	JHC-MW-15008R	Total Recoverable	Water	3005A	
240-120400-3	JHC-MW-15011	Total Recoverable	Water	3005A	
240-120400-4	DUP-5	Total Recoverable	Water	3005A	
MB 240-405549/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-405549/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

### Analysis Batch: 405929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total Recoverable	Water	6020	405549
240-120400-2	JHC-MW-15008R	Total Recoverable	Water	6020	405549
240-120400-3	JHC-MW-15011	Total Recoverable	Water	6020	405549
240-120400-4	DUP-5	Total Recoverable	Water	6020	405549
MB 240-405549/1-A	Method Blank	Total Recoverable	Water	6020	405549
LCS 240-405549/2-A	Lab Control Sample	Total Recoverable	Water	6020	405549

### Prep Batch: 574814

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total/NA	Water	7470A	
240-120400-2	JHC-MW-15008R	Total/NA	Water	7470A	
240-120400-3	JHC-MW-15011	Total/NA	Water	7470A	
MB 440-574814/1-A	Method Blank	Total/NA	Water	7470A	
LCS 440-574814/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Prep Batch: 575067

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-4	DUP-5	Total/NA	Water	7470A	
MB 440-575067/1-A	Method Blank	Total/NA	Water	7470A	
LCS 440-575067/2-A	Lab Control Sample	Total/NA	Water	7470A	
240-120400-4 MS	DUP-5	Total/NA	Water	7470A	
240-120400-4 MSD	DUP-5	Total/NA	Water	7470A	

### Prep Batch: 575071

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total Recoverable	Water	3005A	
240-120400-2	JHC-MW-15008R	Total Recoverable	Water	3005A	
240-120400-3	JHC-MW-15011	Total Recoverable	Water	3005A	
MB 440-575071/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-575071/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

### Prep Batch: 575075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total Recoverable	Water	3005A	
240-120400-2	JHC-MW-15008R	Total Recoverable	Water	3005A	
240-120400-3	JHC-MW-15011	Total Recoverable	Water	3005A	
MB 440-575075/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-575075/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

### Analysis Batch: 575117

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total/NA	Water	7470A	574814

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# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Metals (Continued)

### Analysis Batch: 575117 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-2	JHC-MW-15008R	Total/NA	Water	7470A	574814
240-120400-3	JHC-MW-15011	Total/NA	Water	7470A	574814
MB 440-574814/1-A	Method Blank	Total/NA	Water	7470A	574814
LCS 440-574814/2-A	Lab Control Sample	Total/NA	Water	7470A	574814

### Analysis Batch: 575168

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total Recoverable	Water	6020	575075
240-120400-2	JHC-MW-15008R	Total Recoverable	Water	6020	575075
240-120400-3	JHC-MW-15011	Total Recoverable	Water	6020	575075
MB 440-575075/1-A	Method Blank	Total Recoverable	Water	6020	575075
LCS 440-575075/2-A	Lab Control Sample	Total Recoverable	Water	6020	575075

### Analysis Batch: 575178

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-4	DUP-5	Total/NA	Water	7470A	575067
MB 440-575067/1-A	Method Blank	Total/NA	Water	7470A	575067
LCS 440-575067/2-A	Lab Control Sample	Total/NA	Water	7470A	575067
240-120400-4 MS	DUP-5	Total/NA	Water	7470A	575067
240-120400-4 MSD	DUP-5	Total/NA	Water	7470A	575067

### Prep Batch: 575239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-4	DUP-5	Total Recoverable	Water	3005A	
MB 440-575239/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-575239/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

### Analysis Batch: 575328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total Recoverable	Water	6010B	575071
240-120400-2	JHC-MW-15008R	Total Recoverable	Water	6010B	575071
240-120400-3	JHC-MW-15011	Total Recoverable	Water	6010B	575071
MB 440-575071/1-A	Method Blank	Total Recoverable	Water	6010B	575071
LCS 440-575071/2-A	Lab Control Sample	Total Recoverable	Water	6010B	575071

### Analysis Batch: 575476

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-4	DUP-5	Total Recoverable	Water	6010B	575239
MB 440-575239/1-A	Method Blank	Total Recoverable	Water	6010B	575239
LCS 440-575239/2-A	Lab Control Sample	Total Recoverable	Water	6010B	575239

### Prep Batch: 575554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-4	DUP-5	Total Recoverable	Water	3005A	
MB 440-575554/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-575554/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

### Analysis Batch: 575685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-4	DUP-5	Total Recoverable	Water	6020	575554
MB 440-575554/1-A	Method Blank	Total Recoverable	Water	6020	575554

Eurofins TestAmerica, Canton

# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Metals (Continued)

### Analysis Batch: 575685 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 440-575554/2-A	Lab Control Sample	Total Recoverable	Water	6020	575554

## General Chemistry

### Analysis Batch: 405577

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-2	JHC-MW-15008R	Total/NA	Water	2540 C-2011	
240-120400-4	DUP-5	Total/NA	Water	2540 C-2011	
MB 240-405577/1	Method Blank	Total/NA	Water	2540 C-2011	
LCS 240-405577/2	Lab Control Sample	Total/NA	Water	2540 C-2011	

### Analysis Batch: 405634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total/NA	Water	2540 C-2011	
MB 240-405634/1	Method Blank	Total/NA	Water	2540 C-2011	
LCS 240-405634/2	Lab Control Sample	Total/NA	Water	2540 C-2011	

### Analysis Batch: 405773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-3	JHC-MW-15011	Total/NA	Water	2540 C-2011	
MB 240-405773/1	Method Blank	Total/NA	Water	2540 C-2011	
LCS 240-405773/2	Lab Control Sample	Total/NA	Water	2540 C-2011	

### Analysis Batch: 406966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total/NA	Water	300.0	
240-120400-2	JHC-MW-15008R	Total/NA	Water	300.0	
240-120400-3	JHC-MW-15011	Total/NA	Water	300.0	
240-120400-4	DUP-5	Total/NA	Water	300.0	
MB 240-406966/3	Method Blank	Total/NA	Water	300.0	
LCS 240-406966/4	Lab Control Sample	Total/NA	Water	300.0	
240-120400-1 MS	JHC-MW-15006	Total/NA	Water	300.0	
240-120400-1 MSD	JHC-MW-15006	Total/NA	Water	300.0	

### Analysis Batch: 406967

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-2	JHC-MW-15008R	Total/NA	Water	300.0	
240-120400-4	DUP-5	Total/NA	Water	300.0	
MB 240-406967/3	Method Blank	Total/NA	Water	300.0	
LCS 240-406967/4	Lab Control Sample	Total/NA	Water	300.0	

# Lab Chronicle

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

**Client Sample ID: JHC-MW-15006**

**Lab Sample ID: 240-120400-1**

**Date Collected: 10/10/19 05:45**

**Matrix: Water**

**Date Received: 10/11/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			575071	10/17/19 14:12	EP	TAL IRV
Total Recoverable	Analysis	6010B		1	575328	10/18/19 12:14	TQN	TAL IRV
Total Recoverable	Prep	3005A			405549	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 17:03	DSH	TAL CAN
Total Recoverable	Prep	3005A			575075	10/17/19 14:17	EP	TAL IRV
Total Recoverable	Analysis	6020		1	575168	10/17/19 21:49	P1R	TAL IRV
Total/NA	Prep	7470A			574814	10/16/19 14:49	MEM	TAL IRV
Total/NA	Analysis	7470A		1	575117	10/17/19 03:45	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405634	10/14/19 15:49	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406966	10/23/19 06:38	JWW	TAL CAN

**Client Sample ID: JHC-MW-15008R**

**Lab Sample ID: 240-120400-2**

**Date Collected: 10/09/19 15:13**

**Matrix: Water**

**Date Received: 10/11/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			575071	10/17/19 14:12	EP	TAL IRV
Total Recoverable	Analysis	6010B		1	575328	10/18/19 12:17	TQN	TAL IRV
Total Recoverable	Prep	3005A			405549	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 17:06	DSH	TAL CAN
Total Recoverable	Prep	3005A			575075	10/17/19 14:17	EP	TAL IRV
Total Recoverable	Analysis	6020		1	575168	10/17/19 21:51	P1R	TAL IRV
Total/NA	Prep	7470A			574814	10/16/19 14:49	MEM	TAL IRV
Total/NA	Analysis	7470A		1	575117	10/17/19 03:52	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405577	10/14/19 11:45	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406966	10/23/19 07:41	JWW	TAL CAN
Total/NA	Analysis	300.0		10	406967	10/24/19 01:17	JWW	TAL CAN

**Client Sample ID: JHC-MW-15011**

**Lab Sample ID: 240-120400-3**

**Date Collected: 10/10/19 06:33**

**Matrix: Water**

**Date Received: 10/11/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			575071	10/17/19 14:12	EP	TAL IRV
Total Recoverable	Analysis	6010B		1	575328	10/18/19 12:19	TQN	TAL IRV
Total Recoverable	Prep	3005A			405549	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 17:08	DSH	TAL CAN
Total Recoverable	Prep	3005A			575075	10/17/19 14:17	EP	TAL IRV
Total Recoverable	Analysis	6020		1	575168	10/17/19 21:53	P1R	TAL IRV
Total/NA	Prep	7470A			574814	10/16/19 14:49	MEM	TAL IRV
Total/NA	Analysis	7470A		1	575117	10/17/19 03:56	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405773	10/15/19 12:18	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406966	10/23/19 08:01	JWW	TAL CAN

# Lab Chronicle

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

**Client Sample ID: DUP-5**

**Lab Sample ID: 240-120400-4**

**Date Collected: 10/09/19 00:00**

**Matrix: Water**

**Date Received: 10/11/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			575239	10/18/19 09:04	BV	TAL IRV
Total Recoverable	Analysis	6010B		1	575476	10/20/19 12:26	P1R	TAL IRV
Total Recoverable	Prep	3005A			405549	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 17:10	DSH	TAL CAN
Total Recoverable	Prep	3005A			575554	10/21/19 08:45	BV	TAL IRV
Total Recoverable	Analysis	6020		1	575685	10/21/19 16:01	MQP	TAL IRV
Total/NA	Prep	7470A			575067	10/17/19 14:00	MEM	TAL IRV
Total/NA	Analysis	7470A		1	575178	10/17/19 23:10	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405577	10/14/19 11:45	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406966	10/23/19 08:22	JWW	TAL CAN
Total/NA	Analysis	300.0		10	406967	10/24/19 01:37	JWW	TAL CAN

**Laboratory References:**

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022



# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-1

## Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

## Laboratory: Eurofins TestAmerica, Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-20
Arizona	State	AZ0671	10-14-20
California	Los Angeles County Sanitation Districts	10256	06-30-20
California	State	2706	06-30-20
Guam	State	19-005R	01-23-20
Hawaii	State	CA01531	01-29-20
Kansas	NELAP	E-10420	07-31-20
Nevada	State	CA015312020-4	07-31-20
New Mexico	State	CA01531	01-29-20
Oregon	NELAP	4028 - 006	01-29-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-20



3-5/4.2 27/3-4 4.5/5.2  
**Chain of Custody Record**  
**Grand Rapids**

<b>Client Information</b> Company: TRC Environmental Corporation. Address: 1540 Eisenhower Place City: Ann Arbor State, Zip: MI, 48108-7080 Phone: 734-971-7080(Tel) 734-971-9022(Fax) Email: byelen@trccompanies.com Project Name: JHC - CCR Pond A + Downgradient Site:		Lab PM: Brooks, Kris M E-Mail: kris.brooks@testamericainc.com COC No: 440-171551-31502.1 Page: Page 1 of 2 Job #:	
<b>Due Date Requested:</b> TAT Requested (days): PO #: 135141 WO #: Project #: 44022279 SSOW#:		<b>Analysis Requested</b> 6020 - 1 Metals(L) (CANTON) 6010B, 6020 LL, 7470A (RVINE) 2540C, Calcd, 300.0, 28D CANTON 904.0, R4226R4228, GFPC (ST LOUIS) 903.0 - Standard Target List (ST LOUIS)	
<b>Sample Identification</b>		<b>Special Instructions/Note:</b>	
JHC-MW-15006	10/11/19 0545	Water	Total Number of Containers: 7 Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2OHS Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 X - EDTA Z - other (specify)
JHC-MW-15007	10/11/19 1513	Water	
JHC-MW-15008R		Water	
JHC-MW-15009		Water	
JHC-MW-15010		Water	
JHC-MW-15010 MS		Water	
JHC-MW-15010 MSD		Water	
JHC-MW-15011	10/11/19 0633	Water	
MW-13		Water	
		Water	
<b>Possible Hazard Identification</b> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify)		<b>Sample Disposal</b> (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements:	
<b>Empty Kit Relinquished by:</b> Relinquished by: Fed Ex Relinquished by: [Signature] Relinquished by: [Signature]		<b>Method of Shipment:</b> Date/Time: 10-10-19 08:30 Date/Time: 10/11/19 9:30 Date/Time:	
Custody Seal No.: Δ Yes Δ No		Cooler Temperature(s) °C and Other Remarks:	



Ver: 01/16/2019

<b>Client Information</b>		Sampler: <u>SAVERS RSC</u>		Lab PM: <u>Brooks, Kris M</u>	Carrier Tracking No(s): <u>277</u>	COC No: <u>440-171551-31502.2</u>							
Client Contact: <u>Brian Yelen</u>		Phone: <u>334 904 3316</u>		E-Mail: <u>kris.brooks@testamericainc.com</u>	Page: <u>Page 2 of 2</u>	Job #:							
Company: <u>TRC Environmental Corporation.</u>		Address: <u>1540 Eisenhower Place</u>		Analysis Requested									
City: <u>Ann Arbor</u>		State, Zip: <u>MI, 48108-7080</u>		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Arnochlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:									
Phone: <u>734-971-7080(Tel) 734-971-9022(Fax)</u>		PO #: <u>135141</u>		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA Z - other (specify)									
Email: <u>byelen@trocompanies.com</u>		WO #: <u>44022279</u>		Total Number of Containers: <u>5</u>									
Project Name: <u>JHC - CCR Pond A + Downgradient</u>		SSOW#: <u></u>		Special Instructions/Note:									
Site: <u></u>		Field Filtered Sample (Yes or No): <u>X</u>		Perform MS/MSD (Yes or No): <u>X</u>									
<b>Sample Identification</b>		Sample Date		Sample Time		Sample Type (C=comp, G=grab)		Matrix (Water, Solid, Oversticell, BT-Tissue, Air)		Preservation Code		Special Instructions/Note	
MW-14S								Water					
PZ-24S								Water					
PZ-40S								Water					
DUP-5		<u>10/11/16</u>		<u>—</u>		<u>6</u>		Water		<u>XXXXXX</u>			
FB-5													
EB-5													
<b>Possible Hazard Identification</b>		<input type="checkbox"/> Non-Hazard		<input type="checkbox"/> Flammable		<input type="checkbox"/> Skin Irritant		<input type="checkbox"/> Poison B		<input type="checkbox"/> Unknown		<input type="checkbox"/> Radiological	
<b>Deliverable Requested:</b> I, II, III, IV, Other (specify)													
<b>Empty Kit Relinquished by:</b>		Date/Time: <u>10/11/16 08:30</u>		Date/Time: <u>10/10/15 12:00 p</u>		Date/Time: <u>10/10/15 08:30</u>		Date/Time: <u>10/10/15 08:30</u>		Date/Time: <u>10/10/15 08:30</u>		Date/Time: <u>10/10/15 08:30</u>	
Relinquished by: <u>Filex</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>	
Relinquished by: <u>Filex</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>	
Relinquished by: <u>Filex</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>		Company: <u>TRC</u>	
Custody Seals Intact: <u>Δ Yes Δ No</u>		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <input type="checkbox"/> Months		Special Instructions/QC Requirements:		Method of Shipment:		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	

**Eurofins TestAmerica Canton Sample Receipt Form/Narrative**

Login # : 120400

**Canton Facility**

Client JHC Environmental

Site Name \_\_\_\_\_

Cooler unpacked by:

Carl Brown

Cooler Received on 10/11/19

Opened on 10/11/19

FedEx: 1<sup>st</sup> Grd Exp  UPS FAS Clipper Client Drop Off TestAmerica Courier Other

**Receipt After-hours: Drop-off Date/Time**

**Storage Location**

TestAmerica Cooler # ETVA Foam Box Client Cooler Box Other \_\_\_\_\_

Packing material used: Bubble Wrap Foam Elastic Bag None Other \_\_\_\_\_

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt  See Multiple Cooler Form  
 IR GUN# IR-10 (CF +0.7 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C  
 IR GUN #IR-11 (CF +0.9 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 3 Yes No  
 -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA  
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No  
 -Were tamper/custody seals intact and uncompromised? Yes No NA

3. Shippers' packing slip attached to the cooler(s)?  Yes No

4. Did custody papers accompany the sample(s)?  Yes No

5. Were the custody papers relinquished & signed in the appropriate place?  Yes No

6. Was/were the person(s) who collected the samples clearly identified on the COC?  Yes No

7. Did all bottles arrive in good condition (Unbroken)?  Yes No

8. Could all bottle labels be reconciled with the COC?  Yes No

9. Were correct bottle(s) used for the test(s) indicated?  Yes No

10. Sufficient quantity received to perform indicated analyses?  Yes No

11. Are these work share samples? Yes No

If yes, Questions 12-16 have been checked at the originating laboratory.

12. Were all preserved sample(s) at the correct pH upon receipt?  Yes No NA

13. Were VOAs on the COC? Yes No

14. Were air bubbles >6 mm in any VOA vials?  Yes No NA  Larger than this.

15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # \_\_\_\_\_ Yes No

16. Was a LL Hg or Me Hg trip blank present? Yes No

Tests that are not checked for pH by Receiving:  
 VOAs  
 Oil and Grease  
 TOC

pH Strip Lot# HC991818

Contacted PM \_\_\_\_\_ Date \_\_\_\_\_ by \_\_\_\_\_ via Verbal Voice Mail Other

Concerning \_\_\_\_\_

**17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES**

Samples processed by:

Adam

JHC-MW-15006 COC sample date = 10/11/19, Labels = 10/10/19 - will log per label

**18. SAMPLE CONDITION**

Sample(s) \_\_\_\_\_ were received after the recommended holding time had expired.

Sample(s) \_\_\_\_\_ were received in a broken container.

Sample(s) \_\_\_\_\_ were received with bubble >6 mm in diameter. (Notify PM)

**19. SAMPLE PRESERVATION**

Sample(s) \_\_\_\_\_ were further preserved in the laboratory.

Time preserved: \_\_\_\_\_ Preservative(s) added/Lot number(s): \_\_\_\_\_

VOA Sample Preservation - Date/Time VOAs Frozen: \_\_\_\_\_



Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container pH</u>	<u>Preservative Added (mls)</u>	<u>Lot #</u>
JHC-MW-15006	240-120400-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15006	240-120400-B-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15006	240-120400-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15006	240-120400-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15008R	240-120400-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15008R	240-120400-B-2	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15008R	240-120400-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15008R	240-120400-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15011	240-120400-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15011	240-120400-B-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15011	240-120400-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15011	240-120400-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
DUP-5	240-120400-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____
DUP-5	240-120400-B-4	Plastic 500ml - with Nitric Acid	<2	_____	_____
DUP-5	240-120400-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____
DUP-5	240-120400-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____

**Eurofins TestAmerica, Canton**  
 4101 Shuffel Street NW  
 North Canton, OH 44720  
 Phone: 330-497-9396 Fax: 330-497-0772

# Chain of Custody Record



4101 Shuffel Street NW  
 North Canton, OH 44720  
 Phone: 330-497-9396 Fax: 330-497-0772

Client Information (Sub Contract Lab)		Sampler	Lab PM:	Carnet Tracking No(s)		COC No				
Shipping/Receiving Company		Phone	Brooks, Krs M	1103 6125	03 74	240-111609.1				
TestAmerica Laboratories, Inc		E-Mail	kris.brooks@testamericainc.com	Michigan	Page 1 of 1					
Address		Due Date Requested:	Accreditations Required (See note):							
17461 Derian Ave, Suite 100,		10/23/2019	M - Hexane N - Nohre O - ASNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 L - EDA Z - other (specify)							
City	Irvine	TAT Requested (days):	Preservation Codes:							
State Zip	CA, 92614-5817	PO #	A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Z - other (specify)							
Phone	949-261-1022(Tel) 949-260-3297(Fax)	WO #	Other:							
E-mail		Project #								
		SSOW#								
Project Name	JHC - CCR Groundwater Monitoring 2019	Site								
Site										
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=overseal, B=both)	Field Filtered Sample (Yes or No)	Field Filtration Method (Yes or No)	Field Filtration Code	Analysis Requested	Special Instructions/Note:
JHC-MW-15006 (240-120400-1)		10/10/19	05:45 Eastern	Water	Water	X	X		6020 LI/3005A (MOD) 16 Total Metals	Client sensitive w/dilutions contact PM if dilutions are needed
JHC-MW-15008R (240-120400-2)		10/9/19	15:13 Eastern	Water	Water	X	X		6010B/3005A Total Boron, Calcium	Client sensitive w/dilutions contact PM if dilutions are needed
JHC-MW-15011 (240-120400-3)		10/10/19	06:33 Eastern	Water	Water	X	X		7470A/1470A Prep Total Mercury	Client sensitive w/dilutions contact PM if dilutions are needed
<p>Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte &amp; accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.</p>										
Possible Hazard Identification										
Unconfirmed										
Deliverable Requested: I, II, III, IV, Other (specify)										
Primary Deliverable Rank: 2										
Empty Kit Relinquished by										
Relinquished by <i>Charles J.</i>										
Relinquished by <i>Charles J.</i>										
Relinquished by <i>Charles J.</i>										
Custody Seals Intact: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No										
Custody Seal No. <i>1.6.2.0 1.2.11.6 12-94</i>										
Cooler Temperature(s) °C and Other Remarks										
Received by <i>Charles J.</i> Date: <i>10/19/19 1308</i>										
Received by <i>Charles J.</i> Date/Time: <i>10/15/19 1030</i>										
Received by <i>Charles J.</i> Date/Time: <i>10/15/19 1030</i>										
Cooler Temperature(s) °C and Other Remarks										
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)										
Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <input type="checkbox"/> Months										
Special Instructions/QC Requirements:										
Method of Shipment										



**Eurofins TestAmerica, Canton**  
 4101 Shuffel Street NW  
 North Canton, OH 44720  
 Phone: 330-497-9396 Fax: 330-497-0772

# Chain of Custody Record



EUROFINS  
 LABORATORIES

<b>Client Information (Sub Contract Lab)</b>		Lab PM: Brooks, Kris M	Carrier Tracking Notes: 103 6/25 0780	COC No: 240-111664 1
Shipping/Receiving		E-Mail: kris.brooks@testamericainc.com	State of Origin: Michigan	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc		Accreditations Required (See note) 240-120400-1		
Address: 17461 Derian Ave, Suite 100, City: Irvine		Preservation Codes: A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexene N - None O - AsNaOZ P - Na2OAS Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecylhydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)		
State: Zip CA, 92614-5817		Analysis Requested		
Phone: 949-261-1022(Tel) 949-260-3297(Fax)		Total Number of Containers		
Email:		1		
Project #: 44022279		Special Instructions/Note: Client sensitive w/dilutions contact PM if dilutions are needed		
SSOW#:				
Project Name: JHC - CCR Pond A + Downgradient				
Site:				
Due Date Requested: 10/23/2019				
TAT Requested (days):				
PO #:				
WO #:				
Field Filtered Sample (Yes or No)				
Performance MS/MSD (Yes or No)				
7470A/7470A Prep Total Mercury		X		
6010B/3005A Total Boron, Calcium		X		
6020_LL/3005A (MOD) 16 Total Metals		X		
Sample Identification - Client ID (Lab ID)				
DUP-5 (240-120400-4)				
Sample Date		10/9/19		
Sample Time		Eastern		
Sample Type (C=Comp, G=grab)				
Matrix (Water, Spill, Overstool, Urine, Tissue, A-AU)		Water		
Preservation Code:				
Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.				
<b>Possible Hazard Identification</b>		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		
Unconfirmed		Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <input type="checkbox"/> Months		
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements:		
Empty Kit Relinquished by:		Time: Method of Shipment		
Relinquished by: <i>[Signature]</i>		Received by: <i>[Signature]</i>		
Relinquished by:		Date/Time: 10/16/19 10:30		
Relinquished by:		Date/Time: <i>[Signature]</i>		
Relinquished by:		Date/Time: <i>[Signature]</i>		
Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 29/3.1 / K-89		
Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>				



## Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-120400-1

**Login Number: 120400**

**List Number: 3**

**Creator: Dolidze, Lado**

**List Source: Eurofins TestAmerica, Irvine**

**List Creation: 10/15/19 12:34 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-120400-1

**Login Number: 120400**

**List Number: 4**

**Creator: Ornelas, Olga**

**List Source: Eurofins TestAmerica, Irvine**

**List Creation: 10/16/19 01:29 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## ANALYTICAL REPORT

Eurofins TestAmerica, Canton  
4101 Shuffel Street NW  
North Canton, OH 44720  
Tel: (330)497-9396

Laboratory Job ID: 240-120400-2

Client Project/Site: JHC - CCR Pond A + Downgradient

**For:**

TRC Environmental Corporation.  
1540 Eisenhower Place  
Ann Arbor, Michigan 48108-7080

Attn: Darby Litz



Authorized for release by:  
11/4/2019 8:10:55 PM

Kris Brooks, Project Manager II  
(330)966-9790  
[kris.brooks@testamericainc.com](mailto:kris.brooks@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Definitions/Glossary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

## Qualifiers

### Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

**Job ID: 240-120400-2**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

**Client: TRC Environmental Corporation.**

**Project: JHC - CCR Pond A + Downgradient**

**Report Number: 240-120400-2**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

All analysis were performed at Eurofins TestAmerica St. Louis Laboratory.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 10/11/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 3.4° C, 4.2° C and 5.2° C.

### **RADIUM-228**

Samples JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4) were analyzed for Radium-228 in accordance with EPA Method 904.0. The samples were prepared on 10/16/2019 and analyzed on 10/24/2019.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3), DUP-5 (240-120400-4), (LCS 160-446491/1-A), (LCSD 160-446491/2-A) and (MB 160-446491/22-A)

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

## Job ID: 240-120400-2 (Continued)

### Laboratory: Eurofins TestAmerica, Canton (Continued)

Insufficient sample volume was available to perform a sample duplicate for the following samples: JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### RADIUM-226

Samples JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4) were analyzed for Radium-226 in accordance with EPA Method 903.0. The samples were prepared on 10/16/2019 and analyzed on 10/31/2019.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3), DUP-5 (240-120400-4), (LCS 160-446490/1-A), (LCSD 160-446490/2-A) and (MB 160-446490/22-A)

Ra-226 is reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out. The Ra-226 result should be considered to be potentially high biased. Associated samples have activity below the RL. The results are reported with this narrative. JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3), DUP-5 (240-120400-4), (LCS 160-446490/1-A), (LCSD 160-446490/2-A) and (MB 160-446490/22-A)

Insufficient sample volume was available to perform a sample duplicate for the following samples: JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### COMBINED RADIUM 226 AND RADIUM 228

Samples JHC-MW-15006 (240-120400-1), JHC-MW-15008R (240-120400-2), JHC-MW-15011 (240-120400-3) and DUP-5 (240-120400-4) were analyzed for Combined Radium 226 and Radium 228 in accordance with Ra226\_Ra228. The samples were analyzed on 11/04/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Method Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL

**Protocol References:**

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

**Laboratory References:**

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



# Sample Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-120400-1	JHC-MW-15006	Water	10/10/19 05:45	10/11/19 09:30	
240-120400-2	JHC-MW-15008R	Water	10/09/19 15:13	10/11/19 09:30	
240-120400-3	JHC-MW-15011	Water	10/10/19 06:33	10/11/19 09:30	
240-120400-4	DUP-5	Water	10/09/19 00:00	10/11/19 09:30	

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# Detection Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

**Client Sample ID: JHC-MW-15006**

**Lab Sample ID: 240-120400-1**

No Detections.

**Client Sample ID: JHC-MW-15008R**

**Lab Sample ID: 240-120400-2**

No Detections.

**Client Sample ID: JHC-MW-15011**

**Lab Sample ID: 240-120400-3**

No Detections.

**Client Sample ID: DUP-5**

**Lab Sample ID: 240-120400-4**

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

**Client Sample ID: JHC-MW-15006**

**Lab Sample ID: 240-120400-1**

Date Collected: 10/10/19 05:45

Matrix: Water

Date Received: 10/11/19 09:30

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.310		0.123	0.126	1.00	0.139	pCi/L	10/16/19 17:41	10/31/19 18:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.3		40 - 110					10/16/19 17:41	10/31/19 18:45	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0273	U	0.298	0.298	1.00	0.524	pCi/L	10/16/19 18:25	10/24/19 09:13	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.3		40 - 110					10/16/19 18:25	10/24/19 09:13	1
Y Carrier	81.1		40 - 110					10/16/19 18:25	10/24/19 09:13	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.337	U	0.322	0.324	5.00	0.524	pCi/L		11/04/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

**Client Sample ID: JHC-MW-15008R**

**Lab Sample ID: 240-120400-2**

Date Collected: 10/09/19 15:13

Matrix: Water

Date Received: 10/11/19 09:30

### Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-226</b>	<b>0.449</b>		0.151	0.156	1.00	0.145	pCi/L	10/16/19 17:41	10/31/19 18:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	67.5		40 - 110					10/16/19 17:41	10/31/19 18:45	1

### Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-228</b>	<b>0.817</b>		0.382	0.389	1.00	0.557	pCi/L	10/16/19 18:25	10/24/19 09:13	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	67.5		40 - 110					10/16/19 18:25	10/24/19 09:13	1
Y Carrier	82.6		40 - 110					10/16/19 18:25	10/24/19 09:13	1

### Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Combined Radium 226 + 228</b>	<b>1.27</b>		0.411	0.419	5.00	0.557	pCi/L		11/04/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

**Client Sample ID: JHC-MW-15011**

**Lab Sample ID: 240-120400-3**

Date Collected: 10/10/19 06:33

Matrix: Water

Date Received: 10/11/19 09:30

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-226</b>	<b>0.298</b>		0.134	0.136	1.00	0.158	pCi/L	10/16/19 17:41	10/31/19 18:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	68.9		40 - 110					10/16/19 17:41	10/31/19 18:45	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-228</b>	<b>0.665</b>		0.355	0.360	1.00	0.529	pCi/L	10/16/19 18:25	10/24/19 09:13	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	68.9		40 - 110					10/16/19 18:25	10/24/19 09:13	1
Y Carrier	84.5		40 - 110					10/16/19 18:25	10/24/19 09:13	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Combined Radium 226 + 228</b>	<b>0.963</b>		0.379	0.385	5.00	0.529	pCi/L		11/04/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

**Client Sample ID: DUP-5**

**Lab Sample ID: 240-120400-4**

Date Collected: 10/09/19 00:00

Matrix: Water

Date Received: 10/11/19 09:30

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-226</b>	<b>0.751</b>		0.187	0.199	1.00	0.164	pCi/L	10/16/19 17:41	10/31/19 18:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	73.4		40 - 110					10/16/19 17:41	10/31/19 18:45	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-228</b>	<b>0.744</b>		0.331	0.338	1.00	0.468	pCi/L	10/16/19 18:25	10/24/19 09:14	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	73.4		40 - 110					10/16/19 18:25	10/24/19 09:14	1
Y Carrier	80.0		40 - 110					10/16/19 18:25	10/24/19 09:14	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Combined Radium 226 + 228</b>	<b>1.49</b>		0.380	0.392	5.00	0.468	pCi/L		11/04/19 08:01	1

# Tracer/Carrier Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

## Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba Carrier (40-110)
240-120400-1	JHC-MW-15006	85.3
240-120400-2	JHC-MW-15008R	67.5
240-120400-3	JHC-MW-15011	68.9
240-120400-4	DUP-5	73.4
LCS 160-446490/1-A	Lab Control Sample	81.4
LCSD 160-446490/2-A	Lab Control Sample Dup	83.6
MB 160-446490/22-A	Method Blank	82.5

#### Tracer/Carrier Legend

Ba Carrier = Ba Carrier

## Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
240-120400-1	JHC-MW-15006	85.3	81.1
240-120400-2	JHC-MW-15008R	67.5	82.6
240-120400-3	JHC-MW-15011	68.9	84.5
240-120400-4	DUP-5	73.4	80.0
LCS 160-446491/1-A	Lab Control Sample	81.4	82.6
LCSD 160-446491/2-A	Lab Control Sample Dup	83.6	81.1
MB 160-446491/22-A	Method Blank	82.5	84.1

#### Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Y Carrier = Y Carrier

# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

## Method: 903.0 - Radium-226 (GFPC)

**Lab Sample ID: MB 160-446490/22-A**  
**Matrix: Water**  
**Analysis Batch: 448470**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 446490**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.2261		0.0998	0.102	1.00	0.106	pCi/L	10/16/19 17:41	10/31/19 20:42	1
Carrier	MB	MB	Limits				Prepared		Analyzed	
Ba Carrier	%Yield	Qualifier	40 - 110				10/16/19 17:41		10/31/19 20:42	
	82.5									

**Lab Sample ID: LCS 160-446490/1-A**  
**Matrix: Water**  
**Analysis Batch: 448470**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 446490**

Analyte			Spike	LCS	LCS	Total	RL	MDC	Unit	%Rec	%Rec. Limits
	Added	Result	Qual	Uncert. (2σ+/-)							
Radium-226			11.4	10.08		1.08	1.00	0.110	pCi/L	89	75 - 125
Carrier	LCS	LCS	Limits								
Ba Carrier	%Yield	Qualifier	40 - 110								
	81.4										

**Lab Sample ID: LCSD 160-446490/2-A**  
**Matrix: Water**  
**Analysis Batch: 448470**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 446490**

Analyte			Spike	LCSD	LCSD	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	Limit
	Added	Result	Qual	Uncert. (2σ+/-)									
Radium-226			11.4	11.10		1.17	1.00	0.126	pCi/L	98	75 - 125	0.45	1
Carrier	LCSD	LCSD	Limits										
Ba Carrier	%Yield	Qualifier	40 - 110										
	83.6												

## Method: 904.0 - Radium-228 (GFPC)

**Lab Sample ID: MB 160-446491/22-A**  
**Matrix: Water**  
**Analysis Batch: 447519**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 446491**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.07215	U	0.254	0.254	1.00	0.444	pCi/L	10/16/19 18:25	10/24/19 09:14	1
Carrier	MB	MB	Limits				Prepared		Analyzed	
Ba Carrier	%Yield	Qualifier	40 - 110				10/16/19 18:25		10/24/19 09:14	
	82.5									
Y Carrier	84.1		40 - 110				10/16/19 18:25		10/24/19 09:14	

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

## Method: 904.0 - Radium-228 (GFPC) (Continued)

**Lab Sample ID: LCS 160-446491/1-A**  
**Matrix: Water**  
**Analysis Batch: 447584**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 446491**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	9.46	10.77		1.27	1.00	0.459	pCi/L	114	75 - 125

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	81.4		40 - 110
Y Carrier	82.6		40 - 110

**Lab Sample ID: LCSD 160-446491/2-A**  
**Matrix: Water**  
**Analysis Batch: 447584**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 446491**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	9.46	10.62		1.25	1.00	0.476	pCi/L	112	75 - 125	0.06	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	83.6		40 - 110
Y Carrier	81.1		40 - 110



# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

## Rad

### Prep Batch: 446490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total/NA	Water	PrecSep STD	
240-120400-2	JHC-MW-15008R	Total/NA	Water	PrecSep STD	
240-120400-3	JHC-MW-15011	Total/NA	Water	PrecSep STD	
240-120400-4	DUP-5	Total/NA	Water	PrecSep STD	
MB 160-446490/22-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-446490/1-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-446490/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

### Prep Batch: 446491

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120400-1	JHC-MW-15006	Total/NA	Water	PrecSep_0	
240-120400-2	JHC-MW-15008R	Total/NA	Water	PrecSep_0	
240-120400-3	JHC-MW-15011	Total/NA	Water	PrecSep_0	
240-120400-4	DUP-5	Total/NA	Water	PrecSep_0	
MB 160-446491/22-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-446491/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-446491/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

# Lab Chronicle

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

## Client Sample ID: JHC-MW-15006

Lab Sample ID: 240-120400-1

Date Collected: 10/10/19 05:45

Matrix: Water

Date Received: 10/11/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:45	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447519	10/24/19 09:13	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

## Client Sample ID: JHC-MW-15008R

Lab Sample ID: 240-120400-2

Date Collected: 10/09/19 15:13

Matrix: Water

Date Received: 10/11/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:45	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447519	10/24/19 09:13	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

## Client Sample ID: JHC-MW-15011

Lab Sample ID: 240-120400-3

Date Collected: 10/10/19 06:33

Matrix: Water

Date Received: 10/11/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:45	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447519	10/24/19 09:13	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

## Client Sample ID: DUP-5

Lab Sample ID: 240-120400-4

Date Collected: 10/09/19 00:00

Matrix: Water

Date Received: 10/11/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:45	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447519	10/24/19 09:14	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

**Laboratory References:**

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

## Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

## Laboratory: Eurofins TestAmerica, Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-20
Arizona	State	AZ0671	10-14-20
California	LA Cty Sanitation Districts	10256	06-30-20
California	Los Angeles County Sanitation Districts	10256	06-30-20
California	State	2706	06-30-20
Guam	State	19-005R	01-23-20
Hawaii	State	CA01531	01-29-20
Hawaii	State Program	N/A	01-29-20
Kansas	NELAP	E-10420	07-31-20
Nevada	State	CA015312020-4	07-31-20
New Mexico	State	CA01531	01-29-20
New Mexico	State Program	N/A	01-29-20
Oregon	NELAP	4028 - 006	01-29-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-20
Washington	State Program	C900	09-03-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR Pond A + Downgradient

Job ID: 240-120400-2

## Laboratory: Eurofins TestAmerica, St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-19
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-19
Iowa	State	373	09-17-20
Iowa	State Program	373	12-01-20
Kansas	NELAP	E-10236	10-31-19 *
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-19
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-19
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00028	02-02-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
Washington	State Program	C592	08-30-20
West Virginia DEP	State Program	381	10-31-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

3-5/4.2 27/3-4 45/5-2  
**Chain of Custody Record**  
**Grand Rapids**


<b>Client Information</b>		Lab PM: Brooks, Kris M		COC No: 440-171551-31502.1	
Company: TRC Environmental Corporation.		E-Mail: kris.brooks@testamericainc.com		Page: Page 1 of 2	
Address: 1540 Eisenhower Place		City: Ann Arbor		Job #:	
State, Zip: MI, 48108-7080		PO #: 135141		Preservation Codes:	
Phone: 734-971-7080(Tel) 734-971-9022(Fax)		WO #: 44022279		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Email: byelen@trccompanies.com		Project #: 44022279		M - Hexane N - None O - AsNaO2 P - Na2OHS Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Z - other (specify)	
Site: JHC - CCR Pond A + Downgradient		SSOW#:		Special Instructions/Note:	

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Solid, On-surface, etc.)	Field Filtered Sample (Yes or No)		Perform MSMSD (Yes or No)		6020 - 1 Metals(L) (CANTON)	6010B, 6020 LL, 7470A (RVINE)	9040, R4226R4228, GFFC (ST LOUIS)	9030 - Standard Target List (ST LOUIS)	Total Number of Containers	Special Instructions/Note:
					Preservation Code:	Field Filtered Sample (Yes or No)	Perform MSMSD (Yes or No)	D						
JHC-MW-15006	10/11/19	0545	G	Water	UV	UV	UV	UV	UV	UV	UV	UV	2	
JHC-MW-15007				Water										
JHC-MW-15008R	10/9/19	1513	G	Water	UV	UV	UV	UV	UV	UV	UV	UV	2	
JHC-MW-15009				Water										
JHC-MW-15010				Water										
JHC-MW-15010 MS				Water										
JHC-MW-15010 MSD				Water										
JHC-MW-15011	10/11/19	0633	G	Water	UV	UV	UV	UV	UV	UV	UV	UV		
MW-13				Water										

240-120400 Chain of Custody

**Possible Hazard Identification**  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Radiological

**Deliverable Requested:** I, II, III, IV, Other (specify)

**Empty Kit Relinquished by:** Date: \_\_\_\_\_ Time: \_\_\_\_\_

**Relinquished by:** Date/Time: 10/10/19 08:30 Company: TRC  
 Relinquished by: Date/Time: 10-10-19 12:00pm Company: TRC  
 Relinquished by: Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

**Special Instructions/QC Requirements:**

**Method of Shipment:** \_\_\_\_\_

**Received by:** Date/Time: 10-10-19 8:30AM Company: TRC  
 Received by: Date/Time: 10/10/19 9:30 Company: TRC  
 Received by: Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

**Custody Seal No.:** \_\_\_\_\_  
 Δ Yes Δ No

**Cooler Temperature(s) °C and Other Remarks:**

<b>Client Information</b> Client Contact: SAVERS KSSC Brian Yelen Phone: 334 904 3316 Lab PM: Brooks, Kris M E-Mail: kris.brooks@testamericainc.com		Carrier Tracking No(s): 277 COC No: 440-171551-31502.2 Page: Page 2 of 2 Job #:	
<b>Company:</b> TRC Environmental Corporation. Address: 1540 Eisenhower Place City: Ann Arbor State, Zip: MI, 48108-7080 Phone: 734-971-7080 (Tel) 734-971-9022 (Fax) Email: byelen@trccompanies.com		<b>Analysis Requested</b> Due Date Requested: TAT Requested (days): PO #: 135141 WO #: Project #: 44022279 SOW#:	
<b>Sample Identification</b> MW-14S PZ-24S PZ-40S DUP-5 FB-5 EB-5		Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> D Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/> D 6020 - 1 Metal(L) (CANTON) 6010B, 6020 LL, 7470A (RIVINE) 240C, Calc'd, 300.0, 280 CANTON 904.0, R4226R428, GFPC (ST LOUIS) 903.0 - Standard Target List (ST LOUIS)	
<b>Possible Hazard Identification</b> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological <input type="checkbox"/> Poison B <input type="checkbox"/> Toxic		<b>Special Instructions/Note:</b> Total Number of Containers:	
<b>Deliverable Requested:</b> I, II, III, IV, Other (specify)		<b>Special Instructions/Note:</b> Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
<b>Empty Kit Relinquished by:</b>		<b>Method of Shipment:</b>	
<b>Relinquished by:</b> [Signature] Date/Time: 10/14/15 08:30 Company: TRC		<b>Received by:</b> [Signature] Date/Time: 10/15/15 8:30 AM Company: I-AL	
<b>Relinquished by:</b> [Signature] Date/Time: 10/15/15 12:00 PM Company:		<b>Received by:</b> [Signature] Date/Time: 10/17/15 9:30 Company:	
<b>Relinquished by:</b> [Signature] Date/Time:		<b>Received by:</b> [Signature] Date/Time:	
<b>Custody Seals Intact:</b> Yes <input type="checkbox"/> No <input type="checkbox"/>		<b>Cooler Temperature(s) °C and Other Remarks:</b>	



**Eurofins TestAmerica Canton Sample Receipt Form/Narrative**

Login #: 120400

**Canton Facility**

Client JHC Environmental

Site Name \_\_\_\_\_

Cooler unpacked by:

Carl Brown

Cooler Received on 10/11/19

Opened on 10/11/19

FedEx: 1<sup>st</sup> Grd Exp  UPS FAS Clipper Client Drop Off TestAmerica Courier Other

**Receipt After-hours: Drop-off Date/Time**

Storage Location \_\_\_\_\_

TestAmerica Cooler # ETVA Foam Box Client Cooler Box Other \_\_\_\_\_

Packing material used: Bubble Wrap Foam Elastic Bag None Other \_\_\_\_\_

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt  See Multiple Cooler Form  
 IR GUN# IR-10 (CF +0.7 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C  
 IR GUN #IR-11 (CF +0.9 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 3 Yes No  
 -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA  
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No  
 -Were tamper/custody seals intact and uncompromised? Yes No NA

3. Shippers' packing slip attached to the cooler(s)? Yes No  
 4. Did custody papers accompany the sample(s)? Yes No  
 5. Were the custody papers relinquished & signed in the appropriate place? Yes No  
 6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No  
 7. Did all bottles arrive in good condition (Unbroken)? Yes No  
 8. Could all bottle labels be reconciled with the COC? Yes No  
 9. Were correct bottle(s) used for the test(s) indicated? Yes No  
 10. Sufficient quantity received to perform indicated analyses? Yes No  
 11. Are these work share samples? Yes No

Tests that are not checked for pH by Receiving:  
 VOAs  
 Oil and Grease  
 TOC

If yes, Questions 12-16 have been checked at the originating laboratory.  
 12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC991818

13. Were VOAs on the COC? Yes No  
 14. Were air bubbles >6 mm in any VOA vials? Yes Larger than this. Yes No NA  
 15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # \_\_\_\_\_ Yes No  
 16. Was a LL Hg or Me Hg trip blank present? Yes No

Contacted PM \_\_\_\_\_ Date \_\_\_\_\_ by \_\_\_\_\_ via Verbal Voice Mail Other

Concerning \_\_\_\_\_

**17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES**

Samples processed by:

Adam

JHC-MW-15006 COC sample date = 10/11/19, Labels = 10/10/19 - will log per label

**18. SAMPLE CONDITION**

Sample(s) \_\_\_\_\_ were received after the recommended holding time had expired.  
 Sample(s) \_\_\_\_\_ were received in a broken container.  
 Sample(s) \_\_\_\_\_ were received with bubble >6 mm in diameter. (Notify PM)

**19. SAMPLE PRESERVATION**

Sample(s) \_\_\_\_\_ were further preserved in the laboratory.  
 Time preserved: \_\_\_\_\_ Preservative(s) added/Lot number(s): \_\_\_\_\_

VOA Sample Preservation - Date/Time VOAs Frozen: \_\_\_\_\_



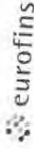


Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container pH</u>	<u>Preservative Added (mls)</u>	<u>Lot #</u>
JHC-MW-15006	240-120400-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15006	240-120400-B-1	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15006	240-120400-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15006	240-120400-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15008R	240-120400-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15008R	240-120400-B-2	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15008R	240-120400-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15008R	240-120400-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15011	240-120400-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
JHC-MW-15011	240-120400-B-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
JHC-MW-15011	240-120400-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
JHC-MW-15011	240-120400-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
DUP-5	240-120400-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____
DUP-5	240-120400-B-4	Plastic 500ml - with Nitric Acid	<2	_____	_____
DUP-5	240-120400-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____
DUP-5	240-120400-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____



# Chain of Custody Record



## Client Information (Sub Contract Lab)

Client Contact:  
Shipping/Receiving  
Company:  
TestAmerica Laboratories, Inc.  
Address:  
13715 Rider Trail North,  
City:  
Earth City  
State, Zip:  
MO, 63045  
Phone:  
314-298-8566(Tel) 314-298-8757(Fax)  
Email:

Sampler:  
Lab PM:  
Brooks, Kris M  
E-Mail:  
kris.brooks@testamericainc.com  
Accreditations Required (See note):  
COC No:  
240-111607.1  
Page:  
Page 1 of 1  
Job #:  
240-120400-1

Project Name:  
JHC - CCR Groundwater Monitoring 2019  
Site:

Carrier Tracking No(s):  
State of Origin:  
Michigan  
Preservation Codes:  
A - HCL  
B - NaOH  
C - Zn Acetate  
D - Nitric Acid  
E - NaHSO4  
F - MeOH  
G - Anchlor  
H - Ascorbic Acid  
I - Ice  
J - DI Water  
K - EDTA  
L - EDA  
Other:  
M - Hexane  
N - None  
O - AsNaO2  
P - Na2O4S  
Q - Na2SO3  
R - Na2S2O3  
S - H2SO4  
T - TSP Dodecahydrate  
U - Acetone  
V - MCAA  
W - pH 4-5  
Z - other (specify)

Due Date Requested:  
10/23/2019  
TAT Requested (days):

Analysis Requested

Sample ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/soil, BR=Residue, A=Air)	Field Filtered Sample (Yes or No)	Perform M/MSD (Yes or No)	903.0/Precep STD Standard Target List	904.0/Precep STD Standard Target List	Ra226Ra228_GFPc	Total Number of containers	Special Instructions/Note:
JHC-MW-15006 (240-120400-1)	10/10/19	05:45 Eastern	Water	Water	X	X	X	X		2	
JHC-MW-15008R (240-120400-2)	10/9/19	15:13 Eastern	Water	Water	X	X	X	X		2	
JHC-MW-15011 (240-120400-3)	10/10/19	06:33 Eastern	Water	Water	X	X	X	X		2	
DUP-5 (240-120400-4)	10/9/19	Eastern	Water	Water	X	X	X	X		2	

PO #:  
WO #:  
Project #:  
44022279  
SSOW#:

Relinquished by:

Special Instructions/QC Requirements:  
Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

Relinquished by:

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Relinquished by:

Method of Shipment:

Custody Seals Intact:  Yes  No

Company: TA Sil  
Company: Company  
Company: Company

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Company: Company  
Company: Company

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Company: TA Sil  
Company: Company  
Company: Company



## Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-120400-2

**Login Number: 120400**

**List Number: 2**

**Creator: Hellm, Michael**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 10/15/19 01:20 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	19.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## ANALYTICAL REPORT

Eurofins TestAmerica, Canton  
4101 Shuffel Street NW  
North Canton, OH 44720  
Tel: (330)497-9396

Laboratory Job ID: 240-120308-1

Client Project/Site: JHC - CCR N&E Monitoring/Temporary

**For:**

TRC Environmental Corporation.  
1540 Eisenhower Place  
Ann Arbor, Michigan 48108-7080

Attn: Darby Litz



*Authorized for release by:  
10/31/2019 7:14:10 PM*

Kris Brooks, Project Manager II  
(330)966-9790  
[kris.brooks@testamericainc.com](mailto:kris.brooks@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Definitions/Glossary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
U	Indicates the analyte was analyzed for but not detected.

### General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

**Job ID: 240-120308-1**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

**Client: TRC Environmental Corporation.**

**Project: JHC - CCR N&E Monitoring/Temporary**

**Report Number: 240-120308-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The following analyses were performed at the Eurofins TestAmerica, Irvine laboratory: 6010B Total Recoverable Metals (ICP); 6020\_LL Metals (ICPMS); 7470A Mercury.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 10/10/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 6 coolers at receipt time were 1.4° C, 3.1° C, 3.2° C, 3.7° C, 4.2° C and 5.8° C.

The unpreserved bottles for samples TW-19-06A and W-19-06B were inadvertently sent to Irvine. Since Irvine was only analyzing for metals they preserved the bottles with nitric acid. The TDS, Chloride, Fluoride and Sulfate are not able to be analyzed for these two samples since there is no unpreserved sample now.

### **TOTAL RECOVERABLE METALS (ICP)**

Samples TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4) and TW-19-06B (240-120308-5) were analyzed for total recoverable metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 10/17/2019 and analyzed on 10/18/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

---

## Job ID: 240-120308-1 (Continued)

---

### Laboratory: Eurofins TestAmerica, Canton (Continued)

#### TOTAL RECOVERABLE METALS (ICPMS)

Samples TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4) and TW-19-06B (240-120308-5) were analyzed for total recoverable metals (ICPMS) in accordance with EPA SW-846 Method 6020. The samples were prepared on 10/14/2019 and analyzed on 10/15/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### METALS (ICPMS)

Samples TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4) and TW-19-06B (240-120308-5) were analyzed for metals (ICPMS) in accordance with SW846 Method 6020. The samples were prepared and analyzed on 10/17/2019.

Selenium failed the recovery criteria low for the MS of sample TW-19-04AMS (240-120308-1) in batch 440-575104. Refer to the QC report for details.

The serial dilution performed for the following sample associated with batch 440-575104 was outside control limits for Molybdenum: (240-120308-G-1-A SD ^5)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### TOTAL MERCURY

Samples TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4) and TW-19-06B (240-120308-5) were analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 10/14/2019 and 10/15/2019 and analyzed on 10/15/2019 and 10/16/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### TOTAL DISSOLVED SOLIDS

Samples TW-19-04A (240-120308-1), TW-19-04B (240-120308-2) and TW-19-05 (240-120308-3) were analyzed for total dissolved solids in accordance with SM 2540C. The samples were analyzed on 10/11/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### ANIONS

Samples TW-19-04A (240-120308-1), TW-19-04B (240-120308-2) and TW-19-05 (240-120308-3) were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 10/22/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# Method Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL IRV
6020	Metals (ICP/MS)	SW846	TAL CAN
6020	Metals (ICP/MS)	SW846	TAL IRV
7470A	Mercury (CVAA)	SW846	TAL IRV
2540 C-2011	Total Dissolved Solids (Dried at 180 °C)	SM	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL CAN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL IRV
7470A	Preparation, Mercury	SW846	TAL IRV

#### Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

# Sample Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-120308-1	TW-19-04A	Water	10/08/19 13:40	10/10/19 09:30	
240-120308-2	TW-19-04B	Water	10/08/19 14:35	10/10/19 09:30	
240-120308-3	TW-19-05	Water	10/08/19 15:20	10/10/19 09:30	
240-120308-4	TW-19-06A	Water	10/08/19 16:20	10/10/19 09:30	
240-120308-5	TW-19-06B	Water	10/08/19 17:00	10/10/19 09:30	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Detection Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Client Sample ID: TW-19-04A

## Lab Sample ID: 240-120308-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	53		1.0	mg/L	1		6010B	Total Recoverable
Boron	1.2		0.050	mg/L	1		6010B	Total Recoverable
Antimony	0.0037		0.0010	mg/L	1		6020	Total Recoverable
Lithium	0.018		0.010	mg/L	1		6020	Total Recoverable
Barium	0.078		0.0050	mg/L	1		6020	Total Recoverable
Molybdenum	0.0078		0.0050	mg/L	1		6020	Total Recoverable
Selenium	0.41		0.0010	mg/L	1		6020	Total Recoverable
Total Dissolved Solids	260		50	mg/L	1		2540 C-2011	Total/NA
Chloride	4.0		2.0	mg/L	1		300.0	Total/NA
Sulfate	57		2.0	mg/L	1		300.0	Total/NA

## Client Sample ID: TW-19-04B

## Lab Sample ID: 240-120308-2

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	51		1.0	mg/L	1		6010B	Total Recoverable
Boron	0.15		0.050	mg/L	1		6010B	Total Recoverable
Antimony	0.0018		0.0010	mg/L	1		6020	Total Recoverable
Barium	0.066		0.0050	mg/L	1		6020	Total Recoverable
Chromium	0.0012		0.0010	mg/L	1		6020	Total Recoverable
Total Dissolved Solids	250		50	mg/L	1		2540 C-2011	Total/NA
Chloride	23		2.0	mg/L	1		300.0	Total/NA
Sulfate	33		2.0	mg/L	1		300.0	Total/NA

## Client Sample ID: TW-19-05

## Lab Sample ID: 240-120308-3

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	39		1.0	mg/L	1		6010B	Total Recoverable
Boron	0.13		0.050	mg/L	1		6010B	Total Recoverable
Antimony	0.0032		0.0010	mg/L	1		6020	Total Recoverable
Lithium	0.022		0.010	mg/L	1		6020	Total Recoverable
Barium	0.012		0.0050	mg/L	1		6020	Total Recoverable
Chromium	0.0013		0.0010	mg/L	1		6020	Total Recoverable
Molybdenum	0.0057		0.0050	mg/L	1		6020	Total Recoverable
Selenium	0.025		0.0010	mg/L	1		6020	Total Recoverable
Total Dissolved Solids	200		50	mg/L	1		2540 C-2011	Total/NA
Chloride	8.8		2.0	mg/L	1		300.0	Total/NA
Sulfate	24		2.0	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton

# Detection Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Client Sample ID: TW-19-06A

## Lab Sample ID: 240-120308-4

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	16		1.0	mg/L	1		6010B	Total Recoverable
Boron	0.27		0.050	mg/L	1		6010B	Total Recoverable
Antimony	0.0010		0.0010	mg/L	1		6020	Total Recoverable
Molybdenum	0.010		0.0050	mg/L	1		6020	Total Recoverable

## Client Sample ID: TW-19-06B

## Lab Sample ID: 240-120308-5

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Calcium	23		1.0	mg/L	1		6010B	Total Recoverable
Boron	0.36		0.050	mg/L	1		6010B	Total Recoverable
Barium	0.011		0.0050	mg/L	1		6020	Total Recoverable
Chromium	0.0010		0.0010	mg/L	1		6020	Total Recoverable
Molybdenum	0.087		0.0050	mg/L	1		6020	Total Recoverable
Selenium	0.0075		0.0010	mg/L	1		6020	Total Recoverable

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton



# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

**Client Sample ID: TW-19-04A**

**Lab Sample ID: 240-120308-1**

Date Collected: 10/08/19 13:40

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	53		1.0	mg/L		10/17/19 08:08	10/18/19 09:22	1
Boron	1.2		0.050	mg/L		10/17/19 08:08	10/18/19 09:22	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0037		0.0010	mg/L		10/17/19 08:04	10/17/19 14:59	1
Lithium	0.018		0.010	mg/L		10/14/19 14:00	10/15/19 16:03	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:59	1
Barium	0.078		0.0050	mg/L		10/17/19 08:04	10/17/19 14:59	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:59	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 08:04	10/17/19 14:59	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:59	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 08:04	10/17/19 14:59	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:59	1
Molybdenum	0.0078		0.0050	mg/L		10/17/19 08:04	10/17/19 14:59	1
Selenium	0.41		0.0010	mg/L		10/17/19 08:04	10/17/19 14:59	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 08:04	10/17/19 14:59	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/14/19 13:14	10/15/19 04:45	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	260		50	mg/L			10/11/19 14:47	1
Chloride	4.0		2.0	mg/L			10/22/19 10:42	1
Fluoride	1.0	U	1.0	mg/L			10/22/19 10:42	1
Sulfate	57		2.0	mg/L			10/22/19 10:42	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

**Client Sample ID: TW-19-04B**

**Lab Sample ID: 240-120308-2**

Date Collected: 10/08/19 14:35

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	51		1.0	mg/L		10/17/19 08:08	10/18/19 09:31	1
Boron	0.15		0.050	mg/L		10/17/19 08:08	10/18/19 09:31	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0018		0.0010	mg/L		10/17/19 08:04	10/17/19 15:21	1
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 16:30	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:21	1
Barium	0.066		0.0050	mg/L		10/17/19 08:04	10/17/19 15:21	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:21	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 08:04	10/17/19 15:21	1
Chromium	0.0012		0.0010	mg/L		10/17/19 08:04	10/17/19 15:21	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 08:04	10/17/19 15:21	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:21	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 08:04	10/17/19 15:21	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:21	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 08:04	10/17/19 15:21	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/14/19 13:14	10/15/19 04:51	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	250		50	mg/L			10/11/19 14:47	1
Chloride	23		2.0	mg/L			10/22/19 11:42	1
Fluoride	1.0	U	1.0	mg/L			10/22/19 11:42	1
Sulfate	33		2.0	mg/L			10/22/19 11:42	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

**Client Sample ID: TW-19-05**

**Lab Sample ID: 240-120308-3**

Date Collected: 10/08/19 15:20

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	39		1.0	mg/L		10/17/19 08:08	10/18/19 09:33	1
Boron	0.13		0.050	mg/L		10/17/19 08:08	10/18/19 09:33	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0032		0.0010	mg/L		10/17/19 08:04	10/17/19 15:24	1
Lithium	0.022		0.010	mg/L		10/14/19 14:00	10/15/19 16:33	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:24	1
Barium	0.012		0.0050	mg/L		10/17/19 08:04	10/17/19 15:24	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:24	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 08:04	10/17/19 15:24	1
Chromium	0.0013		0.0010	mg/L		10/17/19 08:04	10/17/19 15:24	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 08:04	10/17/19 15:24	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:24	1
Molybdenum	0.0057		0.0050	mg/L		10/17/19 08:04	10/17/19 15:24	1
Selenium	0.025		0.0010	mg/L		10/17/19 08:04	10/17/19 15:24	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 08:04	10/17/19 15:24	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/14/19 13:14	10/15/19 04:53	1

**General Chemistry**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	200		50	mg/L			10/11/19 15:18	1
Chloride	8.8		2.0	mg/L			10/22/19 12:02	1
Fluoride	1.0	U	1.0	mg/L			10/22/19 12:02	1
Sulfate	24		2.0	mg/L			10/22/19 12:02	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

**Client Sample ID: TW-19-06A**

**Lab Sample ID: 240-120308-4**

Date Collected: 10/08/19 16:20

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	16		1.0	mg/L		10/17/19 08:08	10/18/19 09:35	1
Boron	0.27		0.050	mg/L		10/17/19 08:08	10/18/19 09:35	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010		0.0010	mg/L		10/17/19 08:04	10/17/19 15:26	1
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 16:35	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:26	1
Barium	0.0050	U	0.0050	mg/L		10/17/19 08:04	10/17/19 15:26	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:26	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 08:04	10/17/19 15:26	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:26	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 08:04	10/17/19 15:26	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:26	1
Molybdenum	0.010		0.0050	mg/L		10/17/19 08:04	10/17/19 15:26	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:26	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 08:04	10/17/19 15:26	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/15/19 17:50	10/16/19 14:28	1



# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

**Client Sample ID: TW-19-06B**

**Lab Sample ID: 240-120308-5**

Date Collected: 10/08/19 17:00

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 6010B - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	23		1.0	mg/L		10/17/19 08:08	10/18/19 09:51	1
Boron	0.36		0.050	mg/L		10/17/19 08:08	10/18/19 09:51	1

**Method: 6020 - Metals (ICP/MS) - Total Recoverable**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:29	1
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 16:37	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:29	1
Barium	0.011		0.0050	mg/L		10/17/19 08:04	10/17/19 15:29	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:29	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 08:04	10/17/19 15:29	1
Chromium	0.0010		0.0010	mg/L		10/17/19 08:04	10/17/19 15:29	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 08:04	10/17/19 15:29	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 15:29	1
Molybdenum	0.087		0.0050	mg/L		10/17/19 08:04	10/17/19 15:29	1
Selenium	0.0075		0.0010	mg/L		10/17/19 08:04	10/17/19 15:29	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 08:04	10/17/19 15:29	1

**Method: 7470A - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/15/19 17:50	10/16/19 14:30	1

# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Method: 6010B - Metals (ICP)

**Lab Sample ID: MB 440-574958/1-A**  
**Matrix: Water**  
**Analysis Batch: 575288**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574958**

Analyte	MB MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Calcium	1.0	U	1.0	mg/L		10/17/19 08:08	10/18/19 09:16	1
Boron	0.050	U	0.050	mg/L		10/17/19 08:08	10/18/19 09:16	1

**Lab Sample ID: LCS 440-574958/2-A**  
**Matrix: Water**  
**Analysis Batch: 575288**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574958**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.00	0.954		mg/L		95	80 - 120

**Lab Sample ID: 240-120308-1 MS**  
**Matrix: Water**  
**Analysis Batch: 575288**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574958**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.2		1.00	2.26		mg/L		108	75 - 125

**Lab Sample ID: 240-120308-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 575288**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574958**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Boron	1.2		1.00	2.19		mg/L		100	75 - 125	3	20

## Method: 6020 - Metals (ICP/MS)

**Lab Sample ID: MB 240-405549/1-A**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405549**

Analyte	MB MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Lithium	0.010	U	0.010	mg/L		10/14/19 14:00	10/15/19 15:58	1

**Lab Sample ID: LCS 240-405549/2-A**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405549**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits

**Lab Sample ID: 240-120308-1 MS**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405549**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits

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# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Method: 6020 - Metals (ICP/MS) (Continued)

**Lab Sample ID: 240-120308-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 405929**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total Recoverable**  
**Prep Batch: 405549**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.018		0.500	0.489		mg/L		94	75 - 125	5	20

**Lab Sample ID: MB 440-574956/1-A**  
**Matrix: Water**  
**Analysis Batch: 575104**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574956**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:55	1
Arsenic	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:55	1
Barium	0.0050	U	0.0050	mg/L		10/17/19 08:04	10/17/19 14:55	1
Beryllium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:55	1
Cadmium	0.00020	U	0.00020	mg/L		10/17/19 08:04	10/17/19 14:55	1
Chromium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:55	1
Cobalt	0.0060	U	0.0060	mg/L		10/17/19 08:04	10/17/19 14:55	1
Lead	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:55	1
Molybdenum	0.0050	U	0.0050	mg/L		10/17/19 08:04	10/17/19 14:55	1
Selenium	0.0010	U	0.0010	mg/L		10/17/19 08:04	10/17/19 14:55	1
Thallium	0.0020	U	0.0020	mg/L		10/17/19 08:04	10/17/19 14:55	1

**Lab Sample ID: LCS 440-574956/2-A**  
**Matrix: Water**  
**Analysis Batch: 575104**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574956**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.0800	0.0837		mg/L		105	80 - 120
Arsenic	0.0800	0.0760		mg/L		95	80 - 120
Barium	0.0800	0.0754		mg/L		94	80 - 120
Beryllium	0.0800	0.0776		mg/L		97	80 - 120
Cadmium	0.0800	0.0755		mg/L		94	80 - 120
Chromium	0.0800	0.0769		mg/L		96	80 - 120
Cobalt	0.0800	0.0765		mg/L		96	80 - 120
Lead	0.0800	0.0747		mg/L		93	80 - 120
Molybdenum	0.0800	0.0770		mg/L		96	80 - 120
Selenium	0.0800	0.0748		mg/L		94	80 - 120
Thallium	0.0800	0.0754		mg/L		94	80 - 120

**Lab Sample ID: 240-120308-1 MS**  
**Matrix: Water**  
**Analysis Batch: 575104**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574956**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.0037		0.0800	0.0889		mg/L		107	75 - 125
Arsenic	0.0010	U	0.0800	0.0723		mg/L		90	75 - 125
Barium	0.078		0.0800	0.155		mg/L		96	75 - 125
Beryllium	0.0010	U	0.0800	0.0786		mg/L		98	75 - 125
Cadmium	0.00020	U	0.0800	0.0761		mg/L		95	75 - 125
Chromium	0.0010	U	0.0800	0.0775		mg/L		96	75 - 125
Cobalt	0.0060	U	0.0800	0.0750		mg/L		93	75 - 125
Lead	0.0010	U	0.0800	0.0743		mg/L		93	75 - 125

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# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Method: 6020 - Metals (ICP/MS) (Continued)

**Lab Sample ID: 240-120308-1 MS**  
**Matrix: Water**  
**Analysis Batch: 575104**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574956**

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	%Rec.	
	Result	Qualifier		Result	Qualifier				Limits	RPD
Molybdenum	0.0078		0.0800	0.0872		mg/L		99	75 - 125	
Selenium	0.41		0.0800	0.464	4	mg/L		73	75 - 125	
Thallium	0.0020	U	0.0800	0.0769		mg/L		95	75 - 125	

**Lab Sample ID: 240-120308-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 575104**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total Recoverable**  
**Prep Batch: 574956**

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	%Rec.		RPD	Limit
	Result	Qualifier		Result	Qualifier				Limits	RPD		
Antimony	0.0037		0.0800	0.0900		mg/L		108	75 - 125	1	20	
Arsenic	0.0010	U	0.0800	0.0733		mg/L		91	75 - 125	1	20	
Barium	0.078		0.0800	0.157		mg/L		100	75 - 125	2	20	
Beryllium	0.0010	U	0.0800	0.0781		mg/L		98	75 - 125	1	20	
Cadmium	0.00020	U	0.0800	0.0763		mg/L		95	75 - 125	0	20	
Chromium	0.0010	U	0.0800	0.0784		mg/L		97	75 - 125	1	20	
Cobalt	0.0060	U	0.0800	0.0753		mg/L		94	75 - 125	0	20	
Lead	0.0010	U	0.0800	0.0764		mg/L		95	75 - 125	3	20	
Molybdenum	0.0078		0.0800	0.0884		mg/L		101	75 - 125	1	20	
Selenium	0.41		0.0800	0.476	4	mg/L		87	75 - 125	2	20	
Thallium	0.0020	U	0.0800	0.0789		mg/L		98	75 - 125	3	20	

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 440-574283/1-A**  
**Matrix: Water**  
**Analysis Batch: 574572**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 574283**

Analyte	MB MB		RL	Unit	D	Prepared	Analyzed	Dil
	Result	Qualifier						
Mercury	0.00020	U	0.00020	mg/L		10/14/19 13:14	10/15/19 04:40	1

**Lab Sample ID: LCS 440-574283/2-A**  
**Matrix: Water**  
**Analysis Batch: 574572**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 574283**

Analyte	Spike	LCS		Unit	D	%Rec	%Rec.	
		Result	Qualifier				Limits	RPD
Mercury	0.00400	0.00387		mg/L		97	80 - 120	

**Lab Sample ID: 240-120308-1 MS**  
**Matrix: Water**  
**Analysis Batch: 574572**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total/NA**  
**Prep Batch: 574283**

Analyte	Sample	Sample	Spike	MS		Unit	D	%Rec	%Rec.	
	Result	Qualifier		Result	Qualifier				Limits	RPD
Mercury	0.00020	U	0.00400	0.00399		mg/L		100	75 - 125	

**Lab Sample ID: 240-120308-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 574572**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total/NA**  
**Prep Batch: 574283**

Analyte	Sample	Sample	Spike	MSD		Unit	D	%Rec	%Rec.		RPD	Limit
	Result	Qualifier		Result	Qualifier				Limits	RPD		
Mercury	0.00020	U	0.00400	0.00401		mg/L		100	75 - 125	0	20	

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# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Method: 7470A - Mercury (CVAA) (Continued)

**Lab Sample ID: MB 440-574603/1-A**  
**Matrix: Water**  
**Analysis Batch: 574649**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 574603**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020	mg/L		10/15/19 17:50	10/16/19 00:16	1

**Lab Sample ID: LCS 440-574603/2-A**  
**Matrix: Water**  
**Analysis Batch: 574649**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 574603**  
**%Rec.**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00400	0.00477		mg/L		119	80 - 120

**Lab Sample ID: 240-120308-4 MS**  
**Matrix: Water**  
**Analysis Batch: 574649**

**Client Sample ID: TW-19-06A**  
**Prep Type: Total/NA**  
**Prep Batch: 574603**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00020	U	0.00400	0.00469		mg/L		117	75 - 125

**Lab Sample ID: 240-120308-4 MSD**  
**Matrix: Water**  
**Analysis Batch: 574649**

**Client Sample ID: TW-19-06A**  
**Prep Type: Total/NA**  
**Prep Batch: 574603**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	0.00020	U	0.00400	0.00440		mg/L		110	75 - 125	6	20

## Method: 2540 C-2011 - Total Dissolved Solids (Dried at 180 °C)

**Lab Sample ID: MB 240-405360/1**  
**Matrix: Water**  
**Analysis Batch: 405360**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	50	U	50	mg/L			10/11/19 14:47	1

**Lab Sample ID: LCS 240-405360/2**  
**Matrix: Water**  
**Analysis Batch: 405360**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**%Rec.**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Dissolved Solids	484	490		mg/L		101	80 - 120

**Lab Sample ID: 240-120308-1 DU**  
**Matrix: Water**  
**Analysis Batch: 405360**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total/NA**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Dissolved Solids	260		257		mg/L		3	20

Eurofins TestAmerica, Canton

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 240-406785/3**  
**Matrix: Water**  
**Analysis Batch: 406785**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Chloride	2.0	U	2.0	mg/L			10/22/19 09:01	1
Fluoride	1.0	U	1.0	mg/L			10/22/19 09:01	1
Sulfate	2.0	U	2.0	mg/L			10/22/19 09:01	1

**Lab Sample ID: LCS 240-406785/4**  
**Matrix: Water**  
**Analysis Batch: 406785**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	2.50	2.52		mg/L		101	90 - 110
Sulfate	50.0	51.5		mg/L		103	90 - 110

**Lab Sample ID: 240-120308-1 MS**  
**Matrix: Water**  
**Analysis Batch: 406785**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	1.0	U	2.50	2.91		mg/L		111	80 - 120
Sulfate	57		50.0	109		mg/L		104	80 - 120

**Lab Sample ID: 240-120308-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 406785**

**Client Sample ID: TW-19-04A**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Fluoride	1.0	U	2.50	2.83		mg/L		107	80 - 120	3	15
Sulfate	57		50.0	107		mg/L		100	80 - 120	2	15

# QC Association Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Metals

### Prep Batch: 405549

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total Recoverable	Water	3005A	
240-120308-2	TW-19-04B	Total Recoverable	Water	3005A	
240-120308-3	TW-19-05	Total Recoverable	Water	3005A	
240-120308-4	TW-19-06A	Total Recoverable	Water	3005A	
240-120308-5	TW-19-06B	Total Recoverable	Water	3005A	
MB 240-405549/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-405549/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-120308-1 MS	TW-19-04A	Total Recoverable	Water	3005A	
240-120308-1 MSD	TW-19-04A	Total Recoverable	Water	3005A	

### Analysis Batch: 405929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total Recoverable	Water	6020	405549
240-120308-2	TW-19-04B	Total Recoverable	Water	6020	405549
240-120308-3	TW-19-05	Total Recoverable	Water	6020	405549
240-120308-4	TW-19-06A	Total Recoverable	Water	6020	405549
240-120308-5	TW-19-06B	Total Recoverable	Water	6020	405549
MB 240-405549/1-A	Method Blank	Total Recoverable	Water	6020	405549
LCS 240-405549/2-A	Lab Control Sample	Total Recoverable	Water	6020	405549
240-120308-1 MS	TW-19-04A	Total Recoverable	Water	6020	405549
240-120308-1 MSD	TW-19-04A	Total Recoverable	Water	6020	405549

### Prep Batch: 574283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total/NA	Water	7470A	
240-120308-2	TW-19-04B	Total/NA	Water	7470A	
240-120308-3	TW-19-05	Total/NA	Water	7470A	
MB 440-574283/1-A	Method Blank	Total/NA	Water	7470A	
LCS 440-574283/2-A	Lab Control Sample	Total/NA	Water	7470A	
240-120308-1 MS	TW-19-04A	Total/NA	Water	7470A	
240-120308-1 MSD	TW-19-04A	Total/NA	Water	7470A	

### Analysis Batch: 574572

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total/NA	Water	7470A	574283
240-120308-2	TW-19-04B	Total/NA	Water	7470A	574283
240-120308-3	TW-19-05	Total/NA	Water	7470A	574283
MB 440-574283/1-A	Method Blank	Total/NA	Water	7470A	574283
LCS 440-574283/2-A	Lab Control Sample	Total/NA	Water	7470A	574283
240-120308-1 MS	TW-19-04A	Total/NA	Water	7470A	574283
240-120308-1 MSD	TW-19-04A	Total/NA	Water	7470A	574283

### Prep Batch: 574603

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-4	TW-19-06A	Total/NA	Water	7470A	
240-120308-5	TW-19-06B	Total/NA	Water	7470A	
MB 440-574603/1-A	Method Blank	Total/NA	Water	7470A	
LCS 440-574603/2-A	Lab Control Sample	Total/NA	Water	7470A	
240-120308-4 MS	TW-19-06A	Total/NA	Water	7470A	
240-120308-4 MSD	TW-19-06A	Total/NA	Water	7470A	

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# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Metals

### Analysis Batch: 574649

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-4	TW-19-06A	Total/NA	Water	7470A	574603
240-120308-5	TW-19-06B	Total/NA	Water	7470A	574603
MB 440-574603/1-A	Method Blank	Total/NA	Water	7470A	574603
LCS 440-574603/2-A	Lab Control Sample	Total/NA	Water	7470A	574603
240-120308-4 MS	TW-19-06A	Total/NA	Water	7470A	574603
240-120308-4 MSD	TW-19-06A	Total/NA	Water	7470A	574603

### Prep Batch: 574956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total Recoverable	Water	3005A	
240-120308-2	TW-19-04B	Total Recoverable	Water	3005A	
240-120308-3	TW-19-05	Total Recoverable	Water	3005A	
240-120308-4	TW-19-06A	Total Recoverable	Water	3005A	
240-120308-5	TW-19-06B	Total Recoverable	Water	3005A	
MB 440-574956/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-574956/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-120308-1 MS	TW-19-04A	Total Recoverable	Water	3005A	
240-120308-1 MSD	TW-19-04A	Total Recoverable	Water	3005A	

### Prep Batch: 574958

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total Recoverable	Water	3005A	
240-120308-2	TW-19-04B	Total Recoverable	Water	3005A	
240-120308-3	TW-19-05	Total Recoverable	Water	3005A	
240-120308-4	TW-19-06A	Total Recoverable	Water	3005A	
240-120308-5	TW-19-06B	Total Recoverable	Water	3005A	
MB 440-574958/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-574958/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-120308-1 MS	TW-19-04A	Total Recoverable	Water	3005A	
240-120308-1 MSD	TW-19-04A	Total Recoverable	Water	3005A	

### Analysis Batch: 575104

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total Recoverable	Water	6020	574956
240-120308-2	TW-19-04B	Total Recoverable	Water	6020	574956
240-120308-3	TW-19-05	Total Recoverable	Water	6020	574956
240-120308-4	TW-19-06A	Total Recoverable	Water	6020	574956
240-120308-5	TW-19-06B	Total Recoverable	Water	6020	574956
MB 440-574956/1-A	Method Blank	Total Recoverable	Water	6020	574956
LCS 440-574956/2-A	Lab Control Sample	Total Recoverable	Water	6020	574956
240-120308-1 MS	TW-19-04A	Total Recoverable	Water	6020	574956
240-120308-1 MSD	TW-19-04A	Total Recoverable	Water	6020	574956

### Analysis Batch: 575288

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total Recoverable	Water	6010B	574958
240-120308-2	TW-19-04B	Total Recoverable	Water	6010B	574958
240-120308-3	TW-19-05	Total Recoverable	Water	6010B	574958
240-120308-4	TW-19-06A	Total Recoverable	Water	6010B	574958
240-120308-5	TW-19-06B	Total Recoverable	Water	6010B	574958
MB 440-574958/1-A	Method Blank	Total Recoverable	Water	6010B	574958

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# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Metals (Continued)

### Analysis Batch: 575288 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 440-574958/2-A	Lab Control Sample	Total Recoverable	Water	6010B	574958
240-120308-1 MS	TW-19-04A	Total Recoverable	Water	6010B	574958
240-120308-1 MSD	TW-19-04A	Total Recoverable	Water	6010B	574958

## General Chemistry

### Analysis Batch: 405360

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total/NA	Water	2540 C-2011	
240-120308-2	TW-19-04B	Total/NA	Water	2540 C-2011	
240-120308-3	TW-19-05	Total/NA	Water	2540 C-2011	
MB 240-405360/1	Method Blank	Total/NA	Water	2540 C-2011	
LCS 240-405360/2	Lab Control Sample	Total/NA	Water	2540 C-2011	
240-120308-1 DU	TW-19-04A	Total/NA	Water	2540 C-2011	

### Analysis Batch: 406785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total/NA	Water	300.0	
240-120308-2	TW-19-04B	Total/NA	Water	300.0	
240-120308-3	TW-19-05	Total/NA	Water	300.0	
MB 240-406785/3	Method Blank	Total/NA	Water	300.0	
LCS 240-406785/4	Lab Control Sample	Total/NA	Water	300.0	
240-120308-1 MS	TW-19-04A	Total/NA	Water	300.0	
240-120308-1 MSD	TW-19-04A	Total/NA	Water	300.0	

# Lab Chronicle

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

**Client Sample ID: TW-19-04A**

**Lab Sample ID: 240-120308-1**

**Date Collected: 10/08/19 13:40**

**Matrix: Water**

**Date Received: 10/10/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			574958	10/17/19 08:08	BV	TAL IRV
Total Recoverable	Analysis	6010B		1	575288	10/18/19 09:22	TQN	TAL IRV
Total Recoverable	Prep	3005A			405549	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 16:03	DSH	TAL CAN
Total Recoverable	Prep	3005A			574956	10/17/19 08:04	BV	TAL IRV
Total Recoverable	Analysis	6020		1	575104	10/17/19 14:59	B1H	TAL IRV
Total/NA	Prep	7470A			574283	10/14/19 13:14	DB	TAL IRV
Total/NA	Analysis	7470A		1	574572	10/15/19 04:45	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405360	10/11/19 14:47	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406785	10/22/19 10:42	JWW	TAL CAN

**Client Sample ID: TW-19-04B**

**Lab Sample ID: 240-120308-2**

**Date Collected: 10/08/19 14:35**

**Matrix: Water**

**Date Received: 10/10/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			574958	10/17/19 08:08	BV	TAL IRV
Total Recoverable	Analysis	6010B		1	575288	10/18/19 09:31	TQN	TAL IRV
Total Recoverable	Prep	3005A			405549	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 16:30	DSH	TAL CAN
Total Recoverable	Prep	3005A			574956	10/17/19 08:04	BV	TAL IRV
Total Recoverable	Analysis	6020		1	575104	10/17/19 15:21	B1H	TAL IRV
Total/NA	Prep	7470A			574283	10/14/19 13:14	DB	TAL IRV
Total/NA	Analysis	7470A		1	574572	10/15/19 04:51	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405360	10/11/19 14:47	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406785	10/22/19 11:42	JWW	TAL CAN

**Client Sample ID: TW-19-05**

**Lab Sample ID: 240-120308-3**

**Date Collected: 10/08/19 15:20**

**Matrix: Water**

**Date Received: 10/10/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			574958	10/17/19 08:08	BV	TAL IRV
Total Recoverable	Analysis	6010B		1	575288	10/18/19 09:33	TQN	TAL IRV
Total Recoverable	Prep	3005A			405549	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 16:33	DSH	TAL CAN
Total Recoverable	Prep	3005A			574956	10/17/19 08:04	BV	TAL IRV
Total Recoverable	Analysis	6020		1	575104	10/17/19 15:24	B1H	TAL IRV
Total/NA	Prep	7470A			574283	10/14/19 13:14	DB	TAL IRV
Total/NA	Analysis	7470A		1	574572	10/15/19 04:53	DB	TAL IRV
Total/NA	Analysis	2540 C-2011		1	405360	10/11/19 15:18	JMR	TAL CAN
Total/NA	Analysis	300.0		1	406785	10/22/19 12:02	JWW	TAL CAN

# Lab Chronicle

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

**Client Sample ID: TW-19-06A**

**Lab Sample ID: 240-120308-4**

**Date Collected: 10/08/19 16:20**

**Matrix: Water**

**Date Received: 10/10/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			574958	10/17/19 08:08	BV	TAL IRV
Total Recoverable	Analysis	6010B		1	575288	10/18/19 09:35	TQN	TAL IRV
Total Recoverable	Prep	3005A			405549	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 16:35	DSH	TAL CAN
Total Recoverable	Prep	3005A			574956	10/17/19 08:04	BV	TAL IRV
Total Recoverable	Analysis	6020		1	575104	10/17/19 15:26	B1H	TAL IRV
Total/NA	Prep	7470A			574603	10/15/19 17:50	DB	TAL IRV
Total/NA	Analysis	7470A		1	574649	10/16/19 14:28	DB	TAL IRV

**Client Sample ID: TW-19-06B**

**Lab Sample ID: 240-120308-5**

**Date Collected: 10/08/19 17:00**

**Matrix: Water**

**Date Received: 10/10/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			574958	10/17/19 08:08	BV	TAL IRV
Total Recoverable	Analysis	6010B		1	575288	10/18/19 09:51	TQN	TAL IRV
Total Recoverable	Prep	3005A			405549	10/14/19 14:00	SLD	TAL CAN
Total Recoverable	Analysis	6020		1	405929	10/15/19 16:37	DSH	TAL CAN
Total Recoverable	Prep	3005A			574956	10/17/19 08:04	BV	TAL IRV
Total Recoverable	Analysis	6020		1	575104	10/17/19 15:29	B1H	TAL IRV
Total/NA	Prep	7470A			574603	10/15/19 17:50	DB	TAL IRV
Total/NA	Analysis	7470A		1	574649	10/16/19 14:30	DB	TAL IRV

**Laboratory References:**

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL IRV = Eurofins TestAmerica, Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-1

## Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

## Laboratory: Eurofins TestAmerica, Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-20
Arizona	State	AZ0671	10-14-20
California	LA Cty Sanitation Districts	10256	06-30-20
California	Los Angeles County Sanitation Districts	10256	06-30-20
California	State	2706	06-30-20
Guam	State	19-005R	01-23-20
Hawaii	State	CA01531	01-29-20
Hawaii	State Program	N/A	01-29-20
Kansas	NELAP	E-10420	07-31-20
Nevada	State	CA015312020-4	07-31-20
New Mexico	State	CA01531	01-29-20
New Mexico	State Program	N/A	01-29-20
Oregon	NELAP	4028 - 006	01-29-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-20
Washington	State Program	C900	09-03-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

**Eurofins TestAmerica, Canton**  
 4101 Shuffel Street NW  
 North Canton, OH 44720  
 Phone: 330-497-9396 Fax: 330-497-0772

# Chain of Custody Record

**eurofins** Environment Testing  
 TestAmerica

**Client Information**  
 Client Contact: Brian Yelen  
 Company: TRC Environmental Corporation.  
 Address: 1540 Eisenhower Place  
 City: Ann Arbor  
 State, Zip: MI, 48108-7080  
 Phone: 734-971-7080(Tel) 734-971-9022(Fax)  
 Email: byelen@trccompanies.com  
 Project Name: JHC - CCR N&E Monitoring/Temporary  
 Site:

Lab PM: Brooks, Kris M  
 E-Mail: kris.brooks@testamericainc.com  
 Lab ID: 271  
 Lab Name: Grand Rapids  
 Lab Address: 271  
 Lab Phone: 271

Lab No: 440-171552-31503.1  
 Page: Page 1 of 2  
 Job #:

**Analysis Requested**

Due Date Requested:  
 TAT Requested (days):  
 PO #:  
 WO #:  
 Project #:  
 SSOW#:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Solid, Other)	Preservation Code	Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		6020 - 1 Metals(L)		6010B, 6020 LL, 7470A		2540C, Calcd, 300.0, 28D		904.0, Ra226Ra228, GFPC		903.0 - Standard Target List		Special Instructions/Note:
						D	N	D	N	D	N	D	N	D	N	D	N	D	N	
TW-19-04A	2019	10.8	G	Water						X	X	X	X	X	X	X	X	X	X	
TW-19-04B		1435		Water						X	X	X	X	X	X	X	X	X	X	
TW-19-05		1520		Water						X	X	X	X	X	X	X	X	X	X	
TW-19-06A		1620		Water						X	X	X	X	X	X	X	X	X	X	
TW-19-06B		1700		Water						X	X	X	X	X	X	X	X	X	X	
MW-14D				Water																
PZ-23S				Water																
PZ-23D				Water																
PZ-24				Water																
PZ-24D				Water																
PZ-40S				Water																



**Possible Hazard Identification**  
 Non-Hazard  Flammable  Skin Irritant  
 Deliverable Requested: I, II, III, IV, Other (specify)

**Empty Kit Relinquished by:** \_\_\_\_\_ Date: \_\_\_\_\_

**Relinquished by:** B. Yelen Date/Time: 10.9.19 0630 TRC Company  
 Relinquished by: B. Yelen Date/Time: 10-9-19 3:01 Company  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

**Special Instructions/QC Requirements:**

**Method of Shipment:** \_\_\_\_\_ Date/Time: 10.9.19 0630 TRC Company  
 Received by: CEC STOR Date/Time: 10-9-19 9:30 Company EPA  
 Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company

**Custody Seals Intact:**  Yes  No **Custody Seal No.:** \_\_\_\_\_  
 Cooler Temperature(s) °C and Other Remarks:



**Eurofins TestAmerica, Canton**  
 4101 Shuffel Street NW  
 North Canton, OH 44720  
 Phone: 330-497-9396 Fax: 330-497-0772

**Chain of Custody Record**

**Grand Rapids**  
 271



Client Information		Lab PM:		Carrier Tracking No(s):		COC No:		
Client Contact: Brian Yelen Company: TRC Environmental Corporation. Address: 1540 Eisenhower Place City: Ann Arbor State, Zip: MI, 48108-7080 Phone: 734-971-7080(Tel) 734-971-9022(Fax) Email: byelen@trccompanies.com Project Name: JHC - CCR N&E Monitoring/Temporary Site:		Brooks, Kris M E-Mail: kris.brooks@testamericainc.com		271		440-171552-31503.2		
Due Date Requested:		Analysis Requested		Preservation Codes:		Other:		
TAT Requested (days): PO #: WO #: Project #: SSOW#:		903.0 - Standard Target List 904.0, Ra226Ra228, GFPC 2540C_Calcid, 300.0_28D 6010B, 6020_LL, 7470A 6020 - 1 Metals(L) Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No)		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Nitric Acid R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA Y - other (specify)		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDTA		Special Instructions/Note: Total Number of containers:
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Solid, On-site, RT-Tissue, A/W)	Preservation Code	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	
DUP-6				Water				
TW-19-04A MS	16.8	1340 G		Water		NY	XX	
TW-19-04A MSD	10.8	1340 G		Water		NY	XX	
FB-6				Water				
EB-6				Water				

**Possible Hazard Identification**  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Radiological  
 Deliverable Requested: I, II, III, IV, Other (specify)

**Empty Kit Relinquished by:** \_\_\_\_\_ Date: \_\_\_\_\_  
**Relinquished by:** \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
**Relinquished by:** *FEL EX* Date/Time: *10-9-15 4:15* Company: *TAC*  
**Relinquished by:** \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

**Special Instructions/QC Requirements:**

**Method of Shipment:** \_\_\_\_\_  
 Recalibrated by: \_\_\_\_\_ Date/Time: *10-9-15 3:00* Company: *TAC*  
 Received by: \_\_\_\_\_ Date/Time: *10-10-19* Company: *EVA*  
 Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Cooler Temperature(s) °C and Other Remarks:



**Eurofins TestAmerica Canton Sample Receipt Form/Narrative**  
**Canton Facility**

Login # : 120308

Client TRC Site Name \_\_\_\_\_ Cooler unpacked by: Ryan Cribley  
 Cooler Received on 10-10-19 Opened on 10-10-19 930

FedEx: 1<sup>st</sup> Grd  Exp  UPS  FAS  Clipper  Client Drop Off  TestAmerica Courier  Other \_\_\_\_\_  
 Receipt After-hours: Drop-off Date/Time \_\_\_\_\_ Storage Location \_\_\_\_\_

TestAmerica Cooler # TA Foam Box  Client Cooler  Box  Other \_\_\_\_\_  
 Packing material used: Bubble Wrap  Foam  Plastic Bag  None  Other \_\_\_\_\_  
 COOLANT:  Wet Ice  Blue Ice  Dry Ice  Water  None

1. Cooler temperature upon receipt  See Multiple Cooler Form  
 IR GUN# IR-10 (CF +0.7 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C  
 IR GUN #IR-11 (CF +0.9 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 6  Yes  No  
 -Were the seals on the outside of the cooler(s) signed & dated? YEL  Yes  No  NA  
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  Yes  No  NA  
 -Were tamper/custody seals intact and uncompromised?  Yes  No  NA
3. Shippers' packing slip attached to the cooler(s)?  Yes  No
4. Did custody papers accompany the sample(s)?  Yes  No
5. Were the custody papers relinquished & signed in the appropriate place?  Yes  No
6. Was/were the person(s) who collected the samples clearly identified on the COC?  Yes  No
7. Did all bottles arrive in good condition (Unbroken)?  Yes  No
8. Could all bottle labels be reconciled with the COC?  Yes  No
9. Were correct bottle(s) used for the test(s) indicated?  Yes  No
10. Sufficient quantity received to perform indicated analyses?  Yes  No
11. Are these work share samples?  Yes  No
12. Were all preserved sample(s) at the correct pH upon receipt?  Yes  No  NA pH Strip Lot# HC991818
13. Were VOAs on the COC?  Yes  No
14. Were air bubbles >6 mm in any VOA vials?  Yes  No  NA  Larger than this.
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # \_\_\_\_\_  Yes  No
16. Was a LL Hg or Me Hg trip blank present?  Yes  No

Tests that are not checked for pH by Receiving:  
  
VOAs  
Oil and Grease  
TOC

Contacted PM \_\_\_\_\_ Date \_\_\_\_\_ by \_\_\_\_\_ via Verbal Voice Mail Other \_\_\_\_\_  
 Concerning \_\_\_\_\_

**17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES** Samples processed by: RL  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**18. SAMPLE CONDITION**  
 Sample(s) \_\_\_\_\_ were received after the recommended holding time had expired.  
 Sample(s) \_\_\_\_\_ were received in a broken container.  
 Sample(s) \_\_\_\_\_ were received with bubble >6 mm in diameter. (Notify PM)

**19. SAMPLE PRESERVATION**  
 Sample(s) \_\_\_\_\_ were further preserved in the laboratory.  
 Time preserved: \_\_\_\_\_ Preservative(s) added/Lot number(s): \_\_\_\_\_  
 VOA Sample Preservation - Date/Time VOAs Frozen: \_\_\_\_\_

WI-NC-099



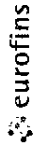


Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container pH</u>	<u>Preservative Added (mls)</u>	<u>Lot #</u>
TW-19-04A	240-120308-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-C-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-G-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-H-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-I-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-J-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-K-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-04B	240-120308-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04B	240-120308-C-2	Plastic 500ml - with Nitric Acid	<2	_____	_____
TW-19-04B	240-120308-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-04B	240-120308-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-05	240-120308-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-05	240-120308-C-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
TW-19-05	240-120308-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-05	240-120308-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-06A	240-120308-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-06A	240-120308-C-4	Plastic 500ml - with Nitric Acid	<2	_____	_____
TW-19-06A	240-120308-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-06A	240-120308-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-06B	240-120308-A-5	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-06B	240-120308-C-5	Plastic 500ml - with Nitric Acid	<2	_____	_____
TW-19-06B	240-120308-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-06B	240-120308-E-5	Plastic 1 liter - Nitric Acid	<2	_____	_____



# Chain of Custody Record



<b>Client Information (Sub Contract Lab)</b> Company: TestAmerica Laboratories, Inc Address: 17461 Derian Ave., Suite 100, Irvine, CA, 92614-5817 Phone: 949-261-1022(Tel) 949-260-3297(Fax) Email: [blank] Project Name: JHC - CCR Groundwater Monitoring 2019 Site: [blank]		Sampler: Brooks, Kris M Lab PM: Brooks, Kris M E-Mail: kris.brooks@testamericainc.com Phone: [blank]		Carrier Tracking No(s): 240-111364.1 State of Origin: Michigan Page 1 of 1 Job #: 240-120308-1	
Due Date Requested: 10/22/2019 TAT Requested (days): [blank]		Analysis Requested:			
PO # [blank] WO # [blank]		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - NaHSO4 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA Y - EDA Z - other (specify)			
Sample Identification - Client ID (Lab ID)		Special Instructions/Note:			
TW-19-04A (240-120308-1)	Sample Date: 10/8/19 Sample Time: 13:40 Eastern	Sample Type (C=comp, G=grab): MS Matrix (Water, Solid, Overstock, BT, Tissue, Air, etc): Water	Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/>	Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/>	Total Number of Containers: 3 Client sensitive w/dilutions contact PM if dilutions are needed.
TW-19-04A (240-120308-1MS)	Sample Date: 10/8/19 Sample Time: 13:40 Eastern	Sample Type (C=comp, G=grab): MS Matrix (Water, Solid, Overstock, BT, Tissue, Air, etc): Water	Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/>	Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/>	Total Number of Containers: 1 Client sensitive w/dilutions contact PM if dilutions are needed.
TW-19-04A (240-120308-1MSD)	Sample Date: 10/8/19 Sample Time: 13:40 Eastern	Sample Type (C=comp, G=grab): MSD Matrix (Water, Solid, Overstock, BT, Tissue, Air, etc): Water	Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/>	Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/>	Total Number of Containers: 1 Client sensitive w/dilutions contact PM if dilutions are needed.
TW-19-04B (240-120308-2)	Sample Date: 10/8/19 Sample Time: 14:35 Eastern	Sample Type (C=comp, G=grab): [blank] Matrix (Water, Solid, Overstock, BT, Tissue, Air, etc): Water	Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/>	Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/>	Total Number of Containers: 1 Client sensitive w/dilutions contact PM if dilutions are needed.
TW-19-05 (240-120308-3)	Sample Date: 10/8/19 Sample Time: 15:20 Eastern	Sample Type (C=comp, G=grab): [blank] Matrix (Water, Solid, Overstock, BT, Tissue, Air, etc): Water	Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/>	Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/>	Total Number of Containers: 1 Client sensitive w/dilutions contact PM if dilutions are needed.
TW-19-06A (240-120308-4)	Sample Date: 10/8/19 Sample Time: 16:20 Eastern	Sample Type (C=comp, G=grab): [blank] Matrix (Water, Solid, Overstock, BT, Tissue, Air, etc): Water	Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/>	Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/>	Total Number of Containers: 1 Client sensitive w/dilutions contact PM if dilutions are needed.
TW-19-06B (240-120308-5)	Sample Date: 10/8/19 Sample Time: 17:00 Eastern	Sample Type (C=comp, G=grab): [blank] Matrix (Water, Solid, Overstock, BT, Tissue, Air, etc): Water	Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/>	Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/>	Total Number of Containers: 1 Client sensitive w/dilutions contact PM if dilutions are needed.
Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.					
<b>Possible Hazard Identification</b> Unconfirmed: <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Deliverable Requested I, II, III, IV, Other (specify): Primary Deliverable Rank 2					
Empty Kit Relinquished by: [blank] Date: [blank] Time: [blank] Method of Shipment: [blank]					
Relinquished by: [Signature] Date: 10/11/19, 16:15 Company: STA Company					
Relinquished by: [Signature] Date: [blank] Company: [blank]					
Relinquished by: [Signature] Date: [blank] Company: [blank]					
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.: [blank] Cooler Temperature: 10/12/14 1630 Company: STA [Signature] and Other Remarks: 10/8/19 4:05 PM					



# Chain of Custody Record



<b>Client Information (Sub Contract Lab)</b>		Lab PM Brooks, Kris M		Garner Tracking No(s) 240-112223.1					
Client Contact Shipping/Receiving		E-Mail kris.brooks@testamericainc.com		Page Page 1 of 1					
Company TestAmerica Laboratories, Inc		Accreditations Required (See note)		Job # 240-120308-1					
Address 17461 Derian Ave, Suite 100, Irvine		Due Date Requested: 10/22/2019		Preservation Codes: M - Hexane N - None O - AgNO3 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - PH 4-5 Z - other (specify)					
City Irvine		TAT Requested (days):		Analysis Requested:					
State, Zip CA, 92614-5817		PO #:		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:					
Phone 949-261-1022(Tel) 949-260-3297(Fax)		WO #:		Total Number of Containers					
Email		Project # 44022279		Special Instructions/Note:					
Site JHC - CCR N&E Monitoring/Temporary		SSOW#		Client sensitive w/dilutions contact PM if dilutions are needed Client sensitive w/dilutions contact PM if dilutions are needed					
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Water, Sealed, On-site)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A/7470A_Prep Total Mercury	6920_LL3005A_T1 Total Metals (Sb,As,Ba,Be,Cd,Cr,Cu,Pb)	6010B/3005A Total Boron, Calcium
TW-19-06A (240-120308-4)	10/8/19	16:20 Eastern	Water	Water	X	X	X	X	X
TW-19-06B (240-120308-5)	10/8/19	17:00 Eastern	Water	Water	X	X	X	X	X

Note: Since laboratory accreditations are subject to change TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

**Possible Hazard Identification**  
 Unconfirmed  
 Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

Empty Kit Relinquished by: \_\_\_\_\_ Date: \_\_\_\_\_ Method of Shipment: \_\_\_\_\_

Relinquished by: \_\_\_\_\_ Date/Time: 10-22-19 1700 Company: ZLO  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_ Date/Time: 10/23/19 1030 Company: JAH  
 Custody Seals Intact: \_\_\_\_\_ No \_\_\_\_\_  
 Custody Seal: \_\_\_\_\_ Cooler Temperature: \_\_\_\_\_ Client Other Remarks: \_\_\_\_\_

**Ship Date: 22Oct19**  
**Track Num: 110361252029**

Ver. 01/16/2019



## Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-120308-1

**Login Number: 120308**

**List Number: 3**

**Creator: Escalante, Maria I**

**List Source: Eurofins TestAmerica, Irvine**

**List Creation: 10/12/19 12:52 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

## ANALYTICAL REPORT

Eurofins TestAmerica, Canton  
4101 Shuffel Street NW  
North Canton, OH 44720  
Tel: (330)497-9396

Laboratory Job ID: 240-120308-2

Client Project/Site: JHC - CCR N&E Monitoring/Temporary

**For:**

TRC Environmental Corporation.  
1540 Eisenhower Place  
Ann Arbor, Michigan 48108-7080

Attn: Darby Litz



*Authorized for release by:  
11/4/2019 8:00:04 PM*

Kris Brooks, Project Manager II  
(330)966-9790  
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### LINKS

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*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Definitions/Glossary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

## Qualifiers

### Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

**Job ID: 240-120308-2**

**Laboratory: Eurofins TestAmerica, Canton**

**Narrative**

## CASE NARRATIVE

**Client: TRC Environmental Corporation.**

**Project: JHC - CCR N&E Monitoring/Temporary**

**Report Number: 240-120308-2**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

All analysis were performed at Eurofins TestAmerica St. Louis Laboratory.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 10/10/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 6 coolers at receipt time were 1.4° C, 3.1° C, 3.2° C, 3.7° C, 4.2° C and 5.8° C.

### **RADIUM-228**

Samples TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4) and TW-19-06B (240-120308-5) were analyzed for Radium-228 in accordance with EPA Method 904.0. The samples were prepared on 10/16/2019 and analyzed on 10/24/2019.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4), TW-19-06B (240-120308-5), (LCS 160-446491/1-A), (LCSD 160-446491/2-A) and (MB 160-446491/22-A)



# Case Narrative

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

## Job ID: 240-120308-2 (Continued)

### Laboratory: Eurofins TestAmerica, Canton (Continued)

Insufficient sample volume was available to perform a sample duplicate for the following samples: TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4) and TW-19-06B (240-120308-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### RADIUM-226

Samples TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4) and TW-19-06B (240-120308-5) were analyzed for Radium-226 in accordance with EPA Method 903.0. The samples were prepared on 10/16/2019 and analyzed on 10/31/2019.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4), TW-19-06B (240-120308-5), (LCS 160-446490/1-A), (LCSD 160-446490/2-A) and (MB 160-446490/22-A)

Ra-226 is reported without a 21-day waiting period to ensure short-lived alpha-emitting radium isotopes (e.g. Ra-224) have decayed out. The Ra-226 result should be considered to be potentially high biased. Associated samples have activity below the RL. The results are reported with this narrative. TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4), TW-19-06B (240-120308-5), (LCS 160-446490/1-A), (LCSD 160-446490/2-A) and (MB 160-446490/22-A)

Insufficient sample volume was available to perform a sample duplicate for the following samples: TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4) and TW-19-06B (240-120308-5). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### COMBINED RADIUM 226 AND RADIUM 228

Samples TW-19-04A (240-120308-1), TW-19-04B (240-120308-2), TW-19-05 (240-120308-3), TW-19-06A (240-120308-4) and TW-19-06B (240-120308-5) were analyzed for Combined Radium 226 and Radium 228 in accordance with Ra226\_Ra228. The samples were analyzed on 11/04/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Method Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep STD	Preparation, Precipitate Separation (Standard In-Growth)	None	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL

#### Protocol References:

EPA = US Environmental Protection Agency

None = None

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

#### Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Sample Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-120308-1	TW-19-04A	Water	10/08/19 13:40	10/10/19 09:30	
240-120308-2	TW-19-04B	Water	10/08/19 14:35	10/10/19 09:30	
240-120308-3	TW-19-05	Water	10/08/19 15:20	10/10/19 09:30	
240-120308-4	TW-19-06A	Water	10/08/19 16:20	10/10/19 09:30	
240-120308-5	TW-19-06B	Water	10/08/19 17:00	10/10/19 09:30	

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# Detection Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

**Client Sample ID: TW-19-04A**

**Lab Sample ID: 240-120308-1**

No Detections.

**Client Sample ID: TW-19-04B**

**Lab Sample ID: 240-120308-2**

No Detections.

**Client Sample ID: TW-19-05**

**Lab Sample ID: 240-120308-3**

No Detections.

**Client Sample ID: TW-19-06A**

**Lab Sample ID: 240-120308-4**

No Detections.

**Client Sample ID: TW-19-06B**

**Lab Sample ID: 240-120308-5**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Canton



# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

**Client Sample ID: TW-19-04A**

**Lab Sample ID: 240-120308-1**

Date Collected: 10/08/19 13:40

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.252		0.108	0.111	1.00	0.118	pCi/L	10/16/19 17:41	10/31/19 18:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.9		40 - 110					10/16/19 17:41	10/31/19 18:41	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.250	U	0.287	0.288	1.00	0.472	pCi/L	10/16/19 18:25	10/24/19 09:09	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.9		40 - 110					10/16/19 18:25	10/24/19 09:09	1
Y Carrier	83.4		40 - 110					10/16/19 18:25	10/24/19 09:09	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.501		0.307	0.309	5.00	0.472	pCi/L		11/04/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

**Client Sample ID: TW-19-04B**

**Lab Sample ID: 240-120308-2**

Date Collected: 10/08/19 14:35

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-226</b>	<b>0.308</b>		0.108	0.111	1.00	0.0911	pCi/L	10/16/19 17:41	10/31/19 18:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.4		40 - 110					10/16/19 17:41	10/31/19 18:41	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium-228</b>	<b>0.838</b>		0.325	0.334	1.00	0.457	pCi/L	10/16/19 18:25	10/24/19 09:09	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.4		40 - 110					10/16/19 18:25	10/24/19 09:09	1
Y Carrier	81.9		40 - 110					10/16/19 18:25	10/24/19 09:09	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Combined Radium 226 + 228</b>	<b>1.15</b>		0.342	0.352	5.00	0.457	pCi/L		11/04/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

**Client Sample ID: TW-19-05**

**Lab Sample ID: 240-120308-3**

Date Collected: 10/08/19 15:20

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.142	U	0.108	0.109	1.00	0.161	pCi/L	10/16/19 17:41	10/31/19 18:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	79.7		40 - 110					10/16/19 17:41	10/31/19 18:41	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.00529	U	0.306	0.306	1.00	0.543	pCi/L	10/16/19 18:25	10/24/19 09:09	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	79.7		40 - 110					10/16/19 18:25	10/24/19 09:09	1
Y Carrier	80.4		40 - 110					10/16/19 18:25	10/24/19 09:09	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.147	U	0.324	0.325	5.00	0.543	pCi/L		11/04/19 08:01	1

# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

**Client Sample ID: TW-19-06A**

**Lab Sample ID: 240-120308-4**

Date Collected: 10/08/19 16:20

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.324		0.125	0.129	1.00	0.133	pCi/L	10/16/19 17:41	10/31/19 18:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	76.3		40 - 110					10/16/19 17:41	10/31/19 18:41	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.282	U	0.312	0.314	1.00	0.513	pCi/L	10/16/19 18:25	10/24/19 09:09	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	76.3		40 - 110					10/16/19 18:25	10/24/19 09:09	1
Y Carrier	83.0		40 - 110					10/16/19 18:25	10/24/19 09:09	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.606		0.336	0.339	5.00	0.513	pCi/L		11/04/19 08:01	1



# Client Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

**Client Sample ID: TW-19-06B**

**Lab Sample ID: 240-120308-5**

Date Collected: 10/08/19 17:00

Matrix: Water

Date Received: 10/10/19 09:30

**Method: 903.0 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.169		0.0931	0.0944	1.00	0.112	pCi/L	10/16/19 17:41	10/31/19 18:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	77.4		40 - 110					10/16/19 17:41	10/31/19 18:41	1

**Method: 904.0 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.00810	U	0.291	0.291	1.00	0.521	pCi/L	10/16/19 18:25	10/24/19 09:12	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	77.4		40 - 110					10/16/19 18:25	10/24/19 09:12	1
Y Carrier	80.4		40 - 110					10/16/19 18:25	10/24/19 09:12	1

**Method: Ra226\_Ra228 - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.161	U	0.306	0.306	5.00	0.521	pCi/L		11/04/19 08:01	1

# Tracer/Carrier Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

## Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

			Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)		
240-120308-1	TW-19-04A	81.9		
240-120308-2	TW-19-04B	86.4		
240-120308-3	TW-19-05	79.7		
240-120308-4	TW-19-06A	76.3		
240-120308-5	TW-19-06B	77.4		
LCS 160-446490/1-A	Lab Control Sample	81.4		
LCSD 160-446490/2-A	Lab Control Sample Dup	83.6		
MB 160-446490/22-A	Method Blank	82.5		
<b>Tracer/Carrier Legend</b>				
Ba Carrier = Ba Carrier				

## Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

			Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)	
240-120308-1	TW-19-04A	81.9	83.4	
240-120308-2	TW-19-04B	86.4	81.9	
240-120308-3	TW-19-05	79.7	80.4	
240-120308-4	TW-19-06A	76.3	83.0	
240-120308-5	TW-19-06B	77.4	80.4	
LCS 160-446491/1-A	Lab Control Sample	81.4	82.6	
LCSD 160-446491/2-A	Lab Control Sample Dup	83.6	81.1	
MB 160-446491/22-A	Method Blank	82.5	84.1	
<b>Tracer/Carrier Legend</b>				
Ba Carrier = Ba Carrier				
Y Carrier = Y Carrier				

# QC Sample Results

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

## Method: 903.0 - Radium-226 (GFPC)

**Lab Sample ID: MB 160-446490/22-A**  
**Matrix: Water**  
**Analysis Batch: 448470**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 446490**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.2261		0.0998	0.102	1.00	0.106	pCi/L	10/16/19 17:41	10/31/19 20:42	1
Carrier	MB	MB	Limits				Prepared		Analyzed	
Ba Carrier	%Yield	Qualifier	40 - 110				10/16/19 17:41		10/31/19 20:42	
	82.5									

**Lab Sample ID: LCS 160-446490/1-A**  
**Matrix: Water**  
**Analysis Batch: 448470**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 446490**

Analyte			Spike	LCS	LCS	Total	RL	MDC	Unit	%Rec	%Rec.	Limits
	Added	Result	Qual	Uncert. (2σ+/-)								
Radium-226			11.4	10.08		1.08	1.00	0.110	pCi/L	89	75 - 125	
Carrier	LCS	LCS	Limits									
Ba Carrier	%Yield	Qualifier	40 - 110									
	81.4											

**Lab Sample ID: LCSD 160-446490/2-A**  
**Matrix: Water**  
**Analysis Batch: 448470**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 446490**

Analyte			Spike	LCSD	LCSD	Total	RL	MDC	Unit	%Rec	%Rec.	Limits	RER	Limit
	Added	Result	Qual	Uncert. (2σ+/-)										
Radium-226			11.4	11.10		1.17	1.00	0.126	pCi/L	98	75 - 125	0.45	1	
Carrier	LCSD	LCSD	Limits											
Ba Carrier	%Yield	Qualifier	40 - 110											
	83.6													

## Method: 904.0 - Radium-228 (GFPC)

**Lab Sample ID: MB 160-446491/22-A**  
**Matrix: Water**  
**Analysis Batch: 447519**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 446491**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.07215	U	0.254	0.254	1.00	0.444	pCi/L	10/16/19 18:25	10/24/19 09:14	1
Carrier	MB	MB	Limits				Prepared		Analyzed	
Ba Carrier	%Yield	Qualifier	40 - 110				10/16/19 18:25		10/24/19 09:14	
	82.5									
Y Carrier	84.1		40 - 110				10/16/19 18:25		10/24/19 09:14	

# QC Sample Results

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

## Method: 904.0 - Radium-228 (GFPC) (Continued)

**Lab Sample ID: LCS 160-446491/1-A**  
**Matrix: Water**  
**Analysis Batch: 447584**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 446491**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	9.46	10.77		1.27	1.00	0.459	pCi/L	114	75 - 125

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	81.4		40 - 110
Y Carrier	82.6		40 - 110

**Lab Sample ID: LCSD 160-446491/2-A**  
**Matrix: Water**  
**Analysis Batch: 447584**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 446491**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	9.46	10.62		1.25	1.00	0.476	pCi/L	112	75 - 125	0.06	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	83.6		40 - 110
Y Carrier	81.1		40 - 110

# QC Association Summary

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

## Rad

### Prep Batch: 446490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total/NA	Water	PrecSep STD	
240-120308-2	TW-19-04B	Total/NA	Water	PrecSep STD	
240-120308-3	TW-19-05	Total/NA	Water	PrecSep STD	
240-120308-4	TW-19-06A	Total/NA	Water	PrecSep STD	
240-120308-5	TW-19-06B	Total/NA	Water	PrecSep STD	
MB 160-446490/22-A	Method Blank	Total/NA	Water	PrecSep STD	
LCS 160-446490/1-A	Lab Control Sample	Total/NA	Water	PrecSep STD	
LCSD 160-446490/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep STD	

### Prep Batch: 446491

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-120308-1	TW-19-04A	Total/NA	Water	PrecSep_0	
240-120308-2	TW-19-04B	Total/NA	Water	PrecSep_0	
240-120308-3	TW-19-05	Total/NA	Water	PrecSep_0	
240-120308-4	TW-19-06A	Total/NA	Water	PrecSep_0	
240-120308-5	TW-19-06B	Total/NA	Water	PrecSep_0	
MB 160-446491/22-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-446491/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-446491/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

# Lab Chronicle

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

## Client Sample ID: TW-19-04A

Lab Sample ID: 240-120308-1

Date Collected: 10/08/19 13:40

Matrix: Water

Date Received: 10/10/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:41	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447584	10/24/19 09:09	JCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

## Client Sample ID: TW-19-04B

Lab Sample ID: 240-120308-2

Date Collected: 10/08/19 14:35

Matrix: Water

Date Received: 10/10/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:41	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447584	10/24/19 09:09	JCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

## Client Sample ID: TW-19-05

Lab Sample ID: 240-120308-3

Date Collected: 10/08/19 15:20

Matrix: Water

Date Received: 10/10/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:41	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447584	10/24/19 09:09	JCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

## Client Sample ID: TW-19-06A

Lab Sample ID: 240-120308-4

Date Collected: 10/08/19 16:20

Matrix: Water

Date Received: 10/10/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:41	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447584	10/24/19 09:09	JCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

# Lab Chronicle

Client: TRC Environmental Corporation.  
Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

**Client Sample ID: TW-19-06B**

**Lab Sample ID: 240-120308-5**

**Date Collected: 10/08/19 17:00**

**Matrix: Water**

**Date Received: 10/10/19 09:30**

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Prep	PrecSep STD			446490	10/16/19 17:41	ORM	TAL SL
Total/NA	Analysis	903.0		1	448470	10/31/19 18:41	KLS	TAL SL
Total/NA	Prep	PrecSep_0			446491	10/16/19 18:25	ORM	TAL SL
Total/NA	Analysis	904.0		1	447519	10/24/19 09:12	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	448667	11/04/19 08:01	SMP	TAL SL

**Laboratory References:**

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

## Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

## Laboratory: Eurofins TestAmerica, Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska	State	CA01531	06-30-20
Arizona	State	AZ0671	10-14-20
California	LA Cty Sanitation Districts	10256	06-30-20
California	Los Angeles County Sanitation Districts	10256	06-30-20
California	State	2706	06-30-20
Guam	State	19-005R	01-23-20
Hawaii	State	CA01531	01-29-20
Hawaii	State Program	N/A	01-29-20
Kansas	NELAP	E-10420	07-31-20
Nevada	State	CA015312020-4	07-31-20
New Mexico	State	CA01531	01-29-20
New Mexico	State Program	N/A	01-29-20
Oregon	NELAP	4028 - 006	01-29-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00214	07-09-21
Washington	State	C900	09-03-20
Washington	State Program	C900	09-03-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.



# Accreditation/Certification Summary

Client: TRC Environmental Corporation.  
 Project/Site: JHC - CCR N&E Monitoring/Temporary

Job ID: 240-120308-2

## Laboratory: Eurofins TestAmerica, St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-19
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-19
Iowa	State	373	09-17-20
Iowa	State Program	373	12-01-20
Kansas	NELAP	E-10236	10-31-19 *
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-19
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-19
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00028	02-02-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
Washington	State Program	C592	08-30-20
West Virginia DEP	State Program	381	10-31-19 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.



**Eurofins TestAmerica, Canton**  
 4101 Shuffel Street NW  
 North Canton, OH 44720  
 Phone: 330-497-9396 Fax: 330-497-0772

# Chain of Custody Record

## Grand Rapids



Environmental Testing  
 TestAmerica

<b>Client Information</b>		Lab PM: Brooks, Kris M		Carrier Tracking No(s):		COC No: 440-171552-31503.2	
Address: 1540 Eisenhower Place		E-Mail: kris.brooks@testamericainc.com		Page: Page 2 of 2		Job #:	
City: Ann Arbor		Project #: 44022279		Due Date Requested:		Preservation Codes:	
State, Zip: MI, 48108-7080		SSOW#:		TAT Requested (days):		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Nitric Acid R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate	
Phone: 734-971-7080(Tel) 734-971-9022(Fax)		Project Name: JHC - CCR N&E Monitoring/Temporary		PO #: 135141		U - Acetone V - MCAA W - pH 4-5 X - other (specify)	
Email: byelen@trccompanies.com		Site:		WO #:		Other:	
Sample Identification		Sample Date		Sample Time		Sample Matrix	
DUP-6		2019		16.8 1340 G		Water	
TW-19-04A MS				10.8 1340 G		Water	
FB-6						Water	
EB-6						Water	
Possible Hazard Identification		Sample Type (C=Comp, G=grab)		Preservation Code		Field Filtered Sample (Yes or No)	
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Radiological		G		D		X	
Deliverable Requested: I, II, III, IV, Other (specify)		Unknown <input type="checkbox"/> Poison B <input type="checkbox"/>		D		X	
Empty Kit Relinquished by:		Date:		Time:		Special Instructions/OC Requirements:	
Relinquished by: <i>FEJ EX</i>		Date/Time: 10-9-15 4:15		Date/Time: 10-9-15 3:00		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Relinquished by: <i>FEJ EX</i>		Date/Time: 10-9-15 4:15		Date/Time: 10-10-19		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Method of Shipment:		Total Number of Containers: 7	
Cooler Temperature(s) °C and Other Remarks:		Company: TAC		Company: TAC		Special Instructions/Note:	



**Eurofins TestAmerica Canton Sample Receipt Form/Narrative**  
**Canton Facility**

Login # : 120308

Client TRC Site Name \_\_\_\_\_ Cooler unpacked by: Ryan Cribley  
 Cooler Received on 10-10-19 Opened on 10-10-19 930  
 FedEx: 1<sup>st</sup> Grd  Exp  UPS  FAS  Clipper  Client Drop Off  TestAmerica Courier  Other \_\_\_\_\_

Receipt After-hours: Drop-off Date/Time \_\_\_\_\_ Storage Location \_\_\_\_\_

TestAmerica Cooler # TA Foam Box  Client Cooler  Box  Other \_\_\_\_\_  
 Packing material used: Bubble Wrap  Foam  Plastic Bag  None  Other \_\_\_\_\_  
 COOLANT:  Wet Ice  Blue Ice  Dry Ice  Water  None

1. Cooler temperature upon receipt  See Multiple Cooler Form  
 IR GUN# IR-10 (CF +0.7 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C  
 IR GUN #IR-11 (CF +0.9 °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 6  Yes  No  
 -Were the seals on the outside of the cooler(s) signed & dated? YEL  Yes  No  NA  
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?  Yes  No  NA  
 -Were tamper/custody seals intact and uncompromised?  Yes  No  NA
3. Shippers' packing slip attached to the cooler(s)?  Yes  No
4. Did custody papers accompany the sample(s)?  Yes  No
5. Were the custody papers relinquished & signed in the appropriate place?  Yes  No
6. Was/were the person(s) who collected the samples clearly identified on the COC?  Yes  No
7. Did all bottles arrive in good condition (Unbroken)?  Yes  No
8. Could all bottle labels be reconciled with the COC?  Yes  No
9. Were correct bottle(s) used for the test(s) indicated?  Yes  No
10. Sufficient quantity received to perform indicated analyses?  Yes  No
11. Are these work share samples?  Yes  No
12. Were all preserved sample(s) at the correct pH upon receipt?  Yes  No  NA pH Strip Lot# HC991818
13. Were VOAs on the COC?  Yes  No
14. Were air bubbles >6 mm in any VOA vials?  Yes  No  NA  Larger than this.
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # \_\_\_\_\_  Yes  No
16. Was a LL Hg or Me Hg trip blank present?  Yes  No

Tests that are not checked for pH by Receiving:  
 VOAs  
 Oil and Grease  
 TOC

Contacted PM \_\_\_\_\_ Date \_\_\_\_\_ by \_\_\_\_\_ via Verbal Voice Mail Other \_\_\_\_\_  
 Concerning \_\_\_\_\_

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES  
 Samples processed by: RL

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18. SAMPLE CONDITION  
 Sample(s) \_\_\_\_\_ were received after the recommended holding time had expired.  
 Sample(s) \_\_\_\_\_ were received in a broken container.  
 Sample(s) \_\_\_\_\_ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION  
 Sample(s) \_\_\_\_\_ were further preserved in the laboratory.  
 Time preserved: \_\_\_\_\_ Preservative(s) added/Lot number(s): \_\_\_\_\_  
 VOA Sample Preservation - Date/Time VOAs Frozen: \_\_\_\_\_

WI-NC-099



Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container pH</u>	<u>Preservative Added (mls)</u>	<u>Lot #</u>
TW-19-04A	240-120308-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-C-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-G-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-H-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-I-1	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-J-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-04A	240-120308-K-1	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-04B	240-120308-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-04B	240-120308-C-2	Plastic 500ml - with Nitric Acid	<2	_____	_____
TW-19-04B	240-120308-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-04B	240-120308-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-05	240-120308-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-05	240-120308-C-3	Plastic 500ml - with Nitric Acid	<2	_____	_____
TW-19-05	240-120308-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-05	240-120308-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-06A	240-120308-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-06A	240-120308-C-4	Plastic 500ml - with Nitric Acid	<2	_____	_____
TW-19-06A	240-120308-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-06A	240-120308-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-06B	240-120308-A-5	Plastic 250ml - with Nitric Acid	<2	_____	_____
TW-19-06B	240-120308-C-5	Plastic 500ml - with Nitric Acid	<2	_____	_____
TW-19-06B	240-120308-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____
TW-19-06B	240-120308-E-5	Plastic 1 liter - Nitric Acid	<2	_____	_____





## Login Sample Receipt Checklist

Client: TRC Environmental Corporation.

Job Number: 240-120308-2

**Login Number: 120308**

**List Number: 2**

**Creator: Harris, Lorin C**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 10/12/19 02:48 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





# Appendix J

## October 2019 Field Notes

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PROJECT NAME:	CEC CCR: JHC 2SA19
PROJECT NUMBER:	322174.0000 P1 T2 322174,0002 P1 T5
PROJECT MANAGER:	S. Holmstrom
SITE LOCATION:	West Olive, MI
DATES OF FIELDWORK:	10/7/2019 TO 10/11/2019
PURPOSE OF FIELDWORK:	CCR GW Sampling N+E GW SAMPLING 115 GW SAMPLING
WORK PERFORMED BY:	Brian Yelen / Javier Jasso

SIGNED Bj 10.22.19  
DATE

Chester Valdes 10/22/19  
CHECKED BY DATE



**GENERAL NOTES**

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10-7-19	TIME ARRIVED: 0830
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso	TIME LEFT: 1700

**WEATHER**

TEMPERATURE: <u>60-70 °F</u>	WIND: <u>5-10 MPH</u>	VISIBILITY: <u>CLEAR</u>
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**WORK / SAMPLING PERFORMED**

SITE WIDE SWL
PICK UP WA METER GR OFFICE

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
----------------------	-------------------------

IN SITU RDO ISSUE	PICK UP WA METER - GR OFFICE

**COMMUNICATION**

NAME	REPRESENTING	SUBJECT / COMMENTS
K. STARKEN	CEC	CHECK IN/OUT

**INVESTIGATION DERIVED WASTE SUMMARY**

WASTE MATRIX	QUANTITY	COMMENTS
GW	NM	Purge to ground

SIGNED B Yelen DATE 10.22.19
 CHECKED BY John O'Haller DATE 10/22/19



**GENERAL NOTES**

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10/7/19	TIME ARRIVED: 0720 ✓
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso	TIME LEFT: 1 hour

WEATHER		
TEMPERATURE: <u>59</u> °F	WIND: <u>10</u> MPH	VISIBILITY: <u>cloudy</u>
WORK / SAMPLING PERFORMED		
<u>water levels</u>		
<u>Wells sampled, JHC MW-15028 Depth: 15027, 15026</u>		
<u>getting supplies</u>		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
<u>NONE</u>	

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
<u>Kenan S</u>	<u>Comsume</u>	<u>on site</u>

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
<u>GW</u>	<u>NM</u>	<u>Purge to ground</u>

 11/10/22 \_\_\_\_\_ BY B Y 10.22.19 \_\_\_\_\_  
 SIGNED DATE CHECKED BY DATE



### GENERAL NOTES

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10.8.19	TIME ARRIVED: 0645
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso	TIME LEFT: 1815

#### WEATHER

TEMPERATURE: 60-70 °F WIND: 5-10 MPH VISIBILITY: CLEAR

#### WORK / SAMPLING PERFORMED

SAMPLE TW-19-01 A/B, -02 A/B, -03 A/B, -04 A/B, -05  
TW-19-06 A/B

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
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#### COMMUNICATION

NAME	REPRESENTING	SUBJECT / COMMENTS
K. STARKEN	CEC	CHECK IN/OUT
EMIL / CHASE	CEC, TRAIL ST	SAMPLE COORD

#### INVESTIGATION DERIVED WASTE SUMMARY

WASTE MATRIX	QUANTITY	COMMENTS
GW	NM	Purge to ground

SIGNED B. Yelen DATE 10.22.19 CHECKED BY [Signature] DATE 10/22/19



**GENERAL NOTES**

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10/9/19	TIME ARRIVED: 0515
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso	TIME LEFT: 1645

**WEATHER**

TEMPERATURE: 41 °F      WIND: 10 MPH      VISIBILITY: clear

**WORK / SAMPLING PERFORMED**

Sampled wells, JHC MW-15025, MS+MSD, 15024, 15023, FB#1, EB#1, 15034, Dup #02, 15033, 15032, 15019, 15018, 15017, 15034, MS+MSD, 15037

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
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none	
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**COMMUNICATION**

NAME	REPRESENTING	SUBJECT / COMMENTS
Kenneth S	Comsumo	on site

**INVESTIGATION DERIVED WASTE SUMMARY**

WASTE MATRIX	QUANTITY	COMMENTS
GW	NM	Purge-to-ground

SIGNED [Signature] 1/10/20      DATE

CHECKED BY BY 10.22.19      DATE



**GENERAL NOTES**

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10.9.19	TIME ARRIVED: 0630
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso	TIME LEFT: 1800

WEATHER		
TEMPERATURE: 60-75 °F	WIND: 5-10 MPH	VISIBILITY: CLEAR
WORK / SAMPLING PERFORMED		
JOINT TRC/TS SAMPLE PZ-23s, PZ-24, PZ-40		
TRC - MW-14D, PZ-24D, PZ-23D		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
-	-

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
K. STARKEN	CEC	CHECK IN/OUT
CHASE	CEC-TS	JOINT SAMPLE

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
GW	NM	Purge to ground

SIGNED B/J DATE 10.22.19
 CHECKED BY [Signature] DATE 10/22/19



**GENERAL NOTES**

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: <u>10/9/19</u>	TIME ARRIVED: <u>0500</u>
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso	TIME LEFT: <u>1600</u>

WEATHER		
TEMPERATURE: <u>49</u> °F	WIND: <u>10</u> MPH	VISIBILITY: <u>Clear</u>
WORK / SAMPLING PERFORMED		
wells sampled JHC MW- 15035, 15031, 15032, 15005, 15004 MS+MSD, 15001, 15005, 15003, Dup #03, 15002, FB #03 FB #03 15010, MS+MSD, 15008R, Dup #05		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
JHC MW 15010 well keep going Dry Recharge clay over and over	

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
Kear's	Comsur	onsite

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
GW	NM	Purge to ground

SIGNED [Signature] / 1/10/20 DATE \_\_\_\_\_ CHECKED BY BY / 10.22.19 DATE \_\_\_\_\_





**GENERAL NOTES**

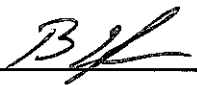
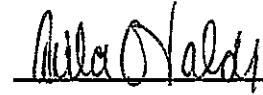
PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10.10.19	TIME ARRIVED: 0645
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B. Yelen / J Jasso	TIME LEFT: 1800

WEATHER		
TEMPERATURE: 50-75 °F	WIND: 5-10 MPH	VISIBILITY: CLEAR
WORK / SAMPLING PERFORMED		
SAMPLE MW-17, P2-17-16, MW-16A, P-11, P-10		
MW-14S, P2-24S, P2-40S		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
—	—

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
K STARKEN	CEC	CHECK IN/OUT
S. HOLMSTROM	TRC	PROGRESS CHECK

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
GW	NM	Purge to ground


 10.22.19
 
 10/22/19  
 SIGNED DATE CHECKED BY DATE



**GENERAL NOTES**

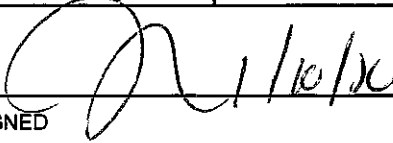
PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10/10/19	TIME ARRIVED: 0800
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso	TIME LEFT: 1730

WEATHER		
TEMPERATURE: 51 °F	WIND: 10 MPH	VISIBILITY: Cloud
WORK / SAMPLING PERFORMED		
Wells Sampled JHC MW 15006, 15011, 15016, Dup #04 15015, 18001, 15013, 18003, 18002 MS+MSD, CB #4, FB#04 18-14, Dup #01, 18-11, 18-10, MS+MSD,		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
TU-18009 pump cant lift water water cut 32.05	

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
Mace S	Comsum	on site

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
GW	NM	Purge to ground

 1/10/19  
 SIGNED \_\_\_\_\_ DATE \_\_\_\_\_ CHECKED BY BY 10.22.19 DATE \_\_\_\_\_



**GENERAL NOTES**

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: <u>10.11.19</u>	TIME ARRIVED: <u>0700</u>
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: <u>B Yelen</u> / J Jasso	TIME LEFT: <u>1000</u>

WEATHER		
TEMPERATURE: <u>60-70 °F</u>	WIND: <u>5-10 MPH</u>	VISIBILITY: <u>CLOUDY / RAIN</u>
WORK / SAMPLING PERFORMED		
<u>SAMPLE (w/ BAILER) TW-18-08 , TW-18-09</u>		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
<u>PERI NOT USABLE TW-18-08 + TW-18-09</u>	<u>BAILER SAMPLE</u>

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
<u>R. STARKEN</u>	<u>CEC</u>	<u>CHECK IN/OUT</u>

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
<u>GW</u>	<u>NM</u>	<u>Purge to ground</u>

B/Y 10.22.19  
 SIGNED DATE

Calvin A. Valentin 10/22/19  
 CHECKED BY DATE



**GENERAL NOTES**

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10/11/19	TIME ARRIVED: 0500
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso	TIME LEFT: 1010

WEATHER		
TEMPERATURE: 105 °F	WIND: 15 MPH	VISIBILITY: cloudy Rain
WORK / SAMPLING PERFORMED		
wells from NW Tue-18-07, 18-04, 18-05, 18-17, 18-08, 18-15, EB #1 F.B #1		

PROBLEMS ENCOUNTERED	CORRECTIVE ACTION TAKEN
Tue-18-08 Pump cnd 1.17 well water level at 32.15	BY - BALOR

COMMUNICATION		
NAME	REPRESENTING	SUBJECT / COMMENTS
K. STARKEN	CEC	CHECK IN/OUT

INVESTIGATION DERIVED WASTE SUMMARY		
WASTE MATRIX	QUANTITY	COMMENTS
GW	NM	Purge to ground

SIGNED [Signature] 11/10/20 DATE

CHECKED BY BY 10.22.19 DATE



### EQUIPMENT SUMMARY

PROJECT NAME:	CEC CCR: JHC 2SA19	SAMPLER NAME: <u>B Yelen / J Jasso</u>
PROJECT NO.:	322174.0000 P1 T2	

**WATER LEVEL MEASUREMENTS COLLECTED WITH:**

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

**PRODUCT LEVEL MEASUREMENTS COLLECTED WITH:**

NA	NA
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

**DEPTH TO BOTTOM OF WELL MEASUREMENTS COLLECTED WITH:**

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

**PURGING METHOD**

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

**SAMPLING METHOD**

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

GEOTECH DISPOSABLE FILTER	0.45 MICRON
NAME AND MODEL OF FILTERATION DEVICE	FILTER TYPE AND SIZE

DEDICATED TEFLON TUBING	<input checked="" type="checkbox"/> LOW-FLOW SAMPLING EVENT
TUBING TYPE	

**PURGE WATER DISPOSAL METHOD**

GROUND  
  DRUM  
  POTW  
  POLYTANK  
  OTHER \_\_\_\_\_

**DECONTAMINATION AND FIELD BLANK WATER SOURCE**

STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE
10.22.19	10/22/19
SIGNED _____ DATE	CHECKED BY _____ DATE



### EQUIPMENT SUMMARY

PROJECT NAME: CEC CCR: JHC 2SA19	SAMPLER NAME: B Yelen / J Jasso
PROJECT NO.: 322174.0000 P1 T2	

**WATER LEVEL MEASUREMENTS COLLECTED WITH:**

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

**PRODUCT LEVEL MEASUREMENTS COLLECTED WITH:**

NA	NA
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

**DEPTH TO BOTTOM OF WELL MEASUREMENTS COLLECTED WITH:**

HERON DIPPER-T	TRC A2
NAME AND MODEL OF INSTRUMENT	SERIAL NUMBER (IF APPLICABLE)

**PURGING METHOD**

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

**SAMPLING METHOD**

PERISTALTIC PUMP	TRC A2
NAME AND MODEL OF PUMP OR TYPE OF BAILER	SERIAL NUMBER (IF APPLICABLE)

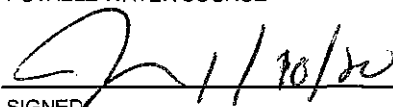
GEOTECH DISPOSABLE FILTER	0.45 MICRON
NAME AND MODEL OF FILTRATION DEVICE	FILTER TYPE AND SIZE

DEDICATED TEFLON TUBING	<input checked="" type="checkbox"/> LOW-FLOW SAMPLING EVENT
TUBING TYPE	

**PURGE WATER DISPOSAL METHOD**

GROUND  
  DRUM  
  POTW  
  POLYTANK  
  OTHER \_\_\_\_\_

**DECONTAMINATION AND FIELD BLANK WATER SOURCE**

STORE BOUGHT	LABORATORY PROVIDED
POTABLE WATER SOURCE	DI WATER SOURCE
 / 1/30/20	BY 10.22.19
SIGNED _____ DATE	CHECKED BY _____ DATE



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC CCR: JHC 2SA19	MODEL: IN-SITU smarTROLL	SAMPLER: <u>(BY) JJ</u>
PROJECT NO.: 322174.0000 P1 T2	SERIAL #: TRC A2	DATE: <u>10-7-19</u>

PH CALIBRATION CHECK

pH 7 (LOT #): 966002 (EXP. DATE): 7/21	pH <u>10</u> (LOT #): 96F665 (EXP. DATE): 6/21	CAL RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
7.02 / 7.02	4.00 / 4.00	<input checked="" type="checkbox"/> WITHIN RANGE	1529
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL READING (LOT #): 96F964 (EXP. DATE): 6/20	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / STANDARD			
1413 / 1413	18.3	<input checked="" type="checkbox"/> WITHIN RANGE	1529
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL READING (LOT #): (EXP. DATE):	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / STANDARD			
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL READING (LOT #): (EXP. DATE):	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / SATURATED AIR			
CANNOT CAL		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL RANGE	TIME
(LOT #): (EXP. DATE):	(LOT #): (EXP. DATE):		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION(S)
(LOT #): (EXP. DATE):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES: <sup>(1)</sup>
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL STANDARD
<input type="checkbox"/> _____	<sup>(1)</sup> CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
<input type="checkbox"/> _____	

NOTES

GET GR METER

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

DOES NOT CAL D.O.

RET WD METER FROM GR OFF.

SIGNED BK 10.22.19 DATE

CHECKED BY [Signature] 10/22/19 DATE



### WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC CCR: JHC 2SA19	MODEL: YSI ProDSS	SAMPLER: BY <u>JJ</u>
PROJECT NO.: 322174.0000 P1 T2	SERIAL #: TRC A2	DATE: <u>10/22/19</u>

#### PH CALIBRATION CHECK

pH 7 (LOT #) <u>966002</u> (EXP. DATE) <u>7/21</u>	pH 4 / 10 (LOT #) <u>96E100</u> (EXP. DATE) <u>5/21</u>	CAL RANGE	TIME
POST-CAL. READING / STANDARD <u>700 / 700</u>	POST-CAL. READING / STANDARD <u>400 / 400</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>1235</u>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #) <u>96F1141</u> (EXP. DATE) <u>6/20</u>	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / STANDARD <u>1413 / 1413</u>	<u>20.4</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>1235</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### ORP CALIBRATION CHECK

CAL. READING (LOT #) <u>18L100623</u> (EXP. DATE) <u>5/23</u>	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / STANDARD <u>223 / 223</u>	<u>20.0</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>1235</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL. READING / SATURATED AIR <u>8.85 / 8.85</u>	<u>19.5</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>1235</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL RANGE	TIME
(LOT #) <u>A8344</u> (EXP. DATE) <u>12/30</u>	(LOT #) _____ (EXP. DATE) _____		
POST-CAL. READING / STANDARD <u>0 / 0</u>	POST-CAL. READING / STANDARD <u>/</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>1235</u>
<u>200 / 200</u>	<u>/</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>1235</u>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION(S)
(LOT #): _____ (EXP. DATE): _____	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
CALIBRATED PARAMETERS	CALIBRATION RANGES <sup>(1)</sup>
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/> _____	
<input type="checkbox"/> _____	

(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

#### NOTES

/
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#### PROBLEMS ENCOUNTERED

#### CORRECTIVE ACTIONS

/
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/
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SIGNED [Signature] DATE 11/10/20

CHECKED BY BY DATE 10.22.19





WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC CCR: JHC 2SA19	MODEL: IN-SITU smarTROLL	SAMPLER: BY JJ
PROJECT NO.: 322174.0000 P1 T2	SERIAL #: TRC A2	DATE: 10-8-19

PH CALIBRATION CHECK

LOT #	PH 7	LOT #	PH 10	CAL RANGE	TIME
965002	7/21	965665	6/21		
POST-CAL READING / STANDARD		POST-CAL READING / STANDARD			
7.00 / 7.00		4.00 / 4.00		<input checked="" type="checkbox"/> WITHIN RANGE	0737
/		/		<input type="checkbox"/> WITHIN RANGE	
/		/		<input type="checkbox"/> WITHIN RANGE	
/		/		<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

LOT #	CAL READING	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
965964	6/20			
POST-CAL READING / STANDARD				
1413 / 1413		10.4	<input checked="" type="checkbox"/> WITHIN RANGE	0723
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

LOT #	CAL READING	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
184100623	12/23			
POST-CAL READING / STANDARD				
250 / 250		8.9	<input checked="" type="checkbox"/> WITHIN RANGE	0740
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

LOT #	CAL READING	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL READING / SATURATED AIR				
10.86 / 10.86		9.3	<input checked="" type="checkbox"/> WITHIN RANGE	0739
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

LOT #	CALIBRATION READING (NTU)	LOT #	CAL RANGE	TIME
1904015	3/19	18293474	3/19	
POST-CAL READING / STANDARD		POST-CAL READING / STANDARD		
10.0 / 0.0		10.0 / 10.0		<input checked="" type="checkbox"/> WITHIN RANGE
/		/		<input type="checkbox"/> WITHIN RANGE
/		/		<input type="checkbox"/> WITHIN RANGE
/		/		<input type="checkbox"/> WITHIN RANGE

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES (1)
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/> _____	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
<input type="checkbox"/> _____	

NOTES

REFILL REF SOLN 0730

PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

ORP NOT CAL	REFILL / REPLACE REF SOLN

SIGNED: *[Signature]* 10.22.19 DATE

CHECKED BY: *[Signature]* 10/22/19 DATE



### WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC CCR: JHC 2SA19	MODEL: YSI ProDSS	SAMPLER: BY / JJ
PROJECT NO.: 322174.0000 P1 T2	SERIAL #: TRC A2	DATE: 10/8/19

#### PH CALIBRATION CHECK

pH 7 (LOT #): 96G002 (EXP. DATE): 7/21	pH 4/10 (LOT #): 96E108 (EXP. DATE): 5/2	CAL RANGE	TIME
POST-CAL READING / STANDARD	POST-CAL READING / STANDARD		
700 / 700	400 / 400	<input checked="" type="checkbox"/> WITHIN RANGE	0430
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL READING (LOT #): 96F141 (EXP. DATE): 6/20	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL READING / STANDARD			
1413 / 1413	NA	<input checked="" type="checkbox"/> WITHIN RANGE	0420
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### ORP CALIBRATION CHECK

CAL READING (LOT #): 18L100603 (EXP. DATE): 5/22	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL READING / STANDARD			
222 / 222	20.0	<input checked="" type="checkbox"/> WITHIN RANGE	0420
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### D.O. CALIBRATION CHECK

CAL READING	TEMPERATURE (°CELSIUS)	CAL RANGE	TIME
POST-CAL READING / SATURATED AIR			
8.85 / 8.85	20.0	<input checked="" type="checkbox"/> WITHIN RANGE	0420
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL RANGE	TIME
(LOT #): 80344 (EXP. DATE): 2/20	(LOT #): (EXP. DATE):		
POST-CAL READING / STANDARD	POST-CAL READING / STANDARD		
0 / 0	/	<input checked="" type="checkbox"/> WITHIN RANGE	0427
200 / 200	/	<input checked="" type="checkbox"/> WITHIN RANGE	0430
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION(S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES <sup>(1)</sup>
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/> _____	<sup>(1)</sup> CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
<input type="checkbox"/> _____	

#### NOTES

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#### PROBLEMS ENCOUNTERED

#### CORRECTIVE ACTIONS

/	/
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SIGNED: [Signature] / 10/22 DATE: \_\_\_\_\_

CHECKED BY: BY 10.22.19 DATE: \_\_\_\_\_



### WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC CCR: JHC 2SA19	MODEL: IN-SITU smarTROLL	SAMPLER: <u>BY JJ</u>
PROJECT NO.: 322174.0000 P1 T2	SERIAL #: TRC A2	DATE: <u>10.9.19</u>

#### PH CALIBRATION CHECK

pH 7 (LOT #): <u>966002</u> (EXP. DATE): <u>7/21</u>	pH 10 (LOT #): <u>966065</u> (EXP. DATE): <u>7/21</u>	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<u>7.06 / 7.06</u>	<u>4.00 / 4.00</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0747</u>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): <u>966964</u> (EXP. DATE): <u>7/20</u>	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<u>1413 / 1413</u>	<u>11.6</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0743</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### ORP CALIBRATION CHECK

CAL. READING (LOT #): <u>182100673</u> (EXP. DATE): <u>12/23</u>	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<u>247 / 247</u>	<u>11.2</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0751</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR			
<u>10.94 / 10.94</u>	<u>11.2</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0749</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): <u>19040115</u> (EXP. DATE): <u>3/19</u>	(LOT #): <u>18293474</u> (EXP. DATE): <u>3/19</u>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<u>0.0 / 0.0</u>	<u>10.0 / 10.0</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0740</u>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES <sup>(1)</sup>
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

#### NOTES


#### PROBLEMS ENCOUNTERED

#### CORRECTIVE ACTIONS


SIGNED  DATE 10.22.19

CHECKED BY  DATE 10/22/19



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC CCR: JHC 2SA19	MODEL: YSI ProDSS	SAMPLER: BY JJ
PROJECT NO.: 322174.0000 P1 T2	SERIAL #: TRC A2	DATE: 10/9/19

PH CALIBRATION CHECK

pH 7		pH 4 / 10		CAL RANGE	TIME
(LOT #): 96E1002	(EXP. DATE): 7/21	(LOT #): 96E1002	(EXP. DATE): 5/21		
POST-CAL. READING / STANDARD		POST-CAL. READING / STANDARD		<input checked="" type="checkbox"/> WITHIN RANGE	CJDC
700 / 700		400 / 400		<input type="checkbox"/> WITHIN RANGE	
/		/		<input type="checkbox"/> WITHIN RANGE	
/		/		<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL RANGE	TIME
(LOT #): 96E1141	(°CELSIUS)		
POST-CAL. READING / STANDARD		<input checked="" type="checkbox"/> WITHIN RANGE	CJDC
143 / 143		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL RANGE	TIME
(LOT #): 18105623	(°CELSIUS)		
POST-CAL. READING / STANDARD		<input checked="" type="checkbox"/> WITHIN RANGE	CJDC
220 / 220		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE	CAL RANGE	TIME
(LOT #):	(°CELSIUS)		
POST-CAL. READING / SATURATED AIR		<input checked="" type="checkbox"/> WITHIN RANGE	CJDC
8.19 / 8.19		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL RANGE	TIME
(LOT #): 18349	(EXP. DATE): 12/12		
POST-CAL. READING / STANDARD		<input checked="" type="checkbox"/> WITHIN RANGE	CJDC
200 / 200		<input checked="" type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES (1)
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/> _____	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
<input type="checkbox"/> _____	

NOTES

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PROBLEMS ENCOUNTERED:

CORRECTIVE ACTIONS:

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SIGNED

*[Signature]* 1/10/20

DATE

CHECKED BY

BV 10.22.19

DATE



### WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC CCR: JHC 2SA19	MODEL: IN-SITU smarTROLL	SAMPLER: <u>BY</u> JJ
PROJECT NO.: 322174.0000 P1 T2	SERIAL #: TRC A2	DATE: <u>10.10.19</u>

#### PH CALIBRATION CHECK

pH 7 (LOT #): <u>966002</u> (EXP. DATE): <u>7/21</u>	pH <u>10</u> (LOT #): <u>966005</u> (EXP. DATE): <u>7/21</u>	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<u>7.06 / 7.06</u>	<u>4.00 / 4.00</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0744</u>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): <u>966004</u> (EXP. DATE): <u>6/20</u>	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<u>1413 / 1413</u>	<u>13.5</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0740</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### ORP CALIBRATION CHECK

CAL. READING (LOT #): <u>18C100623</u> (EXP. DATE): <u>12/23</u>	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<u>245 / 245</u>	<u>12.9</u>	<input type="checkbox"/> WITHIN RANGE	<u>0750</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### D.O. CALIBRATION CHECK

CAL. READING (LOT #): <u>18C100623</u> (EXP. DATE): <u>12/23</u>	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR			
<u>10.61 / 10.61</u>	<u>12.9</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0748</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): <u>19010115</u> (EXP. DATE): <u>3/19</u>	(LOT #): <u>18293774</u> (EXP. DATE): <u>3/19</u>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<u>0.0 / 0.0</u>	<u>10.0 / 10.0</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0745</u>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES <sup>(1)</sup>
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

#### NOTES


#### PROBLEMS ENCOUNTERED

#### CORRECTIVE ACTIONS



SIGNED  DATE 10.22.19

CHECKED BY  DATE 10/22/19



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC CCR: JHC 2SA19	MODEL: YSI ProDSS	SAMPLER: BY <u>JJ</u>
PROJECT NO.: 322174.0000 P1 T2	SERIAL #: TRC A2	DATE: <u>10/10/19</u>

PH CALIBRATION CHECK

LOT #	PH 7	LOT #	PH 4 / 10	CAL RANGE	TIME
<u>966002</u>		<u>96E1020</u>			
<u>7/21</u>		<u>5/21</u>			
POST-CAL. READING / STANDARD		POST-CAL. READING / STANDARD			
<u>700 / 700</u>		<u>400 / 400</u>		<input checked="" type="checkbox"/> WITHIN RANGE	<u>0425</u>
/		/		<input type="checkbox"/> WITHIN RANGE	
/		/		<input type="checkbox"/> WITHIN RANGE	
/		/		<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

LOT #	CAL READING	TEMPERATURE	CAL RANGE	TIME
<u>96E1141</u>				
<u>6/20</u>				
POST-CAL. READING / STANDARD		(°CELSIUS)		
<u>143 / 143</u>		<u>NA</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0405</u>
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

LOT #	CAL READING	TEMPERATURE	CAL RANGE	TIME
<u>181006023</u>				
<u>5/18</u>				
POST-CAL. READING / STANDARD		(°CELSIUS)		
<u>220 / 22</u>		<u>21.0</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0405</u>
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

LOT #	CAL READING	TEMPERATURE	CAL RANGE	TIME
POST-CAL. READING / SATURATED AIR		(°CELSIUS)		
<u>8.19 / 8.19</u>		<u>24.3</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0405</u>
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	
/			<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

LOT #	CALIBRATION READING (NTU)	LOT #	CAL RANGE	TIME
<u>A8344</u>				
<u>12/20</u>				
POST-CAL. READING / STANDARD		POST-CAL. READING / STANDARD		
<u>0 / 0</u>		<u>/</u>		<input checked="" type="checkbox"/> WITHIN RANGE <u>0405</u>
<u>200 / 200</u>		<u>/</u>		<input checked="" type="checkbox"/> WITHIN RANGE <u>0405</u>
/		/		<input type="checkbox"/> WITHIN RANGE
/		/		<input type="checkbox"/> WITHIN RANGE

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION(S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES <sup>(1)</sup>
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/> _____	<sup>(1)</sup> CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
<input type="checkbox"/> _____	

NOTES

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PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS

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SIGNED: [Signature] DATE: 1/10/20

CHECKED BY: BY DATE: 10.22.19



### WATER QUALITY METER CALIBRATION LOG

PROJECT NAME: CEC CCR: JHC 2SA19	MODEL: IN-SITU smarTROLL	SAMPLER: <u>BV</u> / JJ
PROJECT NO.: 322174.0000 P1 T2	SERIAL #: TRC A2	DATE: <u>10.11.19</u>

#### PH CALIBRATION CHECK

pH 7 (LOT #): <u>966002</u> (EXP. DATE): <u>7/21</u>	pH <u>4</u> 10 (LOT #): <u>966065</u> (EXP. DATE): <u>7/21</u>	CAL. RANGE	TIME
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<u>7.05 / 7.05</u>	<u>4.00 / 4.00</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0717</u>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL. READING (LOT #): <u>966964</u> (EXP. DATE): <u>6/20</u>	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<u>1413 / 1413</u>	<u>14.0</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0715</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### ORP CALIBRATION CHECK

CAL. READING (LOT #): <u>184100673</u> (EXP. DATE): <u>12/23</u>	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / STANDARD			
<u>240 / 240</u>	<u>13.1</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0722</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### D.O. CALIBRATION CHECK

CAL. READING	TEMPERATURE (*CELSIUS)	CAL. RANGE	TIME
POST-CAL. READING / SATURATED AIR			
<u>10.0 / 10.0</u>	<u>13.0</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0721</u>
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

#### TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL. RANGE	TIME
(LOT #): <u>1904015</u> (EXP. DATE): <u>3/19</u>	(LOT #): <u>18293474</u> (EXP. DATE): <u>3/19</u>		
POST-CAL. READING / STANDARD	POST-CAL. READING / STANDARD		
<u>0.0 / 0.0</u>	<u>10.0 / 10.0</u>	<input checked="" type="checkbox"/> WITHIN RANGE	<u>0723</u>
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	
/	/	<input type="checkbox"/> WITHIN RANGE	

#### COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION(S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES <sup>(1)</sup>
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/> _____	
<input type="checkbox"/> _____	

(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER

#### NOTES


#### PROBLEMS ENCOUNTERED

#### CORRECTIVE ACTIONS


SIGNED [Signature]      DATE 10.22.19

CHECKED BY [Signature]      DATE 10/22/19



WATER QUALITY METER CALIBRATION LOG

PROJECT NAME:	CEC CCR: JHC 2SA19	MODEL:	YSI ProDSS	SAMPLER:	BY / JJ
PROJECT NO.:	322174.0000 P1 T2	SERIAL #:	TRC A2	DATE:	10.11.19

PH CALIBRATION CHECK

pH 7		pH 4 / 10		CAL RANGE	TIME
(LOT #):	(EXP. DATE):	(LOT #):	(EXP. DATE):		
96002	7/21	96E102	9/21		
POST-CAL. READING / STANDARD		POST-CAL. READING / STANDARD			
72 / 700		400 / 400		<input checked="" type="checkbox"/> WITHIN RANGE	04:20
/		/		<input type="checkbox"/> WITHIN RANGE	
/		/		<input type="checkbox"/> WITHIN RANGE	
/		/		<input type="checkbox"/> WITHIN RANGE	

SPECIFIC CONDUCTIVITY CALIBRATION CHECK

CAL READING	TEMPERATURE	CAL RANGE	TIME
(LOT #):	(*CELSIUS)		
96E1141			
(EXP. DATE):			
POST-CAL. READING / STANDARD			
1413 / 1413		<input checked="" type="checkbox"/> WITHIN RANGE	04:20
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

ORP CALIBRATION CHECK

CAL READING	TEMPERATURE	CAL RANGE	TIME
(LOT #):	(*CELSIUS)		
19100023			
(EXP. DATE):			
POST-CAL. READING / STANDARD			
220 / 220		<input type="checkbox"/> WITHIN RANGE	04:20
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

D.O. CALIBRATION CHECK

CAL READING	TEMPERATURE	CAL RANGE	TIME
	(*CELSIUS)		
POST-CAL. READING / SATURATED AIR			
7.89 / 7.89		<input checked="" type="checkbox"/> WITHIN RANGE	04:20
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

TURBIDITY CALIBRATION CHECK

CALIBRATION READING (NTU)		CAL RANGE	TIME
(LOT #):	(EXP. DATE):		
110349	12/00		
POST-CAL. READING / STANDARD			
0 / 0		<input checked="" type="checkbox"/> WITHIN RANGE	04:20
200 / 200		<input checked="" type="checkbox"/> WITHIN RANGE	04:20
/		<input type="checkbox"/> WITHIN RANGE	
/		<input type="checkbox"/> WITHIN RANGE	

COMMENTS

<input type="checkbox"/> AUTOCAL SOLUTION	<input checked="" type="checkbox"/> STANDARD SOLUTION (S)
(LOT #):	LIST LOT NUMBERS AND EXPIRATION DATES UNDER CALIBRATION CHECK
(EXP. DATE):	
CALIBRATED PARAMETERS	CALIBRATION RANGES (1)
<input type="checkbox"/> pH	pH: +/- 0.2 S.U.
<input type="checkbox"/> COND	COND: +/- 1% OF CAL. STANDARD
<input type="checkbox"/> ORP	ORP: +/- 25 mV
<input type="checkbox"/> D.O.	D.O.: VARIES
<input type="checkbox"/> TURB	TURB: +/- 5% OF CAL. STANDARD
<input type="checkbox"/> _____	(1) CALIBRATION RANGES ARE SPECIFIC TO THE MODEL OF THE WATER QUALITY METER
<input type="checkbox"/> _____	

NOTES


PROBLEMS ENCOUNTERED

CORRECTIVE ACTIONS


SIGNED [Signature] / 10/10/19 DATE

CHECKED BY BY 10.22.19 DATE





## WATER LEVEL DATA

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10/22/19
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
JHC-MW-15006	1039		34.00	38.00		
JHC-MW-15007	1036		34.29	34.70		
JHC-MW-15008R	1037		41.98	47.60		
JHC-MW-15009	1030		42.25	42.85		
JHC-MW-15010	1025		41.90	42.80		
JHC-MW-15011	1041		37.85	40.02		
JHC-MW-15017	0938		13.58	22.97		
JHC-MW-15018	0947		14.43	20.90		
JHC-MW-15019	0944		11.00	19.08		
JHC-MW-15022	0936		27.72	36.25		
JHC-MW-15031	1018		42.35	46.08		
JHC-MW-15032	0948		15.71	26.02		
JHC-MW-15033	0915		20.42	28.72		
JHC-MW-15034	0911		14.15	23.93		
JHC-MW-15035	1015		29.28	35.25		
JHC-MW-15036	0930		29.90	32.55		
JHC-MW-15037	0932		24.35	30.95		
MW-14S						
MW-14D						
PZ-24S						
PZ-24D						

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR  
(E.G., 1.1 + 0.00 T/PVC).

SIGNED JS 10.22.19 DATE

CHECKED [Signature] 10/22/19 DATE

**WATER LEVEL DATA**

1 of 6

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10/16/19
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen / J Jasso

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
JHC-MW-15023	0905		15.85 ✓	27.64		
JHC-MW-15024	0900		11.1 ✓	19.88		
JHC-MW-15025	0855		10.08 ✓	19.91		
JHC-MW-15026	0856		11.88 ✓	20.98		
JHC-MW-15027	0845		12.42 ✓	22.95		
JHC-MW-15028	0839		12.00 ✓	20.75		
JHC-MW-15029	1144		9.50 ✓	20.90		
JHC-MW-15030	1140		7.75 ✓	16.90		
JHC-MW-15001	1148		11.10 ✓	11.78		
JHC-MW-15002	1056		23.49 ✓	33.40		
JHC-MW-15003	1101		32.05 ✓	36.67		
JHC-MW-15005	1047		17.78 ✓	22.75		
JHC-MW-18004	1053		10.98 ✓	19.05		
JHC-MW-18005	1050		10.05 ✓	17.90		
JHC-MW-15013	1109		34.00 ✓	41.12		
JHC-MW-15015	1121		33.20 ✓	40.98		
JHC-MW-15016	1131		30.54 ✓	38.94		
JHC-MW-18001	1126		10.62 ✓	19.35		
JHC-MW-18002	1110		7.94 ✓	17.16		
JHC-MW-18003	1113		7.92 ✓	17.09		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED JJ 10.22.19 DATE

CHECKED [Signature] 10/22/19 DATE

**WATER LEVEL DATA**

PROJECT NAME: CEC CCR: JHC 2SA19				DATE: 10/22/19		
PROJECT NUMBER: 322174.0000 P1 T2				AUTHOR: B Yelen / J Jasso		
WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
PZ-23D	1153	TPVC	16.05	37.38		
PZ-40S						
MW-16A						
MW-16B						
MW-16C						
MW-17						
MW-18A						
MW-18B						
MW-18C						
P1S						
P1D						
P2S						
P2D						
P3S						
P3D						
P4D						
P5S						
P5D						
P6S						
P6D						
P7S						

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR  
(E.G., 1.1 + 0.00 T/PVC).

JJ 10.22.19  
SIGNED DATE

*B Yelen* 10/22/19  
CHECKED DATE



2 of 6

### WATER LEVEL DATA

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10-7-19
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B Yelen J Jasso

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
JHC-MW-15006						
JHC-MW-15007						
JHC-MW-15008R						
JHC-MW-15009						
JHC-MW-15010						
JHC-MW-15011						
JHC-MW-15017						
JHC-MW-15018						
JHC-MW-15019						
JHC-MW-15022						
JHC-MW-15031						
JHC-MW-15032						
JHC-MW-15033						
JHC-MW-15034						
JHC-MW-15035						
JHC-MW-15036						
JHC-MW-15037						
MW-14S	1328	TPVC	11.34 ✓	13.34	NA	NM
MW-14D	1326		8.12 ✓	37.40		
PZ-24S	1334		10.15	11.05		
PZ-24D	1337		6.56	38.65		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

BGL 10.22.19  
 SIGNED DATE

Christa A. Valdes 10/22/19  
 CHECKED DATE



3 of 6

## WATER LEVEL DATA

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10-7-19
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: E Yelen / J Jasso

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
<del>PZ-23D</del> JT						
PZ-40S	1345	TVC	9.59	17.91	NA	NM
MW-16A	1208		10.38	20.85		
MW-16B	1209		9.15	50.45		
MW-16C	1210		9.29	84.60		
MW-17	1245		14.02	23.42		
MW-18A	0946		28.26	37.02		
MW-18B	0947		30.37	72.25		
MW-18C	0948		30.70	87.10		
P1S	1130		15.20	22.45		
P1D	1132		13.50	40.00		
P2S	1134		14.05	22.70		
P2D	1136		15.10	38.15		
P3S	1202		14.33	22.78		
P3D	1204		14.24	33.44		
P4D	1207		11.24	37.14		
P5S	1158		13.01	22.52		
P5D	1200		10.92	33.90		
P6S	1248		12.84	22.80		
P6D	1250		10.98	34.50		
P7S	1151		12.48	22.90		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR  
(E.G., 1.1 + 0.00 T/PVC).

SIGNED

10.22.19

DATE

CHECKED

10/22/19

DATE



4 of 6

**WATER LEVEL DATA**

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10-7-19
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: B. Valen / J Jasso

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
P7D	1153	TPVC	9.15	31.78	NA	NM
P8D	1155		8.68	32.70		
P9S	1145		8.15	19.94		
P9D	1147		7.49	26.97		
P10	1255		7.33	10.68		
P11	1300		5.69	9.55		
SG-19-1	1031	T-SG	1.74	NA		
SG-19-2	1125	T-SG	1.62	NA		
SG-19-3	1320	T-SG	1.88	NA		
TW-17-01	0959	TPVC	29.20	36.30		
TW-17-07	0939	TPVC	26.20	31.66		
TW-17-08	<del>0940</del> 1040		34.28	39.86		
TW-17-10	1049		17.35	20.80		
TW-17-12	1138		12.42	16.40		
TW-17-14	1140		6.60	11.25		
TW-17-16	1142		6.30	12.47		
TW-18-01	1003	TPVC	30.55	34.00		
TW-18-02	1001		28.61	33.40		
TW-18-03	1042		30.13	33.73		
TW-18-04	1023		31.20	34.93		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR (E.G., 1.1 + 0.00 T/PVC).

SIGNED BVC 10.22.19 DATE

CHECKED Christa A. Volody 10/22/19 DATE



5 of 6

## WATER LEVEL DATA

PROJECT NAME: CEC CCR: JHC 2SA19	DATE: 10-7-19
PROJECT NUMBER: 322174.0000 P1 T2	AUTHOR: E Yefeh / J Jasso

WELL LOCATION	TIME	REFERENCE	DEPTH TO WATER (FEET)	DEPTH TO BOTTOM (FEET)	DEPTH TO PRODUCT (FEET)	WATER ELEVATION
TW-18-05	1020		29.96	34.10		
TW-18-06	1026		31.33	37.18		
TW-18-07	1028		31.69	35.60		
TW-18-08	1030		32.25	36.15		
TW-18-09	1032		32.18	35.08		
TW-18-10	1036		29.35	34.05		
TW-18-11	1053		13.15	17.24		
TW-18-12S	0954		29.15	32.47		
TW-18-12I	0955		29.38	45.10		
TW-18-12D	0956		28.62	55.08		
TW-18-13	1046		26.50	30.15		
TW-18-14	090		31.69	34.38		
TW-18-15	1011		29.35	32.34		
TW-18-16	1012		27.65	30.70		
TW-18-17	1015		26.30	29.83		
TW-19-01A	0933		21.63	25.35		
TW-19-01B	0934		21.49	34.99		
TW-19-02A	0930		17.61	21.01		
TW-19-02B	0931		17.42	26.95		
TW-19-03A	0920	14.34	14.34	17.56		
TW-19-03B	0922		14.46	25.30		
TW-19-04A	0915	<del>21.43</del>	<del>21.45</del> 25.30	25.30		

ALL WATER LEVELS MUST INCLUDE REFERENCE POINT AND TAPE CORRECTION FACTOR  
(E.G., 1.1 + 0.00 T/PVC).

SIGNED B. J. Jasso 10.22.19 DATE

CHECKED John Jasso 10/22/19 DATE







# WATER SAMPLE LOG

PROJECT NAME: CEC JHC: CCR-2SA19/RAP-1	PREPARED	CHECKED
PROJECT NUMBER: 322174.000	BY: <u>BJ/JJ</u>	DATE: <u>10.8.19</u>
	BY: <u>AN</u>	DATE: <u>10/22/19</u>

SAMPLE ID: <u>TW-19-01A</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1311</u>	DATE: <u>10.8.19</u>	SAMPLE	TIME: <u>1340</u>	DATE: <u>10.8.19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.49</u> SU		CONDUCTIVITY: <u>317.3</u> umhos/cm		
DEPTH TO WATER: <u>21.45</u> T/ PVC	ORP: <u>47.2</u> mV		DO: <u>0.94</u> mg/L		
DEPTH TO BOTTOM: <u>NM</u> T/ PVC	TURBIDITY: <u>1.25</u> NTU				
WELL VOLUME: <u>NM</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY				
VOLUME REMOVED: <u>7.5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>12.99</u> °C		OTHER: _____		
COLOR: <u>CLR</u>	ODOR: <u>Y</u>		FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: _____		FILTRATE ODOR: _____
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS: <u>CCR NRE + 115</u>					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1315	300	7.66	336.1	48.7	1.78	4.53	16.91	21.45	INITIAL
1320		7.64	324.4	48.1	0.48	2.37	13.64		1.5
1325		7.57	322.0	48.2	0.61	2.75	13.05		3.0
1330		7.52	319.3	47.9	0.84	1.74	12.99		4.5
1335		7.50	318.9	47.5	0.93	1.22	12.99		6.0
1340		7.49	317.3	47.2	0.94	1.25	12.99		7.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1    COND.: +/- 3%    ORP: +/- 10    D.O.: +/- 0.30    TURB: +/- 10%    or <= 10    TEMP.: +/- NA

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____							
NUMBER	SIZE ML	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
2	1000	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	250	PL	B	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
4	250	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	250	PL	B	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
4	500	PL	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
3	500	PL	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: Courier	DATE SHIPPED: <u>10.9.19</u>	AIRBILL NUMBER: NA
COC NUMBER: NA	SIGNATURE: <u>BJL</u>	DATE SIGNED: <u>10.22.19</u>



## WATER SAMPLE LOG

PROJECT NAME: CEC JHC: CCR-2SA19/RAP-1	PREPARED	CHECKED
PROJECT NUMBER: 322174.000	BY: <u>BJ/JJ</u>	DATE: <u>10.8.19</u>
	BY: <u>CAV</u>	DATE: <u>10/22/19</u>

SAMPLE ID: <u>TW-19-04B</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1413</u>	DATE: <u>10.8.19</u>	SAMPLE	TIME: <u>1435</u>	DATE: <u>10.8.19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: <u>8.15</u> SU CONDUCTIVITY: <u>317.5</u> umhos/cm		
			ORP: <u>46.7</u> mV DO: <u>0.27</u> mg/L		
DEPTH TO WATER: <u>21.25</u> T/ PVC			TURBIDITY: <u>1.21</u> NTU		
DEPTH TO BOTTOM: <u>NM</u> T/ PVC			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: <u>NM</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>12.40</u> °C OTHER:		
VOLUME REMOVED: <u>4.5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>CLR</u> ODOR: <u>N</u>		
COLOR: <u>CLR</u> ODOR: <u>N</u>			FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: <u>-</u> FILTRATE ODOR: <u>-</u>		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1420	300	8.11	319.2	48.4	0.44	1.38	13.22	21.25	INITIAL
1425		8.13	324.2	47.3	0.32	1.75	12.49		1.5
1430		8.15	317.4	47.5	0.29	1.50	12.44		3.0
1435		8.15	317.5	46.7	0.27	1.21	12.40		4.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1    COND.: +/- 3%    ORP: +/- 10    D.O.: +/- 0.30    TURB: +/- 10%    or <= 10    TEMP.: +/- NA

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____									
NUMBER	SIZE ml	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE ml	TYPE	PRESERVATIVE	FILTERED	
2	1000	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	1	250	PL	B	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N
1	500	PLASTIC	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	500	PL	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	500	PL	B	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	250	PL	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: Courier	DATE SHIPPED: <u>10.9.19</u>	AIRBILL NUMBER: NA
COC NUMBER: NA	SIGNATURE: <u>Bj/JJ</u>	DATE SIGNED: <u>10.22.19</u>



### WATER SAMPLE LOG

PROJECT NAME: CEC JHC: CCR-2SA19/RAP-1	PREPARED	CHECKED
PROJECT NUMBER: 322174.000	BY: <u>BY JJ</u>	DATE: <u>10.8.19</u>
	BY: <u>AV</u>	DATE: <u>10/22/19</u>

SAMPLE ID: <u>TW-19-05</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1506</u>	DATE: <u>10.8.19</u>	SAMPLE	TIME: <u>1520</u>	DATE: <u>10.8.19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: <u>7.79</u> SU	CONDUCTIVITY: <u>248.3</u> umhos/cm	
DEPTH TO WATER: <u>15.0!</u> T/ PVC			ORP: <u>32.5</u> mV	DO: <u>2.71</u> mg/L	
DEPTH TO BOTTOM: <u>NM</u> T/ PVC			TURBIDITY: <u>1.10</u> NTU		
WELL VOLUME: <u>NM</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <u>6.0</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>13.31</u> °C	OTHER: _____	
COLOR: <u>CLR</u> ODOR: <u>SCT</u>			COLOR: <u>CLR</u>	ODOR: <u>SCT</u>	
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FILTRATE COLOR: _____	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE ODOR: _____	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____	
COMMENTS: _____					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1510	300	8.04	228.7	30.9	4.72	1.99	14.67	15.06	INITIAL
1505		7.81	241.2	32.3	3.43	2.00	13.35		1.5
1510		7.80	246.8	32.6	2.69	0.99	13.33		3.0
1515		7.80	248.5	32.0	2.81	0.99	13.33		4.5
1520		7.79	248.3	32.5	2.71	1.10	13.31		6.0

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

PH: +/- 0.1    COND.: +/- 3%    ORP: +/- 10    D.O.: +/- 0.30    TURB: +/- 10%    or <= 10    TEMP.: +/- NA

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____							
NUMBER	SIZE ml	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE ml	TYPE	PRESERVATIVE	FILTERED
2	1000	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	250	PL	B	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
2	500	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	500	PL	B	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	500	PL	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	250	PL	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: Courier	DATE SHIPPED: <u>10.9.19</u>	AIRBILL NUMBER: NA
COC NUMBER: NA	SIGNATURE: <u>B</u>	DATE SIGNED: <u>10.22.19</u>



# WATER SAMPLE LOG

PROJECT NAME: CEC JHC: CCR-2SA19/RAP-1	PREPARED	CHECKED
PROJECT NUMBER: 322174.000	BY: <u>BY/JJ</u>	DATE: <u>10.8.19</u>
	BY: <u>AN</u>	DATE: <u>10/22/19</u>

SAMPLE ID: <u>TW-19-06A</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING TIME: <u>1555</u> DATE: <u>10.8.19</u>	SAMPLE TIME: <u>1620</u> DATE: <u>10.8.19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>7.44</u> SU CONDUCTIVITY: <u>157.3</u> umhos/cm
DEPTH TO WATER: <u>12.25</u> T/ PVC	ORP: <u>43.3</u> mV DO: <u>0.54</u> mg/L
DEPTH TO BOTTOM: <u>NM</u> T/ PVC	TURBIDITY: <u>1.25</u> NTU
WELL VOLUME: <u>NM</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY
VOLUME REMOVED: <u>6.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>14.21</u> °C OTHER: _____
COLOR: <u>CLR</u> ODOR: <u>N</u>	FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	FILTRATE COLOR: _____ FILTRATE ODOR: _____
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____
COMMENTS: _____	

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1600	300	7.96	161.2	39.4	2.79	3.17	15.97	12.25	INITIAL
1605		7.59	157.5	45.7	0.54	2.63	14.35		1.5
1610		7.49	157.2	46.1	0.53	2.51	14.25		3.0
1615		7.44	157.4	43.7	0.52	1.33	14.22		4.5
1620		7.44	157.3	43.3	0.54	1.25	14.21		6.0

**NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:**

pH: +/- 0.1    COND.: +/- 3%    ORP: +/- 10    D.O.: +/- 0.30    TURB: +/- 10% or <= 10    TEMP: +/- NA

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____									
NUMBER	SIZE ml	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE ml	TYPE	PRESERVATIVE	FILTERED	
2	1000	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	1	250	PL	B	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N
2	500	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	500	PL	B	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	500	PL	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	250	PL	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: Courier	DATE SHIPPED: <u>10.9.19</u>	AIRBILL NUMBER: NA
COC NUMBER: NA	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10.22.19</u>



# WATER SAMPLE LOG

PROJECT NAME: CEC JHC: CCR-2SA19/RAP-1	PREPARED	CHECKED
PROJECT NUMBER: 322174.000	BY: <u>BY / JJ</u> DATE: <u>10.8.19</u>	BY: <u>CAV</u> DATE: <u>10/22/19</u>

SAMPLE ID: <u>TW-19-06B</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1637</u>	DATE: <u>10.8.19</u>	SAMPLE	TIME: <u>1700</u>	DATE: <u>10.8.19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>9.32</u> SU	CONDUCTIVITY: <u>145.9</u> umhos/cm	ORP: <u>17.6</u> mV	DO: <u>0.20</u> mg/L	
DEPTH TO WATER: <u>12.00</u> T/ PVC	TURBIDITY: <u>1.25</u> NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
DEPTH TO BOTTOM: <u>NM</u> T/ PVC	WELL VOLUME: <u>NM</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>12.99</u> °C	OTHER: _____		
VOLUME REMOVED: <u>6.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>CLR</u>	ODOR: <u>N</u>	FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
COLOR: <u>CLR</u> ODOR: <u>N</u>	FILTRATE COLOR: _____	FILTRATE ODOR: _____	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1640	300	8.92	138.7	33.5	0.35	2.96	14.76	12.00	INITIAL
1645		9.30	142.5	27.9	0.26	2.95	13.29		1.5
1650		9.32	144.8	23.2	0.22	2.75	13.07		3.0
1655		9.32	145.6	20.0	0.20	1.11	12.99		4.5
1700		9.32	145.9	17.6	0.20	1.25	12.99		6.0

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1    COND.: +/- 3%    ORP: +/- 10    D.O.: +/- 0.30    TURB: +/- 10%    or <= 10    TEMP.: +/- NA

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____								
NUMBER	SIZE ml	TYPE ml	PRESERVATIVE	FILTERED	NUMBER	SIZE ml	TYPE	PRESERVATIVE	FILTERED	
2	1000	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	1	250	PL	B	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	
2	500	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
1	500	PL	B	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
1	500	PL	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	250	PL	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	

SHIPPING METHOD: Courier	DATE SHIPPED: <u>10.9.19</u>	AIRBILL NUMBER: NA
COC NUMBER: NA	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10.22.19</u>



# WATER SAMPLE LOG

PROJECT NAME: CEC JHC: CCR-2SA19/RAP-1	PREPARED	CHECKED
PROJECT NUMBER: 322174.000	BY: <u>BY JJ</u>	DATE: <u>10.10.19</u> BY: <u>AV</u> DATE: <u>10/22/19</u>

SAMPLE ID: <u>MW-143</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1257</u>	DATE: <u>10.10.19</u>	SAMPLE	TIME: <u>1440</u>	DATE: <u>10.10.19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: <u>5.67</u> SU	CONDUCTIVITY: <u>19.8</u> umhos/cm	
DEPTH TO WATER: <u>8.55</u> T/ PVC			ORP: <u>30.6</u> mV	DO: <u>3.91</u> mg/L	
DEPTH TO BOTTOM: <u>NM</u> T/ PVC			TURBIDITY: <u>1.89</u> NTU		
WELL VOLUME: <u>NM</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>15.05</u> °C OTHER: _____		
VOLUME REMOVED: <u>22.5</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>CLR</u> ODOR: <u>N</u>		
COLOR: <u>CLR</u> ODOR: <u>N</u>			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: _____ FILTRATE ODOR: _____		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			COMMENTS: <u>INSTALL TUBING</u>		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1325	300	7.77	24.2	-30.7	0.78	2.55	19.54	8.58	INITIAL
1330		6.75	20.5	-19.3	2.01	2.61	15.39		1.5
1335		6.57	20.1	-11.3	3.01	2.09	15.13		3.0
1340		6.49	19.9	-2.5	3.22	1.71	15.07		4.5
1345		6.39	19.8	7.5	3.32	1.78	15.06		6.0
1350		6.32	19.6	11.9	3.38	1.64	15.07		7.5
1355		6.22	19.6	14.2	3.50	1.76	15.03		9.0
1400		6.12	19.6	15.0	3.63	1.67	15.12		10.5
1405		6.02	19.5	15.9	3.71	1.77	15.15		12.0
1410		5.96		RECAL	PH				13.5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1    COND.: +/- 3%    ORP: +/- 10    D.O.: +/- 0.30    TURB: +/- 10%    or <= 10    TEMP.: +/- NA

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____									
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	
2	1000	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	500	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	500	PL	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	250	PL	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: Courier	DATE SHIPPED: <u>10.11.19</u>	AIRBILL NUMBER: NA
COC NUMBER: NA	SIGNATURE: <u>BJJ</u>	DATE SIGNED: <u>10.22.19</u>





# WATER SAMPLE LOG

PROJECT NAME: CEC JHC: CCR-2SA19/RAP-1	PREPARED	CHECKED
PROJECT NUMBER: 322174.000	BY: <u>BY/JJ</u>	DATE: <u>10.10.19</u>
	BY: <u>CAN</u>	DATE: <u>10/22/19</u>

SAMPLE ID: <u>FB-5</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input checked="" type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME:	DATE:	SAMPLE	TIME: <u>1445</u>	DATE: <u>10.10.19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: _____ SU	CONDUCTIVITY: _____ umhos/cm	
			ORP: _____ mV	DO: _____ mg/L	
DEPTH TO WATER: _____ T/ PVC			TURBIDITY: _____ NTU		
DEPTH TO BOTTOM _____ T/ PVC			<input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: <u>NM</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: _____ °C OTHER: _____		
VOLUME REMOVED _____ <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: _____ ODOR: _____		
COLOR: _____ ODOR: _____			FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
TURBIDITY <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: _____ FILTRATE ODOR: _____		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
DISPOSAL METHOD <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

**NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:**

pH: +/- 0.1    COND.: +/- 3%    ORP: +/- 10    D.O.: +/- 0.30    TURB: +/- 10% or <= 10    TEMP.: +/- NA

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____											
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED			NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		
<u>1</u>	<u>500</u>	<u>PLASTIC</u>	<u>B</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>1</u>	<u>250</u>	<u>PLASTIC</u>	<u>B</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SHIPPING METHOD: <u>Courier</u>	DATE SHIPPED: <u>10.11.19</u>	AIRBILL NUMBER: <u>NA</u>
COC NUMBER: <u>NA</u>	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10.22.19</u>







# WATER SAMPLE LOG

PROJECT NAME: CEC JHC: CCR-2SA19/RAP-1	PREPARED	CHECKED
PROJECT NUMBER: 322174.000	BY: <u>BY/JJ</u> DATE: <u>10.10.19</u>	BY: <u>CAV</u> DATE: <u>10/22/19</u>

SAMPLE ID: <u>P2-24s</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1503</u>	DATE: <u>10.10.19</u>	SAMPLE	TIME: <u>1530</u>	DATE: <u>10.10.19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>5.50</u> SU		CONDUCTIVITY: <u>23.6</u> umhos/cm		
DEPTH TO WATER: <u>6.86</u> T/ PVC	ORP: <u>48.7</u> mV		DO: <u>2.94</u> mg/L		
DEPTH TO BOTTOM: <u>NM</u> T/ PVC	TURBIDITY: <u>1.55</u> NTU				
WELL VOLUME: <u>NM</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY				
VOLUME REMOVED: <u>7.5</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>15.48</u> °C		OTHER: _____		
COLOR: <u>CLR</u>	ODOR: <u>N</u>		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE COLOR: <u>-</u>		FILTRATE ODOR: <u>-</u>
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
COMMENTS: <u>INSTALL TUBING</u>					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OF <u>1</u> )
1505	300	5.80	42.6	51.8	3.15	4.40	19.14	6.89	INITIAL
1510		5.40	24.2	69.4	5.55	2.66	17.18		1.5
1515		5.40	22.3	50.9	2.86	2.50	15.63		3.0
1520		5.45	22.3	48.4	3.00	1.74	15.52		4.5
1525		5.48	23.3	48.8	3.03	1.75	15.49		6.0
1530		5.50	23.6	48.7	2.94	1.55	15.48		7.5

**NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:**

PH: +/- 0.1    COND.: +/- 3%    ORP: +/- 10    D.O.: +/- 0.30    TURB: +/- 10% or <= 10    TEMP.: +/- NA

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____									
NUMBER	SIZE ml	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	
2	1000	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	500	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	500	PL	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	250	PL	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: Courier	DATE SHIPPED: <u>10.11.19</u>	AIRBILL NUMBER: NA
COC NUMBER: NA	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10.22.19</u>



# WATER SAMPLE LOG

PROJECT NAME: CEC JHC: CCR-2SA19/RAP-1	PREPARED	CHECKED
PROJECT NUMBER: 322174.000	BY: <u>BY/JJ</u>	DATE: <u>10.10.19</u>
	BY: <u>CAN</u>	DATE: <u>10/22/19</u>

SAMPLE ID: <u>P2-40s</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1552</u>	DATE: <u>10.10.19</u>	SAMPLE	TIME: <u>1630</u>	DATE: <u>10.10.19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: <u>5.10</u> SU	CONDUCTIVITY: <u>15.1</u> umhos/cm	ORP: <u>57.7</u> mV	DO: <u>1.51</u> mg/L	
DEPTH TO WATER: <u>9.85</u> T/ PVC	TURBIDITY: <u>2.78</u> NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
DEPTH TO BOTTOM: <u>NM</u> T/ PVC	WELL VOLUME: <u>NM</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: <u>12.25</u> °C	OTHER: _____		
VOLUME REMOVED: <u>9.0</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: <u>CLR</u>	ODOR: <u>N</u>	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
COLOR: <u>CLR</u>	ODOR: <u>N</u>	FILTRATE COLOR: <u>---</u>	FILTRATE ODOR: <u>---</u>		
TURBIDITY: <input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		QC SAMPLE: <input checked="" type="checkbox"/> MS/MSD -5 <input type="checkbox"/> DUP- _____			
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1600	300	5.11	15.2	53.1	2.04	3.38	13.72	9.87	INITIAL
1605			PH CHECK 7.00 - OK			4.00 - OK			1.5
1610		4.85	15.6	85.8	1.74	3.59	14.22		3.0
1615		5.05	15.1	62.5	1.57	3.61	12.44		4.5
1620		5.07	15.1	59.7	1.55	2.78	12.39		6.0
1625		5.11	15.1	57.4	1.51	2.28	12.30		7.5
1630		5.10	15.1	57.7	1.51	2.78	12.25		9.0

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 0.1    COND.: +/- 3%    ORP: +/- 10    D.O.: +/- 0.30    TURB: +/- 10%    or <= 10    TEMP.: +/- NA

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____									
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	
2	1000	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
3	500	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
3	500	PL	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
3	250	PL	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: Courier	DATE SHIPPED: <u>10.11.19</u>	AIRBILL NUMBER: NA
COC NUMBER: NA	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10.22.19</u>



# WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED	CHECKED
PROJECT NUMBER: 322174.0000.P1 T2	BY: JJ	DATE: 1/10/2020

SAMPLE ID: JHC-MW-150-28	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 1255	DATE: 1/10/2020	SAMPLE	TIME: 1325	DATE: 1/10/2020
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 7.20	SU	CONDUCTIVITY: 86.5	umhos/cm	
	ORP: 84.5	mV	DO: 6.37	mg/L	
DEPTH TO WATER: 1200 T/ PVC	TURBIDITY: 3.85 NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
DEPTH TO BOTTOM: NM T/ PVC	TEMPERATURE: 14.2 °C		OTHER:		
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: clear		ODOR: none		
VOLUME REMOVED: 6 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
COLOR: cloudy	ODOR: none		FILTRATE COLOR:		
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input checked="" type="checkbox"/> MODERATE <input type="checkbox"/> VERY		QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- #01			
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		COMMENTS:			

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1255	200	4.00	155.5	104.5	2.30	150.35	15.9	1200	INITIAL
1300		8.49	127.1	53.0	5.27	3.20	14.1	1200	1
1305		8.59	126.0	46.3	5.15	8.20	14.1	1200	2
1310		7.67	93.5	73.0	5.10	8.10	14.1	1200	3
1315		7.20	85.0	85.0	6.30	3.80	14.2	1200	4
1320		7.19	85.0	84.5	6.35	4.00	14.1	1200	5
1325		7.20	86.5	84.5	6.37	3.85	14.1	1200	6

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

PH: +/- 10%    COND.: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____								
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	
2	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
2	500mL	PLASTIC	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
4	1L	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N	

SHIPPING METHOD: _____	CARRIER: _____	DATE SHIPPED: 1/15/20	AIRBILL NUMBER: N/A
COC NUMBER: _____	N/A	SIGNATURE:	DATE SIGNED: 1/10/20



### WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED	CHECKED
PROJECT NUMBER: 322174.0000.P1 T2	BY: JJ SM KL DATE: 11/16/20	BY: BY DATE: 10.22.19

SAMPLE ID: JHC-MW-150-027	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 1400	DATE: 10/19/19	SAMPLE	TIME: 1435	DATE: 10/19/19
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 6.28	SU	CONDUCTIVITY: 69.5	umhos/cm	
	ORP: 134.6	mV	DO: 4.75	mg/L	
DEPTH TO WATER: 12.4k T/ PVC	TURBIDITY: 3.45 NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
DEPTH TO BOTTOM: NM T/ PVC	TEMPERATURE: 11.4 °C		OTHER: _____		
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: clear		ODOR: none		
VOLUME REMOVED: 7 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		FILTRATE COLOR: _____ FILTRATE ODOR: _____		
COLOR: cloudy	ODOR: none		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP- _____		
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input checked="" type="checkbox"/> MODERATE <input type="checkbox"/> VERY	DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER				
COMMENTS: _____					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR/L)
1400	200	6.46	57.5	100.0	8.0	23.50	14.1	12.4	INITIAL
1405		5.25	45.0	145.0	6.16	11.68	11.2	1241	1
1410		5.61	49.0	144.5	5.59	8.20	11.4	1241	2
1415		5.90	54.0	139.0	5.25	3.65	11.4	1241	3
1420		6.15	66.0	135.0	5.00	3.95	11.4	1241	4
1425		6.25	68.5	135.0	4.95	3.80	11.5	1241	5
1430		6.27	69.0	134.6	4.85	3.45	11.5	1241	6
1435		6.28	69.5	134.6	4.75	3.45	11.4	1241	7

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 10%    COND.: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____							
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
1	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	50 mL	PLASTIC	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	1 L	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: _____	CARRIER: _____	DATE SHIPPED: 10/17/19	AIRBILL NUMBER: N/A
COC NUMBER: _____	N/A	SIGNATURE:	DATE SIGNED: 11/16/20



# WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED	CHECKED
PROJECT NUMBER: 322174.0000.P1 T2	BY: JS SN-KL DATE: 1/10/20	BY: BY DATE: 10.22.19

SAMPLE ID: JHC-MW-15002C	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 1458	DATE: 10/19/19	SAMPLE	TIME: 1528	DATE: 10/19/19
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER			PH: 7.26	SU	CONDUCTIVITY: 140.0 umhos/cm
DEPTH TO WATER: 11.82 T/ PVC			ORP: 110.5 mV	DO: 3.70	mg/L
DEPTH TO BOTTOM: NM T/ PVC			TURBIDITY: N/A NTU	11.60	
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: 11.5 °C OTHER:		
VOLUME REMOVED: 6 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: Clear	ODOR: none	
COLOR: Cloudy			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY			FILTRATE COLOR: FILTRATE ODOR:		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR/L)
1458	200	6.62	199.5	139.5	2.67	100.0	15.0	1188	INITIAL
1503		7.93	228.5	91.1	5.40	51.00	11.4	1188	1
1508		7.96	190.5	96.0	4.53	18.50	11.4	1188	2
1513		7.42	142.0	109.5	3.92	12.0	11.5	1188	3
1518		7.27	141.0	109.9	3.80	11.75	11.5	1188	4
1523		7.26	140.5	110.0	3.75	11.65	11.5	1188	5
1528		7.26	140.0	110.5	3.70	11.60	11.5	1188	6

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 10%    COND: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F -									
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	
1	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	1500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	350 mL	PLASTIC	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	1L	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: _____	CARRIER: _____	DATE SHIPPED: 10/26/19	AIRBILL NUMBER: N/A
COC NUMBER: _____	N/A	SIGNATURE:	DATE SIGNED: 11/20/19



# WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED	CHECKED
PROJECT NUMBER: 322174.0000.P1 T2	BY: JJ SN <sup>th</sup> DATE: 10/20	BY: BY DATE: 10.22.19

SAMPLE ID: JHC-MW-150 25	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 0532	DATE: 10/9/19	SAMPLE	TIME: 0557	DATE: 10/9/19
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 8.07	SU	CONDUCTIVITY: 370	umhos/cm	
DEPTH TO WATER: 100 T/ PVC	ORP: 9.8	mV	DO: 2.15	mg/L	
DEPTH TO BOTTOM: NM T/ PVC	TURBIDITY: N/A 2.15 NTU		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: 11.7 °C		OTHER:		
VOLUME REMOVED: 5 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: Clear		ODOR: NONE		
COLOR: Clear	ODOR: NONE		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input checked="" type="checkbox"/> MODERATE <input type="checkbox"/> VERY		FILTRATE COLOR:		FILTRATE ODOR:	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER	QC SAMPLE: <input checked="" type="checkbox"/> MS/MSD <input type="checkbox"/> DUP.		COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0532	200	4.0	223	90.0	0.30	1000	11.7	100	INITIAL
0537		7.9	375.0	22.0	2.40	12.87	11.5	100	1
0542		8.05	370	13.5	2.20	3.0	11.4	100	2
0547		8.06	370	10.0	2.10	2.15	11.4	100	3
0552		8.07	370	9.5	2.10	2.10	11.7	100	4
0557		8.07	370	9.8	2.11	2.15	11.7	100	5

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 10%    COND: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____							
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
3	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
3	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
3	550 mL	PLASTIC	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	1 L	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: _____	CARRIER: _____	DATE SHIPPED: 10/9/19	AIRBILL NUMBER: N/A
COC NUMBER: _____	N/A	SIGNATURE:	DATE SIGNED: 11/10/19



### WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL		PREPARED		CHECKED	
PROJECT NUMBER: 322174.0000.P1 T2		BY: JS-SN-KL	DATE: 10/10/19	BY: BY	DATE: 10.22.19
SAMPLE ID: JHC-MW-150-024		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: 0630	DATE: 10/8/19	SAMPLE	TIME: 0705	DATE: 10/8/19
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER		PH: 7.40	SU	CONDUCTIVITY: 261.0	umhos/cm
DEPTH TO WATER: 11.11 T/ PVC		ORP: 253	mV	DO: 0.61	mg/L
DEPTH TO BOTTOM: NM T/ PVC		TURBIDITY: <del>BLACK</del> NTU 3.00			
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: 11.8 °C OTHER:			
VOLUME REMOVED: 7 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: clear		ODOR: none	
COLOR: <del>BROWN</del> ODOR: none		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
TURBIDITY <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY		FILTRATE COLOR:		FILTRATE ODOR:	
DISPOSAL METHOD <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-			
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0630	200	7.99	308	34.5	8.28	1300	11.2	11.11	INITIAL
0635		8.05	303.5	21.0	6.77	26.45	11.8	11.11	1
0640		8.02	298.0	24.0	2.00	16.00	11.8	11.11	2
0645		7.88	289.0	22.9	0.80	8.60	11.8	11.11	3
0648		7.56	273.1	22.8	0.68	4.30	11.8	11.11	4
0655		7.48	263.0	24.8	0.63	3.00	11.9	11.11	5
0700		7.40	262.0	25.0	0.61	3.10	11.8	11.11	6
0705		7.40	261.0	25.3	0.61	3.00	11.8	11.11	7

**NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:**

PH: +/- 10%    COND.: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F -							
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
1	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
1	500 mL	PLASTIC	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	1 L	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: _____	CARRIER: _____	DATE SHIPPED: 10/8/19	AIRBILL NUMBER: N/A
COC NUMBER: _____	N/A	SIGNATURE:	DATE SIGNED: 1/16/20





# WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED	CHECKED
PROJECT NUMBER: 322174.0000.P1 T2	BY: JJ SM <sup>KL</sup> DATE: 1/10/20	BY: BY DATE: 10.22.19

SAMPLE ID: JHC-MW-150-023	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 0734	DATE: 10/8/19	SAMPLE	TIME: 0804	DATE: 10/8/19
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input type="checkbox"/> BAILER	PH: 6.19	SU: 96.5	CONDUCTIVITY: 96.5 umhos/cm	ORP: 106.0 mV	DO: 0.49 mg/L
DEPTH TO WATER: 15.90 T/ PVC	TURBIDITY: NA 71 NTU	4.75	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
DEPTH TO BOTTOM: NM T/ PVC	TEMPERATURE: 10.4 °C	OTHER:			
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: Clear	ODOR: None			
VOLUME REMOVED: 7 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	FILTRATE COLOR:	FILTRATE ODOR:		
COLOR: Orange	ODOR: None	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-			
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY	DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER				
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0734	200	7.75	1380	55.5	8.70	370.0	10.1	1590	INITIAL
0739		5.95	106.9	93.0	0.60	12.81	10.2	1590	1
0744		6.10	72.0	100.0	0.60	7.68	10.3	1590	2
0749		6.15	81.0	100.4	0.54	5.60	10.4	1590	3
0754		6.20	86.0	105.0	0.48	5.00	10.4	1590	4
0759		6.21	95.8	109.8	0.48	4.95	10.4	1590	5
0804		6.20	96.0	106.0	0.49	4.80	10.4	1590	6
0809		6.19	96.1	106.0	0.49	4.75	10.4	1590	7

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

PH: +/- 10%    COND: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____									
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	
1	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
1	500 mL	PLASTIC	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	1 L	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: _____ CARRIER	DATE SHIPPED: 10/8/19	AIRBILL NUMBER: N/A
COC NUMBER: _____ N/A	SIGNATURE:	DATE SIGNED: 1/10/20





# WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED	CHECKED
PROJECT NUMBER: 322174.0000.P1 T2	BY: <u>JJ SH</u> DATE: <u>11/01/20</u>	BY: <u>BY</u> DATE: <u>10.22.19</u>

SAMPLE ID: <u>FB#01</u>	WELL DIAMETER: <input type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input checked="" type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME:	DATE:	SAMPLE	TIME: <u>0830</u>	DATE: <u>10/20/19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP PERISTALTIC PUMP <input checked="" type="checkbox"/> BAILER			PH: N/A SU	CONDUCTIVITY: N/A	umhos/cm
			ORP: N/A mV	DO: N/A	mg/L
DEPTH TO WATER: <u>7</u> T/ PVC			TURBIDITY: N/A NTU		
DEPTH TO BOTTOM: <u>7</u> T/ PVC			<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>N/A</u> °C	OTHER:	
VOLUME REMOVED: <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>blue</u>	ODOR: <u>NO</u>	
COLOR: _____	ODOR: _____		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY			FILTRATE COLOR: _____	FILTRATE ODOR: _____	
<input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL/OR/L)
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	INITIAL
FB-1									

**NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:**

pH: +/- 10%    COND: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____									
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	
<u>1</u>	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
<u>1</u>	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
	<del>250 mL</del>	<del>PLASTIC</del>	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
	<del>1L</del>	<del>PLASTIC</del>	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: _____ CARRIER	DATE SHIPPED: <u>10/20/19</u>	AIRBILL NUMBER: N/A
COC NUMBER: _____ N/A	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>11/20/19</u>



# WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED	CHECKED
PROJECT NUMBER: 322174.0000.P1 T2	BY: JS SKL	DATE: 1/10/19
	BY: BY	DATE: 10.22.19

SAMPLE ID: JHC-MW-15010	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: 1335	DATE: 10/9/19	SAMPLE	TIME: 1355	DATE: 10/9/19
PURGE METHOD: <input checked="" type="checkbox"/> PUMP BLADDER PUMP (QED) <input type="checkbox"/> BAILER	PH: 6.85	SU	CONDUCTIVITY: 573	umhos/cm	
	ORP: 60.5	mV	DO: 3.60	mg/L	
DEPTH TO WATER: 41.80 T/ PVC	TURBIDITY: N/A		NTU 14.85		
DEPTH TO BOTTOM: NM T/ PVC	<input checked="" type="checkbox"/> NONE		<input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	TEMPERATURE: 16.3 °C		OTHER:		
VOLUME REMOVED: 8 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR: —		ODOR: none		
COLOR: Brown	ODOR: none		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY		FILTRATE COLOR:		FILTRATE ODOR:	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input checked="" type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-			
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1335	HW	6.87	547	2.8	6.14	4600	16.7	4180	INITIAL
1340		6.84	564	31.0	3.81	3300	19.9	4195	2
1345		6.86	565	59.0	3.69	15.00	16.3	4197	4
1350		6.85	570	60.1	3.63	14.95	16.3	4195	6
1355		6.85	573	60.5	3.60	14.85	16.3	4195	8

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

PH: +/- 10%    COND.: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F -									
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	
3	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
3	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
3	250 mL	PLASTIC	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
2	1 L	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: _____	CARRIER: _____	DATE SHIPPED: 1/21/19	AIRBILL NUMBER: N/A
COC NUMBER: _____	N/A	SIGNATURE:	DATE SIGNED: 1/10/19



### WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL		PREPARED		CHECKED	
PROJECT NUMBER: 322174.0000.P1 T2		BY: JJ SHIL	DATE: 1/10/20	BY: BY	DATE: 10/22/19
SAMPLE ID: JHC-MW-15008R		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING TIME: 1443		DATE: 10/9/19		SAMPLE TIME: 1513	
PURGE METHOD: <input checked="" type="checkbox"/> PUMP BLADDER PUMP (QED) <input type="checkbox"/> BAILER		PH: 7.34	SU	CONDUCTIVITY: 793 umhos/cm	
DEPTH TO WATER: 41.95 T/ PVC		ORP: 35.8	mV	DO: 3.25	mg/L 3.25
DEPTH TO BOTTOM: 47.50 T/ PVC		TURBIDITY: 0.35 NTU			
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: 13.0 °C		OTHER:	
VOLUME REMOVED: 1.5 <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: Clear		ODOR: none	
COLOR: Brown		ODOR: none		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY		FILTRATE COLOR:		FILTRATE ODOR:	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input checked="" type="checkbox"/> DUP- HOS		COMMENTS:	

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
1443	400	7.41	827	30.3	6.79	7550	12.4	4205	INITIAL
1448		7.34	828	26.8	3.10	1000	13.1	4205	2
1453		7.33	807	26.15	3.20	4.90	13.0	4205	4
1458		7.33	791	30.0	3.23	11.25	13.0	4205	6
1503		7.34	786	35.0	3.28	0.45	13.0	4205	8
1508		7.34	796	35.3	3.25	0.30	13.0	4205	10
1513		7.34	793	35.8	3.25	0.35	13.0	4205	12

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

PH: +/- 10%    COND.: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F -							
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
2	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	500mL	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
2	250 mL	PLASTIC	A	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
4	1 L	PLASTIC	B	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y <input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: _____	CARRIER: _____	DATE SHIPPED: 10/9/19	AIRBILL NUMBER: N/A
COC NUMBER: _____	N/A	SIGNATURE:	DATE SIGNED: 11/20/20



# WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED	CHECKED
PROJECT NUMBER: 322174.0000.P1 T2	BY: JT SN KL	DATE: 7/10/20
	BY: BY	DATE: 10.22.19

SAMPLE ID: JHC-MW-150 09	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME:	DATE: 10/9/19	SAMPLE	TIME:	DATE: 10/9/19
PURGE METHOD: <input checked="" type="checkbox"/> PUMP <input type="checkbox"/> BAILER	BLADDER PUMP (QED)		PH: SU	CONDUCTIVITY: umhos/cm	
DEPTH TO WATER: 42.20 T/ PVC			ORP: mV	DO: mg/L	
DEPTH TO BOTTOM: 42.85 T/ PVC			TURBIDITY: N/A NTU		
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			<input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY		
VOLUME REMOVED: <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: °C OTHER:		
COLOR: ODOR:			COLOR: OTHER:		
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			FILTRATE COLOR: FILTRATE ODOR:		
			QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		
			COMMENTS:		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
								42.20	INITIAL
NO SAMPLE									

**NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:**

pH: +/- 10%    COND.: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____									
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED	
	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
	250 mL	PLASTIC	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
	1 L	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N

SHIPPING METHOD: _____ CARRIER	DATE SHIPPED: _____	AIRBILL NUMBER: N/A
COC NUMBER: _____ N/A	SIGNATURE:	DATE SIGNED: 1/10/20



## WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED:	CHECKED:
PROJECT NUMBER: 322174.0000.P1 T2	BY: JJ SN KL	DATE: 10/20/19

SAMPLE ID: JHC-MW-15007	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME:	DATE: 10.9.19	SAMPLE	TIME:	DATE:
PURGE METHOD: <input checked="" type="checkbox"/> PUMP BLADDER PUMP (QED) <input type="checkbox"/> BAILER	PH: SU	CONDUCTIVITY: umhos/cm	ORP: mV	DO: mg/L	
DEPTH TO WATER: 34.33 T/ PVC	TURBIDITY: N/A NTU	<input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
DEPTH TO BOTTOM: 34.76 T/ PVC	TEMPERATURE: °C	OTHER:			
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	COLOR:	ODOR:			
VOLUME REMOVED: <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS	FILTRATE (0.45 um) <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	FILTRATE COLOR:			
COLOR:	FILTRATE ODOR:	QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-			
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER				
COMMENTS:					

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
									INITIAL

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 10%    COND.: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F -								
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED
	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
	250 mL	PLASTIC	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
	1 L	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y <input type="checkbox"/> N

SHIPPING METHOD: _____ CARRIER	DATE SHIPPED: _____	AIRBILL NUMBER: N/A
COC NUMBER: _____ N/A	SIGNATURE:	DATE SIGNED: 11/10/19



### WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL		PREPARED		CHECKED	
PROJECT NUMBER: 322174.0000.P1 T2		BY: JJ -SN KL	DATE: 10/10/19	BY: BY	DATE: 10.22.19
SAMPLE ID: JHC-MW-15006		WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER			
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER					
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER					
PURGING	TIME: 0530	DATE: 10/10/19	SAMPLE	TIME: 0545	DATE: 10/10/19
PURGE METHOD: <input checked="" type="checkbox"/> PUMP BLADDER PUMP (QED) <input type="checkbox"/> BAILER		PH: 7.76	SU	CONDUCTIVITY: 357 umhos/cm	
		ORP: -18.0	mV	DO: 0.07 mg/L	
DEPTH TO WATER: 34.02 T/ PVC		TURBIDITY: N/A 1.15 NTU			
DEPTH TO BOTTOM: 38.00 T/ PVC		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY			
WELL VOLUME: N/A <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		TEMPERATURE: 14.2 °C		OTHER:	
VOLUME REMOVED: 1c <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS		COLOR: 1100		ODOR: NONE	
COLOR: BROWN		ODOR: NONE		FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY		FILTRATE COLOR:		FILTRATE ODOR:	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER		QC SAMPLE: <input type="checkbox"/> MS/MSD <input type="checkbox"/> DUP-		COMMENTS:	

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
0530	400	4.00	375	16.0	0.70	450	14.2	34.0	INITIAL
0535		7.67	369	19.7	0.49	15.88	14.2	34.1	2
0538		7.70	372	7.0	0.38	3.40	14.2	34.15	4
0535		7.75	369	-17.8	0.33	1.55	14.2	34.1	6
0546		7.75	367	-17.5	0.31	1.26	14.2	34.1	8
0545		7.76	357	-18.0	0.27	1.15	14.2	34.1	10

NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:

pH: +/- 10%    COND.: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____											
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED			NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		
1	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N						<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	
	500mL	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N						<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	
	250 mL	PLASTIC	A	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N						<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	
2	1 L	PLASTIC	B	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N						<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	
				<input type="checkbox"/> Y	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N		

SHIPPING METHOD: _____ CARRIER	DATE SHIPPED: 10/10/19	AIRBILL NUMBER: N/A
COC NUMBER: _____ N/A	SIGNATURE:	DATE SIGNED: 11/10/19





# WATER SAMPLE LOG

PROJECT NAME: CEC JH CAMPBELL	PREPARED	CHECKED
PROJECT NUMBER: 322174.0000.P1 T2	BY: <u>JJ SN KL</u> DATE: <u>10/10/19</u>	BY: <u>BY</u> DATE: <u>10.22.19</u>

SAMPLE ID: <u>JHC-MW-150-11</u>	WELL DIAMETER: <input checked="" type="checkbox"/> 2" <input type="checkbox"/> 4" <input type="checkbox"/> 6" <input type="checkbox"/> OTHER
WELL MATERIAL: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> SS <input type="checkbox"/> IRON <input type="checkbox"/> GALVANIZED STEEL <input type="checkbox"/> OTHER	
SAMPLE TYPE: <input checked="" type="checkbox"/> GW <input type="checkbox"/> WW <input type="checkbox"/> SW <input type="checkbox"/> DI <input type="checkbox"/> LEACHATE <input type="checkbox"/> OTHER	

PURGING	TIME: <u>1608</u>	DATE: <u>10/10/19</u>	SAMPLE	TIME: <u>1633</u>	DATE: <u>10/10/19</u>
PURGE METHOD: <input checked="" type="checkbox"/> PUMP <input type="checkbox"/> BAILER	BLADDER PUMP (QED)		PH: <u>8.37</u> SU	CONDUCTIVITY: <u>895</u> umhos/cm	
DEPTH TO WATER: <u>37.93</u> T/ PVC			ORP: <u>-175.3</u> mV	DO: <u>0.23</u> mg/L	
DEPTH TO BOTTOM: <u>40.10</u> T/ PVC			TURBIDITY: <u>0.56</u> NTU	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input type="checkbox"/> VERY	
WELL VOLUME: <u>N/A</u> <input type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			TEMPERATURE: <u>14.7</u> °C	OTHER: _____	
VOLUME REMOVED: <u>10</u> <input checked="" type="checkbox"/> LITERS <input type="checkbox"/> GALLONS			COLOR: <u>1.04</u>	ODOR: <u>NO</u>	
COLOR: <u>Brown</u> ODOR: <u>none</u>			FILTRATE (0.45 um) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
TURBIDITY: <input type="checkbox"/> NONE <input type="checkbox"/> SLIGHT <input type="checkbox"/> MODERATE <input checked="" type="checkbox"/> VERY			FILTRATE COLOR: _____	FILTRATE ODOR: _____	
DISPOSAL METHOD: <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> DRUM <input type="checkbox"/> OTHER			COMMENTS: _____		

TIME	PURGE RATE (ML/MIN)	PH (SU)	CONDUCTIVITY (umhos/cm)	ORP (mV)	D.O. (mg/L)	TURBIDITY (NTU)	TEMPERATURE (°C)	WATER LEVEL (FEET)	CUMULATIVE PURGE VOLUME (GAL OR L)
<u>1608</u>	<u>40</u>	<u>8.17</u>	<u>883</u>	<u>-9.5</u>	<u>8.17</u>	<u>350.0</u>	<u>14.13</u>	<u>3794</u>	INITIAL
<u>1613</u>		<u>8.37</u>	<u>897</u>	<u>-130.5</u>	<u>0.31</u>	<u>2.00</u>	<u>14.17</u>	<u>3808</u>	<u>2</u>
<u>1618</u>		<u>8.37</u>	<u>890</u>	<u>-140.0</u>	<u>0.24</u>	<u>1.00</u>	<u>14.7</u>	<u>3808</u>	<u>4</u>
<u>1623</u>		<u>8.37</u>	<u>896</u>	<u>-175.0</u>	<u>0.23</u>	<u>0.43</u>	<u>14.7</u>	<u>3808</u>	<u>6</u>
<u>1628</u>		<u>8.37</u>	<u>895</u>	<u>-175.3</u>	<u>0.23</u>	<u>0.47</u>	<u>14.7</u>	<u>3808</u>	<u>8</u>
<u>1633</u>		<u>8.37</u>	<u>895</u>	<u>-175.3</u>	<u>0.23</u>	<u>0.56</u>	<u>14.7</u>	<u>3808</u>	<u>10</u>

**NOTE: STABILIZATION TEST IS COMPLETE WHEN 3 SUCCESSIVE READINGS ARE WITHIN THE FOLLOWING LIMITS:**

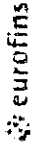
pH: +/- 10%    COND.: +/- 10%    ORP: +/- 10%    D.O.: +/- 10%    TURB: +/- 10%    or <= 5    TEMP.: +/- 0.5°C

BOTTLES FILLED		PRESERVATIVE CODES A - NONE    B - HNO3    C - H2SO4    D - NaOH    E - HCL    F - _____											
NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED			NUMBER	SIZE	TYPE	PRESERVATIVE	FILTERED		
<u>1</u>	<u>500mL</u>	<u>PLASTIC</u>	<u>B</u>	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
<u>1</u>	<u>500mL</u>	<u>PLASTIC</u>	<u>B</u>	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
<u>1</u>	<u>250 mL</u>	<u>PLASTIC</u>	<u>A</u>	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
<u>2</u>	<u>1 L</u>	<u>PLASTIC</u>	<u>B</u>	<input type="checkbox"/> Y	<input checked="" type="checkbox"/> N	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N
				<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N					<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> N

SHIPPING METHOD: _____ CARRIER	DATE SHIPPED: <u>10/10/19</u>	AIRBILL NUMBER: <u>N/A</u>
COC NUMBER: _____ N/A	SIGNATURE: <u>[Signature]</u>	DATE SIGNED: <u>10/10/19</u>



# Chain of Custody Record



Environmental Testing  
 TestAmerica

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<b>Client Information</b>	Lab P/N: <b>Brooke, Kris M</b>	Carrier Tracking No(s):	COC No: <b>440-171551-91502.1</b>
Client Contact: <b>Brian Yelen</b>	E-Mail: <b>kris.brooks@testamericainc.com</b>	<b>Grand Railways</b>	Page: <b>1 of 2</b>
Company: <b>TRC Environmental Corporation</b>	Address: <b>1540 Eisenhower Place</b>	City: <b>Ann Arbor</b>	Job #: <b>7349043710</b>
State, Zip: <b>MI 48108-7080</b>	Phone: <b>734-971-7080 (Tel) 734-971-9022 (Fax)</b>	PO #: <b>135141</b>	
Email: <b>byelen@trccompanies.com</b>	W/O #: <b>44022279</b>	Project #: <b>JHC - CCR Pond A + Downgradient</b>	
Site: <b>JHC - CCR Pond A + Downgradient</b>	SSOW#: <b>44022279</b>		

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Water, Soils, Organics, etc.)	Analysis Requested	
					Method	Priority
JHC-MW-15006				Water		
JHC-MW-15007				Water		
JHC-MW-15008R				Water		
JHC-MW-15009				Water		
JHC-MW-15010	10/21/15	1355	G	Water	9030 - Standard Target List (ST LOUIS)	
JHC-MW-15010 MS	11/1/15	1355	G	Water	9040, R226R228, GPFC (ST LOUIS)	
JHC-MW-15010 MSD	11/1/15	1355	G	Water	2540C, Colod, 1000, 2ND CANTON	
JHC-MW-15011				Water	5010B, 502D, LL, 7470A (RWME)	
MW-13				Water	5020 - 1 Methanol (CANTON)	

240-120306 Chain of Custody

Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological	Deliverable Requested: I, II, III, IV, Other (specify)	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab	Archive For: _____ Months
--	--	---	---------------------------

Empty Kit Relinquished by: _____	Date: _____	Time: _____	Method of Shipment: _____
Relinquished by: <b>[Signature]</b>	Date/Time: <b>10/27/15 1415</b>	Company: <b>TRC</b>	Date/Time: <b>10-27-15 3:00</b>
Relinquished by: <b>[Signature]</b>	Date/Time: <b>10-27-15 3:15</b>	Company: <b>TRC</b>	Date/Time: <b>10-10-19 9:30</b>
Relinquished by: <b>[Signature]</b>	Date/Time: _____	Company: _____	Date/Time: _____

Custody Seals Intact? <b>Yes</b>	Custody Seal No.: _____	Cooler Temperature(s) °C and Other Remarks: _____	Ver: 01/16/2019
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**Eurofins TestAmerica, Canton**  
 4101 Shuffel Street NW  
 North Canton, OH 44720  
 Phone (330) 497-9396 Fax (330) 497-0772

3-5/4-2 27/34  
 Chain of Custody Record

45152  
 Grand

eurofins

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<b>Client Information</b> Client Contact: Brian Yelen E-Mail: kris.brooks@testamcinc.com Lab Pk: Brooks, Kris M E-Mail: kris.brooks@testamcinc.com Phone: 724-904-336 Sample ID: JASSC		COC No: 440-171551-31502.1 Page: Page 1 of 2 Job #:	
<b>Analysis Requested</b> 820 - 1 MW(LU) (CANTON) 810B, 812D, 1L, 7470A (IRVING) 2540C, Caled, 300B, 280 CANTON 904D, R4226#228 GPC (ST LOUIS) 903D - Standard Target List (ST LOUIS)			
<b>Our Data Requested:</b> TAT Requested (days): PO #: 135141 W/O #: Project #: 44022279 SSOWF			
<b>Company:</b> TRC Environmental Corporation <b>Address:</b> 1540 Eisenhower Place <b>City:</b> Ann Arbor <b>State, Zip:</b> MI, 48108-7080 <b>Phone:</b> 734-971-7080 (Tel) 734-971-9022 (Fax) <b>Email:</b> byelen@trccompanies.com <b>Project Name:</b> JHC - CCR, Pond A + Downgradient <b>Site:</b>			
<b>Sample Identification</b> JHC-MW-15006 JHC-MW-15007 JHC-MW-15008R JHC-MW-15009 JHC-MW-15010 JHC-MW-15010 MS JHC-MW-15010 MSD JHC-MW-15011 MW-13	<b>Sample Date</b> 10/11/14 10/14/14 10/14/14 10/14/14 10/14/14 10/14/14 10/14/14 10/14/14	<b>Sample Time</b> 0545 1513 0633	<b>Sample Type</b> C C C C C C C C
<b>Matrix</b> (Prevalent, Suspect, Prescribed, Other) Water Water Water Water Water Water Water Water Water Water Water	<b>Special Instructions/Notes:</b> [Redacted Area]		
<b>Preservation Codes:</b> A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NH4OH F - MeOH G - Anioner H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDTA Other:			
<b>Preservation Codes:</b> M - Hexane N - None O - AsHClO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecylsulfate U - Acetone V - MCAA W - PH 4.5 X - other (specify)			
<b>Possible Hazard Identification</b> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological <b>Deliverable Requested:</b> I, II, III, IV, Other (specify)			
<b>Empty Kit Relinquished by:</b> [Signature] <b>Relinquished by:</b> [Signature] <b>Relinquished by:</b> [Signature] <b>Relinquished by:</b> [Signature]			
<b>Method of Shipment:</b> <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months <b>Special Instructions/QC Requirements:</b>			
<b>Date</b> Relinquished by: 10/14/14 0630 Relinquished by: 10/14/14 12:00pm Relinquished by:		<b>Date</b> Relinquished by: 10/14/14 8:30AM Relinquished by: 10/14/14 9:30 Relinquished by:	
<b>Company</b> TRC TRC TRC		<b>Company</b> TRC TRC TRC	
<b>Custody Seal Intact</b> <input type="checkbox"/> Yes <input type="checkbox"/> No			



<b>Client Information</b> Client Contact: Brian Yellen Company: TRC Environmental Corporation Address: 1540 Eisenhower Place City: Ann Arbor State, Zip: MI, 48108-7080 Phone: 734-971-7080 (Tel), 734-971-9022 (Fax) Email: byellen@trccompanies.com Project Name: JHC - CCR Pond A + Downgradient Site:		<b>Sampler</b> : B. YELLEN <b>Lab PM</b> : Brooks, Kns M <b>E-Mail</b> : kris.brooks@teslamerica-inc.com <b>Carrier Tracking Note</b> :		<b>COC No</b> : 440-171551-31502-2 <b>Page</b> : Page 2 of 2 <b>Job #</b> :		
<b>Due Date Requested</b> : <b>TAT Requested (days)</b> : <b>PG #</b> : 135141 <b>WO #</b> : <b>Project #</b> : 44022279 <b>SSOW #</b> :		<b>Analysis Requested</b> 8020 - 1 Methoxy (CANTON) 80105, 8020 (L, 7470A (RWINE)) 2540C, Chlrd, 300L 280 CANTON 904.0, HAZ268a228, GPPC (ST LOUIS) 903.0 - Standard Target List (ST LOUIS)				
<b>Sample Identification</b> MW-14S PZ-24S PZ-40S DUP-5 FB-5 EB-5 PZ-40S MS-5 PZ-40S MSD-5		<b>Sample Date</b> 10.10 10.10 10.10 10.10 10.10 10.10 10.10	<b>Sample Time</b> 1440 1530 1630 1445 1455 1630 1630	<b>Sample Type</b> S S S S S S S	<b>Matrix</b> Water Water Water Water DI DI W W	<b>Special Instructions/Note</b> : 240-120412 Chain of Custody
<b>Possible Hazard Identification</b> <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological <b>Deliverable Requested</b> I, II, III, IV, Other (specify)						
<b>Empty Kit Relinquished by</b> : Relinquished by: B. YELLEN Relinquished by: Field CX Relinquished by:						
<b>Sample Disposal</b> (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months						
<b>Special Instructions/QC Requirements</b> :						
<b>Received by</b> : B. YELLEN <b>Date/Time</b> : 10.11.19 06:30 <b>Company</b> : TRC		<b>Received by</b> : CEC STAFF <b>Date/Time</b> : 10.11.19 06:30 <b>Company</b> : CEC		<b>Received by</b> : [Signature] <b>Date/Time</b> : 10.12.19 9:50 <b>Company</b> : [Signature]		
<b>Custody Seals Intact</b> <input type="checkbox"/> Yes <input type="checkbox"/> No		<b>Custody Seal No</b> :		<b>Cooler Temperature(s)</b> : C and Other Remarks:		



<b>Client Information</b> Company: TRC Environmental Corporation Address: 1540 Eisenhower Place City: Ann Arbor State: MI 48108-7080 Phone: 734-971-7080 (Tel) 734-971-9022 (Fax) Email: buelen@trccompanies.com Project Name: JHC - CCR NSE Monitoring/Temporary Site: S50WF		<b>Sample Information</b> Sample Date: 2019 Sample Time: 16.8 1340 S 10.8 1340 S Matrix: Water Water Water Water Water		<b>Analysis Requested</b> 6020 - 1 Metals (L) 6010B, 6020 LL, 7470A 2560C, Calc'd, 300.0, 28P 9040, H225R228, GFC 8030 - Standard Target List		<b>Preservation Codes:</b> A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NH4OH F - NaOH G - Amchlor H - Ascorbic Acid I - Ice J - Di Water K - EDTA L - EDTA Other: M - Hexane N - None O - As/NO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecylsulfate U - Acetone V - MCAA W - pH 4-5 Z - others (specify)	
<b>Lab Pk:</b> BROOKS, Kris M <b>E-Mail:</b> kris.brooks@testamericainc.com		<b>Lab Pk:</b> BROOKS, Kris M <b>E-Mail:</b> kris.brooks@testamericainc.com		<b>COE No:</b> 440-171552-31503.2 <b>Page:</b> Page 2 of 2 <b>Job #:</b>		<b>Special Instructions/Note:</b>	
<b>Due Date Requested:</b> TAT Requested (days):		<b>Sample Disposal:</b> <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		<b>Special Instructions/QC Requirements:</b>		<b>Method of Shipment:</b>	
<b>Possible Hazard Identification</b> <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify)		<b>Empty Kit Relinquished by:</b>		<b>Date:</b>		<b>Time:</b>	
<b>Relinquished by:</b> F.J. EX <b>Date/Time:</b> 10-9-19 4:15 <b>Company:</b> TAC		<b>Relinquished by:</b> [Signature] <b>Date/Time:</b> 10-9-19 3:00 <b>Company:</b> TAC		<b>Relinquished by:</b> [Signature] <b>Date/Time:</b> 10-10-19 <b>Company:</b> EYA		<b>Relinquished by:</b> [Signature] <b>Date/Time:</b> 10-10-19 <b>Company:</b> EYA	
<b>Custody Seals Intact:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		<b>Custody Seal No.:</b>		<b>Cooler Temperature(s):</b> °C and Other Remarks			



# Appendix K


## ACM Extension Certification

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A CMS Energy Company

Date: July 12, 2019

To: Operating Record

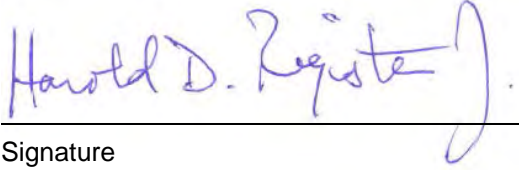
From: Harold D. Register, Jr., P.E. 

RE: Demonstration for 60-Day Extension for Assessment of Corrective Measures  
Professional Engineer Certification  
JH Campbell Unit 1&2 Bottom Ash Pond and JH Campbell Pond A

Professional Engineer Certification Statement [§257.96(a)]

Consumers Energy has determined that the analysis of the effectiveness of potential corrective measures in meeting all of the requirements and objectives of a selected remedy described in §257.97 cannot be achieved within the 90-day timeline to complete the Assessment of Corrective Measures for JH Campbell Unit 1&2 Bottom Ash Pond and JH Campbell Pond A due to site-specific conditions that are changing based on initiating closure activities. Notification was made September 7, 2018 and September 17, 2018 for JH Campbell Unit 1&2 Bottom Ash Pond and JH Campbell Pond A, respectively, that closure activities had been initiated. Groundwater monitoring data collected to date indicates changing conditions that can influence factors that must be considered in the assessment, including source evaluation, plume delineation, groundwater assessment, and source control. The final published rule allows for a single 60 day extension based on site-specific conditions or circumstances.

I hereby attest that, having reviewed the detection and assessment monitoring documentation and being familiar with the provisions of Title 40 of the Code of Federal Regulations §257.96, that the demonstration justifying a 60-day time extension to the 90-day completion period of the Assessment of Corrective Measures is accurate for JH Campbell Unit 1&2 Bottom Ash Pond and JH Campbell Pond A in accordance with the requirements of §257.96(a). This will now set the deadline for completing the Assessment of Corrective Measures for September 11, 2019.

  
\_\_\_\_\_  
Signature

July 12, 2019  
\_\_\_\_\_  
Date of Certification

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

6201056266  
\_\_\_\_\_  
Professional Engineer Certification Number



07/12/2019

# Appendix L

## Semiannual Progress Report

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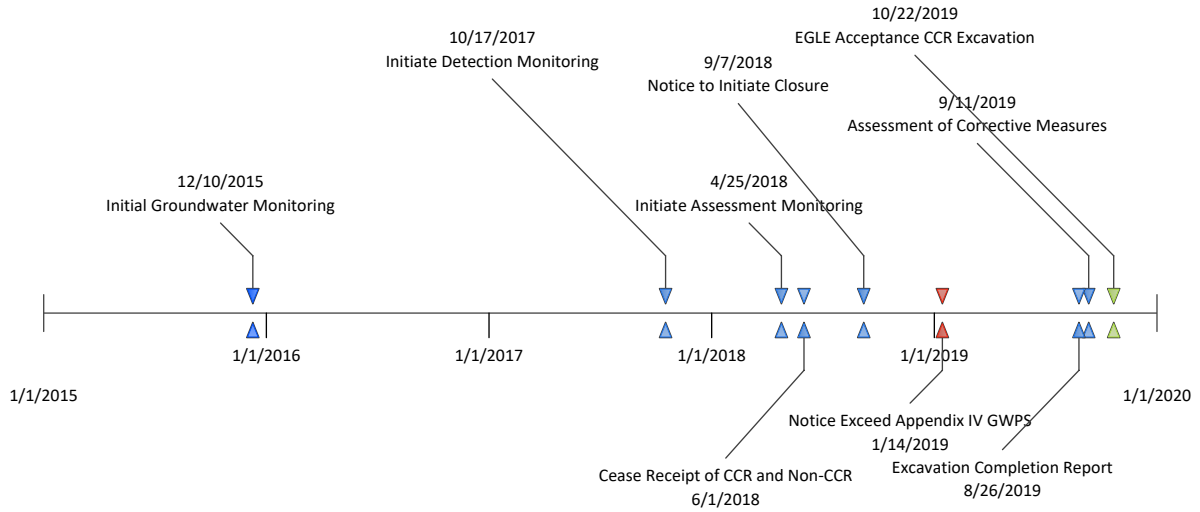
January 30<sup>th</sup>, 2020

Subject:

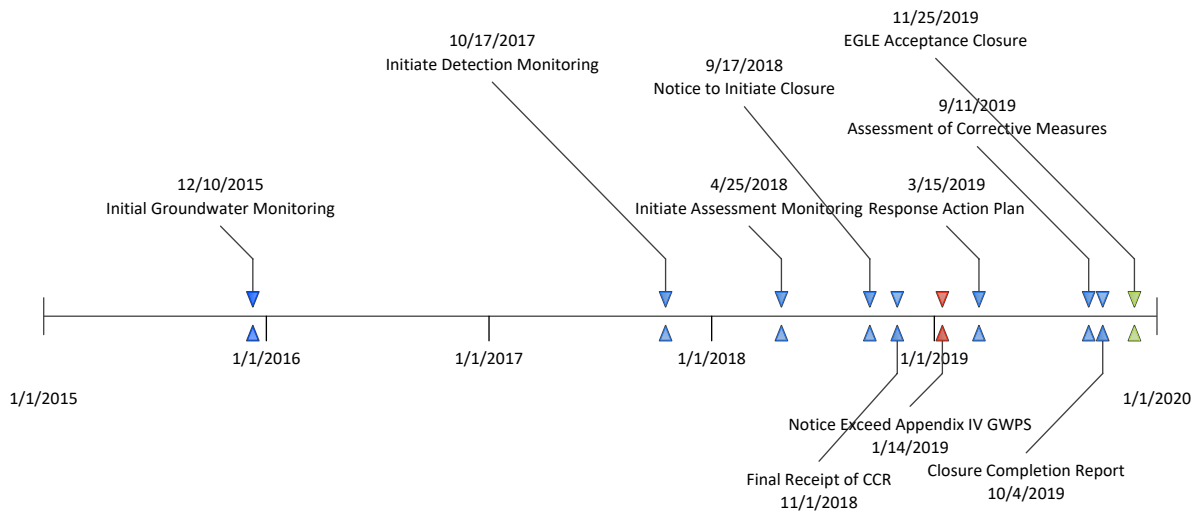
Initial Semiannual Progress Report - Selection of Final Remedy  
JH Campbell Bottom Ash Ponds 1-2 CCR Unit  
JH Campbell Pond A CCR Unit

This Semiannual Progress Report, prepared as a requirement of §257.97(a) of the CCR Rule, describes progress toward selecting and designing the final remedy for two CCR units that triggered Assessment of Corrective Measures (ACM) under the CCR Rule at the JH Campbell Solid Waste Disposal Area: Bottom Ash Ponds 1-2 and Pond A. Based on the schedule of self-implementation prescribed in the CCR Rule, a progress report is required to be prepared semiannually upon completion of the Assessment of Corrective Measures Report until the final remedy is selected. It is noteworthy that assessment of corrective measures for the Bottom Ash Ponds 1-2 and Pond A prescribed by the CCR Rule is being undertaken in coordination with a Michigan Department of Environment, Great Lakes, and Energy (EGLE) Consent Agreement 115-01-2018, which was executed on December 28, 2018 to address sitewide corrective actions. Corrective actions for a portion of the ash management area were previously implemented under an Agreement for a Limited Site-Specific, Criteria Based Remedial Action Plan (RAP-LANDUSE-WHMD-2005-02) that was originally executed on July 31, 2005.

As presented in the key milestones timelines below, a groundwater monitoring system was installed for the CCR units and background monitoring commenced in December 2015 under the CCR Rule self-implementing requirements and schedule. The results from this groundwater monitoring program have been reviewed and coordinated with results from the groundwater monitoring program implemented under the existing state requirements for groundwater monitoring and corrective actions. Consumers Energy first reported the potential for statistically significant increases (SSIs) for Appendix IV constituents from the groundwater monitoring system certified under 257.91 (reference) in the "Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g)" (Consumers Energy Company, January 2019). Subsequently, Assessment of Corrective Measures Reports (TRC, September 2019) were completed on September 11, 2019 for both units.



### Key Milestones – Ponds 1-2



### Key Milestones – Pond A

## Results of 2019 Semi-Annual Sampling Events

Statistical analysis from semiannual groundwater monitoring verified that the only constituent of concern that triggered a statistically significant increase (SSI) and exceeds the established

Groundwater Protection Standard (GWPS) is arsenic. Groundwater monitoring results and statistical evaluations are presented in the appropriate annual groundwater monitoring reports to which this document has been appended.

## **Progress Towards Remedy Selection**

Consumers Energy has not selected a remedy pursuant to §257.97 and R 444 of Part 115 for Ponds 1-2 or for Pond A. However, certain source control measures have been implemented, as detailed below:

### **Ponds 1-2**

Consumers Energy has performed CCR removal at Ponds 1-2 as documented in the "*JH Campbell Generating Facility Bottom Ash Ponds 1-2 Closure Plan*," (Golder, January 2018). Ponds 1-2 is undergoing closure by removal of CCR in accordance with §257.102(c). Following the cessation of hydraulic loading and the cease of receipt of CCR and non-CCR waste streams, CCR removal activities were completed in October 2018 and Consumers Energy submitted final documentation of CCR removal to the EGLE in August 2019 (Golder, 2019). On October 22, 2019 EGLE provided written concurrence that all bottom ash had been removed from Ponds 1-2 based on multiple lines of evidence described in the approved closure work plan.

### **Pond A**

Pursuant to §257.102, Consumers Energy prepared the "*JH Campbell Generating Facility Pond A Closure Plan, West Olive, Michigan*" (Golder, October 2016) and an updated closure plan detailing the final cover system that was submitted to EGLE in February 2019. Following the cessation of hydraulic loading and the cease of receipt of CCR and non-CCR waste streams, Pond A has undergone closure in place in accordance with the requirements for CCR landfills under RCRA (§257.102(d)) and a RCRA closure certification by the qualified professional engineer is in development. The state closure certification as required by Paragraph 4.2 of Consent Agreement WMRPD No. 115-01-2018 was approved by EGLE on November 25, 2019.

### **Source Control Impacts**

It is expected that the cessation of hydraulic loading and other subsequent source control measures will change groundwater conditions with the potential to affect concentrations of Appendix III and Appendix IV constituents in the groundwater. Consumers Energy will continue to execute 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 site groundwater conditions and inform remedy selection.

On March 18, 2019, Consumers Energy submitted the *Pond A Hydrogeological Monitoring Plan, JH Campbell Power Plant, West Olive, Michigan* (Pond A HMP) (TRC, March 2019; Revised July 2019), which includes the *Pond A Assessment Monitoring Plan* (Pond A AMP), to EGLE to comply with the requirements of Part 115, Rule 299.4905. The Pond A HMP and Pond A AMP were implemented during the fourth quarter of 2019. In addition, quarterly monitoring according to the site's EGLE-approved September 1996 *Hydrogeological Monitoring Plan (HMP) for JH Campbell Ash Storage Facility, Consumers Power Company, Solid Waste Disposal Area, Coal Ash, Type III* for the site continued to be implemented in the fourth quarter of 2019. State and federal monitoring and reporting requirements are being coordinated through the referenced documents.

## **State of Michigan Agreement**

On December 21, 2018 Consumers Energy and the Michigan Department of Environmental Quality (now EGLE) signed WMRPD Agreement No. 115-01-2018 (Agreement). Per paragraph 4.5 of the Agreement, Consumers Energy agreed to submit a revised Remedial Action Plan (RAP) for the site by October 1, 2021. The revised RAP must address all existing-identified corrective actions related to the historic and ongoing management of CCR at the site in conformance with Michigan Part 115 Rules, the approved site Hydrogeological Monitoring Plan, and corrective actions in conformance with groundwater monitoring activities Consumers Energy is performing in accordance with the CCR Rule. The revised RAP is anticipated to comprehensively address groundwater monitoring and corrective action requirements in anticipation of documenting compliance with a state or federal permit program.

## **Remedy Selection Process**

The ACM Report identified five technically feasible groundwater management alternatives to address residual arsenic. In conjunction with the work described in the ACM Report, Consumers Energy is developing a feasibility study to inform the development of the updated RAP for 2021. Additional data collected under the state and federal groundwater monitoring programs will be used to inform remedy selection and the creation of the updated RAP.

The final remedy for Ponds 1-2 and Pond A 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).

## References

- Consumers Energy Company. January 14, 2019. Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g), JH Campbell Pond A CCR Unit.
- Consumers Energy Company. January 14, 2019. Notification of Appendix IV Constituent Exceeding Groundwater Protection Standard per §257.95(g), JH Campbell Ponds 1-2 CCR Unit.
- Consumers Power Company. September 1996. Hydrogeological Monitoring Plan for JH Campbell Ash Storage Facility, Consumers Power Company, Solid Waste Disposal Area, Coal Ash, Type III
- Golder Associates. October 2016. JH Campbell Generating Facility Pond A Closure Plan, West Olive, Michigan. Prepared for Consumers Energy Company.
- Golder Associates. January 2018. JH Campbell Generating Facility Bottom Ash Ponds 1-2 Closure Plan, West Olive, Michigan. Prepared for Consumers Energy Company.
- Golder Associates. August 9, 2019. JH Campbell Generating Facility Bottom Ash Ponds 1-2 N/S CCR Removal Documentation Report. Prepared for Consumers Energy Company.
- TRC Environmental Corporation. September 2019. Assessment of Corrective Measures, Consumers Energy Company JH Campbell Ponds 1-2 North and 1-2 South and Pond A Coal Combustion Residual Units. Prepared for Consumers Energy Company.
- TRC Environmental Corporation. March 2019; Revised July 2019. Pond A Hydrogeological Monitoring Plan, JH Campbell Power Plant, West Olive, Michigan. Prepared for Consumers Energy Company